



ASIA PACIFIC ECONOMIC COOPERATION (APEC)
NEW AND RENEWABLE ENERGY TECHNOLOGIES EXPERT GROUP (EGNRET) 41ST MEETING

APEC Project Progress (China) and New Concept Note

Mr. WAN Lin
Beijing, October 16, 2013

Content



1. APEC Projects Progress
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1. APEC Project Progress



- 2014 APEC China Year
- APEC Project Meeting
- EWG Meeting
- Energy Ministerial Meeting
- Leaders' Summit



Low-carbon Model Town (LCMT) Development Model and Tool Kit



- Kick-off Meeting in Beijing
- Session 1: Low Carbon Model Town (LCMT) Development Model and Tool Kit
- Session 2: Low Carbon Model Town (LCMT) Pilot Project Case Study
- Session 3: Panel Discussion
- Session 4: Onsite Investigation to LCMT Project

Research on the Application of Physical Energy Storage Technology to Enhance the Deployment of Renewable Energy in an APEC Low Carbon Town



- Building sector is one of the major energy consumers and its contribution toward global energy consumption is about 40% all over the world. It is therefore vital that energy be used efficiently in and by buildings and their systems.
- The application of physical energy storage technology with renewable energy was proposed to improve energy efficiency in buildings, aiming at reducing the energy consumption of buildings by 20% and the significant reduction of CO₂ emissions. An energy efficient air conditioner with phase change energy storage (ACPCES) by using outdoor renewable cooling resource was developed to realize the above goal.
- An international conference about physical energy storage and low carbon town was held in China. The research results provide a guide about the application of physical energy storage technology for different climate zones in US, Japan and China, which is of great value for APEC community.

District Energy Systems Development Roadmap Study in APEC Economies



- District Energy System (DES) and Distributed Energy Resource (DER) projects are burgeoning in China and several APEC members by virtue of their high energy efficiency and low cost. The Chinese government announced The Guidelines on Developing Natural Gas based DES and DER projects in 2011, offering the policy support and a strategic plan for a stable growth. However, huge gaps exist between Asian and Western Economies in terms of technology and implementation.
- Pan China Construction Group, working closely with the International District Energy Association (IDEA) and the China District Energy Association (CDEA), proposes to lead a study that will result in a 'Road Map' for the development of DES and DER in Asian economies based on western experiences.
- The promotion of DES and DER projects make Green Growth in developing countries available in a cost-efficient way, and comply with the current APEC priorities in smart grid technologies and low carbon model town strategies.

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



- 2012 APEC Energy Ministerial meeting highly addresses the successful progress of APEC low carbon model town. Up to the date, financial-directed town (Yujiapu) and tourism-directed town (Samui) has been approved and researched. Despite of varying land use pattern and characterization of town, experience on low carbon model town projects deserves sharing in the APEC regions.
- APEC low carbon model town capacity building development(LCMT-CBD) will hold few coaching seminars, research activities and forum, which will discuss and disseminate applicable low carbon approaches to the case study areas. In aim to strengthen capacity of greenhouse gas quantification and improve the conscious of operation data quantification, we has designed coaching seminars on low carbon index system and low carbon measures implementation and management for small and medium town as well as LCMT information SOA platform, green product transaction policies investigation and forum event carbon inventory in the project.
- On September 6-7 of this year, we have successfully hosted the above-mentioned coaching seminars at yujiapu Tianjin. Experts and participants from Vietnam, Thailand, Japan, Hongkong and Chinese Taipei were invited to take part in the seminars. Low carbon technologies such as rooftop agriculture, GHG quantification, index system and zero carbon building are heated discussed and shared. At present, we are working on contracting research topics. Interested experts and young talents are encouraged to join in this challenging task.

Study on Measures to Reduce Energy Intensity in APEC Low Carbon Town



- Urbanization is ongoing in many developing economies in APEC region. It has aroused wide concern in many social aspects for the issues of energy and environment. Low carbon town development is believed as one of the most effective solutions to save energy and protect environment during the process of urbanization.
- A study is conducted to investigate the measures to lower the energy intensity in the low carbon town development. It is expected to result in a 'road map' from technical and policy point of view.
- The study of this project will produce a remarkable opportunity to provide learning and demonstrated value to the APEC economies on low carbon town development.

2. New Concept Proposal



1. APEC PV Power Plant Design Evaluation Study (PVDE)
2. APEC Photovoltaic System Performance Ratio Evaluation Study (PV-PRES)
3. APEC Photovoltaic System Best Practices and Latest Development Comparative Study (PV-BPLD)
4. Roadmap Study of APEC Low Carbon Town Development (LCMT-RM)

2.1 PVDE



- 1) To identify and collect various problems, failures and risks during PV power plant design, from real PV power plant, with detailed professional analysis and photo, to help related stakeholders understand the potential risks and hazard.
- 2) Prepare PV design standard and regulatory list and database, to help design institution and project developer carry out design according to latest and efficient requirement.
- 3) To recommend basic framework of PV power plant feasibility study and design documentation list.
- 4) To recommend design evaluation framework and main content concerning PV, electric and mounting parts.
- 5) To develop an APEC PV Design Evaluation Guidebook will be shared among APEC member economies and a workshop will be hosted in China in 2014.

