

**GREATER MEKONG SUBREGION (GMS)  
25<sup>th</sup> MEETING OF THE REGIONAL POWER TRADE COORDINATION COMMITTEE  
(RPTCC-25)  
BANGKOK, THAILAND, 21-22 MARCH 2019**

**SUMMARY OF PROCEEDINGS**

**I. Introduction**

1. The 25<sup>th</sup> Meeting of the Regional Power Trade Coordination Committee was held back-to-back with the meetings of the Working Group on Performance Standards and Grid Codes (WGPG) and Working Group on Regulatory Issues (WGRI), on 20-22 March 2019 in Bangkok, Thailand. The meetings discussed (i) the progress of the work performed under WGPG and WGRI, (ii) follow-up actions under the two working groups, (iii) updated country power sector development, and (iv) future activities to support cross-border power interconnections and trade in the GMS. See **Attachment 1** Agenda.

2. Thailand's Energy Policy and Planning Office (EPPO) in cooperation with the Asian Development Bank (ADB) organized the RPTCC-25 meeting. Members of RPTCC, WGPG, and WGRI from the GMS countries, and representatives of ADB, Agence Française de Développement (AFD), Japan International Cooperation Agency (JICA) as observer, and the World Bank (WB) attended the meeting. See **Attachment 2** List of Participants.

**II. Opening Session**

3. Mr. Victor Jona, Director General of Energy, Ministry of Mines and Energy, Cambodia, chaired RPTCC-25 meeting. Mr. Wattanapong Kurovat, Deputy Director General, EPPO, Thailand and Mr. Andrew Jeffries, Director for Energy Division, Southeast Asia Department, ADB both acted as Co-Chair of RPTCC-25. Mr. Jona and Mr. Jeffries opened the meeting and expressed appreciation to Thailand for the excellent meeting arrangements. Mr. Jona emphasized the numerous achievements of RPTCC since the signing of Inter-Governmental Agreement on Regional Power Trade in the GMS in 2002 and the signing of MOU in 2008. Mr. Jeffries acknowledged the participation and support of development partners, namely AFD, WB and JICA as observer.

4. Mr. Kurovat warmly welcomed participants and informed RPTCC that this year marks a special year for Thailand with two special events taking place. First, the Royal Coronation of the new King of Thailand, King Maha Vajiralongkorn Bodindradebayavarangkun, who will become the 10<sup>th</sup> King of the Chakri Dynasty, will be held 4-6 May. Second, Thailand will host of the ASEAN Minister on Energy Meeting (AMEM) to discuss and share visions to solve the problems in a sustainable way and develop energy sector in ASEAN region based on long-term mutual benefits. He also shared that Ministry of Energy, Thailand, has adopted the "Thailand 4.0" policy, which aims to transform Thailand into more innovative driven country to formulate "Energy 4.0" policy to provide policy support to develop technologies.

### **III. Plenary Meeting**

#### **A. GMS Grid Codes: Progress**

5. Ms. Aruna Wanniachchi, Senior Energy Specialist, ADB updated RPTCC on the progress of the four assigned tasks of WGPG: namely (i) GMS performance standards, (ii) regional transmission regulations, (iii) standard regional metering arrangements and communications, and (iv) draft regional grid code for GMS. Specific progress are as follows (i) RPTCC agreed to adopt the GMS Performance Standards as a reference document in June 2016, (ii) RPTCC adopted the Regional Transmission Regulations as reference documents in December 2017, (iii) the standard Regional Metering Arrangements and Communications was completed in December 2018, and (iv) the draft GMS Regional Grid Code, which had been developed with the assistance of ADB and support by WB consultants to prepare some of the codes, was completed in December 2018 and reviewed by all countries. See **Attachment 3** GMS Grid Codes: Progress.

#### **B. Gap Assessment of GMS Grid Codes for GMS Countries**

6. Mr. Michel Caubet, ADB Consultant, assisted by Dr Graeme Chown, WB Consultant, discussed the adopted structure and development process of the GMS Grid Code. A draft final version of the GMS Grid Code has been completed and submitted to RPTCC-25 for consideration. As part of the first step for gap assessment process, a report “Regional Grid Code – Gap Assessment Analysis” prepared by ADB consultant has been issued presenting the requirements of each Sub-code and the identified pre-conditions. In this context, a first GMS Country Gap Assessment Analysis will be carried out based on the identified pre-conditions. For next steps, ADB with the agreement of WGPG proposed the following support under its TA (i) establishment of a Roadmap for implementation of the regional GMS Grid Code, (ii) establishment of a Load Frequency Control Organization for the GMS Synchronous Areas, (iii) establishment of the technical specifications of the Electronic Highway, and (iv) establishment of the GMS Metering Organization and Architecture. See **Attachment 4** Gap Assessment of Grid Codes for GMS countries.

