



**Asia-Pacific
Economic Cooperation**

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APEC Multistakeholder Dialogue on Promoting Renewable and Clean Energy Policies

APEC Energy Working Group

December 2021



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Economic Cooperation**

APEC Multistakeholder Dialogue on Promoting Renewable and Clean Energy Policies

Hybrid Format | 12 – 13 May 2021

SUMMARY REPORT

APEC Energy Working Group

December 2021

APEC Project: EWG 03 2019A

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TABLE OF CONTENTS

I.	INTRODUCTION	3
II.	BACKGROUND	3
III.	OPENING REMARKS.....	5
IV.	KEY ISSUES.....	6
	1. RCE Policies And Markets – How To Create The Right Market Conditions For Optimal Results	6
	2. Renewable Energy/Fossil Energy Linkages	8
	3. Suggest Draft Clean Energy Legislation Models Which Support The Renewable Energy/Fossil Energy Linkages	8
	4. Discussions	10
V.	RECOMMENDATIONS.....	12
VI.	CONCLUSIONS.....	15
VII.	ANNEX 1: FINAL AGENDA OF THE WORKSHOP	16

APEC MULTI-STAKEHOLDER DIALOGUE ON PROMOTING RENEWABLE AND CLEAN ENERGY (RCE) POLICIES

12-13 May 2021

(a hybrid event)

Summary Report

I. INTRODUCTION

On 12 and 13 May 2021, the APEC Multi-stakeholder Dialogue on Promoting Renewable and Clean Energy (RCE) Policies, initiated by Viet Nam and co-sponsored by Chile; Hong Kong, China; Japan; Chinese Taipei and the United States was held in a hybrid mode. Speakers and participants came from energy-related international organizations and research institutions and APEC member economies' relevant Ministries and government's agencies, companies and business associations.

The Workshop aimed at the following objectives:

- To bring together officials in renewable and clean energy sector, representatives from the private and academic sectors and other stakeholders to discuss how to support market-driven solutions that deliver integrated energy services to consumers and the built environment.
- To strive to identify renewable energy/fossil energy linkages and suggest draft clean energy legislation models which support the linkages.

II. BACKGROUND

Renewable and clean energy have come to the forefront of the global energy transition as well as in the APEC region. In 2017, APEC Economic Leaders stated that “We resolve to enhance energy security to sustain economic growth in the APEC region. We encourage the facilitation of energy-related trade and investment, enhancement of access to affordable and reliable energy, and promotion of sustainable, efficient, and clean energy sources, which, in particular, would contribute to reducing global greenhouse gas emissions.”

According to the APEC Energy Overview (2017), the share of modern renewables to final energy consumption is 7.6%¹. This indicates a limited proportion of renewable energy in most developed and developing economies.

¹ https://aperc.iecej.or.jp/file/2018/6/7/APEC_Energy_Overview_2017.pdf

While future energy systems will require high proportions of renewable and clean energy, yet policy is often developed and implemented separately, risking sub-optimal outcomes for government, consumers and business. For examples, when referring about renewable and clean energy polices and markets, question is raised about how the rights market conditions can be created for optimal results. For examples: in 2010 Viet Nam's National Assembly passed the Law on Utilizing Energy Efficiently and Effectively and in 2015 Viet Nam's Prime Minister stipulated the Strategy to Develop Renewable Energy in Viet Nam by 2030, Vision to 2050; but there is no linkage between the 2010 Law and the 2015 Strategy. Same situation can be seen in legislation of other economies where renewable energy laws/ policies have been developed and implemented independently with laws/ policies on clean energy.

Viet Nam, therefore, proposed to hold an APEC Multi-stakeholder Dialogue on Promoting Renewable and Clean Energy Policies, which would bring together officials in renewable and clean energy sector, representatives from the private and academic sectors and other stakeholders to discuss how to promote renewable and clean energy, supporting market-driven solutions that deliver integrated energy services to consumers and the environment.

