



# RURAL ELECTRIFICATION WORKSHOP

## International Best Practices and Options for Policy Makers

Workshop Report



Renewable Energy Support Programme for ASEAN (ASEAN-RESP)

Supported by





Renewable Energy Support Programme for  
ASEAN



---

**RURAL ELECTRIFICATION WORKSHOP**  
**International Best Practices and Options for Policy Makers**

April 4 – 5, 2013  
Yangon, Myanmar

Workshop Report

Supported by



# Contents

Introduction .....	4
Day 1: Rural Electrification Policy, Planning, Development and Management .....	5
1. Opening Remarks.....	5
2. Keynotes .....	5
3. Grid Extension – Overview and Best Practices .....	6
4. Rural Electrification Policy and Planning .....	7
5. Mini-Grid Electrification – Overview and Best Practices .....	8
Day 2: Productive Use of Energy, Socio-Economic and Technology Aspects .....	10
6. Productive Use of Energy and Sustainability Aspects.....	10
7. Working Group Sessions.....	11
8. Summary of Key Findings .....	12

**Link to presentations:**

[https://energypedia.info/wiki/Rural\\_Electrification\\_Workshop\\_Myanmar\\_April\\_2013](https://energypedia.info/wiki/Rural_Electrification_Workshop_Myanmar_April_2013)

## Introduction

The workshop on “Rural Electrification – International Best Practices and Options for Policy Makers” was held in Yangon, Myanmar on April 4-5, 2013. Participants included over 70 representatives from Cambodia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand and Vietnam, representatives from the Ministry of Industry (Mol) Myanmar and other line ministries, the ASEAN Centre for Energy, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the European Union Energy Initiative Partnership Dialogue Facility (EUEI-PDF) as well as international experts.

The workshop contributed to the ASEAN member states’ commitment “to accelerate the electrification program for the rural and remote areas in the ASEAN region” as stated in the APAEC 2010-2015. Drawing on the experience from various countries, the workshop focused on the promotion of off-grid electrification. The topics covered by the workshops were policy and planning, grid extension, mini-grid electrification, off-grid electrification with stand-alone systems, productive use of energy and small-scale hydropower.

The workshop included plenary sessions as well as roundtable group discussions in order to stimulate a *focussed* and *target-oriented discussion* among relevant stakeholders. Keynote speeches from practitioners and international experts gave insights into different experiences of rural electrification in the ASEAN region and internationally and set the base for discussion during the workshop.

The workshop resulted in the recommendation to establish a continuous discussion (i.e. working groups) in order to formulate appropriate actions on policy, financing mechanisms, business models and project setup, operation and maintenance, socio-economic aspects and community involvement, as well as capacity building.

This report summarizes the main content and findings of the workshop. General recommendations for successfully implementing rural electrification approaches are highlighted throughout the report.

Finally, all speakers’ keynotes and presentations can be downloaded from [https://energypedia.info/wiki/Rural\\_Electrification\\_Workshop\\_Myanmar\\_April\\_2013](https://energypedia.info/wiki/Rural_Electrification_Workshop_Myanmar_April_2013)

# Day 1: Rural Electrification Policy, Planning, Development and Management

## 1. Opening Remarks

Mr. Than Htai, Director General, Myanmar MoI gave the opening remarks, he welcomed all participants and introduced the Rural Electrification in Myanmar, among others, he said 70% of Myanmar's population live in rural areas and the electrification ratio of the country is approx. 25%. Several rural electrification initiatives have been undertaken, but large parts of Myanmar still remain un-electrified. Rural electrification is therefore the right approach to increase Myanmar's electrification ratio and to provide access to energy to remote communities.

Dr. Hardiv Situmeang, Executive Director, ACE, in his opening speech, he also welcomed all participants and he highlighted that in the ASEAN region, disparities between member states in electrification ratio are considerably high. The workshop offers the opportunity for rural electrification stakeholders to exchange knowledge on best practices and approaches to develop sustainable rural electrification projects throughout the ASEAN.

