Establishment of a national training and certification programme for designers, installers and operators of solar rooftop PV systems in Thailand
Rationale and Objective

Rationale

The new version of Thailand’s Power Development Plan (PDP2018) calls for increased participation of the private sector in power generation in Thailand. The PDP2018 targets the installation of 100 MW/year of solar power generation from the private sector to be sold to the grid over 10 years.

However, the country is lacking certified technicians to install rooftop solar PV.

Objectives

1. Strengthen Thailand’s National Energy Efficiency Plan and Alternative Energy Development Plan
2. Support the capacity building of designers and installers of solar rooftop PV
3. Support the development of a National Certification Programme on solar PV
Strategy and Approaches

The project is led by Thailand’s Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy, in cooperation with the International Copper Association and CORE.

Establish an official committee and/or working group with roles and responsibilities.

Establish action plan and engage technical consultant for supporting.

Supported by International Copper Association Southeast Asia Copper Alliance.
How we do it

WP1: Revision and improvement of training curriculum, contents, etc.

1. Committee: Review APEC training material (PPT) and suggestion for improvement
2. ICA provide technical support by designing an appropriate Training Curriculum: duration (5 days) and improving topics and contents of training materials
3. Translate the materials into Thai and fine-tune TC including detailed topics and content to fit with Thailand
4. Stakeholder consultation (hear more feedback and improve)
5. Based on the feedback and comment, 2\textsuperscript{nd} fine-tuning and improvement
6. Compare TC with other institutes and 3\textsuperscript{rd} fine-tuning and improvement
7. Develop extra manual and modify TC by adding 2-day practical training for installer and 1-day practical for designers

Training materials:
- PPT slides
- Training workbooks
- Manual
- Pre-test & post-test
- Evaluation forms
- Tools & Equipments
How we do it

WP2: Preparation and conduct the training (testing the TC and materials)

Phase I: Training & Evaluation

1. Develop a session plan, trainer manual, training supporting tools, instructors, training venue, facility preparation, etc.

2. Training of the Trainer

3. Training of the Trainee

Phase II: Roll-out plan

4. Discuss and identify institutes/stakeholders to be involved in the future training session

5. Finalise the implementation plan, training fee and budget
WP3: Development of national certification scheme

- Identify strategic stakeholders and develop workplan
- Evaluate the potential stakeholders
- Assessing the function and responsibility of strategic stakeholders
- Mapping stakeholders’ activities and job function to compare with the role & responsibility described in the institutional framework of national certification programme
Details of programme implementation
## Course outline

### Designer – Lecture

<table>
<thead>
<tr>
<th>Topic</th>
<th>Existing in APEC</th>
<th>Topic</th>
<th>Existing in APEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Basic of Solar PV</td>
<td>✓</td>
<td>18. Installation Procedures</td>
<td>✓</td>
</tr>
<tr>
<td>3. Electrical workmanship</td>
<td>✓</td>
<td>20. Procurement and Pricing</td>
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<tr>
<td>4. PV Modules</td>
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<td>21. Financial Analysis</td>
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</tr>
<tr>
<td>5. Batteries and Battery Charging</td>
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<td>22. Electrical System Design</td>
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<tr>
<td>8. Inverter – Grid</td>
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<td>25. PV System Design</td>
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</tr>
<tr>
<td>10. Maintenance</td>
<td>✓</td>
<td>27. Industry Standards</td>
<td>✓</td>
</tr>
<tr>
<td>11. Monitoring and Inspection</td>
<td>✓</td>
<td>28. Project Planning</td>
<td>✓</td>
</tr>
<tr>
<td>12. Troubleshooting</td>
<td>✓</td>
<td>29. Project Management</td>
<td>✓</td>
</tr>
<tr>
<td>13. PV System Site Survey</td>
<td>X</td>
<td>30. Local Content – Solar Potential</td>
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</tr>
<tr>
<td>14. Survey Development and Analysis</td>
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<td>31. Local Content – Permission License</td>
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</tr>
<tr>
<td>15. Technical Drawings</td>
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<td>32. Local Content – Connecting Codes</td>
<td>TBC</td>
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<tr>
<td>16. Electrical Symbols</td>
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<td>33. Other (If Any) …</td>
<td>TBC</td>
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<tr>
<td>17. Electrical Diagrams</td>
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</table>

