EWG 45

Agenda Item 10(a)

Report of the Chair of the APEC Expert Group on New & Renewable Technologies

Tom, H. T. Lee, Dr Eng

18-22 March, 2013

Asia-Pacific Economic Cooperation

EGNRET

EGNRET Activities Since EWG 44

- **EGNRET 39**

- **EGNRET 39: Dec. 11 to 14, 2012 in Shanghai, China**
  - Meeting Theme: **Applying Distributed Energy in APEC Member Economies**.
  - **APEC Distributed Energy Forum** was held alongside the meeting.
  - Meeting presentations are available on the EGNRET website: http://www.egnret.ewg.apec.org/meetings/engret39/index.html

EGNRET Activities Since EWG 44

- **EGNRET 39**
  - **Revised Terms of Reference (TOR)**
    - Two new initiatives were listed additionally as the basis for implementing projects.
      - Energy Smart Communities Initiative (ESCI)
      - APEC Smart Grid Initiative (ASGI)
    - Conducting researches related to reduction of energy intensity in APEC region was also added as an EGNRET's activity.

EGNRET Activities Since EWG 44

- EGNRET 39
  - Elections: positions of Chair and Vice-Chair for 2013-2014 term
  - Results
    - Chinese Taipei holds the Chair again
    - Korea takes the position of Vice-Chair

EGNRET Activities Since EWG 44

Upcoming EGNRET 40 Meetings

- The upcoming EGNRET 40 meeting will be held at the Prestige Hotel in Hanoi, Viet Nam form April 2 to 5, 2013.
- Meeting Theme: Integrating New and Renewable Energy into the Grid in the APEC Member Economies
- In addition to EGNRET 40, APEC Workshop on Hydro and Renewable Energy Electricity Integration into Grid with a 1-day site visit will be held alongside the meeting.

EGNRET Project Update

Status	Projects	Note
Completed	3	
On-going	11	1 self-funded project
New CN in-principle approval for Session 1, 2013	3	Approved on March, 14, 2012
New Self-funded CN submitted	1	Submitted to EWG 45 for endorsement.

Completed Projects: 3

Three EGNRET completed projects

- [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)

Completed Projects

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

- This project is to 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.
- The literature survey of global AMI deployment has been carried out to identify the objective and strategy to discover the purposes of AMI deployment as well as the supporting scheme.
- A two-day workshop for the project was held on August 24th -25th, 2011 in Chinese Taipei. The purpose of the workshop was to share the experience of AMI deployment among APEC economies. The workshop presentations are available on the workshop's website at: http://www.egnret.ewg.apec.org/workshops/AMIWorkshop/index.html

Completed Projects

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

- **Major findings of this project**

(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.

Completed Projects

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

- **Major findings of this project (*cont'd*)**

(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.

(4) 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.

Completed Projects

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)

- 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 APEC Electric Vehicle Connectivity Workshop 2012 will be held on 19 June 2012 in Wellington, New Zealand, alongside the EGNRET 38.

Completed Projects

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)

- **Major findings of this project**

1) All APEC Economies are still at a relatively early stage in their PEV market development.

2) Detailed knowledge of PEV connectivity conditions across the stakeholder group was limited and gaps remained in the knowledge base after the completion of the survey despite supplemental desktop research. These gaps were attributed to the combined effects of early market development (meaning that stakeholders are still on a learning curve) plus inefficiencies in the survey process itself.

Completed Projects

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)

- **Major findings of this project (*cont'd*)**

3) Barriers to trade from PEV connectivity conditions were identified in a number of areas such as charging interfaces, grid network interfaces, electrical safety regulations and energy market arrangements. However other barriers to trade such as vehicle homologation requirements and government incentives and other policies were also identified.

4) Some barriers to trade of PEVs throughout APEC were unlikely to be resolved through a process of harmonization, due to the established and entrenched nature of some standards and regulations. Examples in this regard include standard grid configurations and certain electrical safety regulations and vehicle homologation requirements.

Completed Projects

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

- 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,
  - 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 February 2012 to allow for wider dissemination of the information about the project. The project team also established a dedicated project website at www.localenergy-apec.ru, and the final report canbe found at http://publications.apec.org/publication-detail.php?pub_id=1359

Completed Projects

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

- **Major findings of this project**

1) Remote microgrids indeed appear as a standalone, ultimate case of decentralised electricity and a way towards energy independence. Many of these microgrids are designed to reduce diesel fuel consumption by integration of solar photovoltaics, a technology that is the primary driver for remote microgrids over the next 6 years.