2.1 PVDE



- May 2014, the project overseer will establish research team and carry out investigation to collect the problems, risks and faults of PV power plant design, as well as to collect latest PV design standard and regulatory.
- July 2014, to organize expert team to analysis outputs of investigation regarding PV power plant design.
- September 2014, to develop framework of PV power plant feasibility study and draft APEC PV Design Evaluation Guidebook.
- November 2014, to host an APEC PV Plant Design Evaluation Workshop and invite representatives from APEC member economies to discuss how to evaluate PV power plant design properly, and to modify framework of PV power plant feasibility study and draft APEC PV Design Evaluation Guidebook accordingly.
- December 2014 to March 2015, to apply the framework of PV power plant feasibility study and draft APEC PV Design Evaluation Guidebook in new PV power plant, to check if there were any parts could be improved further.
- May 2015, publish the APEC PV Design Evaluation Guidebook and share with all APEC member economies.

2.2 PV-PRES



- To develop standard and regulatory list as reference for PV system Performance Ratio (PR) evaluation, on the basis of IEC standard, UL standard, VDE standard and APEC member economies' standard and regulatory.
- To provide a set of testing method and quantitative calculation formula of PR evaluation, according to the various factors and aspects lead to final PR of a specific PV system.
- To propose core requirement and Key Performance Index (KPI) of equipment and instrument to test PR, make sure different equipments and instruments could work together as a harmonized system and verified by real project PR evaluation.
- To recommend framework and main content of PR evaluation report, which can be used by different stakeholders in different APEC member economies.
- An APEC PV System Performance Ratio Evaluation Guidebook will be developed on the basis of those outcomes and shared within APEC region.

2.2 PV-PRES



- March 2014, to establish a joint research team including experts from PV project developer, EPC company, testing and certification body, research institution, etc.
- April 2014, collect reference materials, existing PR evaluation projects and outcomes, standards and regulatory, develop standard list, KPI of equipment, testing method and evaluation formula
- August 2014, prepare draft guidebook of PR evaluation
- September 2014, organise the APEC Photovoltaic System Performance Ratio Evaluation Workshop, invite experts and stakeholders from all APEC member economies to discuss the draft guidebook
- October 2014 to March 2015, choose proper pilot PV projects to carry out PR evaluation
- March 2015, polish the guidebook according to the outcomes of workshop and on site evaluation results
- May 2015, publish the final guidebook and close the project

2.3 PV-BPLD



- 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.

For example, the LCPV solution, considering the latest development of Fresnel lens, mounting system, tracking system, back-contact solar cell and heat dissipation technology, it could improve about 30% of PV system efficiency and become best choice to some area and economies to achieve PV grid parity.

- To recommend best practices in different APEC member economies to increase safety and efficiency, and reduce cost.
- To prepare a written report and host a workshop in China during APEC China year 2014.

2.3 PV-BPLD



- March 2014: Develop detailed project plan and organize the team
- April 2014: Prepare questionnaire and carry out investigation to the best practices of PV among APEC region
- June 2014: Select specific projects as sample of best practices and latest development
- July 2014: 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.
- November 2014: Organize a workshop to share research outcomes and collect further comments and proposals
- January 2015: Publish a written report
- February 2015: Project closed

2.4 LCMT-RM



- To portray a concise and high level integrated view of LCMT future course of action, create a graphical roadmap which visually highlights the linkages among markets, products, technologies, policy, resources and infrastructure, and identifies gaps, opportunities, barriers, and potential problems.
- To bring a consensus among various stakeholders, create a common vision, providing guidelines for policymakers and decision makers, establish goals and targets, assess promising technology alternatives, identify markets, gaps and barriers, formulate strategies and action items to overcome all those barriers, and improve communication and coordination for technology development in order to increase contribution of LCMT in future.

2.4 LCMT-RM



- The project duration is 12 months, it will be officially started in November 2013, then the mini-conference around the APEC would be start, and the feasible technologies, plans and problems of LCMT would be collected and the last roadmap would be proposed.
- In November 2013, set up the kick-off meeting, put forward the mini-conference timeline, set up the website for the project to update the process;
- In January to February 2014, convene the “where are we going?” about the Low Carbon Town mini-conference based on different scenarios, submit the conference summary;
- In March to April 2014, convene the “where are we now?” about the urbanization mini-conference based on the investigation around the APEC economies, submit the conference summary;
- In May to June 2014, convene the “How can we get there?” about the Low-Carbon Town mini-conference and the large scale workshop based on previous work, submit the conference summary;
- In July to September 2014, coordinate related work of various discussions in a centralized way, collect feedback opinion and draw the LCMT-RM;
- In October 2014, the project summary report will be submitted and published.

