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

40th Meeting

Ha Noi, Viet Nam
2-5 April, 2013,

Introduction

The 40th meeting of the Expert Group on New and Renewable Energy Technologies (EGNRET) was held on April 2 to 5, 2013 at Prestige Hotel in Ha Noi, Viet Nam. In addition to EGNRET 40, the APEC Workshop on Small Hydro and Renewable Grid Integration was held alongside the meeting on April 3-5, 2013.

The EGNRET 40 meeting was co-chaired by the EGNRET Chair, Dr. Hom-Ti (Tom) Lee of the Industrial Technology Research Institute (ITRI), Chinese Taipei and Mr. Pham Thanh Tung, Director of New and Renewable Energy Department at General Directorate of Energy, Ministry of industry and Trade, Viet Nam. Representatives from China, Hong Kong, China, Indonesia, Korea, Malaysia, Singapore, Chinese Taipei, Thailand, USA, Viet Nam, Asia Pacific Energy Research Centre (APERC), Expert Group on Energy Data and Analysis (EGEDA), Low-Carbon Model Town Task Force (LCMT TF), International Renewable Energy Agency (IRENA), and International Copper Association Ltd. (ICA) participated in the meeting.

Dr. Lee welcomed the delegates and opened the meeting, and Mr. Pham Thanh Tung gave an official welcome to the delegates on behalf of Viet Nam. Following the welcome, a final agenda distributed by the Chair was reviewed and accepted.

Overview of New and Renewable Energy in Viet Nam

Mr. Nguyen Ninh Hai (Deputy Director of New and Renewable Energy Department, General Directorate of Energy, Ministry of industry and Trade, Viet Nam) gave a detailed overview of current Viet Nam's renewable energy utilization. Mr. Hai's presentation introduced Viet Nam's renewable energy potential, objectives and orientation for renewable energy development, mechanism and policy, and barriers and solutions.

Mr. Hai expressed that Viet Nam is rich in renewable energy sources. Till 2012, the grid connected renewable energy in Viet Nam produced from small hydro power mostly was 1,466 MW. Other off-grid renewable power including mini hydro, micro hydro, wind, solar, and biogas produced 45-60 MW. Currently, the utilization of small hydro power in Viet Nam was 1,466 MW, but the potential supply is over 7,000 MW. Other renewable energy sources (current use / potential supply) include biomass (150 MW / 500 MW), MSW (2.4 MW / 220 MW), biogas (0.5 MW / 58 MW), wind power (46 MW / 7,000 MW), and solar power (1.5 MW / 4-5 kWh/m^2). In addition, currently no geothermal and tidal energy installation in Viet

Nam, but the potential is estimated at 340 MW and 100-200 MW, respectively. It is expected to Increase the renewable energy share in total installed capacity from 6% in 2020 to 9% in 2030.

To promote renewable energy utilization, Viet Nam formulated some incentives, for example, the import tax exemption for goods which can not be produced inland, corporate tax exemption for the first four years and 50% reduction in the next 9 years, tax and land use fee exemption for renewable energy projects, free Environmental protection fee, and obligation to purchase electricity, i.e., Viet Nam Electricity Company (EVN) must purchase all electricity generated from renewable energy sources. In addition, some specific policies only for wind power and small hydro were also laid down to encourage the development of Renewable energy, including avoided cost tariffs for small hydro projects, support mechanism for wind power projects, development wind power projects and power purchase agreement for wind power projects, etc.

However, some barriers to develop renewable energy remain for renewable energy sector, e.g., lack of financial resources and support, Insufficient FiT support mechanism (only for wind power and small hydro), shortage information / reliable database, Insufficient awareness of available technology, and inadequate high level regualtion/law, strategy, and national plan to develop RE sources. To overcome those barriers and accelerate renewable energy utilization in Viet Nam, developing mechanism and policy, establishing renewable fund, and enhancing public awareness to will be the solutions.

Mr. Hai finally concluded that in Viet Nam, development of renewable enegy source is one of the necessary solutions to meet energy demand and ensure power energy security, especially for remote areas, islands, which can be not connected to the national electricity system to implement the objectives of the government's rural electrification. It is necessary for the establishment of mechanism and policies to encourage renewable enegy development and create a legal framework for investors in renewable enegy sector. In addition, support from international organizations and developed countries in terms of financial and technical support to promote renewable enegy development in Viet Nam is really needed.

Mr. Hai’s detailed presentation is available on the EGNRET website at:

http://www.egnret.ewg.apec.org/meetings/engret40/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 on December 11 to 14, 2012 in Shanghai, China, including EWG 45 (2013.3.18-22 in Thailand), 21st Leaders' Meeting (2013.10.1-8 in Indonesia), and EWG 46 (2013.11.18-22 in Viet Nam).