2) Pike Research forecasts that the global remote microgrid market will expand from 349 MW of generation capacity in 2011 to over 1.1 GW by 2017, an amount that equals or perhaps even surpasses all other microgrid segments combined that are in the current planning stages or have already been deployed.

Completed Projects

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

- **Major findings of this project (*cont'd*)**

3) The challenge is to find business models that would be commercially viable and could be configured to meet specific requirements of individual economies and communities. APEC which brings together developed and developing economies and ensures the presence of both government and businesses at the discussion table, is well positioned to effectively address this task.

4) APEC EWG should indeed re-introduce microgrid within the ESCI as a core paradigm to build smart communities in a decentralized energy environment. APEC makes distinction for its flexible, cost-efficient capacity building projects, and the members should utilize APEC approach to foster training and raising awareness of microgrid project and technology development.

On-going Projects: 11

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)

On-going Projects: 11

(Cont'd)

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)

New Project CN in-principle approval for Session 1, 2013 (3 projects)

EGNRET submitted 6 project Concept Notes for funding in Session 1, 2013, and 3 of them have been granted with in-principle approval by BMC on March, 14, 2012:

[SA-1] APEC Smart DC Community Power Opportunity Assessment (Thailand)

[SA-2] APEC Low Carbon Model Town Capacity Building Development (China)

[SA-3] Promote APEC Low Carbon Town Development with District Energy System (China)

New Project CN in-principle approval for Session 1, 2013

Asia-Pacific Economic Cooperation

[SA-1] 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 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.

New Project CN in-principle approval for Session 1, 2013

[SA-2] 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.

New Project CN in-principle approval for Session 1, 2013

[SA-3] Promote APEC Low Carbon Town Development with District Energy System (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.
- 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.

New Self-funded Project CN Submitted to EWG 45 for endorsement

[SF-1] APEC Low Carbon Town Plan and Design Contest (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: (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.

Thank you for your attention!

Asia-Pacific Economic Cooperation

EGNRET website: http://www.egnret.ewg.apec.org/

On-going Projects

P1. Prospects for Marine Current Energy Generation in APEC Region (S EWG 23 11A) (Russia) (*extended till Mar. 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 steering committee and the lead consultant of the project are now preparing to launch the review and stocktaking exercise, which corresponds to an essential component of the project work plan.
- Project website: www.marineenergy-apec.ru (available in March 2012).

On-going Projects

P2. Best Practices in Energy Efficiency and Renewable Energy Technologies in the Industrial Sector in APEC Region (S EWG 19 11A) (Thailand) *(Cooperated with EGEE&C)* (*extended till Mar. 31, 2013*)

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

On-going Projects

P3. Urban Development Smart Grid Roadmap: Christchurch Recovery Project (EWG 08 2012) (New Zealand lead) (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.

On-going Projects

P4. Research on the Application of Physical Energy Storage Technology to Enhance the Deployment of Renewable Energy in an APEC Low Carbon Town (China)

- Energy storage is essential to utilize renewable resources and reduce CO_2 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.

On-going Projects

P5. The Comprehensive Analysis and Research of Key Technologies and Commercial Model of Low Carbon Model Town Applied in Yujiapu CBD (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 CO_2 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.

On-going Projects

P6. APEC Peer Review on Low-carbon Energy Policies (PRLCE) Phase 2 (EWG 18 2012A) (Japan) *(Approval in Session 3, 2012)*

- 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.

On-going Projects

P7. APEC Workshop on Best Practices on Financing Renewable Energy (EWG 21 2012A) (Viet Nam) (*Approval in Session 3, 2012*)

- This Project aims at holding an APEC Workshop on Best Practices on Financing Renewable Energy. The Workshop is scheduled to take place in Vietnam in March 2013.
- 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.

On-going Projects

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

- 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.

On-going Projects

P9. Operation Technology of Solar Photovoltaic Power Station Roof and Policy Framework (EWG 24 2012A) (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 will be established before July 2013. A congress is arranged in Beijing in Aug 2013.

On-going Projects

P10. 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.

On-going Projects

P.11 2013 APEC Workshop on Geothermal Technology (SF EWG 01/2013) (self-funded, Chinese Taipei)

- 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.