



**Asia-Pacific  
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# **Summary Report – APEC Workshop on Promoting Renewable Energy for Rural and Remote Area Development**

**APEC Energy Working Group**

**April 2023**





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Economic Cooperation**

# **Summary Report – APEC Workshop on Promoting Renewable Energy for Rural and Remote Area Development**

**16 – 17 August 2022**

**APEC Energy Working Group**

**April 2023**

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# **APEC WORKSHOP ON PROMOTING RENEWABLE ENERGY FOR RURAL AND REMOTE AREA DEVELOPMENT**

**16-17 August 2022**

**(a hybrid event)**

## **Summary Report**

### **I. INTRODUCTION**

On 16 and 17 August 2022, the APEC Workshop on Promoting Renewable Energy for Rural and Remote Area Development, initiated by Viet Nam and co-sponsored by Canada; Hong Kong, China; Japan; Indonesia; Korea; Chinese Taipei; Thailand; USA 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 objective:

- to help relevant economies and stakeholders share information and experiences in using renewable energy to promote rural/remote area development as well as develop a set of recommendations on renewable energy policies for policy makers.

### **II. BACKGROUND**

According to the UNDP Study “World Energy Assessment: Energy and the Challenge of Sustainability” in 2015, in the past 20-30 years, several hundred millions of people have improved their access to energy. Nevertheless, we cannot simply ignore the energy needs of the 2 billion people who are mostly in remote/rural area and have no means of escaping continuing cycles of poverty and deprivation (Source: UNDP Study: World Energy Assessment, 2000).

This is mostly due to geographic difficulties. Most of these households are minorities, living in isolated area where the domestic electricity grid cannot reach also their demand for electricity is not high. Therefore, the application of renewable energy is one suitable solution. This solution helps people have access

to electricity for daily work. The cost is also lower than domestic electricity grid, not mentioning the electricity industry can save human resources for the management, operation and money collection. Also, renewable energy models in rural areas are also becoming a trend in economies around the world.

Renewable energy technologies are widely believed to lead to dramatic advances in the quality of life of the rural population and facilitate growth in these areas, which could possibly be achieved at costs that are within the means of government and beneficiaries. This project aims to help these stakeholders sharing information and experiences on applying renewable energy in order to utilize renewable energy to facilitate rural and remote area development as well as develop a set of recommendation on renewable energy policies while developing economy.

Over the recent years, with the objective to build the capacity of APEC members to strengthen domestic and regional energy security, the APEC Energy Working Group has contributed to maximizing the energy sector's contribution to the APEC region's economic and social well-being. However, there has not been a focused activity on promoting renewable energy for rural and remote area development. This project will seek to contribute useful recommendations regarding this topic to the work of the EWG.

### **III. OPENING REMARKS**

In the opening remarks, **Mr Nguyen Van Vy (Deputy Chairman, Viet Nam's Energy Association)** stressed that according to estimates by the International Fund for Agricultural Development (IFAD), about 3.4 billion people (about 45% of the global population) live in rural areas in developing economies. However, meeting the energy needs of people in remote/rural areas is still limited. The speaker highlighted that this is largely due to geographical constraints as most of these households are ethnic minorities, live in remote areas, and do not have access to electricity from the domestic grid. Therefore, the application of renewable energy technology is one of the solutions in line with the ability of the Government and people to have electricity for daily life and to escape from poverty. In addition, the development of renewable energy in rural, remote and isolated areas is also becoming a trend in economies around the world.

Mr Nguyen recalled that the overall goal of APEC cooperation in the energy sector is to aim to reduce energy intensity in the region by 45% by 2035

and double the share of renewables by 2030 as envisioned by the APEC Economic Leaders in Beijing 2014. Through policies to promote renewable energy for development in remote and rural areas, APEC economies not only contribute to increasing the share of renewable energy in the region's mixed energy exploitation compared to 2010, but also to help eliminate hunger, reduce poverty, protect the environment, and work towards sustainable and inclusive development so that no one is left behind.

The speaker emphasized that in developing economies, including Viet Nam, renewable energy is a relatively new, undeveloped field and accounts for a relatively modest proportion of the total energy supply of the economy. The causes of this situation are limited financial resources, incomplete legal framework, inadequate infrastructure, etc. For remote and rural areas, these difficulties are multiplied. This fact has been posing many challenges for developing APEC members in the planning of renewable energy development in remote and rural areas.