This project also strived to identify renewable energy/fossil energy linkages and suggest draft clean energy legislation models which support the linkages. An important linkage between fossil and renewable energy comes from the fact that current fast reacting natural gas turbines can provide a critical role in addressing the operational variability problems that are associated with linking large renewable energy based systems into existing electric grids. The electrical based output of renewable energy systems based on wind or solar photovoltaic technologies can change quickly due to clouds or natural changes in wind speed which can in turn cause overall grid power stability problems. However, fast response gas turbine power systems can pick up the lost power production, quickly stabilizing the electric grid and thus permitting a larger overall penetration of renewable energy systems on the grid.

This important coupling of fossil and renewable energy has not been addressed in detail in past APEC reports which have tended to concentrate on either the potential of only fossil energy systems or only renewable energy systems.

By promoting renewable and clean energy policies, the project would ultimately contribute to wiser and more efficient use of energy and therefore, to APEC's aggregate energy intensity reduction goal of 45% by 2035. In 2017, APEC Ministers welcomed "the efforts toward reducing aggregate energy intensity, accelerating clean, efficient, and renewable energy deployment, pursuing sustainable and resilient energy development, and developing diversified, flexible and integrated natural gas market in the Asia-Pacific, which in particular may contribute to reducing greenhouse gas emissions." They also urged "economies to strengthen coordination and cooperation through sharing best practices, and deploying advanced technologies, including waste recycling." By contributing to promote renewable and clean energy policies, this project is designed to implement Ministers' instructions to accelerate renewable energy development and deployment to attain APEC's aspirational goal of doubling

the share of renewables in the APEC energy mix, including in power generation, from 2010 levels by 2030.

This project is also in line with APEC 2019 Priority on Sustainable Growth, which mentioned that “Energy cooperation has become an increasingly important agenda item for APEC. Today we see the development of technology and new technical procedures having a positive impact on the generation, transmission and distribution of energy. Cheaper and cleaner energy impacts directly on economic activities, on the environment and on the general welfare of society. In APEC Chile 2019 we would like to intensify the work on electromobility and the potential this area has in the Region.”

This project will contribute to the APEC Energy Security Initiative (ESI) as it is the principal mechanism through which the EWG addresses the short and long term energy security challenges in a sustainable manner. In ESI, Long-term measures include facilitating investment, trade and technology cooperation in energy infrastructure, natural gas (including LNG), energy efficiency, clean fossil energy (including carbon capture and geological sequestration), renewable energy and hydrogen and fuel cells². Therefore, this project is one of such long-term measures.

III. OPENING REMARKS

In the opening remarks, Mr Luong Hoang Thai (Director General, Multilateral Trade Policy Department, Ministry of Industry and Trade, Viet Nam) stressed that the aspirational goals of APEC in the energy sector are: to double the share of renewables in the APEC energy mix, including in power generation by 2030 and to reduce APEC’s aggregate energy intensity by 45% from 2005 levels by 2035.

Accordingly, in recent years, APEC has been implementing numerous active, practical and effective cooperation activities, aiming to identify and remove unnecessary trade barriers and promote open, transparent and fair investment mechanisms in order to attract available resources from the private sector for renewable and clean energy development. However, Mr Luong emphasized that renewable energy, especially wind or solar power also has limitations, such as instability due to complete dependence on wind and sunlight, the ability to release capacity as sunlight and wind are concentrated in only a few locations; the increased costs due to investment in transmission systems etc.

The speaker observed that renewables grow rapidly in all our scenarios, with solar at the centre of this new constellation of electricity generation technologies. Therefore, supportive policies and maturing technologies are enabling very cheap access to capital in leading markets. With sharp cost reductions over the past decade, solar PV is consistently cheaper than new coal- or gas- fired power plants in most economies,

² <http://www.ewg.apec.org/initiatives.html>

and solar projects now offer some of the lowest cost electricity ever seen. According to Mr Luong, hydropower remains the largest renewable source of electricity, but solar is the main driver of growth as it sets new records for deployment each year after 2022, followed by onshore and offshore wind. The advance of renewable sources of generation, and of solar in particular, as well as the contribution of nuclear power, is much stronger in the Sustainable Development Scenario and Net Zero Emissions globally by 2050.

