

Comments on Study For a Regional Power Trade Operating Agreement In The Greater Mekong Sub-Region, TA 6100-REG, Final Report

Prepared for Palang Thai, Bangkok.

Date: 2005-06-24

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Executive Summary

The *PTOA-General Design, Final Report: Study For A Regional Power Trade Operating Agreement In The Greater Mekong Sub-Region*, prepared for Asian Development Bank by Mercados Energeticos – Soluziona, presents a design for the Power Trade Operating Agreement (PTOA) and describes an organizational structure and operational procedures that promote electricity trade among the GMS nations. The report calls for a four-stage implementation designed to harmonize the capabilities and procedures of the member nations and evolve in a uniform manner to a market-based interconnection. No timetable is given for implementation of the four stages. Details are provided only for the first two stages; the two later stages are described only in broad outline.

The proposals in the report create concerns over cost, regulatory issues, and organisational structure.

The most serious concern with the report's proposals is the wisdom of committing to an expensive, long-term electricity trade arrangement without certainty of the economic benefits. While from an engineering standpoint there is no doubt that interconnecting power systems can bring operating benefits, the costs may not always justify the benefits.

The *Indicative Master Plan on Power Interconnection in GMS Countries*, prepared for the Asian Development Bank by Norconsult) showed that, for the recommended long-term expansion alternative the benefits would amount to US\$914 M for a total investment of US\$43,496 M. The claimed \$914 M in savings results from savings and benefits of \$2071 M in generation, made possible by an additional investment of \$1157 M in transmission.

The analysis in the *Indicative Master Plan* is based on a conventional vertically integrated utility model, where generation costs and transmission costs all accrue to the same account. This is not the case in a market or semi-market environment such as the proposed PTOA, however. There is no reason to believe that generation costs with the PTOA will converge to marginal costs in the absence of perfect competition, which cannot occur before Stage 4, and is unlikely to occur for many years thereafter because of limited cross-border transmission capacity into the distant future. Thus there does not appear to be any guarantee that consumer-funded investments in a regional transmission system will bring the expected reduction in generation prices to those consumers any time soon.

Without a strong independent regulator to oversee and approve construction of regional

transmission lines there is little reason to believe the interests of the consumers (and other vulnerable stakeholders) will be protected. This introduces the second primary concern with the report's proposals: lack of transparent, independent and participatory regulation in (at least) the first stages of implementation.

In the early stages of the PTOA implementation a primary purpose of the proposed "Regional Regulatory Board" is to facilitate cross-border power exchanges. The report recommends against implementing "a highly independent regional regulatory agency during Stages #1 and #2" because, among other reasons, "the introduction of liberalization and truly competitive markets is not a short or medium-term objective of GMS countries." Yet the non-existence of truly competitive markets is one of the primary motivations for strong and independent regulation. With perfect (or even near-perfect) competition the market can be expected, after time, to respond to the desires of the consumer. Without competition, however, the situation demands an independent regulator who can ensure, among other things, that regional transmission investments are prudent, timely and in the best interests of the consumer. Such an independent regulator is needed, before aggressively pursuing cross-border transmission investments, to provide for meaningful intervention by consumers and other vulnerable stakeholders in decisions on investments that will ultimately become their lasting burden.

Introduction

The comments in this document are based on the author's review of:

- *Executive Summary, Final Report: Study For A Regional Power Trade Operating Agreement In The Greater Mekong Sub-Region.* Prepared for Asian Development Bank by Mercados Energeticos - Soluziona (TA 6100-REG, P 083-02). November 2004.
- *PTOA-General Design, Final Report: Study For A Regional Power Trade Operating Agreement In The Greater Mekong Sub-Region.* Prepared for Asian Development Bank by Mercados Energeticos - Soluziona (TA 6100-REG, P 083-02). October 2004.
- Presentation materials and participant remarks from the Regional Power Trade Coordinating Committee Meeting #2 (1-2 December 2004, Bangkok).

The reviewed material presents a design for the Power Trade Operating Agreement (PTOA), describing an organizational structure and operational procedures that promote electricity trade among the GMS nations.

The PTOA is intended to define the rules (and environment) for commercial transactions on a regional transmission system. The PTOA defines the commercial operation of the regional network in the same way that the Grid Code defines the technical operation. Both the PTOA and the Grid Code are expected to evolve continuously during the evolution to market-based operation on a regional transmission system.

Staged Implementation

The implementation of the PTOA is divided into four stages designed to harmonize the capabilities and procedures of the member nations and evolve in a uniform manner to a market-based interconnection.

