1. **Key development issues and rationale for Bank involvement**

The GMS region, comprising of Cambodia, Lao PDR, Myanmar, Thailand, Vietnam, and Yunnan province of China, spread over 2.3 million square kilometers, houses a population of about 260 million. While growing rapidly, the region exhibits acute disparity among the countries in terms of economic and human development. Despite large endowment of energy resources, the region’s per capita consumption of electricity is low ranging from about only 63 kWh per annum in Cambodia to about 1,900 kWh per annum in Thailand. The six GMS member countries are largely characterized by national electricity demands that do not match with national electricity producing resources. The economic rationale for this “electricity integration” lies in the striking diversity in - electrification ratios, electricity demand and demand growth, electricity tariffs, generation mix, the current state of development of power infrastructure and above all in the endowment of electricity generation resources vis-à-vis electricity demand - in the six countries. High electricity demand growth in the region over the next fifteen years would require capacity addition of almost 100 GW – more than twice its present capacity – and matching investments in transmission and distribution systems. Over the next decade, financing needs in the electricity sectors of Thailand and Vietnam alone are estimated to be about US$3 billion / annum, and US$2 billion / annum respectively.

Momentum for regional economic integration and, in particular, integration of electricity systems among the countries in the GMS region has been growing steadily. The ADB, WB, and other development partners are actively engaged in fostering a coordinated approach towards
development of the GMS countries’ resources, and their activities currently touch upon the following sectors - agriculture, environment, human resource development, investment, energy (electricity), telecommunications, tourism, trade and transport. The WB’s strategy is now articulated in the April 2006 “Strategy Note on Economic Cooperation across the Mekong Sub-Region”. The Bank supports the development of frameworks for joint action; their implementation through AAA, TA, capacity building, dialogue, and investment; and helps ensure that what is being proposed and implemented at the regional level complements and reinforces country level activities and programs. The Bank’s GMS regional assistance strategy focuses on two main areas – (i) continued support to the development of power trade, and (ii) enhancing collaboration on Mekong water resource management. The Bank is also ready to provide assistance in other areas, upon discussion with the GMS governments and the ADB. Two areas where work has already been identified and is in the initial stages are support to trade and transport facilitation and analytical work on labor migration in the GMS region.

Country commitment and ownership of relevant policies and strategies for developing a regional power trade market is strong. The member countries first established the GMS Power Forum in 1992. Support from the ADB and the Bank culminated in the Intergovernmental Agreement on Regional Power Trade (IGA) signed by all countries in November 2002. Key objectives of the IGA are: (i) cost minimization in planning and operation of power provision; (ii) full cost recovery and equitable sharing of benefits of investments; (iii) provision of reliable and economic electricity to all parties. There is also concerted endorsement of private sector participation in sector development in all six countries.

Analytical work to demonstrate the benefits of strengthening regional transmission interconnections, and options for market design were prepared with donor assistance. A Regional Power Trade Coordination Committee (RPTCC) was established as the high level body responsible for actively coordinating and guiding the market’s development. Since its establishment, five RPTCC meetings have been held in China (2004), Thailand, Laos, Myanmar (2005), and Cambodia (2006). RPTCC has so far reviewed the GMS energy cooperation activities; began implementing the RPTCC Work-plan; and most recently, agreed to conduct a study on an integrated regional master plan for power development in the GMS. Technical working groups have been established recently to assist in implementation. At present, detailed design of future market, action plans for implementation, and alignment of regional and national investment priorities are in the process of being discussed among the participants and analytical work is in progress.

The Bank has the unique experience of helping develop power markets in other regions (South East Europe and sub-Saharan Africa), and is, therefore, well positioned in bringing that experience to the GMS. The Bank has been an active participant in all five RPTCC meetings, and working closely with ADB, has helped shape the RPTCC’s agenda and work-plan for implementing the IGA. With support from PHRD, the Bank has contributed to analytical work such as developing a power import-export strategy for Lao PDR, and an Energy Sector Strategy Study and a power development plan for Cambodia; developing principles for ownership and benefit-sharing of cross-border investment projects; good practice guidelines for bilateral power trade; defining the scope of work for an integrated regional power master plan which will inculcate a “regional integrated planning culture” in the development of national power plans; and is going to finance a feasibility study for EHV interconnections between South China and Vietnam. The Bank presented a workshop on international experiences in the August 2006 RPTCC meeting, which was greatly appreciated by the participants.
A draft strategy note outlining the Bank’s strategy for its support for the GMS regional electricity market has been recently prepared. The following key principles govern Bank strategy:

- Overcoming obstacles facing the development of an economically, technically, institutionally, environmentally and socially sustainable regional electricity market;
- Fostering a regional integrated planning culture based on consensus, that ensures (i) optimal development of the region’s resources; and (ii) consistency of bilateral national transactions with ultimate market goals;
- Ensuring the application of sound principles in the development of the market infrastructure, its institutions and its operating rules and regulations; and
- Supporting, in the early years, initiatives and investments in bilateral trade through: (i) large power transfers between countries (such as China-Thailand, China-Vietnam, Laos-Thailand, Laos-Vietnam); and (ii) more modest power transfers between the contiguous borders (such as Laos-Cambodia, Vietnam-Cambodia) which would bring in tremendous benefits of economical electricity in the recipient border areas.

The Bank’s strategy is comprised of a two-pronged approach, combining institutional/policy support and investment support to help achieve the above objectives. Investment support would assist with the construction of cross border connections and the preparation of investments in physical infrastructure generation and transmission, while the institutional component would aim at strengthening the institutional capacity at the regional and individual country levels to facilitate power transactions reflecting market principles of power trading.

2. Proposed objective(s)

The ultimate development objective of the GMS regional power trade program is to lead to the realization of an integrated GMS Power Grid and increase economic trade among the participants. The attainment of this objective and removal of barriers is expected to take several years. These barriers are being and would continue to be addressed through concerted and sustained efforts, over the next several years, on the part of IDA, ADB and other development partners, and the GMS countries themselves through the RPTCC. A regional APL for supporting the regional power trade would be developed within the next two years on: (i) successful completion and adoption of the Regional Power Master Plan followed by consensus on its implementation; and (ii) agreement among the GMS countries on the “road map” for a phased implementation of the long-term program.

Nested within the aforementioned long-term GMS framework, two proposed Projects- GMS Power Trade (Cambodia) and GMS Power Trade (Lao PDR) being prepared simultaneously-have the following three immediate development objectives: (i) to bring affordable grid-based electricity to Cambodia’s provinces of Kampong Cham and Stung Treng, through import of power from Lao PDR and Vietnam; (ii) to supply affordable grid based electricity to the province of Saravan in Lao PDR in the near term while establishing a portion of a transmission link that would in the medium-term help interconnect Cambodia and Thailand through southern Lao PDR to increase power trade among them; and (iii) to help establish load dispatching facilities and capabilities in Lao PDR, that would enable it to optimize its system operation and facilitate its participation in regional trade.
In a broader sense, the proposed project would also contribute towards promoting regional power trade through demonstrating the establishment of mechanisms for common design, financing, and construction of cross-border links and commercial agreement underpinning such transactions.

3. Preliminary description

GMS-Power Trade (Lao PDR) Project:

This Project has the following key components:

(a) **Component L-1: 115 kV Transmission System: Ban Hat Substation to Lao PDR-Border:** This Component would finance investments in Lao PDR to complete the 115 kV Transmission System for supply of surplus hydro power from the South of Lao PDR (see footnote 8) to the Province of Stung Treng in Cambodia. It would involve construction of: (i) a 115 kV double-circuit (240 sq mm ACSR conductor and Optical Fiber Earth Wire), 25 km-long, predominantly lattice tower-mounted transmission line, having a firm capacity of about 90 MVA, from Ban Hat Substation to the Lao PDR border (at Veun Kham); and (ii) two 115 kV switching bays at Ban Hat Substation. This Component is supported by detailed technical, economic, environmental and social impact studies carried out by Consultants under PHRD Grant (PHRD Grant Number: TF054626).

(b) **Component L-2: 115 kV Transmission System: Xeset Substation to Saravan:** This Component constitutes a link in the 115 kV Transmission System that would around 2010 or thereabouts interconnect Thailand, Laos and Cambodia in southern Lao PDR, through connecting Xekong Substation, **Saravan Substation, Xeset Substation** and Ban Jianxi Substation. While implementation of this link strictly from the view point of completing the aforementioned transmission system could be deferred by about two years, its early implementation under the proposed Project is justified on its own merits, as it would enable supply of rapidly growing demand (and thereby economic development of the rural areas) of the province of Saravan, through least cost power supply at 115 kV. It would involve construction of: (i) a 115 kV double-circuit (240 sq mm ACSR conductor and Optical Fiber Earth Wire), 25 km-long, lattice steel tower mounted line of about 90 MVA firm capacity; (ii) a 115/22 kV, 2x20MVA Substation at Saravan, inclusive of 22 kV switching bays; and (iii) two 115 kV switching bays at the existing Xeset Substation. This Component is supported by detailed technical, economic, environmental and social impact studies carried out by Consultants under the aforementioned PHRD Grant TF054626.

