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APEC Workshop on Promoting Renewable Energy Integration and Energy Efficiency through Effective Regulation

APEC Energy Working Group

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APEC Project: EWG 15 2018S

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BACKGROUND

Project Motivation and Description

Key energy sector stakeholders including investors, development institutions, and utilities recognize that the regulatory environment is a major determinant of the direction and pace of sector development. Regulation shapes the behavior of producers and consumers by establishing price- and performance-based incentives, setting appropriate standards, and implementing innovative energy efficiency programs.

Recognizing the importance of dialogue on critical regulatory issues, state-level utility regulatory authorities in the United States came together 130 years ago to form the National Association of Regulatory Utility Commissioners (NARUC), a non-profit organization dedicated to representing the state public service commissions who regulate the utilities that provide essential services such as energy, telecommunications, power, water, and transportation.

NARUC is committed to improving the quality and effectiveness of energy regulation in the United States and around the world. Through its International Programs department, NARUC partners with the United States Agency for the International Development, the United States Department of State, foreign regulatory agencies, and others to support effective energy sectors that enable economic and societal growth. NARUC International utilizes the talents and expertise of state commissioners and staff, helping share lessons learned and forward-thinking practices with regulators and other energy sector stakeholders around the world as they work to enact vital reforms.

In 2017, NARUC International approached the APEC Energy Working Group's United States representatives at the US Department of Energy (DOE) to gauge interest in incorporating international best practices in energy regulation into EWG programming. NARUC recognizes that the technical expertise and comprehensive sector perspective that energy commissions provide are indispensable to implementing effective regulatory oversight that enriches livelihoods, grows economies, ensures sustainable and secure energy, and provides universal access to high quality public services. NARUC and DOE identified EWG expert group meetings as the best platform for engagement.

Following a self-funded half-day add-on workshop to an Expert Group on Energy Efficiency and Conservation (EGEE&C) meeting in Washington DC in April 2018, NARUC organized the self-funded one-day Workshop on Promoting Renewable Energy Integration and Energy Efficiency through Effective Regulation in conjunction with the March 2019 Joint Meeting of the

Participants in the Workshop on Supporting Renewable Energy Integration and Energy Efficiency through Effective Regulation on March 19, 2019 in Hong Kong, China.

Expert Group on New and Renewable Energy Technologies (EGNRET) and EGEE&C in Hong Kong, China. Supported by USAID, this workshop highlighted the important role of regulatory authorities in driving progress toward achievement of an economy's clean energy goals.

Objectives

This workshop aimed to:

1. Highlight the critical role of energy regulation in driving progress toward meeting renewable energy and energy efficiency goals in APEC member economies and throughout the region as a whole;
2. Facilitate the development of stronger, more sustainable energy systems by providing a platform for an exchange of international regulatory best practices among APEC member economies.

Workshop Participants and Structure

Three expert speakers from US State regulatory commissions, one expert from CLP Power Hong Kong Limited, and 40 delegates representing ten APEC economies (and eleven additional organizations) attended the workshop. Representatives from NARUC, the Hong Kong Electrical and Mechanical Services Department (EMSD), EGNRET and EGEE&C provided opening remarks. The APEC economies represented included Brunei Darussalam; Chile; People's Republic of China; Chinese Taipei; Hong Kong, China; Indonesia; Japan; the Philippines; Thailand; the United States; and Viet Nam.

NARUC utilized its network of US State regulatory commissions to solicit three expert speakers to share their respective states' experiences with promoting renewable energy development, integrating renewable energy sources into the existing electrical grid, and encouraging energy efficiency and conservation through demand-side management and innovative consumer-focused programs. The speakers were asked to share best practices, lessons learned, and other key insights. Though the three speakers represented states with three different market structures and regulatory approaches, their presentations all demonstrated the critical role an energy regulator can play in driving the development of an economy's energy sector by shaping the behavior of utilities, consumers, investors, and other stakeholders through appropriate incentives and price signals. NARUC also welcomed speakers from the workshop host, Hong Kong, China, who shared insights into Hong Kong, China's progress toward meeting renewable energy and energy efficiency related objectives.