Stage 1 is largely a continuation of current practice, except for the start of activities intended to influence national utilities and governments to allow for future regional integration in their ongoing activities. Examples include: development of recommended standard conditions for Power Purchase Agreements (PPAs); steps to expedite cross-border transmission links (the few which now exist are either low-capacity or already fully used); addition of a regional perspective to operations planning; and recommendations for expansion planning which consider long-term regional requirements. A particular goal of intervention in expansion planning is to ensure surplus capacity on transmission links that would otherwise only allow for power flows required by existing PPAs. This surplus capacity would then be used in Stage 2.

Stage 2 begins when "any two of at least four" GMS nations can engage in electricity trading, either directly or through a third nation (e.g. China to Thailand through Lao PDR). At this stage the interconnected parties would be able to engage in opportunistic electricity exchanges based on economic savings. The opportunistic exchanges at this stage would bring the first (probably minor) benefits associated with the PTOA. Stage 2 would be considered successful (thus enabling transition to Stage 3) when there is enough cross-border transmission capacity "to allow significant savings in operations costs."

Stage 3 begins when Stage 2 has achieved "success" (significant operational savings, presumably ignoring the sunk costs associated with creation and ramp-up of the PTOA) and when the following conditions have been achieved:

- (1) Acceptance by the GMS countries of regional planning;
- (2) Implementation of the regional planning recommendations, including recommended cross-border transmission links; and
- (3) Acceptance by the GMS countries of PPAs that better reflect the needs of regional operation, including regional dispatch of the contracted power.

Since the above conditions cannot be either scheduled or predicted, Stage 3 is seen as having significant uncertainty as to starting date.

Stage 3 would see all the GMS countries interconnected with 230-500 kV transmission links that would have sufficient capacity to permit cross-border economic exchanges. It would also see the first opportunity for parties other than the national utilities to participate in cross-border electricity trade. It would also introduce centralized operation of the regional transmission network by a Regional System Operator.

Clearly, substantial transmission system investment would be required to facilitate this stage.

Stage 4 begins when the GMS nations accept legal and regulatory changes for their national electricity sectors that are needed to enable a free electricity market. Stage 4 is the first stage at which a true electricity market could be considered to exist, whereby third parties could (more-or-less independently) engage in cross-border electricity trade. At this point the regional transmission network would be sufficiently developed to support significant trade. The objective of this stage would be a fully competitive market.

Because of the uncertainties associated with moving to Stages 3 and 4, the study only considered the detailed development of the PTOA for the first two stages.

Organizational Structure

"The Inter-Governmental Agreement on Power Trade in the Greater Mekong Sub-Region (IGA) ... calls for the establishment of the Regional Power Trade Coordination Committee (RPTCC) to coordinate the implementation of regional power trade under the IGA.

The RPTCC reports ... to the GMS Ministerial Level Conference and the corresponding governments through the Ministers."

The RPTCC is created at Stage 1. Under the RPTCC, the report recommends the creation of the:

- Management Committee (MC)
- Regional Regulatory Board (RRB)
- Regional Transaction Co-ordinator (RTC)
- Planning Working Group (PWG)
- Other standing working groups as decided by the RPTCC (WGs)

The report calls for the RPTCC to create the MC at Stage 2. The MC is an executive group within the RPTCC that is responsible for day-to-day interactions with the remaining PTOA organisations. The MC is to consist of one member from each country that has signed and ratified the IGA. At Stage 2 the MC is to have a permanent office location in one of the member countries along with permanent staff. At this time regular funding is to be provided, either from international or governmental funds or a tax or levy on cross-border energy flows. (Prior to Stage 2 funding is to be provided by each member country for their own member.)

The RRB is to be created at Stage 1. The role of the RRB is to promote trade of electricity among the GMS countries, including: recommending elimination of inhibiting national regulations; encouraging consistent regulations; promoting regulations and mechanisms which will govern international electricity trading; promoting common standards for safety, security, reliability and quality of service for the Regional Transmission Network (RTN); promoting agreements which facilitate construction of cross-border transmission links; assisting with dispute resolution; promoting transparency of information; approving tariffs; setting penalties for non-compliance; participating in regional planning; and market surveillance.

At Stage 3 the RRB is to be converted into a Regional Regulatory Agency (RRA).

The RRB is to consist of one member from each country that has signed and ratified the IGA. By Stage 2 the RRB is to have a permanent office location in one of the member countries along with permanent staff. At this time regular funding is to be provided, either from international or governmental funds or a tax or levy on cross-border energy flows. (Prior to Stage 2 funding is to be provided by each member country for their own member.)