In that sense, the Workshop is the contribution of Viet Nam as through sharing strategies and case studies, APEC members can learn from each other's experiences in formulating and implementing development policies and attracting investment in renewable energy in remote/ rural areas, contributing to solving energy and social problems in the context of increasing energy demand, especially in localities where electricity is not available.

#### **IV. KEY ISSUES**

##### **1. THE IMPORTANCE OF RENEWABLE ENERGY IN RURAL/REMOTE AREA**

There were three speakers in Session 1 including: (1) Mr Toshiaki Matsumura, General Manager for EMS Technology of Kyudenko Corporation, Japan; (2) Mr Vu Quang Dang, Energy Specialist, Asia Development Bank in Viet Nam; (3) Ms Elena Villanueva, Project Manager & Consultant for Asia-Pacific Trama TecnoAmbiental, Barcelona, Spain.

- Mr Toshiaki Mastsumura started the session by giving a short introduction about Kyudenko company, a leading company in Electrical Construction.



He talked briefly about current situation of electricity development in remote areas which is now not yet completed and in high demand of renewable energy. He also mentioned about the problem of renewable energy power generation facilities in the island areas, Stabilizing Solar power. The speaker then shared an overview of power transmission from renewable energy using Kyudenko EMS. To conclude the presentation, the speaker said that renewable energy is an energy with infinite possibilities, many energy resources in renewable energy including PV, wind power, hydro, geothermal and biomass. However, controls and synchronizing of different power source should be most important. Kyudenko EMS provides is door opener for dissemination of renewable energy in remote islands and rural areas.

- The presentation of Mr Vu Quang Dang focused on 3 main parts: Introduction of power sector and rural electrification in Viet Nam; Contributions of small hydropower to rural electrification in rural and remote areas in Viet Nam; and Recommendations. The speaker talked about a typical small hydropower plant, rural electrification by small hydro powerplant (SHP) in Viet Nam. He shared that with electricity, people could access updated information on news, business opportunities, new sciences and technologies. SHP could help to improve flood control, irrigation, fishing, tourist, Improvement of flood control, irrigation, fishing, tourist. SHPs provide clean energy to replace fossil fuels (coal, gas, oil, etc.) for climate change. At the end of the presentation, Mr Dang recommended that Viet Nam should include more SHPs in the draft Power Development Plan 8 (PDP8) for not only commercial hydropower development but also rural electrification, retrofitting old and existing SHPs for better operation, and improvement of SHP benefits for local people (business development).
- Ms Elena Villanueva started her presentation by talking about the definition of remote community. She shared that remote areas in developed and developing economies face many of the same challenges, as a result, there are many lessons and experiences that can be shared in both directions. Developing renewable energy has many benefits for rural areas.

Off-grid renewable energy sources, such as wind farms and solar power, can deliver cheaper and cleaner power than grid connections. Development of the renewable energy sector also creates jobs and brings a host of social benefits, such as access to information technology. The speaker emphasized that cooperation between government, communities, businesses, utilities, and the private sector is vital to the success and sustainability of remote area projects. To conclude, Ms Elena Villanueva said that successful implementation of renewable energies in remote areas will need: (i) Support project planning and implementation; (ii) Design appropriate incentives; (iii) Increase research and development funding; (iv) Prioritize energy efficiency; (v) Provide training and technical support for the local operation; (vi) Determine the appropriate level of renewable energy penetration; (vii) Mitigate risks to attract capital.

## **2. OPPORTUNITIES AND CHALLENGES FOR DEVELOPING RENEWABLE ENERGY IN RURAL/REMOTE AREA**

There were three speakers in Session 2: (1) Professor Terrence Surles, Senior Advisor, Hawaii Natural Energy Institute, USA; (2) Mr Kang Taeil, Founder and CEO, One Energy Island Co., Ltd, Korea; (3) Mr Arkorn Soikaew, Scientist, Practitioner Level, Department of Alternative Energy Development and Efficiency, Thailand.

- Professor Terrence Surles started his presentation by talking about technology opportunities with an update of US energy and electricity use, with a focus on technologies for rural and remote areas. After that he showed charts and diagrams to present current status of renewable energy in the United States. He shared that microgrids are deployed for a variety of reasons, with a focus on resiliency and reliability. Resilience concerns for critical services, such as hospitals, etc., can be a driver for microgrid development. In the second part, examples of microgrid development in the United States. Borrego Springs Microgrid in Southeastern California Desert is a prime example of how a microgrid can be effective for protecting the grid during natural disasters. The speaker emphasized on the Federal Government's involvement in microgrid deployment, by providing financial assistance, technical analysis, and strategic planning to native Americans and native Alaskans. The speaker pointed out that while still

dependent on diesel in remote areas, the national push is to increase renewable production. In addition to government funding, public/private partnerships are an important part of financial support.

