APEC EXPERT GROUP ON NEW & RENEWABLE ENERGY TECHNOLOGIES (EGNRET)

42nd Meeting and EGNRET & EGEE&C Joint Meeting

Hawaii, USA

07-09 April, 2014

Introduction

The 42nd meeting of the Expert Group on New and Renewable Energy Technologies (EGNRET) was held on April 7th to 8th, 2014 at Moana Surfrider, a Westin Resort in Hawaii, USA. In addition, the EGNRET and Expert Group on Energy Efficiency and Conservation (EGEE&C) Joint Meeting was held alongside the meeting on April 9th, 2014.

The EGNRET 42 meeting was co-chaired by Dr. Chung-Hsien Chen, the EGNRET chair from Bureau of Energy of Chinese Taipei, and Dr. Cary Bloyd from Pacific Northwest National Laboratory (PNNL) of USA. Representatives from China, Hong Kong, China, Indonesia, Japan, Korea, New Zealand, Philippines, Singapore, Chinese Taipei, Thailand, the United States, APEC Energy Working Group (EWG), APEC Expert Group on Energy Data Analysis (EGEDA), Asia Pacific Energy Research Centre (APERC), and International Copper Association Ltd. (ICA) participated in the meeting.

On behalf of the host of USA, Dr. Bloyd and Dr. Terry Surles (University of Hawaii) welcomed the delegates and opened the meeting. Dr. Denise Eby Konan, the Dean of the College of Social Sciences and Professor of Economics at the University of Hawai'i at Mānoa (UHM), gave an official welcome and an introduction of the energy situation of Hawaii State and research areas of University of Hawaii. Following the welcome, a final agenda distributed by the Chair was reviewed and accepted. After the EGNRET meeting and the Joint meeting on April 9, the University of Hawaii host gave delegates a site visit tour to a wind farm of First Wind on the north shore of Oahu island, Hawaii.

Clean Energy Solutions – Hawai‘i as a Clean Energy Model

The opening presentation was made by Dr. Denise Eby Konan, the Dean of the College of Social Sciences and Professor of Economics at the University of Hawai'i at Mānoa (UHM).

Hawaii is listed on 3rd lowest per capita energy consumption in the U.S with 94% energy imported. Like many islands in the world, for energy security concern, Hawaii is also eager to look for local sustainable energy solutions.

Hawaii is one of the youngest geological formations in the world, formed by undersea volcanoes, including Maunaloa, Kilauea, and Loihi. 25% of Hawaii’s renewable net electricity generation is from geothermal energy. Besides, Hawaii owns the highest solar penetration in the U.S., which is about 150%.

Since most of the fuel for energy generation is from imported petroleum, Hawaii’s electricity prices are highest in the U.S. The other problem in Hawaii’s energy sector is the instable grid management because Hawaii is dedicated to develop renewables. Following Dr. Konan also gave an introduction of history and research areas of University of Hawaii.

Overview of New and Renewable Energy in U.S
Comments on Energy Policy and Technologies – US and Hawaii

The second presentation of the meeting was made by Dr. Terry Surles (Hawaii Natural Energy Institute at University of Hawaii), who gave an overview of current environment problems and U.S. GHG emissions portfolio. The primary energy consumption focuses of U.S. are: reducing oil use and imports, reducing energy generation by coal, promoting renewables and fracking wins to overtake nuclear. He also showed historical U.S energy consumption data, natural gas development and usage, liquid fuel imports situation, and coal usage and management in the U.S.

In order to approach the emission reduction and energy efficiency promotion sectors, and to address the energy security issue, the U.S. sets priorities in managing carbon

emission including renewables, nuclear, improving energy efficiency, and carbon capture and storage (CCS). In the energy efficiency sector, U.S. government mainly focuses on transportation and other electronic appliances efficiency topics. In promoting renewables, the top 2 renewables in the U.S. are hydroelectric power and biomass utilization.

In the renewables sector, as same as other countries, solar energy is seen as the largest renewable energy resource. Rapid growth in the global PV industry has been driven by policy measures motivated by GHG emissions reductions and declining costs.

The PV industry is primarily crystalline silicon manufacture, around half of which is manufactured in China and mostly installed in Europe. The problem is that China produces PV modules with very low cost, but as the same time China emits around twice as much CO2 per kWh as Europe does. Dr. Surles then showed the solar thermal power plant (Concentrating Thermal Systems) in California and California/Nevada Deserts, and the solar utility scale capacity in the U.S, including the CSP and PV under operating, under construction and development.

Wind energy is the second largest renewable energy resource and also with rapid growth rate in the decade. There are about 25% winds are installed in China. U.S. has been dedicated in installing the most winds in the world, but with significantly weak wind penetration percentage compared to other countries.

U.S. owns plenty of geothermal resources. There are more than 100 GW of estimated undeveloped geothermal in the U.S. The main issues include lack of transmission, remote from load centers, and interstate commerce.

In the energy storage and management sector, Dr. Surles mentioned that the existing grid is “smart” today. The current system has communication and control functions for its large central station generation as well as many of its substations. However, it does not have much communication or control functions beyond its substations and none down at the distributed generation interconnection points. The smart grid projects will

incorporate modern communication and information technologies to the grid where they do not exist today. They will also incorporate information and control systems that increase the capabilities of the existing communication control systems that are in place today.

Smart grid systems such as advance metering infrastructure (AMI) can not only provide information for utilities to use to manage the system, it also provides information to customers to help them manage their own energy use and help customer service representatives to help customers when they have questions on bills.

Dr. Sulres presented the nuclear and natural gas development situation in the U.S, and mentioned their mission is to make Hawaii a role model for energy independence and export those solutions throughout the pacific and around the globe.

In the last part of the presentation, Dr. Surles mentioned the energy solutions under operating or development in Hawaii, and also presented the Japan-US Smart Grid Demonstration Projects, which is being funded primarily by Japan's New Energy and Industrial Technology Development Organization (NEDO) who will utilize approximately $37 Million of fund provided by Japan's Ministry of Economy, Trade and Industry. The US Department of Energy is supporting the project by providing access to their experts at three of their national laboratories (National Renewable Energy Lab, Sandia National Lab, and the Pacific Northwest National Lab).

Dr. Surles's detailed presentation is available on the EGNRET website at: http://www.egnret.ewg.apec.org/meetings/egnret42/index.html

Recent APEC Activities

The Chair briefed the recent and upcoming APEC activities and developments that occurred after the last meeting of the EGNRET 41 on Oct. 16-17, 2013 in Beijing, China, including the two workshops held along with the meeting. The participants of EGNRET 42 meeting included the economy representatives from Hong Kong, China, Indonesia, Japan, Korea, Malaysia, Philippines, Chinese Taipei, Thailand, United States, Asia Pacific Energy Research Centre (APERC), and International Copper

Association Ltd. (ICA).

The meeting theme was Current New and Renewable Energy Priorities in APEC Member Economies, which was set as meeting theme every two years for each economy representative to present the latest renewable development status in their economy.

The Chair mentioned the summary of the updated EGNRET project status and the APEC events after last EGNRET meeting, including the EWG 46 in Da Nang, Viet Nam, EWG 47 in Kunming, China, Energy Ministers Meeting 11 (EMM 11) and APEC Economic Leaders' Meeting 22 (AELM) in Beijing, China.

The EWG 46 summary was also reported. EWG 46 was chaired by EWG Lead Shepherd Dr. Phyllis Yoshida on November 18-21, 2013.Dr. Yoshida emphasized the importance of developing a substantive five-year strategic plan, emphasizing the importance of synergies and tracking progress. The meeting also highlights the EGNRET 2014 priorities, which includes: building human capacity through workshops; cooperate with EGEE&C on LCMT; cooperate with APERC on PRLCE activities; and push forward standards harmonization for testing products/systems.
EWG will also encourage projects regarding the Renewables development besides LCMT projects and the promotion of bio-fuel should be one of the key efforts in EGNRET.

On the other hand, the former APEC Program Director, Ms. O'Grady, was assigned to other responsibilities in APEC. Mr. Jonghan Park has now been assigned as the current APEC Program Director of APEC Secretariat, effective 26 March 2014. The email contact information about Mr. Park is pjh14@apec.org

The Chair finally reported the future prospects of EGNRET in 2014. EGNRET will continue the implementation of new and renewable energy technology workshops and projects that help build the needed human capacity to implement clean energy development across the APEC region and cooperate with EGEE&C to enhance progress in the Low-Carbon Model Town project. This can demonstrate cost effective low carbon technologies (conservation and renewable energy) integration in the urban development, cooperate with APERC to create follow-up PRLCE activities which provide the necessary technology or training workshops for the host economies to implement the recommendations by the PRLCE review team, and push forward the

harmonization of testing standards for products/ system related to the new and renewable energy. This can help in reducing clean energy trade barriers in the APEC region.

APEC Peer Review on Low Carbon Energy Policies (PRLCE) Phase 3 in Malaysia

Dr. Aishiah Mohd Isa of APERC presented a progress report of APEC Peer Review on Low Carbon Energy Policies (PRLCE) Phase 3 in Malaysia. The presentation includes the background of APEC PRLCE project, energy indicators overview of Malaysia, and the PRLCE project in Malaysia.

