Minutes of the 4th meeting of SAFIR Joint Working Group (JWG) "To study, formulate and recommend for facilitating Power trade development in South Asia"

Date: 21st May 2021
Time: 04:30 PM IST
Venue: Virtual mode/ Teams platform

Deputy Chief (Regulatory Affairs) Central Electricity Regulatory Commission (CERC), India welcomed all members to the 4th meeting of SAFIR Joint Working Group (JWG) and provided a brief on the agenda of the meeting. The list of the participants of the meeting has been provided at **Appendix-I**.

Agenda 1: Confirmation of minutes of 3rd meeting held on 28.01.2021

Deputy Chief (RA), CERC presented the minutes of the 3rd JWG meeting held on 28.01.2021 for approval.The JWG unanimously approved the minutes of the 3rd meeting of JWG.

Agenda 2:Harmonization of Rules and Common Minimum Grid Code - Presentation by IRADe

Representatives of IRADe made a presentation (**Annexure - I)** on the jurisdictions/ mandates of the regulators on the matter related to the grid code and the response of IRADe on the comments/ suggestions of Bhutan, the only country that provided comments/ suggestions available to IRADe.

The following emerged after the presentation was made:

- Load shedding should be a last resort.Usage of reserves, or ancillary services should be encouraged to address the contingency.

- For carrying cross border flow of energy, it is important to maintain the frequency band by both the countries at the interconnection point, maintain voltage at the interconnection point, contractual power flow at the interconnection point and protection system at both the ends. Each country should maintain the above indicated parameters for carrying cross border trade.

- The common minimum grid code should have two classifications (a) HVDS system where there are synchronous operations and (b) where there are asynchronous operations/ connections. For implementation of common grid code, organizational structure and structural mechanism need to be developed and put in place in all the countries. This has to be an evolutionary process and thus a road map for such implementation needs to be developed.

- The reporting system should be evolved to carry postmortem analysis so as to identify the cause disturbance, in case there is one.

- IRADeshould engage with the experts of the membercountries who have not provided their suggestions/ comments on the report so that the report is holistic in nature and addresses the concerns of all the countries.

Agenda 3:Electricity market design – International perspectives- Status update by World Bank wrt synthesizing the same withstudies conducted by IRADe

Senior Energy Specialist, World Bank made a presentation**(Annexure - II)** on the scope of work developed regarding the Electricity market design for CBET.

The following emerged after the presentation was made:

- Task 5 (Synthesis report &broader consultations as per direction of JWG) and Task 6 (Capacity building in optimizing National Dispatches to harness benefits of CBET) underComponent 2 of the scope of work may be priortised. World Bank mayengage with Member countries to try out optimisation techniques for dispatch leading to optimizing resource saving in terms of system marginal cost. This would help provide insights into market design aspects.

- Market option like California Western EIM may be explored as it is akin to the situation in the South Asian region where a market in one of the member countries is already in place. This market can be leveraged by other participating members for last mile optimisation of resources under Task 6 under component 2. Subsequently, European markets like NORDPOOL, etc. can be looked into to build on the learnings gained.

- Å Capacity building is important before moving on to a full-fledged market design, to harness the benefits of optimiseddespatch as a whole.

- Å The scope should include Model Regulations that can be adapted by the Regulator for carrying out cross border trade.

- Å There should be a shift from need-based trade of energy to potential-based exchange of power.

- Å There is a need for market reforms and capacity building for implementing CBET and World Bank may provide details on this action.

Decision Points & Way forward

1. Based on the presentation made in this meeting and the documents previously circulated, the JWG members shall forward their suggestions to SAFIR Sectt.

2. The members of JWG may provide their comments/ suggestions on the Common Minimum Grid Code and the Annexureprepared by IRADe and the document circulated by World Bank to the SAFIR Secretariat. SAFIR Secretariat shall compile these commentsas received from members of JWG and communicate the same to IRADe and World Bank so that the updated reports may be presented in the next meeting of the JWG.

3. The World Bank may share the country-based reports to respective member countries by June 2021

4. The date of the next meeting will be mutually decided.

The meeting concluded with vote of thanks to Chair.

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Appendix - I

ListofParticipantsof the4th meeting(Virtual)ofSAFIRJointWorkingGroup(JWG) "To study, formulate and recommend for facilitating Power trade development in South Asia" held on 21stMay 2021 at 04:30PM IST

S. No.	Name & Designation	Organisation
	MEMBERS	
01	Mr.SamdrupThinley, Chairperson/CEO,	JWG/ BEA, Bhutan
02	Mr. I.S Jha, Member	CERC, India
03	Mr. Mohammad Bazlur Rahman, Member	BERC, Bangladesh
04	MrDilli Bahadur Singh, Chairperson,	ERC, Nepal
05	Dr. S K Chatterjee, Chief (Regulatory Affairs) and Convenor	CERC, India
	SPECIAL INVITEES	
06	Mr. Ram P Dhital,	Member, ERC Nepal
07	Mr. RV Shahi, Sr. Energy Advisor	World Bank
08	Mr. Gailius J. Draugelis, Lead Energy Specialist, Energy Sector Unit South Asia Infrastructure	World Bank
09	Mr. V Menghani, Chief (Engineering)	CERC, India
10	Mr. Sonam Darjay, Chief, Licensing & Technical Division	BEA, Bhutan
11	Mr.Rezaul Karim Khan, Director	BERC, Bangladesh
12	Mr. GaminiHerath, Deputy DG	PUCSL, Sri Lanka
13	Mr.Irfan Yousuf, Advisor (RE)	NEPRA, Pakistan
14	Mr. Pankaj Batra, Project Director	SARI/EI, IRADe, India
15	Mr. Rajiv Panda, Technical Head	SARI/EI, IRADe, India
	OTHER PARTICIPANTS	
16	Mr. Md. Adil Chawdhury, Superintendent Engineer	PGCB, Bangladesh
17	Mr. Kanchana Siriwardena, Director Tariffs & Economic Affairs	PUCSL, Sri Lanka
18	Mr B M ChalithPasindu, Asst Director,	PUCSL, Sri Lanka
19	MrDebabrata Chattopadhyay, Senior Energy Specialist	World Bank
20	Mr Salman	World Bank
21	Mr. Simon J. Stolp	World Bank
22	Mr. Yuge Ma	World Bank
23	Ms. Maria Rafique	NEPRA, Pakistan
24	Ms. Rashmi Nair, Deputy Chief (Regulatory Affairs)	CERC, India
25	Mr Saurabh, Principal Research Officer	CERC, India
26	Mr. Ankit Gupta, Research Officer (FOR)	CERC, India
27	Ms Rashmi Saurav, Research Associate	CERC, India

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Annexure-I

South Asia Regional Initiative for Energy Integration (SARI/EI)

Presentation

on

Harmonisation of Rules and Common Minimum Grid Code (CMGC) for South Asia

"Jurisdiction on Grid Codes by Regulatory Commission, Comments and Response on CMGC"

Presented by

Mr. Pankaj Batra, Project Director & Mr. Rajiv Ratna Panda, Associate Director

SARI/EI/IRADe

4TH meeting of the Joint Working Group(JWG) of SAFIR "To study, formulate and recommend for facilitating Power trade development in South Asia" (Virtual Meeting), 4.30 PM IST onwards , through Video conferencing, Friday, 21st May 2021, New Delhi, India

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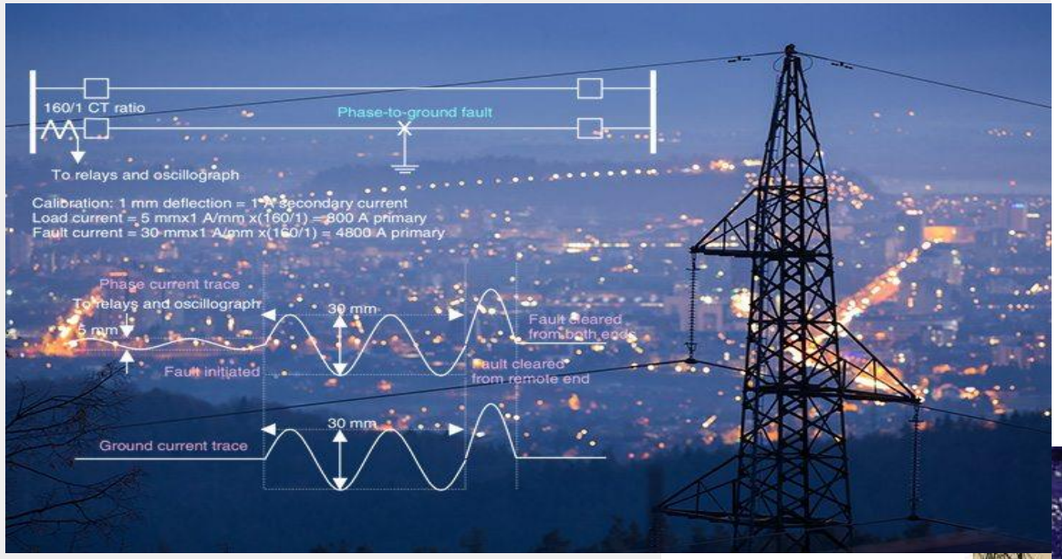
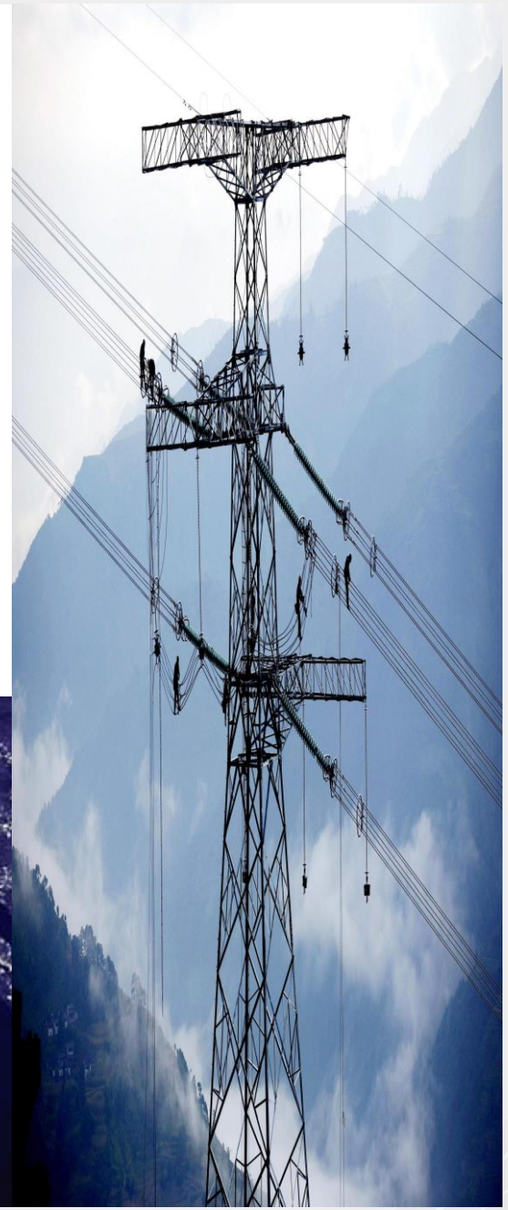




Need for Harmonisation of Rules & Common Minimum Grid Code

Cross Border Electricity Trade in South Asia : Current Scenario

India- Bangladesh ~1160 MW

Bhutan-India ~2100 MW

Nepal-India ~ 500 MW

~ South Asia (BBIN) CBET 2.6 X

~3760* MW

2020

~2986 MW

2018

~2126 MW

2015

~1400 MW

2012

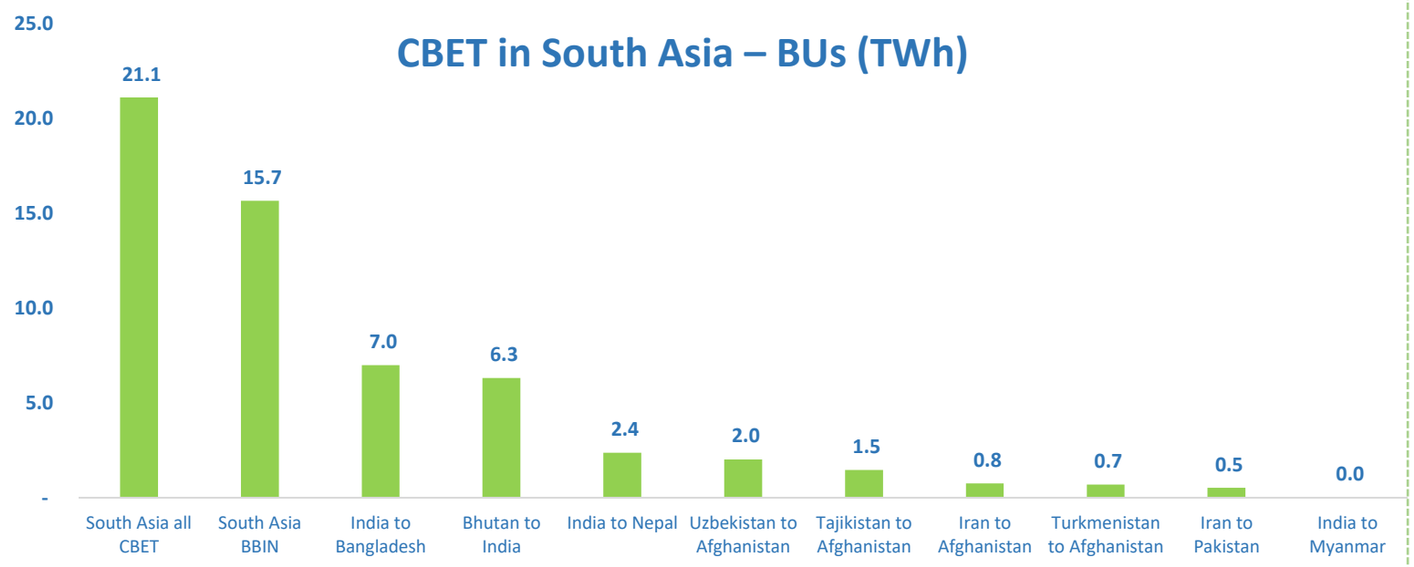
Annual CBET ~ 21 BUs. Dominant BBIN-~16 BUs

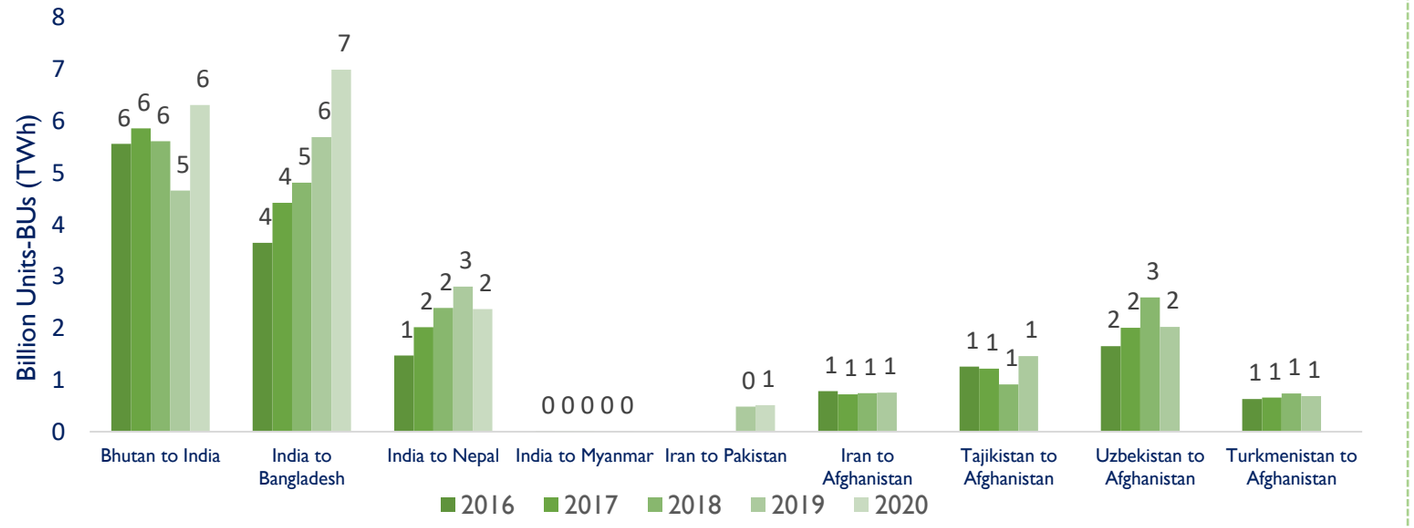
Bilateral & G-G trade Dominates

Comml. CBET in BBIN on Rise 2010-0, 2020-~1266 MW (~33%), Trade through Power Exchange-**Nepal Started trading on India's Power Exchange-IEX DAM, April,2021 **

CBET Potential Remains Large

EUROPE-Leading Regional Power System, CBET trade volume - 467 TWh





Note- All the data are for 2020 except Afghanistan import is for 2019. Based on Data Source from : POSOCO, NEPRA, NSIA, CERC-MMR , Numbers are after rounding of decimal number

Source: Compiled from various Sources , Country Authority Websites across the Region - : India-Myanmar ~ 3-5 MW of CBET , Pakistan-Iran ~ 104 MW CBET, Afghanistan- Imports around 1000 MW collectively from Uzbekistan (326 MW) , Iran (164 MW) , Tajikistan (433 MW) ,Turkmenistan (77 MW) I *~ Maximum Peak Trade I PM Modi inaugurated Mangdechhu hydroelectric plant, Bhutan, Aug 17, 2019

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Cross Border Electricity Trade South Asia (SA) : Future Scenario

SA CBET Outlook

~43.2 GW, Cross Border Interconnection Capacity by 2040

Transitioning from Bilateral to Trilateral CBET in SA

Renewable Energy based CBET (One Sun One World One Grid)