The EWG has met once since EGNRET 39. The EWG 45 was held on March 18-22, 2013 in Koh Samui, Thailand. At EWG 45, the APEC Secretariat introduced two new APEC measures including piloting a long term evaluation

system for APEC projects, and implementing the Strategic Planning Process during this year. In addition, eight EWG endorsed Concept Notes were approved in-principle by BMC for Session 1, 2013, including 3 EGNRET projects. On the other hand, Indonesia introduced the Initiative on Renewable Energy for Energy Security in the APEC Region, and would like to hold the APEC Conference on Clean and Sustainable Energy in September, 2013 in Bali. The EWG members also discussed on setting a target for renewable energy development in the APEC region.

Moreover, Mr. Luis Enrique Vertiz, the Program Director of APEC Secretariat working with EWG will leave in middle April, and the successor will be Mr. Zhiwei Lu (China).

The Chair finally reported the future prospects of EGNRET in 2013:

- The EGNRET will focus more on smart grid, low carbon town, etc. which are directly related to the ESCI and APEC ASGI.
- EGNRET members are encouraged to conduct researches related to reduction of energy intensity in APEC region.
- The EGNRET will strengthen collaboration with APEC other fora, e.g., LCMT Task Force, EGEE&C, Policy Partnership on Science, Technology, and Innovation (PPSTI), and some projects, e.g., PRLCE and PREE supported by APERC.
- Collaboration with International Renewable Energy Agency (IRENA), and International Copper Association Ltd. (ICA) on promotion of renewable energy in the APEC region will be carried out as well.

Progress on APEC Peer Review on Low-Carbon Energy Supply (PRLCE)

Ms. Elvira Torres Gelindon, Senior Researcher at APERC presented a detailed review of APEC Peer Review on Low-Carbon Energy Supply (PRLCE) in the Philippines.

The Philippines hosted the second Peer Review on November 19-23, 2012, and the scope of peer review includes (1) institutional context, (2) renewable energy goals, targets and strategy, (3) regulation and infrastructure, (4) bio-fuels and biomass energy, (5) geothermal, solar and wind, (6) hydropower energy, (7) power supply system (smart grid, FiT, private participation), and (8) green house gas management. Nine experts from APEC economies, APERC, and IRENA joined the review team. Currently the outcomes of the PRLCE in the Philippines are development of a review report, and will be reported to EWG 46 for endorsement. Also the report will be published on the APERC website (http://www.ieej.or.jp/aperc) in the end of this year.

This presentation is available on the website at:

http://www.egnret.ewg.apec.org/meetings/engret38/index.html

APEC Energy Demand and Supply Outlook 2013

Dr. Tran Thanh Lien, Team Leader at APERC gave a presentation on renewable energy and electricity supply in the APEC according to APEC Energy Demand and Supply Outlook 2013. The Outlook produced by APERC every 2 or 3 years, and the 5th Edition was published in February 2013.

According to the APERC analysis in 2012, the electricity generation is projected to a significant growth at an average annual rate of 2% between 2010 and 2035, from 6,933 TWh in 1990 and 13,235 TWh in 2010 to 21,792 TWh in 2035. It can be seen that coal was still by far the dominant source of primary energy for electricity generation in the APEC region, because coal has the advantages of being widely available and relatively inexpensive in many APEC economies. Some key findings show that nuclear development slows down, but not by much; coal electricity is still dominant (as mentioned above), but gas production growth speeds up and could challenge coal; and strong growth in renewable power, but modest in hydro.

Key drivers for the strong new and renewable energy (NRE) growth include supportive government policy and advancements of renewable energy technology. To promote NRE development, many APEC economies have formulated policies including feed-in-tariffs (FiT), renewable portfolio standards (RPS), carbon pricing, regulations limiting GHG emissions, and phasing out fossil fuel subsidies for power generation. On the other hand, NRE technology costs are declining rapidly. For example, module production costs for Solar PV have declined sharply, from USD 4.5/W in 2000 to USD1.00 /W in 2012, event less USD1.00/W, and wind turbine prices had doubled during 2002 – 2008, then have fallen ~20%-30% in recent years and continues down for the long-term, according to Lawrence Berkeley National Laboratory's (LBNL) reports.

For renewable energy supply in APEC region, the significant wind power addition is expected. By 2035, China leads in the output of electricity generated from wind energy, reaching around 738 TWh, followed by the US on about 440 TWh. Together China and the US account for around 88% of wind-based generation output across the APEC region. In addition, geothermal is one of the most economically attractive NRE sources in some APEC economies. The United States will lead the growth in geothermal-based generation, reaching 43 TWh in 2035, followed by Indonesia and Mexico. Also, the share of geothermal generation in New Zealand will reach 19% of its total generation in 2035, the highest in the APEC region. Moreover, from a base of near zero in 2010, solar-based electricity output (lead by China, Japan and the US) will reach over 288 TWh in 2035 with an average annual growth rate of 16%.