However, in many developing economies including Viet Nam, renewable and clean energy is new, undeveloped and accounts for a modest proportion of the total energy supply of the economy. The speaker reiterated that the cause of this situation is that most of the developing economy in the Asia-Pacific region, besides the limitations on financial resources, share the same characteristics that are the limitations of incompleting legal framework, lack of infrastructure in term of both quality and quantity as well as of management science and technology, etc. This fact has posed many challenges to the developing APEC members in the planning of renewable and clean energy development.

Mr Luong concluded that in order to establish a fair, transparent, efficient trade and investment environment and towards the common interests of the whole region, the Governments themselves face many difficulties in building and promoting development of this sector, without active private sector cooperation and support. Effective interactions among Governments, the private sector and other stakeholders will contribute to identifying and resolving barriers to the development of the renewable energy sector and to formulate reasonable and harmonious policies in the future. Therefore, this Dialogue is an opportunity to discuss how to promote renewable and clean energy, supporting market-driven solutions that deliver integrated energy services to consumers and the environment as well as to identify renewable energy/fossil energy linkages and suggest draft clean energy legislation models which support the linkages.

IV. KEY ISSUES

1. RCE Policies And Markets – How To Create The Right Market Conditions For Optimal Results

There were three speakers in Session 1 including: Dr. Terry Surles, Consultant, Hawaii Natural Energy Institute, United States; Mr Martin Brown-Santirso, Senior Consultant, HEAT GmbH, Germany; and Mr. Supa Waisayarat, Director, Super Energy Corp, Thailand.

- Dr Terry Surles opened his presentation by giving some data on the impacts of COVID-19 pandemic that have led to changes in energy resources use. After

that, he provided a short analysis on electricity generation from renewable resources which focused on wind and solar. Also, significant utility – scale storage was added in 2020, while prices continued to decrease. He noted that legislation and regulation are lagging for upgrading the domestic grid. He gave some examples of Hawaii, California, Texas for their electricity sectors and emphasized the need of supporting programs from government. At the end of the presentation, the speaker shared that renewable energy goals will be coupled with other societal and economic needs, and that legislation and regulation must be structured to incorporate technology and societal change. There are three main important criteria: 1) Regulators must effectively respond to legislative mandates and aspirations; 2) Utility business models will need to change in planning for innovative, transformational, and disruptive transitions; and 3) Overall community economic health requires that utilities are profitable and electricity prices are reasonable.

- In the first part of the presentation, Mr Martin Brown-Santirso presented about the case for RCE and barriers for an RCE transition. He then shared that energy transition is very important as it is the link to the economy and society. To create the condition for RCE transitions, it is required to initiating economic diversification investments, strengthening domestic supply chains to enable them to respond to new economic opportunities. The tools for RCE transitions need to have market, technical regulatory, economic and financial, administrative, capacity and skills. At the end of the presentation, Mr Santirso emphasized on some focus points such as: Maximize synergy of RCE with energy efficiency; Support power sector development to accept a high share of renewable intermittent technologies; Electrify transport; Innovation is key, and digitalization is at the core; Aligning social and economic structure with the transition effort; Fair distribution of costs and benefits.
- To begin the presentation, Mr Supa Waisayarat introduced briefly about Super Energy Cooperation which is a public company established in 1994. He showed a chart with figures about Viet Nam energy resources and listed some challenges that the company is facing such as: lack of capital/funding, low tariffs coupled with high investment cost in newer technologies, human resources, weak grid capacity... He shared that many power transmission projects to be prolonged due to difficulties of converting purpose of forest land use. In the draft Master Plan No.8 that Viet Nam paid a great attention to strongly developing a 500KV network to evacuate power from power generation centers far from load center. Mr Supa said that it is required to increase flexibility in electric systems, expand generation, grid infrastructure, power bill saving and high quality power supply. At the end of the presentation, the speaker reaffirmed that develop RCE is to corporate social responsibility.

