= Narrative Report =

# TRAINING PROGRAMME ON RENEWABLE ENERGY: MICRO HYDRO POWER FOR RURAL DEVELOPMENT


**held in cooperation of:**
**the Government of the Republic of Indonesia,**
**the Inter-Church Organization for Development Cooperation (ICCO Foundation),**
**the Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP), and**
**the Non-Aligned Movement**
**Centre for South-South Technical Cooperation (NAM CSSTC)**

**Surabaya, Indonesia, 22 - 29 September 2014**

Narrative Report

**Training Programme on Renewable Energy:**
**Micro Hydro Power for Rural Development**

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## 1. General Situation of the Project

*Background*

Rural development in developing countries has been given high priority. Programmes to empower rural communities have been in place. Infrastructure such as roads, bridges and electricity have been improved to support socio-economic activities. However, the governments are still facing problem in providing electricity to the whole people.

Demand for electricity is substantially increasing in line with the increasing population number, the growing industry and expansion of housing complex. Anyhow, people living in some remote areas still do not have access to electricity. Governments' capacity to supply electricity to their people is limited due to budget shortage, insufficient power plant capacity and other factors. One of the solutions to this problem is micro hydro energy that is relatively cheap, sustainable and appropriate for small communities.

The Government of Indonesia (Ministry of Foreign Affairs and Ministry of Energy and Mineral Resources) in cooperation with the Non-Aligned Movement Centre for South-South Technical Cooperation (NAM CSSTC), in support of the Inter-Church Organization for Development Cooperation (ICCO Foundation) and the Centre on Integrated Rural Development for Asia and the Pacific (CIRDAP) shared experiences with developing countries through Training Programme on Renewable Energy: Micro Hydro Power for Rural Development.

The training programme was conducted from 22 to 29 September 2014 in Ibis Hotel, Surabaya. Field studies were conducted at the Micro Hydro Power Plant of Kalimaron in Seloliman Village of Mojokerto District.

The participants were requested to present their respective country papers on the first session. The 8 (eight) Training Modules were shared in the Class and Field Sessions, namely: (1) Introduction to Renewable Energy; (2) Technical Engineering

of Micro Hydro Power (MHP); (3) Financial Aspect of MHP; (4) Social and Economic Aspects of MHP; (5) Productive Use of Electricity; (6) Basic Knowledge of MHP; (7) Sustainability Aspect of MHP; and (8) Successful Case of MHP Plant of Kalimaron in Seloliman Village.

On the concluding session the participants also prepared and presented their Action Plans to be implemented in their respective countries when they are back home.

The series of evaluations were also made by using forms as described in the Chapter of Expectations and Evaluations on pages 3-10. Participants were requested to express their expectations on the fisrt day before the training session started to be further discussed in the last session before the Closing Ceremony. In conclusion the training programme satisfactorily achieved its objectives.

## 2. Participants and Beneficiaries

Total participant is 18 persons from 10 developing countries, namely: Cambodia, Cuba, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, South Africa, Thailand, and Vietnam. There are 2 persons from Cuba and South Africa as well.

The participants are from the government institutions, universities and state enterprises working on energy-related activities. Detail of participants and resource persons is described on pages 13-14.

## 3. Project Achievements

*Objectives*

(a) The objective of the training programme is to provide participants with basic knowledge of micro hydro power and its implementation to support rural development.

The training programme covered the following subjects:

a. Introduction to Renewable Energy;
b. Technical Engineering of Micro Hydro Power (MHP);
c. Financial Aspect of MHP;
d. Social and Economic Aspects of MHP;
e. Productive Use of Electricity;
f. Basic Knowledge of MHP;
g. Sustainability Aspect of MHP; and
h. Successful Case of MHP Plant of Kalimaron in Seloliman Village.

(b) the criteria of successful achievement ara are as follows:

a. participant's expectations were met;
b. training subjects delivered and discussed were relevant and clearly understood;

c. field studies enriched participants with technical aspects of the subjects concerned; and
d. participants could prepare action plans to be implemented post training.

*Actual Outputs*

The actual outputs are Action Plans prepared by participants on country basis. They also indicated what internal and external assistance to be anticipated.

*Evaluation Results*

Following is the resuts of series of evaluations made:

1. Expectations and Evaluation

Before the training sessions started, all participants were requested to express their expectations in written form using the form prepared by the Committee. Their expectations were compiled by subject of concerns and openly discussed on the last session. They all together checked whether their expectations were met or not. There were also post-class and post-field evaluations by subject. Overall evaluation was also made before the Closing Session.

The results are described as follows:

***1. Check Participant's Expectations:***

| No. | EXPECTATIONS | MET | | | NOT MET | | |
|---|---|---|---|---|---|---|---|
| | | 10 | 8 | 6 | 4 | 2 | 0 |
| **I** | **ON THE GENERAL KNOWLEDGE RELATED WITH RENEWABLE ENERGY** | | | | | | |
| 1 | Knowledge related with renewable energy provides electric in the rural areas in my country. (Vichet Bun, Cambodia) | | √ | | | | |
| 2 | Knowledge related with renewable energy to participate in providing electricity service by renewable energy in rural areas. (Son Davin, Cambodia) | | √ | | | | |
| 3 | - How the hydro power systems? (study and build)<br>- Development in different countries.<br>- Isolations system in Indonesia. (Antuane Gavilan Suarez, Cuba) | | √ | | | | |
| 4 | - I gain the micro hydro power technology lesson including the type of turbine, the testing/measurement of micro hydro survey and operation.<br>- I gain the knowledge about measurement the economy, social, and engineering feasibility. (Wira Widyawidura, Indonesia) | | | √ | | | |
| 5 | I know micro hydro power can be used for electric power plan. (Daud Obed Bekak, Indonesia) | | √ | | | | |
| 6 | Renewable energy is energy that to people, such as: Solar Energy, solar dryer and etc. because energy from natural and human creates. (Bouchanh Phongphackdy, Lao PDR) | | √ | | | | |
| 7 | The renewable energy is necessary energy of living the global world, instead the last energy and save the natural protect our world. (Toulasith Douangchanthip, Lao PDR) | | √ | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8 | To study how other countries develop their renewable energy and how to use the potential optimumly. (Muhammad Khairul Azmir bin Ab Hamid, Malaysia) | | √ | | | | |
| 9 | - The policy and issues related to the renewable energy.<br>- Case studies from other countries. (Zurlinda Asma binti Aziz, Malaysia) | | √ | | | | |
| 10 | Renewable energy is sustainable energy without impacts to environment. It's also called clean energy. (San Htut Thein, Myanmar) | √ | | | | | |
| 11 | Additional knowledge and introduction to technology innovations that are being used by other countries in micro-hydro power or other renewable energy. (Rodolfo Tiwaquen Jr., Philippines) | | √ | | | | |
| 12 | How MHP improve the lives of the remote communities. (Victorino T. Taylan, Philippines) | √ | | | | | |
| 13 | To learn more on the contribution made by renewable energy in the supply of power, in other countries. (Lazarus Mahlangu, South Africa) | | √ | | | | |
| 14 | Most updated renewable energy situation throughout the region or the world. (Peeti Ngamprapasom, Thailand) | | √ | | | | |
| 15 | Participants' country report and planning about renewable energy. (Kris Suppakata, Thailand) | | √ | | | | |
| 16 | - Potential of each kind of renewable energy.<br>- Which is the highest potential of renewable energy.<br>- Hydro kinetic/marine/wave turbine energy. (Nguyen Le Son, Vietnam) | | | √ | | | |
| 17 | I would like to gain the comprehensive information and all types/kinds of renewable energy such as hydropower, solar energy, wind energy and biomass, etc. (Nguyen Thu Phuong, Vietnam) | | | √ | | | |
| 18 | Developer with renewable energy for village community in rural especially implementation. (Dani Usadi, Indonesia) | | √ | | | | |
| **II** | **ON THE BASIC TECHNICAL ASPECTS OF BUILDING AND DEVELOPING MICRO HYDRO POWER PLANT** | | | | | | |
| 1 | On basic technical aspects of building and developing micro hydro power plant in my country have 4 project operations but I have never been joining, with that project so I need to learn from the training. (Vichet Bun, Cambodia) | | √ | | | | |
| 2 | Sharing knowledge related developing micro hydro power plant to all participants in this training programme. (Son Davin, Cambodia) | √ | | | | | |
| 3 | - Indonesia's experiences to build (how do you doing) the hydro power in isolation ones.<br>- How is the way of financial the project? | √ | | | | | |
| | - Policy for development in another country is. (Antuane Gavilan Suarez, Cuba) | | | √ | | | |
| 4 | I gain the knowledge about process operation of MHP and the standard operational procedure of each unit process, types of equipment, and get the knowledge about calculation the potency of MHP to output power. (Wira Widyawidura, Indonesia) | | √ | | | | |
| 5 | - I gain the knowledge about process plan.<br>- I gain the equipment, plans, special for electrical.<br>- I gain the knowledge about mechanical equipment. (Daud Obed Bekak, Indonesia) | | | √ | | | |
| 6 | The building and developing micro hydro power must have account of settlements, for settlements to create maximum benefit, has affect to natural and people. (Bouchanh Phongphackdy, Lao PDR) | | | √ | | | |
| 7 | Some area at far from city is needed energy to develop their life such as education, renewed news and knowledge from telecommunication. (Toulasith Douangchanthip, Lao PDR) | √ | | | | | |
| 8 | All components of micro hydro power plant and how it works technically. (Muhammad Khairul Azmir bin Ab Hamid, Malaysia) | | √ | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | - Factors to be considered in designing/developing micro hydro power plant.<br>- How to design the micro hydro power plant.<br>- Operation and maintenance issues. (Zurlinda Asma binti Aziz, Malaysia) | | √ | | | | |
| 10 | - Water potential and micro hydro power technical knowledge and design and also needed for developing micro hydro power.<br>- Government budget is one of important aspects for rural electrification development. (San Htut Thein, Myanmar) | √ | | | | | |
| 11 | New technology or design for MHP that would be suitable for Asia/Philippines setting. (Rodolfo Tiwaquen Jr., Philippines) | √ | | | | | |
| 12 | - How to select appropriate types of turbines for specific site. | √ | | | | | |
| 13 | - How does ELC works, design of ELC, and other controllers if any. (Victorino T. Taylan, Philippines) | | | √ | | | |
| 14 | To learn how a small hydro power generation facility is constructed + developed and what process is involved. (Lazarus Mahlangu, South Africa) | | √ | | | | |
