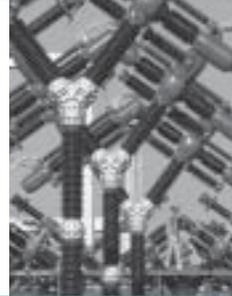


Greater Mekong Sub-region Options for the Structure of the GMS Power Trade Market

A First Overview of Issues and Possible Options



Energy Sector Management Assistance Program

Energy Sector Management Assistance Program (ESMAP)

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Greater Mekong Sub-region Options for the Structure of the *GMS* Power Trade Market

A First Overview of Issues and Possible Options

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Acronyms and Abbreviations

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
BOTs	Build Own Transfers
EASEG	Energy Mining Sector Unit
EGAT	Energy Generating Authority of Thailand
EGP	Experts Group on Power Trade and Interconnection
EPF	Electric Power Forum
ESMAP	Energy Sector Management Assistance Program
EVN	Electricity of Vietnam
GMS	Greater Mekong Sub-region
IGA	Intergovernmental Agreement for Power Trade
IPP	Independent Power Producers
RC	Regional Coordinator
RPTCC	Regional Power Trade Coordinating Committee
RR	Regional Regulator
PPAs	Power Purchase Agreements
PTOA	Power Trade Operating Agreement
TA	Technical Assistance

Executive Summary

Objective and Background

This report is part of a dynamic process aimed at developing power trade in the Greater Mekong Sub-region (GMS), the objective of which will be to provide reliable and economic electric service to consumers, consistent with sustainable use of natural resources.

The overall objective of this report is to delineate options for a guiding vision, overall strategy and associated institutional structure for a future power market in the GMS region, as requested by the GMS Experts Group on Power Trade and Interconnection (EGP) in Hanoi during its December 2001 meeting.

The report's initial findings and recommendations were based on information provided by stakeholders in the GMS power sector (utility executives, power and planning policy officials as well as developers) during confidential interviews conducted in October 2002. The revision of this report incorporates the comments and consensus of the GMS EGP and Electric Power Forum (EPF) received by the World Bank team prior to, and during, the 10th meeting of the GMS Electric Power Forum on November 19, 2003, in Guangzhou (PRC). The delegates were in agreement with the general strategy and vision presented in the October 2002 version of the draft and the changes in this version are not substantive but intended to add clarity, as requested by the delegation during the Guangzhou meeting.

This report is a key transition activity in the phased development of GMS power trade. The first phase focused on confirming the bases for trade, identifying concerns accompanied by knowledge-sharing workshops and putting the policy-level framework in place. The GMS Intergovernmental Agreement for Power Trade (IGA) was signed by all six GMS countries in November 2002, and come into force in November 2003, with the ratification of the IGA by three of the six Mekong countries. Ratification by the remaining three is expected in the first half of 2004.

The IGA is the key policy-level agreement guiding power trade; it establishes an institutional framework for power trade and authorizes implementation activities to move forward.

The ratification and entry into force of the IGA requires that the GMS establish the GMS Regional Power Trade Coordinating Committee (RPTCC) to manage the development of regional power trade. The GMS plans to convene the inception meeting of the RPTCC in February/March 2004. The vision and strategy presented in this report will underpin the drafting of operational agreements and further Technical Assistance (TA) work to develop institutional and regulatory mechanisms tailored to realizing the GMS vision and strategy for development of power trade. The GMS delegates were in agreement with this report's findings and recommended activities presented in this report, which will be the basis of the RPTCC's agreement on a work plan during their inception meeting. It was only after all these measures and consensus was reached, that the team was able to move forward with the final review by ESMAP, and its production and printing in the last quarter of 2006.

There is a great deal that could be done immediately in order to facilitate the creation of the GMS regional market and, indeed, to facilitate cross-border trading before the market has been formally designed and implemented. The activities identified in this report could be carried out directly by the RPTCC using a number of working groups. Another option is for the RPTCC to structure its working groups to create the "embryo" institutions which the regional market will need, i.e., the Regional Coordinator (RC) and the Regional Regulator (RR). Working groups reflecting the chosen structure of the RC and the RR could be appointed, reporting to the RPTCC (as project manager and ultimate decision-maker).

The development of trade depends on expanding physical infrastructure: generation and transmission. The need for foreign investment in the GMS is critical.

Next steps, as recommended at the conclusion of this report, include:

- Performance of a more detailed study of the regulatory and institutional framework for the market as indicated in Section 4 of this report;
- Development of *pro forma* provisions for Power Purchase Agreements (PPAs). Since most GMS countries are actively pursuing private investment, the most immediate need and priority is to develop "*pro forma*" formulations for the relevant provisions of associated PPAs, such as provisions for renegotiation, termination, succession, access to lines, as well as for some common risks: currency denomination exchange rate, interest rate;
- Creation of a GMS power trade website, both as a vehicle for ongoing cooperation, information exchange and learning (between meetings) for GMS utilities and as a window for the public and potential investors/developers;

- Facilitate the development of technical guidelines for design, communication and operations and maintenance by GMS utilities;
- Develop an inventory of existing or planned lines which could be used to begin small-scale trade within the next two years;
- Develop a list of priority projects in advanced stages of preparation for presentation to donors; and
- Convene or organize a business forum to promote investment in generation and transmission in the region.

Section 4 of the report, and the remainder of this report, provide additional background and a more complete discussion of these activities and other issues which were developed during the course of the study.

1. Introduction

Study Background

The World Bank, working together with the Asian Development Bank (ADB), actively supports the development of a regional power market in the GMS: Cambodia, Lao PDR, Myanmar, Thailand, Vietnam and the Yunnan Province of People's Republic of China. In 1995, with the support of the ADB, the Mekong countries formed the EPF to begin assessing the environment for power trade in the region. In 2000, the GMS ministers' conference endorsed the "Policy Statement on Regional Power Trade in Greater Mekong Sub-Region", which provided the basis for moving forward. Representatives of the governments of all six GMS countries signed the IGA on November 3, 2002. The IGA came into force in November 2003, when three of the six Mekong countries provided instruments of ratification or acceptance.

The World Bank Group (the East Asia Region and the Energy Sector Management Assistance Program – ESMAP) joined the GMS/ADB effort in 1996, during the second EPF meeting which took place in Kunming (Yunnan PRC). The World Bank's first task was to prepare an overall regional power trade strategy for the region which was used to define a five-year technical assistance program with ADB. That work plan (FY1990-FY2003) was successfully implemented, based on close collaboration with the GMS and the ADB to support a complementary work plan. The World Bank supported institutional and harmonization work and the EGP. ADB supported the EPF and the indicative master plan in power interconnection in GMS countries, which identified the physical infrastructure and system requirements. In this context, the World Bank organized three workshops in the region and supported the drafting of the IGA in the GMS. The IGA is the key policy-level agreement guiding power trade; it establishes an institutional framework for power trade (RPTCC) and authorizes implementation activities to move forward.

The IGA was first endorsed for signature in December 2001 (Hanoi). At that meeting, GMS power trade officials agreed on the need to establish the institutional and physical infrastructure to implement trade. At that time, the EGP presented their work plan to implement the IGA and requested World Bank and ADB support for different parts of that program. The EGP requested support from the World Bank for the following activities: a) an overall study to guide the choice of market structure – the “Market Options Study”; b) a more detailed study on regulatory and institutional framework, with a high degree of interest in transmission issues and Independent Power Producers-Power Purchase Agreement (IPP/PPA-related issues); and c) the development of a coordination center, as well as continued support of the working level. The EGP requested ADB to support the drafting of the Power Trade Operating Agreement (PTOA): that TA began in September 2003. The EGP also requested both the World Bank and ADB to consider funding of projects’ preparation and support project implementation.

The EPF identified this market options study as the first activity to go forward, as it will serve as the foundation for other activities, in particular, drafting the operating agreement for power trade in the GMS. Accordingly, the EGP agreed in December 2001, at their sixth meeting (Hanoi), to request that the World Bank support a study entitled “Options for the Structure of the GMS Regional Power Market”, including associated institutional and regulatory framework issues.

Objective

The study is part of a dynamic process aimed at developing power trade in the GMS region, the objective of which will be to provide reliable and economic electric service to consumers, consistent with sustainable use of natural resources.

The overall objective of this report is to delineate options for structuring a future power market in the GMS region, as requested by the GMS-EGP in Hanoi, during its December 2001 meeting. As part of this exercise, the EGP requested that the report discuss an evolutionary approach to increased trading and eventual market which can progress with the ongoing structural reforms in each country and which can address the need for expanding the physical infrastructure with which to trade.

Methodology

The findings and recommendations in this report are based on analysis and synthesis of GMS views on future power trade. Four members of the World Bank team attended the

GMS-EGP meeting in Yangon on October 10-11, 2002¹, where the consultants introduced the study to the EGP. The team then formed two groups of two, each of which visited three GMS countries immediately following the Yangon meeting (Team 1: Cambodia, Myanmar and Thailand, Team 2: Yunnan Province and Beijing PRC, Lao PDR, and Vietnam). There was a general consensus at the meeting that to realize the benefits of power trade in the GMS will require development of generation and transmission as well as development of the market structure, national institutional and regulatory frameworks and an operating agreement. The missions' goal was to identify in greater detail than possible in a group meeting setting, the objectives and concerns of the individual countries regarding regional power trade in order to identify actions to support specific projects and to continue the work towards implementation of a regional market. This approach was selected to provide more ownership to the regional members in reflecting their own views. It also aided the mission in gaining a better understanding of the issues and compatibilities among the member countries.

A questionnaire was used to guide discussions and ensure consistency. Copies of the questionnaire were sent in advance to the EGP coordinators (see Annex 1). The confidential interviews focused on three general areas: a) general investment environment in the power sector; b) specific projects; and c) interest in developing uniform procedures and coordination processes.

The teams conducted interviews with government officials in all six Mekong countries (including in ministries with responsibility for planning and investment, as well as those for electric power and power policy) and top power utility representatives – as well as with private developers in some countries.

All responses were combined based on subject-matter category and analyzed for similarities and differences. A draft report based on the missions' findings was sent to GMS on October 31, 2002.

In May 2003, the World Bank (ESMAP and the Energy Mining Sector Unit - EASEG) reaffirmed their interest in supporting GMS power trade and the October 2002 report was reviewed within the World Bank and slightly revised. The revised version was sent to all GMS-EGP delegates for comment in August 2003. The consultants also received GMS comments during the GMS EPF/EGP meeting in November 2003.

¹ The October 2002 mission was composed of Jean-Pierre Charpentier Team Leader (ESMAP) and three consultants James Barker (Barker, Dunn and Rossi, Inc.), Diane Minogue (power market consultant, World Bank) and Fiona Woolf (Cameron McKenna, LLP). The November 2003 mission was composed of Christian Delvoie (EASIN), Junhui Wu and Barry Trembath (EASEG) and James Barker (BDR) and Diane Minogue (Consultant, World Bank).

This report is based on a synthesis of all interviews and comments and reflects the large degree of consensus within the GMS regarding vision and strategy for a phased development of a power trade market in the region. The recommended activities are designed to support the development of this market, based on an initial, intermediate structure/arrangement to facilitate the later development of a final “market structure”.

Sustaining Momentum

The interviewees in each country expressed a consistent view of the broad benefits brought to the region with the introduction of the GMS regional market. Obviously, the benefits that each country hoped to achieve were different initially but they tended to converge over the longer term. The key benefits were the ability to attract investment (an additional, larger market should encourage investors to take more market risk) in generation, transmission and even distribution. Some countries have an objective of exporting electricity to earn foreign currency. This would enable them to invest and to import electricity. Other countries were keen to achieve access to lower priced imports. Another, less obvious, benefit was the ability to achieve electrification by the construction of distribution facilities connected to cross-border interconnectors or generating plant. (It is not necessary that all imports or exports need to be at high voltage.) Over time, the GMS countries hope to share reserves and rely on each other for the provision of back-up generating capacity to maintain system reliability at a lower cost as compared to providing such reserves independent of their neighbors. The benefits of optimization of different times of peak demand are already understood amongst GMS countries.

A further benefit, which emerged in the course of the interviews, was the ability of the GMS countries to learn from each other and to adopt best regional practices as they reform and expand their own electricity industries. Working together to develop and implement the GMS regional market will facilitate the adoption of harmonized technical standards, operating procedures and best practices as well as build confidence and trust between GMS member countries. Such standards, procedures, and practices have the potential for application well in advance of establishment of a regional network. Generally, harmonization in design and commercial arrangements will facilitate integration of the member countries’ systems into a regional network.

The responses to questions on the general investment environment indicated that there were a variety of significant legal, regulatory and commercial risks which investors in the GMS regional market would still face. Whilst all countries accepted the need for an effective mechanism for the enforcement of contracts in the regional market and for disputes to be resolved expeditiously, there was relatively little experience of the enforcement of international

arbitration awards and not all countries are signatories to the United Nations Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York, June 10, 1958; Registered June 7, 1959, Document 4739). The question of import taxes could be problematic and act as a barrier to regional trade. However, these could be addressed under ongoing trade and transit harmonization efforts under way in the GMS.

Although new regulatory regimes are in the course of development and implementation in some countries, which should mitigate the concerns of investors, clearly regulatory risk will continue to be an issue. However, all countries recognized the need for regional regulation of some aspects of the market, particularly in order to deal with access to interconnectors and transmission systems as well as to oversee the operation of the regional market. All parties are concerned about defining the division of authority between member country regulation and regional regulation.

The interviewees were relatively satisfied with the Norconsult regional indicative master plan on power interconnection. While the projects recommended in the master plan are not totally in synch with member countries' individual future power development plans, the master plan is accepted as a basis for discussion regarding future expansion of trade. In addition, member countries have identified other projects which may enable early development (three to five years from now) of bilateral trade. Some of these projects are based on development of small generation projects and others are not associated with development of new generation. These projects could be aimed at providing internal strengthening of networks or cross-border interconnectors.

The Association of Southeast Asian Nations (ASEAN) recently completed its regional interconnection study (AIMS study). ASEAN comprises a much larger area and membership than GMS to the extent that projects identified in the GMS master plan are the same as those identified by the AIMS study, there may be possibilities to coordinate support. However, the GMS countries prefer to retain their sub-regional identity. The chairman of the AIMS study was also the chairman of the GMS-EGP, therefore, each group was aware of each study. The GMS participants are committed to continuing development of the regional market within their current grouping. They make the argument that GMS is more focused on the immediate region and can respond more quickly to opportunities for coordination as compared to ASEAN. In addition, China is not a member of ASEAN, though it is a member of the ASEAN + 3 grouping.