The RTC is to be created at Stage 2, and at Stage 3 "assumes all the functions and responsibilities of a Regional Market Operator." At Stage 2 the RTC's "main function[s] will be to determine the daily availability of cross-border transmission capacity, to receive offers and bids from Agents of the countries for selling-buying energy, to select the set of offers-bids that maximize the regional benefit, to inform the national TSO[s] on the selected transactions, and ex-post, to settle the transactions effectively realized." The TSOs are the Transmission System Operators, initially one for each country (as would exist now in each country with a major

electrical grid) but including, at Stage 3, a single Regional System Operator.

Under the RTC at Stage 2 is a Monitoring and Supervision Center (MSC), "which will be responsible for monitoring the operation of the RTN, and which will coordinate the actions of the TSOs during emergencies. The MSC will be the precursor to the Regional System Operator that will be put in place when Stage 3 starts."

Also under the RTC is a Dispatch Center [DC], which is responsible for day-ahead economic regional dispatch, settlements and the development and maintenance of a "regional data base" (apparently holding, among other things, power system data required for modelling and simulation).

The RTC is to be responsible for developing a maintenance program for lines belonging to the regional transmission grid; short- and medium-term operating plans (together with the OPWG); security analysis results for the regional system (together with the OPWG); and various reports related to market operation.

The RTC Board is to consist of one member from each country that has signed and ratified the IGA. By Stage 2 the RTC is to have a permanent office location in one of the member countries along with permanent staff, including permanent technical staff. At this time regular funding is to be provided, either from international or governmental funds or a tax or levy on cross-border energy flows. (Prior to Stage 2 funding is to be provided by each member country for their own member.)

The PWG is to be created at Stage 1. Responsibilities of the PWG include: in collaboration with the RTC, maintaining details of the current generation plants and the transmission system in the Regional Data Base; developing alternative plans and recommendations for the development of the regional transmission grid; and assisting the RPTCC and RRB with technical studies.

Under the PWG is a Regional Planning Working Group (RPWG), responsible for compiling information on generation plants and the transmission system and developing medium- and long-term expansion plans for the regional transmission system; and an Operational Planning Working Group (OPWG), responsible for analysing and reporting on emergency events on the Regional Transmission Network and performing short-term technical studies.

The PWG is to consist of one member from each country that has signed and ratified the IGA. However the PWG is to have no permanent location and no permanent staff. Staff for the PWG is to "be selected by the group's direction [sic] from the resources that will be available from the different countries. The staff will be selected specifically for each project or activity and will cease after the project or activity is accomplished."

Concerns Raised by the Study

Based on his review, the author found three major areas of concern:

- 1) Cost
- 2) Regulatory Issues
- 3) Organizational Structure

Cost

The most serious concern raised by the report is the wisdom of committing to an expensive, long-term electricity trade arrangement without certainty about the economic benefits.

Quoting from the *PTOA-General Design, Final Report*: “The main objective of the PTOA is to create the operational and regulatory framework for expanding regional electricity interconnections and electricity trading among the GMS countries. The objective of electricity trading is to cover the electricity and power demands in the most economical manner, while maintaining appropriate security and quality conditions.”

Thus the point of interconnection, and so the PTOA, is to “cover the electricity and power demands in the most economical manner”. It is reasonable to question whether this is a likely result.

From an engineering standpoint there is no doubt that interconnecting power systems can bring operating benefits such as increased reliability, improved regulation during system emergencies, the opportunity for reserve sharing, the ability to take advantage of load diversity, and the opportunity for economic interchange.

Whether, in any particular case, the costs justify the benefits, is not always so clear.

The *Indicative Master Plan on Power Interconnection in GMS Countries* (June 2002, TA No. 5920-REG, prepared for the Asian Development Bank by Norconsult) showed that, for the recommended long-term (to 2020) expansion alternative (Scenario 2B), the benefits would amount to US\$914 M for a total investment of US\$43,496 M--a savings of just over 2%.

Looked at in its most positive light, the \$914 M savings results from savings and benefits of \$2071 M in generation, made possible by an additional investment of \$1157 M in transmission. Any opportunity that produces a certain return of \$2 B for an investment of just over \$1 B can only look too good to be true. In this case, it probably is.

The analysis in the *Indicative Master Plan* is based on a conventional vertically integrated utility model, where generation costs and transmission costs all accrue to the same account. This is not the case in a market environment, however. In an electricity market, generation costs are set by the market, and are not necessarily related to marginal costs of generation. (The market and marginal costs converge only with perfect competition.)

In this case the additional \$1157 M costs for transmission go, as do all costs ultimately, to the electrical consumer in the form of a transmission tariff embedded in the rates they pay for electric power.

