

Summary of Discussions
2nd Meeting of the Planning Working Group (PWG-2) of the
Regional Power Trade Coordination Committee (RPTCC)
Lijiang, PRC, 8 November 2006

1. **Background.** The establishment of the Planning Working Group (PWG) was agreed during the 1st Meeting of the Focal Group held in Hanoi in January 2006, and is the first of the sub-groups to be created to carry out priority activities of the RPTCC. The PWG-1 meeting, held in Siem Reap on 13 June 2006, agreed on the procedural arrangements and authorities (electing PRC and Thailand as chair and co-chair, respectively) and discussed the terms of reference for specific PWG tasks, agreeing to focus initially on the study on performance standards and transmission regulation, as well as the preparation and implementation of the training program. The second PWG meeting (PWG-2) was held in Lijiang, PRC and was co-organized by the China Southern Power Grid Co. (CSG) and the Asian Development Bank (ADB). It was attended by PWG nominees of the six GMS member countries, as well as by representatives of ADB, AFD, Soluziona, TEPCO, and World Bank.

2. **Objectives.** The PWG-1 meeting was held to: (i) discuss the terms of reference (TORs) and work plan of priority studies on performance standards and transmission regulation, and the training program; (ii) provide updates and advance the progress of FG/ PWG activities, namely, GMS power master planning, power sector database and website, and best practices for power purchase agreements (PPAs); and (iii) discuss and resolve issues pertaining to priority transmission line projects. Attached is the agenda and program of the meeting (Annex 1) and the list of PWG-2 participants (Annex 2).

Session I- Opening Session

3. Mr. Yu Wenqi, Chairman of the PWG, welcomed the PWG participants and development partners and noted the priority tasks that the PWG would undertake in order to develop regional power trade in the GMS region. He stressed that the PRC together with the other GMS participants, would work hard together to ensure that the work plans to achieve the PWG's objectives are effective and appropriate. He enjoined everyone to contribute to discussions through productive and constructive ideas. He thanked ADB and the consultants for the efforts at organizing the meeting and enjoined everyone to enjoy the beautiful scenery of the ancient city of Lijiang.

4. Mr. Anthony Jude, Principal Energy Specialist, SEID, ADB welcomed the participants to the meeting and thanked CSG for the excellent meeting arrangements in beautiful Lijiang. He recalled the PWG's establishment and agreements on priority tasks and studies. He explained the importance of advancing the progress of the priority PWG studies and RPTCC activities such as the formulation of the power master plan and the development of the database and website. He stressed the need for the countries to agree on the format of the database to help CSG and the consultant to advance work in this area. He encouraged everyone to actively participate in the discussions and provide frank and constructive ideas on various issues.

Session II- Discussion on Priority Studies: Performance Standards; and Transmission Regulation; Next Steps

5. Soluziona (Mr. Karacsonyi) provided a preview of the presentation (Annex 3) covering the scope of the TA, performance standards and transmission regulation. He gave the scope of

work of the TA 6304 comprising four components such as development of Integrated Action Plan on regional power trade and development and facilitating creation of institutions to coordinate/ develop regional power trade, among others. He provided the tentative schedule for PWG activities.

6. **Performance Standards.** He provided a background of the study, and explained its main objective, which is to address the short term reliability problems as a first step to establishing regional quality and reliability standards. He discussed the short term as well as long term objectives for performance standards. The latter included the definition of performance standards and the various categories such as static security, dynamic security, operating reserves, etc. He presented the scope and various activities. Country-level activities included benchmarking, and power system analysis. Regional level activities included definition of scenarios and power system analysis. He gave the deliverables and timeline of the study, which will last a total of 32 weeks.

7. **Transmission Regulation.** Soluziona discussed the transmission services in the GMS through the transmission network model (TNM). Activities included analysis of inter-Transmission System Operator (TSO) compensation mechanisms, design of common regional database, establishment of interconnection capacity calculation procedure, definition of responsibilities of member TSOs to keep real time exchange flows, design of procedures to support the TSO in complying with cross border trading commitments, and design of uniform exchange protocols. He gave the deliverables and timeline of the study, to last 40 weeks.

