



International Copper
Association
Copper Alliance



Asia-Pacific
Economic Cooperation

Capacity building for installers and system designers for solar PV rooftop installations – Report on consultation workshop (11 November 2014)

EGNRET 43rd meeting, 12-13 November 2014, Chiang Mai, Thailand



Project Overview

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Title: Capacity building for installers and system designers for solar PV rooftop installations

APEC ref.: EWG 22/2013A

Sponsor: US Department of Energy, USA

Overseer: Cary Bloyd, Pacific Northwest National Laboratory/U.S. Department of Energy

Partner: International Copper Association Asia, Copper Alliance

Consultant: Castlerock Consulting

Completion: 30 April 2015

Long-term objective: **Remove barriers to the market development of solar PV rooftop installations in APEC developing economies**

- **Installers:**

- Not aware of proper installation practices, lack of knowledge of product selection (cables, connectors, etc.)

- **System designers:**

- Lack of knowledge on safety aspects, selection of products (cables, connectors, inverters, grid-connection issues, etc.)

- **PV system's performance below design (lower output-efficiency; higher operation and maintenance cost: lower ROI for investor)**
- **Safety not ensured (safety of installers OHS; impact of PV installations on fire safety conditions (esp. for rooftop installations))**
- **Problems for grid connection**

- Low confidence in the technology
- Propagation of the myth that solar PV is “expensive”
- Unreliable and not a replacement for generators
- Short lifetime for solar PV systems

The market therefore has a very slow adoption rate

As much as the market wants to grow, lack of professionally designed and well installed solar PV plants prevents the actual growth of the market

Competent solar PV technical staff is the key to rapid growth

1. **Develop training curriculum for installers and system designers**
2. **Identify potential training institutions willing to adopt TC and conduct training (sustainable, self-financed way)**
3. **Transfer TC to training institutions**
4. **Provide recommendations to policy makers on national training and certification programs**

1. Building capacity of installers/designers

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Solution:

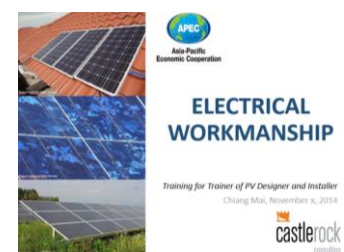
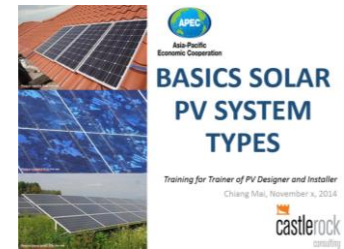
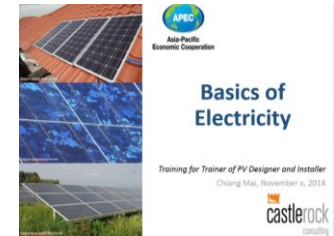
- **Training of installers and designers:**
 - Develop training curriculum with practical demonstration such as videos (for installers)
 - Develop practical training materials
 - Develop train-the-trainers curriculum and materials
 - Transfer training tools to strategic organizations who will conduct training of trainers in-country
- **Under APEC funding, Castlerock Asia has reviewed training curricula from major economies and developed a complete set of training materials to be used in APEC economies**
- **This training curriculum will be transferred FREE-OF-CHARGE to training institutions**

1. Training Curriculum

| Practical Hands-on Sessions | | | |
|--|-----------|----------|-----------|
| Course Name | Installer | Designer | Time |
| Basic electrical instrumentation | √ | √ | 0.50 days |
| Electrical circuit measurements | √ | √ | 0.25 days |
| Electrical load measurements | √ | √ | 0.50 days |
| Solar PV system performance verification | √ | √ | 0.50 days |
| Inspection of PV systems | √ | √ | 0.50 days |
| Monitoring of PV systems | √ | √ | 0.25 days |
| Site survey | √ | √ | 0.50 days |
| Solar PV system installation - off grid | √ | √ | 1.00 days |
| Solar PV system installation - grid tied | √ | √ | 0.50 days |
| Safety procedures | √ | | 0.50 days |

1. Training curriculum

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1. TC: next steps

- **Finalize TC and training materials:**
 - National experts to provide comments
 - Assistance required from EGNRET members to engage local experts
- **Train-the-trainer workshop in early 2015**
 - Assistance required from EGNRET members: introduce local training institutions who could be interested

2/3. Training institutions

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- Few training institutions have responded positively
- Assistance required from EGNRET members: introduce local training institutions
- Training of trainers early 2015

4. National training and certification scheme

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It is critical to establish a system that ensures the competency of installers and system designers, in order to:

- Ensure safety and performance of installations
- Build confidence in the market

Solution: Certification of trained installers and system designers

- Should be self-sustainable
- Must be recognized by the market: industry AND customers

APEC economies experience:

- Certification entirely led by industry (US): solar PV industry promote certification, creating a demand from the market: this secures long-term sustainability of the business by creating credibility, reliability, professionalism
- Supported by government with subsidized training (Thailand): problem relates to sustainability and government budget availability
- Mandated by government: Malaysia

4. Next steps

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- Report on different approaches to be circulated and discussed during next meeting (early 2015)
- Identification of needs for technical assistance by economies

5. Project completion

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- Economies should review training curriculum and make comments: this TC is for their benefit: it can be adopted as is, it can serve to improve/complement current training curriculum used
- EGNRET to help identify suitable training institutions for train-the-trainer workshop (early 2015)

6. Way forward

- ASEAN (RE-SSN) interested to harmonize PV market – cooperation with ICA

| Work Package ONE | Work Package TWO | Work Package THREE | Work Package FOUR |
|--|---|--|---|
| <ul style="list-style-type: none">• Overview of current standards /codes for Solar PV in ASEAN | <ul style="list-style-type: none">• Development of harmonized standards /codes for Solar PV | <ul style="list-style-type: none">• Capacity building of testing laboratories on standards /codes for Solar PV | <ul style="list-style-type: none">• Establishment of national certification programs on solar PV for installers and designers |

- Success in harmonization in ASEAN could benefit APEC: project to be funded by APEC?



Thank you

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