

(as of 26 June 2005)

## **Summary**

### **Rationale**

The importance of reliable energy supply cannot be overemphasized. Energy fuels industrialization, and the development of small and medium enterprises (SMEs) and is thus crucial to sustaining poverty reduction efforts in the GMS. The subregion holds immense potentials for development and private sector investment in the power sector. In 2005, annual per capita power consumption in less developed areas such as Cambodia, Lao PDR and Myanmar do not exceed 300 kWh, far below Thailand's at close to 1,900 kWh.

Major benefits to member countries can be gained by cooperating in the development and complementary use of the subregion's energy resources, especially given their uneven distribution. Regional cooperation, through transmission interconnection and regional power trade, will help efficiently utilize the subregion's energy potential by helping reduce investments in power reserves to meet peak demand, reduce operational costs, achieve more reliable supply, and reduce system losses. Environment benefits are achieved by substituting hydropower for coal and other fossil fuels that generate greenhouse gases. Even countries with energy surplus can benefit by servicing their deficit areas more efficiently with power imports from other grids - such as for Lao PDR's northern provinces, which could be supplied by the line transmitting PRC's power exports to Thailand.

### **Flagship Objectives**

The goal of cooperation in energy is to promote a commercially-based energy system that reliably and competitively supplies electricity to all areas of the subregion in a manner that minimizes environmental and social costs.

To realize this goal, the flagship project on Regional Power Interconnection and Power Trade Arrangements promotes transmission grid interconnection and power development through a two-pronged approach: (i) to develop policies and institutions for cross-border power dispatch and trade; and (ii) to install grid interconnection infrastructure using a building-block approach.

Additional objectives include enhancing power generation from subregional sources, rural electrification –especially of isolated towns and villages of the subregion–, pricing energy on commercial but more equitable basis, and mitigating the social and environmental costs of power projects.

### **Key Components**

The program consists of the following major components:

- a. Group 1. Financing the construction of transmission lines and associated stations to interconnect various national power systems, which would comprise the subregional grid. First phase investments will be put into the eastern side of the Greater Mekong, to link Lao PDR, Thailand, and Viet Nam along the East-West Corridor route;

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## REGIONAL POWER INTERCONNECTION AND POWER TRADE ARRANGEMENTS

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- b. Group 2. Mobilizing private sector investments in power through an improved policy and regulatory climate;
- c. Group 3. Implementing a power market trading system consistent with encouraging power sector investments, including structuring power tariffs on a commercial basis; and
- d. Group 4. Developing a corps of technical personnel (human resource development) for integrated power sector operations.

Group 1 projects for transmission lines and associated investments, such as switching stations, are the most significant in terms of number of projects and size of financing. This reflects the focus of the program to complete the subregional grid and allow power trade to take place.

One of Group 1's largest components is the ASEAN Mekong Basin Development Cooperation (AMBDC) 500-kilovolt (kV) backbone system. ASEAN will be more active in GMS power market development through its ongoing ASEAN Interconnection Master Plan Study. The study will take into account the findings of the ADB-funded GMS Regional Indicative Master Plan on Power Interconnection in the GMS, completed in 2002, which identified cross-border connections needed on the basis of demand forecasts and systems planning scenarios. (Note that the AMBDC project will have common elements with the interconnection lines identified in the GMS Master Plan study, hence the possibility of double counting costs.)

Group 2 initiatives attest to the importance given to mobilizing private sector interest in developing and managing the subregion's energy potentials. This group consists of projects that provide institutional and policy support for raising private sector investments in power, opening opportunities for them to be active participants in developing the subregional grid. The latter includes power lines which will be open for cofinancing with independent power producers (IPPs) through build-and-operate schemes for power generation and transmission. The largest component is the Jinghong power project.

Group 3 initiatives, promoting power market and power trade development, is the next most important group under this flagship program. Large components include power sector development loans by ADB to Lao PDR and Viet Nam, designed to facilitate power trade in these countries through improved transmission system structures.

Much progress has also been achieved in power trade through technical assistance under the GMS Program. The policy statement on regional power trade in the GMS, which contains GMS members' commitment to promote power trade, was formulated with ADB assistance and endorsed during the 9<sup>th</sup> GMS Ministerial Meeting in Manila in January 2000. This was followed by the *Inter-Governmental Agreement on Regional Power Trade* (IGA), signed by the GMS members in November 2002, which committed them to harmonize development of their power systems with interconnection in mind. The Regional Power Trade Coordination Committee (RPTCC) was formed in 2004, to coordinate implementation of regional power trade. The RPTCC is overseeing the formulation of the Regional Power Trade Operating Agreement (RPTOA), which will provide operational guidelines for power trade.

While only one project is listed in Group 4, other projects support the training and development of personnel in the power sector. These include the power sector development projects for Lao PDR and GMS, which all carry strong capacity-building elements.

### **Sequencing Priorities: The GMS Master Plan Study**

The GMS Master Plan study has identified priority interconnections from promising hydropower projects in Lao PDR, Yunnan Province, China and Myanmar for export to Thailand and Viet Nam. The economic viability of each transmission line depends on power generation costs as well as power demand and transmission developments in each country.

Extended cooperation is the most economically viable power interconnection option for the GMS countries. There are existing memoranda of understanding (MOUs) for which commercial agreements have been, or will be established between power-importing and power-exporting countries.

As power cooperation has been in practice in the Greater Mekong for several years now, a number of interconnections already exist between Lao PDR and Thailand. Subsequently, power planning has revealed priority needs in the following areas:

- a. Interconnection for bulk power supply to Cambodia, one from Southern Viet Nam (Phnom Penh Chau Doc 230-kV line) and one from Thailand to Western Cambodia, both in 2004;
- b. Meshed 500-kV grid for Thailand, Lao PDR, and Viet Nam, needed to reinforce the north-eastern Thai grid, from 2006-2007. This includes 500-kV double circuit lines Tha Tako- Chaiphaphum, Chaiphaphum- Udon Thani, and Chaiphaphum- Roi Et. Other lines such as the Roi Et-Savannakhet would be needed from 2008 to 2010;
- c. Grid connection from Nam Mo in Laos to Viet Nam in 2008;
- d. 230-kV interconnection at Vientiane in 2009, linking Nam Ngum 2 with Udon Thani;
- e. Grid connections linking Thailand with hydropower projects in Myanmar (Tasang hpp), and Yunnan (Jinghong hpp) from 2012; and
- f. Grid connection between Yunnan and Viet Nam (Malutang hpp), to take place from 2012 to 2019.

### **Project Financing**

Funding for these interconnections will come from internal corporate funds and/or borrowings from multilateral development banks, commercial banks, or from export credit. Lines may be financed as part of generation component which will rely on private investment. Reforms in decentralization could lead to the private sector taking on power supply functions, such as power generation and trade. However, transmission networks are natural monopolies which should be nationally-coordinated and planned, even with the move towards competitive pricing of transmission services.

### **Risks**

The power flagship program is expected to result in more rational supply and use of electricity on a subregional basis. However, successful transmission grid interconnection and power trade could only take place if GMS countries individually undertake crucial power sector reforms, such as enhancing private sector participation and harmonizing their technical standards with those of their neighbors.

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Also, a number of hydropower generation projects identified in the GMS Master Plan have unresolved social (for example, resettlement) and environmental issues. Successful implementation of these projects depends on the conduct of extensive social and environmental impact analysis, which should provide the basis for fair and realistic impact mitigation programs, where necessary.

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