All interviewees accepted that there would need to be a minimum of basic rules for trading activities, such as, rules for non-discriminatory access to any uncontracted transmission capability, no trading taxes handling exchanges and arrangements to

protect market participants from payment defaults. None of the countries have embarked on the development of transmission pricing. They had no particular preferences as to the approach. All parties also recognized that the development of some degree of uniformity in the procedures and coordination processes would be helpful in the development of a regional network and, in the long term, a regional centrally administered electricity market.

All GMS participants were willing to contribute time, resources and people to a regional process to develop the market and technical rules and to share system planning and system operations information on an ongoing basis. The idea of the development and operation of a website was welcomed, with the understanding that the website could serve as a trading platform in the future. GMS officials and utility executives seemed comfortable with the idea of using a set of technical standards and rules developed in one country as a basis for the development of the regional technical rules.

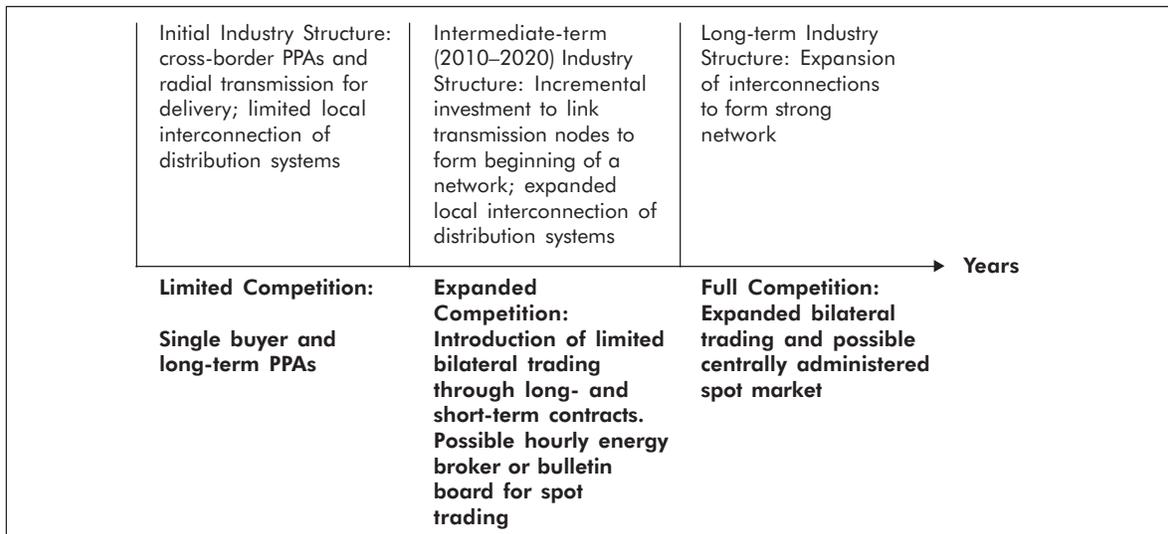
The lack of experience with a number of key elements of a successful regional market, including – transmission pricing, non-discriminatory transmission access, regional regulation, attracting significant private sector investment and the enforcement of international contracts and arbitration awards – may prove to be an advantage. The exercise of dealing with these issues is likely to involve the creation of a simple and practical set of uniform rules and procedures, acceptable to all GMS countries. They could work together to resolve these issues in a spirit of cooperation to achieve consistency and a uniform approach. This could prove to be significantly easier than working to harmonize existing rules and practices which are highly developed and sophisticated.

A Gradual Approach

The strategy discussed by participants was a gradual approach, based on implementation of key planned projects and associated transmission, sequenced with reforms in the investment and power sector environment combined with capacity-building in the power sector. Development of a coordinated or centrally administered regional market to operate in parallel with bilateral trading is likely to be some years into the future. Most interviewees agreed that future integration of the region will be aided to the extent that trading and operational practices are developed within each country according to a uniform set of rules.

Figure 1.1 illustrates a likely evolution of the regional electricity industry.

Figure 1.1: Illustration of Development of GMS Transmission Infrastructure and Possible Evolution of Regional Market



This report focuses on options which are realistic for consideration in the intermediate term as the basic regional transmission infrastructure is put into operation. According to current plans, it appears that it will be at least 2010, and possibly as late as 2020, before all GMS countries are interconnected with transmission and internal country networks are sufficiently developed to permit significant wheeling of transactions by a third party country. The regional industry and potential for trade will remain in the initial stage of development until such an infrastructure is established.

A more extensive centrally administered regional market may be considered in the long term, when the transmission network is strengthened and institutions achieve a greater level of experience. Current plans indicate that it may be 2010-2020 or later before this state of development is achieved. Therefore, this report focuses on the near- and medium-term development of power trade and only very briefly addresses options for the long-term GMS market. All near- and medium-term recommendations are designed to facilitate the development of a full market in the future.

The report identifies concrete steps, which, if taken, would form the basis of progression through the initial stage of development. The GMS and its EPF and EGP have achieved a degree of momentum in development of the region. With the entry into force of the IGA and the establishment of the RPTCC, GMS is poised to maintain and expand the momentum which has led to this point. Though a vibrant and sophisticated market for trading may be years into the future, all GMS members may benefit from small-scale trading and expanded exchange of information as each develops its own domestic industry structures. As recent offers of technical assistance from PRC and Thailand demonstrate, the experience gained by each country may be shared to the benefit of all.

Structure of the Report

This report on market options is organized into five sections:

- Introduction;
- Issues related to the current situation;
- Possible options and requirements for the intermediate term;
- Recommendations for intermediate-term decisions;
- Options for long-term trading in the GMS region; and
- Next steps.

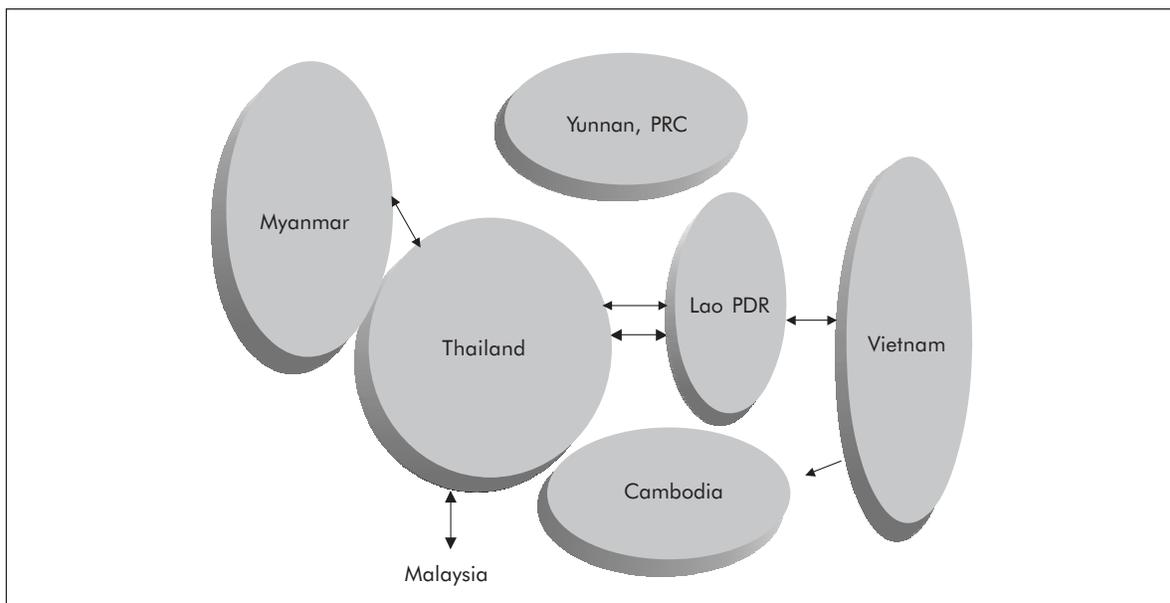
2. Issues Related to the Current Situation

The domestic electric industries among the GMS countries vary widely as to their current state of development. A strong regional market very much depends upon the participation of strong trading parties. Therefore, strengthening domestic utilities and internal transmission infrastructure, as well as developing cross-border interconnections are fundamental requirements for the implementation of the regional market. While the focus of this report is institutional “infrastructure”, a brief synopsis of the transmission system and requirements is provided to enhance understanding of the holistic process of developing power trade.

Transmission

Figure 2.1 provides a simplistic illustration of the current status of interconnections among the GMS countries. The strongest interconnections are between Thailand and Lao PDR.

Figure 2.1: 2003 GMS Transmission Network



Some countries such as Thailand and China have strong internal transmission. Other countries, such as Vietnam, are in the process of strengthening their internal systems.

Numerous cross-border transmission projects, which are associated with planned generation development, have been identified in the Norconsult interconnection master plan study and in a similar study by ASEAN members (AIMS). However, 2010 appears to be the earliest realistic expected date as to when most of these projects, with their associated transmission, will be placed in commercial service. Even then, continuing weak internal transmission infrastructure could limit the potential for trading through GMS member countries. However, other transmission projects which would connect the systems of member countries are being identified, e.g., discussions have begun between China and Vietnam for a 110 kV line which would only be 10 km in length. Such smaller projects could accelerate the pace of cross-border trading.

Industry Structure

Industry structures within GMS member countries are in transition.

In some countries, electricity is supplied by vertically integrated generation, transmission and distribution utilities. In other countries, there are multiple distribution utilities which are separate from generation and transmission utilities. With the exception of a limited number of privately-owned generators, all utilities in the GMS are owned by their respective governments.

In all countries, the domestic utilities are being strengthened. Some countries have begun to restructure their domestic industries and some are considering possible privatization of segments of the industry in addition to generation.

The need for additional investment in infrastructure is universal among all member countries. A larger market in the region should encourage investors to take more market risk in generation, transmission and distribution. Investments in generation, transmission and distribution projects will be particularly beneficial in the early stages, as will pure transmission projects.

Market

Some of the GMS member countries are considering alternative forms of buying and selling electricity at the wholesale level. The designs for internal wholesale markets will be constrained by the extent of generation and transmission infrastructure which exists within the country, e.g., the strong infrastructures within China and Thailand will permit formation of more competitive internal markets as compared to GMS member countries which are in need of significant investments in generation and transmission.

A very great concern is that the internal markets should be developed in such a way as to facilitate regional trading as the regional generation and transmission infrastructure expands, e.g., long-term PPAs, which cannot be modified or renegotiated, may inhibit migration to a vibrant regional market.

It appears that bilateral trading on the basis of long-term agreements such as PPAs and short-term bilateral transactions are the only viable market options until the completion of a strong regional transmission network. It could be the year 2020, before a regional centrally administered market would be a practical market option.

Regulation

Generally, economic regulatory agencies have not yet been established in most GMS countries. However, some of the countries plan to establish such entities.

As such entities are formed and gain experience, they may, in turn, play a key role in formation of a regional market and regional regulation as illustrated by the process which is unfolding in Central America. Just as strong industry structures for supply of electricity must be the foundation for a regional market, so must established domestic regulators exist on which to build a regional regulatory framework.

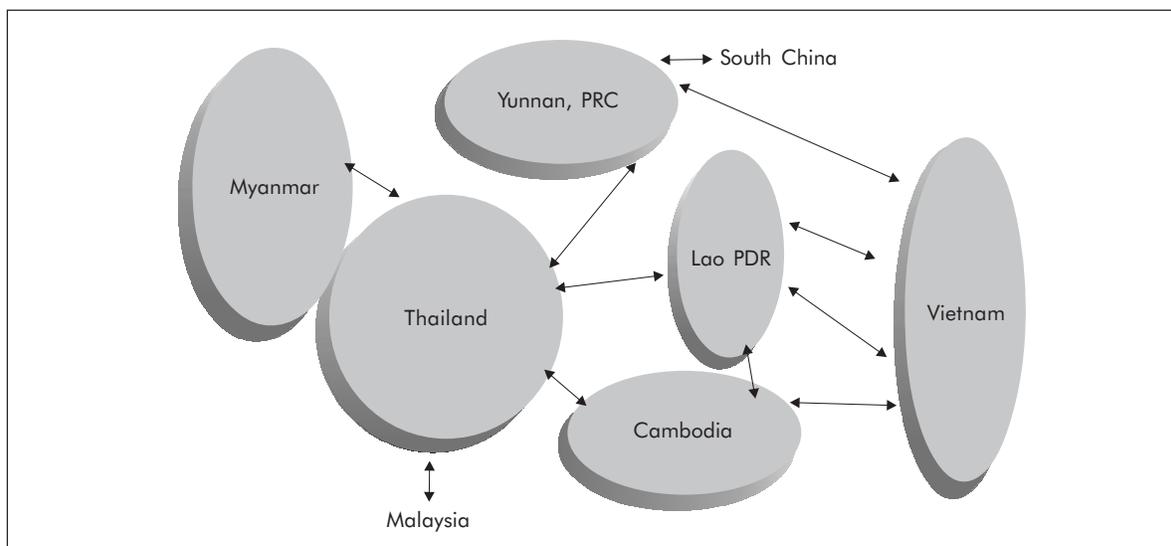
3. Possible Options and Requirements for the Intermediate Term

Assumptions

Options for establishing a regional GMS market during the period of 2010-2020 are based on the following assumptions:

- Each member country will have established a regulator for its domestic electricity industry.
- Each country will operate as a single electrical control area for the purposes of voltage and frequency control within its boundaries. It is expected that Yunnan province and the South China network may not be able to be operate in synchronism with the remainder of the GMS countries.
- Transmission interconnections among the countries and internal transmission networks which will have been established to permit cross-border trading between the two countries through a third country's transmission network (See Figure 3.1).

Figure 3.1: 2003 GMS Transmission Network Required for Regional Market (Year = 2010–2020)



- GMS member countries will have agreed to provide non-discriminatory open access to any transmission capacity which is not already purchased and used under a transmission tariff or contract;
- GMS member countries will have established a regional market administration office and a regional regulatory arrangement; and
- GMS member countries will have established a set of technical (grid code) and commercial rules and procedures under an operating agreement within which regional operations and trading will be conducted.

Principles

Principles should be developed which guide evaluation of options for a regional market. The principles outlined below are based on feedback from GMS participants. In theory, there are many possible regional electricity market/industry structures. However, in practice, the options for consideration on a regional basis are significantly limited due to the lack of a transmission network, likely until after the year 2010. Also, there is a risk that if PPAs do not include adequate provisions for renegotiation or for integration into competitive markets for short-term transactions, the development of regional trading will be limited.

