

EGNRET 49

1. EGNRET Activities

The 49th Meeting of the APEC Expert Group on New and Renewable Energy Technologies (EGNRET 49) was held on October 23 to 27, 2017 in Tokyo, Japan. Two APEC workshops, “APEC Workshop on Small and Medium PV System Database in the APEC Region” (EWG 14 2015A) and “APEC Workshop on Heating Applications of Bio-pellet Made from Ecological-hazard Plant in Small and Medium Enterprises to Enhance Utilization of Renewable Energy in the APEC Region” (EWG 18 2016A) were held alongside the meeting on October 23-24, 2016, including a site visit to the low carbon buildings, i.e., Shimizu Corporation Head Quarter and Commercialized Smart Community Building in Chuo-ku, Tokyo, Japan on October 27, 2018.

The EGNRET 49th meeting was co-chaired by EGNRET Acting Chair, Dr. Hom-Ti (Tom) Lee, Division Director of Planning & Business Development Division at Green Energy and Environment Research Laboratories of the Industrial Technology Research Institute (ITRI), Chinese Taipei, and Mr. Tomio Harada, Director for Natural Resources and Energy Research, International Affairs Division, Agency for Natural Resources and Energy at Ministry of Economy, Trade and Industry (METI), Japan. Representatives from China, Japan, Republic of Korea, Indonesia, the Philippines, Chinese Taipei, Thailand and other APEC representatives from APEC Policy Partnership on Food Security (PPFS), APEC Expert Group on Energy Data Analysis (EGEDA), Asia Pacific Energy Research Centre (APERC) and Low Carbon Model Town Task Force (LCMT-TF) participated in the meeting.

Four invited presentations in the meeting were “Update on APERC Activities and Energy Modelling for the 7th Outlook” by APERC, “Progress Report of Low-Carbon Model Town (LCMT) Project” by LCMT-TF, “Tracking APEC’s Renewable Energy Doubling Goal” by EGEDA, and APEC PPFS Representative also presented a short introduction to PPFS, and “APEC PPFS Opportunities for Cooperation with EGNRET.”

In addition, because renewable energy supply is growing fast in the APEC region, deployment of energy storage systems became much more significant. Therefore, the meeting theme of member economy presentation for EGNRET 49 was “Deployment of Energy Storage for the Expanding Renewable Energy Supply.”

Moreover, in order to share the increasing burden of operations of EGNRET, Mr. Cheng-Nan

Chu (Manager at Industrial Technology Research Institute) was nominated by the Chair as an additional EGNRET secretary, and endorsed by EGNRET Representatives effective 27 October 2017.

All EGNRET 49th meeting presentations are available on the EGNRET website at:

<http://www.egnret.ewg.apec.org/meetings/meetings-v49>

EGNRET thanks Japan for hosting EGNRET 49, and is also grateful to METI, IEEJ, and APERC for their kind support to EGNRET 49. In addition, special gratitude is due to Mr. Takao Ikeda and his colleagues at IEEJ for their kind assistance and arrangement on EGNRET 49 meeting affairs.

2. Discussion during EGNRET 49 Meeting

Two major topics were discussed in the EGNRET 49th meeting including (1) Achieving APEC Renewable Energy Doubling Goal, and (2) Future Cooperation between EGNRET and PPFS / other international organizations.

(1) Achieving APEC Renewable Energy Doubling Goal

In 2014, Energy Ministers at EMM 11 instructed the EWG through the EGNRET to develop the road map for the aspiration goal of doubling the share of renewable in the APEC energy mix, including in power generation by 2030.

In order to step toward to the goal of doubling the renewable energy share and promote renewable energy in APEC region, EGNRET has proposed a project by Chinese Taipei to develop a roadmap toward renewable energy doubling goal by 2030, and this project would like to collaborate with APEC sub-groups and APEC economies.