The objectives of PRLCE includes to share information on low carbon energy performance as well as on policies and measures for improving and promoting low carbon energy in respective economies, to provide opportunities for learning from the experiences of other economies and for broadening the network among low carbon policy experts, and to explore how low carbon goals on an overall and/or sectorial basis and action plans could be effectively formulated in each economy under review, taking into account the range of possible strategies that could be used, according to the circumstance of each economy.
The PRLCE project also monitor progresses on attaining low carbon energy goals on an overall and/or sectorial basis and implementing action plans, and provide recommendations for voluntary implementation on how implementation of action plans could be improved with a view to achieving low carbon energy goals.

Peer reviews are made by experts, mainly from the APEC region. They visit a host economy to review its energy situation and policies, and make recommendations for the host economy. To hold workshops, experts from within and outside of the APEC region work with host economy share information necessary for policy planning in workshop events.

The PRLCE-1 from phase 1 was held in Thailand. Thailand hosted the first PRLCE-1 on 21-25 May 2012 with the focus on Alternative Energy Development Plan (2008-2022) (AEDP) for Solar, Wind, Biomass, Biogas and other renewable energy. The review team consisted of 7 experts (from China, Japan, Malaysia, Chinese Taipei, USA, Viet Nam, IRENA) and 3 APERC Researchers and the review team experts have provided 45 policy recommendations.

The PRLCE-2 of PRLCE phase 1 was held in the Philippines. The Philippines hosted the second PRLCE-2 on 19-23 November 2012 with the focus on National Renewable Energy Program (2011-2030) (including the Feed-in Tariff system for renewable energy). The review team consisted of 6 experts (from China, Japan, Malaysia, New Zealand, Thailand, and IRENA) and 3 APERC Researchers. APERC Researchers and the review team experts have provided 45 recommendations.

Indonesia hosted the PRLCE-3 on 13-17 May, 2013 with the focus on Renewable Energy. The review team consisted of 5 experts (from China, Japan, Malaysia, Thailand, and USA) and 3 APERC Researchers. APERC Researchers and the review team experts have provided 51 recommendations. The draft of review report for the PRLCE-3 in Indonesia was compiled and is now under review by the Indonesian government. The draft review report was tabled for the endorsement of EWG 46 at Da Nang, Viet Nam in 2013 November.

Malaysia and APERC formed the PRLCE Review Team and submitted background information on November 2013. The PRLCE Review Team visited Malaysia on last December and finished the draft PRLCE report in March, 2014. The current working stage is reviewing the draft PRLCE report.by Malaysia. The final draft report is signed-off by Malaysia after the review. The PRLCE Malaysia report is going to get endorsement at EWG 47 Meeting in Kunming in May 2014. The focus of this report includes FIT mechanism and low-carbon transport sector.

The PRLCE of Malaysia covers the topics of renewable energy goals, targets and strategy, energy regulations, sustainable development, and renewable energy resources, which mainly focus on biomass, biogas, small hydro, and solar energy. In low carbon sectors, the topics include low carbon power supply and low carbon transport. The recommendations for renewable energy goals, targets and strategy mainly come from National Renewable Energy Policy and Action Plan (NREPAP 2010) of Malaysia, which provides the renewable energy goal in long term (till 2050) and the direction of renewable energy policy, vision and objectives.

The PRLCE summary and recommendations of Malaysia are tailored towards overcoming existing and specific challenges in the current system like to connect remote resources and to get “First- and last- mile” interconnection for public transport. The conclusion also mentioned that it is important to provide proper signals to end-users and investors to encourage uptake of low-carbon energy supplies and to enhance the existing strategies that have been proven to increase LCE uptake.

Dr. Surles from USA asked if there is any wind energy application in this project. Dr. Isa answered that wind resources is very limited in Malaysia. There is only couple pilot projects and there is no such concerns in this project.

Japan representative also mentioned the Japan government appreciates all the supports to this project.

Dr. Aishiah Mohd Isa's detailed presentation is available on the EGNRET website at: http://www.egnret.ewg.apec.org/meetings/egnret42/index.html

Report on Progress of APEC Low-Carbon Model Town Task force

Following the APERC's presentation was made by Dr. Kazutomo Irie from Asia-Pacific Energy Research Centre on behalf of Mr. Shobu Nagatani from Agency for Natural Resources and Energy METI, Japan, gave a Report on Progress of APEC Low-Carbon Model Town Task force.

There are four parts in this presentation, an introduction of APEC LCMT Task Force Meeting, Overview of the APEC Low Carbon Model Town (LCMT) Project, Progress and Future Development of the LCMT Phase 3 Project, and Progress of the LCMT Phase 4 Project

About the background of LCMT, the three roles of the LCMT Task Force were identified in 9th APEC Energy Ministers' Meeting (Fukui, Japan - 19 June, 2010), which includes developing the concept of the Low-Carbon Town in APEC Region (a guideline of LCMT), conducting the Feasibility Study on selected case town, and sharing best practices for making low-carbon communities a reality.

In 6th APEC LCMT Task Force Meeting on 18 November, 2013, in Da Nang, Viet Nam, there are 15 Economies, Lead Shepherd, EGEDA and EGEEC Chairs, EGNRET representative, APEC Secretariat and APERC representative attended this meeting. The agreement was made in the meeting that Japan will serve as the Chair and the Secretariat of the LCMT Task Force for the next three years. The presentations of

revised “Concept of LCT in the APEC Region”, study on APEC LCT Indicator, progress of “Feasibility Study on Da Nang”, and selections of “Case for Phase 4 Feasibility Study” are also reported in this meeting.

Dr. Irie showed the mechanism of LCMT project. The three main outcomes of LCMT project: F/S report, concept, and policy recommendations. The feasibility of study under F/S report was conducted by urban design consultants. The Study Group A conducted concept part and the Study Group B made the policy recommendation.

Dr. Irie made a progress report about LCMT phase 3. The first step of phase 3 tasks is feasibility study, which the Progress Report was presented to LCMT Task Force members and EWG members at EWG 46 in November, 2013 and the final report of feasibility study will be publish in 2014. The task of concept (refinement) is “The Concept of the Low Carbon Town in APEC Region” which will be tailored for Redevelopment of existing sites. The task of concept (Indicator) proposed to increase in low-carbon town projects in many economies and regions and a uniform methodology and use of low-carbon town indicator in projects are necessary to promote low-carbon towns. A formed comprehensive and integrated Low-Carbon Town Indicator can adequately study the low-carbon measures and manage the project progress of low-carbon town projects by referencing past LCMT outcomes.

The future policy recommendations tasks include the recommendation on regulatory schemes, technical matters, etc. The study Group B will conduct the peer review. The Policy Review Report will be distributed to EWG members

For phase 4 project, invitation letter for nominations of LCMT Phase 4 Project was sent to eligible economies on 2nd September 2013. In October, Japan (Project Overseer) evaluated the nomination and sent out the recommendation to LCMT Task Force and EWG for endorsement. The official announcement of the case study for LCMT Phase 4 Project was reported at EWG 46 on 18-22 November 2013.

The Concept of the Low-Carbon Town in the APEC Region, 2012 (2nd Ed.)
http://publications.apec.org/publication-detail.php?pub_id=1398

Policy Review for Low-Carbon Town Development Project in Koh Samui, Thailand
http://aperc.ieej.or.jp/file/2013/8/21/LCMT2_PolicyReviewReport_Samui.pdf
This presentation is also available on the EGNRET website at:
http://www.egnret.ewg.apec.org/meetings/egnret42/index.html

After the presentation the Japan representative also said this is a Japan proposed project and Japan requests to continue the positive participation of LCMT project from APEC.

Dr. Cary Bloyd from USA asked that if the LCMT indicator is the same as the low carbon energy indicator established in China project.
Dr. Irie answered that the indicator system of Japan LCMT project among APEC region is aiming for measuring the development in each city and each town. The item in the indicator system could be adjusted by each economy or each city. The China indicator study may be modified and integrated into the system and this topic may be discussed in EWG 47 meeting.

Mr. Wan, the China representative, mentioned that China had a workshop of LCMT indicator last October in Beijing. The indicator is more focus on international communicating corporation. China PO of PRLCE group is collecting experience from China Low Carbon Cities and providing references.

Mr. Chen, the EGNRET Chair also asked if this means that China has similar indicators for the low carbon cities. Mr. Wan answered in China they are developing several separated indicators and they are trying to integrate them into one system.

Member Economy Presentations: The Promotion of Biofuels in Transportation Sector

According to the results from last EWG meeting (EWG46) in Viet Nam, EGNRET would like to pay more attention on focusing the biofuels technologies and policies area. Therefore, the meeting theme of the EGNRET 42 meeting is “The Promotion of Biofuels in Transportation Sector”

The last meeting theme in Beijing was “Current New and Renewable Energy Priorities

in APEC Member Economies", which the EGNRET set Renewables Statue Review Program as the topic to review the priorities on developing new and renewable energy technology in APEC economies every two years.

All EGNRET 42 meeting presentations are available on the website at: http://www.egnret.ewg.apec.org/meetings/egnret42/index.html

Renewable Energy and APEC Energy Statistics

Mr. Takuya Miyagawa from APEC EGEDA made a presentation about recent statistics results of renewable energy and APEC energy status.