(c) **Component L-3: Activities to Facilitate Implementation of L-1 and L-2:**

This component would provide consulting services and support for project design and management for facilitating implementation of components L-1 and L-2.

(d) **Component L-4: Load Dispatch Center (including Consulting Services):** Currently Lao PDR does not have a Load Dispatch Center (LDC) for load dispatching, and dispatch of its hydropower generations is rather primitive, mainly through phone calls and manual operations. Its IPP hydropower plants, equipped with SCADA systems, are dispatched by
EGAT\(^1\). Over the next few years, EdL would be interconnecting its four independent area power grids, developing IPP (export as also domestic) hydropower projects and significant HV/EHV interconnections with neighboring countries of Thailand, Vietnam, South China and Cambodia. In fact Lao PDR, with its vast hydropower potential, would be a “generation” hub for the GMS. Under these circumstances, it is imperative that Lao PDR implements as quickly as possible a modern Load Dispatch System, comprising both National and Regional Load Dispatch Centers. This has been confirmed by a pre-feasibility study for Load Dispatch Centers recently accomplished by Consultants under PHRD Grant TF054626. While LDCs (both "soft" and "hard") will improve the quality of domestic supply, it is, from a regional perspective, essential for bringing: (i) voltage and frequency control; (ii) system protection; and (iii) technical information exchange for dispatching in Lao PDR up to the minimum standards required for security of the grids in neighboring countries that are connected, or will be connected to EdL’s grid. By doing so, both the security of a future integrated GMS power grid and EdL’s participation in regional power trade would be enhanced.

This Component provides for: (i) Consulting Study for detailed feasibility and design of the Load Dispatch System and subsequently, (ii) based on priorities identified and co-financing available, staged construction of the LDC as appropriate, including the associated buildings (likely to be existing ones), and SCADA systems and communication facilities\(^2\).

(e) **Component L-5: Feasibility Study: Houay Lamphan Gnai Hydropower Project**

This is a priority project (65 MW, 300 GWh p.a.) of GoL, forming part of a group of hydropower projects in Southern Lao PDR, which are proposed to be developed and interconnected for export and domestic use. Consultants financed through PHRD Grant TF054626 have prepared a pre-feasibility study of the project and have short-listed two options with parameters of: (i) generation cost of about 3.0 USc/kWh and resettlement of about 960 persons; and (ii) generation cost of about 3.4 USc/kWh and no resettlement. This Project Component would advance the preparation of the hydropower project to feasibility stage. The outcome of the study would underpin future project financing and implementation.

(f) **Component: L-6; TA for Collector Substation System**

Lao PDR has a large number of potential hydropower projects that could be developed for export to Thailand and Vietnam. In the past it has been the practice for IPP developers (for the Thai Power Market) to construct individual hydropower projects (Nam Theun 2, Theun Hinbun, Houay Ho) and use dedicated transmission lines from the project to the receiving substations in Thailand. With more extensive development of hydropower projects, foreseen in the coming years, a need is felt for clustering hydropower stations into suitable groups and collecting their outputs at substations located in Lao PDR, for eventual transmission to other countries. This type of arrangement, it is believed, would provide technical and economical benefits per se, and also facilitate the application of broader economic principles of developing a GMS Grid and a GMS Power Market. Such an arrangement would, however, need careful consideration of commercial/ownership, financing, pricing, etc. issues. This Project Component would provide TA of about twenty staff-months for this purpose.

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1 In addition, the power grids of EdL are also interconnected with EGAT grids at several points that facilitate exchange of power both ways.

2 Depending on the estimated cost, further funding may be required.
(h) **Component: L-7: TA for Updating Tariff Study:** The current Tariff Study for EdL is over three years old. Under a rapidly changing investment scenario, where EdL is being increasingly mandated by the Government to undertake investments in hydropower projects, the tariff study needs to be updated taking into account, especially, the impact of export/import tariffs on EdL’s performance. The TA would help EdL in developing suitable financial models for undertaking such studies on its own in future.

4. **Safeguard policies that might apply**

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5. **Tentative financing**

Source: Lao PDR  
BORROWER/RECIPIENT (US$ million)  
INTERNATIONAL DEVELOPMENT ASSOCIATION  
Total  

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6. **Contact points**

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*By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas*