



**International Copper  
Association**  
Copper Alliance

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# **APEC Concept Proposal Capacity building on wind grid interconnection technical guidelines and code**

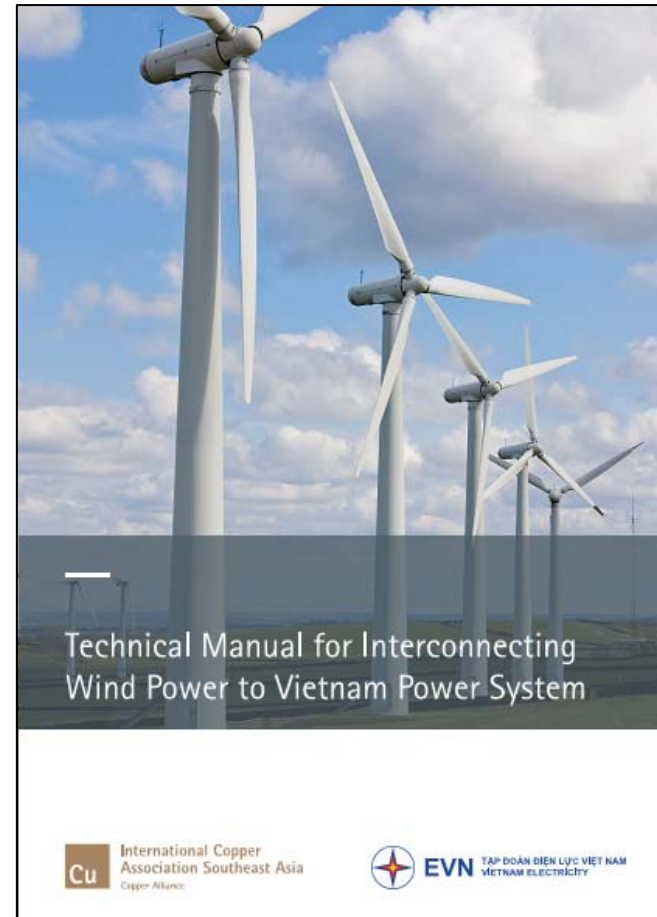
Pierre Cazelles, International Copper Association  
APEC EGNRET Meeting – 16-17 October 2013, Beijing



# Background



- **Technical Manual for Interconnecting Wind Power to Vietnam Power System** developed in 2012-13 by ICA and EVN (Vietnamese and English versions)
- **Objective:** Bring wind power projects in Vietnam to higher standards of development, implementation and operation
- **Follow-up work (ongoing 2013-2014):** development of Vietnam grid interconnection code for wind power systems (MOU signed by EVN and ICA in Hanoi in September 2013)