Mr. Miyagawa made an introduction about Expert Group on Energy Data Analysis (EGEDA) background and explained the operation of data collection for new and renewable energy in APEC. The EGEDA's mission is responsible for providing policy relevant energy information to APEC bodies and the wider community, through collecting energy data of the APEC region, managing the operation of the APEC Energy Data Base through the Coordinating Agency, collecting policy relevant information from member economies, and examining and advising on the research activities of the APERC

EGEDA collects the Energy Data monthly, quarterly, and annually. The monthly data includes oil and gas and the quarterly data includes energy supply section like coal, oil, petroleum products, gas and electricity. Annual data includes energy supply and demand in coal, oil, petroleum products, gas, electricity / heat, new and renewables. EGEDA also collects and arranges other energy related data such as CO2 Emission, Energy Prices, and Oil / Gas reserve and producing / refining capacity as JODI Annual.

Mr. Miyagawa made a detail description of EGEDA's APEC Annual New and Renewable Energy Questionnaire which consist of 5 tables (working sheets): supply sector, imports by origin / exports by destination, transformation and energy sectors, final consumption sector, and conversion factors. There are definitions in each table sector. The definition and data collection of varied renewable energy should be identified before developing a target for renewable energy.

For example, in the supply sector of APEC-ASEAN Joint Format for Annual New and Renewable Energy Data, the table includes production of both primary and secondary energy. However, only quantities used for energy purposes should be reported. For

example, the amount of bagasse used as fuel should be reported and not all the amount of bagasse produced. Charcoal covers solid residue of the destructive distillation and pyrolysis of wood and other vegetal material. Other Biomass includes agricultural wastes such as straw, rice husks, nut shells, poultry litter, crushed grape dregs, etc. and other wastes that are not classified as wood waste, industrial and municipal solid wastes.

The future Annual Energy Data Collection updates includes expanding of import/export, expanding of non-energy use in oil questionnaire, adding unconventional gases in gas questionnaire, adding production of petroleum products from natural gas, and adding bio-gasoline, bioethanol, bio-jet and biodiesel in the questionnaire.

Mr. Miyagawa also showed the renewable energy development percentage in APEC region. Biomass and hydro are the two main renewable energy resources for most economies. The third energy source is geothermal.

More detailed information of EGEDA's energy data analysis can be found at http://www.ieej.or.jp/egeda/

This presentation is available on the website at:
http://www.egnret.ewg.apec.org/meetings/engret42/index.html

EGNRET Project Update

The EGNRET has a variety of projects underway to facilitate use of renewable energy technologies in the APEC region. Currently 7 EGNRET projects have been completed recently since EGNRET 41 in Beijing, and 20 projects including one self-funded project are on-going.

In addition, 13 project Concept Notes and one self-funded project Concept Note have been received and submitted by EGNRET Secretariat for funding in Session 1, 2014.

Completed EGNRET Projects

The 7 completed projects on project year 2013 are listed below:

[C1]	APEC Workshop on Best Practices on Financing Renewable Energy	EWG 21 2012A	Viet Nam

[C2]	Promoting Stable and Consistent Renewable Energy Supply by Utilizing Suitable Energy Storage Systems	EWG 22 2012A	China
[C3]	Research on the Application of Physical Energy Storage Technology with Renewable Energy in a Low Carbon Town	EWG 16 2012A	China
[C4]	Small Hydro and Renewable Grid Integration Workshop	EWG 05 2012A	Viet Nam
[C5]	Prospects for Marine Current Energy Generation in APEC Region	EWG 23 2011A	Russia
[C6]	Study of Demand Response's Effect in Accommodating Renewable Energy Penetration in the Smart Grid	EWG 04 2012A	China
[C7]	2013 APEC Workshop on Geothermal Technology	SF EWG 01 2013	Chinese Taipei

[C1] APEC Workshop on Best Practices on Financing Renewable Energy (EWG 21 2012A, Viet Nam)

This project aims at holding an APEC Workshop on Best Practices on Financing Renewable Energy. The Workshop is scheduled to take place in Viet Nam in March 2013. The key objectives of the project are to analyze the current situation and best practices on financing renewable energy in the APEC region, to present best practices and exchange views of policy-makers, regulators, academia and business representatives on financing renewable energy, and to develop recommendations for more effectiveness in renewable energy financing.
The workshop summary report and presentation slides are available online: http://publications.apec.org/publication-detail.php?pub_id=1439

[C2] Promoting Stable and Consistent Renewable Energy Supply by Utilizing Suitable Energy Storage Systems (EWG 22 2012A, China)

The project aims to contribute to APEC's strategy for carbon reduction, sustainable energy supply and low carbon economy growth in the region. The project provides key findings and recommendations regarding the construction, operation and management of energy storage utilization in three different types of renewable energy generation systems. The main finding of the project including: promoting stable and

consistent renewable energy supply by utilizing suitable energy storage systems, development status of the energy storage industry, analyzing energy storage applications in the new energy field, advancing wind farm development with the use of energy storage, and advancing the development of distributed generation and micro grids via the application of energy storage systems.
The project selects representative demonstrations integrating energy storage systems in: wind farms, solar power generation projects, and distributed energy micro-grids in APEC economies as the cases. In cooperation with world-leading organizations from APEC economies, the project measures and analyzes in-depth first-hand data to draw actionable recommendations. The project provides a useful platform for sharing findings, experience and recommendations with several groups of key stakeholder.
The summary report of the project study and research work is available online:
http://publications.apec.org/publication-detail.php?pub_id=1492

[C3] Research on the Application of Physical Energy Storage Technology with Renewable Energy in a Low Carbon Town (EWG 16 2012A, China)

With the research and demonstration of energy storage technology, energy consumption of buildings will be reduced by 20%. The technology offers substantial benefits in terms of reducing the need for traditional air conditioning and it allows for the shifting of electricity usage from on-peak to off-peak hours. More than 120 papers from all over the world are included in this proceeding, mainly about advanced technology about how to build and reach Low-carbon Town and new physical energy storage technology for energy conversation with phase change material The research provides a base for policy and the criteria of energy storage system which will contribute to the exploitation of energy storage technology and promote its application in APEC regions.

[C4] Small Hydro and Renewable Grid Integration Workshop (EWG 05 2012A, Viet Nam)

Small hydro-electric generation systems are being utilized as part of the economy energy mix across APEC member economies. They are of special importance in developing member economies where they often provide the only firm power available in rural areas. However, as economy wide grids are established, small hydro and other small scale renewable energy systems pose unique technical problems to the economy grid operators. At the workshop they will share experiences on best practices as well as current problems being faced in their economies associated with the integration of small hydro and other renewable energy systems into their electric

grid. Outcomes of the workshop include a suggested road map for addressing current grid integration problems and suggested future APEC projects.

The workshop presentation slides are available online
http://www.egnret.ewg.apec.org/workshops/SmallHydro/

[C5] Prospects for Marine Current Energy Generation in APEC Region (EWG 23 2011A, Russia)

Energy generated from marine currents appears to be relatively reliable and mostly unexplored compared to other renewable energy sources. APEC economies are naturally endowed with access to vast ocean and marine resources that offer potential of tidal, wave and current energy. Technologies and expertise to utilize marine current energy exists in a number of APEC and non-APEC economies, but the industry is in its infancy. Information/technology sharing is needed to advance the understanding of options for marine energy production at large and marine current energy in particular.

The main activity of the project, a conference in Russia in April/May 2012, will bring together the experienced operators and potential interested investors/users of marine energy generating facilities. The project is expected to encourage trade in marine energy products and services and investment in related technology to build capacity for its commercial application.

The final report could be downloaded:
http://publications.apec.org/publication-detail.php?pub_id=1408

[C6] Study of Demand Response's Effect in Accommodating Renewable Energy Penetration in the Smart Grid (EWG 04 2012A, China)

Demand response can promote the interaction of "Source-Load" through incentives and price signals on the basis of real-time output status of renewable generation, encouraging demand side to participate in power grid operation actively to accommodate renewable energy penetration effectively.
This project is composed of four parts:

1) Feasibility analysis of demand response's effect in accommodating renewable energy penetration
2) Study the business operational mode and policy mechanism of demand response

3) Study the implementation program of demand response pilot

4) A workshop about DR business operational mode and project implementation mode

Main outputs of this study includes the feasibility and benefit analysis of improving Renewable Energy consumption by demand response, business operation model and policy mechanism of demand response, and the pilot implementation project mode of demand response.

[C7] 2013 APEC Workshop on Geothermal Technology (SF EWG 01 2013, Chinese Taipei)

The APEC Workshop on Geothermal Energy Development was held 3 days from June 25 to 27, 2013 at NTUH International Convention Center in Taipei. The speakers include the director of the Geothermal Technologies Office at the US Department of Energy, professor at Japan's Tohoku University, department head of Geothermal Sciences at the New Zealand-based GNS Science. Topics include the current status of geothermal energy, development policies and strategies, and an overview of the most advanced geothermal technologies. The workshop serves as a pivotal step in gathering international capacities and in providing surging momentum in geothermal development.

Note on APEC Project Submission Process

The EGNRET Secretariat presented the updated development of APEC project submission.

According to the BMC record, the approval rates of project submission in the past 5 years were 76% (2008), 53% (2009), 53% (2010), 73% (2011), and 48% (2012), respectively, and the average success rate was 58%. The approval rate of EGNRET projects for Session 3, 2012 was 83.3%, BMC in-principle approval rate of EGNRET Concept Notes for Session 1, 2013 was 50%, and for Session 2, 2013 was 100%.