- Mr Kang Taeil divided his presentation into 2 main parts: Opportunity and challenges of electrification for remote communities using renewable energy; and Cases of renewable energy mini-grid project in remote community. Firstly, he talked briefly about renewable energy mini-grids status and forecast of mini-grids by 2030. He shared that total 238 million households to be connected to electricity services. Among them, 111 million households will have access to electricity by renewable energy mini-grids. He explained the reason why we should use renewable energy mini-grids regarding cost, benefit. The speaker also talked about key challenges to promoting renewable energy mini-grids, challenge matrix of mini-grids (policy side). In the second part, the speakers introduced 6 cases of renewable energy microgrid project in remote community.
- To begin the presentation, Mr Arkorn Soikaew introduced about Thailand demography, current energy plants and status of renewable energy. About renewable energy development in Thailand, the speaker shared that Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy had undergone a number of projects to support PV + BESS in remote villages, remote schools including border patrol police schools, highland community center, wild life reserves, and royal initiative projects for rural electrification, lighting, communication, agricultures etc. He talked about some renewable energy cases in Thailand. Mr Arkorn Soikaew said that Thailand was known to apply community biodiesel for agricultural machineries for quite a long time. Community biodiesel can be produced from trans-esterification of used cooking oil from either street-merchandise or home culinary or fruit oil – palm oil, jatropha seed. At the end of the presentation, the speaker talked about the possible setbacks and challenges regarding supply chain, legal constrains, public participation and government organization.

### **3. CASE STUDIES IN DEVELOPING RENEWABLE ENERGY IN RURAL/REMOTE AREA**

There were three speakers in this Session: (1) Ms Chia-Ching Lee, Second Economic Secretary, Bureau of Energy, Ministry of Economic Affairs, Chinese Taipei; (2) Mr Nguyen Hoai Nam, Senior Researcher, Deputy Director, Institute of Energy Science, Viet Nam Academy of Science & Technology; (3) Ms Victoria Sandre, Policy Analyst in the Renewable and Electrical Energy Division at Natural Resources Canada.

- Ms Chia-Ching Lee divided her presentation into 4 main parts: renewable energy target and promotion policy; promoting in indigenous; case sharing; and conclusion. In the first part, the speaker shared some figures about 2025 Renewable Energy Target and promotion of offshore wind. She said that the installed solar PV capacity grew rapidly and currently there are comprehensive planning and monitoring schemes to accelerate solar PV deployment. The speaker also mention about challenges of developing renewable energy in Indigenous and Remote Areas and the purpose of promotion. Public and private sectors join hands to promote renewable energy installation and create a sustainable green living environment. By doing this, we can mitigating impacts by natural disasters, enhancing local energy independence, utilizing local renewable resources facilitating local sustainable development. After presenting 4 cases of developing renewable energy in remoted areas in Chinese Taipei, the speaker concluded that there are 37 cases in indigenous and remote areas have been subsidized for planning and evaluation of renewables installation. Challenges in indigenous and remote areas include inadequate capacity of distribution feeders, insufficient awareness toward renewable energy, long-distance transmission of electrical power and power outages by natural disasters and Chinese Taipei is on the way forward to invest more resources and grid infrastructure installation.
- Mr Nguyen Hoai Nam presented about a project on energy production for rural areas from fruit and vegetable wastes. The objectives of the project is to produce biogas from fruit and vegetable wastes by biological processes. Most of the project works are to experiment the impacts of environmental factors to the biogas production efficiency. From the key result of the research, the speakers listed out some future work on the way forward: Development of biogas project in farm scale using waste of pig and cow,

Biomass gasification technology using organic waste, urban waste; Increasing the efficiency of operation of hybrid power system and PV station; Renewable energy integration technology such as microgrid, BESS.

- At the beginning of the presentation, Ms Victoria Sandre introduced about diesel reliance in remote communities in Canada which showed ~200 communities in Canada are reliant on diesel for heat and power. After that she talked about federal programs targeting reducing diesel dependence in remote communities and Clean Energy for Rural and Remote Communities Program. For the case studies, she presented about Fort Chipewyan Solar Project and Old Crow Solar Project. She highlighted that additional federal investments are needed to make a meaningful transition away from diesel. Coordination of federal programming is required to improve community access to funds. In 2020, Canada's Strengthened Climate Plan announced an additional investment of \$300M over five years, starting in 2022, to continue supporting projects in collaboration with other federal departments. With this new funding, Canada has started to accept project applications and are prioritizing projects led by indigenous communities and organizations.

#### **4. DISCUSSIONS**

- Regarding the combination of renewable energy resources, in Nagasaki of Japan, solar energy has been combined with wind energy. Besides, Japan is researching biomass and combination of solar energy and battery to convert to mixed energy. Combination of solar energy and batteries is introduced to Indonesia to stabilize domestic electricity generation.
- Japan also plans to use the EMS system for renewable energy management to create electrical connectivity for remote areas. This combined energy plan is suitable and plays an important role in electricity supply to rural and remote areas.
- The Chilean speaker shared experience on price control and improvement of the outreach of domestic grid to remote areas with renewable energy. She highlighted that government subsidies was important as the electricity system in Chile was relatively small and high electricity price was unaffordable for local communities in remote areas. For example, in some

islands with only about 15 households in Chile, the household would not be able to pay a high electricity price if the government did not provide a subsidy to adjust the higher tariff in these areas against the normal price paid by the households living elsewhere in the domestic grid. From the perspective of social welfare, most people in remote areas suffer from extremely severe living standards and conditions, and so a government subsidy for electricity price neutralization is justifiable for those target areas.

- Related to investment, as the electricity system in agriculture and remote areas is often too small to attract private investment, the government should invest in construction and operation and let private companies get involved in generation, distribution and/ or maintenance afterwards. However, for sustainable development of rural and remote areas, the regulatory framework should focus more on investment support because the renewable energy investment costs in those areas can be too large for local authorities to afford.
- However, the most important issue in renewable energy development in remote areas is not the construction or the price, but operation and maintenance (O&M). Assigning this task to the local community is not a good answer for many reasons:
  - Local communities often lack technical skills and expertise in O&M and in resolving arising problems along the system;
  - Local communities do not have their own budget for operation and maintenance while revenue from renewable energy is insufficient. Therefore, both financial and technical support are required for the operator to run a sustainable and long-term renewable energy system.
- Experience from Viet Nam shows that the government gives a number of renewable energy projects to the state-owned power companies which have rich experience on power system development. Therefore, when problems arise, they can properly handle them. In addition, the state-owned power companies have social responsibility and therefore they allocate additional financial resources for power development in less developed areas. This model can be a suggestion for other economies.
- Regarding the coverage of electricity for all people, currently in Chile most communities in remote areas have access to solar power through

microgrids. However, the microgrids still partly run on fossil fuel. Therefore, the issue for governments is not the initial investment but the construction of solar panels. Besides, the unclear land ownership is also a problem during the implementation of renewable energy projects.

- Related to biogas as a source of renewable energy for household use, its stability and feasibility mainly depends on availability of technology and acceptance by the community.
- Regarding the development of the ocean energy plan of the Philippines, a speaker explained that the economy was considering offshore wind power development and conducting research on grid connection and cooperation with domestic authorities to understand the offshore wind power aspects. In terms of cost, wave and tidal energies were quite competitive with other sources, but the final pricing should wait until after processing and evaluation of energy projects was finished.
- Regarding sustainable development of small hydropower (SHP) a speaker indicated that among numerous SPH projects invested and developed by private companies in Viet Nam, only a few had negative impacts on the environment, while most were doing well in hydropower development. The problem was that inadequate information and lack of evidence of good practices of renewable energy projects provided to the media led to insufficient and inaccurate communication to the public. Therefore, people may not fully understand the positive contribution of renewable energy plants operated by private sectors.
- If private investors in Viet Nam strictly comply with domestic regulations, adverse impacts of SHP plants on the environment will certainly be eliminated. Specifically:
  - In case the forest needs to be cut down to pave the way for small hydropower plants, the developers can only cut down certain pre-defined forest sections. To make up for that, afforestation is required to restore watershed forests.
  - If ecological flows are designed in the project, technical and administrative measures must be taken to allow the plant to discharge ecological waste. For instance, in Viet Nam small hydropower projects are not allowed to use sluices to block the water flow. It must always be left open to enable inflow and outflow of water to create ecological flows.