2. Renewable Energy/Fossil Energy Linkages

There were two speakers in Session 2: Dr. Nguyen Hoai Nam, Deputy Director, Institute of Energy Science (IES), Viet Nam Academy of Science and Technology; Mr. Chih-Wei Wu, Director, Electricity Division, Bureau of Energy, Ministry of Economic Affairs, Chinese Taipei.

- Dr Nguyen Hoai Nam started his presentation by giving some information about RCE development in Viet Nam in recent years. Before 2019, only two solar power plants were connected to any electric grid with 110kV and above (Phong Dien and Krongpa districts in Viet Nam). In the first 6 months of 2019, 89 solar power plants with the total power capacity of 4439 MW were tested, energized and joined the domestic electric grid. The power development has caused the grid congestion due to higher RE penetration. He presented some energy storage options and demand side management (DSM) which is not only the generation should be adapted to the load but also the load is adapted to the fluctuating feed-in of the Variable Renewable Energy (VRE). DSM enables a supplement to feed-in management by providing flexibilities on the market and thereby preventing curtailments of the VRE. At the end of the presentation, Dr Nam concluded that RE creating new market opportunities for mapping challenging areas of Viet Nam and international best practices.
- At the beginning, Mr Chih-Wei Wu presented about the current status and development policy of renewables which include the policies on energy target, mechanism of feed in tariff, green project and promotion strategies. After that, he mentioned about the role of conventional generation in high VRE shares. About the current status and development of energy storage in electricity markets, Mr Wu provided some analysis on the global energy storage system development and current policies of energy storages in Chinese Taipei with ESS in trial trading platform. To summary the presentation, the speakers said that the integrating higher shares of VRE technologies, such as wind and solar PV, in power systems is vital for decarbonizing the power sector while meet growing demand for electricity. The role of conventional generation will gradually change such as providing backup power instead of baseload power, ancillary service and flexibility retrofit. The install capacity of energy storage system (ESS) will be 590 MW by 2025 and ESS could be regarded as dispatched resource to participate in trial trading platform.

3. Suggest Draft Clean Energy Legislation Models Which Support The Renewable Energy/Fossil Energy Linkages

There were three speakers in this Session: Mr Eric Pyle, Director Public Affairs and Policy, SolarZero, New Zealand; Dr. Joachim Monkelbaan, Global Trade and Sustainable Development Advisor, Switzerland; and Mr Vu Quang Dang, Independent Energy Specialist, Viet Nam.

- Firstly, Mr Eric Pyle introduced briefly about solar Zero New Zealand, a New Zealand's largest solar company. After that he talked about New Zealand power system which is liberalized fully locational marginal price market operating across two electrically independent power tolls and has three stages of power system development. New Zealand government has set a target of carbon zero economy by 2025 but there are still some challenges to achieve the goal such as power system stability, weather matter, batteries, smart control and managing peaks. At the end of the presentation, Mr Pyle concluded that policy at the domestic level need to have clear target and guiding goals. Electricity will power the economy, therefore electricity sector policy/regulation is really important. Besides, software is also critical.
- The presentation of Dr Monkelbaan focused on 3 issues: (i) why clean energy is needed, (ii) Barriers to trade in clean energy technologies and (iii) services negotiations in the World Trade Organization (WTO) and its challenges. At the beginning, he presented about trade in Energy Stimulated Time (ESTs) and the sustainable development goals. Technologies can cover goods and services, and these two are indeed closely entwined. About trade barriers to RCE, the speaker shared that market access and national treatment requirements are for examples that residency is required or forming a consortium with a domestic enterprise, or limited eligibility of foreign citizens for subsidies, including tax benefits. Due to its higher potential for localization, the service sector is considered as the low-hanging fruit for developing economies willing to enter global value chains and foster market linkages with their local industry. About the WTO negotiation, he said that the differentiation between the different types of environmental services is between “traditional environmental services” which is the focus of the Trade in Services Agreement (TiSA) negotiations and “services enabling trade in environmental goods” which are proposed to be considered in the EGA. At the end of the presentation, he listed out some other opportunities for RCE cooperation such as: Agreement on Climate Change, Trade, and Sustainability (ACCTS); WTO Trade and Climate Initiative; Platform on Trade, Climate Change, and Sustainable Energy (including expert group on trade and climate change to bridge WTO and United Nation Framework on Convention on Climate Change (UNFCCC)).
- Mr Vu Quang Dang divided his presentation into 3 main parts: (i) Solar energy development in Viet Nam; (ii) Solar energy competitive bidding in Viet Nam; (iii) Recommendation. To begin the presentation, he introduce briefly about the energy sector in Viet Nam in general and renewable energy development in particular. He then focused on solar energy with more detail on bidding program and legal basis. He shared that by 7 Jan 2021, the Government approved Power Development Plan (PDP) inclusion of 172 solar energy projects of 19 GWp (15.3 GWac) including 43 projects of 5GWac not eligible Fit in Tariff 2 (FIT2) (Decision 13). There is a solar project of 150 MWp (120 MWac) (Rung Xanh – phase 1) submitted to the Prime Minister for approval. At the end of the presentation, he provided some recommendations such as: Finalize the draft