NARUC invited representatives from APEC energy regulators to participate. Participants included a Commissioner and staff from the Philippines Energy Regulatory Commission (ERC) and staff from the Energy Regulatory Authority of Viet Nam (ERAV). Participating regulators were actively engaged in the workshop and came prepared with informed and targeted questions. Their insightful contributions to discussions demonstrated the depth of their technical expertise and the value of regulators' attendance in expert group meetings. The ERC and ERAV also had the opportunity to network and establish relationships with participants from other APEC member economy stakeholders.

WORKSHOP SUMMARY

The one-day workshop took place on 19 March 2019 in Hong Kong, China, in conjunction with the Joint Meeting of the Expert Group on New and Renewable Energy Technologies (EGNRET) and Expert Group on Energy Efficiency and Conservation (EGEE&C).

In addition to meeting the stated workshop objectives, the presentations demonstrated the importance of viewing renewable energy and energy efficiency as highly interrelated and complementary components of an economy's portfolio of available strategies to meet climate and energy goals. Policy makers do not address these issues in siloes, so it is critical that international forums like APEC continue to provide platforms for comprehensive discussion (such as the joint EGNRET/EGEE&C meetings). Though they are not traditionally at the table, energy/electricity regulators are well-suited to drive these conversations as they tend to take a holistic approach that mirrors that of decision makers at energy and economic ministries.

The workshop also highlighted the benefits of regulatory dialogue among APEC member economies. Just as US states and NARUC's international partners share best practices and lessons learned through workshops, meetings, and other peer-to-peer engagements, EWG participants have much to learn from each other on the regulatory front. There is no single correct way of doing things, but by engaging with other APEC members, each economy gains a better understanding of the mechanisms at its disposal to shape a strategy that is best suited to its own context.

Opening Remarks from NARUC

Bevan Flansburg, Deputy Director of International Programs at the National Association of Regulatory Utility Commissioners (NARUC), welcomed the distinguished guests and participants and thanked the Chairs of EGNRET and EGEE&C, Dr Tom Lee and Dr Li Pengcheng, for supporting NARUC's participation. Ms Flansburg noted that the intent of the workshop was to discuss how energy regulation fits into some of the priority focal areas of APEC's Energy Working Group (EWG). This was NARUC's second workshop with APEC, following the Regulatory Workshop on Designing, Implementing, and Financing Energy Efficiency Programs, held in conjunction with the April 2018 EGEE&C meeting in Washington, DC.

Ms Flansburg described NARUC's mission and the work of its International Programs department. NARUC is a non-profit association based in Washington, DC dedicated to representing the US State public service commissions who regulate the utilities that provide essential services such as energy, telecommunications, water, and transportation. For 130 years, NARUC has supported its members by providing avenues for discussion on trending regulatory issues within the sector, leading advocacy efforts, and offering educational resources and opportunities. Over 20 years ago, NARUC decided to expand its mission internationally, and today engages with over 35 international regulators in six continents. NARUC International exists to support its partner regulators to build their capacity to develop robust energy sectors that enable sustainable economic growth. This takes place primarily through peer-to-peer engagement that leverage the expertise of NARUC's membership base to share lessons learned, problem solve, and collaborate to develop unique solutions and forward-thinking practices.

The Deputy Director noted that NARUC's engagement with APEC falls under its Regulatory Dialogue initiative, which is funded by the United States Agency for International Development (USAID). This initiative aims to create platforms for open and productive dialogue between energy regulators and other key sector stakeholders. Through this work, NARUC hopes to enhance participants' understanding of the important role energy regulators can play in driving progress toward both economy-specific and regional objectives, and highlight some of the mechanisms and tools by which regulators can help to create an enabling environment for energy sector investment, enhance electricity access and quality of service, and protect consumers.