A set of design principles is proposed for consideration by the GMS as it evaluates options for a regional market. These may include, but not be limited to:

- Provide flexibility as to which entities may trade in the market;
- Market design should be simple and easily understood by participants;
- Provide a range of choices for kinds of transactions available to participants in the regional market;
- The regional market design should permit a smooth transition to an expanded market at a later date;
- Cost to participate in the regional market should be low;
- Administration of the regional market should be simple and low cost;
- The market rules and administration of the rules should be transparent;
- The market should permit monitoring and enforcement of centrally administered trading; and
- Regulation of the regional market should not conflict with regulation of markets within participating countries.

These principles are intended to serve as a starting point for discussion among the GMS members as to the best set of principles to guide their formulation of a detailed intermediate market design. The RPTCC will be the forum for further development of market design by GMS.

Market Participants

Eligible participants in the regional market may differ from one GMS country to another.

Each of the GMS countries is developing its internal market and industry structure in accordance with its own needs. This is likely to result in different structures which are implemented according to different timetables.

Under the existing industry structures, there would only be a single trading party for each of the countries. However, alternative domestic industry and market structures are being considered. Some of these could result in distribution companies which independently buy from other entities in other countries. The second party to these transactions could be the single buyer for a country, traders, or a generating company, e.g., a distribution company in Thailand could possibly choose among competing generating companies in Lao and China.

Obligation to Install or Contract for Generating Capacity

As noted earlier, a key benefit of the regional market will result from savings gained by reducing the level of installed generating capacity as compared to each member establishing sufficient capacity for a specified level of reliability. A fundamental issue to be addressed by the GMS members is whether or not they would require each market participant to install and operate or to contract for sufficient generating capacity to meet a level to be determined by the market participants. In some markets, such as three of the US markets and in Latin America, there is an obligation to install or to contract for generating capacity. In other markets, such as three other markets in the US, the UK, Australia and Texas, such a requirement is not imposed. Decisions regarding a contracting obligation should be decided before developing the design of the energy market. If there is no obligation to install generating capacity and payment for that capacity, energy pricing will have to be designed to be sufficient to attract investment in generation as in the case of Australia and as was the case with the initial market in England and Wales. The current market, New Electricity Trading Arrangements, in the UK does not adequately compensate generators for their fixed costs. Consequently, generation is being removed from commercial service.

If a decision is made which requires market participants to have a specified amount of generating capacity, then a set of rules must be established to address all of the issues which relate to setting and complying with that requirement. This needs to be addressed in the initial industry structure and market design, even though it is likely that some of the members will not be able to comply with the requirements.

Choices Among Transactions

Market participants should have a range of choices of transactions including:

- System-based sales or unit-based sales;
- Transactions of varying duration;
- Sales of energy, capacity, or a combination of the two;
- Cost-based or market-based pricing;
- Physical delivery transactions, financial hedging transactions, or a combination of the two; and
- Resale of excess purchases in secondary markets.

System or Unit transactions

These choices are discussed in the following sections. Initial trading in the region will likely be based on sales of energy and capacity on the basis of production by a *system* of generators or by a designated generating unit or plant.

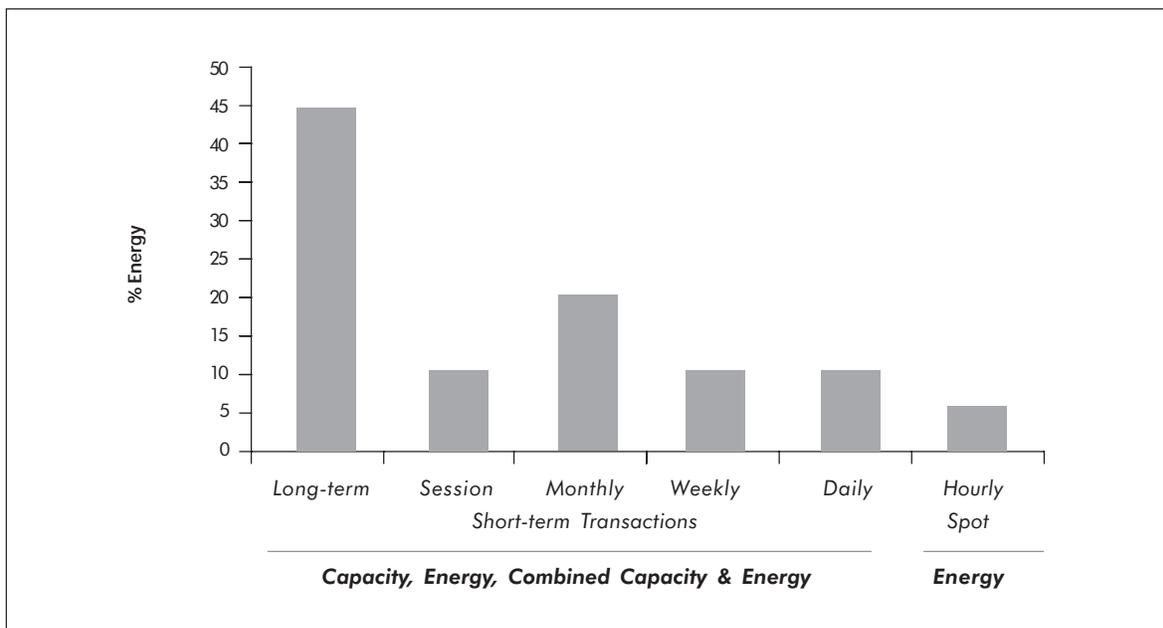
PPAs are usually based on a single unit or multiple units within a single power plant. In contrast, a utility such as Energy Generating Authority of Thailand (EGAT) or Electricity of Vietnam (EVN) could make a sale to another GMS member which is based on a *system* of generating units. Such a sale could be more reliable or firm because EGAT or EVN would back up the sale with its own operating reserve capacity, e.g. if either seller were to lose a generating unit, the sale could remain in place if adequate operating reserves were available. In contrast, a sale from a single generating unit could be less reliable in the event that the unit suffered an outage. An alternative would be for the seller of a unit-based sale, to contract with another party to provide back-up reserves to protect against loss of the unit. Another alternative would be for the buyer to self supply or to purchase back-up reserve capacity from another source.

Rules should be established under an operating agreement for trading in the region to ensure that adequate reserves are provided in order to protect the regional network against a possible widespread disturbance in the event of loss of a generating unit or a transmission line.

Duration of Transactions

The duration of electricity transactions may be divided into three major categories (see Figure 3.2):

Figure 3.2: Illustration of Possible Duration of Transactions and Possible Allocation of Annual Energy Trades



- Long-term generating capacity and/or energy for one or more years, includes PPAs;
- Short-term: seasonal generating capacity and/or energy for a month, week, day; and
- Hourly spot energy market.

It is assumed that each of the GMS market participants will, as an operator of its own control area, use internal generation for real time balancing of generation and demand.

Capacity and Energy

A number of products which are defined in terms of generating capacity and energy may be traded in the regional market.

If the GMS decides to impose a requirement for each member to have a minimum amount of generating capacity, they may have the option of installing and operating that capacity themselves or buying it through contracts.

Transactions may be based on sales of generating capacity, sales of energy only, or combinations of these two products. Typically, a PPA is based on a combination of capacity and energy and could be used to meet a generating capacity obligation. If the PPA were constructed in the form of a two-part tariff, the purchaser could decide to buy energy from another producer if the energy price from the second producer were less than the price

under the PPA. However, such a transaction would only be possible if the PPA allowed the buyer to have the option to take or reject energy under the contract. In such an example, the seller under the PPA could then resell that energy to another buyer, but the capacity would remain the property of the buyer of the PPA.

The sale of generating capacity may be viewed as an option to take energy according to predetermined pricing arrangements for the energy.

Ancillary services such as operating reserves or reactive support from generating units are just other forms of sales of capacity and energy, e.g., a sale of operating reserves would require the generator to reserve a specified amount of capacity to be called upon in the event of an emergency. The price of energy produced by the reserve unit would be agreed in predetermined negotiations.

Cost and Price

Transactions may either be reflective of capital and operating costs or prices may be determined on the basis of competition in which costs remain confidential.

Transactions may be negotiated on the basis of actual capital and operating cost with an allowance for an adequate return on investment. Transactions may also be based on a price which is negotiated in a competitive market.

A major problem with cost-based markets is the need for accounting systems and auditing processes to ensure compliance with contractual agreements and reflection of actual costs. A problem with market-based pricing is the potential for a party to take advantage of market power. It is likely that a number of participants in the regional market may have market power until such a time as the transmission network is expanded to significantly reduce congestion. This is likely to be beyond 2015.

Market monitoring and mitigation processes can help to protect against abuses of market power. The regional market governance structure should include a market surveillance committee. Such a committee of three independent expert advisors would be essential to protect against abuse of market power and inadequate administration and operation of the regional market. If there is a shortage of generating capacity, the generators will have a competitive advantage and the potential to raise prices to excessive levels. Price mitigation measures would be required in such a situation. One method of mitigating prices is to limit them to auditable costs.

Physical and Financial

The GMS members should consider including financial transactions in addition to physical delivery transactions.

Physical delivery requires that a transaction, which involves generating capacity and/or energy, would result in actual delivery of those products.

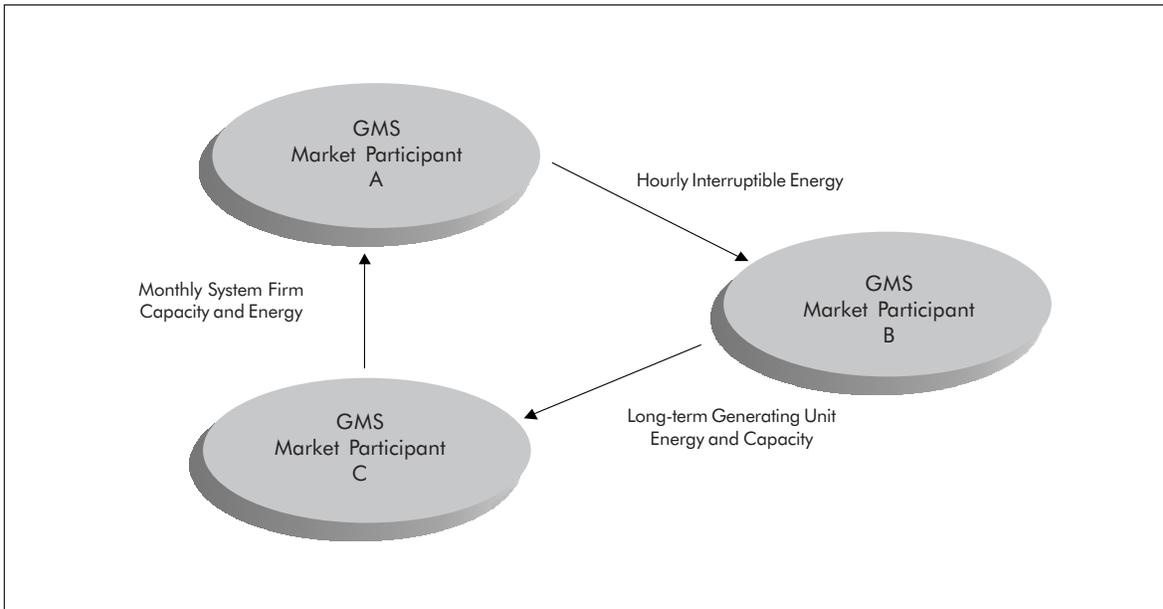
Financial contracts should also be included if GMS participants implement market designs which include hedging transactions in the form of financial contracts. Financial hedging contracts require the buyer to pay the seller, but do not require physical delivery of capacity and energy. Such contracts have typically been used to reduce the volatility of prices in spot markets.

Secondary Market

GMS market participants should have the flexibility to engage in secondary trading of transactions. Secondary trading may be viable long before conditions are met for a centrally administered, unified market. There may be times during which purchases under PPAs may exceed the buyer's load. At such time, the buyer could, if permitted under terms of the PPA, make sales of this excess energy and capacity to another party.

Secondary sales involve resale of part of a primary transaction. As an example, GMS Market Participant C may buy a large amount of long-term generating unit capacity and energy from GMS Market Participant B. However, Participant C may find that for a period of months, it has more capacity and energy than it needs to either meet a capacity obligation or its load forecast. Participant C may then sell this excess capacity and energy, for some limited period such as one month to Market Participant A. If the rules for capacity obligations permit transactions of one month, then Market Participant A could use the purchase to meet its obligation. During the period of the month, Participant A may find, in some hours, that it has excess energy which it bids into the energy broker. It could also be possible that Participant A's bid price and MW might be matched with Participant B's bid price to buy. In this case, for a particular hour there would be a primary sale from Participant B to Participant C and secondary sales by participants C and A as shown in Figure 3.3.

Figure 3.3: Illustration of Secondary Market (Resale of Excess Purchases)



Role of the Regional Market Administrator

In a regional market, all transactions should be approved by the regional market administrator to ensure reliable operation of the regional network.

All transactions should be submitted to the regional market administrator to review to determine that sufficient transmission capacity exists and that reliability criteria, as stated in the operating agreement, will be met.

The intermediate term GMS regional market will be based on the concept of bilateral trading among market participants. Each participant will decide when and how much capacity, energy, or combination of the two that they wish to sell or buy and the price at which the transaction will occur.

Traditionally, when there are relatively few trading parties, it is reasonable for them to directly contact one another in order to identify and negotiate transactions. As the number of trading parties increases, a bulletin board for posting bids to sell and offers to buy may prove to be of value. As the number of trading parties increases further, the GMS regional market administrator may also operate an energy broker to facilitate identifying and scheduling hourly energy transactions. The Norway and the New York power pool markets both have evolved from energy broker operations. Such a simple mechanism could form the foundation for development of an expanded centrally administered market in the long term, e.g., beyond

2015. The benefit of a broker is proportionate to the number of trading parties, e.g., if there are only six trading parties within the GMS, such a mechanism may have relatively little value.

Transition Issues

Initially all transactions may be traded on a bilateral basis among the GMS countries. The intent of bilateral trading is that the market participants would contact one another directly to negotiate the transaction. However, a staging process is suggested during which the market participants could build their expertise to negotiate transactions. During this period, a regional market administrator could assist in arranging short-term transactions. The market participants would be expected to negotiate long-term transactions from the very beginning of implementation of a regional market.