# Objective of APEC proposal

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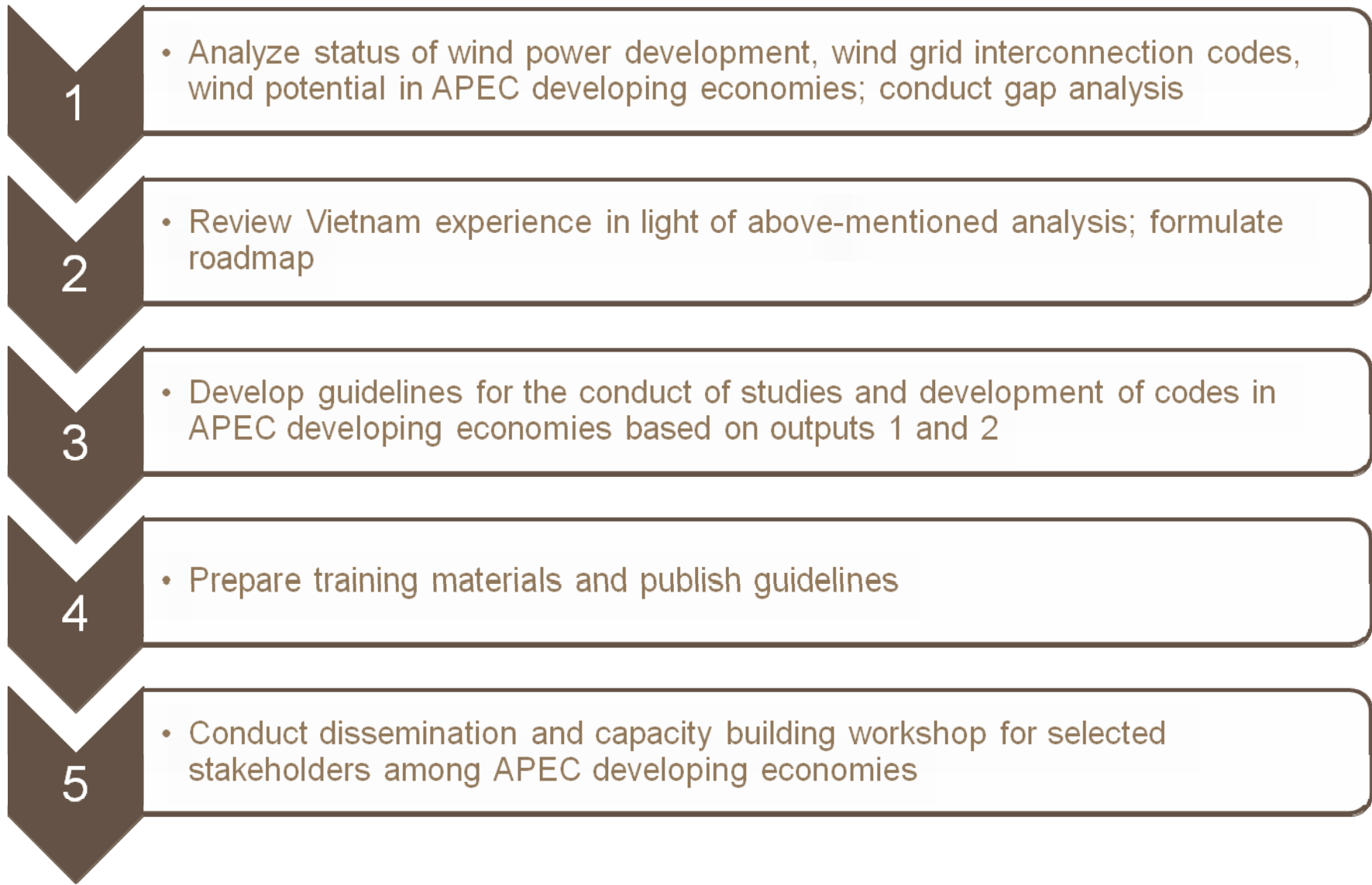


- **Accelerate the development of wind power in APEC economies through appropriate grid interconnection codes**

**By:**

- **Sharing experience** accumulated in the preparation of the technical manual for Vietnam and development of the code among APEC economies:
  - Methodology
  - Outputs
  - Benefits
- **Building capacity** of relevant stakeholders in APEC economies to develop such technical guidelines and code: power utilities, ministries of energy, academia

# Activities and outputs



# Purpose of the Technical Manual

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## Ensure:

- **Smooth integration of wind power plants (WPPs) into the transmission and distribution systems;**
- **Reliable and secure operation of WPPs;**
- **Adherence of WPPs performance to specified standards; and**
- **Continued compliance of the transmission and distribution systems with the power system performance standards already established.**

# Content of the technical manual

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- **Basic standards and references**
- **Wind interconnection criteria**
- **Interconnection parameters:**
  - **Design voltages and frequency**
  - **Active power**
  - **Reactive power**
  - **LVRT requirements**
  - **Power quality—harmonics**
  - **Power quality—voltage flicker**
  - **Grounding arrangements**
  - **Protection schemes**
  - **SCADA Communications**
  - **Data requirements**

# Timing – Work – Budget (estimate)

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Activity	Description	Est. cost (USD)
1. Analyze status; conduct gap analysis	Done by external consultant	30,000
2. Review Vietnam experience in light of output 1; formulate roadmap	Done by ICA and external consultant	-
3. Develop guidelines based on outputs 1 and 2	Done by external consultant under ICA guidance	30,000
4. Prepare training materials and publish guidelines	Done by external consultant under ICA guidance	20,000
5. Conduct dissemination and capacity building workshop for selected stakeholders among APEC developing economies	Logistics, travel cost for participants and speakers	30,000

Duration: 1.5 years

APEC funding sought: 110,000 USD; ICA co-funding: 50,000 USD

# Call for interest

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- Sponsor economy
  - Co-sponsor economies
  - Contributions to co-funding
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- Formal concept note circulated soon after the EGNRET meeting; comments and suggestions welcome
  - Pierre Cazelles: [pierre.cazelles@copperalliance.asia](mailto:pierre.cazelles@copperalliance.asia)



