GREATER MEKONG SUBREGION
22nd MEETING OF THE REGIONAL POWER TRADE COORDINATION COMMITTEE (RPTCC-22)
CHENGDU, PRC, 19–21 JUNE 2017

SUMMARY OF PROCEEDINGS

I. Introduction

1. The GMS Regional Power Trade Coordination Committee convened its 22nd meeting, with back-to-back meetings of the Working Group on Performance Standards and Grid Codes (WGPG) and Working Group on Regulatory Issues (WGRI), on 19–21June 2017 in Chengdu, People's Republic of (RPTCC-22). The meeting concluded work performed in 2016 under WGPG and WGRI; and discussed future activities to support cross-border power interconnections and trade in the Greater Mekong Subregion (GMS). The agenda of the meetings is in **Attachment 1.**

II. Opening Session

2. The RPTCC-22 was organized by the National Energy Administration, People's Republic of China in cooperation with the Asian Development Bank (ADB). Dr. Prasert Sinsukprasert, Deputy Director General, Energy Policy and Planning Office, Thailand, RPTCC Chair; His Excellency Li Fanrong, Vice Minister, National Energy Administration, the People's Republic of China; and Mr. Andrew Jeffries, Director for Energy Division, Southeast Asia Department of ADB warmly welcomed participants and expressed appreciation to PRC for the excellent meeting arrangements. Members of RPTCC, WGPG, and WGRI from the GMS countries, and representatives of ADB, AFD, and the World Bank attended the meeting. **Attachment 2** provides the list of participants.

III. Session 1: TA 9003-REG Integrated Resource Planning with Strategic Environmental Assessment for Sustainable Power Sector Development in the Greater Mekong Subregion—Progress and Next Steps

3. ADB Energy Specialist, Ms. Hyunjung Lee, provided a brief technical assistance (TA) update (**Attachment 3**). The project has completed gap analysis missions for five GMS countries; mission for PRC will be conducted soon. The gap analysis of the five GMS countries shows that in their recent update of their power development plans (PDPs) for the next 10–15 years the five countries have very limited integration of renewable energy (RE), energy efficiency (EE) and demand-side management (DSM), and regional power trade opportunities, as well as environmental and social externalities in the optimization process. All countries show high-level political leadership and commitment to improving integrated planning. In this context, the countries are establishing the legal and regulatory framework for SEA implementation in the planning process. Another common feature is the limited capability of the software used for PDP modelling to accommodate various features in considering intermittent and small scale scattered renewable energy resources and a full spectrum of demand side measures and targets as well as internalizing key parameters from the Strategic Environmental Assessment within the optimized model.

4. Since the TA is moving to the implementation of a range of capacity development activities, future activities will include workshops at both regional and national levels where an orientation on the different elements of an Integrated Resource Planning with SEA approach will

be provided. The key ideas and findings of the project will be consolidated into several knowledge products for regional and global distribution.

5. TA consultants, Mssrs. Don Webster and John Soussan, gave a presentation titled "Transforming Power Development Planning through Integrating SEA into an IRP Approach" (**Attachment 4**).

Feedback from the Meeting Participants

6. The GMS countries acknowledged the importance of promotion of RE. The participants noted the price of solar energy is declining as a result of more investments and development in solar technologies. Member countries shared the situation with regard to power development. For example, Cambodia indicated that while solar energy is relatively new in the country, it acknowledged the potential of solar for power production, and shared that solar development is moving forward with the ADB support project under consideration. Myanmar has no solar project in operation and conveyed the ongoing revision of power sector plan which will consider minimizing coal-fired plants. Lao PDR also noted the importance RE promotion in the country.

7. The participants suggested that the design of training programs and knowledge products to consider dealing with emerging technology which affects the power sector. ADB assured the countries that this will be considered in the development of training programs. Thailand (Chair) reiterated the notable RE trends in the region but also stressed the importance of electrification, urbanization, and technology (internet) and other emerging trends which need to be integrated in PDPs. On capacity building, the consultants emphasized that the subject matter of the training programs will be based on findings/recommendations in the gap analysis; the team will circulate a questionnaire to get feedback of the countries and identify focus.