The \$2017 M benefits of lower generation costs accrue, however, to the (largely private sector) producers. Where competition is plentiful enough to force the producers to forgo some of their profits, the resulting lower costs trickle down to the consumers as lower electricity prices.

From the perspective of the consumer, then, are the probable reductions in energy prices low enough to offset the guaranteed increase in transmission tariffs? Consideration of the likely

competitive situation in at least the first three stages of the PTOA and analysis of the economic data for Scenario 2B in the *Indicative Master Plan* (Tables 6-14 and 6-16) suggest that they will not.

The only way to answer this question with confidence is to do a multi-year simulation of the power system along with operation of the market. This is a great deal of work and requires a great deal of data, repeating much of what Norconsult had done in the *Indicative Master Plan*, but this time in conjunction with a market simulation. The author is not equipped to do this type of simulation, and certainly could not have done so in the available time.

We can, however, make some reasonable assumptions and use reasoning to gain useful insight.

Disclaimer: The author did not have time available to look into the details of the proposed PTOA dispatch. The following rough analysis is indicative, but should not be viewed as a correct projected outcome under PTOA dispatch, or even necessarily a likely outcome.

We begin by recognizing that a true market cannot come about before Stage 4 of the PTOA implementation, which is likely to be in the far distant future. The consultants did not give any estimate for when Stage 4 may be reached, but appeared to be of the view it will be in the distant future. (“Currently, there are no fixed dates for the events that will produce the transition from one stage to the next. Meanwhile, the regulatory changes that are necessary for the beginning of Stage #4 are probably not even currently in mind of most of the GMS countries.”)

We thus analyse the situation in the first three stages of the PTOA, where a true market, and thus competitive supply and demand, do not yet exist.

The proposed method (for the PTOA) for allocating dispatch among the generating units is based upon bids and offers. The consultants go to some trouble to explain why they believe this method is a better choice than dispatch based on variable costs (pg. 49 of the report).

While the consultants may be correct in their preference, a problem arises because to develop the \$914 M net benefit Norconsult assumed dispatch based on variable costs. The consultants for the PTOA study (Soluziona) understand that “price-based offers and bids [are] effective [only] in markets with high levels of competition, where participants are encouraged to offer-bid their actual variable costs to maximize profits.” This is a situation approaching pure competition.

For at least the first three stages of the PTOA, however, competition will be very limited because of the expected small volume of cross-border opportunity transactions. Soluziona states “the relatively small volume of the cross-border opportunity transactions in relation with internal demands will mitigate the potential raise of price offers to excessive levels.” The author disagrees strongly with this assertion.

Experience in California and other jurisdictions has demonstrated that the two relatively unique traits of electricity—it’s non-storability and the “obligation to serve” of utilities (effectively eliminating price elasticity for short-term price movements)—allows even very small suppliers to exercise market power during peak load periods, when supplies are tight. Since the region is experiencing rapid growth (7-8% in Thailand and approximately 12% in PRC), it is reasonable to

expect cross-border transactions to be critical to maintaining load during peak periods. This situation is created when countries rely on imported power to meet predicted load growth without mitigating the risk with long-term fixed-price contracts (e.g. PPAs).

Thus the author believes that it is incorrect to expect that the low volume cross-border opportunities will cause prices to tend toward marginal prices.

On the other hand, as pointed out in the report, "From Stages #1 to #3, single buyers will be responsible for most (or all) of the cross-border transactions." Effectively then, there is a near monopsony during these early stages. It is long-term PPAs and this near monopsony, the author believes, and not the small proportion of cross-border energy compared with internal energy, which will act to help balance supplier market power.

It seems probable to this author that whatever accommodation develops between the two interests (the seller's interest in gaining the highest price, and the buyer's interest in gaining the lowest price) limited regional transmission capacity and rapid regional load growth will result in the balance point being significantly away from marginal cost in favour of sellers.

How this resolves will determine who gains the benefits from the interconnection. If sellers are able to use their knowledge of buyers' needs for their energy (from the forecasted national loads), they could gain the upper hand in bidding and earn more than their marginal costs, leaving the consumers with less than the expected energy price benefits in exchange for the additional transmission cost.

In the end, with seriously deficient competition, each party will get what they can "game" from the system. It is truly difficult to predict what may result, although experience with electrical markets has shown that prices rise rapidly under periods of short supply, which could well exist in the rapidly electrifying GMS region.

However the above situation resolves, the situation becomes worse for consumers as a result of uncertainty regarding the feasibility of many of the national inventories of potential generation projects.