Thank you for your precious time



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- Mr. WAN Lin graduated from Renmin University of China in 1994, majored in Industrial Economics and International Economics.
- He joined China Classification Society, CCS in 1994, having worked as strategy researcher, production inspector, project manager, cooperation department manager, assistant to Chairman of International Association of Classification Society (IACS). He was appointed as the general manager of China Classification Society London branch in 2003.
- In 2005, he acquired the Master degree in MSc Shipping, Trade and Finance at CASS business school, City University, London. He went to the US for Tri-State (New York, New Jersey, Connecticut) Maritime Cluster Research sponsored by the Baltic Exchange scholarship in 2005.
- He joined China General Certification Centre (CGC) as vice president in 2008, in charge of PV, solar thermal business, as well as Strategy & International Cooperation.
- He is APEC EGNRET member, CCAA Senior Auditor, member of China's national PV standard committee and IEC, and main contact window in renewable energy cooperation between China and US, EU, AFRICA, APEC, BRICS, Mainland and Taiwan, as well as Co-Chairman of WG Standard, Testing & Certification in China-US RE cooperation, and steering committee member of PV Quality Assurance Forum.

APEC Concept Note

*Please submit through APEC Secretariat Program Director. Concept Notes of more than **3 pages** (including title page) or incomplete submissions will not be considered.*

Project Title:	APEC PV Power Plant Design Evaluation Study (PVDE)
Source of funds (Select one):	<input type="checkbox"/> Operational Account <input type="checkbox"/> TILF Special Account <input checked="" type="checkbox"/> APEC Support Fund
Committee / WG / Sub-fora / Task-force:	Energy Working Group (EWG) / Expert Group on New and Renewable Energy Technologies (EGNRET)
Proposing APEC economy:	China
Co-sponsoring economies:	Hong Kong China, Indonesia, Japan, Korea, Malaysia, Philippines, Chinese Taipei, Thailand, USA
Expected start date:	May 1, 2014
Expected completion date:	May 31, 2015
Project summary: Describe the project in under 150 words. Your summary should include the project topic, planned activities, timing and location: <i>(Summary must be no longer than the box provided. Cover sheet must fit on one page)</i>	<p>The APEC PV Power Plant Design Evaluation Study (PVDE) responds to the APEC 2013 Leaders' Declaration 'invigorate work to develop clean and renewable energy'.</p> <p>The PVDE project is to</p> <ol style="list-style-type: none"> 1) Identify and collect various problems, failures and risks during PV power plant design. 2) Prepare PV design standard and regulatory list and database. 3) Recommend basic framework of PV power plant feasibility study and design documentation list. 4) Recommend design evaluation framework and main content concerning PV, electric and mounting parts. <p>An APEC PV Design Evaluation Guidebook will be shared among APEC member economies and a workshop will be hosted in China in 2014.</p>
Total cost of proposal: (APEC funding + self-funding) USD 200,000	Total amount being sought from APEC (USD): 120,000 By category: <i>Travel:</i> 15,000 <i>Labor costs:</i> 80,000 <i>Hosting:</i> 9,000 <i>Publication & distribution:</i> 10,000 <i>Other:</i> 6,000

Project Overseer Information and Declaration:

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Title: Professor

Organization: Jia Xun Design Institution

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As Project Overseer and on behalf of the above said Organization, I declare that this submission was prepared in accordance with the **Guidebook on APEC Projects** and any ensuing project will comply with said Guidebook. Failure to do so may result in the BMC denying or revoking funding and/or project approval. I understand that any funds approved are granted on the basis of the information in the document's budget table, in the case of any inconsistencies within the document.

Name of Project Overseer

Date: October 10, 2013

Project Synopsis

1. **Relevance:** Why should APEC undertake this project? What problem or opportunity will the project address and why is it important?

APEC Economic Leaders issued declaration on October 8 under the theme of 'Resilient Asia-Pacific, engine of global growth', in the third section of 'Sustainable Growth with Equity', they emphasis to 'invigorate work to develop clean and renewable energy'.

The photovoltaic (PV) technology develops very fast during past years. However, there are still lots of challenges of PV application including how to reduce the cost and improve efficiency and reliability of PV power plant. Especially in the stage of PV power station design, it is a relative new and small revenue business to traditional power plant design institution.

Once there were mistakes and faults in PV power plant design, it would be very difficult to adjust during the construction or maintenance stage, and could cause huge lose or even threaten the safety of human being.

Considering the various environmental and requirement of different APEC member economies, there are lots of experiences and lessons could be shared among different design institutions, together with project developer and other stakeholders, to improve the design quality and reliability of PV power plant.

The APEC PV Plant Design Evaluation Study (PVDE) project would invite the leading PV design institutions and experts to share their knowledge, experiences and lessons together and share with all APEC member economies related stakeholders.

2. **Objectives:** Describe the 2-3 key objectives of the project. (e.g., to... create a framework...; ensure participants will be able to...; share experiences...; enhance understanding...; develop recommendations...; build interest...; revise strategies... etc.)