4. Recommendations for Intermediate-term Decisions

Starting the Process through the RPTCC

The inception meeting of the RPTCC is scheduled for February/March 2004. There is a great deal that the RPTCC could do immediately in order to facilitate the creation of the GMS regional market and, indeed, to facilitate cross-border trading before the market has been formally designed and implemented. The activities identified in this report could be carried out directly by the RPTCC using a number of working groups. Another option is for the RPTCC to structure its working groups to create the “embryo” institutions which the regional market will need, i.e., the RC and the RR. Working groups reflecting the chosen structure of the RC and the RR could be appointed, reporting to the RPTCC (as project manager and ultimate decision-maker). The GMS participants at the November 2003 meeting were comfortable with the idea of establishing “embryo” institutions immediately. However, this decision will be made by the RPTCC once it is formally constituted.

Governance of the RC and the RR

The RPTCC will design the governance structure and membership of these two institutions. It would be important to ensure that both institutions are capable of making timely, efficient and unbiased decisions for the benefit of the region as a whole and for all participants in the regional market. The RC would, typically, be governed by a board consisting of representatives of each country. One option is for these representatives to be entirely independent of the electricity industry in each country (i.e., no affiliations with market participants) or the board might consist of representatives of each type of market participant (e.g., buyer, seller, transmission company, distribution company). Currently, in other parts of the world, hybrid arrangements are preferred involving an independent board with ultimate decision-making authority advised by a committee of market participants representing, in a balanced manner, all the interests of the participants in the market. Another option is a single board consisting of both independent board members and members who represent market participant interests. Advisors who are experienced in the alternative

forms of governance could assist helping the member countries to understand the advantages and disadvantages of each approach. The RPTCC will work to develop a solution for governance which best fits the special circumstances of the GMS members.

As far as the RR is concerned, the culture is such in the GMS countries that a regulatory commission comprising six members, one member drawn from each GMS country, is likely to be the preferred option. It is questionable as to whether other members might accept an appointee from only one of the member countries or, as an alternative, an appointee from outside all of the six countries. In either case, there is a greater risk of bad decision-making with a single regulator as compared to three or more regulators serving on a panel. It will be important to ensure that the RR remains closely coordinated with the regulators in each country. For this purpose, it might be possible to require that the RR is comprised of a regulator from each country, as the job is unlikely to be full-time. This should ensure maximum coordination.

The RPTCC would decide the location of the institutions. It is probably not desirable that they both be located in the same country. In order to make the selection, the countries could submit the sealed envelopes with their wishes to a neutral third party.

Role of the Regional Coordinator and its Working Groups

There are a variety of activities which could be immediately undertaken, which would facilitate regional trading and the development and implementation of the GMS regional market. For example, working groups dealing with RC activities under the RPTCC could:

- Collect and exchange information in a number of useful and key areas, e.g., technical guidelines and standards, coordination, operational rules and procedures and on services which could be traded in the short term such as mutual support services, swaps and exchanges. Databases of current and planned investment projects, planning data and operational procedures could be created with a view to the future needs of the GMS market and to facilitate more immediate trading;
- It might be possible for a website to be developed to publicize a variety of useful information such as:
 - Opportunities for regional trade and associated data (e.g., load curves, reserves, demand forecasts);
 - Prices at which countries would be prepared to import;
 - Opportunities for services for mutual support, reserve-sharing, reliability, etc;
 - Beneficial cross-border electrification schemes; and
 - Beneficial small-scale investment projects.

- Beneficial large-scale investment projects; and
- Begin development of an operating agreement which would include both commercial and technical issues, the latter being in the form of a regional grid code (covering planning, standards, operations, communication systems, etc.).
- Another group could study how the RC might facilitate regional trading by:
 - Bulletin boards/website;
 - Brokering;
 - Standardizing contracts (possibly based on existing models);
 - Facilitating short-term trades;
 - Facilitating mutual support, sharing of reserves, provision of ancillary services over time; and
 - Facilitate congestion management/allocation of scarce transmission.

Indeed, the arrangements could be tested in a small way on a pilot basis where interconnection and transmission capacity permits.

- Another working group under the “embryo” RC could develop a critical path analysis, program and time frame for the design and implementation of the GMS regional market on an evolutionary basis e.g., decision on whether to require a minimum level of generating capacity, how capacity and energy requirements may be met through bilateral contracts (medium- and long-term) standardized contracts for short-term trades, a balancing mechanism, ancillary services trading, a spot market and, when there is sufficient infrastructure, possibly a pool (if it can be well designed and there is sufficient infrastructure). A design that envisages and facilitates the evolution over a period of time, is likely to be more successful in attracting long-term investment into the region than one that simply deals with one stage at a time;
- Another working group could begin to develop the role of the RC as a front line monitor of the GMS regional market and design the appropriate market monitoring committee and establish its role and responsibilities; and
- Other working groups to be determined by the RPTCC, e.g., a working group to address social and environmental impact requirements, etc.

Role of the Regional Regulator Working Groups

Working groups established under an “embryo” or shadow regional regulator reporting to the RPTCC, could carry out an important and useful service to attract the investment which the regional market will need at as early a stage as possible. It will be the role of RR to promote investment and to balance the interests of investors with the interests of the consumers.

- A working group could collect and exchange information on the investment frameworks in each of the GMS countries and create a comparative table of these national frameworks (covering legal, regulatory, contractual, customs, tax employment and other issues of concern to investors). This could be published on a website together with a clear statement of the intention to create a well-designed regional market. This should help to attract investors;
- Another working group under the RR could collect and exchange information on regulation with a view to harmonizing the regulatory approaches in each GMS country and also creating the regulatory regime for the GMS regional market. This could involve studying regulatory techniques from other countries and looking at the lessons learned and the best practices. Ultimately, this would develop into the design of the full regulatory regime for the GMS market;
- Another working group could study and develop transmission and interconnector pricing principles. It would be convenient if it were also to develop the rules for non-discriminatory access to transmission systems and interconnectors;
- In the initial stages, it might be helpful for the RPTCC to obtain assistance which could be shared among GMS countries on the pricing of capacity and energy for long-, medium- and short-term trades; and
- Another area which would benefit from study at an early stage, is the possibility of the creation of regional transmission companies which would develop the regional transmission system and interconnectors. There might be several companies that would be involved in the creation of the regional transmission system, some of them entirely independent or operating in consortium with national market participants. Others might represent joint ventures between the public sector and the private sector using public-private partnership techniques to manage the risks. The regional market might allow for one or more regulated regional transmission companies owned by each of the GMS member countries (or major market participants in those countries), where the countries agree to share the responsibility for ensuring that the revenue requirements of the regional transmission company are met by inclusion of a certain proportion of those requirements in their national tariffs. There was some interest amongst GMS interviewees in establishing a regional transmission company composed of the six-member country utilities.

Projects which maximize regional benefits and the newest financing techniques could also be studied and publicized in order to assist in attracting investment.

It would also be useful if the potential obstacles to cross-border trade and to investment in the regional market could be presented to the relevant authorities and publicized in order to raise awareness of the need to remove or avoid creating these obstacles.

Ultimately, the RR would have responsibility for:

- Approving the grid code, the operating agreement and all the other rules, codes and agreements of the GMS regional market. It would also approve subsequent rule changes;
- Enforcing the rules of the GMS regional market;
- Monitoring and mitigating regional market power on the advice of the market monitoring committee;
- Coordinating with national governments, agencies and regulators; and
- Acting as a champion of the GMS regional market and promoter of investment and competition. Identifying the potential staff of the RR and training them for their future activities will take time and should get commenced at an early stage.

5. Options for Long-term Trading in the GMS Region

As the GMS countries develop their domestic electric industries and internal markets, they may, at some point, wish to consider expanding the services provided by the regional market, e.g., develop expanded centrally administered markets. In theory, they could consider combining national markets into a single regional market. But such possibilities should only be considered after full implementation of an intermediate regional market. At such a time, in the future, there will be a wealth of experience upon which to draw from.

Centrally administered markets have been evolving since the early 20th century. The early markets, such as in north-east US, were designed for vertically integrated electric utilities and were subject to cost-based forms of regulation.

Beginning in the last part of the 20th century, markets were developed to accommodate an unbundled electricity industry. Many open access wholesale electricity markets have been developed and implemented over the past 12 years. There have been many problems and some successes. Perhaps the two most visible examples of problems have been the decision to totally replace, at a very great cost, the initial market designs for England and Wales and for California. In the US, the market which was initially implemented in Texas is also being redesigned. In contrast, the national market in Australia and the PJM market in the US are regarded as having been relatively successful. All markets have experienced some degree of difficulty in implementation and have required adjustments.

Problems in centrally administered markets have arisen from:

- Poor governance structures;
- Two-tier regulatory systems (separate regulation of wholesale and retail prices) which did not permit retail prices to reflect wholesale market prices;
- Insufficient opportunities to hedge volatile spot prices;
- Manipulation of transmission to the benefit of affiliated generation and retail businesses;

- Abuses of market power and inadequate detection capabilities;
- Failure of market administrator to comply with market rules; and
- Extensive unbundling of ancillary services and development of spot competitive markets for each service (which created opportunities for driving prices up artificially).

Transmission expansion and pricing of transmission has proven to be particularly troublesome. One reason for this is that governments and regulators have typically allowed very low rates of return on transmission investment over very long asset lives. The straight line depreciation over a 40-year asset life has deterred investors who have preferred to invest in projects with a more immediate return. It has been a mistake to think that low rates of remuneration will protect consumers. The transmission component of a consumer's bill is a very small proportion of the whole (usually less 5-9 percent). Underinvestment in transmission creates significant costs to consumers, particularly in terms of running more expensive generation in areas which cannot benefit from cheaper imports.

Environmental opposition to transmission has been very effective in stopping much-needed expansion of the US transmission network, as well as for generation. These environmental and social concerns have already been raised regarding GMS regional power trade. Therefore, it is highly recommended that the GMS-RPTCC constitute an environmental/social working group to identify project-affected areas and people and initiate a consultation process. In addition, the working group could develop a public education campaign which demonstrates possible environmental benefits arising from power trade.

There is some recent, limited experience with merchant transmission projects where the developer takes the usage risk. To ensure that the project will be economical when built, the developer will usually want to sell reasonably long-term transmission rights to use the system (physical or financial) to potential users in advance of undertaking the project. The successful sale of these rights depends upon there being sufficient purchasers of the rights who know what value to place on them when they bid or negotiate the price and the period of the rights. There are also regulatory issues which have to be dealt with. The holders of transmission rights should not be allowed to hoard them (without using them) to prevent their competitors from obtaining access to the transmission facilities. A "use-it-or-lose-it" rule has to be imposed.

6. Next Steps

Support Needed

Actions are needed in the near-term to facilitate achievement of the vision of a regional market for electricity (intermediate- and long-term). This section outlines a related series of activities designed to support the development of trade in the near- and medium-term.

The recommended activities are based on discussions with GMS and focus on institutional, regulatory and knowledge-sharing aspects of progressive development of regional power trade. The development of trade depends on expanding physical infrastructure; supporting activities and projects are presented in the interconnection master plan. However, this report's recommended activities do address infrastructure where developing regional infrastructure requires attention for the institutional environment. (For example, the need for foreign investment in these projects, creates a need to balance the requirements of the PPAs required by investors with the flexibility for GMS to evolve into a market).

The activities presented in this section could be used by the RPTCC to define the future work plan for GMS power trade development. As in the past, the GMS could seek support for these activities from the World Bank, the ADB and other donors, as necessary. The work plan could include:

- *Performance of a more detailed study of the regulatory and institutional framework for the market.* The seven GMS participants were in agreement that the regulatory study, first requested in the FY1999-FY2003 power trade work plan, should go forward. GMS is particularly concerned with transmission issues and with the interface between domestic regulation and regional trading rules;
- *Development of pro forma provisions for IPP-associated PPAs.* Since most GMS counties are actively pursuing IPPs/Build Own Transfers (BOTs), the GMS interviewees identified the most immediate need and priority as to develop "pro forma" formulations for those

provisions of PPAs known to inhibit development of power trade, such as provisions for renegotiation, termination, succession, access to lines, and sales of uncontracted energy. In addition, GMS participants would include developing provisions to address some common risks, such as currency denomination, exchange rate risk and interest rate risk. This activity would include input from developers of generation projects to ensure that realistic provisions are drafted to balance the need of both parties;

- *Creation of a GMS power trade website.* The website would serve both as a vehicle for ongoing cooperation, information exchange and learning (between meetings) for GMS utilities, and as a window for the public and potential investors/developers;
- *Facilitate the development of technical guidelines for design, communication and operations and maintenance by GMS utilities.* This activity would fit well under the drafting of the PTOA, supported by ADB;
- *Develop an inventory of existing or planned lines which could be used to begin small-scale trade within the next two years;*
- *Develop a list of priority-projects in advanced stage of preparation for presentation to donors; and*
- *Convene an investor/donor forum and establish a GMS Power Trade Business Association.* After completion of prioritization activity, convene an investor/donor forum to mobilize support for priority projects. Establish an ongoing business association to provide a mechanism where all interested parties (equipment suppliers, large consumers, potential investors, etc.) can meet to share experience, make deals, promote investment in generation and transmission in the region and develop public or government education programs.

7. Conclusion

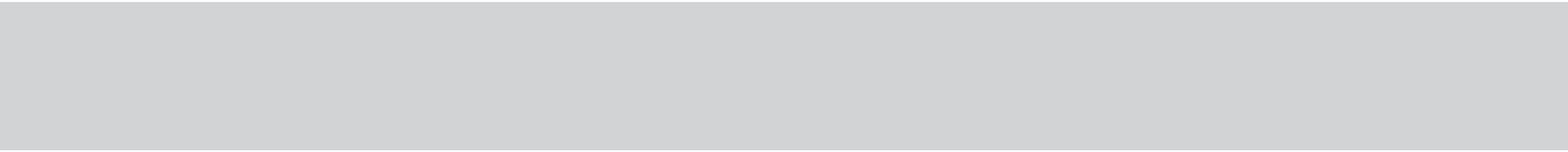
The GMS has made continuous progress towards making power trade a reality. During the initial work plan, completed in 2003, the GMS-EPF and EGP identified benefits from trade under various cooperation scenarios along with the regional projects necessary to create those benefits (supported by ADB). In addition, the EGP and EPF participated in information-sharing workshops (supported by ESMAP) and established the institutional framework at the policy level with the drafting, signature and ratification of the IGA (supported by ESMAP and EASEG).

