

## Curriculum Design Statement



**Regional Capacity Building on Affordable,  
Sustainable and Innovative Technology Based  
Energy for Mountainous Rural Area**



## 1. Project Background

Energy is central to nearly every major challenge, and opportunity the world faces today. Be it jobs, security, climate change, food production or increasing incomes, access to sustainable energy for all is essential for strengthening economies, protecting ecosystems and achieving equity. It has become clear that current patterns of energy use are environmentally unsustainable. Globally, a large fraction of the world's population—more than two billion people still lacks access to one or several types of basic energy services, including electricity, clean cooking fuel and an adequate means of transportation. This lack of modern energy services stifles income-generating activities and hampers the provision of basic services such as health care and education. The emissions are also important drivers of climate change and local environmental degradation.

The priority must be made for access to energy in rural areas for the national growth and poverty eradication plans with the commitment of the required resources. Capacity at the national utility should be built in planning, design, implementation, and operation. In addition, innovative methods are required to improve affordability for consumers. Rural area need to be screened for clinics, schools, irrigation, and potential economic activities using gender-sensitive criteria and consultations. The productive use of energy can be launched to ensure income generation and extended social benefits. At the same time, the energy to the rural poor programs can be instituted for increasing coverage, expand accessibility to poor households particularly in inaccessible mountainous regions. Subsidizing energy to the rural household and agricultural sectors of the economy have been a policy followed by some of the developing countries with the view to make energy affordable to the poorest sections of society.

The immediate concerns are the use of energy technologies to increase access to modern energy services in rural areas. The development of energy technologies such as improved cook stoves to increase efficiency and reduce health impacts of traditional fuel use has had a long history and has shown some success. However, growing concern over climate change and the increasing acceptance of a need for low-carbon development trajectories have provided renewed emphasis on improving access to modern energy services using various energy technologies. The various energy supply technologies have been reviewed. The usual list includes renewable energy technologies (*e.g.*, wind, solar and biomass), nuclear technology and advanced fossil-fuel systems with carbon capture and sequestration. Natural gas systems are widely viewed as a crucial 'bridge' technology. In addition, energy efficiency

is often cited as a critically important and an often lower-cost complement to supply side improvements.

In principle, the same supply- and demand-side options are available to all countries. Nevertheless, some options, especially technologies that are in very early stages of commercialization or require very large, initial capital investments or substantial outside expertise to operate, are likely to face additional obstacles to their use in developing countries.

If we focus on renewable energy technologies because they can be particularly attractive in dispersed, 'off-grid' applications. Therefore, they represent important options for rural areas that lack electricity transmission and distribution infrastructures. A number of renewable energy technologies have been so improved that they can now provide electricity at a lower cost than other supply options wherever extension of the grid is prohibitively expensive or uneconomic. There are six broad categories of renewable energy technologies. They are biomass, wind, solar, hydro, geothermal and marine. They can be tapped by using a variety of conversion technologies or processes to produce a range of energy services, including electricity, heat (or cooling), fuels, mechanical power and illumination. The competitiveness of different renewable technologies in different settings depends on their cost and performance, as well as the local cost and availability of fossil-based energy. All of these factors still vary widely and depend strongly on local conditions.

Energy Technologies can play an important role in reducing energy poverty and increasing access to modern energy services in rural areas in appropriate and environmentally sound ways. The use of biogas and improved biomass stoves has led to increased cooking efficiency, less smoke inhalation, greater safety and reduced fuel wood consumption. The use of solar PV systems, wind turbines and pico-hydropower has increased living standards, powered entertainment systems and provided opportunities to undertake productive activities as artificial light extended work and study hours and electricity was used to charge batteries and power mobile telecommunications base stations.

There has been remarkable progress in the Lancang-Mekong River Basin energy sector over the past two decades. Considerable success was also achieved in rolling out rural electrification in member countries. Rapid provision of large-scale, high-volume national grid systems; successful mobilization of indigenous resources; and the beginnings of cross-

country trade also took place. These successes have been achieved mainly at the national level. Despite considerable political pronouncements that recognize the imperatives of regional cooperation, progress has not matched national achievements. The high-volume trans-boundary connections that have been made to date within the Lancang-Mekong River Basin do not achieve a true interconnection of systems with synchronous operations.