The main objectives of PVDE project including:

1) To identify and collect various problems, failures and risks during PV power plant design, from real PV power plant, with detailed professional analysis and photo, to help related stakeholders understand the potential risks and hazard.

2) Prepare PV design standard and regulatory list and database, to help design institution and project developer carry out design according to latest and efficient requirement.

3) To recommend basic framework of PV power plant feasibility study and design documentation list.

4) To recommend design evaluation framework and main content concerning PV, electric and mounting parts.

5) To develop an APEC PV Design Evaluation Guidebook will be shared among APEC member economies and a workshop will be hosted in China in 2014.

3. **Alignment:** Describe how the project will help achieve APEC's key priorities and meet your forum's work-plan or medium-term plan.

The PVDE project responds to the APEC 2013 Leaders' Declaration 'invigorate work to develop clean and renewable energy', and to the declaration of 10th APEC Ministerial Meeting in Russia in 2012, Energy Security: Challenges and Strategic Choices.

The mission of EGNRET is to facilitate an increase in the use of new and renewable energy technologies in the APEC region. Among various choices of new and renewable energy, PV is one of the most important and feasible solutions to improve energy structure in APEC region.

Through PVDE project, there will be close cooperation among all APEC member economies in PV design which could improve the quality of power plant, reduce the life-cycling cost within short time window.

4. **Methodology: How do you plan to implement the project? In this section, address:**

- **Timeline: Project timelines and dates for key activities and deliverables**

1) May 2014, the project overseer will establish research team and carry out investigation to collect the problems, risks and faults of PV power plant design, as well as to collect latest PV design standard and regulatory.

2) July 2014, to organize expert team to analysis outputs of investigation regarding PV power plant design.

3) September 2014, to develop framework of PV power plant feasibility study and draft APEC PV Design Evaluation Guidebook.

4) November 2014, to host an APEC PV Plant Design Evaluation Workshop and invite representatives from APEC member economies to discuss how to evaluate PV power plant design properly, and to modify framework of PV power plant feasibility study and draft APEC PV Design Evaluation Guidebook accordingly.

3) December 2014 to March 2015, to apply the framework of PV power plant feasibility study and draft APEC PV Design Evaluation Guidebook in new PV power plant, to check if there were any parts could be improved further.

4) May 2015, publish the APEC PV Design Evaluation Guidebook and share with all APEC member economies.

- **Stakeholders: Beneficiaries and stakeholders (APEC & non-APEC) and how they will be engaged**

PV design institution and project developer could get high quality design from acknowledge sharing and exchange among APEC member economies.

For other related stakeholders, PVDE project outcomes could provide wide and in-depth understanding concerning latest PV design technology development, safety control and future of PV application, and encourage their willingness and confidence to increase using PV in their life.

- **Previous projects/activities: If and how this proposal builds on the findings or lessons learned from previous projects/activities, while avoiding duplication**

The PVDE project builds on previous study of *Renewable Energy for Urban Application in the APEC Region* published by EGNRET on January 29, 2010, and the workshops including: *Defining Cost-Effective PV in the APEC Region* in Taipei in Oct 2008, *APEC Conference on PV Policy and System Development*, Taipei 2011, *Conference on Solar Technology Standards & Conformance* at San Francisco, USA in September 2011.

The PVDE project will also stay close contact and cooperation with *EWG 11 2013A - APEC Photovoltaic Application Roadmap and Model Study (PVARM)* and *EWG 15 2013A - APEC Photovoltaic Communication and Cooperation Platform (PVCCP)*.

- **Communication: How you plan to communicate the results or benefits of this project to others**

A workshop is planned in China in 2014 to share the latest research and development of PV power plant design.

A written APEC PV Design Evaluation Guidebook will be published and shared among all APEC member economies.

APEC Concept Note

*Please submit through APEC Secretariat Program Director. Concept Notes of more than **3 pages** (including title page) or incomplete submissions will not be considered.*

Project Title:	APEC Photovoltaic System Performance Ratio Evaluation Study (PV-PRES)
Source of funds (Select one):	<input type="checkbox"/> Operational Account <input type="checkbox"/> TILF Special Account <input checked="" type="checkbox"/> APEC Support Fund
Committee / WG / Sub-fora / Task-force:	Energy Working Group (EWG) / Expert Group on New and Renewable Energy Technologies (EGNRET)
Proposing APEC economy:	China
Co-sponsoring economies:	Hong Kong China, Indonesia, Japan, Korea, Malaysia, Philippines, Chinese Taipei, Thailand, USA
Expected start date:	March 1, 2014
Expected completion date:	May 31, 2015
Project summary: Describe the project in under 150 words. Your summary should include the project topic, planned activities, timing and location: <i>(Summary must be no longer than the box provided. Cover sheet must fit on one page)</i>	The APEC Photovoltaic System Performance Ratio Evaluation Study (PV-PRES) is designed to fulfil following four goals: 1) To develop standard and regulatory list as reference for PV system Performance Ratio (PR) evaluation. 2) To provide a set of testing method and quantitative calculation formula of PR evaluation. 3) To propose core requirement and Key Performance Index (KPI) of equipment and instrument to test PR. 4) To recommend framework and main content of PR evaluation report. A Guidebook of how to evaluate PV system PR will be published and shared among APEC member economies and a workshop will be organized in China in 2014.
Total cost of proposal: (APEC funding + self-funding) USD 195,000	Total amount being sought from APEC (USD): 130,000 By category: <i>Travel: 30,000</i> <i>Labor costs: 80,000</i> <i>Hosting: 7,000</i> <i>Publication & distribution: 10,000</i> <i>Other: 3,000</i>