8. **Discussions.** Thailand inquired whether the regional database development activities shown in the slides coincide with the activities being coordinated by Thailand. Soluziona explained that database activities pertain to transmission regulation matters. PRC noted that system stability differs across countries, and asked the reason behind the national studies. Soluziona clarified that national studies would analyze only reliability at national level with the view to using information for analyzing how reliability could be promoted at the regional level. On the issue of cross-border transfer of system instability, Soluziona said measures would be studied to minimize such disturbances such as specifying criteria for disconnection or investing to improve the reliability of weaker national systems.

9. It was noted that Cambodia is currently connected to two systems, the Thailand and Viet Nam systems and in the near future to the Lao system. Performance standards, it was stressed, are important in ensuring long-term reliability of Cambodia's connection with its neighbors. PRC suggested that attention be paid to differences between systems that are planning to interconnect, such as between Thailand and PRC, or between PRC and Viet Nam. Lao PDR asked for clarification on whether the TA 6304's scope of work similarly covers activities described in the inception report earlier circulated. Soluziona clarified that the inception report did not elaborate on certain components that have only recently been agreed as priority ones.

10. ADB (Mr. Jude) noted that consensus would be needed on an agreement that may be signed in time for the 3rd GMS Summit. He added that the countries would have to guide the consultant on the areas that would have to be prioritized. Viet Nam said the proposed TORs are comprehensive but suggested that planning criteria be included as a category of performance standards. Myanmar informed of its plan for interconnecting with two systems in the future (with Thailand and PRC) and agreed on the importance of performance standards to promote such interconnection.

11. The countries were requested to nominate counterparts for the studies to work with Soluziona. Each country provided the name of the counterpart to work with Soluziona. PRC informed of the need for Soluziona to coordinate with its consultant for the interconnection project (PRC-Viet Nam) to optimize the use of information gathered.

Session III- Discussion of Training Program

12. **Training Implementation Plan.** Soluziona (Mr. Benitez) presented the overview and objectives of the capacity building and HRD components, which include the capacity building plan for each country and general training/ workshops on regional power trade (presentation is attached as Annex 4). He gave the approach and methodology for the training plan, in terms of activities and schedule, and the scope of the regional and national training. On regional training he explained that the plan was for Soluziona to conduct three training courses, and the proposed course content for each (electricity regulation, electricity markets and cross-border trading, and power system planning). ADB asked the countries to give their views on the courses proposed, and to indicate whether any country wishes to host the course. CSG expressed interest in hosting the first course, Cambodia the second course, and EGAT the third course. ADB noted that each country is allotted four participants for each course. The national training plan will comprise of conducting regional workshops to support national level training plans and the development of a Medium Term Capacity Building Plan. The latter would include detailed/ specific technical courses needed for 2006-2010. He reiterated the need for the countries to comment on the proposed courses by 24 November 2006, and to decide on the participants for each course. CSG indicated that it would support financing an additional participant from each country for the training on electricity regulation.

13. **Discussion.** ADB asked the countries' views on what courses they would like to be conducted first. ADB (Mr. Bui) suggested that the training courses be tailored to priority RPTCC activities and studies, and that practical issues be tacked onto the courses. ADB (Mr. Zhai) proposed including the lessons to be learned from neighboring countries' experiences. PRC suggested that Myanmar, Lao PDR and Cambodia be allotted five slots in the training. PRC also requested training in software for preparing the master plan. Soluziona said that training in practical use of planning models will be included. On the planning model software, Soluziona said that it has the license for training purposes, but not for the use by the countries, although this can be arranged if the countries so desire to use them. It was agreed that power system planning could be held first. WB suggested coverage of transmission regulation and performance standards in the first course (electricity regulation). Viet Nam suggested inclusion of licensing regulation in the first course. Soluziona requested the countries to convey their suggestions on the courses in writing. ADB (Mr. Jude) advised letting the training courses proceed as presented with minor modifications, and then reviewing the need for additional subjects to be covered in follow-up courses.