Dr. Tran's presentation is available on the EGNRET website at:

http://www.egnret.ewg.apec.org/meetings/engret40/index.html

The APEC Energy Demand and Supply Outlook 2013 can also be downloaded from the APERC website at:

http://aperc.ieej.or.jp/publications/reports/outlook.php

Overview of Low-Carbon Model Town (LCMT) Task Force Activities

Following APERC's presentations, Mr. Shinji Kakuno, Chair of LCMT TF gave the progress on the APEC Low-Carbon Model Town (LCMT) Task Force projects.

Mr. Kakuno's presentation focused on the progress of the LCMT Phase 3 project. In Phase 3, two candidate projects were nominated including San Borja Town, Lima, Peru, and Da Nang City, Viet Nam. After evaluation, Da Nang City is to be the case study for LCMT Phase 3 Project, announced officially at EWG 44 in November, 2012, and the feasibility study project was final approved in December, 2012. For LCMT concept refinement, "The Concept of the Low Carbon Town in APEC Region" will be tailored for Brownfield Redevelopment. Study Group A & LCMT Task Force will collaborate with the OECD, and conduct site visits on low-carbon development projects in July. Simultaneously, Study Group B will conduct peer review for policy recommendations after the site visit to Da Nang City during September - October, 2013. The preliminary results will be unveiled at EWG 46 in Da Nang, Viet Nam in November, 2013.

Mr. Kakuno also mentioned that outcomes of the LCMT Phase 2 Project (Samui Island, Thailand) have been published, and can be downloaded at the APEC website:

- Final Report for APEC Low Carbon Model Town Project Phase 2
  http://publications.apec.org/publication-detail.php?pub_id=1400

- 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 (Final Report)
  (will be uploaded to the APERC website soon)

This presentation is also available on the EGNRET website at:

http://www.egnret.ewg.apec.org/meetings/engret38/index.html

Dr. Twarath Sutabutr (Thailand) also briefed an additional remark with a video broadcast on the outcomes of the LCMT development in Samui Island.

EGEDA on Observing New and Renewable Data in APEC and IEA

Since the EWG members' discussion on setting a target for renewable energy development in the APEC region at EWG 45, the definition and data collection of varied renewable energy should be identified before developing the target. Thus, Mr. Takuya Miyagawa, the Representative of the Expert Group on Energy Data and Analysis (EGEDA) was invited to give a presentation on observing new and renewable data in APEC and IEA. Mr. Miyagawa first introduced the EGEDA

mission and history of the annual energy data collection in APEC region, then explained the operation of data collection for new and renewable energy in APEC.

Currently, EGEDA's database contains 3 types of energy data, including (1) Monthly Oil & Gas Data, i.e., JODI (Joint Organization Data Initiative) Oil and JODI Gas, (2) Quarterly Energy Supply Data, and (3) Annual Energy Data. The questionnaire for APEC annual energy data collection on new & renewable energy contains 4 tables including the supply, transformation, final consumption, and conversion factor. Renewable energy products in the new and renewable questionnaire are classified into 13 parts:

- Fuelwood and Woodwaste
- Bagasse
- Charcoal
- Other Biomass
- Biogas
- Industrial Waste
- Municipal Solid Waste
- Liquid Biofuels
- Hydro
- Geothermal (Electricity / Heat)
- Solar (Photovoltaic / Thermal)
- Tide, Wave and Ocean
- Wind

EGEDA also revised definition according to development of new energy source. For example, the definition of natural gas was revised for 2012 data collection, and the shale gas and coal seam gas were added into the category.

Mr. Miyagawa also showed some examples of APEC energy balance tables and survey results compared with data from IEA. 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/engret40/index.html

Member Economy Presentations: Integrating New and Renewable Energy into the Grid in the APEC Member Economies

The economy presentation topic for EGNRET 40 was "Integrating New and Renewable Energy into the Grid in the APEC Member Economies." This topic was suggested by Dr. Chung-Hsien Chen (Chinese Taipei) because with the variability of renewable resources, addressing challenges of connection, transmission and distribution is very important to increase the renewable energy utilization through integration. Besides, the APEC Workshop on Small Hydro and Renewable Grid Integration was also held alongside the meeting. Thus, through member presentations and discussion on this meeting theme, EGNRET members can exchange information and learn the incentives and measures to promote integration of new and renewable energy into the grid.

The meeting presentations are available on the website at:

http://www.egnret.ewg.apec.org/meetings/engret40/index.html

IRENA on Establishing the Renewable Energy Policy Advice Network (REPAN)

Mr. Jeffrey Skeer, Senior Programme Officer at International Renewable Energy Agency (IRENA) was invited to give a presentation on Establishing the Renewable Energy Policy Advice Network (REPAN). Currently, IRENA would like to establish a single, unified, one-stop, and global Renewable Energy Policy Advice Network, and get countries to nominate experts who will contribute their services free of charge to those who seek their advice. A new REPAN platform web page will be established jointly sponsored by IRENA and Clean Energy Solutions Center. Also, REPAN will engage with countries of the Clean Energy Ministerial (CEM) to support the joint activity. In addition, IRENA conducts about eight renewable readiness assessments (RRAs) each year to help countries identify priority actions for accelerating renewable energy deployment, with support from all concerned stakeholders.