solar energy competitive bidding program (with support from various institutions including Asian Development Bank (ADB), World Bank (WB), Electric of Viet Nam (EVN), Institute of Energy (IE), etc.); Promulgate the official solar energy competitive bidding program; Capacity building on the solar energy competitive bidding program; and Implementation of two (02) pilot solar energy competitive biddings (a ground-mounted solar energy project and a floating solar energy project) in 2021 for lesson learnt before large application since 2022.

4. Discussions

- A speaker commented that as renewable energy reached 30-40% of total generation, there may be increased curtailment of these resources due to over-supply. However, other challenges would be unfavorable weather conditions, including more rainy or hazy days in a year and insufficient wind, which may eventually have a bad impact on solar and wind energy production.
- Storage may be a good solution for renewable energy. Given that chemical storage is too expensive, the key question is whether or not the pumped hydro storage (PHS) can give a better option in terms of price and quantity. A speaker responded that there were plans for longer term storage. PHS required a lot of land and thus the right conditions for it have to be put in place. At the same time, the US Department of Energy invested a lot in various battery systems, particularly chemical batteries, and hopefully the price would go down. Moreover, despite of the current on-going push for hydrogen storage, the unsolved problems are that it is still hard to work the bugs out, the technology is expensive to operate and needs specific materials to contain hydrogen for long periods of time.
- A speaker gave an example on a big hydro project 20 years ago where a power company in New Zealand had to spend \$15 million on pending legal challenges due to the opposition of community and non-governmental organizations and also the lack of experience on a licensing system and management act.
- Besides, the price of solar power is expected to decrease by 30- 40% in the future, sharply driving down the benefits for investors. A participant informed that wind power seemed unsuitable for Viet Nam's power generation capacity. The Government of Viet Nam tried to develop solar power, but there were challenges related to large storage capacity for night consumption and reducing price. Additionally, the price of electricity in other economies was higher than that in Viet Nam, but the income of Vietnamese people was lower. Therefore, it was still unreasonable to increase the price even when the investors wanted to. Although electric vehicles and equipment were expected to become popular in the future, power sources would be made redundant and investors would suffer losses without a proper management system for power generation.

