GREATER MEKONG SYSTEM REGIONAL GRID CODE

Preamble (draft)

1 of 10 Code Documents

Version 0.4

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Document #	Title: **GMS Regional Grid Code Preamble**	Print Date: **[Date]**
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Note: A *section titled "ANNEX: Code – History of Comments" is attached to each Code. It provides a log of every comment and subsequent consideration taken on the Code.*

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Introduction

(1) The preamble provides the context for the Regional Grid Code and its various sub-sections. It also contains detailed definitions and abbreviations of the terms used in the Regional Grid Code documents and summarises the different sub-codes making up the Regional Grid Code.

1. Regional Power Trade in the GMS

1.1 GMS Policy Objectives

(1) The Regional Grid Code is a key regulatory instrument required to support the pursuit of the energy sector policy objectives for GMS. These objectives are set out in the signed Inter-Governmental Agreement (IGA) on Regional Power Trade in GMS, dated November 3, 2002. GMS Member States have committed to establishing the policy and institutional framework to advance regional electricity trade. Given their different levels of technical capacity, the six Member States have agreed to a phased approach to enhance regional power trade under MOU-1 and MOU-2. MOU-1 set the guidelines for the first stage of the GMS power market development based on bilateral power transactions in the absence of the regional power grid. Under MOU-2 a roadmap was agreed towards power market opening based on the assumption that guaranteed "third party access" to regional power transmission facilities would enable enhanced power trade between GMS countries by 2012.

(2) In 2015, the Association of South East Asian Nations (ASEAN), which includes all members of the GMS except China established the ASEAN Economic Community (AEC). The AEC envisages the establishment of a single market and production base in the region. One of the key areas for AEC development includes enhancing infrastructure connectivity through regional transport and energy links, as well as deeper integration of regional energy markets. Therefore, AEC has provided a strong new impetus for the acceleration of activities under MOU-2, including the continued discussions regarding establishment of the Regional Power Coordination Center (RPCC).

(3) In December 2013, Inter-Governmental Memorandum of Understanding for the Establishment of the Regional Power Coordination Centre in the Greater Mekong Subregion was signed. RPCC will oversee the evolution of the GMS power market towards a more open, integrated and competitive electricity market. In addition, Regional Power Trade Coordination Committee (RPTCC) agreed the establishment of two working groups for (i) power market regulatory issues; and (ii) performance standards and grid code. The *RPCC* is responsible for management and approval of this Regional Grid Code.

1.2 Objectives for Regional Power Trade

(1) The objectives for regional power trade as stated in the IGA are:

a. Coordinate and cooperate in the planning and operation of their systems to minimise costs while maintaining satisfactory reliability; and

b. Fully recover the costs and share equitably in the resulting benefits, including reductions in required generation and transmission capacity, reductions in fuel costs and improved use of low – cost electricity sources; and

c. Provide reliable and economic electric services to the customers of each *Party*.

1.3 Regional and National Grid Code Relationship

(1) The *Regional Grid Code* takes precedence over National Grid Codes for all matters related to the interconnected network. Notwithstanding this, certain equipment connected to the interconnected system can be deemed to be excluded from the Regional Grid Code coverage, where equipment performance or lack thereof has no impact on the Interconnected System.

1.4 Separate Synchronous Areas

(1) The *Regional Grid Code* could have separate criteria listed for each synchronous area in the GMS. Specifically each synchronous area could have separate standard Frequency Control recognising the difference in the sizes of the synchronous area.

(2) The *Regional Grid Code* will have guidelines for reserve sharing between synchronous areas.

2. Legal Authority

2.1 Legislation

(1) The *Regional Grid Code* derives its legal authority from the IGA.

(2) The *Parties* to the IGA are the Governments of the Kingdom of Cambodia, the People's Republic of China, the Lao People's Democratic Republic, the Republic of the Union of Myanmar, the Kingdom of Thailand, and the Socialist Republic of Viet Nam.

(3) Article 4.1 of the IGA states: The *Parties* assign responsibility for the policy direction and supervision of regional trade under this IGA to the Ministers responsible for electricity or electricity policy, as appropriate. These Ministers shall meet as and when they deem necessary, or at the request of the Chair of the Regional Power Trade Coordination Committee (RPTCC) to be formed in accordance with Article 4.2 herein.

(4) Article 4.2 of IGA states: "The *Parties* recognise the need for a high-level body, the RPTCC, to actively coordinate for successful implementation of regional trade and to represent the countries involved in regional power trade. The Parties designate their national representatives to the current Electric Power Forum to constitute the first GMS Ministerial Level Conference and the respective national governments through the Ministers under Article 4.1 herein. The *RPTCC* shall have independence in management of its operations for purpose of achieving its main objectives. The current Experts Group of Power Interconnection and Trade shall provide technical support to the *RPTCC*."

(5) Article 4.4 of IGA states: "The *Parties* also authorize their respective appropriate national authorities and government-designated electric utilities to enter into necessary

agreements to regulate the establishment and operation of regional power trade, subject to the approval of the *RPTCC*. The Parties shall support and assist their respective appropriate national authorities and government-designated electric utilities in the performance and execution of their obligations in terms of any agreement entered onto between the respective utilities pursuant to this IGA and consistent with the Policy Statement.*"*

2.2 Applicability

(1) All parties engaging in Regional Power Trade in the Greater Mekong Sub-Region are required to comply with the provisions of the IGA and subsequently the provisions of this *Regional Grid Code*.

(2) Any breach could result in the revocation of [*RPCC* membership] or fine.

(3) The *RPCC* may grant exemptions to the [*RPCC* membership] conditions and code requirements.

3. Regional Grid Code

3.1 Definition

(1) The term *Regional Grid Code* is widely used to refer to a document (or set of documents) that legally establishes technical and other requirements for the connection to and use of an electrical system by parties other than the owning electric utility in a manner that will ensure reliable, efficient, and safe operation.

3.2 Need for a Grid Code

(1) The *Regional Grid Code* is required to define technical requirements and rules for *Users* of the regional interconnection and trade of electricity.

(2) With the introduction of bilateral transactions that require "third party access" to and use of the transmission networks, these rules need to be formalised.

(3) Bilateral trading *Parties* require formal and transparent mechanisms to describe how the provision of a safe, reliable, economical planning and operation of the system will be achieved. There are at least two ways to structure the formal arrangements *Parties*:

   (a) Write all the necessary rules and operations into bilateral agreements between the *Parties*.
   (b) Develop a *Regional Grid Code* to define all the common codes and standards that are needed to operate a safe, reliable and economic *Transmission System*.

(4) There are a number of important advantages that a well-designed and transparent *Regional Grid Code* helps to promote:

   (a) The *Regional Grid Code* is applicable to all *Parties* without favour or discrimination thus promoting a level playing field between the *Parties*.
   (b) Changes to the *Regional Grid Code* are facilitated through a transparent process, which allows for input by all the Parties.
   (c) The above features help to reduce investor risks resulting in lower barriers to entry and potentially to lower electricity prices to end consumers.

(5) A *Regional Grid Code* therefore provides the rules and procedures that enable the power system to be planned and operated reliably. It is also a more effective instrument than bilateral agreements, particularly when more independent players are introduced and when further reforms are undertaken.

3.3 Objectives

(1) The fundamental function of a *Regional Grid Code* is to establish the rules and procedures that allow *GMS Parties* to use the power system and to permit the power system to be planned and operated:

(a) Safely,
(b) Reliably,
(c) Efficiently, and
(d) Economically.

(2) In order to achieve this goal, the *Regional Grid Code* must:

(a) Be objective,
(b) Be transparent,
(c) Be non-discriminatory,
(d) Be consistent with Greater Mekong Sub-Regional policy,
(e) Define the obligations and accountabilities of all the *GMS Parties*,
(f) Specify minimum technical requirements for the *Regional Transmission System,* and
(g) Ensure that the relevant information is made available.

(3) The *Regional Grid Code* will provide the following assurances:

(a) To the *RPCC*, the assurance that the *GMS Parties* operate according to the respective Regulatory conditions.
(b) To *Parties*, the assurance that transmission service-providers operate transparently and provide non-discriminatory access to their defined services.
(c) To transmission service-providers, the assurance that *Parties* will honour their mutual *Regional Grid Code* obligations and that there is Regional agreement on these.

3.4 Grid Code Overview

(1) Preamble: This document provides the context for the *Regional Grid Code* and its various sub-sections.

(2) Glossary: This document contains detailed definitions and abbreviations of the terms used in the *Regional Grid Code.*

(3) The Governance Code (GC): This document sets out how the *Regional Grid Code* will be maintained. It describes the process that will be followed to update the *Regional Grid Code* to improve safety, reliability and operational standards. It sets out how *Parties* can influence the amendment process and defines who has the Authority to recommend and ultimately approve and enforce the changes. In addition the document will also explain oversight and compliance requirements that need to be observed by all *Parties*. The Governance Code also sets out dispute management procedures.

(4) The Connection Code - Requirements for Generators (RfG), High Voltage Direct Current Connections (HVDC) and Demand Connection: This document provides network requirements for grid connection of generators (of all sizes), HVDC connections

including DC connected generators and demand connections. It is broken down into sections defining the requirements in terms of:

(a) Frequency tolerance, active power and frequency control requirements
(b) Voltage tolerance, voltage control and reactive power provision
(c) Fault ride through capability
(d) Protection requirements
(e) System Restoration, Islanding and Black start capability
(f) Information requirements
(g) Connection and testing requirements

(5) The Operation Codes: The Operation Code (OC) sets out the data exchange between and responsibilities of *RPCC* and the transmission system operators (*TSOs*) in operating the Interconnected Transmission System. The OC deals with the criteria and procedures which will be required to facilitate efficient, safe, reliable and coordinated system operation of the GMS. The Operation Codes includes four (4) elementary Codes to cover the following operational aspects:

(a) Operational Security Code (OS): This Code defines the Operational Security requirements and principles for Transmission Systems applicable to all TSOs, DSOs and Significant Grid Users in Normal and Alert System State. Furthermore, this Network Code identifies the general provisions in relation to the Emergency State, Blackout State and Restoration.

(b) Operational Planning & Scheduling Code (OPS): This Code defines the minimum Operational Planning and Scheduling requirements for ensuring coherent and coordinated operational planning processes of the Synchronous Areas applicable to all Significant Grid Users, all Transmission System Operators and all Distribution System Operators.

(c) Load Frequency Control and Reserves Code (LFCR): This Code defines the minimal requirements and principles for load-frequency control and reserves applicable to all TSOs, Reserve Connecting DSOs and Reserve Providers.

(d) Emergency and Restoration Code (EM): This Code defines the Operational Security requirements and principles applicable for Emergency State, Blackout State and Restoration to TSOs, DSOs, Significant Grid Users, Defence Service Providers, Restoration Service Providers, Market Participants and any third party that has a role pursuant to the [GMS Network Market Code] and efficient utilisation of the power system and resources.

(6) The Metering Code (MC): The Metering Code (MC) specifies the minimum technical, design and operational criteria to be complied with for the metering of each point of interchange of energy between *Control Areas, TSO's* and other trading *Parties*. The MC also specifies the associated data collection equipment and the related metering procedures required for the operation of the *GMS Interconnected Transmission System*. The code sets out provisions relating:

(a) Main *Metering Installations* and check *Metering Installations* used for the measurement of active and reactive energy;
(b) The collection of Metering data;
(c) The provision, installation and maintenance of equipment;
(d) The accuracy of all equipment used in the process of electricity Metering;
(e) Testing procedures to be adhered to;
(f) Storage requirements for Metering data;
(g) Competencies and standards of performance; and
(h) The relationship of entities involved in the electricity Metering industry.

(7) The System Operator Training Code (SOTC): The System Operator Training Code (SOTC) sets out the responsibilities and the minimum acceptable requirements for the development and implementation of System Operator Training and Authorisation programmes. This Code shall ensure that *System Operators* throughout *GMS* are provided with continuous and coordinated operational training in order to promote the reliability and security of the *GMS Interconnected Transmission System.*

4. Notices and domicile

(1) Communication with the Secretariat in respect of the normal operations of this *Regional Grid Code* shall be sent to the following chosen address:

Address to be added

(2) Any notice given in terms of this *Regional Grid Code* shall be in writing and shall -

(a) if delivered by hand, be deemed to have been duly received by the addressee on the date of delivery and a receipt will have to be produced as proof of delivery;
(b) if posted by pre-paid registered post, be deemed to have been received by the addressee 14 days after the date of such posting;
(c) if successfully transmitted by facsimile, be deemed to have been received by the addressee one day after dispatch.

(3) Notwithstanding anything to the contrary contained in this *Regional Grid Code*, a written notice or communication actually received by one of the *Parties* from another, including by way of facsimile transmission, shall be adequate written notice or communication to such *Party*.

ANNEX: Preamble – History of Comments

#	Country	Reference section in the document	Country Comment	Consultants Review and Recommendation	Country Acceptance
1.	Vietnam	Section 4	Grid code definitions aligned with set of glossary terms in Policy 5.	Definitions have been aligned and included in draft Version 0.3.	
2.	Vietnam	Overall	What is the relation between Policies and Section of GC. How we could harmonize and take into account the contents of Policies in RGC?	Policies will be converted to form the grid code.	
3	Vietnam	Overall	Relationship between National GC and RGC. What happen as the NGC and RGC have the gaps, conflict, etc.?	The regional grid code is for all equipment that impacts interconnected operations and has precedence over NGC. NGC will need to be aligned where RGC is stricter than NGC and the requirement impacts interconnected system. Where NGC is stricter then no mandatory change is required unless the RGC.	
4	China	Section 1	We suggest the following content should be considered in the grid code: (1) risk evaluation and control; (2) demand for protection and system stability devices; (3) demands for communication devices.	(1) Risk is covered in system operations planning and security codes. (2) Demand protection will be covered in demand connection code. (3) Communications is covered in information exchange code.	
5	Vietnam	Overall	The development of RE is orientation and direction of each GMS country, hence the GMS Grid Code should take into account the technical requirements for RE, particularly wind and solar energy.	Connection code section 3 covers DC connected power plant modules and has as much detail as is in the European Grid Code.	

#	Country	Reference section in the document	Country Comment	Consultants Review and Recommendation	Country Acceptance
6	Vietnam	Overall	In GMS Grid Code, it mentioned about the technical requirements, so what is relation and harmonization between technical performance and technical requirements.	Technical performance is covered in many places – please provide examples of where technical performance is missing.	
7	Laos	Definitions and abbreviations	Separate Glossary of Terms document created for Code.	Grid code definitions and abbreviations removed from preamble.	
8	Laos	Section 3.4 Grid Code Overview	Section 3.4 Grid Code Overview - To be updated based on grid code documents provided.	Section 3.4 Grid Code Overview.	
9	Laos	Section 3.4 Grid Code Overview	Long term regional Planning Code removed from GMS regional code and to be issued as a separate planning document.	References to planning code removed.	