#### **C. GMS Interconnection Pre-Feasibility Study**

7. Ms. Wanniachchi updated RPTCC on the proposed pre-feasibility studies of priority GMS interconnection projects including the terms of reference and progress to date. ADB engaged Electricity De France (EDF) to conduct the pre-feasibility assessments of short-term regional power projects. There are four proposed interconnection projects, mostly requiring decisions on the locations, scope and extent of the studies. For next steps, ADB will discuss with Lao PDR, Myanmar, and Cambodia on the scope and extent of the studies. See **Attachment 5** GMS Interconnection Pre-Feasibility Study.

#### **D. GMS Power Market Development – Business Cases Final Report**

8. Dr. Stuart Thorncraft, WB Consultant, presented the modelling results of business cases for Greater Power market Integration in the GMS, which was intended as an overall summary of the last 3 years of work by WB consultant with a particular focus on the integrated case. The study has demonstrated the benefits of greater integration of the GMS region and identified the cross-border interconnections that will lead to the greatest benefits in the region and hence should be prioritised. A 10-year roadmap was developed prioritizing investments in cross-border

transmission projects based on those the projects that would deliver the greatest benefits to the region. The roadmap identified: (i) high level strategy for interconnection, and (ii) important preconditions that need to be implemented as part of progressing the GMS towards a fully interconnected region. This could be used to guide project specific discussions. The next steps that were recommended were: (i) detailed technical studies to support individual business cases, (ii) economic viability of HVDC interconnection in the region, (iii) regional grid code to be agreed, (iv) planning frameworks within the member countries to be adjusted, (v) rigorous approach for development and implementation of regional transmission wheeling charges, (vi) country-by-country of specific policies and regulatory reforms, and (vii) further consideration should be given by the RPTCC and possible successor or subsidiary groups to the trading rules and balancing arrangements. Finally, World Bank stressed that GMS member countries are at different stages both at policy level and in terms of practical implementation regarding various issues and these are important for “realising” the projects that were identified in the study as being of high priority to the region. Therefore, achieving highest level regional cooperation level is essential and recognizing the importance of the continued role of the RPTCC and the potential evolution into the RPCC in the future is critical to the future evolution of the GMS power sector. See **Attachment 6** GMS Power Market Development–Business Cases Final Report.

### **Discussions:**

- WB reiterated the need to continue the analytical work done in this report and as well as collaboration with ADB. Furthermore, WB stressed that remarkable benefits can be achieved through regional cooperation and integration. However, countries should establish the direction and enjoined RPTCC to move the agenda forward.
- On generation/transmission planning methodology, the study was based on a comprehensive review of power development plans as they were in place in 2017 as well as a comprehensive review of interconnection projects that have been previously studied. The consultant developed a detailed least cost generation and transmission model for the region suitable for long-range economic planning decisions. The data used in the study was collected in 2017 by the consultant based on Power Development Plans at the time and other detailed work and assessments. Like all modelling of this nature, updates over time are recommended, however, the broad conclusions of the study would not likely change significantly based on updates and developments that have occurred since 2017.
- Countries raised the possibility to consider some more business case options, e.g. (i) PRC on a business case on China and Viet Nam interconnection and (ii) Viet Nam on business case taking into account the impact of increasing renewable energy (RE) resources in most countries. For the business case on China and Viet Nam, World Bank indicated the need to collect more data to look into this possibility, while the effect of RE is minimal.
- Viet Nam raised the importance of consistency of the work of the three studies ensuring that there are no overlaps but should be interactive. Further, the results of the three studies should be useful to all countries.
- Finally, WB reminded RPTCC that achieving a desired level of accuracy in the study requires data for analysis. Once RPTCC establish a joint body, like the Regional Power Coordination Center or another body, countries need to set up a joint database since only countries can validate the data and decide on specific models to be adopted.