- One participant sounded rather skeptical on whether competitive power retail prices and competitive power generation should be made available in Viet Nam. A speaker commented that the matter was about cost.
- After updating on renewable energy - fossil energy linkages, a moderator informed that as renewable energy was being gradually added to the domestic grid, the market price started going down and the trend of renewable energy transformation of the power system being considered by using the existing power plants, which provided the conventional generation, for ancillary services. In the future, more market-based approaches to ancillary services should be considered.
- A speaker updated that in Viet Nam all solar rooftops were installed with no battery.
- Regarding energy storage system, a speaker commented that in the future chemical storage could be made available at a lower price and higher safety level. Then it could become popular due to its responsiveness and simplicity. However, the biological, geological and technical issues would need to be settled in this trend.
- The significant growth in solar energy installations in Viet Nam between 2019 and 2020 could be compared to the US, despite that licensing, construction, disputes and contracting may take time. A speaker addressed the question by pointing out three main reasons: (i) Many projects of about 4 - 5 gigawatts were prepared in 2016-2017 and approved in the FIT1. After being kept waiting for permission, they could eventually start under the FIT2 when the fit-in tariff (FiT) turned attractive; (ii) The central and provincial government in Viet Nam offered support to attract investors by allowing the use of low-value agricultural land for solar energy production to boost economic growth and tax revenue; (iii) In Viet Nam investors were very active in new business. At the beginning they may have been a bit conservative about solar deployment, but after having experience through FIT1, they could easily apply for development of solar projects in FIT2. Moreover, solar PV rooftop projects of under one megawatt required no permissions and were really easy to install, and this is another reason for the booming growth of solar energy.
- In terms of long-term resilience, stability storage and related issues, the key questions are how to turn to 100% renewables and how to sustainably manage the weather issue (e.g. around 40 rainy days and nights occurred in 2006 in Hawaii).
- A speaker reminded that the over-supply of renewable energy might have to be changed in the future because there were many ways to make use of electricity surplus. Simple forms of electricity can be used to generate hydrogen to use for other sources.

- In New Zealand, there will be more spillage from hydro systems and it is a problem for hydro engineers. The most cost-effective solution is to run a hydro plant, maintenance and so on.
- Related to the linkages between trade, climate change and sustainable energy, a participant commented that trade had a large impact on climate change because it led to economic growth and enabled technology transfer, which in turn had an impact on emissions. Climate change also had an impact on trade by changing patterns of food production, affecting infrastructure services such as harbors that were essential to trade. So there were very close linkages between the two areas in terms of policy.
- In the US, commerce, industry, and climate change communities need to be better connected. The new Administration is working on the linkages and synergies between trade and climate change to improve acceptance of more aggressive climate policies.
- Three tasks for the global platform for trade, climate change and sustainable energy include: (i) to work with WTO on such topics as discussion on trade and environmental sustainability structure; (ii) to work with the United Nations Framework Convention on Climate Change (UN FCCC) to address various trade issues, including discussion the Paris Climate Agreement implementation; and (iii) to engage trade and private sector advocates in a so-called expert group on trade and climate change, where trade experts, private sector experts, policy-makers, civil society, researchers and multiple stakeholders can talk, discuss and together work out the ways forward.

V. RECOMMENDATIONS

During the final session, participants shared overall views and recommendations on what APEC should do in term of policies and actions to support the RCE development in APEC member economies.

- A participant highlighted a fact that power generation and transmission in Viet Nam was growing rapidly to meet the increasing demand for electricity. However, many power transmission companies had to suspend operation due to the breakout of the COVID-19 pandemic. Given the huge demand for electricity consumption in summer and the overall demand for economic development, it was not feasible to shut power generation down.
- Having said that, four main issues needed to be resolved, including policy for energy development, master plan, investment promotion and electricity production development.

+ Regarding energy development policy: The regulatory framework should not be changed too often. There should be a policy to encourage affordable clean energy, a competitive electricity policy, and a policy to allow direct sale to consumers so that investors could make a profit.

+ Regarding the master plan: While power generation in Viet Nam is currently booming, power transmission is still interrupted. Learning experience of other economies and stakeholders is essential to prevent disruption of business and banking activities and reverse impact on investors.

+ Regarding investment promotion: It is suggested that APEC support Viet Nam in providing affordable and clean electricity. Advice should focus on reasonable pricing, renewable and clean energy sources for the world economy, and better data analysis on how to improve solar and wind energy. In addition, an emphasis on the renewable and clean energy certificate policy can be suggested to further increase renewable energy utilization by multiple stakeholders.