The EGNRET Secretariat emphasized that each Concept Note (including title page) should be less than 3 pages, and each project full proposal should be no more than 12 A4 pages, including the budget explanation. The templates of Concept Notes and Full Project Proposals are shown in the Guidebook on APEC Projects (9th edition)

published in February, 2014. The useful information for project submission including 9th edition Guidebook, forms, and resources (including Project Quality Training Materials) can be found at APEC Project website directly:
The 9th edition APEC Project Guidebook:
http://www.apec.org/~/media/Files/Projects/Resources/201402_APECProjectsGuidebook_9thEd.docx
APEC Project Forms and Resources:
http://www.apec.org/Projects/Forms-and-Resources.aspx

Also, the Concept Notes deadline of APEC projects session 2 is on July 21st. However, the concept notes should be sent to EGNRET Secretariat before 2 weeks of the APEC deadline. All concept notes for standard projects must be endorsed by EGNRET before sending to EWG for further endorsement and ranking.

In addition, Since EGNRET project submission has been booming recently, in order to assist member economies in project management for submission and implementation, EGNRET Secretariat would appreciate if member economies could cooperate with the following actions:

When proposed member economies submit full proposal to APEC Secretariat, Please also send a copy to EGNRET Secretariat.
When proposed member economies submit Monitoring Reports and the Completion Report, please inform EGNRET Secretariat with a copy.
When the project is completed, please send two-page project summary to EGNRET Secretariat. This summary will be reported to the EWG meeting by EGNRET Chair.
Please inform EGNRET Secretariat, when you upload the final report to APEC. EGNRET Secretariat will also inform all EGNRET members.

If it would be possible, please present the project final outcome at EGNRET meeting by PO or economy representative when project is completed.

Development of New Project for Session 1, 2014 Funding

There are 14 concept notes submitted to APEC Secretariat for Project Session 1

funding and 3 of them are going to be submitted for the full proposal evaluation in July, 2014.

Project Session 1 has been extremely competitive. The APEC Secretariat received 125 concept notes and had low amount of project funds available. Only expect around 20 – 25% of concept notes will be funded. This compares to an historical average of around 55% of concept notes being funded.

The three passed project concept notes for session 1 is listed below:

[NRE141-1] APEC Photovoltaic System Best Practices and Latest Development Comparative Study (PV-BPLD) (China)

[NRE141-2] APEC Public - Private Dialogue on Addressing Impediments in Financing Renewable Energy (Viet Nam)

[NRE141-3] APEC Peer Review on Low-carbon Energy Policies (PRLCE) Phase 3 (Japan)

The above projects are described briefly as below.

[NRE141-1] APEC Photovoltaic System Best Practices and Latest Development Comparative Study (PV-BPLD) (China)

The APEC Photovoltaic System Best Practices and Latest Development Comparative Study (PV-BPLD) project responds to the 25th APEC Ministers Meeting and 21st APEC Economic Leaders' Declaration, to develop clean and renewable energy within APEC region.

The objects of PV-BPLD projects are:

1) To carry out comparative study of different PV system practices, including most popular large scale PV system, high concentrated PV system (HCPV), low concentrated PV system (LCPV), PV system with optimizer or micro-inverter, etc.
2) To recommend best practices in different APEC member economies to increase safety and efficiency, and reduce cost.
3) To prepare a written report and host a workshop in China during APEC China year 2014.

[NRE141-2] APEC Public - Private Dialogue on Addressing Impediments in Financing Renewable Energy (Viet Nam)

This project aims at holding an APEC Public - Private Dialogue on Addressing Impediments in Financing Renewable Energy. The Dialogue is scheduled to take

place in Viet Nam in the 1st quarter of 2015.

The key objectives of the proposed project are to:

1) Exchange information on impediments in financing renewable energy in APEC economies;
2) Develop recommendations as a reference tool for APEC economies to tackle the above-mentioned impediments;
3) Continue the good cooperation and coordination among attendants who participated in the APEC Workshop on Best Practices on Financing Renewable Energy in June 2013.

[NRE141-3] APEC Peer Review on Low-carbon Energy Policies (PRLCE) Phase 3 (Japan)

The PRLCE responds to the Energy Ministers' instruction from their meeting in Fukui, Japan in 2010; to explore mechanisms to encourage APEC economies to set individual goals and action plans for introducing low-emission power sources.

As with the APEC Peer Review on Energy Efficiency (PREE), a peer review team comprised of experts on low-carbon energy supply policy from APEC member economies will review goals and policies to promote low-carbon energy supply. The review team will provide recommendations based on this and assist with effective policy making in this area as well as the effective formulation of action plans etc.

Low-emission power sources include renewable, nuclear and fossil-fuel with carbon capture and storage. The scope of review will be decided depending on the host economy's priorities. One PRLCE is planned in 2014.

Development of New Projects for Session 2, 2014 Funding

Two new Concept Notes were proposed at the meeting for endorsement for applying funding for Session 2, 2014.

[NRE142-1] Research for auto-use biogas demonstration, popularization and utilization: A case study in Zhejiang Province China (China)

[NRE142-2] Promoting Environmental Friendly Compact Heat Pump or hot water solar collector and Demoting Electric Shower Unit Water Heater in domestic sectors and resort hotel (Thailand)

These projects are described briefly as below:

[NRE142-1] Research for auto-use biogas demonstration, popularization and utilization: A case study in Zhejiang Province China (China)

The project is aimed to set up a model of auto-use biogas popularization and utilization for the Asian-Pacific Region, and serve as a model of waste disposal and pollution abatement. Resource condition, technology foundation and other relevant factors will be studied in Zhejiang Province as a case.

Planned project activities include gathering materials and conduct survey, e.g., utilization situation of biogas inland and abroad, the resource condition and distribution status of biogas in Zhejiang Province, etc. And complete preliminary draft. It will be conducted on Jun. 2014 - Oct. 2014. The second step of the project is convene a domestic seminar for reviewing the preliminary draft, which will be conducted on Nov. 2014 - Dec. 2014. The last part of the project is convene an international seminar, and publish ISR report online on Jan. 2015 - Jun. 2015.

[NRE142-2] Promoting Environmental Friendly Compact Heat Pump or hot water solar collector and Demoting Electric Shower Unit Water Heater in domestic sectors and resort hotel (Thailand)

The power capacity (kW) of electric shower unit water heater (ESU) is generally 5 times greater than the substitution technology i.e. compact heat pumps (CHP) and hot water solar collectors (HSC). The compact heat pumps are good for the available power grid area whereas the hot water solar collector is suitable for both grid and off grid area. The morning and evening peak demand from hot water showering could be cut by the substitution technology.

Planned Activities of the project: 12 months of project period, there would be (1) project setting up, (2) promotion period, (3) application for pilot case (4) implementation of pilot cases for compact heat pump and hot water solar collector, (5) monitoring and evaluation, (6) closing and dissemination.

The prospected output of the project will be pilot cases of peak cutting

After the two concept notes description, economies decided that there are few parts of both concept notes should be modified. The EGNRET Secretariat will make endorsement decision after the adjusted concept notes being circulated.

The revised concept notes should be sent back to EGNRET Secretariat as soon as possible, and the Secretariat will make a circulation and endorsement among the

economies. After the endorsement they will be submitted to EWG for further ranking and endorsement by the deadline (July 21, announced by BMC).

Progress with APEC Energy Smart Communities Initiative (ESCI) and APEC Smart Grids Initiative (ASGI)

Dr. Cary Bloyd made an introduction of ESCI and ASGI projects.
The Energy Smart Communities Initiative (ESCI) was launched in November 2010 by U.S. President Obama and Japan's Prime Minister Kan.

The ESCI is meant to help realized APEC Leaders' goal to reduce the energy intensity of their economies by 45% by 2035. The ESCI contains two crosscutting elements and four pillars. The two crosscutting elements are Knowledge Sharing Platform (KSP) and Low Carbon Model Towns (LCMT). The four pillars of the Energy Smart Communities Initiative: Smart Transportation, Smart Buildings, Smart Grids, and Smart Jobs and Consumers.

For ASGI, EMM-9 instructed the Energy Working Group (EWG) as "to start an APEC Smart Grid Initiative (ASGI) to evaluate the potential of smart grids to support the integration of intermittent renewable energies and energy management approaches in buildings and industry." The Smart Grid Initiative is being led by the U.S, Korea, and Chinese Taipei.

In the presentation Dr. Bloyd also showed listed projects related to LCMT and the projects under The Energy Smart Communities Initiative and APEC Smart Grid Initiative.

This presentation is also available on the EGNRET website at:
http://www.egnret.ewg.apec.org/meetings/egnret42/index.html

Discussion 1 – Current and Projected Economy Renewable Energy Usage Through 2030

In the 2007 Sydney Declaration, APEC Leaders agreed: "Work towards achieving an APEC-wide goal of a reduction in energy intensity of at least 25 percent by 2030 (with

2005 as the base year)".

Dr. Cary started the discussion with mentioning that the discussion result will be used for the joint meeting discussion next day. Since every economy is doing something in energy area, the discussion is addressed with the goal of APEC new and renewable energy target. In the previous presentation, EGEDA provided a snap shot of different sectors that what economies are doing now in the renewable energy area.