# APEC Project Proposal

<b>Project Title:</b>	<b>Capacity building for installers and system designers for solar PV rooftop installations</b>
<b>Source of funds:</b> <i>(Select one):</i> <input type="checkbox"/> Operational Account <input type="checkbox"/> TILF Special Account <input checked="" type="checkbox"/> APEC Support Fund	
<b>Committee / WG / Sub-fora / Task-force:</b>	EWG, Expert Group on New and Renewable Energy Technologies (EGNRET)
<b>Proposing APEC economy:</b>	USA
<b>Co-sponsoring economies:</b>	China, Korea, Chinese Taipei, New Zealand, Thailand
<b>Expected start date:</b>	Feb 2014
<b>Expected completion date:</b>	May 2015
<b>Project summary:</b>  <b>Describe the project in under <u>150 words</u>.</b>  <b>Your summary should include the project topic, planned activities, timing and location:</b>	<p>This Project is proposed to overcome important barriers in the form of lack of or inadequate competency of rooftop solar PV installers and system designers, through appropriate training and certification programs. The training will focus on aspects insufficiently addressed and often overlooked: selection of appropriate materials and products, proper installation practices, rooftop fire safety hazards during installation and overall safety of installation during operation, wiring and connection to the grid. In order to maximize the outreach and ensure the sustainability of this Project, the training materials will be transferred to competent training institutions in APEC economies. As market recognition of installers and system designers' skills and competency is essential, a certification program will be developed and relevant government institutions will be trained and assisted by experts to establish their own national certification program. The long-term objective of this project is therefore to increase the performance/output of rooftop solar PV systems and facilitate connection to the grid for rooftop solar PV systems, as a means to support APEC economies' efforts in increasing the share of electricity from renewable energy sources.</p>
<b>Total cost of proposal:</b> <i>(APEC funding + self-funding)</i>  <b>300,000 USD</b>	<b>Total amount being sought from APEC (USD):</b> 150,000  <b>By category:</b> <i>Travel:</i> 60,000 <i>Labour costs:</i> 80,000  <i>Hosting:</i> 0 <i>Publication &amp; distribution:</i> 10,000 <i>Other:</i> 0

**Project Proponent Information and Declaration:**

**Name:** Mr. Cary Bloyd

**Title:** Senior Staff Scientist

**Organization:** Pacific Northwest National Laboratory/U.S. Department of Energy

**Postal address:** 902 Battelle Blvd., Richland, Washington 99352 USA

**E-mail:** cary.bloyd@pnnl.gov

I declare that this submission has been prepared in line with the **Guidebook on APEC Projects**. If approved, I agree to develop the project in line with APEC project requirements.

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*Name of Project Proponent*

**Date:**

# Project Details

## SECTION A: Relevance to APEC

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

**Opportunity:** Installations of solar PV systems have enjoyed a tremendous and steady growth for over a decade worldwide, addressing the need for renewable sources of energy. Solar PV systems are one of the strategic solutions perfectly adapted to developing economies in order to meet the objectives of reducing emissions of GHG related to electricity production. Regarding solar PV rooftop installations, they are becoming a viable solution to reduce the burden on the electricity grid for households, especially in economies with undercapacity and/or growing electricity needs, especially in cities. The adoption of pro-active policies combined with subsidies and the development of safety and efficiency standards in this regard are confirming the opportunities and needs for such applications.

**Problems:** This fast and steady growth has however highlighted several problems that start to affect the reliability and efficiency of such systems, especially for rooftop installations. In developing economies in particular, installers and system designers are lacking proper skills which result in: 1) a lower performance (or efficiency) of the system: lower output-efficiency; higher operation and maintenance cost: lower ROI for investors; 2) safety issues during installation (OHS) and operation (rooftop solar PV systems modify the fire safety conditions of the roof), resulting in increasing numbers of accidents, sometimes fatal, and fires with huge consequences on humans and buildings; and 3) grid-connection issues. This lack of competency in most installers and system designers seriously: 1) reduces the overall performance/output of solar PV systems; 2) increases risks of fire and other safety issues for human and equipment; and 3) make distribution utilities reluctant to connect such systems to their grid.

**Relevance to APEC:** developing economies in APEC are witnessing a steady growth in the demand for and installation of such system, and do not have the required legal structure and training programs to accompany this development properly and satisfactorily. It is crucial that APEC developing economies benefit from the experience of developed economies and are assisted with the development of standards and, most importantly, with building the capacity of installers and system designers. APEC offers the perfect forum to provide efficiently such technical assistance.

### 2. Objectives:

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

To contribute to this long-term objective, the project will:

- Develop a training curriculum for installers and system designers (as well as for trainers)
- Identify training institutions in APEC economies
- Transfer the training curriculums to training institutions
- Design a certification program for installers and system designers
- Create awareness among government institutions in APEC economies on the need for training and certification of installers and system designers
- Build capacity of government institutions on how to establish national certification schemes.