Session IV- Progress of Priority PWG Activities

14. **Long-Term Indicative Master Plan** (presentation is attached, Annex 5). Soluziona (Mr. Karacsonyi) gave the goal of the Long Run Indicative Master Plan (LRMP), which is to define the least cost expansion plan for generation and transmission that will simultaneously meet all strategic targets associated to critical issues. He stressed that Integrated Energy Planning (IEP) is a more appropriate tool to deal with wider scope objectives, such as convergence of social energy policy with sustainable development. He discussed the focus of the IEP and the two critical elements that characterize it. The IEP approach, he noted, requires obtaining appropriate information such as on load forecasts at the national level, existing plans for generation/

transmission expansion, etc. He then explained the requirements for data collection, load forecasts, collection of hydrological information and preliminary system simulations. He discussed the planning reliability criteria, noting the various approaches in achieving generation adequacy and focused on a critical parameter to define the socially optimal called the Value of Loss Load (VOLL).

15. Soluziona said it would review the various generation and transmission expansion alternatives with the aim of developing scenarios important for power systems planning. This includes definition of a sound and realistic “base” scenario representing the most probable evolution of the relevant variables involved in the planning process. He explained that alternative scenarios would be used to assess the impact of uncertainties in basic variables on the performance of the optimal generation plan, and usual sensitivities include the discount rate, demand growth, VOLL, fuel costs, technology, large-scale generation development and emissions targets. He then discussed the optimal expansion plan, its aims, system simulations involved, the iterative process, its performance assessment, its products and the models that could be used. He discussed the activities involved in financial analysis and risk analysis (financial and technical), and presented the deliverables and timeline of the indicative master planning activity.

16. **Discussion.** ADB (Mr. Jude) noted that hydrological data on critical basins may not be readily available. ADB (Mr. Baardsen) added that it would be a challenge to obtain hydrological data. Most GMS country representatives committed to submit to Soluziona the needed data for the master plan study, including load flow and hydrological data, by 15 November 2006; Thailand and Viet Nam agreed to submit by 30 November. Lao PDR asked how the plan would differ from GMS Indicative Master Plan completed in 2002. Soluziona explained that the master plan would cover all generation and transmission prospects, including for purely national level power systems. PRC noted that the national master plans should be consistent with the regional master plan; Soluziona agreed that national plans would be the input data for the regional master plan. The WB stressed that national master plans are by nature balanced; she asked whether the regional study would recommend replacement of some national generation projects with regional ones, given prospects for cross-border interconnections.

17. **CSG Suggestion on GMS Master Plan.** CSG provided the basic viewpoints for the GMS master plan, stressing that the power generation plan should focus on resource optimization while the power grid plan should focus on analysis of power flow. CSG suggested that after the Regional Master Plan is validated, each GMS member country should adjust its national plan to be consistent with the regional plan, and for the GMS members to provide fundamental data in time. CSG presented the work mechanism consisting of duty assignments among GMS members, ADB and the consultant. The organization would include a technical work team comprising engineers from GMS countries and consulting company; the work pattern suggested involves both separate work and teamwork. Suggestions were made concerning tools and models (which should be validated by the GMS members) and work schedules and data requirements.

18. **Discussion.** GMS country representatives were asked for their views on the CSG proposals. Various concerns were expressed regarding the uses of the master plan, the methodology for its preparation, data collection challenges, and the timing/ scheduling of the study. ADB (Mr. Bui) noted that national master plans may already incorporate elements of power trade with GMS neighbors, but scope for further optimization may be identified in the regional plan. WB (Mr. Larssen) cited the different perspectives regarding the country's and consultant's roles in developing the master plan. ADB (Mr. Jude) stressed that the GMS

countries should provide the resources if they would like to have a master plan. He said that the master plan needed is one based on least-cost analysis, and to do this the countries should assign technical staff to work with the consultant. ADB (Mr. Jude) suggested that the consultant move forward with the work, and keep options open with respect to contributions from the GMS countries. He stressed the need for stronger buy-in from the GMS countries, especially given that grant assistance from AFD and SIDA would require the GMS countries to look beyond narrow interests and overcome obstacles to achieve the vision of an interconnected GMS region.