Ms Flansburg then introduced NARUC's three speakers, regulatory experts from different US states:

- Commissioner Anthony O'Donnell of the Maryland Public Service Commission
- John Garvey of the New York Public Service Commission
- James Loewen, independent energy regulatory consultant, (formerly of the California Public Service Commission)

Finally, Ms Flansburg extended a special welcome to NARUC's invited guests from two regulatory authorities in the APEC region: the Philippines Energy Regulatory Commission (ERC) and the Energy Regulatory Authority of Vietnam (ERAV).

Opening Remarks from EMSD

Mr Harry Lai Hon Chung of the Electrical and Mechanical Services Department (EMSD) of Hong Kong, China, gave opening remarks on behalf of the host economy. Mr Chung delivered a brief presentation summarizing Hong Kong, China's energy sector. He highlighted Hong Kong, China's efforts to reduce coal-fired generation from 48% of its fuel mix in 2015 to 25% in 2020, and continue increasing the share of natural gas and non-fossil fuels in electricity generation through 2030. Mr Chung noted various challenges to widespread adoption of renewable energy (e.g. geographic limitations), but also shared numerous examples of innovative solar, wind, and waste-to-energy projects. He outlined Hong Kong, China's strategies for encouraging renewable energy development and consumption, including a feed-in-tariff scheme and other guidelines and support programs. Mr Chung shared information on government-led plans designed to provide comprehensive policy guidance, such as Hong Kong, China's Climate Action Plan 2030+ and the Energy Savings Plan for Hong Kong, China's Build Environment 2015-2025+, and other energy efficiency promotion strategies. Finally, he shared information on EMSD's public engagement practices, noting the importance of stakeholder participation.

Welcoming Remarks from EGNRET and EGEE&C Chairs

Dr Tom Lee, APEC EGNRET Chair, and Dr Li Pengcheng, EGEE&C Chair, gave brief welcoming remarks on behalf of their respective expert groups.

Workshop Objectives and Agenda Overview

Rachel Estrada, Senior Program Officer at NARUC International Programs, provided an overview of the workshop objectives and agenda. She then asked all participants to give brief introductions.

Presentation 1: Sustainable Initiatives for a Smarter and Greener City

This presentation, given by C.Y. Cheng, Head of Business Development and Business Insights at CLP Power Hong Kong Limited, highlighted Hong Kong, China's efforts to deliver sustainable solutions to make Hong Kong, China a "smart city." CLP Power Hong Kong Limited, a wholly-owned subsidiary of CLP Holdings Limited, is one of the largest investor-owned power businesses in Asia. The utility provides electricity service to approximately 2.5 million customers, over 80% of Hong Kong, China's population. Mr Cheng outlined how CLP Power's supports energy savings by both homes and businesses through various enabling mechanisms, tools, information materials, and public education programs.

As of 2018, CLP Power has strengthened its energy efficiency and conservation efforts, utilizing energy audits, renewable energy certificates, funds for community energy savings and electrical equipment upgrades, and peak demand management. Mr Cheng highlighted CLP Power's Eco Building Fund 2018, which allocates $100 million per year to retrofitting projects, retro-commissioning to optimize building control and operation, and smart technologies for building management. The program sets an annual target of providing 48 GWh in energy savings through upgrades to communal areas of 400 residential and commercial buildings. Mr Cheng also discussed CLP Power's Electrical Equipment Upgrade Scheme and the Renewable Energy Scheme. The Renewable Energy Scheme is comprised of a renewable energy feed-in-tariff and renewable energy certificates. Finally, he shared the conservation benefits of CLP's peak demand management program, which results in significant savings for large customers such as hotels, shopping malls, and industrial plants.