Mr. Skeer also introduced another two IRENA activities, including Global Renewable Energy Islands Network (GREIN), and REMAP 2030 - Country Analysis Process. GREIN is a platform for pooling knowledge, sharing best practices and seeking innovative solutions for accelerated uptake of clean and cost-effective renewable energy technologies on islands. REMAP 2030 is a roadmap aimed to doubling the renewable energy share in the global energy mix by 2030, and is also intended to contribute the UN Secretary General's Sustainable Energy for All (SE4ALL) initiative for Ensuring universal access to modern energy services, doubling the global rate of improvement in energy efficiency, and doubling the share of RE in the global energy mix by 2030.

Finally Mr. Skeer emphasized that IRENA expects to collaborate with EGNRET. The Chair expressed welcome, and encouraged the EGNRET members in considering future collaboration with IRENA.

These presentations are available on the website at:

http://www.egnret.ewg.apec.org/meetings/engret40/index.html

Completed EGNRET Projects

Three EGNRET completed projects include

C1. Addressing Challenges of AMI Deployment in APEC (EWG 07/2011A) (Chinese Taipei)
C2. Stock-take of Electric Vehicle Interface with Electricity and Smart Grids Across APEC Economies and the Potential for Harmonization (EWG 11/2011) (New Zealand)

C3. Piloting Smart/micro Grid Projects for Insular and Remote Localities in APEC Economies (S EWG 15 11A) (Russia)

The above projects are described briefly as below.

C1. Addressing Challenges of AMI Deployment in APEC (EWG 07/2011A)
(Chinese Taipei lead)

The 9th Energy Ministerial Meeting (EMM 9) in 2010 instructed EWG 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. Advanced Metering Infrastructure (AMI) is a foundation enabling technology for the Smart Grid. Many countries in the worldwide announce and start their AMI programs. However, it seems many issues are needed to overcome. These issues include policy, meter reliability, information security, customer education, and so on. This project will investigate the development strategies and current status of AMI in all APEC economies, and provide recommendations for AMI deployment. The methodology of this project involves survey and analysis of AMI development status, and an two-day AMI workshop.

Currently, the worldwide AMI deployment status is continuously collected, and the first completed region was Australia. It was found out that each economy has its own deployment plan. More important, the plan adopted the Minimum AMI Functionality Specification and Minimum AMI Service Levels Specification to ensure the quality of system integration. In addition, the interconnection with HAN (Home Area Network) and the functionality of IHD was also considered in Australia.

The APEC AMI Workshop has been held on 24-25 August, 2011 in Chinese Taipei. In total 16 speakers were invited from 9 economies, and 216 participants from 7 economies attended the Workshop. The presentation files of the Workshop can be found at:

http://www.egnret.ewg.apec.org/workshops/AMIWorkshop/index.html

APEC member economies which are developing their AMI can be beneficiary most from the project. They will gain valuable experiences from field trials, policy making, system requirements, etc. As a result, effective action plans can be made to accelerate the development of AMI in the APEC region.

The main findings of this project are summarized as followings:
(1) Principles of AMI deployment: Major criteria such as economic efficiency, societal equity, sustainable development and security have been defined, and variables including standardization, interoperability, timing and cost-benefit analysis were also identified.
(2) Guidelines for APEC economies: The process of improving public awareness, proposing comprehensive plan, and developing applicable demand control program are suggested. Afterwards, support schemes such as policy, privacy, security and cost-benefit analysis are needed to be carried out.
(3) Transition from AMI to smart grids: AMI forms the fundamental networking for

power grid systems, and enables the increment of renewable energy adoption and efficiency improvement. However, more considerations pop out while the power systems are turned into smart grids, such as scalability, interoperability, and customer services. All the issues are dependent, and require more efforts to maintain the integrity and functionality of smart grids.

C2. Stock-take of Electric Vehicle Interface with Electricity and Smart Grids Across APEC Economies and the Potential for Harmonization (EWG 11/2011) (New Zealand lead)

The objective of the project is to enhance understanding in APEC economies of EV connectivity to electricity grids and identify opportunities to increase the harmonization of standards and requirements to promote the deployment and integration of EVs, both vehicles and supporting technologies.

The methodology of this project involves 3 main steps, including a survey of APEC economies on existing EV connectivity infrastructure, regulations, and standards; a desktop review of the results; and a workshop to discuss the findings and collect APEC feedback.

The deployment of electric vehicles in a given economy requires careful consideration of the electrical systems, hardware configuration conditions, and existing standards and regulations. Differences in these conditions across APEC economies may create barriers to the diffusion of EVs across the region. Currently, there is an increasing amount of pressure on harmonizing these requirements by users and producers of EVs to maximize their market opportunities.