8. ADB staff, Mr. Duy-Thanh Bui, provided detailed comments to the consultant team in writing. His comments mainly concern (i) the necessity to establish linkages with works done by ADB in Phase 1 (SEA), with other projects sponsored by other partners (e.g., IFC supported SEA done for Lao PDR, and ongoing SEA in Myanmar); and the need to make results relevant to RPTCC and bring added value; (ii) the particular recommendations in modelling techniques in order to capture various renewable and energy efficiency measures; and (iii) the need to draw the lessons learnt from the application of IRP in Viet Nam and provide country specific recommendations for wider application of IRP. Full comments in writing were communicated with the consultant team via email.

9. Action: ADB project officer and consultant team to work closely with GMS countries to implement agreed next steps toward the end of the TA (**see Attachment 3**).

IV. Session 2: Summary of WGPG Progress and Way Forward

A. GMS Performance Standards and Transmission Regulations

10. ADB staff, Ms. Aruna Wanniachchi, presented the progress of four key tasks assigned in 2012 to WGPG: (i) GMS Performance Standards, (ii) GMS Transmission Regulations, (iii) Standard Regional Metering Arrangements, and (iv) GMS Grid Code. Under ADB technical assistances, the first three tasks have been completed. Review and updating by GMS members is pending. Completion of the three tasks are a prerequisite for implementing Task 4, preparing a regional Grid Code which is supported jointly by ADB and the World Bank.

11. **Task 1, GMS Performance Standards.** ADB consultants have completed common performance standards. This was based on European standards (ENSTO-E) as agreed during the implementation of previous TAs, as the European grid is developed for many decades and it is one of the most reliable integrated power systems. The consultants conducted a detailed presentation to WGPG on the first day of the meeting. Each of the proposed common standards were discussed in length and revised as necessory. WGPG adopted the updated document to use as a reference document provided in **Attachment 5**. Lao PDR stated they have adopted these standards in their new power infrastructure development projects. Viet Nam and Thailand power systems mostly comply with the proposed standards. WGPG chair confirmed that the GMS interconnected system shall be based on high standards to be achieved gradually due to the importance of reliability, quality, and stability of power supply.

12. **Task 2: Transmission Regulations and Task 3: Regional Metering Arrangements.** Draft transmission regulations with four policies: (i) policy on communication infrastructure, (ii) policy on data exchanges, (iii) policy on scheduling and accounting, (iv) policy on coordinated operational planning and (v) glossary of terms have been prepared under ADB technical support by consultant Mr. Michel Caubet who was the team leader of ADB RETA 6440. These are to be reviewed and validated by the WGPG, supported by ADB consultants in joint meetings. The tasks were delayed due to the pending establishment of regional power coordination center (RPCC). Therefore, until the center is established, three joint meetings of 2 days each were proposed before the end of this year, tentatively in August, October, and December 2017.

V. Session 3: Road Map for a GMS Regional Grid Code

13. **WGPG Task 4. GMS Regional Grid Code.** This is the final task for WGPG**.** The WGPG meeting in June 2012 agreed that WGPG completes tasks 1–3 first and commence preparing the Grid Code. ADB tasked the consultant, Mr. Caubet, to complete above tasks and preparation of the Grid Code. The World Bank is also supporting the preparation of the Grid Code. The World Bank consultants presented a draft outline of a Grid Code. ADB consultant, Mr Caubet explained in detail the links of tasks 1–3 results to Grid Code which was highly recognized by WGPG. RPTCC chair noted that there should be no duplication of the work done by ADB and World Bank consultants supporting the preparation of the Regional Grid Code. Hence he conducted a separate coordination meeting with ADB, World Bank and the consultants, and requested both consultants to work jointly as one team, share results and prepare a joint work plan to achieve the GMS Grid Code (**Attachment 6**). ADB and the World Bank consultants agreed with the requested approach and will work as one team. Their deliverables will be provided to both ADB and the World Bank before they are circulated through ADB to WGPG secretariat for review and circulate to WGPG.