GMS power trade representatives recognize that to realize the benefits of trade will require a multifaceted effort to develop: the internal/domestic pre-conditions for power trade, regional projects and regional trading mechanisms, human resources and a process for ensuring that regional trade is developed in an environmentally sustainable and socially responsible manner.

In this context, GMS requested this study on options for the structure of the GMS regional power market to provide the basis for development of the detailed institutional and regulatory environment for power trade, as well as for the commercial terms and conditions to be drafted under the PTOA-TA (under way, supported by ADB).

The consensus of the GMS interviewees and the Guangzhou meeting participants, was that while maximum benefits to the region and to each member country would most likely occur in a regionally unified competitive market structure, establishment of such a market could not occur until sufficient infrastructure and institutional/regulatory mechanisms were in place, unlikely before 2015. Progress towards a future market needs to occur in a phased manner, working with current levels of development to put in place conditions for increased trade. The near-term and medium-term activities recommended in this report support the phased development of a regional power market, in which GMS would first meet the pre-conditions for the intermediate market. The strategy for achieving a regional market is based on phased development of the institutional and physical infrastructure for trade over the next 15 years.

The above vision is consistent with the overall *GMS* economic cooperation program, where regional power trade is an important part of a regional strategy to increase economic growth and reduce poverty in all *GMS* countries. The future regional power market will create many benefits, at both national and regional levels. The participants would like to see these benefits shared as equitably as possible.



Annex 1

World Bank Mission:

Greater Mekong Sub-region

Options for the Structure of the

GMS Regional Power Market Study

Inception Report and Interview Questionnaire

Study Context

The study is part of a dynamic process aimed at developing power trade in the GMS region, the objective of which will be to provide reliable and economic electric service to consumers, consistent with sustainable use of natural resources. In 2000, the GMS ministers conference endorsed the "Policy Statement on Regional Power Trade in Greater Mekong Sub-region," which provided the basis for moving forward. As part of this initiative, Norconsult's regional indicative master plan on power interconnection in the Greater Mekong Sub-region (supported by ADB) is expected to be finalized in 2002 and the "GMS-IGA on Regional Power Trade" – supported by the World Bank – is expected to be signed in late 2002 (at which time the RPTCC is likely to be established). The next steps in the process include to prepare a draft operating agreement and grid code for GMS power trade. However, work on operating agreement and grid code can only begin after decisions on market structure and certain regulatory issues (access, transmission pricing etc.) are made. The EGP agreed in December 2001, at their sixth meeting (Hanoi), to request that the World Bank support a study entitled "Options for the Structure of the GMS Regional Power Market," including associated institutional and regulatory framework issues. The interview questions will provide the necessary regional input to inform the study on options for the Structure of the GMS Regional Power Project.

The Interview Questions

To realize the benefits of power trade in the GMS will require the development of generation and transmission, the market structure, national institutional and regulatory frameworks and an operating agreement. In this context, the strategy discussed by participants was a gradual approach, based on implementation of key planned projects and associated transmission, a sequencing of investment and reform and concurrent capacity-building in the power sector. The development of a regional market to operate in parallel with bilateral trading is likely to be some years into the future. This is similar to the evolution of other

regional transmission networks and electricity markets in countries and regions such as Scandinavia, the US, Europe and Australia. However, as discussions in the meetings have shown, future integration of the region will be aided to the extent that trading and operational practices are developed within each country according to a uniform set of rules.

While much information has been developed during the EPF and EGP meetings, there is a need to expand on the group discussions as a basis for identifying the next steps to be taken. The mission will identify, in greater detail, the objectives and concerns of the individual countries in order to develop specific actions to support specific projects and to continue to work towards long-term implementation of a regional market. In order to understand issues in greater detail, the following questions are raised as a means of focusing the discussion.

Three Areas of Discussion

- General investment environment;
- Issues related to development and construction of specific projects; and
- Development of uniform procedures and coordination processes.

The World Bank would welcome any comments on this first draft of questions to be discussed.

General investment environment

The member countries of the GMS understand the general benefits of cross-border trade and have agreed to sign the IGA. However, further discussion is needed in order for the World Bank team (the team) to understand the general environment in which decisions will be made within each country, so that the regional market structure and design which are implemented over time are capable of meeting the objectives of each country. Clearly, it will be important for the team to address any particular concerns which the countries may have so that progress is not unnecessarily delayed.

Benefits of Cross-border Development Projects

It will be of great value to the team to gain a better understanding of each country's perception of specific benefits in order to develop options for a regional power market. If realistic options are to be designed, they must be based on addressing the areas of greatest concern to a member country. Therefore, the team will appreciate any reaction which decision-makers in a country may have to questions such as: does the country perceive itself as an exporter of electricity, as an importer or both? If it hopes to import power, in what

circumstances is it likely to do so on a short or long-term basis? Are there concerns regarding the need to have a diversity of fuels for supply of electrical energy or of the need to diversify the risk of generation outages?

Priority for development

It will also be helpful for the team to understand if a country has a policy which favors development of domestic generation over generation from other countries. As an example of such an issue, there was a concern at one time for the US to avoid exposure to a risk of loss of generating capacity in another country such as Canada or Mexico. While this was not an official policy of the US Government, utilities within the US were reluctant to enter into contracts with their counterparts in neighboring countries for firm generating capacity. They were willing to buy energy under long-term contracts, but only based on having sufficient domestic generation in the event that cross-border imports were interrupted. Is this a concern to a specific GMS country? Would it favor a domestic development project, even if it cost more than agreeing to a contract for a purchase from a neighboring country?

Regulatory and Commercial Risks

It is well documented that the current environment, worldwide, is discouraging to power station and transmission line project development, in general, and among emerging economies, in particular. There has been extensive discussion and reporting of discussions of the problems of regulatory and commercial risks as barriers to potential investment by international developers. A question which must be addressed is, what specific actions are each country taking to address these risks?

In most instances, development of economic regulators of electricity, which have effective authority, which is independent of the government, is taking an extended period of time. Could the member country provide the team with an assessment as to when a regulatory agency will be in full operation? Will this agency have full authority to set and approve prices and contracts for both domestic and for international transactions?

If full implementation of regulation is not likely in the near future, it is then logical to ask how decisions governing trading and use of transmission systems and interconnectors in a regional GMS market could be made? A governance structure involving representatives of each country could be empowered to set, change and enforce the market rules. This might have the character of a regional regulatory agency. It might consult or be advised by a committee consisting of representatives from the utilities or regional market participants in each company. Would the

GMS countries be prepared to accept and abide by decisions made in this way?

If decision-making or regulation on a regional basis cannot be established, is regulation through contractual provisions an adequate and realistic substitute, specifically as applied to cross-border contracts? Would a specific country and its participants in the regional market accept resolution of disputes by a recognized international arbitration agency? If so, what agency? Would its decisions be enforced in each country?

Generally, the team would like to be aware of any actions that each member of the GMS has taken to reduce regulatory and commercial risks.

Project Development

It has been accepted that a GMS regional transmission network will only follow development and linking of a number of specific generation and transmission projects which are based on long-term contracts. Also, discussions within the GMS have noted that a market for sale of production capability will only develop after the installation of cross-border generation and transmission projects. Sales of excess capability and resale of long-term purchases may then permit the establishment of a more sophisticated regional electricity market.

This type of market development and evolution has already occurred within the East China region and elsewhere in China. But development of a regional market, beyond the transactions which serve as the financial foundations for the projects (such as long-term power purchase or transmission service agreements), will only happen to the extent that project contractual and financing provisions do not limit such sales. However, financial institutions are sensitive to the need to develop trading in new markets and more flexible project documents can be negotiated.

In order to develop options for consideration by the GMS members, the team would like to develop information on specific projects. This information will serve as a background for the development of recommendations and will be kept confidential. Therefore, a number of questions are raised in the questionnaire (page 37) with regard to specific projects.

Development of uniform procedures and coordination processes

Resolution of issues and different procedures and rules which must be agreed between electric systems and markets have long been a barrier to increased trading among

utilities within a country, among regions within a country and among countries. It is today a major issue which confronts further development of markets within the US, Europe, and elsewhere.

Uniform trading rules, procedures and coordination processes would assist in the development of a regional network and, in the long term, a regional centrally administered electricity market. The team wishes to understand the degree of support which GMS member countries will provide for development of such regional approaches to commercial and technical issues as related to both planning and operating timeframes. Many of these issues have been addressed in discussions among the GMS members and are documented in reports by consultants, the World Bank, and by the ADB.

It is not unusual, as in the case of the GMS members, to find agreement that utilities and countries recognize the need for, and benefits of, agreeing to a common set of rules. However, it is also normal for each of the entities to believe that everyone else should conform to that entity's rules. It is relatively easy to agree on the principle of harmonization among countries, but much more difficult to agree on details.

Therefore, it will help the team a great deal if representatives from each country indicate, in detail, where there are specific areas of concern and a reluctance to change. Would a country be prepared to accept modified or different rules as compared to those which are already in operation? There is no point in recommending development of a market design, or a grid code or an operating agreement which includes provisions which cannot be agreed to. However, agreement by every member should not be required in order to establish detailed rules. A number of questions are raised in the questionnaire in order to develop this level of understanding for each country.

In addition, questions are raised with regard to the extent that each GMS member would contribute staff and resources to the development of common sets of rules and procedures for use in the region. Consultants may continue to provide assistance to the members of the GMS. This assistance reflects extensive experience elsewhere. But it is the people who are the day-to-day operators of the electric systems that need most to develop, and take full ownership of any rules for a regional market and operations. Such ownership can only come through active, first-hand involvement in the development of details. A test of the commitment of countries to fulfilling the objectives set forth in the IGA is the level of its own resources, people and money, which it will commit to development of uniform procedures and coordination processes.

Questionnaire

General Investment Environment

- What are the benefits which you see as justifying your government's financial support of specific cross-border generation and transmission development projects?
- Is there a policy of preference for development of domestic generation as compared to imports?
- What measures have been taken by the government to reduce concerns of investors with regard to regulatory and commercial risks?
- What are the difficulties that an investor is likely to encounter in obtaining the necessary permits, consents, land and rights-of-way?
- What is the state of contract enforceability in your country and how are contractual disputes decided? (Any contract disputes involving the power sector?)
- What is the status of development and implementation of regulation in your country?
- Do you view regional decision-making or regulation of a regional market as being a realistic possibility? If so, in what timeframe?
- Would you be prepared to accept resolution of disputes by an international agency with respect to regional market operations and to implement the decisions of that agency in your country?

Project Development

Identify and assign a relative value of benefits or importance to the three cross-border projects which you would most like to see actually implemented. For each of these projects:

- Is the project identified in the Norconsult indicative master plan?
- What are the primary benefits which would result from the project?
- What entity has the lead for developing the project?
- What are the specific obstacles to the development of the project?
- Can you identify any action which a regional organization such as the EGP (and the soon-to-be established GMS-RPTCC) or ASEAN could take which would assist in development of the project?
- Is there any action that the World Bank, the ADB or any other organization could take to assist in the development of the project ?

Development of Uniform Procedures and Coordination Processes

Uniform procedures and coordination processes which would assist in development of a regional network and, in the long-term, a regional centrally administered electricity market, if desired by the GMS. The team wishes to understand the degree of support that your country will provide for the development of such regional approaches to commercial and technical issues as related to both planning and operating timeframes.

- Are you prepared to accept a minimum of basic rules for trading activities such as: rules for non-discriminatory access to any uncontracted transmission capability, no trading taxes hampering exchanges, guarantees of payments through external escrow accounts to avoid commercial conflicts, etc?
- Have you developed principles for transmission pricing and a preferred approach to charging for connection to and use of transmission?
- Would you contribute the time and resources of people to a regional process to develop:
 - a transmission charging structure which would be uniformly applied within the region?
 - model rules for bilateral transactions?
 - technical rules related to design and operation of cross-border transmission interconnectors and scheduling and dispatch of generation?
- Does the Norconsult indicative master plan accurately capture plans within your country?
- Would you share system planning information and participate in a regional planning process with the other countries in the region on an ongoing basis? What entity within your country would be responsible for providing the information?
- Would you support development and operation of a website, under sponsorship of the EGP, or the soon-to-be established GMS-RPTCC, for sharing planning and operating information as well as for disseminating draft documents for review and comment? Who do you believe should operate such a website? Would you share in the expense of supporting such an operation?
- Thailand is in the process of creating a set of technical rules in the form of a grid code. If the Government of Thailand were willing to share this document with other members of GMS, would you support using this document as a basis for development of a regional grid code?



Annex 2

Technical Assistance for
Power Trade in Greater Mekong
Sub-region

Barker, Dunn & Rossi, Inc.

Preliminary Description

Introduction

In its study of options for the development of GMS trade in electricity, the World Bank report identified several activities to be taken by the GMS-RPTCC in support of trade.

At the same time, the ADB has initiated a study to develop a PTOA. The PTOA study will focus on technical and commercial guidelines and should provide technical assistance in some, but not all areas of concern to the member countries.

The following is a preliminary listing and brief description of the scope of technical assistance proposed for consideration by the World Bank. This work would complement and provide input into the drafting of the PTOA. Most of these activities were agreed during earlier meetings of the GMS-EGP and EPF in 2001 and 2002, and reaffirmed during the EPF meeting in November 2003.

Estimates are also provided as to the magnitude of the assistance to be provided, but these estimates should be understood as being very preliminary.

Regulatory and Institutional Framework

The implementation of the intermediate-term market is based on the following assumptions regarding the institutional and regulatory framework: each member will have a regulator for its domestic electricity industry, members will provide non-discriminatory open access to any transmission capacity which is not already purchased and used under a contract, GMS members will have established a regional market administration office and a regional regulator.

GMS officials are concerned about the extent to which regional regulation of power trade will be required and the interface between regional regulation and national regulation. Problems have been encountered in other regions and groups of countries as a result of conflicts between local regulation and regional regulation. The countries of the GMS can take advantage of “lessons learned” and design the regulatory interface to avoid such conflicts. GMS power officials recognize that they need to inform themselves as to the issues and legislation and regulations that may be constructed in the respective countries in order to facilitate establishment of regional trade and possibly a regional regulator or regulatory body.

The objective of this activity is to meet the conditions to implement an intermediate regional market in a manner which permits a smooth transition to the long-term goal of a regional network.

Under this proposed technical assistance, the World Bank could, as requested by the GMS, assist in developing guidelines for national regulation and regional regulation which would take account of the respective needs of the countries and the region, as well as pave the way for the evolution of the power market. It is expected that the scope of this support would include the terms and conditions for use of the regional transmission network. Pricing issues for regional transmission access are being addressed in the ADB-PTOA study. However, the GMS has requested World Bank support for developing institutional mechanisms regarding the conditions for access and for expansion of the regional transmission network.