The EGNRET Secretariat presented “Filling the Gap to Reach the Goal of Doubling Renewable Energy in the APEC” to introduce the background of renewable energy (RE) doubling goal, progress on APEC project of RE doubling goal, research framework, and regional roadmap development of RE doubling goal. The conclusions of presentation reveals that economies in the APEC region should be working together to reach the renewable energy doubling goal. It is suggested that APEC economies should take APEC RE doubling goal into consideration when APEC economies are making their renewable energy targets and policies. The APEC economies are encouraged to support the RE doubling goal by a variety of development plans. The policy comprised Financial Mechanism,

Market Reform, Technology Innovation, Capacity Building and Infrastructure is recommended to achieve the RE doubling goal. The capacity of EGNRET, APERC and EGEDA on instruments for RE Doubling Goal, and the future collaboration direction is shown in presentation as well.

Three related activities were held to accelerate approaching the RE doubling goal including the First Seminar on Conducting APEC Renewable Energy Roadmap (March 2-3, 2017 in Tokyo, Japan), APEC Workshop on Filling the Gap to Reach the Goal of Doubling Renewable Energy in the APEC Region (March 27, 2017 in Jeju, Republic of Korea), and the Second Seminar on APEC Renewable Doubling Goal Roadmap (October 23, 2017 in Tokyo, Japan). The second phase project Concept Note for funding in Session 1, 2018 has also been proposed by Chinese Taipei.

The detailed report is shown at Meeting Item 12(d) Progress toward Renewable Energy Doubling Goal presented by EGNRET Secretariat.

EGNRET also thanks APERC, EGEDA, ESTO and NREL for their kind support and assistance in developing the roadmap of the RE Doubling Goal.

(2) Future Cooperation between EGNRET and PPFS / other international organizations

Strengthening collaboration with APEC other fora and non-APEC international organizations has been listed in the EGNRET Terms of Reference.

In EGNRET 49, Mr. Matthew Tan, the PPFS representative presented the feasibility of opportunities for cooperation between PPFS and EGNRET including (1) submission of joint concept note with support from PPFS and vice versa, (2) cooperation with APEC Centres for sustainable development in agriculture and fishery sectors in Singapore, (3) joint collaboration in current PPFS project, and (4) use of technologies in PPFS & EGNRET projects. The prospects of the future of farming are agriculture and aquaculture farms that run completely on renewable energy. The ideas will be taken into consideration by EGNRET members for proposing new projects in the near future. Furthermore, the EGNRET members are also encouraged to conduct cooperation with non-APEC international organizations. Once the cooperation is established, EGNRET will report to EWG for endorsement.

3. EGNRET Project Update

The EGNRET has variety of projects underway to facilitate the use of renewable energy

technologies in the APEC region.

Currently, 4 EGNRET projects have been completed since EWG 53, and 12 on-going projects from 2015 to 2017. Moreover, 2 projects have already been successful in gaining in-principle approval for APEC funding in Session 2, 2017, and Project Overseers for these 2 projects have been informed for development and submission of their full project proposals by 26 Oct., 2017. In addition, 2 new project Concept Notes have been submitted for funding for EWG review currently in Session 1, 2018.

In addition, in EGNRET 49, on behalf of Ms. Penelope Howarth, the Program Director of EWG, the EGNRET Secretariat presented the APEC project reform including Eligibility Criteria and Guidelines for Accessing the Energy Efficiency and Low Carbon Measures Sub-Fund. Also, in order to report to EWG meeting, the EGNRET members are requested to submit a two-page Summary of Completed Project (see Annex) to the EGNRET Secretariat after project is completed.

The above projects are listed below.