14. **Gap Analysis and Preparation of Grid Code.** Based on the draft Regional Grid Code (RGC) and the proposed performance standards, it will be possible to carry out gap analysis and determine changes required in national grid codes to ensure their compliance with the RGC. This needs significant amount of work and gap analysis of performance standard for full compliance with the proposed common performance standards.

15. A timeline was presented proposing the development of three versions of a Regional Grid Code over the period from October 2017 to June 2018, such that by RPTCC-23 a finalized version of the code would be available for implementation in the GMS countries.

(i). Requested actions from member countries. The member countries are requested to participate fully in the proposed meetings of the WGPG and to comment on drafts of the Regional Grid Code in an efficient manner to ensure that the Draft Code can be developed in accordance with the proposed timeline. RPTCC members are asked to ensure that sufficient resources are devoted to this activity, to enable the review and refinement of the Regional Grid Code to progress smoothly.

16. Ms. Aruna Wanniachchi highlighted that the composition of the team: (i) Generation Planner, (ii) Transmission Planner, and (iii) Regulatory Expert is very critical to work on these final products and requested all countries to retain the originally proposed staff. In case of changes, countries shall ensure the composition with the right experts. This is one of the key requirements for the successful completion of the WGPG work. RPTCC chair emphasized that sufficient resources should be devoted to this activity to enable the review and refinement of the WGPG work.

17. **Next steps for completion of WGPG work**. Three joint meetings of 2 days each were proposed to be held tentatively in August, October, and December 2017. Electricity Generating Authority of Thailand (EGAT) offered the venue for the first meeting at EGAT. December meeting would be back-to-back with next RPTCC meeting. The work plan, which is to be sent by the ADB consultant by 15 July 2017, was discussed.

B. Regional Master Plan

18. ADB supported establishing a regional master plan which was completed in 2010. In that, transmission system studies were not detailed and the situation has changed drastically. Therefore, a regional master plan based on detailed generation and transmission studies is a critical need. As agreed in RPTCC-21 held in December 2016, ADB engaged two consultants, a power system economist and a transmission expert, from Manitoba Hydro International (MHI). ADB attempted to recruit a generation expert but could not identify an experienced expert so far.

19. The transmission expert of MHI presented an overview of the assignment of consultants—the objectives and deliverables, study methodology, and data requirements and data collection. Potential cross border transmission options also discussed. The consultants will use a software developed by MHI, “multi period DC Optimum power flow base long term transmission planning” for the study and PSS/E transmission planning software for AC power flow analysis. The consultants also explained the strategy towards establishment of the regional master plan and the data required. Both system studies and economic assessment should be conducted to prepare the master plan recommendations.

20. Most of the countries expressed concern on data sharing. ADB indicated, in case the data is not available, consultants are to build the model based on the data that can be shared, some data available on public domain, and assumptions on the confidential data. The World Bank stressed the importance for GMS countries to understand requirements to establish a systematic database and make it available for various studies in a common format. Due to the countries’ uncertainties on the data availability, it is difficult to predict a timeline for completing the regional masterplan.

21. Consultants will collect data and confirm the sufficiency to conduct transmission system studies. In the meantime, ADB will engage a generation expert when the countries confirm the data sharing.

VI. Session 3: Summary of WGRI Finding and Conclusions with Regard to WGRI Report 1 and Report 2

22. The meeting of the WGRI on 19th June 2017 was chaired by Madame Wu Ye, delegate from the National Energy Administration, PRC. The summary and conclusions of the WGRI Meeting was presented (**Attachment 7**). WGRI focuses on the tasks specified in the MOU2. The WGRI work is organized as follows: (i) identify the regulatory barriers to more active regional power trade and propose measures for countries toward regional harmonization of regulatory regime (Report 1—completed); (ii) propose principles for open access to transmission system and propose methodological framework for estimating transmission (wheeling) charges of using common transmission facility (Report 2—completed); and (iii) establish rules for short-term trading and for settling disputes (Report 3—to be prepared).