The *PTOA-General Design, Final Report* states: "... there is not enough base information to estimate costs for developing hydro plants, gas fields or coal mines. Several of the hydro projects, primarily the most important resource in the region, are at desk- or pre-feasibility levels. There are no field studies that would allow for the verification of the civil work cost estimations. [sic] Hence, in order to forecast the pattern of probable cross-border trading, it was necessary to outline scenarios with several assumptions on the [sic] specific characteristics of the hydro power plants."¹

The report then goes on to say: "the energy flows in most of the scenarios are only limited by the capacity of international connections. This conclusion has been obtained from the simulations that have been done on the optimal joint operation of GMS electricity systems. It ... confirms the

¹ Note that the Vietnam representative at the 2004-12-02 RPTCC-2 conference stated that, for projects in Vietnam, "most of Hydro power plans had PreFS, FS, and Technical Design. It is expected that up to 2020, almost [all] Hydro power projects in Vietnam will be implemented."

economical convenience of cross-border trading among the GMS countries ...".

Taken together these statements lead us to conclude that, even though the project costs are not yet known to any reasonable degree of accuracy, the costs of electricity from the projects were assumed to be low enough to displace existing generation (with its known costs). This is not a very reassuring conclusion: the results were apparently driven by the assumptions.

Without completed hydrological, geological/geotechnical and environmental studies, little confidence can be placed in the assumed production costs from these future plants. With hydroelectric projects in particular, it is essential to know the capital costs with reasonable accuracy. The two major factors influencing electricity cost from hydroelectric plants are capital cost and average annual energy output, since most of the cost of electricity from hydroelectric projects is associated with paying off the initial investment. The "fuel", water, is generally available either for "free" or for a comparatively low "water use rent", so operating costs are generally nominal even after accounting for maintenance.

Without having completed feasibility studies for all of the main proposed projects, the economic benefit of the projects, and thus the entire interconnection plan, is uncertain.

In a situation such as this it would have been better if the consultant had presented the results of sensitivity studies, showing how the benefits would vary with variations in the assumptions (e.g. generation plant capital costs). If the expected benefits were very large as compared with the investment costs it may be reasonable to assume that an error in the benefits may not be severe. In the present case, however, with no certainty that prices for regional transactions will approach marginal costs, no such assumption can be made.

The generation projects included in the *Indicative Master Plan* obtained 42% of their firm capacity from projects located in the Lao PDR. Using data from a report on potential generation projects located in Laos (*Power System Development Plan For Lao PDR, Volume C : Project Catalogue*, August 2004, prepared for Lao People's Democratic Republic, Ministry of Industry & Handicrafts, Department of Electricity and the World Bank by Maunsell Limited in association with Lahmeyer GmbH), the author reviewed the updated status of the Lao projects in the *Indicative Master Plan*. By mid-2004 only eight of these fourteen projects (representing two-thirds of the firm power) had reached feasibility stage, at which point there is sufficient information to know if the projects are worth pursuing.

Table 1 shows the Lao PDR plants used in the *Indicative Master Plan* Scenario 2B (from Table 8 and Section 6.4) with 95% firm capacities and weighted average energy costs from *Power System Development Plan For Lao PDR, Volume C : Project Catalogue*. Some of the costs are relatively high, especially if transmission losses are considered.²

Meanwhile, there are a host of other costs associated with PTOA implementation. The costs in

² Average transmission costs are fairly involved to compute, requiring detailed simulations over annual time periods with varying loads, however a nominal value of 10% is sometimes used. With 10% average losses the effective cost of energy from Nam Theun 1, for example, would rise to 8.3 cents/kWh delivered to the buyer, plus applicable regional transmission charges.

Plant	Year	Country	WB 95% firm MW	Weighted Average Energy Cost (US cents/kWh)	Study Level
Nam Mo	2006	Lao PDR	118	2.4	Feasibility
Nam Theun 2	2008	Lao PDR	1010	1.4	Contract Reference Design
Nam Ngum 2	2008	Lao PDR	195	5.2	Inventory
Xe Pian-Xe Namnoy	2010	Lao PDR	219	5.4	Feasibility
Xe Kaman 1	2010	Lao PDR	413	2.7	Feasibility
Nam Theun 1	2012	Lao PDR	343	7.5	Inventory
Nam Kong 1	2012	Lao PDR	117	5.1	Pre-feasibility
Xe Kaman 3	2012	Lao PDR	254	2.6	Feasibility

Table 1. Status of Lao PDR generation projects included in *Indicative Master Plan Scenario 2B*. See text for references.

the *Indicative Master Plan* did not include PTOA implementation costs, so these costs reduce the reported benefit.