The final workshop was held in New Zealand in June alongside the EGNRET 38 meeting. The workshop was attended by approximately 90 delegated including the EGNRET representatives. The rest of the attendance was made up of NZ representatives of the auto industry, electricity industry, government, academia, and NGOs. The workshop provided an ideal stage to discuss the research, resulting in robust discussion. The consultants obtained valuable material which was incorporated into the final product.

The final report has been disseminated to all APEC economies, APEC working groups with an interest in transport, energy efficiency, and smart grids. The dissemination included a large number of identified regional experts and a call to forward to interested parties.

The workshop presentations and the final report can be found in the Workshop official website (including podcasts):

http://www.eeca.govt.nz/content/apec-electric-vehicle-connectivity-workshop-2012

C3. Piloting Smart/micro Grid Projects for Insular and Remote Localities in APEC Economies (S EWG 15 11A) (Russia lead)

The objectives of the project are to compile and share member economies' experiences in introducing new technologies for local energy systems including smart & micro grid technologies to support sustainable development of remote

and isolated areas, to review microgrid as a critical component of smart grid concept for local energy systems with a view to maximize the economic and environmental effect of tested and ready-to-use technologies, and to provide a menu of options to APEC economies for piloting of smart/micro grid projects in the form of assessment methodologies, business scenario models and specific recommendations.

A project newsletter was released in the end of February, 2012 to allow for wider dissemination of the information about the project. The project team has also been working towards establishing a dedicated project website:

http://www.localenergy-apec.ru

The project team succeeded in engaging a variety of stakeholders, including researchers, project developers, investors, energy cooperatives and local administrations to cover every important aspect of the microgrid project development. The Workshop also provided representatives from APEC economies an exclusive opportunity to enhance their skills in modelling hybrid renewable microgrids.

The project team also found that remote hybrid renewable microgrids are an efficient and smart way to cater to the basic energy needs in a decentralised or distributed energy environment. This is often the case for developing economies where access to centralised infrastructure is limited, but also for developed economies that seek for smarter way of energy management. Project team members and the Workshop participants agreed that renewable microgrids and cooperative forms of ownership and management should find their prominent place in the APEC Energy Smart Communities Initiative.

The final report of this project can be found at

http://publications.apec.org/publication-detail.php?pub_id=1359

On-going EGNRET Projects Update

Currently the EGNRET is implementing 11 projects:

P1. Prospects for Marine Current Energy Generation in APEC Region (S EWG 23 11A) (Russia)
P2. Best Practices in Energy Efficiency and Renewable Energy Technologies in the Industrial Sector in APEC Region (S EWG 19 11A) (Cooperated with EGEE&C) (Thailand)
P3. Urban Development Smart Grid Roadmap: Christchurch Recovery Project (EWG 08 2012) (Cooperated with EGEE&C) (New Zealand)
P4. Research on the Application of Physical Energy Storage Technology to Enhance the Deployment of Renewable Energy in an APEC Low Carbon Town (EWG 16 2012A) (China)
P.5 The Comprehensive Analysis and Research of Key Technologies and Commercial Model of Low Carbon Model Town Applied in Yujiapu CBD EWG (EWG 11/2012A) (China)

P6. APEC Peer Review on Low-carbon Energy Policies (PRLCE) Phase 2 (EWG 18 2012A) (Japan) (*Approval in Session 3, 2012*)
P7. APEC Workshop on Best Practices on Financing Renewable Energy (EWG 21 2012A) (Viet Nam) (*Approval in Session 3, 2012*)
P8. Promoting Stable and Consistent Renewable Energy Supply by Utilizing Suitable Energy Storage Systems (EWG 22 2012A) (China) (*Approval in Session 3, 2012*)
P9. Operation Technology of Solar Photovoltaic Power Station Roof and Policy Framework (EWG 24 2012A) (China) (*Approval in Session 3, 2012*)
P.10 Study on Measures to Reduce Energy Intensity in APEC Low Carbon Town (EWG 23/2012A) (China) (*Approval in Session 3, 2012*)
P.11 2013 APEC Workshop on Geothermal Technology (SF EWG 01/2013) (self-funded, Chinese Taipei) (*Endorsed at EWG 44*)

The above projects are described briefly as below.

P1. Prospects for Marine Current Energy Generation in APEC Region (S EWG 23 11A) (Russia lead)

The PO has applied for an extension of project implementation till March 31, 2013.

The objectives of the project are within the context of APEC Sustainable/ Green Growth agenda, to raise awareness of the benefits of marine energy generation with particular focus to marine current energy, and to compile widely dispersed information on the deployment of marine current generating technologies and to make this information accessible to APEC economies.

The methodology of this project consists of two major components, including review of marine renewable energy technologies and stocktake of successful deployment models, and two-day conference structured along the lines of the review and stocktake exercise. The project website is available at

http://www.marineenergy-apec.ru

Marine renewable power is still seen by many as an exotic renewable source. This project highlighted that the interest and investment in the marine power sector has grown rapidly over the past five years with significant advances being made in the development of commercial scale marine power technologies and projects.

