

Energy Resources in Cambodia  
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Chandara Lim,  
Suon Ponnarith

General Directorate of Energy Hydro Electricity Department  
Phnom Penh, Cambodia

### Introduction

Cambodia is one of the South-bordered nearby Laos to the North, Vietnam to the East and South Thailand to the West and North. The population of Cambodia is 11 million, with annual growth rate 2.6%. Cambodia is an agricultural Country and about 85% of population are farmers and living in the rural area. Actual GDP Growth rate of 4-6%. Cambodia covering the area of 181.035km<sup>2</sup>, divided in three cities and 22 provinces, Phnom Penh is Capital city of Cambodia.

The Ministry of Industry, Mines and Energy(MIME) Through General Directorate du Cambodia are responsible for 1) Strategy,2) Planing, 3) Resource, 4) Monitoring and 5) Supplying electricity in whole country. The Power System in all Provincial City and Capital City of Phnom Penh were destroyed nearly Cambodia is now facing a shortage of spare part (old Machines) and other plenty of problem which is delaying the restoration and rehabilitation of the country.

### Energy Resources

#### 1. Hydroelectricity Sector

The Assessment of Water Resources for Hydropower Development in the Kingdom of Cambodia indicates that Cambodia has an abundant hydropower potential with total estimated installed Capacity of about 10,000 MW, of which 50% in the Mekong mainstream, 40% in its tributaries and remaining 10% is in the south-western coastal area outside the Mekong River Basin.

In addition to the Mekong River some 25 major tributaries and hundred of small river are flowing through the country. About 50 possible sites of small to large hydropower projects in whole country.

The classification of hydropower projects in regard to their size, has generally been referred to a large medium and small hydropower plant. Since there are no definite international values as to what they really refer to , and for the sake of proper understanding in this proposal the following are designated (by Hydro Electricity Department of MIME) by the rated installed capacities of hydropower plants as shown in Table1.

The hydropower assessment has shown it would be for Cambodia to meet all its electricity requirements for several decades from water. Indeed export of hydropower to neighboring countries is an option to consider for future policy.

Since one of the point of the Energy Policy relates to sustainable electricity supply, the Royal Government would like to conduct per-feasibility and feasibility studies of some of the projects.

There are several hydropower sites which have been investigated in the past. KiriromI (10MW) in Kampong Speu Province was completed in 1968. Due to the civil war in 1970 this hydropower station was destroyed and not operating but currently , the Royal Government of Cambodia has provided to the private company from China (CETIC) to invest on BOT (Build, Operate, Transfer) basis for rehabilitation of this hydropower station. Nowadays the rehabilitation is expected at the end of 2002. A Mini-hydropower station OchumII with the installed capacity of 1MW in Rattanakiri province was commissioned in 1993 and to date in operation.

## 2. Electricity Sector

At present according to the Survey's result by the GDE in 1999:

- About 5% of the rural population use electricity from the national grid supply, mostly from diesel power station which depending on imported oil and are in poor operating condition with limited duration about 4 to 6 hour per day (in the evening).
- About 10% of them use the car batteries to supply the light , TV, and radio.
- About 3% of these population use their own small diesel generators with the output from 500W to 5,000W.
- More than 80% use kerosene lanterns to provide the evening lights.

Hence more than 80% of the rural population of Cambodia do not have any form electricity supply available of them.

Same idea of the magnitude of the task can seen by looking at selected indicator:

### 2.1 Electricity Supply

Electricity generation in Cambodia is in 22 small isolated systems, which serve Phnom Penh and capital towns of the provinces. The largest system is in the Phnom Penh, which has a population of around 1 million and 100,000 customers. The system in the Phnom Penh has a peak demand of 65MW and power generation capacity of 85 MW, out of the which 35 MW is provided by an IPP1 and 15 MW by an IPP2. The total installed capacity for provincial cities 37 MW with size range from 300kW to 5 MW. All of the existing generating facilities in the country is oil-based diesel generation depending on imported oil and large losses and low efficiency in distribution, the unit cost of electricity is the highest in the region and varies from 9-35 cents US\$ per kWh.

### 2.2 Transmission Facilities

Power facilities are installed for operating only in the Phnom Penh and the capital of provinces. All of these facilities are completely isolated without any transmission lines interconnected arrange them. There are three kinds of the medium distribution line 6.3 kV 15kV and 22 kV, in the network. In the current power system development plan, EDC decided to unify successively there medium voltage 22 kV in order to increase power distribution capability of the lines ,to decrease power losses and form more efficient system operation.

### 2.3 Electricity Demand

Cambodia's future electricity demand (forecast done by EDC in 1998) is projected at 150MW in 2000,477MW in 2010 and 746MW in 2016, due to the improving situation this increase in demand can not be satisfied by the existing power station. This is considered critical as continued shortage in the electricity supply will seriously restrain the ongoing reconstruction and socioeconomic development of the country. The need for Cambodia will be to meet future electricity demand and to reduce her dependence upon imported fuel and to exchange of electricity with neighboring countries.

### 3. Other Energy Resources

Important about other Cambodia energy resources such as : coal, oil and gas, geothermal with and solar is limited. Discovery of commercial gas or oil fields make a great impact on the imports of fuel for power station. There is considerable interest in off shore oil prospecting especially as five holed drilled in the three license areas have hydrocarbon indications. Little is known about wind and solar energy resources. Based on the experiences in other countries and considering the priorities the Royal Government considers that it is not appropriate at this stage of Cambodia's development to be devoting significant resources to investigation of these resources.

### Future Development of the Energy Sector

The important issues that need to be considered for the development of the energy sector in the Cambodia are as follows:

1. Feasibility Study of other large scale hydropower project such as : KiriromIV, III.
2. Feasibility Study of Kamchay hydropower project granted by Canadian Government.
3. Feasibility Study of Stung Battambang I, II, Stung Atay, Stung Russey Chrum hydropower projects.
4. Feasibility Study of gas turbine combine cycle generation in Sihanouk ville ,Japanese grant funding.
5. Feasibility Study on the transmission link to Sihanouk Ville and link to Vietnam will commence with Japanese PHRD Grant and World Bank (WB)

### Technical Assistance.

6. Private sector investment in the energy sector to be the most efficient way of providing new generation capacity.
7. Power trade agreement for supplying electricity to the border areas nearly Vietnam and Thailand.

8. The Construction of micro-hydropower plant in Mondul Kiri province which completed Design Study in year 1999.

#### Conclusion

It is clear that the development of hydropower project is one of the key factors to help Cambodia to reduce her dependence upon imported fuel and to meet her electricity demand in the future with affordable cost electricity supply.