19. **Models for Optimal Expansion Plan.** Soluziona discussed the mechanics of the long-term indicative master plan models such as the ORDENA and the stochastic dual dynamic programming (SDDP). Presentation is attached, Annex 6. For ORDENA he discussed the load modeling and generation units modeling with examples of plants characteristics. He gave the objective function of the model, the assumed variable costs and model solving procedure (using the CPLEX software). Examples for gas price netback and typical outputs were provided. For the SDDP model Soluziona explained the objective function, its uses, and main outputs. Applications of the model were discussed, such as for hydro-thermal dispatch problem, reservoir planning (immediate and future cost calculation and cost functions calculation), and hydro plants modeling. Examples of typical outputs with simulations for the PTOA project were illustrated.

20. **Discussion.** Thailand (Mr. Sompol) expressed his concern on the level of detail of the countries' data that is required to yield accurate results, especially where PPA and other regulations are concerned, versus the ability of the program to handle such a complicated problem. GMS representatives expressed various concerns about the models' ability to optimize for existing and new plants. Soluziona explained the strengths and weaknesses of each model in relation to objective calculations required, especially given a constraint, such as set limit to CO₂ emissions. In response to a query from Thailand, Soluziona explained how optimization is undertaken for both generation and transmission expansion, using an iterative process under the various models presented. In response to query from ADB, Soluziona expressed that the models presented are relevant for use in the GMS, given that these involve optimization of reservoir capacity. On the query about how many load centers and generation centers could be handled by the model, Soluziona showed the number of centers as applied for the ORDENA model in Europe.

21. **Regional Database.** Soluziona (Mr. Benitez) presented on Database and Website Implementation (attached, Annex 7), which covered the overview and objectives of the platform or database for information exchange and communication among GMS countries. He noted the accomplishments to date, which include the development of a conceptual design of the platform, which the country representatives would be asked to validate in two weeks. He explained the processes involved in the website design, involving the outputs and the roles of the GMS countries and ADB/ donors. He said the website would have a public and private environment, which would have profiles and contents. On the private data there would be limited access, encrypted backups and strong authentication system. He showed the relationship between the system administrator, server and users. He explained the usefulness of on-line forums to foster dialogues and serve as a forum for interaction.

22. On database design, the characteristics were presented covering GMS and country data on energy resources and the power sector. Soluziona presented the details of data on the power sector, grouped under the regulatory framework, technical information and economic information. He discussed the decision points in terms due dates for such activities as validating

the conceptual design (24 Nov. 2006), finalizing the functional design and TOR (22 Dec. 2006), appointing the IT company to handle development (12 Jan. 2007), and validating other design issues (26 Jan. 2007). On the implementation plan, he stressed the main milestones comprising the aforementioned activities (methodology validation, conceptual design, etc.)

23. **Regional Power Database and Website.** CSG's presentation (Annex 8) commenced with the goal of the website which included news publishing, information collection and sharing and scalability. CSG explained the key concerns of system architecture comprising robust application and performance, data security and availability, access security and compatibility. CSG also discussed the tasks already performed and the issues that have to be addressed in website development such as data formats, responsibilities for system design, etc. Also presented were the proposed costs for process handling, software and hardware, integration and training/ maintenance. Suggestions included maintenance of the website by the owner country, the use of English, confirmation of data format as soon as possible, and collection of requirements of each country by Soluziona.