One of the most immediate costs is for continuing studies and consultants. The Draft RPTCC Work Plan lists 14 further items of work required. This list is not complete, and only six of the items have preliminary cost estimates, yet costs for these six alone total nearly US\$4M.

Just ahead are yet more costs for such item as:

- Setting up the RPTCC/MC, and RRB, including facilities and hiring and training staff;
- Computing surplus capacity of lines³, including methodology development, training, software & hardware;
- Setting up the Regional Transactions Coordinator, including facilities, hiring & training, communications, hardware, software; SCADA (and later AGC) and related metering, RTU and telecommunications; and designing and implementing a regional metering system (with associated telemetry) for settlement of cross-border transactions;
- Development of cross-border trading capabilities, including hiring and training staff, trading support systems (communications, hardware, specialized software⁴);
- Setting up the Regional System Operator, including facilities, hiring and training staff, communications systems, computer hardware & software.

³ Calculating the allowable flows on transmission lines can be extremely complex, especially as the systems become more interconnected with parallel (but remote) paths, giving rise to "loop flows".

⁴ The quality of software must be very high since large amounts of money are at stake, and errors can be very difficult to analyse and correct (particularly if data have been lost).

Add to these the costs which will be incurred by individual nations in meeting the requirements of participation in the PTOA, such as under-frequency load-shedding schemes, and control centres, telecommunications, and SCADA/AGC (necessary supervisory and control equipment) for, at the very least, Cambodia and Lao PDR.

Taken together these costs can amount to many tens of millions of dollars.

Without costs for the full set of steps to implementation (at least to Stage 2), the *PTOA-General Design, Final Report* is at best a vision statement.

Regulatory Issues

There are two significant deficiencies regarding the RRB.

The first is the relaxed "financial interest" requirements for RRB nominees. Since this organisation is destined to be powerfully influential, the independence of the RRB delegates from market participants is essential.

The membership requirements for the MC and RRB state that the nominee must not "have a financial interest in any private business connected (either directly or indirectly) with any generation, transmission, system operation, distribution or trading of electricity in the GMS, or is [sic] engaged in any activity (whether for remuneration or otherwise) that is connected with any such service or system."

The membership requirements for the RTC and PWG, on the other hand, replace the words "in any private business connected" in the MC and RRB requirements with "in any business connected" (removing the qualifier "private"). Clearly this is a significantly stricter requirement for impartiality.

The consultants explain in a footnote to the RRB requirements: "We are assuming that most of the officers of the PTOA institutions will be recruited from the national utilities. Therefore the restriction is limited to private interests." Yet private interests are much more at risk from lack of RRB independence than the national utilities, and there is no justification for claiming that individuals who are directly connected with national utilities are unbiased and will not show favouritism—overt or otherwise—to their employer. If a market is ever to become a possibility, therefore, it is essential from the outset that, however difficult the practical considerations, the nominees for the RRB, at the very least, meet the stricter "financial independence" requirements of the RTC and PWG nominees. It may be possible to find suitably independent yet knowledgeable candidates in universities or government, or who can be repatriated from non-GMS utilities.

While it may seem that true independence of RRB members is less important in the early years of the RRB, it is these early years that set the tone and culture of the RRB organisation, leading to rules, procedures and attitudes which can be difficult or impossible to correct in later (Stage 3 & 4) years.

The second significant deficiency relates to transparency and public involvement in investment decisions regarding regional transmission.

The report states, regarding the role of the RRB in Stage 1 (pg. 45): “The main target for the Regional Regulatory Board during Stage #1 is to remove all unnecessary impediments to cross-border exchanges, in spite of the low cross-border capacity. ... Another important target is to put in place the regional planning activities, and to promote the development of the transmission facilities that this process identifies as of regional interest.” And later, regarding the role of the RRB in Stage 2 (pg. 59):

“There are several reasons why it is not recommended (or rather it does not seem possible) to implement a highly independent regional regulatory agency during Stages #1 and #2:

- ... the introduction of liberalization and truly competitive markets is not a short or medium-term objective of GMS countries. ... “

But “highly independent” regulation plays a critical role even in non-competitive (monopolistic or oligopolistic) markets.

From a consumer perspective one of the most valuable roles of independent regulators is critical and transparent review of system expansion plans (or, in some cases, the lack of suitable plans).

Without this critical independent oversight, the tendency of engineers to want to make the power system better and better runs virtually unchecked, leading to "gold-plated" power systems and unnecessarily high power prices. Since power prices are based on utility revenue requirements, which in turn are based on investments in the power system infrastructure, the consumer pays for the gold plating.

Well-executed regulatory regimes provide a public forum where utilities must present their development plans for review and approval. These forums provide an excellent opportunity for consumer groups to challenge utility managers in front of an independent panel. It is not uncommon for utilities to have to "return to the drawing board" as a result of these quasi-judicial reviews, revising their plans to something more cost-effective before returning again for approval.

Admittedly, this oversight is imperfect. Even with regulatory oversight, past apparent failures have, in the developed world, encouraged the move away from regulated monopolies toward competitive markets for generation. Transferring investment risk from the consumer (ratepayer) to private sector investors was expected to result in a gradual reduction of excess generation capacity under the financial scrutiny of private sector investors.

Yet, imperfections notwithstanding, this sort of regulation is still required for the transmission and distribution systems, commonly considered to be "natural monopolies", which have been left behind in the rush to "deregulation".

Thus it would be expected that the PTOA implementation would include just such a regulator, complete with public forum, for the regional transmission system. Apparently this is not the case.

While the RRB is to have a role in regional planning (“decide [sic] / participate in the regional

planning”), nowhere in the report could the author find reference to public hearings into proposed regional expansion plans. In none of the first three stages was there evidence of transparent oversight over transmission investments. Certainly, in Stages 1 and 2, the RRB does not play a conventional regulatory role complete with public review of planned investments. Rather, it appears that the role of the RRB is to encourage investments without providing opportunity for public comment. Although there appear to be plans for a true regulator by Stage 4, it can already be too late, as many of the transmission investments—which the unrepresented ratepayers are required to fund—will have already been made or committed.

RRB meetings are discussed in some detail in terms of their need, the locations and the meeting frequency. It appears, however, that the RRB meetings are restricted to the members of the RRB. From the description in the report, it is clear the meetings are not intended to be advertised publicly.

The description of the objectives and functions of the RRB makes only one (indirect) reference to any public involvement in the entire regulatory process: “... promote transparency of information and make available the information to the stakeholders by organizing and managing the databases needed to achieve this objective ...”. So, it appears, there will be databases that consumers, as stakeholders, can peruse—presumably after the decisions have been taken.

There is also discussion of a “Stakeholders’ panel”:

“The RRB will organize the functioning and procedures of a “stakeholders’ panel”. It shall serve as the initial environment where the different stakeholders may give their point of view on matters regarding the development [of] the regional market, the regulations that are proposed, the regulations that should be proposed and the problems that may arise.

The RRB must define the composition of the panel and its procedures to function.

The RRB will take into account the point of view of the stakeholders’ panel when making decisions or recommendations.”

“Involvement”, apparently, is by invitation only.

This does not meet the standards for a modern regulatory process. The opportunity for open public intervention is paramount.

Organizational Structure

The report states that the PWG will not have permanent staff or a permanent location. The presentation states: "The PWG will not have, at least in the beginning, permanent staff. The staff necessary to perform the duties will be selected by the group’s direction from the resources that will be available from the different countries. The staff will be selected specifically for each project or activity and will cease after the project or activity is accomplished. The PWG does not need to have a permanent location at the beginning."

The author agrees that at Stage 1 the planning function can be left to a PWG, which can manage

without either a permanent location or permanent staff. Stage 1 mainly gives incentives to the GMS governments to rationalize their regulatory situations and to the national utilities to work together toward possible future interconnection. Avoiding a commitment to facilities and staff at Stage 1 gives time to see if, after detailed analysis of individual projects, the economics of interconnection are as strong as suggested.

By Stage 2 however, the situation changes. It is at Stage 2 that the regional plans are being developed which will permit a transition to Stage 3 and toward an opening market. At this time a permanent staff and location are essential for effective and transparent regional expansion planning.

While Working Groups can play a valuable role in bringing together many minds to solve specific problems and guide policy development, they are no substitute for a formal organization with structured management, dedicated and consistent staffing, and clear accountability. The RPTCC and its sub-organizations should no more have to depend upon transient, uncommitted professional staff than do the national utilities. The RPTCC's need for permanent planning staff to achieve its regional expansion and operational planning goals is at least as strong as that of the existing national utilities. And in the case of the RPTCC, even more is at risk: the ultimate well-being of the electrical system of the entire GMS region, along with its collective economy.

