




EIE-06-256 REEPRO

Intelligent Energy  Europe

Promotion of the Efficient Use of Renewable Energies in Developing Countries

**REEPRO Level 1 Course 2
Training by Trainers: Solar Photovoltaic**

June 23-27th 2008

**Venue: Sokpaluang campus, Faculty of Engineering
National University of Laos, Vientiane, Lao PDR**

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List of abbreviations

| | |
|-----|--------------------------|
| BCS | Battery Charging Station |
| FE | Faculty of Engineering |
| ME | Mechanical Engineering |
| SHS | Solar Home System |

1 Objectives

The Training by trainer level 1 Course 2 is to show how well our trainees can handle with prepared training materials with focus on solar energy applications and business on its base

2 Methodology and Activities

- Dr Khamphone Nanthavong as coordinator of the training level 1 introduced the objectives and tasks of the training course
- Then the trainees started presenting their selected training modules
- The training was moderated by Dr Khamphone Nanthavong
- NUOL team was responsible for arrangement of the Training
- The Training was conducted at Mechanical Lab building

2.1 Training performance

Participants

The participants of the training comprised of Trainers level 1 and Final year Mechanical Engineering Students (table 1)

Table 1 List of participants

| Name | Organisation |
|---------------------------------|-------------------------------------|
| 1. Khamphone Nanthavong | NUOL (REEPRO staff) |
| 2. Sengratry Kythavone | NUOL (REEPRO staff) |
| 3. Phouang Phouthavong | NUOL |
| 4. Vongsavanh Chanthaboune | NUOL |
| 5. Thongvanh Vilayphonh | NUOL (REEPRO staff) |
| 6. Khampha Keomanichanh | CDEA |
| 7. Bouangeun Xayalath | CDEA |
| 8. Phonepaseuth | STRI |
| 9. Vilath Samvichit | LIRE |
| 10. Khambang Vilaysane | Sunlabob Co. |
| 11. Sounee Boutavong | 5 th year student, ME/FE |
| 12. Wayang Payvanlee | >> |
| 13. Bountem Lexkhoun | >> |
| 14. Sengdao Khattiya | >> |
| 15. Lemthong Chanthavong | >> |
| 16. Souksavanh Chanthapadith | >> |
| 17. Phetsaphonen Bounyachith | >> |
| 18. Visomphane Chanthaphouthone | >> |
| 19. Bounthavy Souvanny | 4 th year student of ME |
| 20. Mengly | >> |
| 21. Sivay Chanthavong | >> |

The training materials presentation

The topics of presentation and relevant trainers in charges are listed in the table 2.

Table 2 Presented Training materials

| Module | Trainers in charges | Organizations |
|---|--|----------------------|
| IN: Introduction | Khamphone Nanthavong | FE |
| BA: Basics (solar energy) | Thongvanh Volayphone | FE |
| PT: (Power transmission and storage | Phouang Phouthavong | FE |
| PV01-02 | Phonpaseuth | STRI |
| PV03-04 | Sengratry Kythavone | FE |
| PV05-06 | Khambang Vilaysane Vilath Samvichit | Sunlabob Co. LIRE |
| ST: Solar thermal | Vongsavanh Chanthaboune | FE |
| BU01: <i>EN (Entrepreneurship)</i> | Bouangeun Xayalath | CDEA |
| BU02: FN (Financing) | Bouangeun Xayalath | CDEA |
| BU03: PD(Project Development) | Khampha Keomanichanh | CDEA |
| CS: Case study of Ban manh, Khammuane province | Khamphone Nanthavong | FE |
| CS: Project community (Houn district, Oudomxay province) | Khampha Keomanichanh | CDEA |
| PW: Introduction on SolarLex tool kit | Khamphone Nanthavong | FE |
| PW: mini solar home tool kit | Khamphone Nanthavong | FE |

2.2 Achievement and lessons learned

- General remarks:
 - Obviously, the trainers could handle with the training materials prepared: understanding of the core contents and purposes of the introduced materials, especially for the technical materials mostly the trainers are from engineering field and are FE lecturers
 - Mostly the trainers have actively participated into almost all training sessions
 - Many of trainers missed this training with unknown reasons. Some of them were abroad (e.g., trainers from STRI, VOPS/MEM, FE), some are in business trip to province (freelancers).