EWG leader shepherd, Dr. Phyllis Yoshida said, in order to achieve the renewable target, we have to think about what kind of the definition of renewable energy is suitable for APEC because there are several definitions about new and renewable energy combination by various organizations and economies.

There are 15% of Renewable Energy have been used in the world. How to double the goal from 15% to 30% in 2030 or set up other goals/agreements for APEC will be a priority challenge topic to do. After, every economy representative briefed the renewables development status, goals and future policies in their economies.

Dr. Yoshida made a more detail and a conclusion for this discussion. She mentioned that US does have a goal for renewables, which is double the amount by 2030 over 2012, but the renewable areas only includes Solar, Winds, and Geothermal. In terms of resource maps, IRENA is currently making a list for their second group of economies that will do resources maps for renewables.

Dr. Cary Bloyd also mentioned that project overseers should all submit updated status of each projects to EGNRET Secretariat so we can make a more efficient sharing of projects information and help to set up goals of project implementation in the future.

Discussion 2 – Renewable Energy Cost and Roadmap

Dr. Bloyd started the discussion by showing a proposed list of each renewable energy technology items and cost goals over 2030 or 2035 (in USD/kWh).

Dr. Bloyd made suggestions that Project Overseers should report project status more

often to EGNRET Secretariat. The information could be provided to EGEDA for more accurate and completed EGNRET project implementation statistics, which may be used in EGNRET and EWG future strategies and decisions making.

Japan representatives made a comment that Japan has their own renewables cost targets for certain near future instead 2030 or 2035 already. He suggested that EGNRET could come up with a mechanism for getting how much cost for each renewable technology, and it could be used to share each economy's efforts on reducing the cost.

Japan representative also expressed that Japan supports what Dr. Bloyd said that EGNRET economies could make more collaboration and share efforts on reducing the cost of developing renewables.

Administration and Operation

Thailand representative, Mr. Kurujit Nakornthap, expressed that Thailand is pleased to hold EGNRET 43 meeting in mid-November, 2014.A site visit tour is possible to be arranged along with the EGNRET 43rd meeting since Thailand is developing many renewable projects.

So far there are possible couple choices of cities as meeting location including Bangkok and Chiang Mai. The site visit tour in Bangkok could be solar farm or biodiesel plant. The site visit tour of Chiang Mai would be biogas/biomass projects.

The Chair also announced that the elections will be held at EGNRET 43 for the positions of Chair and Vice-Chair of EGNRET for the term from 2015 to 2016. Economies interested in holding an office are asked to provide the current Chair with their nominations prior to EGNRET 43.

The Chair asked if there was any additional new business. There being none, the Chair and EGNRET delegates thanked USA for hosting the meeting and closed the 42nd meeting of the APEC Expert Group on New and Renewable Energy Technologies. The meeting minutes will be approved and distributed and approved

out of session.

Special gratitudes are due to Dr. Cary Bloyd (PNNL), Dr. Terry Surles, Professor Denise Eby Konan (University of Hawaii), and their colleagues for their kind assistance and arrangement on meeting affairs

Meeting slides materials have been distributed online.
http://www.egnret.ewg.apec.org/meetings/egnret42/index.html

EGNRET and EGEE&C Joint Meeting

The EGNRET and EGEE&C Joint Meeting was held on April 9, 2014, and was co-chair by Dr. Phyllis Yoshida, APEC EWG Lead Shepherd, Dr. Chung-Hsien Chen, EGNRET Chair, and Dr. Terry Collins, EGEE&C Chair. The last joint meeting of two groups had taken place at EGNRET 36, in Washion D.C., USA on March 4, 2011.

Dr. Yoshida gave an official welcome to the delegates, and opened the meeting, and EGEE&C and EGNRET Chairs, Dr. Collins and Dr. Chen also welcomed all the participants. Also, the senior United States Senator from Hawaii, Mr. Brian Schatz, gave a welcome open remarks by a video. He mentioned that 3 years go in Hawaii, APEC leaders meeting set a goal to reduced energy intensity in the region by 45% by 2035. The goal fits the meeting theme of the Joint Meeting and he thanks the EGNRET and EGEE&C's effort on finding the solutions to world's energy challenges.

Following the welcome, the official agenda of the joint meeting distributed by the Chairs was reviewed and accepted.

EGNRET Updates on APEC-funded and Self-funded EGNRET Projects Completed in 2013

The EGNRET Secretariat made a brief introduction of EGNRET, including the mission, main activities, annual meeting theme, and project criteria of EGNRET. The current EGNRET operation crew was introduced to all meeting participants also.

EGNRET has 7 projected completed in 2013, 20 projects under implementation, and received 14 Concept Notes for Project Session 1, 2014. In 2013, EGNRET has the project approval rate 100% in both session 2 and session 3.

The 7 completed projects are listed as follow:

[C1]	2013 APEC Workshop on Geothermal Technology	SF EWG 01 2013	Chinese Taipei
[C2]	Small Hydro and Renewable Grid Integration Workshop	EWG 05 2012A	Viet Nam
[C3]	APEC Workshop on Best Practices on Financing Renewable Energy	EWG 21 2012A	Viet Nam

[C4]	Prospects for Marine Current Energy Generation in APEC Region	EWG 23 2011A	Russia
[C5]	Study of Demand Response's Effect in Accommodating Renewable Energy Penetration in the Smart Grid	EWG 04 2012A	China
[C6]	Promoting Stable and Consistent Renewable Energy Supply by Utilizing Suitable Energy Storage Systems	EWG 22 2012A	China
[C7]	Research on the Application of Physical Energy Storage Technology with Renewable Energy in a Low Carbon Town	EWG 16 2012A	China

The EGNRET Secretarait made a description about the the first four projects and showed the project summary, outcomes and final reports, and the China representative, Mr. Wan Lin, made a detail presentation about the rest of 3 China completed projects.

After the completed project section, the EGNRET Secretarait also quickly showed the 20 on-going EGNRET projects.

EGEE&C Updates on APEC-funded and self-funded EGNRET projects completed in 2013

There are 4 completed projects under EGEE&C in 2013. The invited EGEE&C PO and economy representative gave presentation of these projects below.

1. Update on APEC Distribution Transformers Survey Project (EWG15 2012A) (China)
2. Workshop to Support the Development of National Lighting Design Centers in APEC Region (EWG 14/2012A) (USA)
3. Christchurch Smarter Grid Roadmap (EWG 08 2012) (New Zealand)
4. Best Practices in Energy Efficiency and Renewable Energy Technologies in the Industrial Sector in APEC Region (EWG 19 2011) (Thailand)

ICA's Programs on Renewable Energy

Mr. Pierre Cazelles from International Copper Association (ICA) gave a presentation

about ICA's programs on Renewable Energy.

First of all Mr. Cazelles gave an introduction about ICA. ICA is an international non-profit organization dedicated to promote the use of copper. ICA has offices in Singapore, Thailand, Vietnam, Indonesia, Malaysia, Korea, Taiwan, Japan, and China. So far the most important program of ICA is Sustainable Energy (energy efficiency and renewable energy/access to energy) as copper is the most efficient electrical and thermal conductor.

Mr. Cazelles also briefed the international cooperation programs of ICA, which includes increasing the uptake of High Efficiency Motors (HEMs) and driving systems in Philippine Industries: European Commission, China Heat Pump Water Heater Challenge Program: European Commission, Promotion and deployment of energy efficient air conditioners in ASEAN: European Commission. With APEC, ICA has the programs of Harmonization of EE standards for AC in ASEAN, Distribution transformers MEPS survey, Develop training program for installers and designers in solar PV rooftop (under US lead), and Establishment of the APEC Network of MV&E authorities (under Australia lead).

Mr. Cazelles explained that renewables is 12 times more copper-intensive than conventional energy systems, including wind turbines, PV, CSP, small hydro, small renewables system..., etc.

60% of ICA's programs are aiming for sustainable energy. The renewable energy section is divided into decentralized energy and distributed generation. The two main sections in energy efficient appliances areas are air conditioners and heat pump water heaters. The air conditioners projects in ASEAN include harmonization of MEPS and capacity building for manufacturers and labs, consumer awareness. The project is funded by EU. In China, ICA has projects support standard making for inverters and central AC systems (increasing MEPS); support top runner program in Shanghai; organize round Robin test between China major labs and labs in SEA; support CNIS with training programs for manufacturers and labs on new EE standards for inverters and central AC systems; consumer awareness programs.

Mr. Cazelles finally showed the Wind-Grid integration project details and the ICA main activities, outputs, workings schedule and budgets estimation information.

These presentations are also available on the EGNRET website at:
http://www.egnret.ewg.apec.org/meetings/engret42/index.html

Discussion 1 – The New APEC Renewable Energy Goal

The EGNRET Chair, Dr. Chen, opened the discussion with the background information about the EGNRET response to EWG 45 on APEC Renewable Energy Target. In EGNRET 40 Meeting (Ha Noi, Viet Nam, 2-5 April, 2013), to respond the EWG members' discussion on setting a target for renewable energy development in the APEC region at EWG 45, the following suggestions were reached after fluent discussion by EGNRET members at EGNRET 40 Meeting.

EGNRET suggests APERC and EGEDA consider proposing an APEC funded project to establish a common definition of different types of renewable energy incorporating with current classification of renewable energies developed by EGEDA, IRENA, and IEA. EGNRET also suggests ESCI-KSP (Energy Smart Communities Initiative – Knowledge Sharing Platform) may be a platform for uploading member economies' renewable energy data as a reference for further policy making of renewable energy in APEC region. The Chair also forwarded the above suggestions to the EWG Lead Shepherd, APERC Chair, and EGEDA Chair for their consideration.

In the first discussion session of the joint meeting, the EWG Lead Shepherd, Dr. Phyllis Yoshida and Dr. Bloyd from PNNL of United States introduced a proposal for APEC to introduce a Renewable Energy target with the aim to double the share of renewable energy in APEC.

The EGNRET Chair suggested an APEC projects to advance the proposal, but EWG has indicated that an output is needed by the EMM in September 2014. The EWG indicated that it queried APERC, IEA, IRENA, and EIA to understand the current level of renewable energy in the APEC region. The responses of renewable energy ratio goal ranged from 9.5% to 11%. Dr. Yoshida expressed that we should generally support to the Renewable Energy Target from the UN. To double the current level, a number of definitions and agreements on reasonable options and targets should be set up and traditional biomass should be included.

The discussion followed the proposal is summarized and listed below:

1. Dr. Cary Bloyd indicated that the targets were initially mentioned as a share of the total account of efficiency and from the final consumption rather than TPES.
2. EGEDA had comments and presented slides addressing 3 key issues:
   a. Explicitly definition (like traditional and non-commercial biomass, or hydropower)
   b. Technical barriers in data collection (ex. off-grid solar PV is difficult to collect accurately),
   c. Current situation of renewable energy data varies between economies. For example, non-commercial biomass data is difficult to estimate and not reliable).
3. To set a renewable energy goal in APEC area, collecting accurate statistics data is essential, but more important, standard methodologies in collection of new and renewable energy data applied to all economies should be established soon.
4. EWG indicated the difficulties in collecting data and making standard methodologies, which means that it should be the focus of future work.
5. USA representative suggested that this effort should be made even if estimation is difficult. For example of hydro development, they collected information and made the decisions over time. Projects with dedicated resources could be utilized to advance this issue.
6. Japan expressed the concerns of the needs to address these issues to make the initiative viable. Japan is already in a unique situation as it has set renewable energy targets. However, it has become a political issue and agreement in Japan. Clearly definitions of new and renewable energy should be the first step and then target setting will be initiated later. Japan considers that the target is quite ambitious; however there is no model provided with viable and achievable scenarios.
7. Thailand representative said they would like a more clarified proposal to initiate the development of appropriate position.

a. EWG emphasized that the Energy Ministers came to EWG to develop a proposal to double the share of renewable energy and put it into a place of an aspirational target which enables further projects aiming to achieve this target. The objective is to double the renewable energy share of APEC region and not specific to individual economy.

8. Thailand representative indicated that they already have a plan regarding to increase the renewable energy deployment. It is important to make a goal

rather than a binding target. Besides, the target should be conditional depending on the cost of renewable energy development and it should be revised if no positive income estimated. Developing economies will need more resources about technology and capacity transfer, and possibly funding.

9. Japan representative highlighted the issues of target accounting and definitions. For example, using geothermal electricity increases in TPES (Total Primary Energy Supply) significantly rather than in TFEC (Total Final Energy Consumption).
10. The ICA representative highlighted that UNFCCC considers non-commercial biomass as non-renewable given the unsustainable practices and other negative effects of using such energy at household levels.
11. EGNERT Chair, Dr. Chen, represented Chinese Taipei, said Chinese Taipei is willing welcome to set RE goal in APEC region, we have energy target in 2030 about 20% installed capacity for the wind, PV… I don't know the exact number. After the meeting the economy could sent data to EGEDA and may have a definition and present it into EWG meeting and leader's meeting.
12. Representative from Chinese Taipei also indicated that according to the figure of all APEC renewable energy situations, currently only 9.3% RE have been installed. If we follow the UN RE goal, the goal will be triple instead of double the amount of RE that we have now. Since almost every economy has their own roadmap of renewable energy, it is suggested that we should collect the roadmap data and send to EGEDA. EGEDA may calculate the actual number that we should set as renewable energy goal projected in 2035 and the amount of capacity that every economy might increase since the RE situation is totally different in every economy. Collecting the data of economy RE roadmap should be started as soon as possible and it may help economies to increase the RE capacity individually.
13. EGNRET Chair expressed that the goal setting in APEC region should be made soon since several economies already have roadmaps. A collection of all these roadmaps could facilitate the exercise of setting a realistic renewable energy goal. EGEDA was the possible unit to do the collection work.
14. Japan representative indicated that while they may be able to support with analysis and technical capacity, they are not in position to engage in setting or committing to a target for internal reasons.
15. Philippines representative has indicated that doubling the renewable energy share for Philippines would be a too large goal as they already has around 40% renewable energy share. It is hard for them to contribute strongly in the goal of

doubling the share, but they are still working on progressing renewable energy development.

16. Singapore underlined that similar to the energy intensity goal, the proposed renewable energy goal would be a collective aspirational goal for all economies and there would be no references to individual obligations in any APEC communication on this issue.
17. Dr. Bloyd from the USA suggested that we should focus on technologies that can actually cause change such as LED that allows economies to get closer to the targets. It is also significant for R&D dedication in these areas to get reasonable prices of transformative technologies.
18. China representative supported the general direction of setting a target, but it should support the EGNRET chair suggestion that research and collection are important to get a better understanding of each economy's potential areas and available technologies.
19. Japan representative expressed that with changing landscape in renewable energy area, each country will be tracking where they stand in this race without any target in place. For example Japan has a number of activities in place to maximize renewable energy already.

In conclusion, data collecting and analysis regarding to renewable energy development is essential before making the decision about setting up a goal of promoting renewable energy share. The collecting work may be done by APERC or EGEDA. Definition, cost estimation, funding mechanism, and a binding goal for all or specific goal for each economy will be a big issue to discuss and decide later. Many economies concerns that setting a common goal for everyone would be inappropriate since every economy has their own plan already. In order to achieve the goal, it is also important to clarify which technology or which section should be focused. The goal may be integrated with the goal of reducing energy intensity in 2035.

Discussion 2 –Asia Pacific Economic Cooperation - Energy Working Group Draft Strategic Plan for 2014 - 2018

Dr. Yoshida emphasized the importance of developing a substantive five-year strategic plan and the importance of synergies and tracking progress The goal of renewable energy and the promoting process methods should be put into the Strategic Plan as one of the guidelines. The Strategic Plan is used as a roadmap and guideline for APEC economies.

Economies gave different comments regarding to the specific content of the Strategic Plan. It will be essential to enhance the cooperation of technology and investment among economies. A number of reasonable scenarios will help to promote the possible renewable energy share.

UL from USA expressed that we should encourage more private sectors to help governments to execute the activities to reach the goals in the plans.

Special gratitudes are due to Dr. Cary Bloyd (PNNL), Dr. Terry Surles, Professor Denise Eby Konan (University of Hawaii), and their colleagues for their kind assistance and arrangement on meeting affairs

LIST OF PARTICIPANTS

China

Lin Wan, Beijing Energy Innovation Ltd.

Hong Kong, China

Mr. Ming Sum CHOI, Electrical and Mechanical Services Department

Indonesia

Mr. Andi Novianto, Coordinating Ministry for Economic Affairs of Indonesia
Mr. Bambang Adi Winarso, Coordinating Ministry for Economic Affairs of Indonesia
Mr. Hudha Wijayanto, New Renewable Energy and Energy Conservation of Indonesia

Japan

Mr. Takao IKEDA, The Institute of Energy Economics, Japan
Mr. Toshiaki Nagata, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry

Korea

Mr. Gavin Yu, Sang Keun Yu, Korea Energy Management Co. (KEMCO)

New Zealand

Mr. Martin Brown-Santirso, Energy Efficiency and Conservation Authority
Mr. Terry Collins, Energy Efficiency and Conservation Authority

Philippine

Marissa Cerezo, Renewable Energy Management Bureau Department of Energy

Singapore

Ms. Agnes Koh, Energy Market Authority

Ms. Faith Gan, Energy Market Authority

Chinese Taipei

Chung-Hsien Chen, Bureau of Energy, MOEA

Bing-Chwen Yang, Industrial Technology Research Institute (ITRI)

Keng-Tung Wu, National Chung Hsing University

Vivian Hsieh, Industrial Technology Research Institute (ITRI)

Thailand

Dr. Kurujit Nakornthap, Deputy Permanent Secretary

Ms. Munlika Sompranon, Dept. of Alternative Energy Development & Efficiency

Ms.Chidchanok Choompalee, Ministry of Energy

USA

Dr. Cary Bloyd, PNNL

Dr. Terry Surles, University of Hawaii

Mr. Derek Greenauer, UL

Ms. Diana Shaoqian Lu, University of Hawaii at Manoa

EWG

Dr. Phyllis Yoshida, Energy Working Group of APEC

APERC

Dr. Kazutomo IRIE

Dr. Aishah Mohd Isa

Dr. Brantley Liddle

EGEDA

Mr Takuya Miyagawa, Energy Data and Modelling Center, The Institute of Energy Economics, Japan

Mr. Ryo Eto, Energy Data and Modelling Center, The Institute of Energy Economics, Japan

ICA

Pierre Cazelles, International Copper Association

Mr. Steven Sim, International Copper Association Southeast Asia Limited

Attachments

[Attachment 1] On-going Projects of EGNRET

[Attachment 1] On-going Projects of EGNRET

[P1] Urban Development Smart Grid Roadmap: Christchurch Recovery Project (Cooperated with EGEE&C) (New Zealand, EWG 08 2012)

[P2] The Comprehensive Analysis and Research of Key Technologies and Commercial Model of Low Carbon Model Town Applied in Yujiapu CBD EWG (China, EWG 11 2012A)

[P3] APEC Peer Review on Low-carbon Energy Policies (PRLCE) Phase 2 (Japan, EWG 18 2012A)

[P4] Operation Technology of Solar Photovoltaic Power Station Roof and Policy Framework (China, EWG 24 2012A)

[P5] Study on Measures to Reduce Energy Intensity in APEC Low Carbon Town (China, EWG 23 2012A)

[P6] APEC Smart DC Community Power Opportunity Assessment (Thailand, EWG 06 2013A)

[P7] APEC Low Carbon Model Town Capacity Building Development (China, EWG 05 2013A)

[P8] Promote APEC Low Carbon Town Development with District Energy System (China, EWG 07 2013A)

[P9] APEC Low Carbon Town Plan and Design Contest (China, EWG 01 2013S)

[P10] APEC Low Carbon Model Town (LCMT) Promotion through Eco-Point Program (LCMT-EPP) (Thailand, EWG 10 2013A)

[P11] APEC Low-Carbon Model Town Development Model and Tool Kit Study (LCMT-DMTK) (China, EWG 13 2013A)

[P12] APEC Photovoltaic Application Roadmap and Model Study (PVARM) (China, EWG 11 2013A)

[P13] APEC Photovoltaic Communication and Cooperation Platform (PVCCP) (China, EWG 16 2013A)

[P14] APEC Workshop on Promoting the Development of Wind Energy (Viet Nam, EWG 14 2013A)

[P15] Capacity building for installers and system designers for solar PV rooftop installations (USA, EWG 22 2013A)

[P16] APEC Conference on Facilitating the Solar Supply Chain (Viet Nam, EWG 23 2013A)

[P17] Study of APEC Low Carbon Model Town Development Index System (China, EWG 21 2013A)

[P18] APEC Low-Carbon Model Town Energy Management System Development and Application Research (China, EWG 20 2013A)

[P19] APEC Low-Carbon Model Town Heating System Application Model and Best

Practices (China, EWG 25 2013A)
[P20] District Energy Systems Development Roadmap Study in APEC Economies (China, EWG 24 2013A)

The above projects are described briefly as below.

P1. Urban Development Smart Grid Roadmap: Christchurch Recovery Project (EWG 08 2012, New Zealand) (Cooperated with EGEE&C)

Christchurch, New Zealand has been hit by a series of earthquakes in 2010 and 2011. The resulting damage has required demolition of significant areas of the city. The recovery and rebuilding process will take time, but offers a unique opportunity to establish cutting edge energy efficiency and renewable energy technologies in Christchurch.

The New Zealand Energy Efficiency and Conservation Authority (EECA) proposes to lead a study that will result in a 'Road Map' for establishing a 'smart electricity grid' in Christchurch, to deliver the maximum social, environmental and economic benefits to the city.

The recovery of Christchurch represents a remarkable opportunity to provide learning and demonstration value to the APEC Community on integrating smart grid technologies into the rebuilt city.

P2. The Comprehensive Analysis and Research of Key Technologies and Commercial Model of Low Carbon Model Town Applied in Yujiapu CBD (EWG 11 2012A, China)

This project will propose a smart energy network system that encompasses the entire circle for sustainable and low-carbon development in Yujiapu financial district, Tianjin city.

Smart grid (SG) which could achieve deployment and integration of distributed resources such as solar and wind energy and area energy supply network (cooling, heating) have been extensively discussed independently.

In this study, the Smart Energy Network system proposed will integrate those two systems together in order to promote use of renewable energy and consequently reduce CO2 emission of entire city.

The smart energy network makes it possible to collect real-time data from both demand side of energy use and operation status of energy supply side within Yujiapu district, which could substantially support the management staff to achieve an efficient operation.

P3. APEC Peer Review on Low-carbon Energy Policies (PRLCE) Phase 2 (EWG 18 2012A, Japan)

The Peer Review on Low-Carbon Energy Supply (PRLCE) was established in response to the Energy Ministers' instruction at their meeting in Fukui, Japan in 2010, which called for exploratory mechanisms among APEC economies to set individual goals and action plans for introducing low-emission power sources.

As with APEC's PREE, a peer review team comprised by low-carbon energy experts from APEC member economies will assess the host economy's conditions to design effective low-carbon energy goals and action plans to propose recommendations that might be voluntarily adopted to strengthen the policies adopted and monitor their progress. Although renewable power supply is accentuated, low-emission power sources also encompass nuclear and fossil fuels with carbon capture and storage.

Two PRLCE are expected in Mexico and other economy to be defined, to be held during the second half of 2013.

P4. Operation Technology of Solar Photovoltaic Power Station Roof and Policy Framework (EWG 24 2012, China)

Central cities of many APEC economies have sufficient space resource for solar photovoltaic power station roof, which is a realization way of APEC low carbon model town. Solar photovoltaic power station roof is an emerging electricity market model that has already proved its efficiency of transforming the electric supply industry into a centralized, producer-controlled network.

Can this model be an effective solution to the PV stations? Does it require a special policy in combining to the grid? What design a pilot project should follow to introduce solar photovoltaic power station roof to APEC economies where urban space resources are abundant? These are the questions that the project seeks to address through analytical and physical meeting activities.

Official website and expert database was established before July 2013. A congress is arranged in Beijing in Aug 2013.

P5. Study on Measures to Reduce Energy Intensity in APEC Low Carbon Town (EWG 23/2012A, China)

This project, submitted from Shanghai, China, is intended to quantitatively investigate the measures to reduce energy intensity of economic output in APEC Low Carbon Town (LCT). These measures include establishing low carbon industries, applying low carbon urban layouts, generating low carbon energy, developing low carbon buildings, establishing low carbon transportation and promoting resources recycling.

The objective of the project is to provide a practical framework for developing LCTs under the context of developing APEC economies in terms of its economic level, energy sources, climatic conditions and investment capabilities.

The project activities will mainly include:

1) investigation on the effect and effectiveness of the various measures,
2) identification of best practices thereof and their benefits in terms of reducing energy intensity,
3) organization of a workshop to disseminate the practices of the new town of Songhua River Farm in Heilongjiang province, China.

P6. APEC Smart DC Community Power Opportunity Assessment (EWG 06 2013A, Thailand)

Smart Direct Current (DC) community power systems have the capability to provide energy services at the community level at a reduced cost and higher reliability than conventional fossil fuel based microgrid systems. Such systems are particularly suited for the rural areas of developing APEC member economies that often lack grid connected electrical service.

Smart DC power systems link together electricity produced from renewable energy systems (photovoltaic (PV), wind, biomass, or small hydro) and efficient DC appliances including electric vehicles (EVs) without the need for costly conversion of the power from DC to AC via an inverter which is typically utilized in fossil energy based microgrids.

This project will include a report, which identifies the current DC community power landscape and opportunities in the APEC region and a project workshop, which will bring representatives from the research community, industry, and government officials in the APEC region to help develop an overall roadmap for smart DC community

power systems development in the APEC region.

P7. APEC Low Carbon Model Town Capacity Building Development (EWG 05 2013A, China)

This LCMT-CBD project refers to St. Petersburg Declaration publicized in 2012 APEC Energy Ministerial Meeting, where the successful progress of APEC Low Carbon Model Town (LCMT) was been underlined. So far two LCMT projects have been processed in Yujiapu, Tianjin and Samui, Thailand. However, towns in APEC region have varying degrees of land use patterns observed in towns as well as many specific conditions, as LCMT Task Force mentioned. Therefore, it is necessary to carry out capacity building development on LCMT system. Furthermore, how to deploy the approaches to apply LCMT as useful tools into the developing area is valuable to investigated.

The project will invite the APEC economies to share experiences on low carbon model town projects such as Yujiapu and Samui. Coaching seminars, research activities and forum will hold to discuss the applicable Low Carbon approaches to the case study areas. The gain from the project will be reported on APEC website. The project will formally start at May 2013 and will finish at April 2014. Project locations will include LCMTs area, case studies areas etc.

P8. Promote APEC Low Carbon Town Development with District Energy System (EWG 07 2013A, China)

This proposed project is designed to establish a framework of District Energy System with Multiple Forms of Supply in the low-carbon town, including CCHP (combined cooling, heating and power), roof solar energy and water source heat pump. The low-carbon town here will be the efficient and sustainable stepped utilization model of planned energy resources as well as diversified and clean energy utilization structure, with low carbon emission and the principle of scientific energy using, comprehensive energy using and systematic planning.

With enormous potential in terms of energy intensity reduction and CO2 emission, it is beneficial to assess energy policies of APEC member economies and achieve the goal of APEC's meeting.