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As Project Overseer and on behalf of the above said Organization, I declare that this submission was prepared in accordance with the **Guidebook on APEC Projects** and any ensuing project will comply with said Guidebook. Failure to do so may result in the BMC denying or revoking funding and/or project approval. I understand that any funds approved are granted on the basis of the information in the document's budget table, in the case of any inconsistencies within the document.

Name of Project Overseer

Date: October 11, 2013

Project Synopsis

1. **Relevance:** Why should APEC undertake this project? What problem or opportunity will the project address and why is it important?

APEC Photovoltaic System Performance Ratio Evaluation Study (PV-PRES) responds to the 25th APEC Ministers Meeting (AMM 25) in Indonesia on October 5, 2013: 'We instructed officials to implement set of specific actions that will strengthen our collective efforts on energy development, specifically on clean and renewable energy, to reach the energy security and sustainability in the region'.

In order to develop PV in large scale, it is important to make sure the PV System is safe, efficient and reliable. Lots of PV project developers use Build Transfer (BT) or Build Operate Transfer (BOT) model currently in APEC member economies. Considering the PV system is heavily invested with relatively low IRR cash flow in a long period, the developer and investor need to precisely know the Performance Ratio (PR) of a specific project with convincing standard, method, equipment and supporting materials.

By now, there is different understanding and method to evaluate PV system PR. This could not only cause misunderstanding between investor and Engineer, Procure and Construct (EPC) company within a specific economy, but also make it difficult to cooperate among different APEC member economies.

The PV-PRES project will provide a guidebook for reference of all APEC member economies and could be used as reference for different stakeholders to evaluate PV system.

2. **Objectives:** Describe the 2-3 key objectives of the project. (e.g., to... create a framework...; ensure participants will be able to...; share experiences...; enhance understanding...; develop recommendations...; build interest...; revise strategies... etc.)

The main objectives of PV-PRES project including:

To develop standard and regulatory list as reference for PV system Performance Ratio (PR) evaluation, on the basis of IEC standard, UL standard, VDE standard and APEC member economies' standard and regulatory.

To provide a set of testing method and quantitative calculation formula of PR evaluation, according to the various factors and aspects lead to final PR of a specific PV system.

To propose core requirement and Key Performance Index (KPI) of equipment and instrument to test PR, make sure different equipments and instruments could work together as a harmonized system and verified by real project PR evaluation.

To recommend framework and main content of PR evaluation report, which can be used by different stakeholders in different APEC member economies.

An APEC PV System Performance Ratio Evaluation Guidebook will be developed on the basis of those outcomes and shared within APEC region.

3. **Alignment:** Describe how the project will help achieve APEC's key priorities and meet your forum's work-plan or medium-term plan.

The 21st APEC Leaders' Meeting was held in Indonesia in October 2013 and declared to develop clean and renewable energy through public-private partnership.

For EGNRET 2014 prospects, it is important to '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 '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.'

The PV-PRES project will help to improve the technology communication and exchange, as well as to push forward investment and trade in PV sector among different APEC member economies.

4. **Methodology: How do you plan to implement the project? In this section, address:**

• **Timeline: Project timelines and dates for key activities and deliverables**

- ✗ March 2014, to establish a joint research team including experts from PV project developer, EPC company, testing and certification body, research institution, etc.
- ✗ April 2014, collect reference materials, existing PR evaluation projects and outcomes, standards and regulatory, develop standard list, KPI of equipment, testing method and evaluation formula
- ✗ August 2014, prepare draft guidebook of PR evaluation
- ✗ September 2014, organise the APEC Photovoltaic System Performance Ratio Evaluation Workshop, invite experts and stakeholders from all APEC member economies to discuss the draft guidebook
- ✗ October 2014 to March 2015, choose proper pilot PV projects to carry out PR evaluation
- ✗ March 2015, polish the guidebook according to the outcomes of workshop and on site evaluation results
- ✗ May 2015, publish the final guidebook and close the project

• **Stakeholders: Beneficiaries and stakeholders (APEC & non-APEC) and how they will be engaged**

The project owner and developer could have precise understanding of their heavily invested PV asset. The EPC company could enhance their quality control and risk management according to the PR evaluation scheme. Bank and insurance companies will be much easier to evaluate a specific PV project according to the outcomes of PV-PRES project. Testing and certification body could provide independent third party service according to the PR evaluation guidebook and facilitate the liquidity and transparent of PV assets.