- Some remarks from the discussion at the end of the training:
 - The trainers agreed that the prepared materials cover all aspects of the things, necessary for trainers to be able to provide the training for the next levels.
 - Some technical materials are seemingly too deep and thus difficult for many trainers, even they are technical, but not renewable energy - related fields people
 - Mostly trainers have had troubles in understanding of specific business-related matters, such as financial terms, financial processes or procedures

3 Appendix

3.1 Depicted Training sessions



Figure 1: The audience of the Training by Trainers Level 1 course 2 comprised the trainers them selves and students of 4th and 5th years of Mechanical department



Figure 2: Mr. Thongvanh Vilayphone is presenting the Basics Module



Figure 3: The famous lecture of Electrical Engineering department-REEPRO trainer- is presenting Power transmission and storage basics



Figure 4: The second day of the training has just started



Figure 5: Trainer from FE is showing principle of domestic solar water heating system



Figure 6: Trainer from CDEA is presenting small business analysis

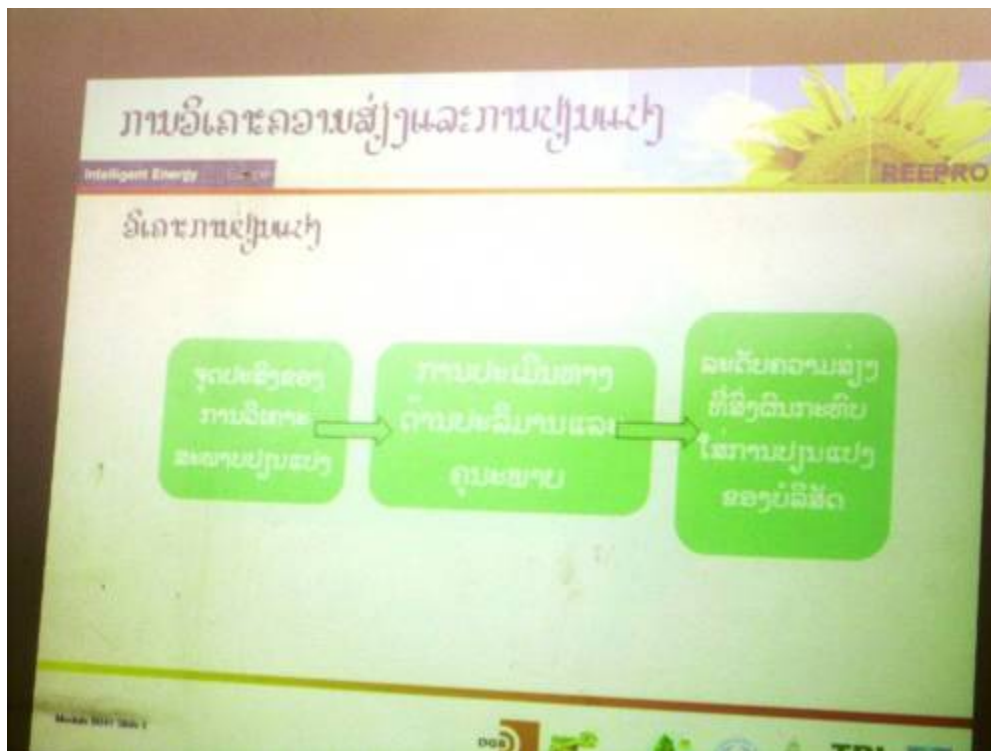


Figure 7: Risks analysis in small business is among the contents of presented topics



Figure 8: The Trainer Phonsavanh from STRI is presenting Introduction on PV systems and their application



Figure 9 Fourth and fifth year students of Mechanical Engineering department participating the training