The project will produce the following outputs:

- **Output 1:** Development of training curriculums for installers and system designers, as well as for trainers.
- **Output 2:** Development of training materials, including video for hands-on training on installation of rooftop solar PV systems, in line with the training curriculums
- **Output 3:** Mapping out of training institutions in APEC economies and direct contact (telephone interviews) with them to present the objectives of the program and gauge their interest in offering training for installers and system designers.
- **Output 4:** Transfer of training curriculums and training materials to selected training institutions in APEC economies
- **Output 5:** Design of a certification program for installers and system designers, including roadmap for the establishment of such certification programs in APEC economies

- **Output 6:** Capacity building for government institutions for the establishment of national certification programs for installers and system designers.

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

This project resonates with the “APEC Growth Strategy” adopted by APEC Leaders in 2010 to achieve growth that is balanced, inclusive, sustainable, innovative and secure. The goals for sustainable growth include “improving access to environmental goods and services” and “promoting private investment in green industries and production processes.” It clearly aligns with APEC Energy Ministers instructions: We instruct the EWG to progress the Plan of Action for the Energy Trade and Investment Task Force, and in particular to support the APEC Environmental Goods and Services (EGS) Work Programme with assistance from the EGEEC, in view of the EWG's expertise on EGS in the energy sector.

The project is also relevant to the APEC Leaders’ declaration in 2011 that aspires to achieve 45% energy intensity improvement of APEC economies by 2035. The project aims to involve a number of APEC groups that have direct mandates in one or more of the areas that this project may influence. They include EWG, EGEEC and EGNRET. Given that this project enables all of these groups to progress their mandated agendas, this project is in close alignment to APEC’s priorities.

**4. For TILF Special Account applications: Briefly describe how the project will contribute to APEC trade and investment liberalization and facilitation with reference to specific parts of the Osaka Action Agenda (Part 1, Section C and, where appropriate, Part 2).**

**For APEC Support Fund applications: Briefly describe how the project will support the capacity building needs of APEC developing economies, and how they will be engaged.**

The project is heavily focuses on capacity building by design. It will develop training curriculums, training materials, and training and certification programs to be transferred to the competent authorities and training providers in APEC developing economies. This training and certification package will directly address the main problem related to the satisfactory deployment of solar PV rooftop installations in APEC developing economies, as described in Section 1. Relevance. The table below relates the major problems faced by APEC developing economies in terms of solar PV rooftop deployment and the content of the training curriculums to be developed by the project:

<b>Problem</b>	<b>Related content in the training curriculums</b>
Designers do not have sufficient understanding regarding safety aspects, selection of products (cables, connectors, inverters, grid-connection issues, etc.)	<to be updated>
Installers are not aware of proper installation practices, lack of knowledge of product selection (cables, connectors, etc.)	

The training curriculums and related training materials will be developed based on existing training and certification programs for installers and system designers successfully developed and adopted in APEC developed economies (and some in developing economies), and benefit from extensive experience and knowledge already accumulated on rooftop solar PV systems installations. The critical aspect of the project relates to the effective transfer of such materials to relevant stakeholders in APEC economies. As such, the project will dedicate sufficient resources and time to identify qualified training providers in APEC developing economies (output 3), and conduct extensive training workshops with them and their local trainers to effectively transfer the training curriculums and materials (output 4).

The support of government institutions (especially ministries in charge of energy) is also critical in the effective acceptance and adoption of the training programs in their respective economies, through official endorsement. The project will therefore design a training and certification program and develop a comprehensive and implementable roadmap for the effective endorsement and adoption of such training and certification programs on a national basis (output 5). The development of such model will be done in close consultation with relevant government representatives from APEC economies. This model will then be transferred to APEC developing economies through a training workshop (output 6). The International Copper Association, a key partner in this project, will

use its strong international presence and own resources to continue provide technical assistance to government and training institutions after the end of the APEC funding to keep the momentum and ensure a smooth implementation of such programs in APEC developing economies.

## **SECTION B: Project Effectiveness**

### **5. Work plan: Provide a timeline of actions you will take to reach your objectives. For each, include:**

- **How it will be carried out and how member economies, beneficiaries & others will be involved**
- **Related outputs for that particular step (e.g. contract, agenda, participant list, workshop, report)**

A project team will be established to carry out daily operations under the project. Its composition may vary at different steps of the project and will comprise several consultants. The International Copper Association will make available its country managers in the following economies (China, Thailand, Vietnam, Malaysia, Indonesia, Philippines, Mexico and Chile) to provide effective support in coordinating with local stakeholders. It will also provide a dedicated project manager to assist the Project Overseer.

The project work plan will include the following steps.

#### **Step1: Develop training curriculums for installers and system designers, as well as for trainers (month 1 to 7)**

- Experts group discussions to identify existing training programs worldwide (via teleconf, web meeting, literature review, internet search)
- Research major existing training programs to gather data and information on training content, methodology, successes and failures
- Experts group discussions to review existing programs and prepare outline of training curriculums to be developed
- Development of training curriculums accordingly

**Output 1:** Training curriculum evaluation criteria, test procedures and test materials for: 1) installers; 2) system designers; 3) trainers.