| 15 | - Check lists for building and developing one.<br>- Pros & cons for building and developing one.<br>- Lessons learned from any project. (Peeti Ngamprapasom, Thailand) | √ | | | | | |
| 16 | - Financial feasibility for micro hydro power plant. | | | √ | | | |
| 17 | - Partnership & local technology in ASEAN countries. (Kris Suppakata, Thailand) | | √ | | | | |
| 18 | - Which issues have to be considered before building and developing micro hydro power?<br>- About technical, which type of turbine & generator, control system are mostly used? (Nguyen Le Son, Vietnam) | √ | | | | | |
| 19 | I expect to gain the technical requirements in order to build and operate the micro hydro power plant, the technical standards for building and developing these hydro power plants from different countries. (Nguyen Thu Phuong, Vietnam) | | √ | | | | |
| 20 | Resources one river to few micro hydro power. (Dani Usadi, Indonesia) | | √ | | | | |
| **III** | **HOW YOU MAY RELATE THE SUBSTANCES (EITHER POLICY OR TECHNICAL ASPECTS) THAT WILL BE DELIVERED IN THE SESSION TO YOUR COUNTRY'S INTEREST** | | | | | | |
| 1 | I relate the substance that will be delivered in the session to my country's rural areas. (Vichet Bun, Cambodia) | √ | | | | | |
| 2 | Joint development social economic and environment for people in rural area in my country. (Son Davin, Cambodia) | √ | | | | | |
| 3 | - Selection of turbine.<br>- How is the selection for a new project? (Site and natural characteristic?)<br>- Economic aspect for the isolation projects. (Antuane Gavilan Suarez, Cuba) | | √ | | | | |
| 4 | I should use the basic theory for implementation/application on technical aspect. In other case, if this basic theory doesn't work properly, I must modify with own experiment. (Wira Widyawidura, Indonesia) | √ | | | | | |
| 5 | How to look the energy potency in the country can be used for micro hydro power plant development. (Daud Obed Bekak, Indonesia) | | √ | | | | |
| 6 | Delivered for my country, it is seeking for country to upgrade for new knowledge, because not effects on the environment. (Bouchanh Phongphackdy, Lao PDR) | √ | | | | | |
| 7 | I would like expand knowledge from the training course to the important for develop energy at rural areas which it in interested and deliver. (Toulasith Douangchanthip, Lao PDR) | √ | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8 | How to utilize the renewable energy in Malaysia. | | √ | | | | |
| 9 | How to make sure the implementations of micro hydro power plant in Malaysia is always successful. (Muhammad Khairul Azmir bin Ab Hamid, Malaysia) | | √ | | | | |
| 10 | To apply the knowledge in monitoring renewable energy development especially in micro hydro. (Zurlinda Asma binti Aziz, Malaysia) | | √ | | | | |
| 11 | I need to learn and relate theory & technical aspects from this training program and other ASEAN countries that will be delivered in the session to my country's interest. (San Htut Thein, Myanmar) | √ | | | | | |
| 12 | How MHP or renewable energy could uplift the life of a community or people that is not supplied by the GRID. (Rodolfo Tiwaquen Jr., Philippines) | √ | | | | | |
| 13 | The theory is important for educating people as well as hands on activities. (Victorino T. Taylan, Philippines) | √ | | | | | |
| 14 | Our country needs to harvest the potential of micro hydro power generation, in order to increase access to electricity for many people living in rural areas. (Lazarus Mahlangu, South Africa) | √ | | | | | |
| 15 | The easiest or simplest way to build one, also most economical way to do so. (Peeti Ngamprapasom, Thailand) | √ | | | | | |
| 16 | Adapt to my new micro hydro power plant project, do find the suitable technology. (Kris Suppakata, Thailand) | √ | | | | | |
| 17 | To have suitable policy and procedure so my country may shorten time for rural development. (Nguyen Le Son, Vietnam) | | √ | | | | |
| 18 | The country's interest is seeking to develop the country and reduce the poverty. Besides, the purposes of this training is to enhance micro hydro power for rural development so that, I expect to link these substances delivered and gain the result in order to apply to Vietnam. (Nguyen Thu Phuong, Vietnam) | | √ | | | | |
| 19 | It's complicated especially if related micro hydro powering between community using/user. (Dani Usadi, Indonesia) | | | √ | | | |
| **IV** | **POSSIBLE APPLICATION OF KNOWLEDGE AND EXPERIENCES SHARED IN THE SESSION TO YOUR COUNTRY'S RENEWABLE ENERGY PROGRAMME** | | | | | | |
| 1 | Possible application of knowledge and experience shared in the session to my country is renewable energy program I will share to all staffs to my office. (Vichet Bun, Cambodia) | √ | | | | | |
| 2 | Ensure adequate resource, appropriate institutional mechanism and training to empower the poor involving in rural electrification to participate. (Son Davin, Cambodia) | | √ | | | | |
| 3 | - I will do the training for my specialist and another person with the knowledge in this training.<br>- I can do the conference about the experience in different countries. (Antuane Gavilan Suarez, Cuba) | √ | | | | | |
| 4 | Due to sharing knowledge from other country participant and from trainer, I hope I get the knowledge about how to modify the MHP technology (unit process/equipment) based on difficulties level of landslide or geographical condition. (Wira Widyawidura, Indonesia) | √ | | | | | |
| 5 | How to regulate Voltage, to of wide fluctuation when in loaded. (Daud Obed Bekak, Indonesia) | | | √ | | | |
| 6 | With problems have building and developing micro hydro power, solar energy for use energy to people. (Bouchanh Phongphackdy, Lao PDR) | | | √ | | | |
| 7 | In the past, we lost a lot of water from river. But in the present day we develop upgrade generator to generate energy from river. On the other hand, in some rural area are not gotten there. So it is very important to continue supporting there. (Thoulasith Douangchanthip, Lao PDR) | | √ | | | | |
| 8 | Design & operational knowledge from this training would improve | | √ | | | | |