Mr. Ingmar Stelter, Programme Director, EUEI-PDF, said in his opening remark that Rural electrification faces many challenges, among others inadequate infrastructures and affordability. Therefore, an adequate planning process that meets the energy needs of the communities, including productive use of energy (PUE) is essential. It is recommended that rural electrification efforts include PUE from the beginning as it leads to economic development.

## 2. Keynotes

Experiences from the ASEAN:

Mr. Arne Schweinfurth, Advisor from GIZ gave experiences of GIZ in the region, among others, he pointed out that main rationales for rural electrification with renewable energy (RE) are: i) increasing fossil fuel costs; and ii) the cost competitiveness of electricity from renewable sources in remote areas.

From a practitioners' point of view, the following issues are identified to be the most relevant in the region:

- Policy Framework: Comprehensive approach, long-term commitment; one responsible authority;
- Financing Mechanism: Clear and transparent rules; investment security;
- Project Setup and Business Models: Include the private sector; consider productive use of energy;
- Appropriate Technology: Thorough technology assessment; local capacity; cross border cooperation;
- Community Involvement: Bottom-up approach instead of top-down planning; capacity building;

- Training and Capacity Building: Continuous training; local training capacities; train-the-trainer activities.
- In the ASEAN region, RE technologies for rural electrification are available and reliable and successful business cases are acknowledged. This offers a good potential for intensified regional cooperation on rural electrification.

Mr. Than Oo, MoI, on behalf of Mr. Zaw Moe Win, MoEP, presented the pictures of Myanmar's energy:

- Un-electrified villages in Myanmar amount for more than 45,000 out of the total of 62,218 villages. The Ministry of Electric Power (MoEP) plans to electrify 4,793 villages by 2016. General power generation will be increased by constructing hydro and coal power plants.
- Power consumption per capita is among the lowest in the ASEAN countries and the electricity tariff rate does not reflect the market rate due to high subsidies. However, off-grid electricity tariffs are rather high (approx. 35 US Cents/kWh).
- Current schemes on rural electrification focus on mini hydropower, biomass and solar power. By formulating new electricity policies, Myanmar's government is making an effort to reduce the "rural-urban divide" with regards to electricity access.

Discussion:

- The most common business model applied in rural electrification in Myanmar is the community-based model.
- A law for private entity engagement in rural electrification is currently under development.

### **3. Grid Extension – Overview and Best Practices**

Experiences from World Bank Vietnam: Mr. Van Tien Hung

- Success factors of rural electrification in Vietnam:
  - Strong commitment of central and local government as well as the end-users ("government and the people do it together");
  - Well-adjusted to local contexts; and
  - Ability to mobilize different financing sources.
- Two remaining issues in Vietnam: rehabilitation of outdated rural electrification systems and provision of electricity access for households in mountainous areas and islands.
- Recent developments: Electricity tariffs are higher in rural areas than in urban areas, thereby creating social injustice. The government unified the tariffs, applying a subsidy for rural electricity tariffs. Vietnam has managed to reduce the electricity loss from 50% to 10% and is now reaching also less developed and isolated areas.

#### 4. Rural Electrification Policy and Planning

##### International experiences:

Ms. Anjali Shanker:

- Vision and objectives to electrify rural areas must be clearly set, since they determine socio-economic consequences and technology choice.
- Target groups and areas to be electrified should have growth potential (economic activity).
- Successful rural electrification requires functioning industrial, financing and regulatory frameworks as well as continuous supply, either from grid or off-grid sources.
- Experiences show that it is impossible to electrify isolated areas on a profitable basis. Thus, rural electrification funds/agencies are required, which are capable of developing business plans, mobilize private sector and leverage grants.