### Installer – Lecture

<table>
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</tr>
</thead>
<tbody>
<tr>
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<td>15. Electrical Symbols</td>
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</tr>
<tr>
<td>3. Electrical workmanship</td>
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<td>16. Electrical Diagrams</td>
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</table>
Organise stakeholder

**TOPIC OF CONSULTATION / PUBLIC HEARING**

The local contents that should apply in the training curriculum (TC) includes:

- Apply for permits and licensing (ex. ง.4 / ง.2)
- Local installation standards and Safety Codes
- Environmental Impact Assessment
- Others (if any)

**POINT OF DISCUSSION**

- The venue for activity – DEDE office/video conference or any?

**STEP 1**
Name list of target participants to be invited
- **Regulator:** ERC
- **Government & State Enterprise:** DEDE, EGAT
- **Academic:** CU, SERT, NU, KU
- **Standard:** TISI, EIT
- **Private sector:** TBC
Approximately **20 participants**

**STEP 2**
Draft the invitation letter for DEDE to issue the official invitation letter
- Project background
- Objectives
- Expected outcomes

**STEP 3**
- Draft the agenda for consultation
- Arrange the meeting rooms, place and time
- Send official letter and attachments to all invitees and follow up the confirmation

**STEP 4**
Prepare and print out materials for consultation
# Training session plan

**STEP 1**  
Scheduling the training for trainer session and trainees for pilot training

**STEP 2**  
Selecting the target groups in relation to solar project jobs and experiences

**STEP 3**  
- Qualifying the trainers and trainees for pilot training
- In view of current qualification, shall be compliance with the **2013 ERC regulation** requires the installer to have the manager and operating employee

**STEP 4**  
Preparing the:  
- training session plan elaborating the outline of curriculum and sessions  
- Time durations  
- Instructors

**STEP 5**  
Prepare the:  
- Training evaluation elaborating the evaluation questions for overall curriculum and instructors

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**2013 ERC regulation**
Enrollment and conduct the training

**STEP 1**

Method 1: post the application and qualification on DEDE’s website. The application form will send to the BMC for qualification process

Method 2: directly invite to target group by official letter from DEDE

**Target Group:**
- Central gov. ex. DEDE, EPPO, EAGT
- PV industry: manufactures
- Project developer ex. Supplier, ESCO
- Private sectors

**No. of Trainers / Trainees:** 20 per each

**Qualification of trainers / Trainees:**
- Relevant knowledge or academic background
- Experience in involvement in the PV project

**Training Duration:** TBC Days

**STEP 2**

**STEP 3**

- Draft the training curriculum
- Coordinate with DEDE to post in DEDE website for enrollment
  - Qualifications
  - Application forms
  - Training session plan
  - Training rooms, place and time
- Review the application and qualification and notify the applicants for attending the training

**STEP 4**

- Prepare and print out materials for trainings including
  - Course outlines
  - Manuals
  - Slides
  - Training evaluation forms
- Conduct the training by arranging the instructors for each topic
- Summary and develop the training report
Recommendation for National Certification Scheme

STEP 1: Reviewing the Certificate Programme from International

**Topic of Review:**
- Process and structure of certification / accreditation
- Requirement and qualifications
- Relevant documents

**Example Scheme:**
- Person Responsible for Energy (PREs) under Energy Conservation Act
- Certificate approval scheme for mechanics and electricians by Labor Skill Development

STEP 2: Synthesising and Developing the Concept of National Certification Programme

The strategy paper will be including the following topics:

**Need of the National Certification Program:**
- Definition of the programme
- Programme objectives: certification program benefits, built-up skilled engineers/workers and improvement, international compliance & acceptance, improving the safety standard

**Concept of the National Certification Programme:**
- National certification programme components
- Certification: criteria and process
  - Registration, level of certificate, test requirements
- Accreditation: criteria and process
  - Training programme: course outlines
  - Training institutions: qualified instructors
  - Trainers: academic background, experiences, training courses
- Institutional framework / regulations: members of committees, institutional function roles and responsibilities

**Implementation Planning:**
- Pathways to implement the national certification programme
- Activity and sub-activities
Thank you

For more information, please contact:

kittisak.sukvivatn@copperalliance.org