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|---|---|---|---|---|---|---|---|
| | Malaysia's renewable energy programme. (Muhammad Khairul Azmir bin Ab Hamid, Malaysia) | | | | | | |
| 9 | Monitoring all micro/small hydro projects under feed-in tariff mechanism (renewable energy programme) in Malaysia. (Zurlinda Asma binti Aziz, Malaysia) | | √ | | | | |
| 10 | I want to share my country RE programme which are implemented/micro at the drop structure of irrigation canal of dam project for rural area in Myanmar. (San Htut Thein, Myanmar) | | √ | | | | |
| 11 | The experiences and technical knowledge derive from this training should be used to enhanced our local renewable energy programme. (Rodolfo Tiwaquen Jr., Philippines) | √ | | | | | |
| 12 | - Application to remote communities<br>- Application to models for teaching (prototype models). (Victorino T. Taylan, Philippines) | √ | | | | | |
| 13 | To assist many rural people in how a micro hydro power facility can be created or developed for them to have electricity and be self sustaining + have better life. (Lazarus Mahlangu, South Africa) | √ | | | | | |
| 14 | KM Programme in the department. Put materials on internet (the Department's website). (Peeti Ngamprapasom, Thailand) | √ | | | | | |
| 15 | This knowledge & paper from this session will be the one of micro hydro power body in my office, like a paper reviews, which is used to develop the micro hydro projects in PEA. (Kris Suppakata, Thailand) | √ | | | | | |
| 16 | - Cooperate with other company/institute/country for some filed of micro hydro power plant.<br>- Apply new structure of micro hydro power plant. (Nguyen Le Son, Vietnam) | | √ | | | | |
| 17 | I expect to learn the experiences from many countries, especially the managing structure and framework from successful countries, the technical standards, then can apply to the specific condition in Vietnam. (Nguyen Thu Phuong, Vietnam) | | √ | | | | |
| 18 | Possible application for low flow on high flow in rural and village at Indonesia. (Dani Usadi, Indonesia) | | √ | | | | |
| **V** | **OTHER EXPECTATIONS** | | | | | | |
| 1 | I hope I get good information/knowledge about how to measure the economical feasibility, particularly on measuring cost and benefit ratio based on investment cost, social aspect, devices providing, and O&M process. (Wira Widyawidura, Indonesia) | | √ | | | | |
| 2 | How to resolve water condition problem which have light alkalinity and hardness. (Daud Obed Bekak, Indonesia) | | √ | | | | |
| 3 | I say that about measures to manage (Laos) to builders and users. (Bouchanh Phongphackdy, Lao PDR) | | √ | | | | |
| 4 | Hydro power is the special energy that we received from natural, so it is very necessary to bring & providing these energy to supply of convenience life and instead the energy of world which really lastly in the future. (Toulasith Douangchanthip, Lao PDR) | √ | | | | | |
| 5 | To learn and share as much as possible. (Muhammad Khairul Azmir bin Ab Hamid, Malaysia) | √ | | | | | |
| 6 | After attending this training, I hope that micro hydro power technology and experience are spread out of ASEAN region. And to be promoted the rural electrification of each country. So, I'm very proud of this training to promote rural electrification development for my country. (San Htut Thein, Myanmar) | √ | | | | | |
| 7 | Introduction to new technology on micro hydro especially on the load controllers and availability of low-cost turbine, turbine design & generators. (Rodolfo Tiwaquen Jr., Philippines) | √ | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 8 | - Visit on-site models of MHP. | √ | | | | | |
| | - Visit tourist spots in Surabaya. (Victorino T. Taylan, Philippines) | | | | | √ | |
| 9 | Generally to improve the lives of people in the rural aresa, who currently do not have access to electricity. And how their economic situation can improve by the development of micro hydro power facilities. I would like to know the social-economic aspect. (Lazarus Mahlangu, South Africa) | √ | | | | | |
| 10 | - Contacts of manufacturer of (turbine and generators)<br>- Price lists and catalog of equipments related to this field. | √ | | | | | |
| 11 | - Windows of ivestments in R/E in each country. (Peeti Ngamprapasom, Thailand) | | | √ | | | |
| 12 | Knowledge sharing about the micro hydro technology. (Kris Suppakata, Thailand) | √ | | | | | |
| | - Operation/maintenance for MHP (grid-off system). | √ | | | | | |
| 13 | - Coordinate different renewable energy from different source like wind/hydro/solar/marine. (Nguyen Le Son, Vietnam) | | | | √ | | |
| 14 | Not only develop the hydro power energy, but also develop other kinds of energy from renewable energy, using all of the energies to get the best efficiency. (Nguyen Thu Phuong, Vietnam) | | | √ | | | |
| 15 | Concrete cooperation and better far the development of renewable energy in the future. (Dani Usadi, Indonesia) | √ | | | | | |
| **Total** | | **25** | **33** | **9** | **1** | **1** | **0** |
| | | **67** | | | **2** | | |
| **Percentage** | | **97.1%** | | | **2.9%** | | |