### **E. GMS Transmission Master Plan**

9. Manitoba Consultants provided an update on the development of the generation/transmission master plan for the power trade in the GMS region. The study aims to (i)

determine optimal regional generation planning scenarios for 2022-2035 based on individual country generation plans, (ii) determine the optimal cross-border power transmission scenarios to facilitate generation plan for 2022-2030, and (iii) determine and rank most economically and technically feasible cross-border transmission expansions and corresponding regional generation development scenarios. The study is based on system modelling and studies. Consultants has completed the transmission model with available data and some assumptions and generation model is in progress. Results of the preliminary transmission planning study shows that increasing cross-border interconnections reduces the operational cost of the region by \$3.5 to \$6.8 billion in 10 year planning horizon. To develop power trade master plan, further analysis is required. The remaining work will require the collection of additional data to improve the accuracy of the report. It is observed that consultants work is impacted due to countries are reluctant in providing necessary data, See **Attachment 7** GMS Transmission Master Plan.

#### **Discussion:**

- ADB requested countries to provide necessary data to the consultants and suggested consultants to provide preliminary results of the study in the meantime.

#### **F. Summary of WGRI Activities**

10. Mr. Duy-Thanh Bui, Principal Energy Economist, ADB and Jonathan Hedgecock, Consultant discussed the progress of the work done by the WGRI, specifically, transmission pricing and Transmission company development. The initial work on transmission pricing focused on defining a methodology for wheeling charges covering power flows between countries. WGRI has discussed and agreed on the main enhancements introduced to the postage stamp transmission charge method, such as (i) differentiation of charge by time of year to reflect hydrological variations, (ii) differentiation of charges by capacity and energy, and (ii) introduction of transmission charges to generators and consumers. Countries will adapt the introduced enhancements as appropriate for their transmission charges.

11. As part of a broader electricity sector reform process, WGRI has discussed and agreed on the concept of Transmission Company (Transco), highlighting the interfaces between the Transco and other power sector participants. All countries acknowledge the advantage of Transco and a variety of Transco models are currently being explored in the GMS countries. Enabling environment and some institutional arrangement supporting Transco concept exist in GMS countries and are evolving. The WGRI will finalize the Report on Transmission Company Model and GMS countries will consider the applications of the concept in their country context as necessary. See **Attachment 8** GMS Transmission Pricing Upgraded and Development of Transco Model.

#### **G. Updates on Various Initiatives**

##### **1. RETA-9003: Update on Integrated Resource Planning with SEA and extended scope for Clean Energy Development in the GMS**

12. Ms. Hyunjung Lee, Senior Energy Economist, ADB updated the activities under TA 9003 since RPTCC-24 held in June 2018 such as (i) two country workshops in Myanmar and Thailand, (ii) knowledge product published on Integrating SEA into Power Development Planning in Viet Nam in December 2018, and (iii) two twinning workshops on renewable energy integration in PRC and strategic environmental assessment in Viet Nam. Those workshops were participated by

around 100 people from the concerned ministries, utilities and agencies. ADB also presented the extended scope with additional financing (\$1,050,000) which was approved in December 2018, in support for renewable energy and energy efficiency development in the GMS. The detailed terms of reference will be developed for the extended scope after country consultations scheduled on April-May 2019. See **Attachment 9** RETA-9003: Update on Integrated Resource Planning with SEA and extended scope for Clean Energy Development in the GMS.

#### **Discussions:**

- Renewable energy and energy efficiency are important components in sustainable energy sector development.
- Energy intensity level of GMS countries is about two times higher than the world average but reduction is still doable.
- China and Myanmar show improved energy intensity for the past 10 years, possibly due to improvement of regulations, standards and building codes. Other factors to be considered are improving tariffs standards and mandatory regulations for large energy consumers. However, WB cautioned the use of indicators.
- Applying SEA in PDP's is perceived as important particularly in providing awareness to decision makers.

## **2. Regional Investment Framework (RIF) 2022 Monitoring and Progress**

13. Ms. Pinsuda Alexander, Economist (Regional Cooperation) from ADB, presented the 2018 updates and revisions to energy sector projects. The key changes in 2018 were to add/include project points of contact, project outputs, and geographical locations and updated project progress on projects listed in the RIF 2022. Specific updates included updated project costs and co-financiers of the WB and AIIB for the Lao PDR Northern Cross-Border Power Trade and Distribution Project. The RIF 2022 also added the ongoing TA project Integrated Resource Planning with Strategic Environmental Assessments for Sustainable Power Sector Development in the GMS. The 2019 updating of the RIF project progress will kick-off in the first week of June 2019. The GMS Secretariat will seek updates from the RPTCC members via written correspondences. See **Attachment 10** Regional Investment Framework (RIF) 2022 Monitoring and Progress.