Presentation 2: Energy Policy in Maryland – Powering Towards the Future

In this presentation, Commissioner Anthony O'Donnell of the Maryland Public Service Commission spoke to his state's efforts to shape an energy supply system designed to become cleaner and more efficient over time. He noted that Maryland has 2.6 million total electric customers that are served by four investor-owned systems, five municipal systems, and four rural electric cooperative systems. The state is primarily reliant on nuclear and coal-fired generation, but is seeing a growing share of renewables in the mix. Commissioner O'Donnell shared a number of mechanisms his commission uses to promote renewable energy development and energy efficiency, beginning with EmPOWER. Under the EmPOWER program, Maryland set targets for reducing per capita electricity consumption and peak demand. Participating utilities are required to file plans every three years. Costs are recovered through a surcharge, and there are sub-programs tailored to residential, commercial, and industrial consumers, as well as others focused on demand response and low-income customers.

The Commissioner also discussed Maryland's implementation of a Renewable Portfolio Standard (RPS), in which Maryland set a target to meet 25% of its energy need with renewables by 2020. He described the functionality of the RPS, noting that there are carve-outs for wind and solar energy. He then outlined the state's grid modernization efforts. Maryland is widely seen as a leader in grid modernization; its program's targeted review areas include rate design, electric vehicle policies, energy storage, the interconnection process, competitive markets and customer choice, and distribution system planning. Finally, he discussed Maryland's participation in the

PJM Interconnection, a regional competitive wholesale electricity market, and in the Regional Greenhouse Gas Initiative (RGGI), and nine-member state CO_2 cap-and-trade program.

Commissioner O'Donnell ended his presentation by sharing a number of lessons learned from Maryland's experience: (1) broad stakeholder involvement in energy efficiency and grid modernization working groups is critical; (2) decisions made by the energy regulator can shape state policy; (3) changes to statute may be frequent; (4) implementation is key – the best-laid plans for grid modernization may not go smoothly; (5) transportation electrification requires long-term vision; (5) regional market efficiency may not align with policy, but flexibility in regional agreements may help; (6) incentives serving one policy can affect another.

Presentation 3: Next Generation of Clean Energy Regulation – A New York Perspective

This presentation, given by John Garvey, Utility Supervisor, Office of Clean Energy (Markets and Innovation) at the New York Department of Public Service shared New York's approach to supporting energy efficiency and renewable energy integration. Mr Garvey shared key facts about New York State and its energy sector; with 20 million people, New York ranks as the world's 11th largest economy, and contains America's largest city. Its largest source of electricity generation is natural gas (35.3%), followed closely by nuclear (25.9%) and hydropower (16.9%), then other fuels and imports.

To provide a broader context for participants, Mr Garvey described the evolution of the electric industry in the United States, including reforms from the 1970s to 2000s that allowed for generation by non-traditional energy sources and saw the development of competitive power markets. He noted that US states do not operate under uniform market structures, but each generally falls within one of four categories: states with regulated gas and electricity markets; states with deregulated gas markets; states with deregulated electricity markets; and states with deregulated gas and electricity markets. Mr Garvey asserted that historical regulatory approaches and utility business models are not well adapted to address current challenges such as aging infrastructure, system inefficiency, flat load growth, and climate change. In addition, in response to factors such as falling technology costs, the rise of the digital economy and new IT capabilities, and the proliferation of new and innovative business models, the industry is seeing the beginnings of a paradigm shift to decentralized systems that incorporate intermittent sources, bi-directional power flows, price-responsive demand, and greater influence of consumer preference.

In line with these trends, Mr Garvey discussed New York's Reforming the Energy Vision (REV) program, a set of multi-year regulatory proceedings to make it easier for consumers and utilities to invest in distributed energy resources, transform the way electricity is produced, bought, and sold, and enable the integration of large-scale renewable generation. REV relies on the establishment of an intelligent Distributed System Platform (DSP), customer engagement, market animation, and satisfaction of various environmental objectives. Mr Garvey discussed the implementation process, and noted the positive early reactions from industry watchers.

Throughout his presentation, Mr Garvey emphasized the importance of clear policy backed by strong political will, stakeholder consultation and utility buy-in, careful sequencing of reforms, and

the ability and willingness to reexamine programs and business modes based on market conditions.