+ Regarding electricity production development: It is necessary to solidify investors and project owners if electricity is to be generated from renewable or clean energy sources. A clear policy direction is important for the future.

- In Thailand the target is to increase the share of renewable energy to 30% of domestic energy consumption by 2027. The first action is to expand digitalization of renewable energy delivery, especially in the local economy. Thailand is working on social and economic models to emphasize the local economy, for example, to use more RCE in replacement of fossil fuel energy, and to contribute to the agricultural and rural areas by encouraging farmers to use renewable energy, or biomass – power bartering between farmers and power plants.
- The tariff policy is of utmost importance to balance the benefits of businesses, investors and consumers, and to allow for robust RCE development.
- A participant shared that economies were in different situations. Depending on the situation of its economy, a government had specific options to promote RCE and prioritized specific needs.
- In order to provide funding, it was advisable to consider setting up clean tech fund through which the government can invest in RCE projects. In the case of Hong Kong, China, the government had set up the Green Tech fund amounting to HK\$ 200 million for research and development projects to help achieving the carbon neutrality before 2050 through energy decarbonization, green transport, waste management, etc. The government would also invest in new and

renewable energy projects and work with the power companies to explore the possibility of building marine windfarms.

- It was advisable to give incentives to the private sector, universities and startups to introduce innovative technologies in promoting new and renewable energy. If incentives were provided for universities and research institutes to develop technologies and improve energy policy, more applications could be expected and more RCE projects would be promoted.
- Hong Kong, China had set up the FiT schemes, and about 15,000 applications had been received, with a total capacity of more than 200 megawatts. The power companies had sold about 800 renewable energy certificates, with total electricity generation of over 18 million kilowatt hours. An online platform for government departments and public organizations to solicit innovative technology solutions proposed by universities and start-ups was launched. So far, over 700 innovative technology solutions had been collected through this platform, and more than 130 projects had been put on trial, over 20% of which were related to energy efficiency and renewable energy.
- The participant pointed out that economies with similar situations might consider to set up memorandum of understanding on energy cooperation, as in the case of Hong Kong, China and Singapore, where bilateral workshops could be organized to exchange knowledge and experience on areas of common interest.
- Intellectual capacity, exchanging information and lessons learned are important to cooperate in trade information, educating one another, working with local industries and working with multinational corporations to develop technologies for substantial growth of solar energy.
- Having a better way of educating government leaders is of enormous important. In an economy, most officials have a background in laws and know little about energy technologies, electricity grid or transportation systems. Therefore, it is necessary to educate them properly to make proper policies. There is an urgent need for helping government decision makers to understand issues while working on the policy agenda.
- Smart energy transition is taking place now around the world and APEC economies also have the same task to transform from conventional energy to renewable and clean energy. APEC can support by developing a consistent RCE roadmap for energy preservation.
- Related RCE development options, many APEC economies have successfully taken competitive RCE options, so their lessons learned and recommendations are important for the other economies.
- It is suggested that the government of Viet Nam should conduct a competitive RCE action plan as soon as possible so that more projects can take place.

- Apart from renewable energy, coal was a key source of carbon emission. The government should issue a coal early retirement policy to encourage the coal power plants to retire earlier. It means that the government should give incentives and issue a policy to compensate companies' investments.
- In New Zealand, wind is valuable for the economy. Technology around floating solar is the challenge for New Zealand and educating policy makers on the electricity system is needed.
- A speaker recommended more workshops and case studies to share, learn and build up collective intellectual capital.

VI. CONCLUSIONS

In her closing remarks, Ms Pham Quynh Mai (Viet Nam' Senior Official to APEC) recognized that it is crucial for all APEC member economies to address the ever-growing demand for energy, and at the same time meeting the need for environmental protection and climate change adaptation. One solution is putting the right policies for healthy RCE market development and maintaining the reasonable linkages between renewable and conventional energy resources, particularly under the devastating impact of Covid-19.