#### **Step2: Development of training materials (Month 8 to 12)**

- Identify and hire service provider for the production of the video
- Prepare storyboard for the video (with expert group discussions)
- Produce video for hands-on training on installation of rooftop solar PV systems
- Prepare other training materials in line with the training curriculums

**Output 2:** Training materials (PPTs, training workbook) for: 1) installers; 2) system designers; 3) trainers. Video on installation of rooftop solar PV systems

#### **Step3: Mapping out of training institutions in APEC economies (Month 8 to 12)**

- Initial mapping of training institutions in the field of solar PV system installations through expert group discussions and internet search
- Preparation of documentation to explain the objectives and content of the training and certification programs
- Series of discussions with prospective training institutions to gauge their interest and analyze their capability to conduct training of installers and system designers
- Prepare report

**Output 3:** Report on existing training providers in APEC developing economies, including analysis of their capacity and willingness to implement training activities in their respective economies

#### **Step 4: Transfer of training curriculums and training materials to selected training institutions in APEC economies (Month 14-16)**

- Organize 1 training workshop for selected training institutions to transfer the training curriculums and materials (5 days each)

**Output 4:** 1 workshop, 5 days, 20 participants trained

#### **Step 5: Design of a certification program for installers and system designers, including roadmap for the establishment of such certification programs in APEC economies (Month 2 to 11)**

- Expert group discussions to identify existing certification programs worldwide (via teleconf, web meeting)

- Research major existing certification programs to gather data and information on training content, certification methodology, successes and failures
- Expert group discussion to review existing programs and design certification program to be developed
- Prepare draft of certification program, including roadmap for establishment
- Review of draft by EGEE&C and EGNRET members and other government representatives (including consultation workshop held in conjunction with the annual EGEE&C and EGNRET meetings, as well as direct face-to-face consultation meetings coordinated by ICA country managers in the different APEC developing economies)
- Prepare final report “Certification program for installers and system designers”, including roadmap for its implementation

**Output 5:** “Certification program for installers and system designers”, including roadmap for its implementation

**Step 6: Capacity building for government institutions for the establishment of national certification programs for installers and system designers (Month 2-16)**

- Presentation of the objectives of the Project to EGEE&C and EGNRET members during the first 2014 annual meetings: creation of the Project’s steering committee with APEC representatives
- Regular updates on the progress to Steering Committee members by Project Overseer
- Meeting of the Steering Committee in conjunction with the November 2014 annual meeting of the EGEE&C: review of training curriculums and training materials as well as draft certification program
- Training workshop for Steering Committee members during the first 2015 annual EGEE&C and/or EGNRET meetings to build capacity on the establishment of a national certification program
- Provision of expert’s technical assistance on a needs-basis for the establishment of national certification programs

**Output 6:** 3 meetings of the PSC, 1 day, 20 participants each; 2 workshops for 20 governments officials in total

**6. Risks: What risks may be involved in implementing the project and how will they be managed?**

There are little risks outside the direct control of the project proponent and its partner ICA. The development of the training curriculums, training materials and the design of the training and certification program faces no external risk as they will build on existing successful curriculums and models, already implemented in APEC developed and (some) developing economies.

There are inherent risks related to the effective transfer of those materials to training providers in APEC developing economies. To mitigate this risk, sufficient time and resources will be dedicated to identify those training providers and analyze their capacity to effectively conduct the training programs in their respective countries: in-house trainers; history of conducting training programs; “customer” base and outreach capacity; financial resources. A five-day training workshop will be organized for their trainers to ensure effective thorough understanding and acquisition of the knowledge and training techniques. Local trainers will be pre-selected to confirm their competency as a trainer and as solar PV expert. Once the APEC funding is stopped, ICA, through its local presence in most APEC developing economies, will continue provide support and technical assistance to help them implement the training programs.

The other risk relates to the acceptance of the training programs in the APEC developing economies. To minimize this risk, the Project will develop a certification program to be implemented by APEC economies. The endorsement of such certification program will legitimate the training offered and significantly contribute to its success and widespread adoption. To do that, the Project will engage representatives for ministries in charge of energy from the APEC developing economies through the establishment of the Project Steering Committee (PSC) with members of the APEC EGEE&C and EGNRET. The Project is confident of the commitment of these representatives as all economies face the problems related to the lack of skills among installers and system designers that the Project will address through the training and certification program. The engagement of these government representatives will be ensure through direct face-to-face meetings by ICA country managers to actively participate in the design of such certification programs, as well as through the meetings of the PSC in conjunction with the EGEE&C and EGNRET bi-annual meetings. Once the APEC funding is stopped, ICA, through its local presence in most APEC developing economies, will continue provide support and technical assistance to ministries in charge of energy to help them implement the certification programs.

The Project will also benefit from the synergy with two (2) other Projects that are being submitted to APEC for funding, namely: “APEC Photovoltaic Application Roadmap and Model Study (PVARM)” and “APEC Photovoltaic Communication and Cooperation Platform (PVCCP)”, both submitted by China.

**7. Monitoring and Evaluation: What indicators will you use to know if the project is on track (monitoring) and successful in meeting its objectives (evaluation)? What information will you collect (e.g. stakeholder feedback, website hits, participant stats etc.) and how will you collect it (e.g. meetings, surveys, interviews, peer review, records review)?**

The following indicators have been designed for this project:

Indicator	Source of information	Means of verification
Existing training and certification programs currently in place in APEC economies are all reviewed	Report on existing training and certification programs in APEC economies (output 1)	List of references
The training curriculums developed meet the needs of APEC developing economies	Evaluation forms by EGEE&C and EGNRET members (PSC members)	Collected during bi-annual EGEE&C and EGNRET meetings
The training materials are of high quality and the training curriculums efficiently build the capacity of trainers and trainees	Evaluation forms; results of testing	Collected during the training workshops
Training providers in APEC developing economies with strong capacity to implement the training programs are engaged	Analysis of training providers' capacity; MOUs signed with training providers	Report on existing training providers in APEC developing economies, including analysis of their capacity and willingness to implement training activities in their respective economies; Copies of MOUs
The certification program is implementable and meets the needs and expectations of APEC developing economies	Report of the PSC meetings; evaluation forms	Collected during and after the PSC (EGEE&C and EGNRET) meetings

In accordance with APEC requirements, the project team will provide regular research reports, and with APEC timely communication, take appropriate action as soon as possible when the progress is unsatisfactory.

**8. Linkages: Describe the involvement of other APEC fora, and relevant other organisations. Include:**

- **Engagement:** How are you engaging other relevant fora, within and outside of APEC?
- **Previous work:** How does this project build on, yet avoid duplication of, previous or ongoing APEC initiatives, or those of other organisations?
- **APEC's comparative advantage:** Why is APEC the best sources of funds for this project?

**Engagement:** A Project Steering Committee will be established with members of the APEC EGEE&C and EGNRET. They will be kept regularly informed of the progress, and be consulted as follows: 1) through direct face-to-face meetings with ICA country managers in APEC developing economies; 2) the PSC will meet three to four times, in conjunction with the EGEE&C and EGNRET bi-annual meetings. They will also participate in a training workshop to transfer the certification program roadmap. A dedicated set of activities is foreseen for this particular aspect (Step 6: Capacity building for government institutions for the establishment of national certification programs for installers and system designers). The project will also actively engaged stakeholders outside of

APEC: training providers (step 3 and step 4)/ Through the active engaged of ICA, the project will benefit from the experience of the EU in developing and implementing training and certification programs for solar PV rooftop installers and system designers.

**Previous work:** This project directly builds on several previous work: 1) ICA has already developed or helped governments develop similar programs in Europe through its European Copper Institute; 2) economies such as the US and some in the EU have already developed and adopted such programs;

**APEC's comparative advantage:** the solar PV market is globalized as far as equipment is concerned. APEC assembling developing economies in Asia, the fastest growing region in the world, including for solar rooftop PV systems. They all face the same problems, as described in Section 1. Relevance. And the solution to these problems is unique and the same: building the capacity of installers and system designers. So there are opportunities to address those challenges in all APEC developing economies with one single coordinated project, this Project. The APEC provides an invaluable and unique forum assembling the strategic decision-makers and the relevant stakeholders regarding this Project, with cohesion and coordination. It represents the most appropriate forum to conduct this work efficiently. Furthermore, this Project will complement and benefit from two other Projects that are being submitted to APEC for funding, namely: "APEC Photovoltaic Application Roadmap and Model Study (PVARM)" and "APEC Photovoltaic Communication and Cooperation Platform (PVCCP)", both submitted by China.

### **SECTION C: Project Efficiency**

9. **Budget: Complete the budget and budget notes for the project in the template in SECTION F of this form. The budget should include calculation assumptions (e.g., unit costs) and self-funding contributions. Please consult the Guidebook on APEC Projects for eligible expenses.**

10. **Cost Efficiency: Highlight how the project offers APEC maximum value for money. In what ways will the project maximize the cost-efficient use of resources?**

The self-funding is 50%, so the proposing economy will invest the cost of labour substantially, while APEC funds will be spent primarily to enable the participation of eligible economies and partly contractor fees. ICA, partner in this project, will mobilize its network of offices throughout the APEC region to facilitate project implementation and especially meetings with stakeholders, and provide cash co-funding in the range of 60,000 USD.

### **SECTION D: Project Impact**

11. **Beneficiaries: Explain who the direct project beneficiaries are and what the intended benefits will be. Include an explanation of how the project outputs (e.g. workshop, symposium, research paper, best practices etc.) will assist the project beneficiaries.**

This Project targets two types of stakeholders in APEC economies: 1) representatives from relevant government institutions for the establishment of national certification programs: they will meet regularly during Project implementation (EGEE&C and EGNRET meetings), have their capacity built (training workshop, output 6) and benefit from experts' technical assistance for the establishment of national certification programs; 2) training institutions, both public and private, in APEC economies: they will be identified, their capacity and interest analyzed, and the training curriculums and materials will be transferred to them so they can, in the long-term and on a sustainable basis, conduct training and installers and system designers. Ultimately, the final beneficiaries are installers and system designers in APEC developing economies, who, by attending the training program and receive certification, will increase their professional competencies and strengthen their career development. The Project will directly support governments of APEC developing economies in their efforts to promote safe and efficient solar PV rooftop systems as a means to reduce pressure on the electricity grid, increase energy security, and reduce GHG emissions.

12. **Gender: What steps will the project take to ensure the participation and engagement of both men and women throughout the project? How do project objectives benefit women?**

The project does not aim to explicitly benefit men or women.

To ensure that no gender is disadvantaged, the project team will encourage equitable participation by men and women at all steps of the project. Sex-disaggregated data will be applied for project assessment where feasible, i.e. workshop attendance. The selection of consultants, workshop presenters will be organised in an unbiased environment irrespective of gender. Besides, Project Overseer will take care to ensure that the workshop and all related administrative arrangements are

executed in a gender-neutral manner, and in particular in a manner that does not disadvantage women. Women from APEC economies will be targeted as workshop participants and presenters.

It is expected that the project output would benefit all members of the private and public sector engaged, regardless of gender.

**13. Dissemination: Describe plans to disseminate results and/or outputs of the project, including:**

- **The number, form and content of any publications (Note: APEC will not fund website maintenance or publications that are collections of PowerPoint slides. APEC encourages electronic publication.)**
- **The target audience**
- **Any intention to sell outputs arising from this project.**

The outputs of this Project are designed for wide dissemination and transfer of ownership: the training curriculums and materials will be transferred to competent training institutions in APEC economies in the framework of a training workshop, and be freely downloadable from the APEC website. The certification scheme to be designed will also be directly transferred to competent government institutions in APEC economies in the framework of a training workshop.

More specifically, the Project will produce the following outputs for dissemination:

- Training curriculum, evaluation procedures, testing documentation, training materials, training workbooks for: 1) installers; 2) training curriculum for system designers; trainers: hard copies (20 each), electronic copies (in CD-ROM), uploading of APEC, ICA and other training web sites
- Video on solar PV rooftop installation best practices for installers: electronic (in CD-ROM)
- Final report “Certification program for installers and system designers”, including roadmap for its implementation: hard copies (50), electronic (CD-ROM)
- 1 workshop, 5 days, 20 participants trained from training institutions in APEC economies
- 3 meetings of the PSC, 1 day, 20 participants each
- 2 workshops for 20 governments officials in total

The workshops, reports and all training materials will be advertised by publishing on APEC, EWG, EGEE&C and EGNRET websites, through press releases, and by targeting stakeholders in all APEC economies. The outputs will also be delivered directly to international energy-related training institutions. ICA will also largely disseminate the outcomes of the project through its own web sites and networks.

## **SECTION E: Project Sustainability**

**14. Sustainability: Describe how the project will continue to have impact after the APEC funding is finished.**

- **How will stakeholders and beneficiaries be supported to carry forward the results and lessons from the project?**
- **After project completion, what are the possible next steps to build on its outputs and outcomes? How will you try to ensure these future actions will take place?**

Sustainability is embedded in the design of the project. The training of installers and system designers need to happen on a large, nation-wide scale. So the Project will transfer the training curriculums and materials to qualified training providers in APEC developing economies. They will be carefully selected. Training providers constitute agents of change who will effectively create multiplier effects. They will adopt and effectively conduct the training programs for two reasons: 1) they will derive incomes from this new activity; 2) the training will be endorsed by their respective governments and be associated with a certification, which will be made possible as a result of output 6: Capacity building for government institutions for the establishment of national certification programs for installers and system designers.