24. **Discussion.** GMS representatives expressed concerns about administration, maintenance, updating and funding of the website and database, and the management of sensitive data. In response to CSG's query, ADB explained that three bids would be requested from prequalified database developers based in PRC. Soluziona explained that it would prepare the TORs that would be used as basis for the bids. ADB clarified that while CSG was tasked to maintain the website, the software, hardware and site development would be funded by the TA 6304. ADB (Mr. Bui) suggested enhancements to boost the functionality of the database (such as being able to handle horizontal and time series data). Soluziona noted however that the proposed enhancements may have to be evaluated against the resources available for development. ADB (Mr. Zhai) suggested the consultant look at the format/ content of the website of the ASEAN Center for Energy as a model. ADB (Mr. Jude) reiterated that the meeting agreed on the concept for the database and website development, and that Soluziona would shortly circulate the paper to the GMS countries, and comments are due on 27 November 2006.

25. **Good Practice Guidelines for Bilateral PPAs in the GMS.** Soluziona (Mr. Karacsonyi) presented on the final report of the study on PPAs (presentation is attached, Annex 9). He first discussed the role and main provisions of bilateral agreements, and then defined PPAs in relation to IPPs. He gave the target of good practices in PPAs, such as to attract investors to build power plants and get the "best price" for energy provided by IPPs, and discussed how these targets are achieved. He presented the scope of the analysis which was based on an analysis of good and bad international experiences. He explained the risk mapping in PPA, noting the various expectations and the various risks (market, infrastructure, regulatory, external and political) at the project and structural levels. He then presented the main features of PPAs in terms of pricing and risk allocation (seller's and buyer's side) and illustrated the impact of risk on energy prices. He listed the types of project risks and their allocation, and the measures for managing these risks. Soluziona listed the main features of PPA recommended for the GMS, and discussed the price formula for PPA, based on risk allocation and price structure. For hydropower PPAs the important issue concerns reservoir management, and the mechanics for pricing/ seller's optimal reservoir management was shown. Recommended for the GMS is for the buyer to manage the reservoir. Soluziona then presented the main features of PPA when transmission facilities are developed exclusively for interconnecting specific projects. General recommendations regarding PPA provisions in multipurpose hydro projects were discussed, including for ancillary services. Finally, provisions of PPAs in transition to competitive markets were discussed.

26. Lao PDR (Mr. Vilaysone) said the revised report is available for review by the GMS representatives. The World Bank (Ms. Arizu) reiterated that a table summarizing main recommendations of the report would be prepared and circulated shortly; the table will include a column for the comments of GMS representatives. CSG (Mr. Shi) noted that the most important aspect of the study is its prescription for a transparent pricing method. Thailand (Mr. Varavoot) raised questions regarding two-part tariffs (energy and capacity) particularly for hydro projects and Soluziona clarified the rationale behind this practice, given the effects of risks on investors' returns. CSG noted other cases for PPA pricing that could be studied and WB suggested that a request for covering these be submitted in writing as part of the GMS countries' comments on the report.

Session V- Closing Session

27. *Consideration and Adoption of Proceedings.* Mr. Jude announced the distribution of the draft summary of proceedings for review by the body. After the PWG members reviewed the draft summary of proceedings, and after incorporation of suggested changes, the body therefore approved the minutes of the PWG-2 meeting.

28. **Summary and Closing Remarks.** Mr. Jude cited the main agreements on the work plan for the studies on performance standards and transmission regulation. He also cited the agreements on the training program presented, particularly on the venues/ hosts for the three priority programs. He noted the discussions on the master planning methodologies, and with data supplied by the countries, the running of the models would be left with the consultant; the results would then be discussed with the GMS representatives for further refinement. He cited that resources could be sourced for software and hardware to be used for modeling and database development. He enjoined the countries to move forward on the database concept and design as presented by the consultant. He said a matrix would be prepared on the agreements of the PWG-2 meeting that would be presented to the FG-3 meeting for confirmation. The FG-3 meeting would also consider the discussions and agreements reached at the project meetings earlier held, and that the summaries of these meetings would be circulated prior to the FG-3 meeting.