### **H. Update of GMS Countries Power System Development, Cooperation, and Trade**

14. GMS countries provided updates of their power system development, intra GMS cooperation, and trade including macroeconomic indicators and policy and technological update. The presentation indicated continued growth of electricity demand across the region; increasing generation capacity, reduction in power losses, priority on developing renewable energy resources; and enhanced power cooperation with neighboring countries through memorandum of understanding (MOUs) signed among the countries with high prospect of bilateral electricity trade. See **Attachment 11** for the Country presentations.

15. Key points discussed in the country presentations are summarized below:

- Cambodia faces challenges in power supply with the onset of dry season this year as the operation of hydropower is reduced to 25 percent.

- Lao PDR's trilateral MOU (Malaysia, Thailand, and Lao PDR) which will facilitate multilateral.
- Cross-border power trade is an encouraging development in the GMS power trade.
- Myanmar's national target of 100 percent household electrification by 2030 is similar with Cambodia's target.
- Thailand clarified on the changes in composition of power generation, notably in the reduction of fossil fuel, from 22% in 2018 to 12% in 2037, considering factors such as climate change.
- In terms of natural gas, the share was reduced from 60% in 2018 to 53% in 2037. Thailand requires 30,000 MW of natural gas but sources are limited. To secure the price of natural gas, Thailand has long-term contracts and mentioned one source is Myanmar, although volume is declining.
- Viet Nam has limited capacity on renewable energy (RE) but solar energy will increase depending on policy decision and lessons to enhance development.
- Policy support on RE in Viet Nam is key to attract investors to develop this area especially in light with the challenges in RE development. Future policy for RE development includes (i) studies for electricity tariff for solar and wind, (ii) building technical standard for solar and wind power, and (iii) policy for grid expansion to integrate large portion of RE.
- The duration of PPA in Viet Nam is 20 years and Viet Nam have to sign a new agreement, possibly with the same company.

## **I. Final Session**

### **1. Summary of Main Discussion Points and Next Steps**

16. Each working group discussed and deliberated the main achievements and works to be carried out as summary below.

#### **17. Summary of works implemented under WGPG:**

- GMS Grid Code. WGPG completed draft GMS Grid Code including the tasks assigned to WGPG in 2012: (i) Harmonized Performance Standards adopted by RPTCC in Dec 2016, (ii) Transmission Regulations completed in Dec 2017, (iii) Standard Regional Metering Arrangements completed in Dec 2018, and (iv) GMS Grid Code completed in Dec 2018. Draft Grid Code including the comments matrix shared with RPTCC in January 2019. Participants confirmed the draft has been circulated to the relevant ministerial departments for comments and approval.
- Gap Assessment. ADB consultant has commenced gap assessment and discussed the strategy in assessing the gaps.
- Regional Master Plan. Two individual consultants under ADB TA are conducting the system studies. Most of the transmission system has been modelled and generation modelling in ongoing. It is expected to complete the draft master plan by June 2020. Data from the countries is required to verify the accuracy of the models. Consultants requested the support

of national power system engineers from each country for two weeks to obtain data in the next 3 months.

- Feasibility Studies of Regional Projects. To shift to implementation of the interconnected GMS Grid, pre-feasibility study of priority interconnection projects was commenced. Upon confirmation of the short-term projects, ADB engaged EDF to conduct the pre-feasibility studies in 2018. To date, the countries have been unable to provide the project details to conduct the studies. Therefore, it is required to confirm the scope with each country and revise consultants' scope of work.
- Group expansion. WGPG completed the assigned tasks and the team was expanded under ADB guidance with five (5) new tasks focusing on Strategic Planning and Operations to reflect the need to shift towards more complete, actual application of cross-border power trade. The group was renamed as Working Group on Planning and Operations (WGPO) and the group will now take charge of the draft Grid Code, preparation of master plan, and the gap assessments. Expanded TOR and team composition was discussed. Key tasks from Mar 2018 to December 2022 are as follows:
  - Establish a roadmap for enforcing the regional GMS Grid Codes (Task 5).
  - Establish an organization for the operationalization of the GMS interconnected areas (Task 6).
  - Establish the design of the regional electrical ITC system (Electronic Highway) (Task 7).
  - Establish an ad-hoc Metering Organization and Architecture (Task 8).
  - Provide guidance to Consultants establishing the regional Master Plan, own it and update routinely (annually) (Task 9).
  - Provide guidance to Consultants undertaking preparatory studies of new interconnection lines (Task 10).