(1) Completed Projects since EWG 53 (4 projects)

	Project Title	Proposing Economy	Project Number
1	Long Term Reliability Study of PV Systems for Installation on Islands	Chinese Taipei	EWG 21 2015A
2	Best Practices for Developing the Green Energy Smart Farm in the APEC Region	Chinese Taipei	EWG 23 2015A
3	Renewable Energy Safety in APEC	Thailand	EWG 17 2015A
4	Small and Medium PV System Database in the APEC Region *	Thailand	EWG 14 2015A

* Completed on 30 Nov., 2017

Two-page summary of each completed project is attached in the Annex.

(2) On-going projects (12 projects)

	Project Title	Proposing Economy	Project Number
1	APEC Peer Review on Low-Carbon Energy Policies (PRLCE), Phase 4	Japan	EWG 01 2017A
2	Making the Case for Clean Energy Investments with Life-Cycle Impact Assessments	USA	EWG 02 2017A
3	Economic and Life Cycle Analysis of Solar Photovoltaic Systems in APEC Region toward Low-Carbon Society	Malaysia	EWG 06 2017A

4	Study on the Cost-Effective Renewable Energy-Supply Solutions based on Innovative Solar Technologies to Promote Green Buildings in APEC Region	China	EWG 03 2016A
5	Research on Energy Storage Technologies to Build Sustainable Energy Systems in the APEC Region	China	EWG 04 2016A
6	Off Grid Electrification Option for Remote Regions in APEC Economies	China	EWG 07 2016A
7	Promoting innovative green financing mechanisms for sustainable urbanization and quality infrastructure development in APEC region	China	EWG 09 2016A
8	Filling the Gap to Reach the Goal of Doubling Renewable Energy in the APEC Region	Chinese Taipei	EWG 11 2016A
9	Heating Applications of Bio-pellet Made from Ecological-hazard Plant in Small and Medium Enterprises to Enhance Utilization of Renewable Energy in the APEC Region	Chinese Taipei	EWG 18 2016A
10	Guidelines toward High Biodiesel Blend Diesel (eg B20) Specification in the APEC Region	Thailand	EWG 20 2016A
11	APEC Low Carbon Model Town Solar Photovoltaic Agricultural Development Mode Study	China	EWG 11 2015A
12	Developing Solar-Powered Emergency Shelter Solutions (SPESS) as an Energy-Resilience Tool for Natural Disaster Relief in APEC Community	China	EWG 22 2015A

(3) In-principle approval for APEC funding for Session 2, 2017 (2 Projects)

Project Number by EWG	Project Title	Proposing Economy
EWG 3	Empowering a Distributed Energy Resource Future through Regulatory and Market Reforms	Thailand
EWG 6	Integrated energy system planning for equitable access to sustainable energy for remote communities in the northern regions of North Sulawesi	Australia

(4) The proposing Concept Notes for Session 1, 2018 (2 projects)

Project Number by EGNRET	Project Title	Proposing Economy
[NRE181-1]	Policy and technology analysis to support development and deployment of renewable energy in APEC Region	China
[NRE181-2]	Filling the Gap to Reach the Goal of Doubling Renewable Energy in the APEC Region- Phase 2	Chinese Taipei

4. Prospects of EGNRET Works in 2018

The EGNRET will focus more on renewable energy doubling goal, smart grid, low carbon town, etc. which are directly related to the SE4All, ESCI and APEC ASGI.

EGNRET members are encouraged to conduct researches related to reduction of energy intensity in APEC region.

EGNRET will expand the experience exchange or share of best practices for each economy to access the enough technology to further promote the renewable energy for RE doubling goal.

The EGNRET will strengthen collaboration with APEC other fora such as PPFS, APERC, APSEC, LCMT-TF, EGEE&C, EGEDA, Policy Partnership on Science, Technology, and Innovation (PPSTI), and some projects, e.g., PRLCE and PREE, and LCMT supported.

Collaboration with International Energy Agency (IEA), International Renewable Energy Agency (IRENA), Economic Research Institute for ASEAN and East Asia (ERIA), Energy Research Institute Network (ERIN), and International Copper Association Ltd. (ICA) on promotion of renewable energy in the APEC region will be carried out as well. All cross-fora cooperation will be reported to EWG for endorsement.