Based on the percentage of met expectations (97.1.00%), we may conclude that the participants are satisfied with the training programmes they participated.

[*As reference, the scoring range is classified as follows: 81-100% met is Satisfied; 51-80% met is Good; 26-50% met is Sufficient; and 0-25% met is Failed* ]

### *2. Summary of Evaluation by Training Subjects:*

Participants were requested to fill up the Evaluation by Subject/Field Form right after the related subject/field was finished. The Evaluation by Subject/Field Form is shown on pages 16-17. The tabulation result of the filled up questionnaires shows the conclusion as follows:

| No | A1 | A2 | B1 | B2 | B3 | Score | Relevance | Efficiency |
|---|---|---|---|---|---|---|---|---|
| 1 | 4,2 | 4,2 | 4,1 | 4,4 | 4,4 | 4,2 | 4,2 | 4,3 |
| 2 | 4,1 | 4,4 | 4,2 | 4,4 | 4,1 | 4,2 | 4,3 | 4,2 |
| 3 | 4,2 | 4,1 | 4,2 | 4,4 | 4,3 | 4,2 | 4,1 | 4,3 |
| 4 | 4,6 | 4,5 | 4,3 | 4,7 | 4,3 | 4,5 | 4,6 | 4,5 |
| 5 | 4,4 | 4,4 | 4,5 | 4,6 | 4,6 | 4,5 | 4,4 | 4,6 |
| 6 | 4,6 | 4,6 | 4,3 | 4,6 | 4,3 | 4,5 | 4,6 | 4,4 |
| 7 | 4,4 | 4,5 | 4,3 | 4,4 | 4,3 | 4,4 | 4,4 | 4,4 |
| 8 | 4,8 | 4,7 | 4,7 | 4,9 | 4,8 | 4,8 | 4,8 | 4,8 |
| | 4,4 | 4,4 | 4,3 | 4,6 | 4,4 | 4,4 | 4,4 | 4,4 |

1. Ezrom Tapparen on *Introduction to Renewable Energy*
2. Priyono Sutikno on *Technical Engineering of MHP*
3. Chayun Budiono on *Financial Aspect of MHP*
4. Bambang Irjanto on *Social and Econopmic Aspects of MHP*
5. Amalia Suryani on *Productive Use of Electricity*
6. Rajershwer P. Saini on *Basic Knowledge of MHP*
7. Rajershwer P. Saini on *Sustainability of MHP*
8. Field Study to MHP Plant of Kalimaron at Seloliman Village

Block A for Relevance; Block B for Efficiency

The score range is from 1 to 5. [1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree]. If the average score of all training subjects is closer to 5, it means that the 8 subjects delivered in the Class and Field Sessions are well understood by the participants and most appropriate for them. Based on the average of scores described above, the evaluation result is good.

### *3. Summary of Overall Evaluation:*

Participants were requested to fill up the Overall Evaluation Form on the last session. The Overall Evaluation Form is shown on pages 18-20. The tabulation results of the filled up questionnaires show the conclusion as follows:

| No | A1 | A2 | B1a | B1b | B2 | C1 | C2 | C3 | C4 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 5 |
| 2 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 5 | 5 |
| 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 |
| 4 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 4 |
| 5 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 |
| 6 | 5 | 5 | 5 | 5 | 3 | 5 | 4 | 5 | 5 |
| 7 | 5 | 4 | 4 | 4 | 5 | 3 | 4 | 4 | 4 |
| 8 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 |
| 9 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 10 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 3 |
| 11 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 12 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 13 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 3 |
| 14 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 15 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 3 |
| 16 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 |
| 17 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 |
| 18 | 5 | 5 | 4 | 3 | 5 | 5 | 5 | 5 | 4 |
| | | | | | | | | | |
| Total | 82 | 82 | 83 | 79 | 80 | 76 | 78 | 78 | 78 |
| Score | 4,6 | 4,6 | 4,6 | 4,4 | 4,4 | 4,2 | 4,3 | 4,3 | 4,3 |
| | **4,56** | | **4,48** | | | **4,31** | | | |
| | | | | | Total Score | | | | 39,8 |
| | | | | | Final Score | | | | **4,42** |

Block A for Relevance; Blok B for Effectiveness; Block C for Efficiency

The score range is from 1 to 5. [1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree]. If the average score of all training subjects is closer to 5, it means that overall subjects delivered in the Class and Field Sessions are well understood by the participants and most appropriate for them. Based on the average of scores described above, the overall evaluation result is good. This evaluation also to cross-check the result of evaluation by training subjects. There's consistency between evaluation by subjects and overall performance of the training sessions.

## 4. Work Activities / Progress

The training programme was conducted through:

*Class Session*:

The session conducted using adult-learning methodology. There is no instruction but knowledge-sharing approach is applied.

*Field Session*:

Field study to the best practice of micro hydro power plants is intended to see how micro hydro power plant works to generate electric power and give benefits to local communities as the beneficiaries. In the case of MHP Plant of Kalimaron the beneficiaries are also the owners. They have established an Association of MHP Kalimaron which the members are the local communities represented by the community groups to sit in the Board of Association. The Association officially and technically controls the MHP Plant of Kalimaron, both for 'on grid' and 'off grid'. During the field study the participants also exercised some practical works.