Presentation 4: Renewable Energy and Energy Efficiency – the California Perspective

In this presentation, James Loewen, founder of Everspring Energy, an energy consultancy, and formerly of the California Public Service Commission (CPUC) shared key takeaways from California's regulatory experience. First, he noted that while California has many regulatory actors and a complicated industry structure, there is a clear environmental consensus among public, legal, and regulatory actors. This allows for bold action and environmental leadership, but Mr Loewen acknowledged that there is still plenty of room for improvement.

Mr Loewen detailed California's decarbonization efforts, citing the primary contributors of greenhouse gas emissions as the transportation sector, industry, and agriculture, with the electric power sector contributing roughly 10% of the state's total GHG emissions. California's policy and regulatory frameworks rely on four "Pillars of Decarbonization": (1) energy efficiency and conservation; (2) electrification of industries, buildings, and vehicles; (3) transitioning to low-carbon fuels; and (4) reducing non-combustion GHGs (e.g. methane, nitrous oxide, etc.).

Mr Loewen then focused on the first pillar, energy efficiency. He noted that his state's objectives in promoting energy efficiency are to reduce GHG emissions, help the economy, and lessen the need for new power plants and transmission lines. California has utilized a number of tools to support its energy efficiency efforts, including "decoupling" of utility profits from sales volumes, rate design, utility-run programs such as customer rebates and shareholder rewards for program success, and standard setting for buildings and appliances. Mr Loewen addressed the difficulties in evaluation, measurement, and verification (EM&V) for efficiency programs, noting several common approaches. He noted that in the near future, state agencies and regulatory authorities will need to reassess the feasibility of California's aggressive target of doubling energy efficiency savings, and reconsider whether utilities are the correct entities to manage energy efficiency programs.

The presentation then shifted to California's renewable energy transition. This transition is occurring at both the utility-scale and at the level of customer-sited systems. Mr Loewen acknowledged that California faces the same challenges faced by other economies looking to integrate increased volumes of non-dispatchable, intermittent renewable energy sources. He also described the challenges associated with matching peak load with the typical timing patterns of renewable energy generation, illustrating the resulting potential over-generation with a graph commonly known as the "Duck Curve." He listed various strategies an economy may employ to mitigate the impacts of the Duck Curve, including spreading generators over a large area, over-building and curtailing renewables, investing in energy storage, administering demand-side management, and employing electric vehicles to assist with load smoothing. He also recommended keeping at least 10% of dispatchable energy.

Mr Loewen concluded by sharing important lesson's learned from his time as a regulator in California. Key among these were the importance of developing broad societal consensus around policy goals (e.g. environmentalism), the benefits of an auction-based electricity market, the

importance of applying due process and broad stakeholder engagement, and most critically, the recognition that regulatory authorities can bring about the desired behavior to meet high-level economic goals by putting in place the right incentives.

Summary Observations and Takeaways

An economy's regulatory environment is a major determinant of its energy and electricity sector development. As iterated above, regulators shape the behavior of producers and consumers by establishing price- and performance-based incentives, setting appropriate standards, and implementing innovative energy efficiency programs. In addition, regulatory authorities house valuable technical expertise that can and should be utilized to inform effective policy making. They are well placed to play a leading role alongside ministry officials in shaping and executing policy dialogue related to energy/electricity sector development. Throughout NARUC's workshop, a commissioner and regulatory staff from the Philippines ERC and ERAV asked informed questions of the expert speakers, and demonstrated their commitment to utilizing their respective regulatory toolkits to devise economy-specific strategies to meet their clean energy and energy efficiency objectives while encouraging enhanced quality and reliability of electricity service.

The content of the presentations by US-based regulators also demonstrated the importance of viewing renewable energy and energy efficiency as highly interrelated components of an economy's portfolio of available strategies to meet climate and energy goals. Regulators and policy makers do not address these issues in siloes. Economy-wide energy roadmaps, climate strategies, and economic plans necessarily take comprehensive approaches based on analysis of the contributions and complementarities of generation sources, efficiency measures, and other pieces of the puzzle. It is therefore critical that international forums such as APEC continue to provide platforms for inclusive discussion (such as the joint EGNRET/EGEE&C meetings). Though they are not traditionally at the table, energy/electricity regulators are well-suited to play a leading role in these settings as they tend to take a holistic approach that mirrors that of decision makers at energy and economic ministries.

