



CORNERSTONE
OF RURAL
ELECTRIFICATION



Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

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



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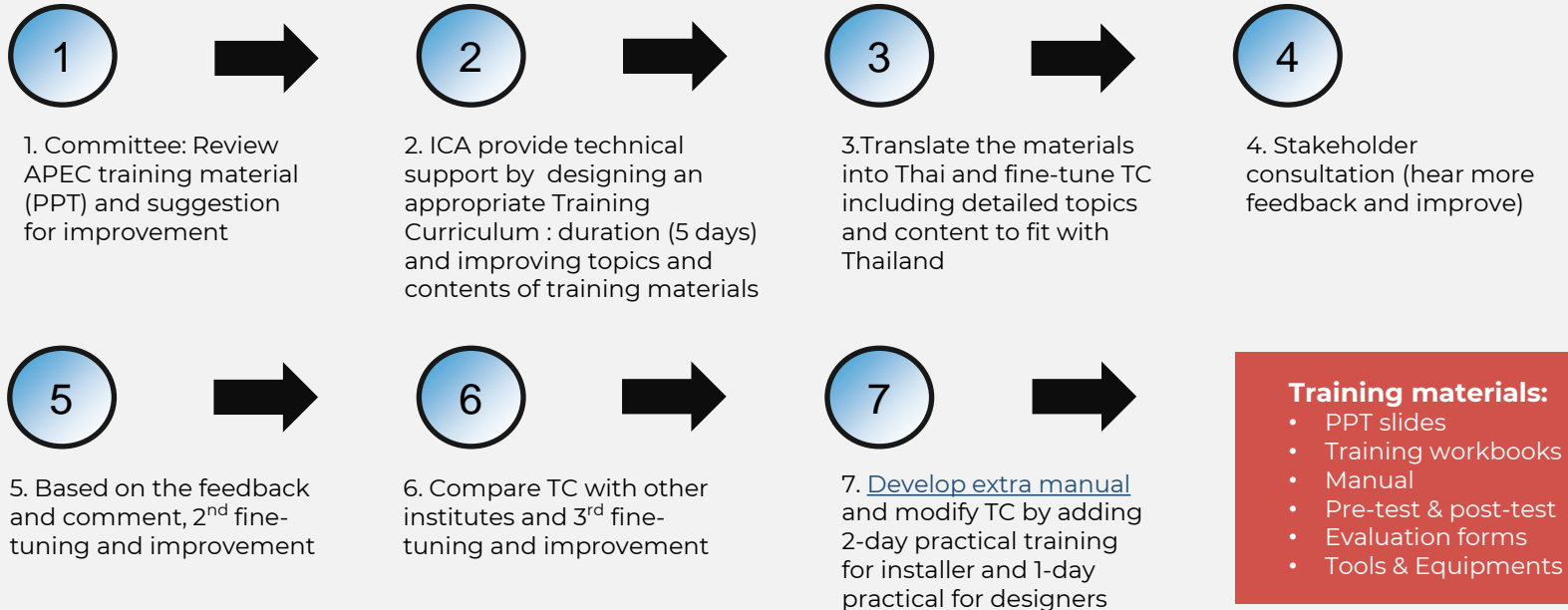
Supported by