Each and every member economy can choose to develop and implement their own strategy and goal, towards the achievement of green and sustainable growth. For example, in the U.S. domestic, state, and private sector goals are merged toward carbon-free power by 2035, while in Chinese Taipei 20% of electricity supply will come from renewable energy by 2025. Other APEC economies may set their different policy goals. In this process, it is extremely helpful for member economies to learn from one another experience and success stories on policies and legislation models, which facilitate the development of RCE; how to coordinate among government ministries and between the public and private sectors (current and potential investors) for optimal results; how to manage various expectations and cope with different changes pre and post Covid-19.

The Senior Official highlighted that there is still a long way to go towards the achievement of the APEC's aspirational goal of doubling the share of renewables in the APEC energy mix, including in power generation, from 2010 levels by 2030. That involves addressing challenges to access to finance, infrastructure, training, consumers, pricing, etc. Viet Nam wishes to join and strongly support APEC's common efforts on accelerating renewable and clean energy development and deployment towards this end.

VII. ANNEX 1: FINAL AGENDA OF THE WORKSHOP

12 May 2021 (Wednesday)	
08:30–09:00	Registration and Test Run
09:00–09:10	<u>Opening Ceremony</u> By Mr Luong Hoang Thai, Director General, Multilateral Trade Policy Department, Ministry of Industry and Trade, Viet Nam
09:10–09:20	<u>Introduction - Dialogue overview and goals</u> 1. Instructions for Dialogue in a hybrid format 2. A short introduction to the event: Dialogue objectives, expectations and agenda
09:20–10:20	Session 1: RCE POLICIES AND MARKETS – HOW TO CREATE THE RIGHT MARKET CONDITIONS FOR OPTIMAL RESULTS <i>Moderator:</i> - Dr. Worajit Setthapun, Dean of Asian Development College for Community Economy and Technology (adiCET), Chiang Mai Rajabhat University, Thailand <i>Speakers:</i> + Dr. Terry Surles, Consultant, Hawaii Natural Energy Institute, United States; + Mr Martin Brown-Santirso, Senior Consultant, HEAT GmbH, Germany; + Mr. Supa Waisayarat, Director, Super Energy Corp, Thailand.
10:20–10:30	Coffee Break
10:30–11:30	Session 2: RENEWABLE ENERGY/FOSSIL ENERGY LINKAGES <i>Moderator:</i> - Mr Eric Pyle, Director Public Affairs and Policy, SolarZero, New Zealand. <i>Speakers:</i> - Dr. Nguyen Hoai Nam, Deputy Director, Institute of Energy Science (IES), Viet Nam Academy of Science and Technology; - Mr. Chih-Wei Wu, Director, Electricity Division, Bureau of Energy, Ministry of Economic Affairs, Chinese Taipei.

13 May 2021 (Thursday)	
08:30–09:00	Registration and Test Run
09:00 – 10:20	<p>Session 3: SUGGEST DRAFT CLEAN ENERGY LEGISLATION MODELS WHICH SUPPORT THE RENEWABLE ENERGY/FOSSIL ENERGY LINKAGES</p> <p><i>Moderator:</i></p> <p>- Dr. Terry Surles, Consultant, Hawaii Natural Energy Institute, United States.</p> <p><i>Speakers:</i></p> <p>+ Mr Eric Pyle, Director Public Affair and Policy, SolarZero, New Zealand;</p> <p>+ Dr. Joachim Monkelbaan, Global Trade and Sustainable Development Advisor, Switzerland;</p> <p>+ Mr Vu Quang Dang, Independent Energy Specialist, Viet Nam.</p>
10:20–10:30	Coffee Break
10:30 – 11:20	<p>Session 4: POLICY RECOMMENDATIONS</p> <p><i>Moderator:</i></p> <p>- Ms Nguyen Huong Tra, National University, Viet Nam</p>
11:20 – 11:30	<p><u>Closing Remarks</u></p> <p>By Ms Pham Quynh Mai, Deputy Director General, Multilateral Trade Policy Department, Ministry of Industry and Trade and Viet Nam’s Senior Official to APEC</p>