Mr Alex Arter:

- Lack of energy access creates potential social tensions and/or migration. Therefore, to be able to provide sustainable energy access, local actors and entrepreneurs must be encouraged and suitable regulatory frameworks must be put into place.
- Technology-driven projects and hardware subsidies should be avoided since it leads to unsustainable projects. Instead, projects should be driven by cost-based rationales.
- The provision of energy efficient appliances (in PUE context) is important to trigger local development.

Lessons learnt from Cambodia, Mr. Loeung Keosela:

Major challenge of rural electrification in Cambodia: mobilization of funding.

The key lessons learnt are as follows:

- Involvement of public and private entrepreneurs to overcome fund constraints and trigger rapid electrification.
- Supply to rural areas by grid extension is preferred, for remote areas mini-grid systems and for other further remote areas stand-alone system is encouraged.
- For areas where electricity supply is not viable, subsidy is required. The amount of subsidy depends on degree of non-viability.
- A well designed monitoring and evaluation framework is essential for properly assessing the real achievements of a project.
- To make private sector investments happen in rural electrification, the basic policy and regulatory enabling environment should be complemented with careful designed and well-targeted financing support, technical assistance and capacity building.

Recommendation: To formulate policy, strategy and plan for development of rural electrification as a first step.

## 5. Mini-Grid Electrification – Overview and Best Practices

### International Experience

Ms. Anjali Shanker:

- Mini-grid electrification entails economic, capacity building and regulatory frameworks.
- Implementation requires risk sharing to soften the terms of financing; in general, risks can be shared through concessional finance.
- Important to explore different business models for mini grids, since they can result in different economic returns.

Experiences from Malaysia, Mr. Khairul Anuar Abd Azis:

- In order to avoid costly diesel systems, solar hybrid system were developed for off-grid locations in Malaysia.
- If installed properly, solar hybrid systems can be a least cost options for rural electrification.
- Major challenge: logistics of transporting materials.
- Sustainability criteria for solar hybrid systems:
  - Distance from existing grid sources more than 15-20km depend on load demand
  - No planning for grid extension in next 5 years
  - Enough space and no shading
  - Accessible for fuel delivery and routine maintenance work

Experiences from Myanmar, Mr. Col. Thoung Win:

- RE-based project schemes in Myanmar specifically target biomass, solar PV and mini hydropower. Most of the technologies for small scale electrification are available in the country.
- RE financing mainly through government but also communities and NGOs.
- Major challenges: Lack of IPP law; Need for improved technology, efficiency, standards and specifications, financing and capacity building.
- Government has recently created institutions for developing policy and supports on energy including rural electrification.
- In the process of promoting rural electrification, issues to be addressed are:
  - Government policy and support (IPP Law, PPA, FIT, etc.);
  - Financial inputs – grants, aids, contributions, soft loans;
  - Local and international organization as well as private sector involvement;
  - Capacity building for local people.
  - Off-grid Electrification Stand Alone Systems – Overview and Best Practices

## International Experience

Mr. Eric Lysen:

So-called “solar trap” should be avoided: Clients with pico solar PV systems, despite the provision of an initial level of service, should still be considered non-electrified.

- Preferences of the users: system should give a bright light, be affordable, multipurpose: lighting 2 rooms, phone charging, portable, easy to use, safe and secure, have a long battery life.
- Sustainability considerations: need for quality assurance in product manufacturing (introduction of standards recommended) as well as appropriate and innovative business models.
- Role of governments: Facilitating role, not interfering with the market:
  - Quality assurance scheme for products in market;
  - Providing and disseminating reliable information about products;
  - Education of consumers about costs and quality;
  - No subsidies to products;
  - Gradual reduction of kerosene subsidies;
  - Guarantees for micro credit schemes.
- Role of donors can play indirect role:
  - Funding programmes to educate target groups;
  - Helping to guarantee a minimum quality level of the systems;
  - Supporting micro-credits;
  - Avoiding to subsidize equipment;
  - No interference with the market.