Institutional arrangements for regional cooperation need to be extended beyond the electricity sector. The Lancang-Mekong River Basin Strategic Framework 2012–2022 sets out principles to govern the next moves toward economic integration, including a greater focus on decision making on issues that are clearly regional in nature. The Sub regional Energy Sector Forum (SEF) is an important innovation with strong potential for decision support. There are strong reasons why regional cooperation should be high up in the agenda of national policy makers. Energy security, climate change, and energy access are the overriding objectives of energy policy. Within many developing countries, including the Lancang-Mekong River Basin, the development and promotion of rural energy is largely constrained by lack of technology, limited awareness among policy-makers, lack of capacity in terms of trained personnel, poor regulatory and policy environment, and financial and investment barriers. Capacity building Program aimed at the deployment of energy technologies in rural areas should be integrated into wider rural development programmes to ensure suitability and harmonization. Similarly enabling government policy is essential to stimulate uptake of these energy technologies in rural areas, both on the supply and demand sides. Government support may take many forms: regulation, subsidization, import duties, public awareness campaigns, or more likely a combination of these.

To address the issue on manpower training, Mekong Institute (MI) proposes to design and deliver one training program for participants coming from the six Lancang-Mekong River Basin countries of Cambodia, China, Lao PDR, Myanmar, Thailand and Vietnam. The training program is planned to benefit 30 professionals. Among the 6 Lancang-Mekong River Basin countries, China and Thailand are more advanced in developing and commercializing Energy Technology sources. Hence, technology and knowledge exchange between these countries and the rest of the Lancang-Mekong River Basin is seen as an important step in fostering cooperation in future energy needs and ultimate energy security in the Lancang-Mekong River Basin.

## **2. Project Objectives**

The ultimate objectives of this project are:

- a. To enhance the knowledge and skills of government officials, extensionists, and professionals from the academic and research institutions in rural energy technologies development, utilization and promotion.
- b. To achieve institutional development/capacity building on rural energy including renewable energy, energy efficiency and greenhouse gas abatement technologies in rural areas.
- c. To enhance the awareness by disseminating the regional good practices and new approaches to minimize adverse effects of energy technologies in rural energy access.
- d. To establish a network of energy technology practitioners that will continue to build energy information and technology, share current developments, and promote sustainable energy production and consumption practices.

## **3. Project Content**

The modular training programs will be conducted with Structured Learning Visits to rural energy projects in Thailand. The training program will invite resource persons from the Lancang-Mekong River Basin and is designed as follows:

1. Learn to do phase: A two-week regional training program on ‘Affordable, Sustainable and Innovative Technology Based Energy for Mountainous Rural Area’ to be conducted at MI residential training center with study visits to different energy projects in Thailand.
2. Do to learn (transferring) phase: A six-month work-based assignment. At the end of the training, each participant will develop an individual action plan to transfer newly-acquired knowledge and technologies into practice back at their worksites. During this training phase, resource persons and MI trainers will provide on-line technical support via MI supported internet portal. Each alumnus can send email to individual resource person or post questions in the web-board and the concerned resource person or MI trainer will post response in a timely manner. A follow-up on the progress of

individual action plans will be made by MI staff 6 months after completion of the training course.

## **4. Training Modules**

The training program is proposed to cover the following modules:

### **Module 1: Enabling Sustainable Development through Rural Energy Access**

This is an introductory module for the training focusing on the importance of achieving energy access on rural and remote areas. The session will explain how the lack of access to reliable, affordable and sustainable energy contributes to the cycle of poverty and exacerbate problems of health, education, food security, water, gender quality and environment degradation. The module will additionally set the contents of energy access's scenario in the Lancang-Mekong River Basin, and discuss how to tackle rural energy access through an integrated approach that recognizes the synergies between energy and other development sectors in the region.

#### **Module Objectives:**

1. To explain energy access and trends in rural and remote areas of the Lancang-Mekong River Basin
2. To improve the participants' appreciation towards the linkage between rural development and energy access
3. To alert the awareness on necessity of integrated approach for sustainable development while securing energy

#### **Topics:**

- Linkage between Energy Access and Sustainable Development
- Energy Access and Outlook in the Lancang-Mekong River Basin with emphasis on Mountainous Rural Areas
- Opportunities and Challenges to Rural Energy Applications in the Lancang-Mekong River Basin

## **Module 2: Enabling Factors for Innovative and Modern Energy Provision in Rural Areas**

This module will deepen the understanding of participants on the critical factors to consider in developing effective rural energy access programs and projects. It would discuss creating the right policy and regulatory framework in areas of planning, infrastructure investments, capacity development and technical transfer. Additionally, the importance of cross-sector value chain development and its business models to leverage synergies in local structure would be highlighted.