The development of a regional market to operate in parallel with bilateral trading is likely to be some years in the future, and will be facilitated to the extent that trading and operational practices are developed within each country according to a uniform set of rules. In addition, the institutional and regulatory frameworks must recognize the need for investment and to balance the interests of the private sector and the government/utility.

The estimated cost for this assistance is US\$230,000.

Pro Forma PPAS

The development of power trade depends, in part, on expanding the physical infrastructure in the GMS (generation, transmission and distribution). The countries of the GMS would like to ensure that the benefits and risks of these development projects are spread equitably amongst all parties. A major impediment to economic operation of systems and evolution of markets has been the terms and conditions of rigid PPAs associated with IPPs. Much

experience has been gained with regard to PPAs and the need for flexibility at the same time as providing developers and their financial backers with the certainty of revenue streams which are required.

It is proposed that the World Bank could, if requested by the GMS, develop *pro forma* PPAs for thermal and hydro generation which could serve all member countries as they negotiate new projects. One of the concerns which was expressed to the World Bank mission in October 2002, was uncertainty as to government requirements for PPAs. It appears that developers would welcome uniform provisions in order to expedite the negotiation process.

Since most GMS countries are actively pursuing IPPs/BOTs, the most immediate need and priority is to develop *pro forma* formulations for the relevant provisions of PPAs, such as those for renegotiation, termination, succession, access to lines, as well as exchange rate and interest rate risks.

The objective is to provide a compendium of best practices accompanied by the development of provisions specific to the GMS which can balance the needs of private capital providers with the flexibility necessary to evolve into a market in the medium term. There are several separate studies under way in the region which address PPA provisions, this study will account for them and, to the extent possible, develop a harmonized approach to be applied to regional power trade transactions. The proposed technical assistance would build on the basis of other work which has already been completed in the region with regard to development of *pro forma* PPAs (e.g., Cambodia).

The estimated cost for this assistance is US\$170,000.

Infrastructure Development: Inventory and Prioritize Near-term Projects

Master plans, based on large-scale development of generation and associated transmission infrastructure, were recently completed by the GMS (Norconsult/ADB) and by ASEAN. In addition, the potential exists for developing small-scale projects with relatively little investment which could provide the benefit of near-term returns and familiarize GMS with trade.

The proposed assistance would be to: a) expand work which has already been completed to identify small-scale projects which would result in increased infrastructure to build towards a regional transmission network; and, b) provide a ranked inventory of the large-scale infrastructure projects. This proposed project would provide, as requested by the GMS,

assistance in developing an inventory of existing or planned projects which could be used to begin small-scale trade in the next three to five years, as well as for large-scale projects. In addition to such an inventory, the project would also establish a relative value to the region and rank the projects in order of those having the greatest benefit to regional infrastructure.

The estimated cost for this assistance is US\$ 250,000.

Knowledge Management: Website Development

Improved information exchange is needed to aid the member countries with regard to planning and design of systems which will be interconnected. Websites offer an efficient mechanism for sharing information. In the US, such sites are routinely used for soliciting comment on proposed guidelines and rules.

The proposed assistance would provide funding for development and operation of a website for the GMS region.

GMS power sector officials in all countries, as well as developers, strongly support the creation of this website. It would be part of a computerized information management system to support central data management in a standardized format. The website would be a vehicle for ongoing cooperation among GMS utilities, a window for the public, chambers of commerce and potential investors/developers. The new RPTCC would maintain and update the website.

While the initial emphasis would be on design and planning information, this power trade website could later provide GMS participants and other stakeholders with access to power trade-related information, with access in accordance to agreed information exchange guidelines.

Participating members of the EPF already operate and maintain websites. Therefore, the proposed technical assistance would be to support this activity as managed by one of the participants.

The estimated cost for development of the website would be US\$35,000, plus additional expenses to support regular updating.

Coordinate and Comment on the PTOA

The proposed activities will provide an implementable institutional and regulatory framework. At the same time, the GMS will be drafting the GMS PTOA. The scope and objectives of the PTOA project are very broad. Coordination between activities is required to ensure that there is no duplication and that all issues are addressed.

Annex 3

Report on Study of Options for the Structure of the GMS Power Trade Market for the World Bank

James V. Barker, Jr., Consultant
10th Meeting of the Sub-regional Electric Power Forum
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Presentation of Draft Findings and Recommendations

Outline of Presentation

- Objectives and methodology of study;
- Major findings;
- Assumptions;
- Evolution of the regional market; and
- Summary;
 - Findings;
 - Recommendations.

Objectives and methodology of study

Objective: to identify options for structuring power trade and future power market, accounting for diversity of power sector development among member countries.

- Methodology: Based on questionnaire, held confidential meetings with key decision makers in each GMS country to determine issues of concern; and
- Areas of focus in meetings held in October 2002 were:
 - General investment environment;
 - Identification of three most likely projects; and
 - Receptivity to development of uniform procedures and coordination processes.

Major findings

- Substantial expansion of transmission and generation infrastructure, both regional and domestic, to countries required;
- A gradual step-by-step development of the regional market is practical and desirable:

- Initial transactions based on PPAs and small transactions;
- Bilateral trading for short-term transactions will evolve;
- Guidelines for PPAs and other technical and commercial documents will be welcomed by all parties; and
- Some regional regulation is acceptable.

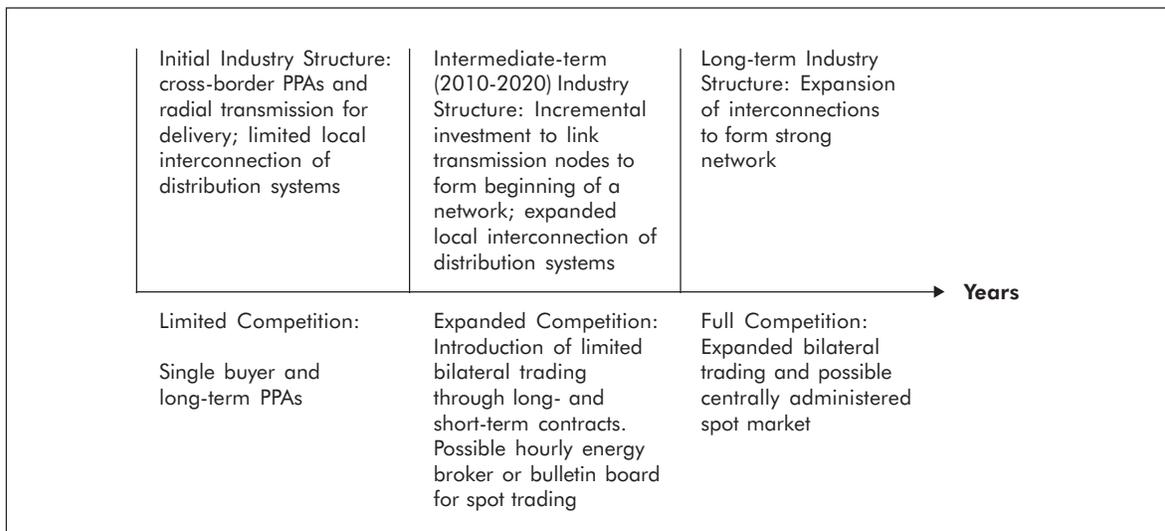
Observation based on international experience

- Many regional networks developed on a generation project basis;
- Problems due to incompatibility of:
 - Physical system;
 - Commercial agreements;
- RPTCC has the opportunity to facilitate the integration of the region through development of technical and commercial guidelines; and
- Guidelines could be applied as soon as they are developed.

Assumptions for the intermediate market

- Each member country will have established a regulator for its domestic electricity industry;
- Each country will operate as a single electrical control area for the purposes of voltage and frequency control within its boundaries; and
- Transmission interconnections among the countries and internal transmission networks will have been established to permit cross-border trading between two of the countries through a third country’s transmission network.

Figure A3.1: Industry Structure for the Initial, Intermediate and Long Terms



- GMS member countries will have:
 - Agreed to provide non-discriminatory open access to any transmission capacity which is not already purchased and used under a transmission tariff or contract;
 - Established a regional market administration office and a regional regulator; and
 - Established a set of technical (Grid Code) and commercial rules and procedures under a PTOA within which regional operations and trading will be conducted.

Timing of intermediate market

- Comments at the time of interviews indicated that the establishment of infrastructure necessary for intermediate-term market would be after 2010;
- Subsequent comments indicate that it may be 2020 before the intermediate market can be established;
 - Most transmission projects are likely to be developed after 2010 (Nam Theun 2) project; and
 - An issue may be the extent to which short-term trade of excess purchases may be made among GMS member countries – even with 100 percent of a plant production contracted, the buying party may, at times, have excess available for sale if the transfer capability were available.

Summary

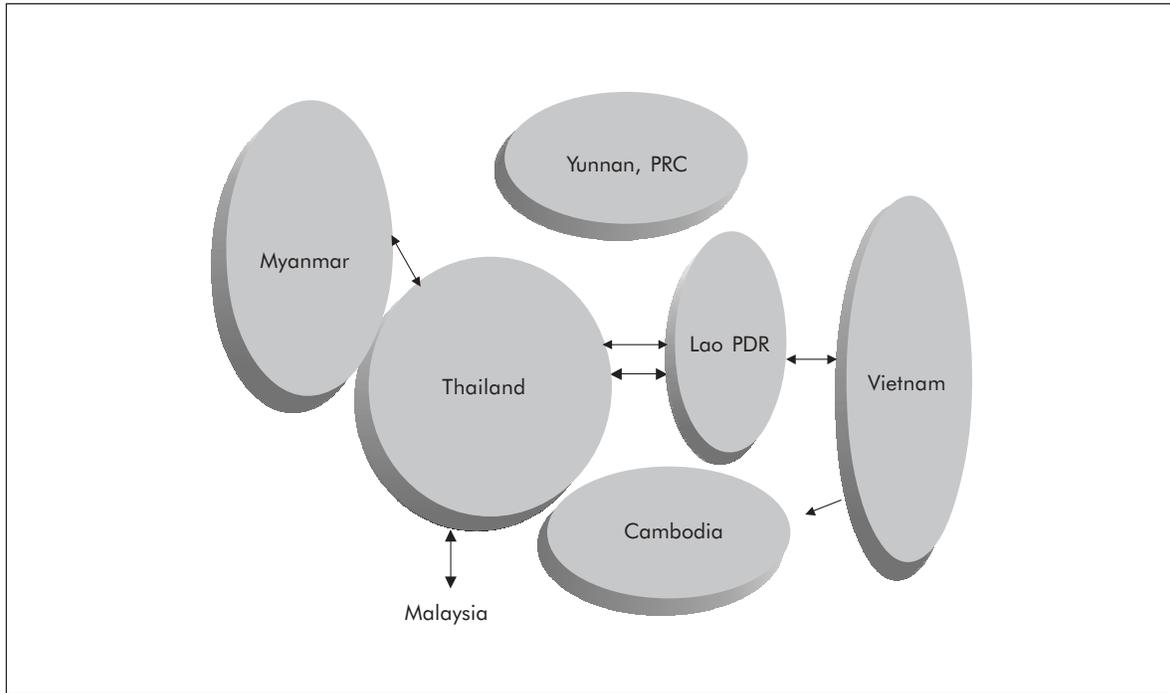
Findings and recommendations

Possible options and requirements for intermediate term

Transmission Infrastructure

- Development of trade depends upon expansion of transmission;
- New cross-border lines are directly related, and funded, to deliver generation capacity and energy from specific projects under long-term contracts;
- Rules have not been established in every member country regarding which entities:
 - will build new transmission;
 - have right of access; and
- Uniform terms and conditions for transmission have not been established within the region.

Figure A3.2: 2003 GMS Transmission Network



Recommendations

- Priorities should be established for proposed transmission projects;
- Identify projects which create regional network;
- Pricing methodology should be developed for regional third-party access;
- Institutional development study should :
 - Identify which entities may:
 - build new transmission;
 - have right of access; and
- Recommend uniform terms and conditions for transmission.

Regulation

- Generally, economic regulatory agencies have not yet been established in most GMS countries;
- Some countries plan to establish such entities;
- Regional regulation should be built on the basis of strong domestic member country regulators; and
- Consensus required as to division of authority between domestic and regional regulation.

Recommendations

- An institutional development study should recommend:
 - Division of authority between regional and member country regulators;
 - Staffing and organization plans for regional regulator;
 - Processes and procedures; and
 - Terms and conditions for access to and use of the regional network.

Markets

- Member countries are considering alternative designs for internal markets;
- Designs for internal wholesale markets are constrained by limited internal and regional generation and transmission infrastructure;
 - Strong infrastructures within China and Thailand will permit formation of more competitive internal markets;
- Long-term contracts (PPAs) generally do not permit reassignment;
- Possible types of transactions;
 - System-based sales or unit-based sales (PPAs are unit sales);
 - Transactions of varying duration;
 - Sales of energy, capacity, or a combination of the two;
 - Cost-based or market-based pricing;
 - Physical delivery transactions, financial hedging transactions, or a combination of the two; and
 - Resale of excess purchases in secondary markets.

Recommendations

- Internal markets should be developed in such a way as to permit and facilitate regional trading as the GMS regional generation and transmission infrastructure expands; and
- *Pro forma* model PPAs should be developed to meet the needs of generation developers, their financing institutions and facilitate migration to fluid markets, e.g., the buyer of capacity and energy should be permitted to sell any temporary excess purchases in a secondary market.

Develop a Set of Principles for Regional Market Design

Examples Include:

- Provide flexibility as to which entities may trade in the market;
- Market design should be simple and easily understood by participants;
- Provide a range of choices of kinds of transactions available to participants in the regional market;
- Permit smooth transition to an expanded market at a later date;
- Cost to participate in the regional market should be low;
- Administration of the regional market should be simple and low cost;
- Market rules and administration of the rules should be transparent;
- Market should permit monitoring and enforcement of centrally administered trading; and
- Regulation of the regional market should not conflict with regulation of markets within participating countries.

Market Participants

- Eligible participants in the regional market may differ from one GMS country to another;
- Each of the GMS countries is developing its internal market and industry structure in accordance with its own needs;
 - Different internal market structures will be implemented according to different timetables;
- Under existing industry structures, there may only be a single trading party for each of the countries for system sales;
 - Generation developers negotiating long-term bilateral transactions subject to government approval on both sides of a specific border; and
 - Some member country industry structures could result in distribution companies which independently buy from other entities in other countries.