23. The WGRI meeting focused on the recommendations made in Report 1 and Report 2. After intensive discussion and careful examination, the WGRI accepted the following:

(i). On the importance of the country/regional regulatory independence, it was agreed to emphasize on ***functional independence*** of regulatory bodies in GMS countries while acknowledging the important roles played by the governments;

(ii). On the issue of sector restructuring, it was agreed that the priority for power sector restructuring should be to achieve ***operational independence and accounting separation*** for transmission and system operation;

(iii). It was agreed that a standard form for Power Purchase Agreements should be defined as ***a high-level template*** for point to point bilateral trades, allowing customization to meet the legal requirements of each country.

(iv). It was agreed that bilateral trades should not require commercial approval by the RPTCC, however the ***RPTCC can play a role in reviewing the technical feasibility*** of those trades;

(v). The WGRI agreed to further build on the experience of the GMS countries to date in cross-border trading to learn experience and to advance further regional trade;

(vi). The WGRI agreed that the ***RPTCC*** will not act as a regional regulatory body, but should ***act as an advisory body for the national regulatory bodies, and provide a forum for the exchange of views and experience;***

(vii). ***The proposed Third Party Access principles accepted*** and WGRI will work with national regulators to develop elements that are essential for their party access, such as:

- (a). Licensing requirements;
- (b). Transmission Connection Agreements; and
- (c). Transmission Use of System Agreements

(viii). It was agreed to pursue the gradual implementation of a methodology for estimating wheeling charges based on megawatt-kilometer (MW-km) distance and load-flow based methods.

24. Actions: Looking ahead, the WGRI agreed that WGRI to (i) work with national regulatory agencies to pursue the development of Third Party Access principles in GMS power sectors; and (ii) apply the MW-km distance approach and the flow-based approach for wheeling charges in on-going and future GMS interconnection projects.

VII. Session 3: The World Bank Supported "GMS Power Market Development Assessment Studies

A. Interconnection Business Cases for Laos, Cambodia, and Vietnam

25. A consultant, Mr. Stuart Thorncraft, made a presentation (**Attachment 8**). This is to evaluate the benefits of interconnection projects between RPTCC member countries that would accelerate cross-border trade. The cross-border projects that are considered are those identified in the original RETA-6440 study or others that have been newly proposed since the completion of RETA-6440. The focus on Laos and Cambodia is motivated by exploring the possibility of leveraging progress made to date on cross-border trade. Furthermore, both Laos and Cambodia are important gateways for a longer-term vision of having regional trade involving all countries within the GMS—in particular, developments in Laos and Cambodia could provide a pathway for eventual synchronization of two large power systems in Thailand and Vietnam.

26. The following five (5) business cases were presented:

(i). Southern Laos to Central Vietnam
(ii). Southern Laos to Southern Vietnam
(iii). Northern Laos to Northern Vietnam
(iv). Cambodia to Southern Vietnam
(v). Cambodia to Central Vietnam

27. The key findings, considering the results of detailed modelling and analysis, were as follows:

(i). All cases revealed net positive benefits; some cases more than others. This means that all projects examined are beneficial to the region.
(ii). Cross-border trade from Southern Laos to Central Vietnam of about 1000 megawatts is beneficial and power flows immediately. Southern Laos to Southern Vietnam is similar, but yields lower benefits because the cost of transmission infrastructure is higher.
(iii). Cross-border trade between Northern Laos and Northern Vietnam delivers substantial benefits, but most of the benefits occur from about 2025 onwards as the interconnector only starts to become utilized from 2025. This is because Vietnam does not require new supplies of electricity until about 2025.
(iv). Both cases for Cambodia show Cambodia continuing to import power rather than developing as a power exporter.

28. Based on the analysis, a number of priority projects have been identified:

(i). First priority: Southern Laos to Central Vietnam—the benefits are significant and infrastructure is in place to enable this to occur with minimal transmission investment. Cambodia to Southern Vietnam should also have high priority but more for the purpose of improving power system stability between Cambodia and Vietnam, rather than because the project offers a high Net Present Value.
(ii). Second priority: Northern Laos to Northern Vietnam makes sense as a high priority from the year 2025. This delivers substantial benefits to the region.
(iii). Lower Priority: The other business cases analysed are lower priority.