#### 18. **Summary of works implemented under WGRI:**

- WGRI has discussed and agreed on the main enhancements introduced to the postage stamp transmission charge method, such as differentiation of charge by time of year to reflect hydrological variations; differentiation of charges by capacity and energy, and introduction of transmission charges to generators and consumers. Countries will adapt the introduced enhancements as appropriate for their transmission charges.
- WGRI has discussed and agreed on the concept of Transmission Company. The WGRI will finalize the Report on Transmission Company Model and GMS countries will consider the applications of the concept in their country context as necessary.
- WGRI reviewed and endorsed the set of outputs that it prepared including Report 1 to 4 (**detailed in the Summary Proceedings**) and stressed that the next phase of WGRI work will have to focus on moving from research to implementation working closely with WGPG/WGPO.
- WGRI indicated that the methodological/analytical developmental works done by the group has relevance to GMS countries to different level (such as postage stamp transmission charge with differentiation by time of year, or capacity and energy charges).
- WGRI considered that it is not a pre-requisite that the power sector in each GMS country needs to be un-bundled for the applying results of the group works. Enabling environment and some institutional arrangement supporting TransCo concept exist in GMS countries and are evolving. WGRI proposed a concept of benchmarking transmission charges if the data may not meet the requirement of calculation.

## 2. **Summary of RPTCC-25**

#### 19. **Summary of RPTCC-25 meeting:**

- RPTCC-25 acknowledged a large amount of analytical works carried out by two working groups to date and their values.
- RPTCC-25 acknowledged gaps among the GMS countries, between each country and the proposed technical standards, and grid codes. The meeting pointed out that until the full harmonization of technical and regulatory aspects is done, power trade will continue incorporating possible standards and codes.
- RPTCC-25 adopted that the GMS power trade cooperation has stepped into Stage 2. The meeting recommended that future RPTCC and WG works will focus on enhancing, deepening practical experiences of Stage 2 of GMS power roadmap. The meeting also recognized that Stage 3 needs substantive work and commitment by countries. A regional centre is becoming an urgent need.
- RPTCC-25 recommended further that, WGs, in deepening practical experiences of Stage 2, move from research to implementation by piloting application of technical and regulatory works in actual interconnection projects; simulating actual projects; and GMS master plan should clearly show the linkages between generation plans and transmission plans.
- RPTCC-25 highlighted the capacity building and training needs by all countries to enhanced technical capacity to handle increase intermittent renewable electricity (solar and wind), synchronization of two systems, contracting aspects etc. Many development agencies operating in these countries are supporting these requirements. There is a need for stock taking, coordination and target the real needs. Countries need to provide consolidated information conforming the needs.
- RPTCC-25 recommended closer coordination between two WGs, better coordination within each GMS country particularly RPTCC, and SOM and Ministerial Meetings and Conferences.
- RPTCC-25 recommended cooperation GMS with ASEAN, RPTCC with HAPUA.
- RPTCC-25 adopted that ADB assistance is valued and should continue. GMS countries request ADB to continue it support by providing technical assistance. The current working arrangement-RPTCC and ADB identify priority issues, consultants led the works, member countries reviewed, commented and adopt the results with ADB coordination – is considered suitable for near terms. In addition, RPTCC adopts expanding scope of work and team composition of WGPG and renaming it to WGPO, which will continue implementing remaining tasks adopted and indicated in the amended TOR.

### **3. Other Businesses**

20. To continue tradition of hosting and chairing the RPTCC meeting, it was tentatively agreed that the next RPTCC meeting will be hosted by Viet Nam end of 2019. Cambodia will chair the next meeting. The exact date and venue will be confirmed later at due time.

### **4. Closing session**

21. The chairs gave thanks to all attendees for their active participation and valuable contribution to the RPTCC-25 meeting.

**Attachments:**

1. Agenda
2. List of Participants
3. GMS Grid Codes: Progress
4. Gap Assessment of Grid Codes for GMS countries
5. GMS Interconnection Pre-Feasibility Study
6. GMS Power Market Development–Business Cases Final Report
7. GMS Transmission Master Plan
8. GMS Transmission Pricing Upgraded and Development of Transco Model
9. RETA-9003: Update on Integrated Resource Planning with SEA and extended scope for Clean Energy Development in the GMS
10. Regional Investment Framework (RIF) 2022 Monitoring and Progress
11. Country Presentation
  - 11.1 Cambodia
  - 11.2 Lao PDR
  - 11.3 Myanmar
  - 11.4 People’s Republic of China
  - 11.5 Thailand
  - 11.6 Viet Nam