Recommendations

- Clearly identify which entities are entitled to enter into cross-border transactions within each country

Obligation to Install or Contract Generating Capacity

- Benefit of sharing diversity of generating unit outages among members of regional market;
- Will GMS require each market participant to install and operate or to contract for sufficient generating capacity to meet specified criteria?
 - Sufficient capacity to permit meeting reliability criteria with both scheduled and unscheduled outages of units;
 - In three of the US markets and in Latin America, there is an obligation to contract for generating capacity;
 - No contract obligation in other markets in the US, the UK and Australia;
- Decisions regarding a capacity obligation should be decided before developing the design of the energy market;
 - If there is no obligation to install generating capacity and payment for that capacity, energy pricing must be sufficient to attract investment in generation as is the case of Australia and as was the case with the initial market in England and Wales; and
- Low energy prices under, NETA in the UK has resulted in generation being removed from commercial service.

Recommendations

- The GMS members should consider and come to a common agreement as to whether or not it will have an obligation to contract for a specified minimum of generating capacity in order to be permitted to trade in the regional market; and
- If the decision is to impose such a requirement, the rules and procedures for meeting that requirement will have to be developed.

Role of the Regional Market Administrator

- General agreement among GMS members that there should be an RMA;
- With few trading parties, it is practical for each market participant to contact all others hourly;
- Recommendation:
 - All transactions should be submitted to the RMA to determine that sufficient transmission capacity exists and that reliability criteria will be met;
 - RMA may assist in identifying possible bilateral transactions;
- As the number of trading parties increases, a bulletin board may prove to be of value;
- As the number of trading parties increases further, the RMA may also operate an energy broker;
- Norway and New York Power Pool markets evolved from energy broker operations; and

- Benefit of a broker is proportionate to the number of trading parties, e.g., if there are only six trading parties within the GMS, such a mechanism may have relatively little value.

Transition Issues

- A staging process is suggested during which the market participants could build their expertise to negotiate transactions;
- During this period, a RMA could assist in arranging short-term transactions; and
- Market participants would be expected to negotiate long-term transactions from the very beginning of the implementation of a regional market.

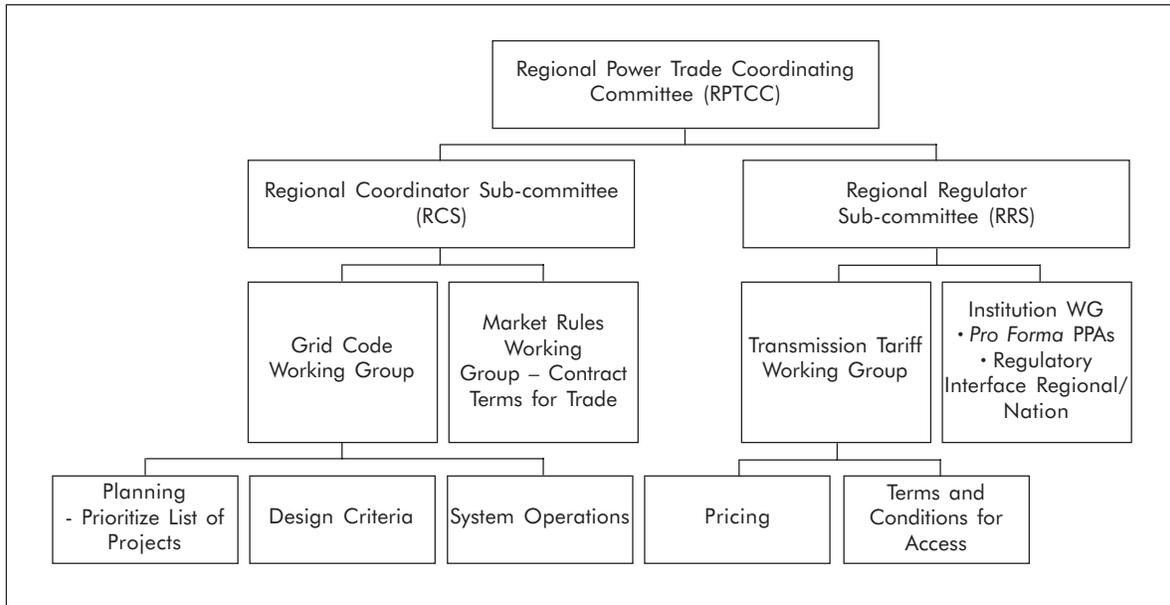
Role of the Regional Power Trade Coordinating Committee

- The RPTCC has been formed;
- Important issues will have to be addressed including all of those stated in previous slides. In addition:
 - Governance processes will have to be designed for the:
 - RC;
 - RR;
 - Will members of the oversight boards be drawn from:
 - Entities which trade in the markets or which operate transmission; or
 - Will they be independent from any market participant; or
 - A combination of the above two possibilities.

Recommendations

- The RPTCC should:
 - Facilitate cross-border trading before the regional market has been formally designed and implemented;
 - Act as project manager and ultimate decision maker;
 - Establish sub-committees and working groups;
 - Structure working groups to create “embryo” or shadow institutions;
- RC;
- RR;
- The RPTCC should:
 - Design the governance structure for the RC and the RR; and
 - Determine the location of any day-to-day offices which may be established for the RC and the RR.

Figure A3.3: Illustration of Implementation Organizational Structure



Annex 4

Presentation on Study of Options for the Structure of the GMS Power Trade Market for the World Bank

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Next Steps

Presentation Overview

- Vision and strategy for power trade and intermediate market in GMS;
- Recommended activities;
- Finalize GMS market structure options paper;
 - Comments and clarifications; and
- Discuss and agree on follow-up.

Vision of GMS Power Trade

- Engage in regional power trade and eventual market to obtain benefits at national and regional level; and
 - Terms of trade and market design for regional power trade can create value and benefits for all participants, and provide a framework to mitigate and share risks.

Strategy

- Benefits realized through evolutionary development to the intermediate market
Evolutionary model promotes and aligns with progress in power sector reforms and infrastructure creation – at national and regional levels;
 - **Near-term:** small-scale-trade within the next two years using a regional framework plus activities to facilitate regional market development (medium- and long-term);
 - **Intermediate-term:** expanded competition, bilateral plus energy trade; and
 - **Long-term:** competitive market, central administration.

Strategy: Create Conditions for Intermediate GMS Power Trade Market

- Develop national and regional infrastructure for power trade;
- Assure each country can operate as a single electrical control area;
- Develop technical and commercial rules and procedures to govern regional trade;
- Develop transmission rules;
- Develop regional institutions to manage trade; and
- Provide training/capacity-building in all aspects of regional power trade.

Strategy Implementation: Recommended Activities

From Report

- Study of supporting regulatory and institutional framework, including transmission provision and access; and interface between national and regional regulation;
- Develop *pro forma* PPAs and contract terms for trade;
- Develop inventory of existing or planned projects that could be used to begin small-scale trade in the next two years;
- Prioritized a list of projects with high potential to boost regional trade, especially those in advanced stages of preparation;
- Establish the new GMS power trade website;
- Develop technical guidelines (PTOA process); and
- GMS power trade business/investment forum.

Add: RPTCC support (develop recommendation to Ministers on GMS power market structure and phases; work plan and critical path analysis, other)

Other: Country representatives additions.

Coordinate with other regional initiatives – where appropriate – to gain maximum support for projects and activities; expand development partners; and avoid duplication and inefficient use of resources (Examples: CLMV, AIMS, GMS-BF, Asian Bond Market)

Table A4.1: Strategy Implementation: Recommended Activities

<i>Structure Activities to Address Intermediate Stages</i>	<i>First Stage: Start-up Small-scale Regional Trade Within Next Two Years</i>	<i>Second Stage Two Market</i>
Regulatory & Institutional Study	Assess if any changes are required to begin trade	Full range of regional institutional/regulatory issues to support market
<i>Pro Forma</i> PPA & Contract Terms	Standard terms sheet for energy trade, mutual aid	PA terms, renegotiation provisions, etc.
Project Identification & Prioritization	Identify viable small-scale projects/upgrades to begin trade	Priority regional project inventory
Knowledge Management	GMS power trade website	Centralization market support, monitoring
Investment Forum &/or Trade Association various	One-time donor/investor forum following project prioritization process	Ongoing GMS electricity business association parties

Regulatory and Institutional Study GMS Power Trade

Objective: Near-term

Assist GMS in evaluating the sufficiency of current regulatory/institutional environment to facilitate small-scale power trade

Output

Short report: a) summarizing any current requirements; b) identifying any gaps and/or obstacles; and c) if gaps/obstacles exist, formulation of provisions for GMS countries to consider to remedy.

***Pro Forma* Contracts Activity**

Objective

Assist GMS in realizing maximum benefits from regional IPP projects by developing a set of *Pro forma* PPA provisions to provide sufficient flexibility to accommodate evolution of the

market, as well as to address risk-sharing regarding fluctuations in external environment (interest and exchange rate, fuel price, etc.)

Coordinated GMS Approach

Several similar country-specific initiatives to develop PPAs under way in GMS, need to ensure compatibility.

Output

Handbook of PPA provisions specific to GMS will account for needs and practice in the region, as well as the need to balance interests of parties in realistic ways.

Pro Forma PPA Provisions and Contract Terms for Power Trade in the GMS

Intermediate Market

- Infrastructure required for trade will use private financing (foreign, regional domestic), and PPAs;
- Long-term PPAs can be obstacles to market evolution, as well as to economic scheduling and dispatch;
- Balance needs of private capital providers with flexibility needed to evolve into a market; and
- New best-practice: benefit from experience of others.

Near-term

Facilitate development of small-scale trade

- Standard terms and conditions for electricity transactions.

Pro Forma Provisions: Energy Sales Contracts

Objective – Near-term

Develop regionally accepted contract terms to facilitate development of small-scale trade in GMS and provide experience with standardized trade prior to intermediate market

Output

Handbook of standard terms and provisions for electricity trade contracts in the GMS region (energy, mutual support, etc.)

GMS Power Trade “Knowledge Management”

Objective – Near-term

Facilitate expanded power trade and investment in GMS Power through development of the GMS power trade website. Could provide:

- Communication platform amongst GMS parties;
- Knowledge base – GMS power sector information bank forum for information exchange and reporting according to agreed protocols;
- Comfort with sharing data for intermediate market; and
- External promotion services.

Output

GMS power trade website, with mechanisms for updating and monitoring (RPTCC/working groups)

Objective – Intermediate Market

Develop a communications center to support growth of GMS power trade into an efficient regional power market (e.g., maintaining reliable and stable operation, administering trading, monitoring, providing additional benefits to members through studies, databases, etc.)

Requires sufficient number of participants to be a viable tool for trade

Output

Functions agreed and action plan to implement central market support, to include: staffing, facilities and equipment, communications and networks, necessary software/hardware, training and development

GMS Power Trade Project Prioritization

Objective – Near-term

- Identify and prioritize areas where upgrading or minor investment in generation or transmission lines will create opportunity for bilateral trade within two years

Objective – Develop Infrastructure for Intermediate Market

Provide a roadmap for investment in power trade infrastructure by establishing: GMS regional power trade priority project inventory, based on economic and financial analysis

GMS Power Trade Investment Conference/Forum

Objective – Near-term

Develop priority infrastructure required to support GMS power trade and realize benefits from trade

Output

- Donor and investor conference for GMS power trade to present agreed priority infrastructure and technical assistance projects for financing and support

GMS Power Trade Business Association

Objective – Intermediate Market

Facilitate development of GMS power trade

Output

- A regular forum to discuss regional electricity issues and raise awareness about benefits and opportunities (utilities, manufacturers, large consumers, municipal groups, etc.)

Timing of Report’s Recommended Activities

Move Forward Together now on

- Priority project inventory;
- Development of recommended market structure for GMS ministers;
- *Pro forma* PPA and contracts; and
- Supporting regulatory institutional framework.

Can be Followed by

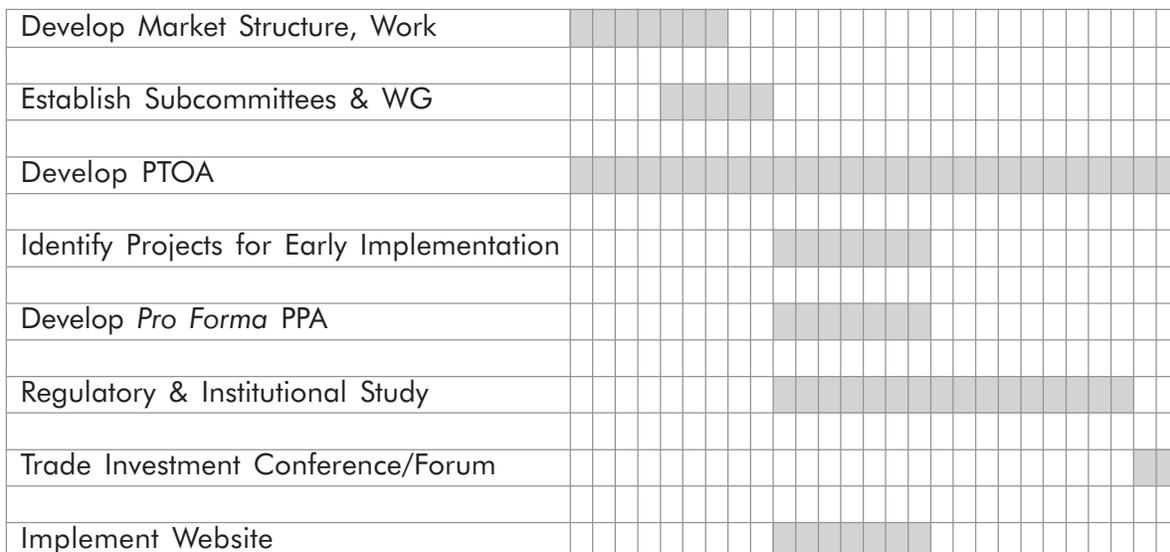
- GMS power trade knowledge management; and
- GMS power trade business forum/association.

Developing GMS Power Trade: Next Steps

At EPF-10 Meeting

- Agree on finalization of market structure options report;
- Agree on process to move forward with vision, strategy and recommended activities; and
- Ensure coordination amongst activities (PTOA process, institutional/regulatory work, *pro forma* PPAs, project inventories).