A conference “Prospects for Marine Current Energy Generation in APEC Region” was held back-to-back with the Workshop “Microgrids for Local Energy Supply to Remote Areas and Islands in APEC Region” (project No. S EWG 15/2011A) on 16-17 October, 2012 in the Russky Island, Vladivostok, Russia. This allowed a more efficient and coordinated preparation and some cost savings for the participants.

The project steering committee and consultants are currently reviewing the outcome of the conference with a view to make it available to a wider audience in APEC member economies.

P2. Best Practices in Energy Efficiency and Renewable Energy Technologies in the Industrial Sector in APEC Region (S EWG 19 11A) (Cooperated with EGEE&C) (Thailand lead)

This project will address the best practices, identify the hurdles and opportunities of the application of energy efficiency (EE) and new and renewable energy (NRE) technologies in the industrial sector among member economies to better support and promote the dissemination of NRE and EE in the overall region. The key objective of this project is to develop a report which clearly identifies the examples of successful adoption of new and renewable energy technologies combined with energy efficiency in the APEC industrial sector, the obstacles that prevent the adoption of technologies, and the applicability of lesson learned from previous reports including APEC supported activities.

The main tasks of this project are (1) to clearly identify examples of the successful adoption of new and renewable energy combined with energy efficiency in the APEC industrial sector, (2) to review the obstacles that prevent the adoption of new and renewable energy technologies combined with energy efficiency in the industrial sector, and (3) to review the applicability of lesson learned from previous industrial energy analysis reports including APEC supported activities. The final output will be suggested roadmap for the successful implementation of industrial sector new and renewable energy and energy efficiency system in APEC member economies.

Currently the PO and consultant have mutually discussed and agreed upon lists of renewable energy and energy efficiency to be included in the report, as well as the scopes of case studies that would benefit to APEC industrial sector. The consultants have extensively reviewed and searched for specific case studies, which would be analyzed for the obstacles that could prevent the adoption of such technologies.

However, the project has been approved for nine months but the contract was prepared and signed with some delays so the PO has applied for an extension till March 31, 2013.

P3. Christchurch Smart Energy Grids: Earthquake Recovery Project (EWG 08 2012) (Cooperated with EGEE&C) (New Zealand lead)

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.

P4. Research on the Application of Physical Energy Storage Technology to Enhance the Deployment of Renewable Energy in an APEC low Carbon Town (EWG 16 2012A) (China lead)

Energy storage is essential to utilize renewable resources and reduce CO2 emissions considerably because of the intermittent and uncontrollable availability of renewables. It is also an acceptable method of smoothing power demand, which is a major part of our national energy security and sustainable development.

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. This research will provide 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.

P5. The Comprehensive Analysis and Research of Key Technologies and Commercial Model of Low Carbon Model Town Applied in Yujiapu CBD (EWG 11/2012A) (China lead)

APEC has been paying more and more attention to the CO_2 reduction in in APEC economies, and has selected Yujiapu CBD as the first APEC Low Carbon Model town Project. Because Yujiapu CBD fits the concept of comprehensive low carbon in “Town” not a single building. On the other hand, the construction will last for a long time in this town, the study about continuous implementation of LCMT is very important. From this study, Promoting sustainable LCMT development model would be expected.

The methodology of this project involved three major activities, including (1) local survey for Yujiapu's traffic system, energy resources, local policies, and global low carbon enterprises, (2) the construction of low carbon system, including low carbon technology standards, management standards, and investment model, and (3) inviting experts from all economies to attend review meetings in different stages of the project.

Currently, the local survey was finished and a comprehensive understanding of the CBD'S energy data, traffic planning, and Tianjin City's policies about low carbon have been acquired. The technological selection of Yujiapu's DHC has also been finished. In addition, the low carbon traffic system has been planned, including the strategy of introducing BRT into the Yujiapu CBD, the design of CBD's bus circle routines, and the planning of EV charging piles. The application of the solar energy and the recycling of garbage were also discussed.

P6. APEC Peer Review on Low-carbon Energy Policies (PRLCE) Phase 2 (EWG 18 2012A) (Japan lead)

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. Two additional PRLCE's are planned in 2013.

P7. APEC Workshop on Best Practices on Financing Renewable Energy (EWG 21 2012A) (Viet Nam Lead)

This Project aims at holding an APEC Workshop on Best Practices on Financing Renewable Energy. The key objectives of the proposed project are to analyze the current situation and best practices on financing renewable energy in the APEC region; present best practices and exchange views of policy-makers, regulators, academia and business representatives on financing renewable energy; and develop recommendations for more effectiveness in renewable energy financing.