P9. APEC Low Carbon Town Plan and Design Contest (EWG 01 2013S, Self-funded, China)

To promote the concept of low-carbon towns, enhance the public awareness of

low-carbon buildings, demonstrate the effectiveness of green building design, share knowledge on low-carbon town design, the organizer will hold an international contest on low-carbon building and towns design for selected demonstrative buildings and towns in China. The winner of the contest will get the contract for the projects. The organizer will assist the winner to start business in China. The contest will also align with other international organizations like EU, World Energy Council, IEA and Energy Charter.

This contest is a process of exploring and sharing knowledge of energy-efficient buildings and low-carbon towns. Contest will be held within different groups: college students, professionals and the public.

The project will consist of three phases:

- May 2013, contest rules to compose and start to invite teams
- Jul 2013, team start design process with support from the organizer,
- Oct 2014, board members to choose outstanding teams and award will be announced.

P10. APEC Low Carbon Model Town (LCMT) Promotion through Eco-Point Program (LCMT-EPP) (EWG 10 2013A, Thailand)

The project will develop a guideline (including the identification of goal and scope definition, certification criteria, an institutional framework, short- and long-term benefits) of an eco-point program for supporting the implementation of low carbon measures previously proposed in the APEC projects. It will also build up an Eco-Point Program (EPP) Forum which is an on-line networking system for sharing experiences and knowledge on low carbon technologies and society among the APEC member economies.

A roadmap for the guideline implementation will be developed using Samui Island as a case. Planned project activities include the guideline, roadmap and EPP Forum development, public consultation via the EPP Forum, meetings and seminars. The project will be carried out over 1 year period from May 2013 to April 2014 in Thailand. Nonetheless, the EPP Forum will broaden the physical boundary of project results to be capable for wide applications in APEC member economies.

P11. APEC Low-Carbon Model Town Development Model and Tool Kit Study (LCMT-DMTK) (EWG 13 2013A, China)

The APEC economies have already possessed a great number of technologies, plans

and models which apply to the Low-Carbon Model Town (LCMT), and create huge market at the same time. How to develop large scale LCMT in a short time window efficiently and properly is a big challenge to APEC member economies as a whole.

APEC Low-Carbon Model Town Development Model and Tool Kit Study (LCMT-DMTK) is aimed to provide recommendation and suggestion regarding:

(1)Procedure that help to improve development efficiency,

(2)Solution, from existing project, research and other industry,

(3)Tool kits, especially feasibility study and planning, etc., on the basis of China-EU cooperation, and the Solar Decathlon competition held in China in August 2013. The deliverable achievement of this project will be a published research report and one symposium in China in 2014.

P12. APEC Photovoltaic Application Roadmap and Model Study (PVARM) (EWG 11 2013A, China)

The key activities of this project are:

(1)to carry out case study and SWOT analysis to typical PV project, including casualty and losses, in different area and environment,

(2)to bring suggestion of possible PV application roadmap for APEC economies' reference,

(3)to compare and discuss the advantages and weakness of different PV development models, including large size ground-mounted power plant, industrial and commercial project, residential project, and application in agriculture, transportation, and to summarize the best practices.

A workshop will be held in China as APEC chair in 2014 and a written report will be shared in APEC and EGNRET website.

P13. APEC Photovoltaic Communication and Cooperation Platform (PVCCP) (EWG 16 2013A, Viet Nam)

The Photovoltaic Communication and Cooperation Platform (PVCCP) project is to meet the mission for the increase of renewable energy usage, which was addressed by 10th APEC Ministerial Meeting in Russia in 2012. The PVCCP project's goals including:

1) establish a PV System Life-cycling Risk Management Scheme, to identify and control potential risks of different periods including planning, design, manufacturing, construction, maintenance, etc,

2) develop PV Risk Analysis Tool Kits to carry out risk analysis, mainly focus on three stages: design, construction and maintenance ,
3) provide support to EGNRET and related stakeholders who wish to evaluate the risk and quality of specific PV project,
4) provide content and tool support concerning PV to the Knowledge Sharing Platform (KSP) of Energy Smart Communities Initiative (ESCI).

A workshop will be organized in China in 2014.

P14. APEC Workshop on Promoting the Development of Wind Energy (EWG 14 2013A, Viet Nam)

In the context of significant industrial and population growth, increasing shortages of conventional energy and sharp fluctuation of price, renewable energy, including wind energy appears to be an efficient and sustainable alternative.

The APEC Workshop on Facilitating the Development of Wind Energy aims to:
1) identify obstacles for a wide application of wind energy;
2) exchange and discuss current strategies, policies and technologies in the APEC region which also creates a platform for member economies, especially developing ones to build up capacity for government officials in the process of policy making and implementation of wind energy projects;
3) explore further cooperation opportunities among APEC member economies, with the ultimate goal of ensuring energy security for the sake of APEC's sustainable growth

P15. Capacity building for installers and system designers for solar PV rooftop installations (EWG 22 2013A, USA)

This Project is proposed to overcome important barriers in the form of lack of or inadequate competency of rooftop solar PV installers and system designers, through appropriate training and certification programs.

The training will focus on aspects insufficiently addressed and often overlooked: selection of appropriate materials and products, proper installation practices, rooftop fire safety hazards during installation and overall safety of installation during operation, wiring and connection to the grid.

As market recognition of installers and system designers' skills and competency is essential, a certification program will be developed and relevant government

institutions will be trained and assisted by experts to establish their own national certification program.

The long-term objective of this project is therefore to increase the performance/output of rooftop solar PV systems and facilitate connection to the grid for rooftop solar PV systems, as a means to support APEC economies' efforts in increasing the share of electricity from renewable energy sources.

P16. APEC Conference on Facilitating the Solar Supply Chain (EWG 23 2013A) (Viet Nam)

This project proposes to hold a 2-day APEC Conference on Facilitating the Solar Supply Chain in Viet Nam in the 3rd quarter of 2014.

The main objectives of the projects are:

1. To update information on trends of solar panel source and possible changes in demographics on supply chains in the future;
2. To create a platform for APEC member economies to discuss current supply chain management procedures and networks in the solar industry;
3. To discuss opportunities and challenges in the solar equipment industry, with possible recommendations to tackle with such challenges;
4. To explore potential cooperation opportunities among APEC member economies in facilitating the solar supply chain

P17. Study of APEC Low Carbon Model Town Development Index System (EWG 21 2013A, China)

In 2010, China and Japan in the 9th APEC Energy Ministers meeting jointly proposed the construction of Low Carbon Model Town projects. Two test-cases have been carried out in Yujiapu, China and Samui, Thailand. China's National Energy Administration (NEA) has carried out APEC LCMT promotion activities from 2013. But the technical guidance and Index system of LCMT construction still hasn't been studied systematically.

The Index system (such as tourism type, industry type, etc.) relate to the low carbon town plan, low carbon industry, low carbon building, low carbon transportation, low carbon energy, resource recycling, etc.

In the course of project implementation, desk analysis and field surveys will be conducted, relevant low-carbon town experts in APEC economies will be engaged

through participation of seminars and peer reviews, and the views from key players such as construction contractors, designers, and device providers will be solicited.

P18. APEC Low-Carbon Model Town Energy Management System Development and Application Research (LCMT-EMSDA) (EWG 20 2013A, China)

APEC Low Carbon Model Town (LCMT) related projects have provided lots of valuable reference information concerning policy, model and best practices to APEC member economies. Energy Management System (EMS) is an important tool and approach to push forward LCMT.

The LCMT-EMSDA project's goals including:

1. Briefly review the latest development, technology, solution and research concerning EMS in APEC region.
2. Analysis the advantages and potential risks or weakness of EMS application.
3. Summary the proper procedure and process, key points to develop EMS.
4. Best practices of different EMS development and application, including residential house, building, renewable energy power plant, harbor, etc.
5. A final report will be published and special workshop will be organized as part of APEC China year 2014.

P19. APEC Low-Carbon Model Town Heating System Application Model and Best Practices (LCMT-HSAM) (EWG 25 2013A, China)

The central and distributed heating system is an important component of energy system in Low Carbon Model Town (LCMT). Poor planning, design, operation and maintenance of Heating System would not only waste lots of energy and money, but could also cause serious safety risk and pollution to the city and wide region around.

The APEC Low-Carbon Model Town Heating System Application Model and Best Practices (LCMT-HSAM) project is aimed to:

1. Summarize the latest development of research, product and solution of different economic heating system.
2. Analysis best practices, advantage and weakness of different heating system.
3. Provide application model to help related stakeholders to choose or analysis different heating system.
4. Organize a workshop in APEC China year 2014 to share LCMT-HSAM

project outputs and exchange knowledge and experiences among participants. A written report will be prepared as part of workshop materials.

P20. District Energy Systems Development Roadmap Study in APEC Economies (EWG 24 2013A, China)

It is proved in many economies that District Energy System (DES) is a cost-effective measure to increase energy efficiency and reduce carbon emission. This project aims to share DES techniques and practice experiences to all APEC economies.

The following activities are planned:

1. Case studies including site visits and interviews, seminars, and workshops shall be organized to study a number of selected DES cases in APEC economies, leaded by an expert team. A comprehensive research report shall be created to summarize and categorize the case studies in selected APEC economies.
2. A set of practice guidelines shall be developed by the expert team to specify the techniques and protocols of certain DES systems.
3. An international DES symposium shall be organized to involve stakeholders from main APEC member economies for technique and policy communication to share the research fruits. The guideline development and symposium shall both take place in China in 2014.