Figure A4.1: Indicative Plan for Transition to Intermediate Market



Finalizing Options Report: Comments and Clarifications

Received as on November 11, 2003

- Comments/Clarifications;
 - Timing of 2010 for intermediate market;
 - Clarification of capacity obligation;
 - Other;
- Corrections;
 - Cross-border transmission line; and
 - Other fact corrections: provide marked copy.

List of Technical Reports

Region/Country	Activity/Report Title	Date	Number
SUB-SAHARAN AFRICA (AFR)			
Africa	Power Trade in Nile Basin Initiative Phase II (CD Only): Part I: Minutes of the High-level Power Experts Meeting; and Part II: Minutes of the First Meeting of the Nile Basin Ministers Responsible for Electricity	04/05	067/05
	Introducing Low-cost Methods in Electricity Distribution Networks	10/06	104/06
Cameroon	Decentralized Rural Electrification Project in Cameroon	01/05	087/05
Chad	Revenue Management Seminar. Oslo, June 25-26, 2003. (CD Only)	06/05	075/05
Côte d'Ivoire	Workshop on Rural Energy and Sustainable Development, January 30-31, 2002. (<i>Atelier sur l'Energie en régions rurales et le Développement durable 30-31, janvier 2002</i>)	04/05	068/05
Ethiopia	Phase-Out of Leaded Gasoline in Oil Importing Countries of Sub-Saharan Africa: The Case of Ethiopia - Action Plan.	12/03	038/03
	Sub-Saharan Petroleum Products Transportation Corridor: Analysis and Case Studies	03/03	033/03
	Phase-Out of Leaded Gasoline in Sub-Saharan Africa	04/02	028/02
	Energy and Poverty: How can Modern Energy Services Contribute to Poverty Reduction	03/03	032/03
East Africa	Sub-Regional Conference on the Phase-out Leaded Gasoline in East Africa. June 5-7, 2002.	11/03	044/03
Ghana	Poverty and Social Impact Analysis of Electricity Tariffs	12/05	088/05
	Women Enterprise Study: Developing a Model for Mainstreaming Gender into Modern Energy Service Delivery	03/06	096/06
	Sector Reform and the Poor: Energy Use and Supply in Ghana	03/06	097/06
Kenya	Field Performance Evaluation of Amorphous Silicon (a-Si) Photovoltaic Systems in Kenya: Methods and Measurement in Support of a Sustainable Commercial Solar Energy Industry	08/00	005/00
	The Kenya Portable Battery Pack Experience: Test Marketing an Alternative for Low-Income Rural Household Electrification	12/01	05/01
Malawi	Rural Energy and Institutional Development	04/05	069/05
Mali	Phase-Out of Leaded Gasoline in Oil Importing Countries of Sub-Saharan Africa: The Case of Mali - Action Plan. (<i>Elimination progressive de l'essence au plomb dans les pays importateurs de pétrole en Afrique subsaharienne. Le cas du Mali — Mali Plan d'action</i>)	12/03	041/03
Mauritania	Phase-Out of Leaded Gasoline in Oil Importing Countries of Sub-Saharan Africa: The Case of Mauritania - Action Plan. (<i>Elimination progressive de l'essence au plomb dans les pays importateurs de pétrole en Afrique subsaharienne. Le cas de la Mauritanie – Plan d'action.</i>)	12/03	040/03

Region/Country	Activity/Report Title	Date	Number
Nigeria	Phase-Out of Leaded Gasoline in Nigeria	11/02	029/02
	Nigerian LP Gas Sector Improvement Study	03/04	056/04
	Taxation and State Participation in Nigeria's Oil and Gas Sector	08/04	057/04
Regional	Second Steering Committee: The Road Ahead. Clean Air Initiative In Sub-Saharan African Cities. Paris, March 13-14, 2003.	12/03	045/03
	Lead Elimination from Gasoline in Sub-Saharan Africa. Sub-regional Conference of the West-Africa group. Dakar, Senegal March 26-27, 2002 (<i>Deuxième comité directeur : La route à suivre - L'initiative sur l'assainissement de l'air. Paris, le 13-14 mars 2003</i>)	12/03	046/03
	1998-2002 Progress Report. The World Bank Clean Air Initiative in Sub-Saharan African Cities. Working Paper #10 (Clean Air Initiative/ESMAP)	02/02	048/04
	Landfill Gas Capture Opportunity in Sub Saharan Africa	06/05	074/05
	The Evolution of Enterprise Reform in Africa: From State-owned Enterprises to Private Participation in Infrastructure-and Back?	11/05	084/05
Senegal	Regional Conference on the Phase-Out of Leaded Gasoline in Sub-Saharan Africa (<i>Elimination du plomb dans l'essence en Afrique subsaharienne Conférence sous regionales du Groupe Afrique de l'Ouest. Dakar, Sénégal. March 26-27, 2002.</i>)	03/02	022/02
	Alleviating Fuel Adulteration Practices in the Downstream Oil Sector in Senegal	12/03	046/03
		09/05	079/05
South Africa	South Africa Workshop: People's Power Workshop.	12/04	064/04
Swaziland	Solar Electrification Program 2001 2010: Phase 1: 2001 2002 (Solar Energy in the Pilot Area)	12/01	019/01
Tanzania	Mini Hydropower Development Case Studies on the Malagarasi, Muhuwesi, and Kikuletwa Rivers Volumes I, II, and III	04/02	024/02
	Phase-Out of Leaded Gasoline in Oil Importing Countries of Sub-Saharan Africa: The Case of Tanzania - Action Plan.	12/03	039/03
Uganda	Report on the Uganda Power Sector Reform and Regulation Strategy Workshop	08/00	004/00
WEST AFRICA (AFR)			
Regional	Market Development	12/01	017/01
EAST ASIA AND PACIFIC (EAP)			
Cambodia	Efficiency Improvement for Commercialization of the Power Sector	10/02	031/02
	TA For Capacity Building of the Electricity Authority	09/05	076/05
China	Assessing Markets for Renewable Energy in Rural Areas of Northwestern China	08/00	003/00
	Technology Assessment of Clean Coal Technologies for China Volume I-Electric Power Production	05/01	011/01
	Technology Assessment of Clean Coal Technologies for China Volume II-Environmental and Energy Efficiency Improvements for Non-power Uses of Coal	05/01	011/01
	Technology Assessment of Clean Coal Technologies for China Volume III-Environmental Compliance in the Energy Sector: Methodological Approach and Least-Cost Strategies	12/01	011/01
	Policy Advice on Implementation of Clean Coal Technology	09/06	104/06
	Scoping Study for Voluntary Green Electricity Schemes in Beijing and Shanghai	09/06	105/06
Papua New Guinea	Energy Sector and Rural Electrification Background Note	03/06	102/06
Philippines	Rural Electrification Regulation Framework. (CD Only).	10/05	080/05
Thailand	DSM in Thailand: A Case Study	10/00	008/00
	Development of a Regional Power Market in the Greater Mekong Sub-Region (GMS)	12/01	015/01
	Greater Mekong Sub-region Options for the Structure of the GMS Power Trade Market A First Overview of Issues and Possible Options	12/06	108/06

Region/Country	Activity/Report Title	Date	Number
Vietnam	Options for Renewable Energy in Vietnam	07/00	001/00
	Renewable Energy Action Plan	03/02	021/02
	Vietnam's Petroleum Sector: Technical Assistance for the Revision of the Existing Legal and Regulatory Framework	03/04	053/04
	Vietnam Policy Dialogue Seminar and New Mining Code	03/06	098/06
SOUTH ASIA (SAS)			
Bangladesh	Workshop on Bangladesh Power Sector Reform	12/01	018/01
	Integrating Gender in Energy Provision: The Case of Bangladesh	04/04	054/04
	Opportunities for Women in Renewable Energy Technology Use In Bangladesh, Phase I	04/04	055/04
EUROPE AND CENTRAL ASIA (ECA)			
Azerbaijan	Natural Gas Sector Re-structuring and Regulatory Reform	03/06	099/06
Macedonia	Elements of Energy and Environment Strategy in Macedonia	03/06	100/06
Poland	Poland (URE): Assistance for the Implementation of the New Tariff Regulatory System: Volume I, Economic Report, Volume II, Legal Report	03/06	101/06
Russia	Russia Pipeline Oil Spill Study	03/03	034/03
Uzbekistan	Energy Efficiency in Urban Water Utilities in Central Asia	10/05	082/05
MIDDLE EASTERN AND NORTH AFRICA REGION (MENA)			
Regional	Roundtable on Opportunities and Challenges in the Water, Sanitation And Power Sectors in the Middle East and North Africa Region. Summary Proceedings, May 26-28, 2003. Beit Mary, Lebanon. (CD)	02/04	049/04
Djibouti	Potentiel de réduction des coûts de l'électricité et Stratégie sectorielle d'accroissement de l'accès à l'Énergie en République de Djibouti	02/07	110/07
Morocco	Amélioration de l'Efficacité Énergie: Environnement de la Zone Industrielle de Sidi Bernoussi, Casablanca	12/05	085/05
LATIN AMERICA AND THE CARIBBEAN REGION (LCR)			
Brazil	Background Study for a National Rural Electrification Strategy: Aiming for Universal Access	03/05	066/05
	How do Peri-Urban Poor Meet their Energy Needs: A Case Study of Caju Shantytown, Rio de Janeiro	02/06	094/06
Bolivia	Country Program Phase II: Rural Energy and Energy Efficiency Report on Operational Activities	05/05	072/05
Chile	Desafíos de la Electrificación Rural	10/05	082/05
Colombia	Desarrollo Económico Reciente en Infraestructura: Balanceando las necesidades sociales y productivas de la infraestructura	03/07	325/05
Ecuador	Programa de Entrenamiento a Representantes de Nacionalidades Amazónicas en Temas Hidrocarbúricos	08/02	025/02
	Stimulating the Picohydropower Market for Low-Income Households in Ecuador	12/05	090/05
Guatemala	Evaluation of Improved Stove Programs: Final Report of Project Case Studies	12/04	060/04
Haiti	Strategy to Alleviate the Pressure of Fuel Demand on National Woodfuel Resources (English) <i>(Stratégie pour l'allègement de la Pression sur les Ressources Ligneuses Nationales par la Demande en Combustibles)</i>	03/07	112/07

Region/Country	Activity/Report Title	Date	Number
Honduras	Remote Energy Systems and Rural Connectivity: Technical Assistance to the Aldeas Solares Program of Honduras	12/05	092/05
Mexico	Energy Policies and the Mexican Economy	01/04	047/04
	Technical Assistance for Long-Term Program for Renewable Energy Development	02/06	093/06
Nicaragua	Aid-Memoir from the Rural Electrification Workshop (Spanish only)	03/03	030/04
	Sustainable Charcoal Production in the Chinandega Region	04/05	071/05
Perú	Extending the Use of Natural Gas to Inland Perú (Spanish/English)	04/06	103/06
	Solar – Diesel Hybrid Options for the Peruvian Amazon: Lessons Learned from Padre Cocha	03/07	111/07
Regional	Regional Electricity Markets Interconnections - Phase I		
	Identification of Issues for the Development of Regional Power Markets in South America	12/01	016/01
	Regional Electricity Markets Interconnections - Phase II		
	Proposals to Facilitate Increased Energy Exchanges in South America	04/02	016/01
	Population, Energy and Environment Program (PEA)		
	Comparative Analysis on the Distribution of Oil Rents (English and Spanish)	02/02	020/02
	Estudio Comparativo sobre la Distribución de la Renta Petrolera		
	Estudio de Casos: Bolivia, Colombia, Ecuador y Perú	03/02	023/02
	Latin American and Caribbean Refinery Sector Development Report - Volumes I and II	08/02	026/02
	The Population, Energy and Environmental Program (EAP) (English and Spanish)	08/02	027/02
	Bank Experience in Non-energy Projects with Rural Electrification Components: A Review of Integration Issues in LCR	02/04	052/04
	Supporting Gender and Sustainable Energy Initiatives in Central America	12/04	061/04
	Energy from Landfill Gas for the LCR Region: Best Practice and Social Issues (CD Only)	01/05	065/05
	Study on Investment and Private Sector Participation in Power Distribution in Latin America and the Caribbean Region	12/05	089/05
GLOBAL			
	Impact of Power Sector Reform on the Poor: A Review of Issues and the Literature	07/00	002/00
	Best Practices for Sustainable Development of Micro Hydro Power in Developing Countries	08/00	006/00
	Mini-Grid Design Manual	09/00	007/00
	Photovoltaic Applications in Rural Areas of the Developing World	11/00	009/00
	Subsidies and Sustainable Rural Energy Services: Can we Create Incentives Without Distorting Markets?	12/00	010/00
	Sustainable Woodfuel Supplies from the Dry Tropical Woodlands	06/01	013/01
	Key Factors for Private Sector Investment in Power Distribution	08/01	014/01
	Cross-Border Oil and Gas Pipelines: Problems and Prospects	06/03	035/03
	Monitoring and Evaluation in Rural Electrification Projects: A Demand-Oriented Approach	07/03	037/03
	Household Energy Use in Developing Countries: A Multicountry Study	10/03	042/03
	Knowledge Exchange: Online Consultation and Project Profile from South Asia Practitioners Workshop. Colombo, Sri Lanka, June 2-4, 2003	12/03	043/03

Region/Country	Activity/Report Title	Date	Number
	Energy & Environmental Health: A Literature Review and Recommendations	03/04	050/04
	Petroleum Revenue Management Workshop	03/04	051/04
	Operating Utility DSM Programs in a Restructuring Electricity Sector	12/05	058/04
	Evaluation of ESMAP Regional Power Trade Portfolio (TAG Report)	12/04	059/04
	Gender in Sustainable Energy Regional Workshop Series: Mesoamerican Network on Gender in Sustainable Energy (GENES) Winrock and ESMAP	12/04	062/04
	Women in Mining Voices for a Change Conference (CD Only)	12/04	063/04
	Renewable Energy Potential in Selected Countries: Volume I: North Africa, Central Europe, and the Former Soviet Union, Volume II: Latin America	04/05	070/05
	Renewable Energy Toolkit Needs Assessment	08/05	077/05
	Portable Solar Photovoltaic Lanterns: Performance and Certification Specification and Type Approval	08/05	078/05
	Crude Oil Prices Differentials and Differences in Oil Qualities: A Statistical Analysis	10/05	081/05
	Operating Utility DSM Programs in a Restructuring Electricity Sector	12/05	086/05
	Sector Reform and the Poor: Energy Use and Supply in Four Countries: Botswana, Ghana, Honduras and Senegal	03/06	095/06



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