SUMMARY OF COMPLETED PROJECT

Long Term Reliability Study of Photovoltaic (PV) System Installation on Islands (EWG 21 2015A)

Expert Group on New and Renewable Energy Technologies (EGNRET)

Background

The access to reliable energy services is crucial for economic activity and a sustainable development in remote rural and marine areas in the APEC region. An estimated 130 million people living in ocean area of APEC region do not yet have access to electricity what underlines the importance of continuing activities. Solar PV systems are one of the strategic solutions perfectly adapted to developing economies in order to meet the objectives of reducing emissions of GHG related to electricity production. The reliability issues of PV system in the coast area become very crucial because polymeric materials inside solar cells are prone to crack under high salinity environment. Also, moisture and corrosive sodium ions shorten the efficiency and service life of solar system under this kind of harsh environment. The reliability issues, however, is still not common knowledge among the APEC region. A study and a guideline of keeping the PV modules maintenance and raise the reliability will be helpful to promote the PV installation in APEC region. The study result of this project will help to approach the doubling renewable energy goal in the APEC region in 2030.

Objectives of the Project

The objective of this project is to understand the reliability of PV system which was operated in harsh environment-high temperature, salty, and humidity. Recommendations of the need parts requisitions are proposed.

Methodology

The methodology of this project involved three major activities, one is studying a PV system, which is operated in the harsh environment for more than sixteen years, another is an international workshop for experience sharing and the other is data collecting and analyzing of solar power policies, comparison between feed-in tariff, subsidized rate and standard rates in major APEC economies.

Outcomes of the Projects

The Project Report:

A short executive summary list the failure modes (or potential failure modes) and what should be done differently by manufacturers, system designers, and installers (that would make it really valuable to those of us working in salt-laden environments).

A risk-matrix on what are the likelihood of failure and the consequence and then the residual risk after mitigation would be extremely useful for APEC economies.

In summaries, the results of the outcome knowledge are expected to impact to different aspects:

a. Policy:

The project outcomes provide useful suggestions to help APEC economies to develop applicable and suitable policies like feed-in-tariff, promotion strategies, installation plans for PV power stations, and long-term maintenance processes in typical sub-tropical/tropical coastal areas.

b. Financial Support:

The project outcome aims to build up the capacity about failure modes of the PV systems, and enhance the operation life of photovoltaic power stations to twenty to twenty five service life in the coastal area for the potential or existing PV industries. Once the public, industry and banks get confidence about installing PV systems even under costal harsh environments, it will be much easier to get financial support from the different parties.

c. Improving the renewable energy application and building up industry/job opportunities in APEC developing economies:

The long term objectives of this project is not only providing electricity to these off-grid areas, but also creating economic activities and job opportunities by help developing economies to build up their own PV industry supply chain..

The Workshop:

It offers an opportunity to assess the validity of the project findings, and provide the check, peer reviews, consultations, and also receive the feedback for further revised actions.

The workshop and the final report are available on the workshop's website at:

Workshop: http://publications.apec.org/publication-detail.php?pub_id=1878

Project report: http://publications.apec.org/publication-detail.php?pub_id=1879

SUMMARY OF COMPLETED PROJECT

Long Term Reliability Study of Photovoltaic (PV) System Installation on Islands (EWG 21 2015A)

Expert Group on New and Renewable Energy Technologies (EGNRET)

Background

Currently in APEC's developing economies, most farms are located in the remote rural areas, and are difficult to connect the centralized power grid for access to the modern and clean energy. These farmers and their family rely on burning traditional biomass fuels directly for cooking, heating, studying, etc. breathing in toxic smoke. Only introducing the modern and clean energy can relieve them from the time-consuming drudgery to improve their living conditions. Thus, in order to cope with this difficult situation, deployment of the small-scale standalone distributed power system employed renewable energy with the appropriate financial mechanism can assist the farmers and their family in access to the modern and clean energy.

Objectives of the Project

The objectives of this project are listed as follows:

- (1) Assess and demonstrate the small-scale distributed renewable energy in the farms including solar PV and advanced biomass energy derived from the agricultural waste for the APEC region;
- (2) Introduce the PV-ESCO (energy service company) model, a financial mechanism to provide the economic benefits to farmers directly in the APEC regions;
- (3) Help APEC's developing economies to build up the green energy smart farms with access to the renewable energy, and also assist the farmers and their family in reducing the poverty.

Methodology

The project was carried out in the following 4 tasks:

- (1) Two workshops of the best practice and experience exchange were conducted alongside the demonstration site visits to focus on the preliminary findings in light of the desired outcomes;
- (2) A small demonstration site (test base) was established in an experimental farm in Chinese Taipei to conduct project experiments and show the best practice model for developing the green energy smart farm in the APEC region;
- (3) A Guidebook was published to provide all useful information and knowledge about

building a green energy smart farm. This Guidebook was uploaded to the EGNRET's website, and also was delivered to the farmers who request support to build up a green energy smart farm.

- (4) The final project report was produced highlighting the recommendations to develop the green energy smart farm with the small-scale standalone distributed renewable energy system in the APEC region. The report was also uploaded to the EGNRET's website.

Outcomes of the Projects

(1) Workshops

Two workshops were conducted alongside the demonstration site visits to focus on the preliminary findings in light of the desired outcomes. The 1st Workshop was held on Apr. 12-13, 2016 in Taichung, Chinese Taipei, and the 2nd Workshop was held on Oct. 12-13, 2016 in Jakarta Indonesia.

(2) Demonstration site

A small demonstration site (test base) was established at the Experimental Animal Farm, National Chung Hsing University in Taichung, Chinese Taipei to conduct project experiments and show the best practice model for developing the green energy smart farm in the APEC region. The site will be maintained to provide more researchers for conducting experiments and for follow-up actions, and to offer the site visits as a best practice model farm.

(3) Guidebook

A Guidebook was published to provide all useful information and knowledge about building a green energy smart farm including 5 parts: Introduction, Scope and Objectives, Legal Concerns on Establishing Green Energy Smart Farm, Financial Issue on Establishing Green Energy Smart Farm, and Remarks. This Guidebook was uploaded to the APEC EGNRET's website, and also was delivered to the farmers who request support to build up a green energy smart farm.

(4) Final Project Report

The final project report contains 7 parts including one appendix, the Guidebook: Introduction, Legal Issues on Development of Green Energy Farm, Policy and Economic Analysis of Renewable Energy for Smart Farms in the APEC Region, Establishing a Small Smart Farm Demonstration Site, Project Workshops, Social Entrepreneurship Matters, and Guidebook for Building a Green Energy Smart Farm.

A new concept, RETI (Regulations, Economy, Technologies, and Integration) was proposed for developing the green energy smart farm.

SUMMARY OF COMPLETED PROJECT

Renewable Energy Safety in APEC (EWG 17 2015A)

Expert Group on New and Renewable Energy Technologies (EGNRET)

Background

Renewable Energy Technology (RET) becomes popular to general population throughout APEC region. In communities, RET such as Biogas and Solar PV is more favorable over other technologies. However, it seems that the safety aspect of these RETs has not been fully recognized by people who utilize RET which leads to property damages, casualties, and deaths. Over the past 10 years, there were reports on accidents related to use RET in Thailand. This project aims to raise safety awareness in using RET in selected APEC economies (Thailand, Viet Nam, The Philippines, Indonesia and Malaysia). The method which is being implemented successfully in Thailand is using community-based renewable energy volunteers as safety ambassadors. They were trained with safety protocols to be able to use and demonstrate safety equipment correctly. In long term, the volunteers will go back to their communities and be spokespersons on RET safety. APEC economies such as Viet Nam, the Philippines, Indonesia, and Malaysia, are selected to participate in this project since they share a common culture. So that this project could benefit in their RET promotion with a minimum number of accidents. Long-term planning for each economy will be established in order to receive support from their governments.