- Terms and conditions relating to electricity generation in the dry season must be negotiated before project implementation to harmonize economic and social development benefits.
- In summary, according to Viet Nam's experience, the development of small hydropower will be sustainable as far as the investors are committed to fully comply with the laws. Therefore, stricter enforcement and supervision for sustainable development of small hydropower and environmental protection is essential.
- To raise awareness and encourage participation of local communities in renewable energy projects, it is suggested to build a good relationship with local people before implementation.
- A speaker described a project of the Japanese government to build a smart solar rooftop grid on Fiji island. The experience showed that it would not be effective to focus only on technology transfer without building smooth interactions and good relationships with local people and small energy service providers (ESCOs). Such a relationship should be built at the first place indeed. It would help find out local people's needs and capabilities to take advantage of technologies. Based on that, the developer can design training programs for local people to operate the microgrid on their own.
- Another speaker added that the application of technology, such as for wind turbine projects, in remote and difficult areas depends on geography and climate of regions.
- Language can be a challenge for project implementation. Mandarin is the main language in Chinese Taipei, however, many indigenous communities in remote areas do not speak Mandarin. Although the project provides interpreters for local people, most of them cannot understand the policy on electricity development. That is why the government and businesses have to spend a lot of time consulting local and rural communities. The lessons learned are:
  - Training is essential to familiarize local people with daily operation and maintenance of the power station. It would help ensure everyone's participation in and responsibilities for daily operation of the facility.
  - Training programs need to be developed to prepare local people for project operation.



- Promoting communication and strengthening relationship with local people can be done through building a tripartite linkage among government - local people - training centers to provide financial and human resources, equipment, experts and expertise to ensure sustainability for daily operations.

## **V. RECOMMENDATIONS**

During the final session, there were 3 panelists in this Session: (1) Professor Terrence Surles, Senior Advisor, Hawaii Natural Energy Institute, USA; (2) Ms Director Mylene C. Capongcol, Director, Department of Energy, Renewable Energy and Management Bureau, Philippines; (3) Mr Hu Xiaofeng, Department Director, China Renewable Energy Engineering Institute.

- In this Session Professor Terrence Surles focused on 3 main issues: Overview of international activities; Challenges; and Proposed advice to governments. In the first part, the speaker showed some figures about international efforts in mini-grid development in Africa and Asia and percentage of mini-grids powered by solar energy systems. Professor Surles shared that international organizations have made recommendations on government roles for program management. Development of rural and remote electricity grids must have governmental financial support. Development of proper financing requires involvement of many stakeholders. Government policies and regulations must be flexible to allow for new business models and technologies. Legal and regulatory framework must be transparent with regulatory requirements and obligations fairly enforced. Planning process is important – as proper planning saves funds and allows the community to be involved. Mechanisms for connecting rural and remote grids to the domestic grid should be straightforward as part of the interconnection approval process. Development must be connected to other societal, economic, energy, and environmental policies.

- Ms Director Mylene C. Capongcol briefly introduced about the Philippines with some information about population, income and expenditure, some regulation/policies about renewable energy development plan and programs. In the second part, she talked about current ongoing program including Net Metering for renewable energy, NPC renewable energy Roadmap, 2021-2040, renewable energy Support Programs to Total Electrification, Productive Uses of renewable energy (PURE) Pilot Projects. In the third part, the speaker provided some recommendations to governments: Establish local baselines, set clear and specific policy objectives; Determine goals, specific targets backed by appropriate implementing rules and regulatory frameworks; Go beyond household electrification. Integrate food security and climate resilience; Build local and international partnerships to expand user experience, show proof of concept and success indicators.
- Mr Hu Xiaofeng started his presentation by presenting about ideas of renewable energy development in rural areas in which President Xi mentioned the rural energy revolution at the 14th meeting of the Central Finance and Economics Leading Group in 2016. After that he talked about the Rural Revitalization Strategic Plan in China and some related key support policies. Some rural energy construction ideas were listed, including develop distributed wind power and photovoltaic power generation on roofs, fields, collective idle land, promoting biomass energy, geothermal energy, solar energy and electric heating according to local conditions, improving the industrial foundation, and building a multi-energy complementary clean heating system that integrates urban and rural areas in the county, etc. In the second part, he shared a typical case of Lankao County which was the first rural energy revolution pilot construction demonstration county in China. From 2017 to 2021, Lankao County has made a series of achievements in the development of rural renewable energy. He shared that Compared with 2016, the proportion of non-fossil energy consumption in the county increased from 22% to 63%. The proportion of new energy power generation in the total electricity consumption has increased from 21% to 90%. The penetration rate of clean heating has increased from 14% to 99%, and the public green travel rate has reached 90%.