Figure 10: Topic of Mr. Sengratry (FE) is Solar cells and modules



Figure 11: First lunch after hard training session is delicious

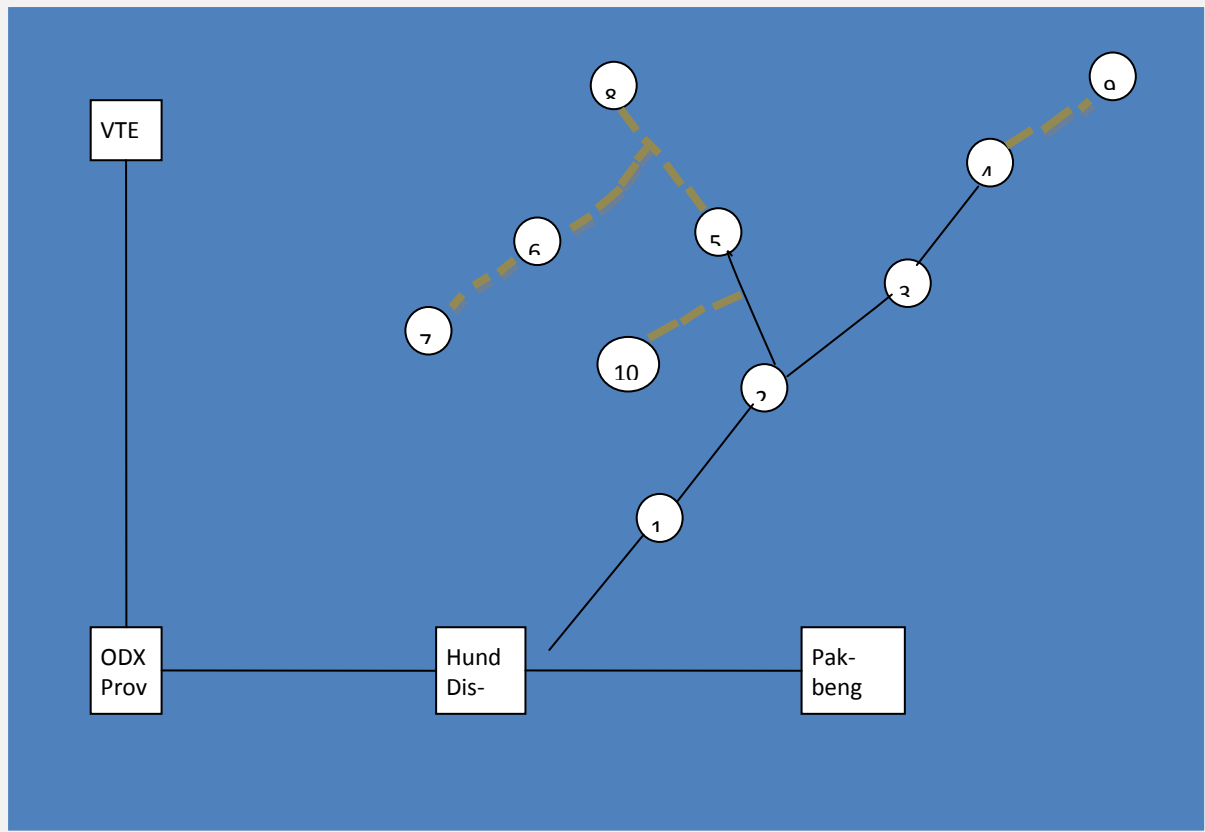


Figure 12: Target area for Project communities in Houme district, Oudomxay province