*Pesentation of Country Reports:*

Participants were requested to prepare and present their Country Reports covering problems and potentials of renewable energy development, especially of micro hydro power. Their knowledge and experiences were shared during the class and field sessions.

*Preparation of Action Plan:*

At the end of the Class Session, participants were asked to prepare Action Plan to be implemented in their respective countries when they are back home. They also indicated possible future collaboration post training.

*Language*:

The language used in the Training Programme is English.

## 5. Problems and Difficulties

Basically problems and difficulties were not significantly found, either during the training preparation and implementation. However there was only one thing that should be carefully managed and anticipated which is related to the nomination and selection processes.

The nomination forms received were not in schedule as expected. Most of the nominees were a bit late in the selection process, although they were still in time to proceed with administrative works.

In general, the qualification of participants was met.

## 6. Recommendations

Following is the conclusion and recommendation for further anticipation:

The overall implementation of the training programme on renewable energy: micro hydro power for rural development has been well implemented, both substantially and logistically.

However, there are some feedbacks from the participants expressed during the overall evaluation that could be accommodated in future similar training, as follows:

1. Despite the training subjects have been considered appropriate, it could be enriched with supporting references from other countries that have similar cases.
2. Tehnical exercises at fieldsite might be added with other instruments which are not complicated.
3. Since the field study is not merely on technical matters, it is suggested to extend more days at feldsite to observe and practise relevant field works related to social, institutional and economic development.

There is also strong recommendation to conduct another similar training with considering the feedbacks from participants. In this regard, NAM CSSTC and the Ministry of Energy and Mineral Resources instantly identify another best practice of community-based microhydro prower development that also generates value added to local communty. Potential plants are located in West Sumatera, South Sulawesi and Lombok. These three sites should be assessed at field level before they are selected.

## 7. Name and title of person(s) who prepared the report

1. **Achmad Rofi'ie**
   Assistant Director for Programme, NAM CSSTC
   **for <u>Narrative Report</u>**

2. **Subandiyo**
   Assistant Director for Administration and Finance, NAM CSSTC
   **for <u>Financial Report</u>**

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## Attachments

### ***List of Participants***

| No | Country | Name | Office |
|---|---|---|---|
| 1 | Cambodia | Mr. Son Davin | Ministry of Mines and Energy |
| 2 | Cambodia | Mr. Vichet Bun | Ministry of Mines and Energy |
| 3 | Cuba | Ms. Antuane Gavilan Suarez | National Electrical United |
| 4 | Indonesia | Mr. Wira Widyawidura | University of Proklamasi 45 |
| 5 | Indonesia | Mr. Daud Obed Bekak | State Politechnics Kupang |
| 6 | Indonesia | Mr. Dani Usadi | Ministry of Home Affairs |
| 7 | Lao PDR | Mr. Toulasith Doungchanthip | Ministry of Science and Technology |
| 8 | Lao PDR | Mr. Bouachanh Phongphackdy | Renewable Energy and New Material Institute |
| 9 | Malaysia | Ms. Zurlinda Asma Binti Aziz | Sustainable Energy Development Authority |
| 10 | Malaysia | Mr. Muhammad Khairul Azmir Bin AB Hamid | Ministry of Rural and Regional Development |
| 11 | Myanmar | Mr. San Htut Thein | Ministry of Agriculture and Irrigation |
| 12 | Philippines | Mr. Rodolfo M. Tiwaquen, Jr. | Benguet State University |
| 13 | Philippines | Mr. Victorino Tamayo Taylan | Central Luzon State University |
| 14 | South Africa | Mr. July Lazaruz Mahlangu | Department of Energy |
| 15 | Thailand | Mr. Peeti Ngamprapasom | Department of Alternative Energy Development and Efficiency |
| 16 | Thailand | Mr. Kris Suppakata | Provincial Electricity Authority |
| 17 | Vietnam | Ms. Nguyen Thu Phuong | Center for Environmental Research |
| 18 | Vietnam | Mr. Nguyen Le Son | Vietnam Institute For Hydropower And Renewable Energy |

## ***List of Resource Persons***

| No | Name | Institution |
|---|---|---|
| 1 | Mr. Ezrom M.D. Tapparan | Ministry of Energy and Mineral Resources |
| 2 | Mr. Priyono Sutikno | Bandung Institute of Technology |
| 3 | Mr. Chayun Budiono | Institute of Technology Sepuluh November |
| 4 | Mr. Bambang Irjanto | University of Prokalamasi 45 |
| 5 | Ms. Amalia Suryani | Deutsche Gesellschaft fur Internationale Zusammenarbeit |
| 6 | Mr. Rajeshwer Prasad Saini | Indian Institute of Technology Roorkee |
| 7 | Mr. Kusetiadi Raharjo | Heksa Prakarsa Teknik Small Hydropower Engineering |
| 8 | Mr. Suroso | Seloliman Environmental Education Foundation |
| 9 | Mr. Faisal Rahadian | Bandung Hydro Association |