More Commercial form of CBET, Trade Through Power Exchange Platform

Regional Power Market Development & Market Integration

Enabling Policy & Regulatory Frameworks

Guidelines for the Import / Export (Cross Border)-2018 of Electricity

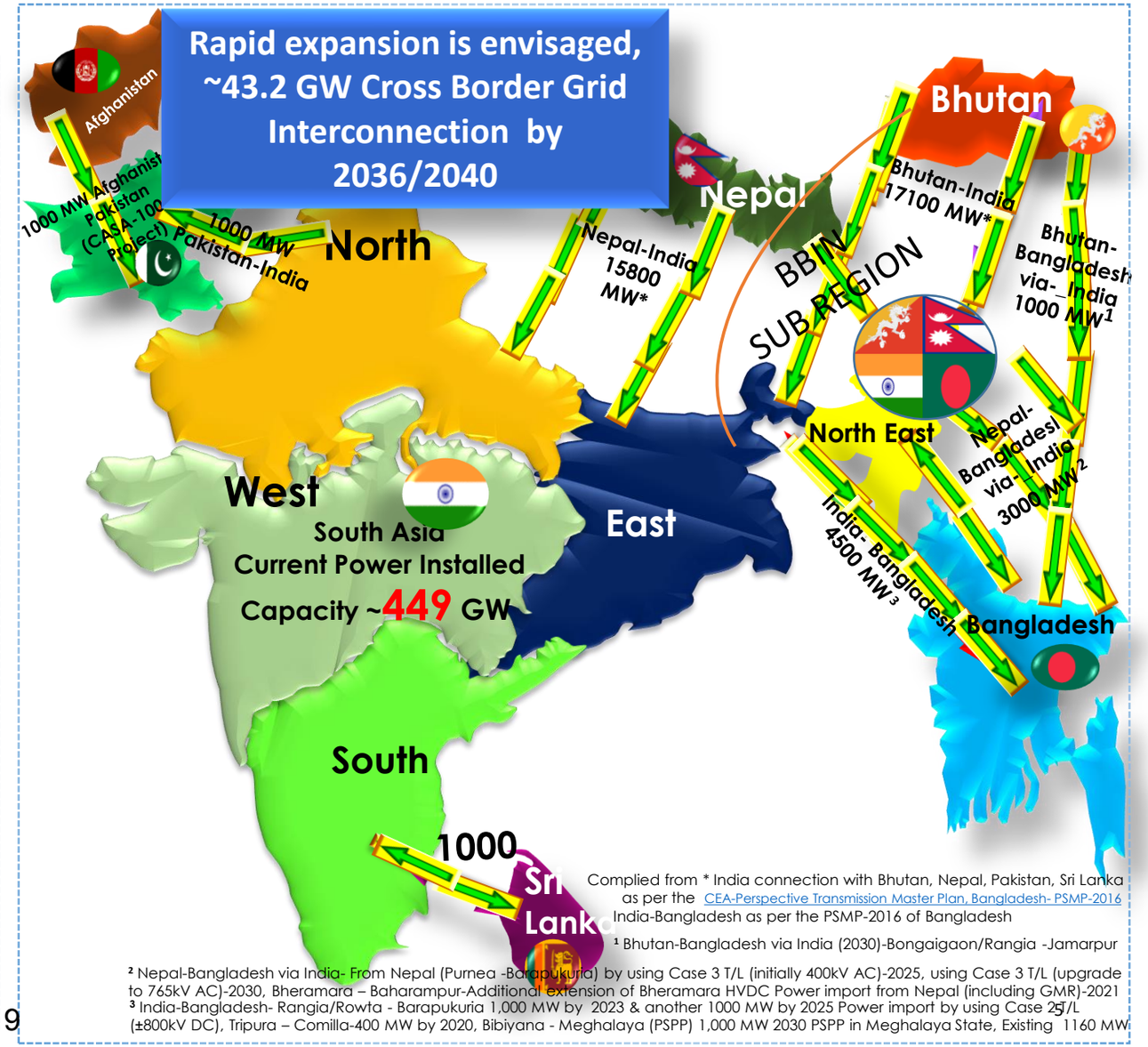
Section 3.1, 5.3, 8.6

Central Electricity Regulatory Commission (Cross-Border Trade of Electricity) Regulations, 2019

Section 3 (2), 6, 12 (6)

Procedure for approval and facilitating Import/Export (Cross Border) of Electricity by the DA Authority-Feb, 2021

Section 8, Annex-V, 6.5, 6.6 (iii), Annex-III



Common Minimum Grid Code (CMGC): Objective

- **The Common Minimum Grid Code for South Asia : lays down the rules, guidelines and standards to be followed by various South Asia country participants in the system for cross border trading in electricity, while operating the power system, in the most secure, reliable, economic and efficient manner.**

Facilitation of cross border trading of power, while ensuring secure, reliable, economic and efficient operation of the grid.

Facilitation of the coordinated optimal operation of the South Asian Grid.

Facilitation of coordinated and optimal maintenance planning of generation and transmission facilities in the South Asian grid.

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Jurisdiction over Grid Code by the Regulators of South Asian Countries

Jurisdiction on Grid Codes in Bangladesh- Bangladesh Energy Regulatory Commission

Main Act: - Bangladesh Energy Regulatory Commission Act, 2003

(http://www.clcbd.org/document/download/277.html)

Relevant Section/Clause:

(" CHAPTER – 4, Functions, Powers and Proceedings of the Commission

22. Functions of the Commission—

Subject to the provisions of this Act, functions of Commission shall be as follows:-

…….

(f) to frame codes and standards and make enforcement of those compulsory with a view to ensuring quality of service;

…….. ")

("59. Power to make regulations—

(1) Commission may, for the fulfillment of the objectives of this Act, make regulation by publishing it in the official gazette.

(2) Without affecting the totality of the said power, regulations may be made, on any or all of the following heads:

…….

(e) making of different codes and standards ;

……..")

In exercise of the powers conferred by section 59 of the Bangladesh Energy Regulatory Commission Act 2003 (Act 13 of 2003), read with sub-sections 2(e) and 2(f) thereof and for the fulfilment of the objectives of the Act, the Bangladesh Energy Regulatory Commission has made the grid code regulations:

Jurisdiction on Grid Codes in Bhutan- Bhutan Electricity Authority

Main Act- ELECTRICITY ACT OF BHUTAN YEAR 2001

(http://www.bea.gov.bt/wp-content/uploads/2021/03/ElectricityActBhutan2001.pdf)

Relevant Section/Clause:

Preamble

The Electricity Act enables the restructuring of the power supply industry and the possible participation of the private sector, by providing mechanisms for licensing and regulating the operations of power companies. The establishment of the Bhutan Electricity Authority as an autonomous body will ensure a transparent regulatory regime; the Authority also has the role of laying down the standards, codes, and specifications of the Electricity Supply Industry. By this means the Electricity Act will define the roles and responsibilities of suppliers and protect the interests of the general public.

(" 11 Functions of the Authority

11.1 Functions of the Authority are:

i) to develop regulations, standards, codes, principles and procedures, which include, but are not limited to the following :

a. performance standards, including minimum technical and safety requirements for construction, operation and maintenance of generation, transmission and distribution facilities;

……")

(" 89 The Authority shall, by statutory instrument, make regulations to establish a Grid Code. ")

Jurisdiction on Grid Codes in India-Central/State Electricity Regulatory Commission

Main Act: - THE ELECTRICITY ACT, 2003

(http://www.cercind.gov.in/Act-with-amendment.pdf)

Relevant Section/Clause:

(" Section 79. (Functions of Central Commission): --- (1) The Central Commission shall discharge the following functions, namely:-

……..

(h) to specify Grid Code having regard to Grid Standards; ")

……..

(" Section 86. (Functions of State Commission): --- (1) The State Commission shall discharge the following functions, namely: -

…….

(h) specify State Grid Code consistent with the Grid Code specified under clause (h) of sub-section (1) of section 79; ")

……..

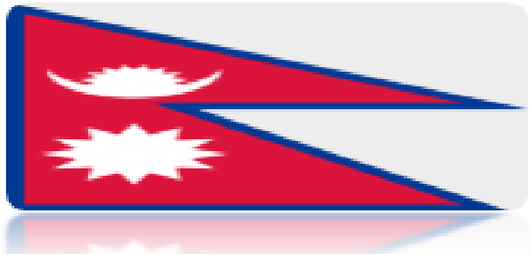
(" Section 178. (Powers of Central Commission to make regulations): --- (1) The Central Commission may, by notification make regulations consistent with this Act and the rules generally to carry out the provisions of this Act.

(2) In particular and without prejudice to the generality of the power contained in sub-section (1), such regulations may provide for all or any of following matters, namely:-……

(g) Grid Code under sub-section (2) of section 28; ")

The Indian Electricity Grid Code (IEGC) is a regulation made by the Central Commission in exercise of powers under clause (h) of subsection (1) of Section 79 read with clause (g) of sub-section (2) of Section 178 of the Act.

Jurisdiction on Grid Codes in Nepal-Electricity Regulatory Commission



ELECTRICITY REGULATORY COMMISSION

(Electricity sector regulator of the Government of Nepal)

Main Act: - Electricity Regulation Commission Act, 2017 (https://erc.gov.np/storage/listies/April2020/erc-act-2017-english.pdf)

Relevant Section/Clause:

(" Chapter 6, Function, duties and authority of the commission

12 To manage the technician : For the regulation with regard to generation, transmission, distribution and business of electricity the commission shall carry up the following works :

A. To form, execute and monitor the grid code and distribution code for electricity service.

…….

……. ")

Jurisdiction on Grid Codes in Pakistan-National Electric Power Regulatory Authority

Main Act: - Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (https://nepra.org.pk/Legislation/1-Act/NEPRA%20Act%201997%20as%20amended%20vide%202018%20Act.pdf)

Relevant Section/Clause:

(" 23G. **System Operator licence**.–(1) No person shall, unless licensed by the Authority under this Act, undertake functions as a system operator as may be specified by the Authority, including but not limited to.-

…..

(4) An application for licence under sub-section (3) shall be accompanied by a draft grid code governing the form and manner in which the system operator shall undertake its licensed activities. ")

(" 23H. Duties and responsibilities of a system operator.–

(1) A system operator shall, from time to time and subject to approval by the Authority, make such grid management code as may be required to enable it to carry out its functions as a system operator.

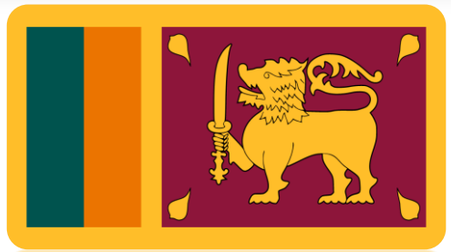
(2) A system operator shall regulate its operations, standards of practice and business conduct in accordance policies and procedures as approved by the Authority.

(3) The Authority may, if required in the public interest, direct the system operator to make such grid code or amend its existing grid code as it may specify in writing: Provided that if the system operator does not comply with the direction of the Authority within a period of thirty days without providing just cause for such non-compliance to the Authority, the grid code of the system operator shall be deemed to have been made or amended, as the case may be, and shall take effect accordingly.

……")

Grid code is prepared in "Pursuant to Section 35 of NEPRA Act and Article 16 of the NTDC licence, the National Transmission and Dispatch Company is required to ensure that there is in force at all times a Grid Code. Consequently, NTDC is required to submit a comprehensive Grid Code for approval of the Authority in accordance with the requirement of Article 16 of its licence. The Grid Code provides for the smooth and effective functioning of NTDC and other NEPRA licensees that are or will be connected to the NTDC's Bulk Transmission System ".

Jurisdiction on Grid Codes in Sri Lanka- PUBLIC UTILITIES COMMISSION (PUCSL)



Public Utilities Commission of Sri Lanka

Main Act: - Sri Lanka Electricity Act, No 20 of 2009 (SLEA 2009)

(https://www.pucsl.gov.lk/wp-content/uploads/2017/12/electricity_act_2009.pdf)

Relevant Section/Clause:

(" CHAPTER II FUNCTIONS OF THE COMMISSION

3. (1) The functions of the Commission shall be to act as the economic, technical and safety regulator for the electricity industry in Sri Lanka, and—

,,

(c) to approve such technical and operational codes and standards as are required from time to time to be developed by licensees; ")

……

(" 17. Without prejudice to the generality of section 15, a transmission licence issued to a licensee shall include conditions—

…….

(f) requiring the licensee to implement and maintain such technical or operational codes in relation to the transmission system (including a grid code) as the Commission considers necessary or expedient; ")

……..

The Grid Code of Sri Lanka has been formulated in terms of the provisions of Clause 17(f) and 3.1 (c) of the Sri Lanka Electricity Act, No 20 of 2009 (SLEA 2009), which require the licensees to implement and maintain technical or operational codes; the Public Utilities Commission of Sri Lanka (PUCSL) to approve and regulate the implementation of such codes

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Comments & Response on the Common Minimum Grid Code (CMGC)

SL no	BEA Comments	SARI/EI/IRADe Response
1.	**Clause 2** **Comments** i). Definitions are missing ii). Definition should also including the roles of all South Asian Forums and other Bodies for role clarity.	**Clause 2 –** **Yes, the Definitions and Role of various concerned bodies in South Asia are missing. These would be put once the Common Minimum Grid Code (CMGC) for South Asia is finalized.**
2.	**Clause 3 (e)** ***Till these are formed, the concerned Indian entity can do the coordination in lieu of the respective forums.*** **Comments** This clause could be reframed as it doesn't provide equal opportunity to all the member countries in support of their duties for effective and optimal cross-border trade of electricity. We are of the view that this common minimum grid code should only come into force after all the relevant guidelines/procedures are put in place and the roles of respective forums are clearly spelled out.	**Clause 3(e) –** **The CMGC for South Asia must give equal opportunities for all South Asian nations. The purpose of putting this was that Cross Border Electricity trade (CBET) should not wait till the various South Asian Forums, i.e. the Forum of Regulators, the Forum of Planning Agencies, the Forum of System Operators, the Forum of Transmission Utilities are formalized. The CMGC is a technical document and grid security is uppermost during CBET. Therefore, this is an interim arrangement only. In India too, it has diverse stakeholders, with their own interests, i.e. the Central Government, the State Government and privately owned generators and transmission licensees. Therefore, this document is made to have a level playing field for all these players. Since these systems are already in place, it was thought that this could start with the existing arrangement. The roles of respective forums will be clearly spelled out.**

SL no	BEA Comments	SARI/EI/IRADe Response
3.	**Clause 4** **Comments** The overall objective of the minimum grid code doesn't highlight fairness and non-discrimination to have the secure, and reliable operation of South Asian grid and for efficient energy exchange within the member countries.	**Clause 4 –** **We will add the fairness and non-discrimination in the objective (a) of the CMGC, worded as given below:** **"(a) Facilitation of cross border trading of power in a fair and non-discriminatory manner for all South Asian nations, while ensuring secure, reliable, economic and efficient operation of the grid.**
4.	**Clause 5.1 (c)** *Any new country getting connected to the South Asia grid shall neither suffer unacceptable effects due to its connectivity nor impose unacceptable effects on the South Asia grid.* **Comments** The unacceptable effects other than voltage and frequency which is mentioned in the subsequent clauses if any, should be clearly qualified in this clause.	**Clause 5.1(c) – The unacceptable effects may be many, other than control of frequency and/or voltage. This could be due to non-reliable protection, improper protection coordination, improper insulation coordination, non-use of standard equipment, leading to equipment failure and thereby causing disruption to the grid, non-abiding by system protection schemes, etc. That is why a general term has been used.**
5.	**Clause 5.2** **Comments** i). The term "new country" used throughout the code may be replaced with suitable word such as "country" or "Applicant". ii). The final approval for connection to the South Asia grid should be provided by the System Operator of individual member countries in consultation with the SAFTU. Or the clause may be further refined by including the role of System Operator in the process of granting connection to the South Asian electricity grid.	**Clause 5.2 – "New country" has been used and not "applicant", because there should be only one entity, representing a new country getting connected to the South Asian grid on behalf of the country. We will replace this with "applicant", and define the term "applicant" as the transmission utility of the new country getting connected to the South Asian grid, as only they will ensure the physical connectivity, taking into account the requirements of insulation coordination, generic protection schemes, protection coordination, communication requirements, etc. The approval will be given by SAFTU, in accordance with a predefined Procedure for Connectivity to the Grid.**

SL no	BEA Comments	SARI/EI/IRADe Response
6.	**Clause 5.2 (A)** *c) The new country would have to implement generation and/or load control mechanisms to be able to control cross border power flows, in case of contingencies.* *d) The new country would also have to abide by the Regional under frequency load shedding schemes to ensure commensurate load shedding in case of grid disturbances to prevent falling frequency, and also abide by the Regional islanding schemes and system protection schemes, which would be decided by the South Asian Forum of Planning bodies, which are involved in operation planning..* **Comments** The impositions highlighted in clause 5.2 (c) & (d) may not be necessary in the grid code. However, in this place, a clause may be added in the Common Minimum Grid Code stating that the existing PPAs (long-term power purchase agreement signed between two countries) are exempted from meeting the requirement of the common minimum grid code such as the requirement of generation and/or load control mechanism, load shedding requirements, etc. Therefore, a similar clause as follows may be introduced in the common minimum grid code: *"Prior to the implementation of this Common Minimum Grid Code, the member countries may have concluded Power Purchase Agreements which may be at variance to the provisions of this Code. Nothing contained in this Common Minimum Grid Code is intended to modify the parties' rights and obligations under the Power Purchase Agreements. In the event of any conflict, the Power Purchase Agreements takes precedence only to the extent that it does not affect the safety and security of the South Asian Grid".*	**Clause 5.2 (A), (c) and (d) –** **These do not refer to individual generators but to the country as a whole. For example, in Bhutan, most of the generators have a PPA, stating that the power generated, after taking care of the power consumption of Bhutan, will be sold to India. However, there may be some generator which is transacting only through the market in India, and does not have such a PPA clause with India. Therefore, there would have to be a mechanism to control power flow as per schedule, across the boundary.** **Also, in case all the generators trip in Bhutan on account of a grid disturbance, along with large scale tripping of generators in the South Asian grid, commensurate load shedding would have to be done in each country, to restore the grid to normal. This clause is specifically for grid disturbances.**