### **Module Objectives:**

1. To enhance the participants' knowledge on policy and regulatory requirement conducive to rural energy access projects
2. To develop the understanding of participants on financing energy access for all
3. To familiarize the participants with P5 models- Pro-Poor Public-Private Partnership for Energy Access Projects

### **Topics:**

- Policy and Regulatory Framework for Sustainable Energy Access
- Financing Energy Access for All ,Sources of Financing and Barriers to Scaling up
- Pro-poor Public-Private Partnerships and Policy Framework for Rural Energy Access

## **Module 3: Good Practices and Initiatives for Rural Energy Access**

This module is composed of good practices of policies, measures and actions that promote energy access in rural areas. The good practices and lessons learned would be drawn from the international and country-level experiences in the development of rural energy. Additionally, the innovative rural energy products, systems and services undertaken by the countries in the region would be included in the module. China's and Thailand's efforts and experiences in this regard will be especially used as regional good practices. Furthermore, it will identify lessons learned and ways to apply successful energy applications and usages including stand-alone renewable systems.

**Module Objectives:**

1. To identify good practices and lessons learned on rural energy-access development globally and regionally
2. To improve knowledge on participants on the existing technology options suitable for mountainous areas in the region
3. To enable participants determine relevant renewable energy products, systems and services for their rural communities.

**Topics:**

- Relevant Good Practices and Models in Increasing Energy Services in Rural Areas
- Current Efforts in Rural Energy Development and Different Technology Options in the Lancang-Mekong River Basin
- Practical and Affordable Renewable Energy Initiatives and Bio Energy in Mountainous Areas

**Module 4: Structured Learning Visits**

This module exposes the participants to rural energy-access projects in Thailand and provides opportunities for them to learn from the project's experiences, lessons learned and good practices. Information from the visits is also needed for course assignments and presentation of participants upon return from the visits.

**Module Objectives:**

- To expose participants to first-hand experiences by observing rural energy-access projects in Thailand
- To share lessons learned , good practices and their replicability in the home countries of participants

**Sites**

1. Three site-visits to rural energy projects in Thailand
2. Interview with representatives from the Energy Policy and Planning Office to learn about Thailand's experience on developing rural energy-access from the public policy perspective



## **Module 5: Regional Cooperation for Improving Innovative Energy Access in Mountainous Rural Areas**

Further to domestic energy sector improvement, the module will identify the scope to enhance regional cooperation in rural energy-access development. It will discuss how to encourage technical and technical transfer among the countries. By working together with other development partners that are working with each regional country, it will also find room for cooperation by sequencing the priorities area to scale-up access to modern energy service in the rural areas of all countries. Furthermore, the module will discuss the potential of regional energy market to support energy-access development.

### **Module Objectives:**

1. To increase the appreciation of participants on regional cooperation in energy-access development
2. To determine opportunities and challenges in enhancing regional cooperation
3. To determine the possibility of creating energy markets that could support energy-access development

### **Topics:**

- Regional Energy Cooperation Program and its Advantages
- Enhancing Cooperation in the Lancang-Mekong River Basin
- Regional Energy Market: Opportunities and Challenges

## **5. Target Participants**

The training program will consist of 30 participants with 5 participants representing each Lancang-Mekong River Basin country. The training program targets professionals from the academic, research and extension institutions involved in rural energy projects with and/or under the aegis of national and/or international organizations, institutions, universities, NGOs, etc. in the Lancang-Mekong River Basin.

## 6. Training Outcomes

The intended program outcomes are as follows:

- Government officials and practitioners are better prepared to develop effective energy-access programs that support livelihood improvement of rural people in the region;
- Network of government officials and practitioners that would contribute in enhancing regional energy cooperation;
- To enhance knowledge which will help to improve the availability and utilization of energy; environmental management; and working and living conditions in rural areas;
- To adopt good practices which have demonstrated notable outcomes and sustainable approach for promotion of eco-friendly rural energy technologies for preserving nature and enhancing rural livelihoods for poverty reduction and human development.

## 7. Contact Person 联系人

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