29. Action/Next steps: Develop a report on the findings for circulation to the RPTCC members for their comments. A more detailed write up of the material that was presented will be provided to GMS countries in written form by the end of July 2017.

VIII. Session 3: Presentation of Short-Term Trading Rules, Balancing, and Settlement (WGRI Report 3)

30. Mr. Jonathan Hedgecock, a consultant under the TA8830-REG, made a short presentation about the short-term trading rules, balancing, and settlement. The concept presented was too advanced and seemed disconnected with the Report 1 and Report 2. It was decided that the material presented may not exactly be applicable for development from Stage 1 to Stage 2, where regional power trade makes use of surplus transmission capacity. The content of Report 3 requires further planning and conceptualization. The consultant and ADB will prepare a short outline for Report 3 and request countries to comment and provide inputs.

31. Action: Consultant to prepare an outline of rules for short-term trading for application in GMS countries. Countries review and provide feedback. Consultant prepares Report 3 prior to the next RPTCC meeting.

IX. Session 4: Proposed Future Activities to Support RPTCC—ADB support

32. Ms. Aruna Wanniachchi discussed a new technical assistance, or additional financing to the ongoing TA, aiming to continue supporting the RPTCC in the next 2.5 years. The proposed activities include: (i) continued support to RPTCC and the two working groups, (ii) establishment of a regional master plan, (iii) establishment of a regional planning unit (RPU), and (iv) pre-feasibility studies of proposed projects for the medium-term to be commissioned between 2022 and 2025.

33. Countries inquired on the details on the output 3, establishment of an RPU. Questions were raised regarding the job description of this unit, whether this is a permanent unit or a similar set up like the working groups, and if it is a permanent unit then what is the financing arrangement for its staff and activities. In response, Ms. Aruna explained that this unit is to take the responsibility in regional planning going forward, and to take the ownership of the ongoing tasks. It is in a way the bridge between the two working groups and the RPCC. One of the options is to form it within the two working groups. ADB encourages RPTCC to take the ownership to ensure the sustainability of the efforts. The job description of the unit is to be prepared by an expert as this is an important role. RPTCC chair stressed the need for institutional set up to coordinate the work. However, he requested to establish relevant terms of reference for the proposed unit. ADB would support preparing it and get RPTCC's concurrence.

34. Viet Nam delegation suggested that the work on the regional masterplan should consider long-term permanent set-up which could be a separate unit or just a working group similar to current working groups. Viet Nam also pointed out problem on institutional data sharing, and proposed to meet and discuss on how to address the data sharing problem.

35. Ms. Aruna referred to MHI's experience in data collection in a similar study in South Asia. She highlighted the need for power system studies to establish technically and economically viable medium-term and long-term projects. She also highlighted the need for GMS countries to identify a generation planner and a transmission planner to work closely with consultants during transmission masterplan.

36. Mr. Bui noted that on the intended output (i) continued support to RPTCC and the two working groups—for WGRI, this will include approval of WGRI recommendations, e.g., methodology for third party access, wheeling charge, etc; and also, application of these recommendations in real projects. The output (iv) aims to develop new investment projects for the GMS countries—the RPTCC approach has always been parallel institutional and infrastructure development. During the last two or three years, RPTCC's focus was on institutional support. Now time has come to develop further investment projects. The concept paper of this TA has been prepared and has gone through a number of steps of ADB internal approval. ADB is ready to share the concept paper to RPTCC.

37. Mr. Bui requested GMS countries to volunteer to apply the proposed principles and methodologies of wheeling charges. Representatives from Lao PDR indicated that Lao PDR is willing to apply the proposed principle and methodologies in the real project that Lao PDR is developing with neighboring countries (e.g. LTMS project) subject to further detailed discussions.

38. Action: ADB to finalize the new TA before the end of 2017. TA activities to start in 2018.

X. Session 4: Midterm Review of the GMS Strategic Framework and Project Pipeline for Regional Investment Framework 2022

39. Ms. Pinsuda Alexander made a presentation on links between the RPTCC and the overall GMS Cooperation Program (**Attachment 9**). The presentation addressed four key topics: (i) GMS Strategic Framework Mid-Term Review—preliminary outcomes from country consultations and energy sector focused group discussion (ii) upcoming GMS Program high-level meetings; (iii) RPTCC feedback on the GMS Regional Investment Framework and verification of planned regional energy project pipeline through 2022, and (iv) RPTCC feedback on a map of GMS power interconnections.