The PV-PRES project will make the most of EGNRET expertise resources and platform, to invite experts and professional institutions work together to develop a harmonized and practical PR evaluation scheme for all APEC member economies.

• **Previous projects/activities: If and how this proposal builds on the findings or lessons learned from previous projects/activities, while avoiding duplication**

The PVPRES project is built upon Conference on Solar Technology Standards & Conformance (San Francisco, USA, September 2011), APEC Workshop on Ensuring Photovoltaic (PV) Reliability and Durability (Chinese Taipei, October 2011), as well as the 'APEC Photovoltaic Application Roadmap and Model Study (PVARM)' and 'APEC Photovoltaic Communication and Cooperation Platform (PVCCP)' projects' outcomes.

• **Communication: How you plan to communicate the results or benefits of this project to others**

An APEC Photovoltaic System Performance Ratio Evaluation Workshop will be hosted in China during APEC China year 2014 and a written APEC Photovoltaic System Performance Ratio Evaluation Guidebook will be published and shared among all APEC member economies.

APEC Concept Note

*Please submit through APEC Secretariat Program Director. Concept Notes of more than **3 pages** (including title page) or incomplete submissions will not be considered.*

Project Title:	APEC Photovoltaic System Best Practices and Latest Development Comparative Study (PV-BPLD)
Source of funds (Select one):	<input type="checkbox"/> Operational Account <input type="checkbox"/> TILF Special Account <input checked="" type="checkbox"/> APEC Support Fund
Committee / WG / Sub-fora / Task-force:	Energy Working Group (EWG) / Expert Group on New and Renewable Energy Technologies (EGNRET)
Proposing APEC economy:	China
Co-sponsoring economies:	Hong Kong China, Indonesia, Japan, Korea, Malaysia, Philippines, Chinese Taipei, Thailand, USA
Expected start date:	March 1, 2014
Expected completion date:	February 28, 2015
Project summary: Describe the project in under 150 words. Your summary should include the project topic, planned activities, timing and location: <i>(Summary must be no longer than the box provided. Cover sheet must fit on one page)</i>	<p>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.</p> <p>The objects of PV-BPLD projects are:</p> <ol style="list-style-type: none"> 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.
Total cost of proposal: (APEC funding + self-funding) USD 195,000	Total amount being sought from APEC (USD): 130,000 By category: <i>Travel:</i> 30,000 <i>Labor costs:</i> 80,000 <i>Hosting:</i> 7,000 <i>Publication & distribution:</i> 10,000 <i>Other:</i> 3,000

Project Overseer Information and Declaration:

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Title: Professor, IEC TC 82 Member

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As Project Overseer and on behalf of the above said Organization, I declare that this submission was prepared in accordance with the **Guidebook on APEC Projects** and any ensuing project will comply with said Guidebook. Failure to do so may result in the BMC denying or revoking funding and/or project approval. I understand that any funds approved are granted on the basis of the information in the document's budget table, in the case of any inconsistencies within the document.

Name of Project Overseer

Date: October 13, 2013

Project Synopsis

1. **Relevance:** Why should APEC undertake this project? What problem or opportunity will the project address and why is it important?

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.

Photovoltaic has been accepted by almost all APEC member economies as an important solution to achieve clean, sustainable, low carbon emission goals.

The photovoltaic industry develops very fast in recent years due to both technology innovation and large scale commercial implementation. There are lots of new practices and solutions from different APEC member economies like high concentrated PV system (HCPV), low concentrated PV system (LCPV), PV system with optimizer or micro-inverter, etc. Among those practices, we may find clues, characters and inspiration for new generation of PV system. For example, some developer in Inner Mongolia, China announced they already reduced the electricity price as low as 0.07US cent per kWh with LCPV. If this is possible, it could hugely contribute to the development of clean and renewable energy among all APEC region.

However, those new practices and solutions badly need summarize and analysis by leading PV experts with latest information, especially considering the various location of PV projects located and fast development.

The PV-BPLD project will carry out professional in depth comparative research to the latest practice and provide to all APEC member economies' reference in time.

2. **Objectives:** Describe the 2-3 key objectives of the project. (e.g., to... create a framework...; ensure participants will be able to...; share experiences...; enhance understanding...; develop recommendations...; build interest...; revise strategies... etc.)

The objectives of PV-BPLD project including:

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.

For example, the LCPV solution, considering the latest development of Fresnel lens, mounting system, tracking system, back-contact solar cell and heat dissipation technology, it could improve about 30% of PV system efficiency and become best choice to some area and economies to achieve PV grid parity.

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.

3. **Alignment:** Describe how the project will help achieve APEC's key priorities and meet your forum's work-plan or medium-term plan.