But this will not happen entirely during the project duration. To keep the momentum initiated and ensure effective replication, ICA, through its presence in APEC developing economies and its own financial and human resources, will continue provide technical assistance to training providers to support their promotional efforts and training activities, as well as to governments in effectively establishing a nation-wide certification program for installers and system designers.



**15. Project Overseers: Who will oversee the project—including any hiring of contractors—and drive it to success? Please include the names and brief biographies of the PO and any other main point(s) of contact responsible for this project.**

<to be filled later>

**SECTION F: APEC Project Itemized Budget APEC**

<i>All Figures in USD</i>	# of Units	Unit Rate	APEC Funding	Self Funding
<b>Direct Labour</b>				
Speaker's honorarium ( <i>government officials ineligible</i> )	(# of speakers)			
Translator's fees	1,000 pages	\$15		\$15,000
Short-term clerical fees	200 hours	\$20		\$4,000
Contractor (including Researcher) fees				
Consultant for step 1,2,3, 4	150 man-days	\$600	\$90,000	
IT company for video development	20 man-days	\$500		\$10,000
Project Administration	160 man-days	\$450		\$72,000
Contractor's secretary fees	200 hours	\$35		\$7,000
<b>Travel (Speaker, Experts, Researchers)</b>				
One training workshop for training institutions, location to be determined, 5 day, 20 part. (2 experts invited):				
Per Diem (incl. accommodation and "75% additional payment"): 7 per diem for each expert, 2 experts, 2	14 pers-day	\$175		\$2,450
Airfare (restricted economy class)	2 pers-trip	\$500		\$1,000
<b>Travel for Participants (from Travel-eligible economies)</b>				
One training workshop for training institutions, location to be determined, 5 day, 20 part.:				
Per diem (incl. accommodations and "75% additional payment"): 7 per pers.	140 pers-day	\$200	\$14,000	\$14,000
Airfare (restricted economy class)	20 pers-trip	\$500	\$6,000	\$4,000
Training workshop for government institutions, location to be determined, 2 days, 20 part.:				
Per diem (incl. accommodations and "75% additional payment"): 3 per pers.	60 pers-day	\$175	\$6,300	\$3,600
Airfare (restricted economy class)	20 pers-trip	\$500	\$6,000	\$4,000
<b>Other items</b>				
Publication/distribution of report	200 copies	\$54.5	\$10,900	
Specialized equipment or materials ( <i>please describe</i> )	(type, #, and # of days)			
Photocopying	(# of copies)			
Communications (telephone, fax, mail, courier)				
<b>Hosting (provide breakdown, e.g., room rental, stationery)</b>				
Training workshop for training institutions: 5 days: meeting room, stationery, backdrop, etc.	5 days	\$1,400	\$7,000	
Training workshop for government institutions: 2 days: meeting room, stationery, backdrop, etc.	2 days	\$1,400	\$2,800	
PSC meetings: 1 day each; 5 meetings: meeting room, stationery, backdrop, etc.	5 days	\$1,400	\$7,000	
Welcome diners for guests	9 diners	\$1,439		\$12,950
<b>Total</b>			<b>\$150,000</b>	<b>\$150,000</b>

**Budget Note 1: Drawdown timetable: Provide a timetable for the drawdown of APEC funding requested.**

The proposed payment drawdown is as follows:

Activity	Drawdown	Time
Step1: Develop training curriculums for installers and system designers, as well as for trainers	30%	Month 2
Step2: Development of training materials	50%	Month 8
Step 4: Transfer of training curriculums and training materials to selected training institutions in APEC economies	60%	Month 12
Step 6: Capacity building for government institutions for the establishment of national certification programs for installers and system designers	80%	Month 14
Final payment	100%	Month 18 (2 months)

		after completion
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**Budget Note 2: Direct labour: Provide information for APEC-funded positions including general duties, total hours and who will be contracted, if known. (It is not acceptable to contract staff from your own organisation or government employees.)**

Direct labour funded by APEC will consist of the consultant and consultant's secretary. Total estimated hours are shown in the above table. The consultant will be selected competitively via an APEC Request for Proposals.

**Budget Note 3: Waivers: Provide details of any requests for waivers from the normal APEC financial rules, with justifications (e.g. from tendering requirements, for advance payment, simultaneous interpretation payment) in the notes column of the budget table, or below if the waiver requires a detailed explanation.**

It is anticipated that active participants may request advance payment of travel expenses. Travel eligible participants will represent beneficiaries who include government officials from developing economies. Hence, waiver is requested to fund travel of government officials if they are nominated as active participants.

**Budget Note 4: Self-funding: The total self-funding is \$150,000, including the ICA contribution of \$100,000 and USA contribution of \$50,000, representing altogether 50% of the project budget.**