**International Copper
Association Southeast Asia**
Copper Alliance

How we do it

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



How we do it



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

1

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



2

2 Training of the Trainer



3

2 Training of the Trainee

Phase I: Training & Evaluation

4

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



5

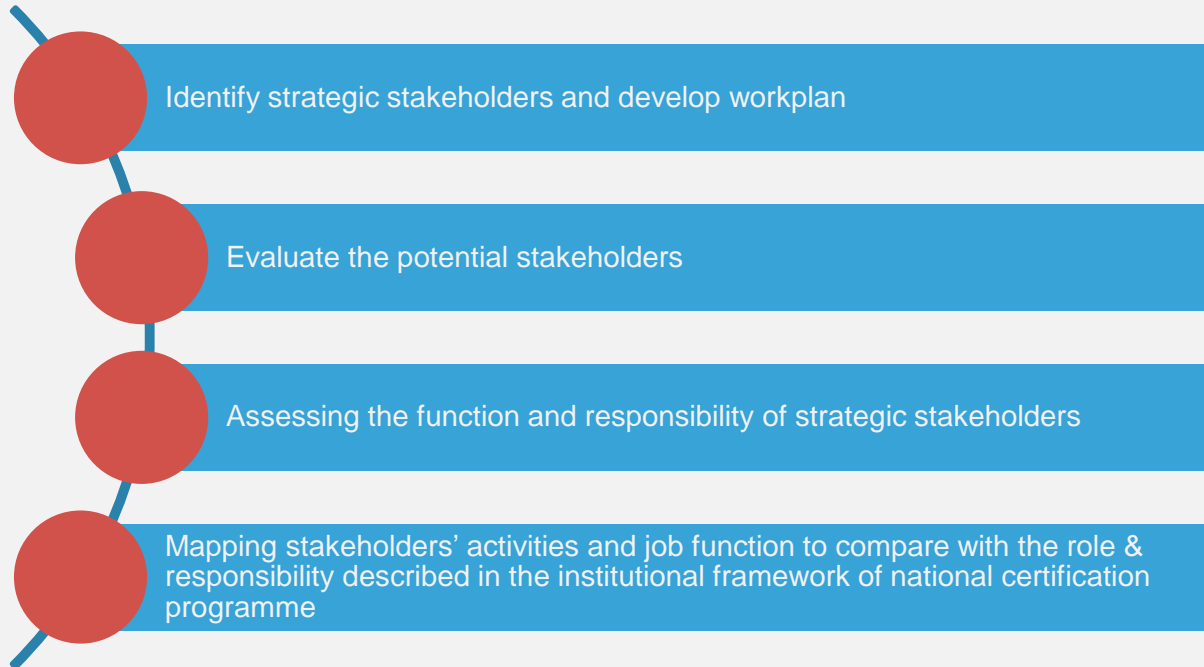
5. Finalise the implementation plan, training fee and budget

Phase II: Roll-out plan

How we do it



WP3: Development of national certification scheme



Details of programme implementation



Course outline



Designer – Lecture

	Topic	Existing in APEC		Topic	Existing in APEC
1	Basic of Solar PV	✓	18	Installation Procedures	✓
2	Basics of Electricity	✓	19	Brand Specific Procedures	✓
3	Electrical workmanship	✓	20	Procurement and Pricing	✓
4	PV Modules	✓	21	Financial Analysis	✓
5	Batteries and Battery Charging	✓	22	Electrical System Design	✓
6	Solar Charge Controller	✓	23	Solar PV System Design Tools	✓
7	Inverter – Battery	✓	24	Solar PV Resource Databases	✓
8	Inverter – Grid	✓	25	PV System Design	✓
9	Commissioning and Performance Verification	✓	26	Safety Procedures	✓
10	Maintenance	✓	27	Industry Standards	✓
11	Monitoring and Inspection	✓	28	Project Planning	✓
12	Troubleshooting	✓	29	Project Management	✓
13	PV System Site Survey	X	30	Local Content – Solar Potential	TBC
14	Survey Development and Analysis	X	31	Local Content – Permission License	TBC
15	Technical Drawings	✓	32	Local Content – Connecting Codes	TBC
16	Electrical Symbols	✓	33	Other (If Any)	
17	Electrical Diagrams	✓			

Installer – Lecture

	Topic	Existing in APEC		Topic	Existing in APEC
1	Basic of Solar PV	✓	14	Technical Drawings	✓
2	Basics of Electricity	✓	15	Electrical Symbols	✓
3	Electrical workmanship	✓	16	Electrical Diagrams	✓
4	PV Modules	✓	17	Installation Procedures	✓
5	Batteries and Battery Charging	✓	18	Electrical System Design	✓
6	Solar Charge Controller	✓	19	Safety Procedures	✓
7	Inverter – Battery	✓	20	Industry Standards	✓
8	Inverter – Grid	✓	21	Industry Standards	✓
9	Commissioning and Performance Verification	✓	22	Local Content – Solar Potential	TBC
10	Maintenance	✓	23	Local Content – Permission License	TBC
11	Monitoring and Inspection	✓	24	Local Content – Connecting Codes	TBC
12	Troubleshooting	✓	25	Other (If Any)	
13	PV System Site Survey	X			

Organise stakeholder



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

TOPIC OF CONSULTATION / PUBLIC HEARING

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

- Apply for permits and licensing (ex. ๗.4 / พ.ร.๒)
- 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 ?

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



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

STEP 2



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 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:

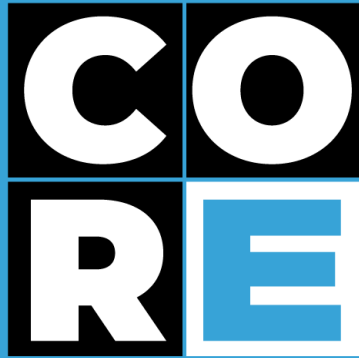
- Definition of the programme
- Programme objectives: certification program benefits, built-up skilled engineers/workers and improvement, international compliance & acceptance, improving the safety standard

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*