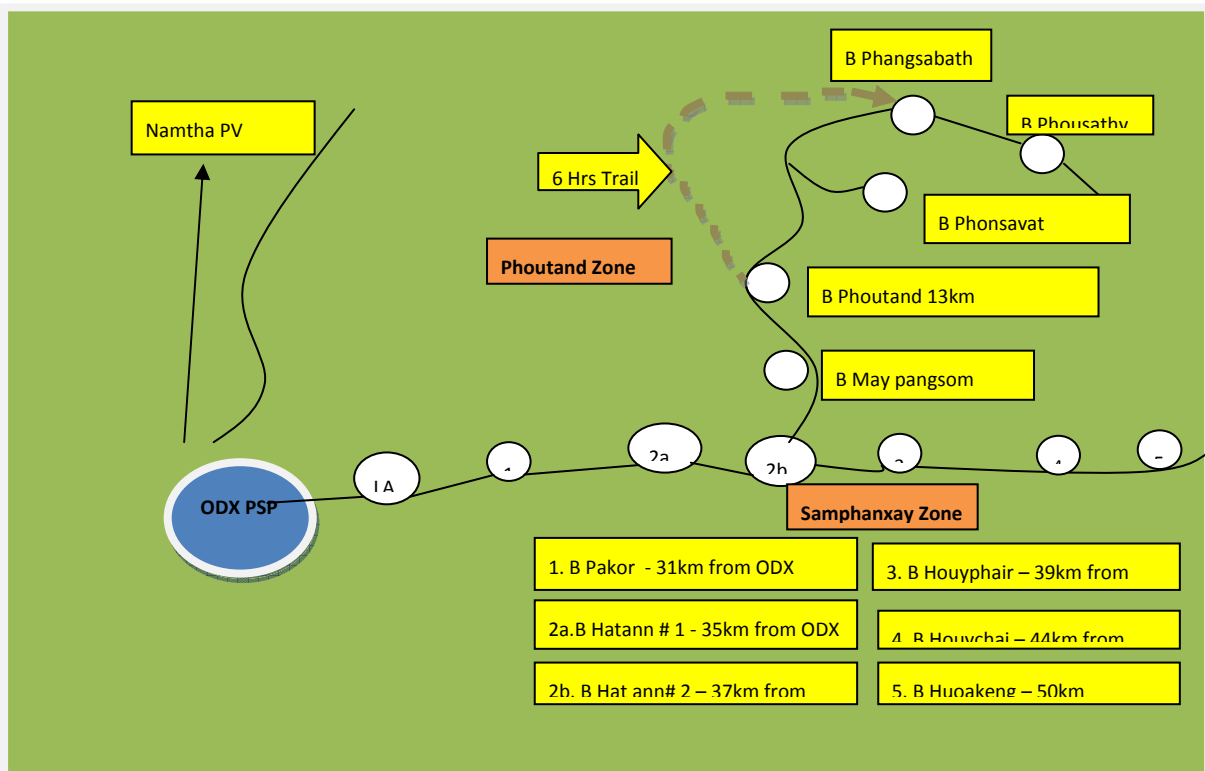


Figure 13: Another nearby targeted area for pilot and project communities

3.2 Training Schedule



EIE-06-256 REEPRO

Intelligent Energy  Europe

Promotion of the Efficient Use of Renewable Energies in Developing Countries

REEPRO Level 1 Training Workshop

Course 2: “Solar Photovoltaic”

Laos, June 23rd to 27th 2008

Tentative Schedule

Location:

Mechanical Lab Building (A2)

Faculty of Engineering

National University of Laos

June 2008

Day 1: REEPRO Hands-on training on small-scale Solar and Biomass installation

| Times | Presentation | |
|-------------------------|--|--------------------------------------|
| Day 1: Monday | 23 June 2008 | |
| 9:00-9:15 | Opening remarks | By Khamphone (FE) |
| 9:15-10:00 | IN-INTRODUCTION | By Khamphone (FE) |
| 10:00-10:45 | BA-Basics | By By Thongvanh (FE) |
| 10:45 -11:00 | Break | |
| 11:00-12:30 | PT-Power Transmission | By Mr. Phouang (FE) |
| 12:30-11:30 | Lunch break | |
| 13:30-14:30 | PV-1 Introduction, solar energy source PV-2 Systems: types, components | Mr. Phonesavanh (STRI) |
| 14:30-15:00 | PV-3 Solar cells, module | By Mr. Sengratry (FE) |
| 15:00-15:15 | Break | |
| 15:15 -16:30 | PV-3 Solar cells, module (cont.) PV-4 Characteristics of cells, modules | By Mr. Sengratry (FE) |
| Day 2: Tuesday | 24 June 2008 | |
| 09:00-10:45 | PV-5 PV systems-applications | By Mr. Vilath (Sunlabob Co.) |
| 10:45-11:00 | Break | |
| 11:00-12:30 | PV-6 PV systems-experiences | By Mr. Khambang |
| 12:30-13:30 | Lunch break | |
| 13:30-15:00 | EW-Practical work: Mini SHS kit | By Mr. Khambang Dr Khamphone |
| 15:00-15:15 | Break | |
| 15:15-16:45 | EW-Practical work: SHS exercise | By Mr. Vilath (LIRE) Dr Khamphone |
| Day 3: Wednesday | 25 June 2008 | |
| 09:00-10:00 | PW-Practical work: introduction on exercises with Mini SHS kit | Khambang, Khamphone |
| 10:00-10:45 | Solar Thermal | Mr. Vongsavanh (FE) |
| 10:45-11:00 | Break | |
| 11:00-12:30 | Solar Thermal (Cont.) | Mr. Vongsavanh |
| | | |
| 12:30-13:30 | Lunch break | |

| | | |
|------------------------|--|------------------------|
| 13:30-15:00 | BU1: EN (Entrepreneurship) | Mr. Bouangeun (CDEA) |
| 15:00-15:15 | Break | |
| 15:15-16:30 | Exercise on SWOT: BCS business in Ban Man | Khamphone |
| Day 4: Thursday | 26 June 2008 | |
| 09:00-10:45 | BU02: Financing | Mr. Bouangeun (CDEA) |
| 10:45-11:00 | Break | |
| 11:00-12:30 | BU03: PD (project development) | Mr. Khampha (CDEA) |
| 12:30-13:30 | Lunch break | |
| 13:30-15:30 | BU03: PD (project development) | Mr. Khampha (CDEA) |
| 15:00-15:15 | Break | |
| 15:15-16:30 | CS: case study (Ban Manh, Khammuane province): possible options of Electrification | Mr. Khamphon (FE/NUOL) |
| Day 5: Friday | 27 June 2008 | |
| 09:00-10:45 | CS: Pilot and Project communities (Oudomxay province) | Mr. Khampha (CDEA) |
| 10:45-11:00 | Break | |
| 11:00-12:00 | Training evaluation and feedback. Closing remarks | Khamphone and Khampha |
| 12:00 | Lunch | |