Objectives of the Project

1. To establish long-term planning for RET safety in selected APEC economies.
2. To create network of community-based renewable energy volunteers for each economy
3. To build capacity on RE safety in chosen APEC economies.

Methodology

The methodology of this project involved the activities and deliverables. The main activities are to carry out series of workshops in order to share the renewable energy safety experiences that were implemented successfully in Thailand to selected APEC economies (Viet Nam, The Philippines, Indonesia and Malaysia).

The project organizes totally six workshops. The first workshop in Thailand aims to share the project with stakeholders of each economy. The second workshop in the Philippines, the third in Viet Nam, the fourth in Indonesia and the fifth in Malaysia aim to share and transfer

the experiences, knowledge, and techniques on RE safety awareness that implemented in Thailand to the participants from selected APEC economies. And the sixth workshop in Chiang Mai, Thailand aims to develop long-term planning for further dissemination of the project of each economy.

Outcomes of the Projects

1. The experts from chosen APEC economies participated the first workshop in Chiang Mai, Thailand. They shared the experiences on Renewable Energy Technology (RET) promotion. The result found that, among selected APEC economies, there are a large number of RE sources i.e. hydro, wind, biomass, biogas and solar energy. However, there are some records about accidents in the production and utilization of those RETs.
2. The training and experience transfer sessions were organized following the plan. The experts from Thailand were shared and transferred the experiences, knowledge, and techniques on RE safety awareness to the participants from the selected economy. As the same time, they learned about RE safety issues and practices from selected economies.
3. Long-term planning for RET safety in selected APEC economies are summarized as follows:
 - 3.1 The Philippines: RE safety promotion-promoting safety everywhere/workplace imparts public or workers awareness and discipline, increase in the awareness of RE safety–technician who works with jobs which involve dangers must always be briefed and required to wear safety gears, another essential part of being/keeping safe is “Planning”
 - 3.2 Viet Nam: There is no safety regulations/policies for RE in particular in Viet Nam. The policies and regulations related to RE safety need to be put into enforced soon, the motivating mechanism on solar development and draft circular on its guidelines and raising awareness and training for local people/users at communities is needed.
 - 3.3 Indonesia: Safety is important in RE projects from conceptual to operation and maintenance, for sustainable future growth, the RE safety plans must be developed and implemented.
 - 3.4 Malaysia: The National RE Policy and Action Plan Strategic Thrusts were established in 2010 for Promote RE safety. The plan consists introduce a legal and regulatory framework, provide conducive business environment for RE, intensify human capital development, enhance RE research and development and create public awareness and RE policy advocacy programs. Malaysia should increase in RE safety promotion, particularly in an urban area.

SUMMARY OF COMPLETED PROJECT

Small and Medium PV System Database in the APEC Region (EWG 14/2015A)

Expert Group on New and Renewable Energy Technologies (EGNRET)

Background

At present, the PV systems are becoming more economical with increased grid parity. APEC Energy Ministers also expressed their goal of doubling the share of renewables by 2030. The small and medium PV systems are the decentralized power sources which utilize the local resources in the environmentally friendly manner. The APEC member consists of developed and developing member economies. The grid connected PV systems could be found in both the developing and developed member economies. However, most of the off-grid PV systems can be found in the developing member economies. The developed and developing member economies could learn and facilitate each other to push forward the implementation of renewable energy technologies.