## ***Project/Training Programme***

| Date | Session | Agenda |
|---|---|---|
| Monday, 22 Sept 2014 | 09:00-10:00 | ***Opening Ceremony*** |
| | 10:00-10:15 | Coffee break |
| | 10:15-12:00 | - Briefing on the Programme and Logistics (*NAM CSSTC/AHB*)<br>- Presentation of Country Papers |
| | 12:00-13:00 | Lunch break |
| | 13:00-15:00 | - Presentation of Country Papers (*Participants*) |
| | 15:00-15.15 | Coffee break |
| | 15:15-17:00 | - Presentation of Country Papers (*Participants*) |
| Tuesday, 23 Sept 2014 | 09:00-10:30 | - Introduction to Renewable Energy (*Ezrom Tapparan*) |
| | 10:30-10:45 | Coffee break |
| | 10:45-12:15 | - Introduction to Renewable Energy (*Ezrom Tapparan*) |
| | 12:15-13:15 | Lunch break |
| | 13:15-14:45 | - Technical Engineering of MHP (*Priyono Sutikno*) |
| | 14:45-15:00 | Coffee break |
| | 15:00-16:30 | - Technical Engineering of MHP (*Priyono Sutikno*) |
| | 16:30-17:00 | - Lessons learned |
| Wednesday, 24 Sept 2014 | 09:00-10:30 | - Technical Engineering of MHP (*Priyono Sutikno*) |
| | 10:30-10:45 | Coffee break |
| | 10:45-12:15 | - Financial Aspect of MHP (*Chayun Budiono*) |
| | 12:15-13:15 | Lunch break |
| | 13:15-14:45 | - Financial Aspect of MHP (*Chayun Budiono*) |

| | | |
|---|---|---|
| | 14:45-15:00 | Coffee break |
| | 15:00-16:30 | - Social and Economic Aspects of MHP (*Bambang Irjanto*) |
| | 16:30-17:00 | - Lessons learned |
| Thursday, 25 Sept 2014 | 09:00-10:30 | - Social and Economic Aspects of MHP (*Bambang Irjanto*) |
| | 10:30-10:45 | Coffee break |
| | 10:45-12:15 | - Social and Economic Aspects of MHP (*Bambang Irjanto*) |
| | 12:15-13:15 | Lunch break |
| | 13:15-14:45 | - Productive Use of Energy (*Amalia Suryani*) |
| | 14:45-15:00 | Coffee break |
| | 15:00-16:30 | - Productive Use of Energy (*Amalia Suryani*) |
| | 16:30-17:00 | - Lessons learned |
| Friday, 26 Sept 2014 | 09:00-10:30 | - Basic Knowledge of Micro Hydro Power (*Rajeshwer P. Saini*) |
| | 10:30-10:45 | Coffee break |
| | 10:45-11:30 | - Basic Knowledge of MHP (*Rajeshwer P. Saini*) |
| | 11:30-13:30 | Lunch break |
| | 13:30-14:15 | - Sustainability Aspect of MHP (*Rajeshwer P. Saini*) |
| | 14:15-15:00 | Coffee break |
| | 15:00-16:30 | - Sustainability Aspect of MHP (*Rajeshwer P. Saini*) |
| | 16:30-17:00 | - Lessons learned |
| Saturday, 27 Sept 2014 | ***Daylong*** | - Field Study to Micro Hydro Power Plant (*Faisal Rahadian*) |
| Sunday, 28 Sept 2014 | ***Daylong*** | - Free/Sightseeing |
| Monday, 29 Sept 2014 | 09:00-10:30 | - Wrap-up of Overall Lessons Learned on MHP (*?*) |
| | 10:30-10:45 | Coffee break |
| | 10:45-12:15 | - Preparation of Action Plan by Country |
| | 12:15-13:15 | Lunch break |
| | 13:15-14:45 | - Presentation of Action Plan |
| | 14:45-15:00 | Coffee break |
| | 15:00-16:30 | - Check Expectations and Overall Evaluation |
| | 16:30-17:00 | - ***Closing Ceremony*** |

***Evaluation Forms***

**SUBJECT/FIELD EVALUATION**

Training Programme on Renewable Energy:
Micro Hydro Power for Rural Development
Surabaya, 22 - 29 September 2014

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**Name of Subject/Field** :

**Name of Trainer/ Resource Person** :

**Date** : **Time :**

Instruction:

Use the following score to indicate the extent to which you agree or disagree with each of the statements below.

Score Code:

| | |
|---|---|
| Strongly disagree | = 1 |
| Disagree | = 2 |
| Neutral | = 3 |
| Agree | = 4 |
| Strongly agree | = 5 |

If you have any comment, please write down on the space at the end of each item.

## *BLOCK A:* RELEVANCE

A1. I was able to understand the operating system of Micro Hydro Power. (Level of Understanding)

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| | | | | |

Comment:

……

A2. Knowledge/skills gained from this field visit could be applied in my country. (Level of Application)

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| | | | | |

Comment:

……

## BLOCK B: EFFICIENCY

B1. Documents provided (Training Materials) are appropriate and useful.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| | | | | |

Comment:

……

B2. The Trainer/ The resource person is professional (Method of instruction, Communication skills: clear explanation, clear answers to questions)

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| | | | | |

Comment:

……

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| | | | | |

B3. The time given was appropriate.

Comment:

……

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……

# OVERALL EVALUATION

Training Programme on Renewable Energy:
Micro Hydro Power for Rural Development
Surabaya, 22 - 29 September 2014

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Instruction:

Use the following score to indicate the extent to which you agree or disagree with each of the statements below.