P8. Promoting Stable and Consistent Renewable Energy Supply by Utilizing Suitable Energy Storage Systems (EWG 22 2012A) (China lead)

The proposed project aims to contribute to the APEC's strategy for carbon reduction, sustainable energy supply and low carbon economy growth in the region. The project will provide key findings and recommendations regarding the construction, operation and management of energy storage utilization in three different types of renewable energy generation systems. It will detail suitable technology solutions, outline essential business model parameters, and develop policy recommendations – all aimed at promoting widespread understanding and deployment of renewable energy storage systems that supply affordable, stable, and consistent electricity in APEC region. The project will select representative demonstrations integrating energy storage systems in wind farms, solar power generation projects, and distributed energy micro-grids in APEC economies as the test cases. The project will measure and analyze in-depth first-hand data in cooperation with world leading organizations from APEC economies. Also, the project will provide a useful platform for sharing findings and experience and recommendations with all key stakeholders.

P9. Operation Technology of Solar Photovoltaic Power Station Roof and Policy Framework (EWG 24 2012A) (China lead)

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 will be established before July 2013. A congress is arranged in Beijing in Aug 2013.

P10. Study on Measures to Reduce Energy Intensity in APEC Low Carbon Town (EWG 23/2012A) (China lead)

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. Therefore, 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 is scheduled for completion within one year, and 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, and (3) organization of a workshop to disseminate the practices of the new town of Songhua River Farm in Heilongjiang province, China.

P11. 2013 APEC Workshop on Geothermal Technology (SF EWG 01/2013) (self-funded, Chinese Taipei lead)

EMM9 in 2010 has instructed EWG to continue its assessment of renewable energy options for reducing carbon emissions. Abundant geothermal resources in the APEC region should be developed intensively. Therefore, the objectives of this project are to exchange the information and promote geothermal systems. The activities of this workshop include two parts: (1) two days of workshop in Taipei covering exploration, drilling, reservoir engineering, and energy conversion of geothermal systems and (2) one day of by invitation only Tatun volcanic site visit and a visit to related research institute to understand local capabilities and discuss possibilities of collaboration on exploiting geothermal energy.

The workshop is expected that the whole event will take 3 days from June 25 to 27, 2013 at NTUH International Convention Center in Taipei.

New Project Proposals for Funding in Session 1, 2013

The EGNRET submitted 6 project Concept Notes for funding in Session 1, 2013, and 3 of them have received BMC in-principle approval on March, 14, 2012. The full proposals of the in-principle approval projects should be submitted by 15 April or 22 April, 2013:

SA1. APEC Smart DC Community Power Opportunity Assessment (Thailand)
SA2. APEC Low Carbon Model Town Capacity Building Development (China)
SA3. Promote APEC Low Carbon Town Development with District Energy System (China)

In addition, an EGNRET endorsed self-funded project led by China was submitted to EWG 45 for endorsement:

SF1. APEC Low Carbon Town Plan and Design Contest (China)

The above projects are described briefly as below.

SA1. APEC Smart DC Community Power Opportunity Assessment (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 microgird 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.

SA2. APEC Low Carbon Model Town Capacity Building Development (China)

This LCMT-CBD project refers to St. Petersburg Declaration publicized in 2012 APEC Energy Ministerial Meeting, 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 inves-tigated.

The project will invite the APEC economies to share experiences on low carbon model town projects such as Yujiapu and Samui. Seminars and learning workshops will be also held to discuss the applicable Low carbon approaches to the case study areas. The gain from the project will be reported on APEC website.

SA3. Promote APEC Low Carbon Town Development with District Energy System (China)

According to the Leaders' Declaration of the 19th APEC Economic Leaders' Meeting stated as “We can and must address both the region’s economic and environmental challenges by speeding the transition toward a global low-carbon

economy" and "Aspire to reduce APEC's aggregate energy intensity by 45% by 2035", it is significant challenge for the APEC economies to improve energy efficiency and reduce CO_2 emissions while promote green economy growth.

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 CO_2 emission, it is beneficial to assess energy policies of APEC member economies and achieve the goal of APEC's meeting.

SF1. APEC Low Carbon Town Plan and Design Contest (self-funded, China)

Development of low carbon towns supports excellent opportunities to reduce energy consumption. Design methodology for low-carbon buildings and towns is very different to traditional process.

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, (1) May 2013, contest rules to compose and start to invite teams (2) Jul 2013, team start design process with support from the organizer, (3) Oct 2014, board members to choose outstanding teams and award will be announced.

Development of New Project for Session 2, 2013 Funding

Four new project Concept Notes were proposed at the Meeting for endorsement:

N1. APEC Low Carbon Model Town (LCMT) Promotion through Eco-Point Program (LCMT-EPP) (Thailand)
N2. APEC Low-Carbon Model Town Development Nodel and Tool Kit Study (LCMT-DMTK) (China)
N3. APEC PV Application Roadmap and Model Study (PVARM) (China)
N4. APEC PV Communication and Cooperation Platform (PVCCP) (China)

The above projects are summarized as below.