To obtain the maximum benefit of the PV systems in the future, PV system stakeholders should study from previous installed systems. Hence, there is a need for a systematic way and platform of recording and monitoring the operation of the PV systems. The platform can be a web-based database for the Small and Medium PV System for information sharing on implementation and performance of the systems. Gathering and analyzing PV systems for best implementation practices is the key to increase the use of new and renewable energy. It is hoped that the open access database will benefit the stakeholders of the APEC member economies such as government, private, public, academic, and commercial sectors.

Objectives of the Project

This project seeks to create a collaboration to share information of small to medium scale PV system for the promotion of renewable energy.

1. To compile, collate, analyze, report, disseminate profiling of small to medium scale PV system information in selected grid connected and off-grid PV systems.
2. To initiate a strong institutional network for collecting, updating and maintaining the database for the PV systems in the APEC member economies.
3. To share the information of small to medium scale PV system status in a common platform as an information cloud sharing environment.

Methodology

1. Set up project organizing team of selected experts from 5 participating APEC economies.
2. Organize the 1st Project organization team meeting and the 1st workshop to determine the way forward, type of data, how to update and maintain the database and the structure of PV system database.
3. Design and create the web database “www.apecpv.cmru.ac.th” with the host at Chiang Mai Rajabhat University.

4. The member of the project organizing team input the data from small and medium scale PV systems to the database and fix the bugs from the program.
5. Organize the 2nd Project organization team meeting and the 2nd workshop to share experience on data collection; input to the database; and determine the way forward for reporting format and data analysis concept to benefit all stakeholders.

Outcomes of the Projects

Monitoring and recording all PV systems in all APEC member economies is a very challenging task. It required networks of institutions (public, private, and academic) in each economy for local data collection and updating the database. In this project, 5 economies participated: Indonesia, Malaysia, Thailand, United States and Vietnam. There were 2 workshops held in Chiang Mai, Thailand on 26-27 September 2016 and Tokyo, Japan on 23 October 2017. The workshops were led by expert members with tailored program for experience sharing, brainstorming and collaboration. The workshop included several sessions with varying dynamics such as expert presentations, case studies discussion, and group breakout discussion. The focus of the workshop were the brainstorming regarding way forward for data sharing of the PV system under the database platform.

Workshop 1 provided guideline for Data Collection and Compilation; Processing, Analysis and Updating Database Methods; and Database Structure, Reporting, Maintenance and Sustainability. The data would be categorized into 3 tiers: 1) General Information (no data logging), 2) Monthly Data (kWh, Solar Irradiation, etc.): averaged per month, 3) Detailed Performance: 1-10 min data logger. It was determined that the project consultant, Chiang Mai Rajabhat University, was responsible to develop the database and coordinate between the participating economies.

In this project, data from 50 PV system sites from 5 economies were input into the database. The data were in the form of general data, average monthly performance data and very detailed performance daily data. Due to the variety of data format from each site, the participating economy and the database host trouble-shooted the database website together. Due to proprietary information for many of the PV sites, the University network in this project provided the information for the 50 sites that could be shared.

The 2nd Workshop provided the venue for sharing of experiences and way forward in using the online platform. The recommendations from the experts and participants were: the need for data quality control; data collection based on IEC standard; standardize unit and time; easier way to input data; and file size limitation. The database should be more focused and more detailed such as on Performance data, Performance ratio, Energy Storage, Power Factor, kWh, Location Site Mapping/ Geographical View, PV structure, CO₂ Emission Computations, Energy consumption data and Algorithm for Forecasting. The project should develop the data sharing agreement of how the data can be used shared. There is also opportunity for APEC database to be integrate with the IEA database. However, the database should be simple and not too complicated for data input. Low cost and wireless long range data monitoring devices should be implemented for off grid systems. The collected data should be analyzed with big data analytics and machine learning to automatically report the useful information for the stake holders.

The way-forward for the PV database should be to increase the awareness and the benefit of the database and use the existing network – for data collection. The database should be built upon the network with EGNRET Network, IEA database, APERC, CSR, Industry Associations, Government Monitoring.