To develop clean and renewable energy within APEC region is the common goal of different APEC member economies and addressed by APEC Ministers Meeting and 21st APEC Economic Leaders' Declaration.

According to EGNRET 40th meeting in Viet Nam in April 2013, EGNRET members are encouraged to conduct researches related to reduction of energy intensity in APEC region.

The EGNRET is one of the best platform to catch up with the fast development of PV industry and technology. The PV-BPLD project is to find out the real performance and best practices in time, organize professional analysis and feedback to all related stakeholders.

4. **Methodology: How do you plan to implement the project? In this section, address:**

- **Timeline: Project timelines and dates for key activities and deliverables**

The PV-BPLD project will last for one year and be carried out according to following schedule:

March 2014: Develop detailed project plan and organize the team

April 2014: Prepare questionnaire and carry out investigation to the best practices of PV among APEC region

June 2014: Select specific projects as sample of best practices and latest development

July 2014: 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.

November 2014: Organize a workshop to share research outcomes and collect further comments and proposals

January 2015: Publish a written report

February 2015: Project closed

- **Stakeholders: Beneficiaries and stakeholders (APEC & non-APEC) and how they will be engaged**

For government officials, policy maker, the PV-BPLD project could provide them first-hand, latest materials and best practices from different APEC member economies to help them choose right strategy, planning and policy.

For PV system developer and investor, this project can help them understand the differences of various solution and practices through comparative study, and choose proper PV solutions according to environmental and economic factors.

For other related stakeholders, this study will summarize the PV industry's development in time and provide them a clear and precise understanding.

- **Previous projects/activities: If and how this proposal builds on the findings or lessons learned from previous projects/activities, while avoiding duplication**

The PV-BPLD project builds on the findings and outcomes from projects including Operation Technology of Solar Photovoltaic Power Station Roof and Policy Framework, APEC Photovoltaic Application Roadmap and Model Study (PVARM) and APEC Photovoltaic Communication and Cooperation Platform (PVCCP), etc.

This project will also benefit from the Conference on Solar Technology Standards & Conformance (San Francisco, USA, September 2011), APEC Workshop on Ensuring Photovoltaic (PV) Reliability and Durability (Chinese Taipei, October 2011).

- **Communication: How you plan to communicate the results or benefits of this project to others**

The PV-BPLD project will publish a written report regarding The APEC Photovoltaic System Best Practices and Latest Development Comparative Study. A workshop will be organized in China in 2014 and all APEC member economies will be invited.

APEC Concept Note

*Please submit through APEC Secretariat Program Director. Concept Notes of more than **3 pages** (including title page) or incomplete submissions will not be considered.*

Project Title:	Roadmap Study of APEC Low Carbon Town Development (LCMT-RM)
Source of funds (Select one):	<input type="checkbox"/> Operational Account <input type="checkbox"/> TILF Special Account <input checked="" type="checkbox"/> APEC Support Fund
Committee / WG / Sub-fora / Task-force:	Energy Working Group (EWG)
Proposing APEC economy:	China
Co-sponsoring economies:	Australia; Hong Kong China, Indonesia, Japan, Korea, Malaysia, Philippines, Chinese Taipei, Thailand, USA
Expected start date:	01/04/2014
Expected completion date:	31/10/2014
Project summary: Describe the project in under 150 words. Your summary should include the project topic, planned activities, timing and location: <i>(Summary must be no longer than the box provided. Cover sheet must fit on one page)</i>	<p>The APEC economies have already proposed numerous technologies, plans which apply to the Low-Carbon Model Town (LCMT), such as Yujiapu and Samui Island. How to develop large scale LCMT in the sustainable, efficiently and properly way is a big challenging to APEC economies as a whole.</p> <p>Roadmap Study of APEC Low Carbon Town Development (LCMT-RM) is aim to outline the goals, barriers, strategies necessary for achieving LCMT. It is used to answer three fundamental questions of LCMT: (1) Where are we going? i.e. what are our vision, mission, objectives, goals and targets etc. (2)Where are we now? i.e. present state of town, technology, markets etc., and (3) How can we get there? i.e. policy measures, action plans, R&D programs, long-term & short-term strategies etc.</p> <p>At least ten mini-conferences in various regions and a large scale workshop later 3 days' in Tianjin, 2014, China would be hold, to discuss the LCMT-RM based on the different scenario.</p>
Total cost of proposal: (APEC funding + self-funding) USD 20,000	Total amount being sought from APEC (USD): 10,000 By category: <i>Travel:</i> 20,000 <i>Labor costs:</i> 30,000 <i>Hosting:</i> 30,000 <i>Publication & distribution:</i> 20,000 <i>Other:</i> -

Project Overseer Information and Declaration:

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As Project Overseer and on behalf of the above said Organization, I declare that this submission was prepared in accordance with the **Guidebook on APEC Projects** and any ensuing project will comply with said Guidebook. Failure to do so may result in the BMC denying or revoking funding and/or project approval. I understand that any funds approved are granted on the basis of the information in the document's budget table, in the case of any inconsistencies within the document.

Name of Project Overseer

Date: 2013.10.4

Project Synopsis

1. **Relevance:** Why should APEC undertake this project? What problem or opportunity will the project address and why is it important?

In June 2010 at the 9th APEC Ministerial Meeting, the APEC Low-Carbon Model Town (LCMT) Project was put forward, and Yujiapu CBD in Tianjin, China was determined to be the first APEC LCMT project. In June 2012, the 10th APEC Ministerial Meeting was held in St. Petersburg, discussed about and reached broad consensus on the progress made in recent years in LCTs Project. The APEC Low Carbon City Workshop: Achieving Sustainability through Low Carbon Cities that was held in Kuala Lumpur, Malaysia in March 2012.

The development of LCMT in China was greatly accelerated, and it entered a stage of national, full-scale demonstrations that were driven by central government policies, facilitated by international cooperation, and encouraged by the self-motivated practices of regional governments.

2. **Objectives:** Describe the 2-3 key objectives of the project. (e.g., to... create a framework...; ensure participants will be able to...; share experiences...; enhance understanding...; develop recommendations...; build interest...; revise strategies... etc.)

To portray a concise and high level integrated view of LCMT future course of action, create a graphical roadmap which visually highlights the linkages among markets, products, technologies, policy, resources and infrastructure, and identifies gaps, opportunities, barriers, and potential problems.

To bring a consensus among various stakeholders, create a common vision, providing guidelines for policymakers and decision makers, establish goals and targets, assess promising technology alternatives, identify markets, gaps and barriers, formulate strategies and action items to overcome all those barriers, and improve communication and coordination for technology development in order to increase contribution of LCMT in future.

3. **Alignment:** Describe how the project will help achieve APEC's key priorities and meet your forum's work-plan or medium-term plan.

Roadmaps have been widely used at product, technology, company, industry and national levels by many renowned companies, NGOs, academia, industrial associations, community groups, and governmental organizations to address diverse issues.

Roadmaps are developed after a series of workshops rather than depending on one or two workshops. Multiple committees are formulated to perform various tasks during the LCMT-RM process. The project will make the most of existing APEC LCMT research outcome and best practices, to put together valuable information, experiences and lessons learned, sorted out and summarized on time. The LCMT-RM will be very helpful to develop large scale of LCMT efficiently and properly in near future.

4. **Methodology:** How do you plan to implement the project? In this section, address:

- **Timeline:** Project timelines and dates for key activities and deliverables

The project duration is 12 months, it will be officially started in November 2013, then the mini-conference around the APEC would be start, and the feasible technologies, plans and problems of LCMT would be collected and the last roadmap would be proposed.

In November 2013, set up the kick-off meeting, put forward the mini-conference timeline, set up the website for the project to update the process;

In January to February 2014, convene the “where are we going?” about the Low Carbon Town mini-conference based on different scenarios, submit the conference summary;

In March to April 2014, convene the “where are we now?” about the urbanization mini-conference based on the investigation around the APEC economies, submit the conference summary;

In May to June 2014, convene the “How can we get there?” about the Low-Carbon Town mini-conference and the large scale workshop based on previous work, submit the conference summary;

In July to September 2014, coordinate related work of various discussions in a centralized way, collect feedback opinion and draw the LCMT-RM;

In October 2014, the project summary report will be submitted and published.

- **Stakeholders: Beneficiaries and stakeholders (APEC & non-APEC) and how they will be engaged**

LCMT-RM will help R&D managers and policy makers to grasp and track Low Carbon Town trends in research of the promising emerging and disruptive technologies that have high potential in future. After LCMT-RM process all stakeholders have better understanding of current market and technology status, vision, goals, objectives, and future plans.

Therefore, LCMT-RM process results in building consensus across the company or entire industry/sector by bringing together all key stakeholders and develops vision of the future.

- **Previous projects/activities: If and how this proposal builds on the findings or lessons learned from previous projects/activities, while avoiding duplication**

The project is built on the previous LCMT project phase 1 (Yujiapu CBD, China), phase 2 (Samui Island, Thailand), phase 3 (Da Nang, Viet Nam), as well as reports and workshop including Report on APEC LCMT Project, Low Carbon Model Town Workshop, APEC Low Carbon City Workshop: 'Achieving Sustainability through Low Carbon Cities' (2012), Workshop on Low Carbon Model Town Task Force and Conference: Case Study Samui Model (2013).

This project aims to put forward the Roadmap development of APEC LCMT, especially, based on the different scenario, such as the situation of china, which has much town and city zone on the way to LCMT.

- **Communication: How you plan to communicate the results or benefits of this project to others**

The LCMT-RM process allows all stakeholders to present their perspective and facilitate consensus building among them, also provide a comprehensive framework to plan and coordinate all activities for technology development. Therefore, the LCMT-RM achievement would be useful for the LCMT development around the APEC economies.