Participants also shared overall views and recommendations on what APEC should do in term of policies and actions to support the renewable energy development in rural/remote areas in APEC member economies as follows:

**To governments:**

- Put in place mechanisms to enable the participation of all parties, promoting financial transparency and developing portals on financial mechanisms;
- Improve coordination and public-private partnership to fully support rural and remote areas in such projects.
- Carry out more research and development work on different renewable energy sources, with a focus on technologies that can best support micro-grids, EMS and hybrid system, etc.
- Study, learn experience and create renewable energy innovative challenge fund to better promote ideas, deployment and financing for renewable energy in remote and rural areas.
- Create more enabling policies and regulations for innovative financing mechanism for renewable energy in rural and remote areas, particularly those combining research institutes, private sector investors, and communities. Example are: the challenge fund for renewable energy, renewable energy public-private partnership program (PPP definition and regulations needs to be updated), etc.
- Develop and apply home solar battery model. This model is the right choice for climate change adaptation solutions, taking into account the economic development and ecological conditions of each economy. This type of model will be best suitable for economies in tropical areas like Viet Nam, Thailand, etc.
- Support access to financial resources that help remove the huge barrier for developing economies to acquire technologies, especially green ones. Financial support will help solve this problem. It would be very useful to set up a transparent public portal so that the one who participates will find

out who is providing appropriate financial sources, technological solutions, etc. Every information should be clearly displayed on this portal.

- Improved coordination and collaboration between public and private partners to support rural areas in a comprehensive way.
- Determine the scope of the program that needs to be developed. That is, how geographically large is the area or areas and how many people live there.
- Develop planning for targeting specific remote and rural areas. When doing so, develop relationships with members of the communities that will be impacted.
- Determine if a governmental organization is needed to catalyze the program. Both the United States and Canada programs can be used as examples. In the United States, it is the Rural Electricity Cooperative Agency that funds the development of remote grids that the private sector will not do. If this is necessary, develop sufficient funding for early organization and planning.
- All early planning should work with community members, the financial community, potential private sector funders, and technology providers.
- In the case of technology providers, determine what changes may need to occur to specific technologies to make them more effective – more durable, less subject to breakdown – in remote and rural areas.
- During early planning, part of the effort must be to educate and inform all participants of any issues – cultural, societal, technical, geographical
- Develop and continue to monitor training programs for local community members who will be responsible for operating and maintaining the renewable energy systems.
- Develop a process for feedback. This should take the form of periodic meetings for exchange of information – discussions of problems and successes. This is the basis for a broader “lessons learned” approach.
- Government activities should remain flexible in order to be modified based on problems that have occurred. Flexibility is also important in order to provide different solutions for different remote and rural areas as circumstances may be different from one to another.

**To APEC:**

- Organize more workshops, seminars for policy makers, bankers and financiers on renewable energy technologies, renewable energy projects and potentials to become better aware of the sector and develop appropriate enabling legal and financial mechanisms.
- Organize policy dialogues among the private sector, civil society and the government to better understand and communicate on the economic, social and environmental benefits of renewable energy in remote and rural areas, discuss and agree on the common interests, and reach a higher level of consensus and cooperation to promote renewable energy in the region.
- Consider using the Renewable Expert Working Group meeting to focus on technologies and broader approaches to providing renewable energy to remote and rural communities.
- Invite community members from remote and rural communities to participate in these meetings. These discussions are generally from technology or government experts. It will be very useful to have community members who are impacted by these program initiatives to offer their observations.

## **VI. CONCLUSIONS**

In her closing remarks, Ms Pham Quynh Mai (Viet Nam's Senior Official to APEC) recognized productive sessions were held on a number of important issues such as the roles of renewable energy in rural and remote areas; opportunities and challenges for developing renewable energy in those areas; sharing experiences through case studies in the application of renewable energy in member economies; and making recommendations to promote and address challenges in renewable energy development, so on. The Senior Official also noted efforts to promote access to energy in general, and renewable energy in particular to the vulnerable, especially those in rural and remote areas for more inclusive growth and development. What is more important, common views of Workshop participants are shared, that it is critical to build local and international partnerships, adopt appropriate rules and regulation, develop new skill sets for remote and rural systems to allow consistent and effective operation etc.