Including professional planning staff as an integral part of the Stage 2 RTC (especially since the RTC is intended to become the future Regional System Operator) would create a far more conventional, and infinitely more workable structure with advantages to all stakeholders:

- The RPTCC, RTC and RRB will benefit from the assurance that dedicated, experienced and knowledgeable technical staff will be available as required—without having to argue with management at the national utilities—to perform studies and investigations and provide expert, unbiased advice.
- National utilities and their planning departments will benefit from:
 - Assurance that their premier staff will not be "raided" at inopportune times because of overriding RPTCC needs, leaving the empty-handed utility management with inadequate experienced staff to meet their own national goals.
 - Confidence that the RPTCC's planning expertise is provided by independent (and thus unbiased), committed professionals who would gain no benefit from slanting study results or advice to favour other (possibly competing) GMS neighbours.
- Professional staff will benefit from:
 - The ability (and even encouragement) to adopt consistent approaches to problem investigation, solution, and reporting.
 - The ability to develop long-term interdependencies with other RPTCC professional staff, allowing formation of strong technical teams.
 - Development of strong and trusting relationships with the RTC staff, which depend absolutely on advice from the planning staff to ensure the health of the regional power system.
 - Confidence that, by taking the trouble to learn the intimate details of the regional system and its behaviour, they are gaining knowledge that will enhance their professional value to their employer, leading to job security, promotion and salary increases.
 - Confidence that they can dedicate themselves to their assigned problem without feeling the need to divert attention to questions about their "regular" job

responsibilities or give in to political pressure from their employer to skew results that favour that employer (both problems being more severe since, with the PTOA proposal, these staff would almost certainly remain in their "home" offices while working on RPTCC problems).

- Assurance that their technical tools and databases will be the same from job to job, allowing them to focus on the technical difficulties of the power system rather than unfamiliarity with their tools and information sources.
- Future independent electricity market participants benefit from the confidence that the RPTCC technical staff is independent of the undue influences of other market participants (a major motivation for the strict Standards of Conduct requirements imposed on professional staff of U.S. transmission operators by the US Federal Energy Regulatory Commission). Transparency is visibly increased, and financial risk to project investments is significantly reduced.
- Regional governments will benefit from the confidence that the economies of their nations are not being placed in jeopardy by undue influence on the professional staff that is providing detailed technical information and advice to the RPTCC representatives.
- GMS region industrial, commercial and residential electricity consumers benefit from a regional power system which is developed by independent professional staff who are keeping the consumers' interests in mind.

Closing Thoughts

In view of the weak market before Stage 4, the benefits of the PTOA (but not the Grid Code) and the RPTCC and related organizations are unclear.

If trans-national interconnections have strong financial and engineering merit, it would seem likely that GMS utilities could work together on joint project development.⁵

North America had already completed the equivalent of Stage 2 by the mid-1960s, including some of Stage 3, through utilities working together of their own accord⁶. Additional implementation corresponding to steps in Stage 3 was completed in the late 1960s and 1970s. Once again, this was accomplished by utility initiative, setting up a structure of reliability regions that worked closely together on common issues. Only in the mid-1990s, when market-related steps were required to transition to the equivalent of Stage 4, was concentrated government intervention required.⁷

Where financial and engineering incentives exist, utilities around the world have a history of finding ways of working together productively.

⁵ In fact, it appears from many of the short- and medium-term plans that GMS utilities already have been working together without any organizational formalities.

⁶ Government involvement was occasionally required when treaties were required, but that has also been occurring in the GMS region.

⁷ Even with government intervention, this effort has been struggling forward since the mid 1990s and is still incompletely and imperfectly implemented. In particular, the development and effective implementation of regional system operators has become a major stumbling block.

In view of this long history, an effort with the costs and commitments of the PTOA appears premature until interconnections become commonplace, and sufficient generation and trans-national transmission capacity become available to permit a meaningful electricity marketplace.

Conclusion

Although regional interconnection would unquestionably bring operating benefits, the *PTOA-General Design, Final Report* did not present a compelling case for aggressive interconnection.

The *Indicative Master Plan* predicted compelling returns if all of the assumptions of the studies (regarding costs, feasibility of generation development, etc.) were reliable. Yet the *Indicative Master Plan* required generation to be provided at marginal cost for the predicted benefit to be realized.

Based on the *PTOA-General Design, Final Report* the PTOA is unlikely to produce marginal cost generation until well into Stage 4, which appears likely to be in the distant future, long after the costs of the required regional transmission investments have been incurred. The consumer is thus burdened with major investments now in the hope of a (somewhat uncertain) return in decades to come. Consumer risks thus appear to be high.

The regulatory process described in the *PTOA-General Design, Final Report* does not appear to provide a meaningful opportunity for stakeholders to challenge the assumptions and conclusions in regional expansion plans. In view of the apparent risks to the consumer, significant investments in regional transmission should not be made, or committed to, without allowing for open stakeholder participation through a strongly independent and transparent regulatory process.