40. The preliminary findings of GMS Strategic Framework (2012–2022) Mid-Term Review (MTR) and focused group discussions found that most of the GMS regional cooperation has been most active in terms of supporting regional power trade. The MTR's initial recommendations will be (i) to continue supporting power grid and regulatory alignment and (ii) development of regional power planning, trading, and interconnections. But other areas such as energy efficiency, renewable energy, and power subsectors (including coal, oil, and gas) have been active in the sphere of GMS regional energy cooperation. The RPTCC is requested to consider how these latter areas should be included, or not, in the GMS Strategic Framework for the next five years.

41. There are several high-level meetings, a senior officials' meeting, and a regional training on power inter-connections taking place in between July 2017 and March 2018. The RPTCC work program and progress will be presented at these meetings. The Chair, Dr. Prasert, will report on the progress, outcomes, and areas needed for guidance by the GMS senior officials at the next SOM meeting on July 6–7, 2017 in Bangkok, Thailand.

42. On the Regional Investment Framework (RIF), Ms. Alexander presented that there will be an expanded RIF to cover the period to 2022 which may include: projects from the original RIF 2013–2022, projects from the RIF Implementation Plan (RIF-IP 2014-2020), and any new proposed projects. Ms. Alexander proposed that the six GMS interconnection projects as agreed upon at RPTCC-21 be added to the new RIF 2022. Furthermore, Ms. Alexander sought RPTCC inputs on project progress for the current RIF-IP. The RPTCC is requested to provide

confirmation of projects, any additional proposed projects, and project progress updates by 30 June to the Secretariat.

43. In the future, the business case interconnection projects as discussed by the World Bank, or other planned high-voltage interconnection projects as listed in the GMS Energy Sector Assessment, Strategy, and Road Map (ASR) may be added through future RPTCC meetings.

(i). Countries agreed to review the energy projects in the RIF IP 2020 and RIF 2013–2022 and will provide confirmation if projects will be included or dropped.

(ii). Countries reviewed the six new energy projects proposed for the RIF 2018–2022. Countries confirmed the inclusion of proposed projects except for project 6: Lao PDR (Nam Mo 1 and Nam Mo 2) which Lao PDR will confirm. The countries also updated some project information, such as location, voltage, etc.

(iii). Fourth progress report as of April 2016 of RIF IP will also be provided by countries.

(iv). RPTCC inputs/confirmation requested by 30 June 2017.

(v). Power interconnection map was also presented to the countries, generating updates on the status of transmission line. Map will be updated and will be presented to the countries for confirmation.

44. Lastly, Ms. Alexander presented a 2012 map of interconnection projects in the GMS and sought RPTCC updates. The RPTCC is requested to send in any updates or corrections on this map by 30 June. The map will be revised and circulated back to the RPTCC before finalization in August 2017.

XI. Closing

45. The Chairs summarized the discussions of the meetings, stressing that a lot of works had been accomplished within 2 days. The Chairs requested member countries, ADB, and consultants to implement the agreed Actions as per the meeting. The Chairs and the NEA representatives thanked all participants for their valuable contributions to the results of the meetings.

46. **Next RPTCC meeting**. Lao PDR has generously agreed to host RPTCC-23 tentatively in December 2017. Arrangements will be confirmed in due time.

Attachments:

1. Agenda for RPTCC-22
2. List of Participants
3. Sustainable Power Sector Development in the GMS—Update on RETA 9003
4. Transforming Power Development Planning through Integrating SEA into an IRP Approach
5. GMS Performance Standards, Transmission Regulations and Regional Grid Code
6. Grid Code Work Program
7. Summary and Conclusions of WGRI Works
8. World Bank: GMS Power Market Development
9. MTR of the GMS Strategic Framework and Project Pipeline for Regional Investment Framework 2022