Experience from Myanmar:

Mr. Jim Taylor: Pico PV Systems Financing and Distribution Systems

- Key success factor for rural electrification in Myanmar:
  - To optimize the distribution networks via different channels (e.g. retailers, village kiosks, community channels).
  - Further sustainable rural electrification requirements: i) affordability; ii) quality of the equipment; and iii) adequate product design.

General remarks:

- Many manufacturers exist in the market. Technical specifications can be found online (e.g. [www.lightingafrica.com](http://www.lightingafrica.com)).
- Warranty for products should at least be 2 years.

## Day 2: Productive Use of Energy, Socio-Economic and Technology Aspects

### 6. Productive Use of Energy and Sustainability Aspects

Mr. Robert Schultz, Experiences from Indonesia: Sustainability measures for MHP

- Key Performance Indicator (KPI) survey
  - A comprehensive, tested and refined survey tool (data capture, entry and analysis) will help to monitor the projects' sustainability.
  - It is recommended to conduct this technical, social, economic and environmental assessment for MHP sites after a minimum 6 months of operation.
- MHP village support tools
  - Comprehensive training modules with enabled trainers for village management committee trainings supported by user-friendly guides will contribute to the capacity building.
  - Through community feed-back, a SMS-based platform can help monitoring the plants' performance (technical and administration) also in remote areas.
- Productive Use of Energy (PUE) support
  - In order to tackle the mostly low capacity factor in rural electrification, it is recommended to implement PUE activities in electrified rural communities.
  - Putting a PUE tariff in place will increase the income generation of the power plant significantly. Hence it is recommended to connect to as many businesses as the plant operator can.
  - Sustainability of PUE can be achieved through creating diversified economic activities (based on numerous small-scale, off-the-shelf appliances) rather than relying on a single, specialized large PUE. Individual businesses have proven to be more sustainable than community type ones.

#### International experience:

Mr. Lucius Mayer-Tasch: Productive Use of Energy (PUE):

- Rational of PUE promotion: PUE has the potential to increase impact of electrification through increased income and employment etc., however:
  - PUE can be a zero-sum game, when it leads only to a redistribution of wealth within the same community
  - Value-adding productive uses should be prioritized: PUE activities should focus on income generating activities that benefit the entire community.
  - Significant positive effects on income, employment etc. cannot be taken for granted.

- Need to accompany energy access programs with PUE promotion activities.
- Recommended features for PUE promotion:
  - Identify PUE opportunities (value chain analysis etc.) and assess the demand for PUE activities in the target area before deciding upon a specific product.
  - Raise awareness about PUE opportunities.
  - Provide Business Development Services (BDS) for start-ups and established businesses: Rural enterprises interested in investing in electricity connection, must take into account business profitability. Hence, capacity building on business and management for rural enterprise initiating PUE activities must take place before implementing PUE activities.
  - Facilitate access to efficient and high-quality end-use equipment through advice, demonstration and improved access to long-term credit.

## 7. Working Group Sessions

Four working groups were set, each focusing on a specific technology (mini hydropower, solar PV, hybrid systems, grid extension). Topics discussed in each group were (1) stable and predictable policy framework, (2) reliable support policies and a feasible financing mechanism, (3) sustainable project setup and business models, (4) appropriate technology, (5) socio-economic aspects and community involvement, as well as (6) continuous training and capacity building. The results of each group are summarized in Table 1.

**Table 1: Results of group discussion**

Results / Recommendations
Mini Hydropower (MHP): <ul style="list-style-type: none"> <li>• All highlighted aspects (1-6, see above) are of equal importance.</li> <li>• A facilitated and continuous dialogue between policy makers, key stakeholders and local consultants is necessary. For each aspect (1-6), at least two people from different backgrounds (central and local government, private sector, communities, academia, etc.) should be involved. International expertise should be involved were needed.</li> <li>• The establishment of a “MHP Roundtable” according to the mentioned setup is necessary to initiate and develop a sustainable MHP market.</li> </ul>
Solar PV: <ul style="list-style-type: none"> <li>• Establishment of a National PV working group (from government, finance, industry, academia, etc.) that will develop: (i) PV road map; (ii) Information and capacity building at all levels; (iii) PV industry association; (iv) Taxes and import procedures (within ASEAN), and (v) Regulatory framework for IPP (e.g. for foreign investment).</li> <li>• Reach the rural people with electricity through making clear business cases and providing guaranteed micro finance through commercial standards.</li> <li>• Impose quality and standards.</li> </ul>
Hybrid systems:

<ul style="list-style-type: none"> <li>• Reaching poor remote population with grid electricity requires subsidies.</li> <li>• Private sector should be encouraged and supported to hybridize their system to reduce the tariff.</li> <li>• Guarantee that the grid will not reach the respective area for a certain period of time.</li> </ul>
<p>Grid extension:</p> <ul style="list-style-type: none"> <li>• Clear policy and funding to implement rural electrification.</li> <li>• Funds should be allocated for capacity building.</li> <li>• Capacity building activities should target policy makers and financiers and should be conducted continuously.</li> </ul>

## 8. Summary of Key Findings

### Policy

- A clear commitment and strategy from the government is crucial.
- A transparent and reliable rural electrification plan should be in place (e.g. action plans, roadmaps).
- Feasible legal framework for private sector participation has to be put in place (investment security).
- Stakeholders from all policy levels (e.g. ministries, local government, community representatives) should be involved in rural electrification activities.
- One central entity is recommended to coordinate rural electrification efforts of different stakeholders in the country. A clear institutional setup (e.g. Rural Electrification Fund) helps to successfully attract international support.
- Leverage functioning institutions and working groups for promoting and developing rural electrification activities (e.g. Interministerial Committee on Rural Electrification, National Energy Management Committee in Myanmar).

### Financing

- To make rural electrification sustainable, various financing sources must be explored (i.e. public, private and international).
- The financial structure (e.g. tariffs, subsidies) needs to be clearly established to provide investment security for the private sector.
- Financial support (i.e. subsidies) need to be established according to the technology applied (e.g. small PV appliances, MHP, etc.).
- Dedicated budgets for rural electrification need to be available on all levels (e.g. central, provincial).

### Project planning and setup

Clear roles and responsibilities of involved actors (central and provincial government, utility, etc.) are necessary.

The planning of rural electrification projects needs to consider the input of all these stakeholders in a structured way.

Tailor-made business models need to be explored and allowed for (private sector participation).

Local communities have to be involved in the planning and implementation process.

### **Technology**

- A technology-neutral baseline needs to be established (i.e. what are the resources available? What are the energy needs?).
- Technology choice should be done based on clear criteria (e.g. based on pre-feasibility studies).
- Standards and specifications are required to ensure minimum quality and security of supply.
- Locally or regionally (i.e. ASEAN) available technologies are preferred if they can provide the necessary quality.

### **Capacity Building**

- Capacity building for all actors involved is needed (policy makers to local communities, private sector, investors, etc.) to understand technical and financial requirements.
- Capacity building measures should be continuous (e.g. workshops) and also include communities.
- Train-the-trainer activities are crucial to build up local capacities and to ensure continuous training also on the community level.

### **Sustainability**

- Sustainability of rural electrification can be enhanced through:
  - PUE, which has the potential to increase impact of electrification through increased income and employment.
  - Comprehensive monitoring systems such as KPI surveys.
  - Effective feedback mechanisms such as the SMS gateway.

### **Proposed Way Forward for Myanmar**

The establishment of national technology-based working groups, composed of all relevant stakeholder groups - including government, finance, industry, academia, etc. - is highly recommended (in particular for MHP and PV).

The establishment of such multi-stakeholder working groups will help to assure that rural electrification (through the respective technology) will be addressed on a long-term and continuous basis. In addition such working group would offer an adequate forum to collaborate with international experts. In order to obtain support on this, cooperation with international organizations and programs (e.g. ASEAN-RESP) is recommended.