Score Code:

| | |
|---|---|
| Strongly disagree | = 1 |
| Disagree | = 2 |
| Neutral | = 3 |
| Agree | = 4 |
| Strongly agree | = 5 |

If you have any comment, please write down on the space at the end of each item.

## BLOCK A: RELEVANCE

A1. The knowledge and practices of Micro Hydro Power for Rural Development scheme seem workable in my country.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| | | | | |

Comment :

……

……

A2. The content of the course (how to understand, develop and manage micro hydro power, and its benefit for rural development seem workable in my country.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Comment:

……

……

## BLOCK B: EFFECTIVENESS

**B1. I was able to achieve the following objectives of this course:**

a. Knowledge and practices of Micro Hydro Power.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Comment:

……

……

b. Explain and analyse Micro Hydro Power Development, its context, actors and venues, its relevance to your host country and the skills it requires.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Comment:

……

……

**B2. The course contents are clearly related to your present or future works**.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Comment:

……

……

## BLOCK C: EFFICIENCY

C1. This course has covered the subjects that I expected.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Comment:

……

……

C2. In general, the study visits arranged were suitable to help me deepen my understanding or further improve my skills on each subject.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Comment:

……

……

C3. I consider the course is "timely" implemented according to the country's needs in developing micro hydro power (objective of the course).

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Comment:

……

……

C4. One-week course is appropriate.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Comment:

……

……

***Documentation***


Sitting (Left to Right): Cecep Effendi (CIRDAP), Djajang Sukarna (MoEMR of Indonesia), Achmad Rofi'ie (NAM CSSTC)
Standing (Left to Right): M. Khairul Azmir Bin AB Hamid (Malaysia), Kris Suppakata (Thailand), Upik Jamil (MoEMR of Indonesia), Son Davin (Cambodia), Wira Widyawidura (Indonesia), Faisal Rahadian (Training Coordinator), Antuane Gavilan Suarez (Cuba), Victorino Tamayo Taylan (Philippines), Peeti Ngamprapasom (Thailand), Rodolfo M. Tiwaquen Jr. (Philippines), San Htut Thein (Myanmar), Daud Obed Bekak (Indonesia), July Lazaruz Mahlangu (South Africa), Bouachanh Phongphackdy (Lao PDR), Toulasith Doungchanthip (Lao PDR), Nguyen Le Son (Viet Nam), Nguyen Thu Phuong (Viet Nam), Vichet Bun (Cambodia), Zurlinda Asma Aziz (Malaysia), Suroso (Resource Person), Ahmad Khulaemi (Resource Person)

Group photo of participants on the Morning Session

Welcoming Remarks by Achmad Rofi'ie,
Assistant Director for Progamme of NAM CSSTC

Remarks by Dr. Cecep Effendi,
Director General of CIRDAP

Opening Remarks of the Training Sessions by Djajang Sukarna,
Head of the Education & Training Agency, Ministry of Energy & Mineral Resources of Indonesia


Group photo of participants with the VIP Guests
on the Afternoon's Official Opening Session of the Training Programme

Signing of Agreement betwen the Head of the Education & Training Agency of
the Ministry of Energy & Mineral Resources and Director of NAM CSSTC

Official Opening Remarks by H.E. Ambassador Esti Andayani,
Director of NAM CSSTC


Class Session at the Ibis Hotel, Surabaya


Presentation of Country Paper by Participants

Field Session at the MHP Plant of Kalimaron in Seloliman, Mojokerto District

Observing the stream's flow of River Kalimaron that is used as source of energy

Power House of MHP Plant of Kalimaron

Turbine made in Bandung, Indonesia, used in the Power House

Productive use of electricity by the community member


Preparation of Action Plan by Participants


Presentation of Action Plan by Participants

Hasril Nuzahar, Head of Education & Training Centre for Electricity, New Energy, Renewable & Energy Conservation, Ministry of Energy & Mineral Resources of Indonesia awarding Certificate to the Participant on the Closing Session

H.E. Ambassador Dato Paduka Mahmud Haji Saidin, Ambassador of Brunei Darussalam to Indonesia awarding Certificate to the Participant on the Closing Session

H.E. Ambassador Esti Andayani, Director of NAM CSSTC
awarding Certificate to the Participant on the Closing Session

Participants' representative, Victorino Tamayo Taylan (Philippines), delivering Vote of Thanks
to the Training Committee on the Closing Session

Hasril Nuzahar, Head of Education & Training Centre for Electricity, New Energy, Renewable & Energy Conservation, Ministry of Energy & Mineral Resources of Indonesia delivering Closing Remarks on the Closing Session

H.E. Esti Andayani, Director of NAM CSSTC
delivering Closing Remarks on the Closing Session

Non-Aligned Movement Centre for South-South Technical Cooperation (NAM CSSTC) was established in 1995 at the 11th Summit of NAM held in Cartagena as one of the vital and effective means for promoting and accelerating development in the developing countries. As a centre for actions and pooling resources as well as a forum for dialogue, its objective is to achieve the development goals of NAM member countries in attaining sustained people-centred development and to enable developing countries to participate more actively and equally in the process of globalization. The programmes carry direct and long-term benefit to render the economy of developing countries to be more broad-based, efficient and resilient.

*Director:*
Ambassador Esti Andayani
*Assistant Director for Programme:*
Achmad Rofi'ie
*Assistant Director for Administration & Finance:*
Subandiyo

website: http://www.csstc.org