Finally, the workshop highlighted the benefits of regulatory dialogue among APEC member economies. Just as US states and NARUC's international partners share best practices and lessons learned through workshops, meetings, peer reviews, and other peer-to-peer engagements, EWG participants have much to learn from each other on the regulatory front. There is no single correct way of doing things, but by engaging with other APEC members, each economy gains a better understanding of the mechanisms at its disposal to shape a strategy that is best suited to its own context.

Next Steps:

NARUC will continue to coordinate with the EWG's US representatives to explore opportunities for future NARUC-APEC engagement. Future workshops and/or projects will be subject to available funding. Engagements may take the form of workshops, peer reviews, etc. Regardless of format, NARUC will utilize the expertise of its US-based and international membership.

Appendix 1: Workshop Agenda

APEC/NARUC Workshop on Supporting Renewable Energy Integration and Energy Efficiency through Effective Regulation

19 March 2019
Regal Kowloon Hotel, Hong Kong, China

Funded by the United States Agency for International Development (USAID) Bureau for Economic Growth, Education and Environment (E3)/Energy Division and organized by the National Association of Regulatory Utility Commissioners (NARUC), this one-day workshop will highlight the role of the energy regulator in creating an enabling environment that encourages private investment in renewable energy and supports sustainable energy sector development and programs; and provide a platform for dialogue among APEC member economies on regulatory tools and strategies to advance clean energy and energy efficiency goals.

Through presentations and targeted discussions, the workshop aims to enhance participants' understanding of the instrumental role of smart regulation in furthering regional objectives related to renewable energy deployment and energy efficiency. Regulators can shape the development of the energy sector in myriad ways, such as setting electricity rates, reviewing and approving power purchase agreements (PPAs), overseeing licensing and bidding for new projects, implementing demand-side management and energy efficiency programs, etc. Increased awareness and comprehension of regulatory mechanisms and best practices enables decision makers to develop and implement more effective programs and policies.

Workshop Agenda				
8:30 AM	-	9:00 AM	Arrival & Registration	
9:00 AM	-	9:15 AM	Opening Remarks	Bevan Flansburg, Deputy Director, International Programs, NARUC Harry Lai Hon Chung, Electrical and Mechanical Services Department (EMSD), Hong Kong, China
9:15 AM	-	9:30 AM	Welcome	Dr Tom Lee, APEC EGNRET Chair Li Pengcheng, APEC EGEE&C Chair
9:30 AM	-	9:45 AM	Workshop Objectives & Agenda	Rachel Estrada, Senior Program Officer, International Programs, NARUC

9:45 AM	-	10:00 AM	Participant Introductions	All
10:00 AM	-	10:45 AM	Sustainable Initiatives for a Smarter and Greener City	C.Y. Cheng, Head of Business Development and Business Insights, CLP Power Hong Kong Limited
10:45 AM	-	11:00 AM	Coffee Break	
11:00 AM	-	12:20 PM	Energy Policy in Maryland: Powering Towards the Future	Anthony O'Donnell, Commissioner, Maryland Public Service Commission
12:20 PM	-	1:35 PM	Lunch	
1:35 PM	-	2:55 PM	New York: the Next Generation of Clean Energy Regulation	John Garvey, Utility Supervisor, Office of Clean Energy (Markets and Innovation), New York Department of Public Service
2:55 PM	-	3:10 PM	Coffee Break	
3:10 PM	-	4:30 PM	Renewable Energy and Energy Efficiency: the California Perspective	James Loewen, Independent Regulatory Consultant, Everspring Energy (ret'd California Public Utilities Commission)
4:30 PM	-	5:00 PM	Summary Observations & Takeaways	NARUC Staff and Speakers