Through the sharing of information and lessons learnt, Ms Pham highlighted that each and every member economy could choose to develop and

implement their own strategy and goal, towards the achievement of green, sustainable, and inclusive growth. Economies could choose to promote research and development, implement pilot programs or develop strategies to support renewable energy in rural and remote areas with consideration to specific circumstances.

By hosting this Workshop, Viet Nam wishes to join and strongly support APEC's common efforts on accelerating renewable and clean energy development and deployment as well as enhance access to renewable energy to those more disadvantaged in rural and remote areas.

## VII. ANNEX 1: FINAL AGENDA OF THE WORKSHOP

<b>16 August 2022 (Tuesday)</b>	
09:00–09:10	<p><b><u>Opening Ceremony</u></b> Mr Nguyen Van Vy, Vice President, Renewable Energy Association of Viet Nam</p>
09:10–10.00	<p><b>Session 1: THE IMPORTANCE OF RENEWABLE ENERGY IN RURAL/ REMOTE AREA</b></p> <p><b>Moderator:</b> - Ms Nguyen Huong Tra, National University, Viet Nam</p> <p><b>Speakers:</b> - Ms Elena Villanueva, Project Manager &amp; Consultant for Asia-Pacific Trama TecnoAmbiental, Spain. - Mr Toshiaki Matsumura, General Manager for EMS Technology of Kyudenko Corporation, Japan. - Mr Vu Quang Dang, Energy Specialist, Asia Development Bank in Viet Nam.</p>
10:00–10:20	<b>Discussions (Q&amp;A)</b>
10:20–10:30	Coffee Break
10:30–11:10	<p><b>Session 2: OPPORTUNITIES AND CHALLENGES FOR DEVELOPING RENEWABLE ENERGY IN RURAL/ REMOTE AREA</b></p> <p><b>Moderator:</b> - Ms Nguyen Huyen Chau, Visiting Scholar, RMIT International University Viet Nam</p> <p><b>Speakers:</b> - Professor Terrence Surles, Senior Advisor, Hawaii Natural Energy Institute, USA. - Mr Kang Taeil, Founder and CEO, One Energy Island Co., Ltd, Korea. - Mr Arkorn Soikaew, Scientist, Practitioner Level, Department of Alternative Energy Development and Efficiency, Thailand.</p>
11:10–11:30	<b>Discussions (Q&amp;A)</b>

<b>17 August 2022 (Wednesday)</b>	
09:00–09:50	<p><b>Session 3: CASE STUDIES IN DEVELOPING RENEWABLE ENERGY IN RURAL/ REMOTE AREA</b></p> <p><b>Moderator:</b> - Ms Nguyen Huyen Chau, Visiting Scholar, RMIT International University Viet Nam</p> <p><b>Speakers:</b> - Ms Chia-Ching Lee, Second Economic Secretary, Bureau of Energy, Ministry of Economic Affairs, Chinese Taipei. - Mr Nguyen Hoai Nam, Senior Researcher, Deputy Director, Institute of Energy Science, Viet Nam Academy of Science &amp; Technology. - Ms Victoria Sandre, Policy analyst in the Renewable and Electrical Energy Division, Natural Resources Canada.</p>
09:50 – 10:10	<b>Discussions (Q&amp;A)</b>
10:10 – 10:30	Coffee Break
10:30 – 11:20	<p><b>Session 4: RECOMMENDATIONS FOR GOVERNMENTS TO DEVELOP RENEWABLE ENERGY IN RURAL/ REMOTE AREA</b></p> <p><b>Moderator:</b> - Ms Nguyen Huong Tra, National University, Viet Nam</p> <p><b>Panelists:</b> - Ms Director Mylene C. Capongcol, Director, Department of Energy, Renewable Energy and Management Bureau, Philippines. - Mr Hu Xiaofeng, Department Director, China Renewable Energy Engineering Institute. - Professor Terrence Surles, Senior Advisor, Hawaii Natural Energy Institute, USA.</p>
11:20 – 11:30	<p><b><u>Closing Remarks</u></b> - Ms Pham Quynh Mai, Viet Nam’s Senior Official to APEC</p>