N1. APEC Low Carbon Model Town (LCMT) Promotion through Eco-Point Program (LCMT-EPP) (Thailand)

This 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. The EPP Forum will be implemented through Energy Smart Communities Initiative Knowledge Sharing Platform (APEC ESCI-KSP). 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 14 months from Aug. 2013 to Sep. 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.

N2. APEC Low-Carbon Model Town Development Nodel and Tool Kit Study (LCMT-DMTK) (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. Therefore, 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.

N3. APEC PV Application Roadmap and Model Study (PVARM) (China)

The Photovoltaic Application Roadmap and Model Study (PVARM) project responds to the 20th APEC Economic Leaders' Meeting and 10th APEC Ministerial Meeting in Russia in 2012; to explore potential field and model for large scale application of Photovoltaic in future. The key activities 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, etc. A workshop will be held in China as APEC chair in 2014 and a written report will be shared in EWG and EGNRET websites.

N4. APEC PV Communication and Cooperation Platform (PVCCP) (China)

The Photovoltaic Communication and Cooperation Platform (PVCCP) project is to: 1) establish a PV System Life-cycling Risk Management Scheme, to identify and control potential risks of different period including planning, design, manufacturing, construction, maintenance, etc, 2) develop tool kits to carry out risk analysis and provide compatible and consistent evaluation systems, standards, evaluation methods, and database, 3) provide support to EGNRET and related stakeholders who wish to evaluate the risk and quality of specific PV project, and 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.

After briefing discussion, the EGNRET Representatives supported these projects, and also agreed that all economies participated in the EGNRET 40 meeting would be these projects' co-sponsors.

The revised concept notes should be sent back to EGNRET Secretariat soon no later than 16 May, 2013 for submitting to EWG and APEC Secretariats for further ranking and endorsement procedure.

Note on APEC Project Submission Process

The EGNRET Secretariat presented the new 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%, and BMC in-principle approval rate of EGNRET Concept Notes for Session 1, 2013 was 50%.

The APEC project approval timelines for 2013 are listed as below:

Session	Submission	Standard Projects	
		Submission Deadline	Notification Date
Session 1	Concept Notes	1 February, 2013	21 March, 2013
	Full Proposals	15 April, 2013 22 April, 2013	29 April, 2013 16 May, 2013
Session 2	Concept Notes	16 May, 2013	4 July, 2013
	Full Proposals	22 July, 2013 12 August, 2013	12 August, 2013 5 September, 2013
Session 3	Concept Notes	Early September *	24 October, 2013
	Full Proposals	15 November, 2013 25 November, 2013	6 December, 2013 23 December, 2013

* *Date to be confirmed.*

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. The templates of Concept Notes and Full Project Proposals are shown in the Guidebook on APEC Projects (8th edition) published in May, 2012. The useful information for project submission including 8th ed. Guidebook, forms, and resources (including Project Quality Training Materials) can be found at APEC Project website directly:

http://www.apec.org/Projects/Forms-and-Resources.aspx

Also, if EGNRET members would like to propose other new concept notes for Session 2, 2013, the deadline for submission to EGNRET will be 3 May, 2013. 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.
- When proposed member economies submit / upload the final full report to the APEC, please inform EGNRET Secretariat with a copy. EGNRET Secretariat will also upload the final full report to EGNRET website, and inform all EGNRET members.
- When project is completed, proposed member economies are invited to present the project final outcome at the EGNRET meeting.

Response to EWG 45 on APEC Renewable Energy Target

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:

- 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 will forward the above suggestions to the EWG Lead Shepherd, APERC Chair, and EGEDA Chair for their consideration.

Administration and Operation

Dr. Tom Lee announced that he will be having a new assignment at Industrial Technology Research Institute (ITRI) that results in the difficulty for him to continue taking the chairship of EGNRET. Therefore, Chinese Taipei will assign a successor to hold the Chair position in the near future. Dr. Tom Lee and Dr. Keng-Tung Wu, the EGNRET Secretariat thanked all members for their support in the past. EGNRET members also expressed their gratitudes to Dr. Lee and Dr. Wu for their contribution on managing the operation of EGNRET.

In addition, after discussion, the venue and date of the next meeting (EGNRET 41) will be determined later.

The Chair asked if there was any additional new business. There being none, the Chair and EGNRET delegates thanked Viet Nam for hosting the meeting and closed the 40th meeting of the APEC Expert Group on New and Renewable Energy Technologies. Meeting minutes will be distributed and approved out of session.

Special gratitudes are due to Mr. Pham Thanh Tung, Mr. Nguyen Ninh Haiand, and Mr. Do Thanh Vinh at General Directorate of Energy, Ministry of Industry and Trade, Viet Nam, and their colleagues for their kind assistance and arrangement on meeting affairs.

The EGNRET 40 meeting presentations are available on the website at:

http://www.egnret.ewg.apec.org/meetings/egnret40/index.html

and presentations of The APEC Workshop on Small Hydro and Renewable Grid Integration can also be found at the EGNRET website:

http://www.egnret.ewg.apec.org/workshops/SmallHydro/index.html

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