SL no	BEA Comments	SARI/EI/IRADe Response
7.	**Clause 5.2 &5.3** **Comments** The clause 5.2 & 5.3 seems to provide same information. Therefore, it is proposed that these two clauses be merged together for clarity.	**Clause 5.2 and 5.3 –** **This has been correctly pointed out. Para 5.3(a) would be modified as "The minimum technical requirements for connectivity to the South Asian grid are as given below".**
8.	**Clause 5.3 (A) (e).** *It would also have to ensure installation of Data Acquisition System, disturbance recorders and sequence-of-events recorder at the interconnection points and other significant points, as specified by SAFTU, to analyze faults through post mortem, so that such instances do not recur.* **Comments** The cybersecurity clause may need to be incorporated in this clause.	**Clause 5.3 (A), (e) –** **We agree that since data acquisition system is being used for transfer of information, standards on cyber security must be followed. Since the Clause 5.3 (A), (f) also deals with voice and data communication systems, cyber security would also be a concern here. Therefore, we propose a separate cyber security clause at 5.3(A), (g), as given below:** **"The relevant international standards on cyber security of power systems may be followed."**
9.	**Clause 5.3(A) (f).** *The new country would have to ensure robust, redundant and reliable communication between countries, so that voice and data communication takes place instantly and seamlessly across countries. This would be mutually decided* **Comments** Word "redundant" may be omitted or replaced by some other suitable word.	**Clause 5.3 (A), (f) –** **We will replace the word "redundant" with the re-formulated sentence, as given below:** **"The new country would have to ensure robust, and reliable communication between countries, through two different modes of communication, so that voice and data communication takes place instantly and seamlessly across countries"**

SL no	BEA Comments	SARI/EI/IRADe Response
10.	**Clauses 6.1, 6.2 & 6.3** **Comments** i). The clauses 6.1. & 6.2 indeed is not applicable as they relate to the Frequency and the AC voltage aspects which are exclusively associated to the synchronously connected (AC) systems ii). Clause 6.3 however should be as well applicable to the asynchronously connected (HVDC) system too as it relates to the aspects of Periodic Protection Coordination requirement and the need for periodic testing of the protection devices. It is understood in general that the HVDC system too will have various protection schemes applied on them, which will in turn also consist of associated protection devices. Their periodic coordination and testing of the associated protection devices, therefore, is inevitable as it exists for any AC system.	**Clause 6.3 –** **It is mentioned in the comments, that Clause 6.3 should be applicable for HVDC connections also. It may be mentioned that HVDC connection does not result in carry over of the fault across the HVDC system. Therefore, if any grid fault happens in the country, which is through the HVDC system to the South Asian grid, it will not affect the South Asian grid at large and the quantum of power, as was existing before the grid fault would keep flowing across the HVDC link, unless there is insufficient power in that system. Since the CMGC specifies the minimum requirements, the additional requirement of protection coordination within that country is not necessary for the country connected through an HVDC link. Protection coordination on a South Asia Regional basis is not required. What however, has to work properly is the control and protection system of the HVDC link. The same is being added in Clause 6.0 (B), as given below:** **"For HVDC connection, the provisions 6.1, 6.2, 6.3 will not apply. However, the reliability of the control and protection of the HVDC link has to be ensured, and testing would have to be done periodically"**

SL no	BEA Comments	SARI/EI/IRADe Response
11.	**Clause 6.5** *All connected countries would have to furnish the required data to the concerned country System Operators whose grid is likely to be affected, and South Asia Forum of planning bodies from disturbance recorders and sequence-of-events recorder within 48 hours of the tripping. Restoration procedures, including black start would have to be laid out by the South Asia Forum of planning bodies for the South Asian Grid as a whole, to facilitate quick restoration of the system after tripping.* **Comments** i). It is proposed that the sentences "…48 hours of tripping..." may be rephrased as "...48 hours after power restoration..." ii). It is proposed that the role of South Asian Forum for Planning Bodies may be clearly defined as the activities such as restoration procedures including black star, islanding etc., are usually to be laid by the System Operator.	**Clause 6.5 –** It is suggested that the system operator of the country where a tripping has taken place should furnish the reports of the disturbance recorder and sequence-of-events recorder to the system operators of the country/countries affected and the South Asia forum of planning bodies, within 48 hours of the restoration and not 48 hours of tripping. We can take this as a starting point for the CMGC of the South Asian countries. However, this should graduate to **48 hours after tripping** in the future. Also, it has been suggested that the role of the Forum of planning agencies should be defined. The role of all the agencies would be defined and added in the CMGC, after discussion with all countries. The forum of planning agencies would deal with operational planning.

SL no	BEA Comments	SARI/EI/IRADe Response
12	**Clause 6.6 (a)** *A daily report covering the performance of the regional grid shall be prepared by each country's system operator, based on the format decided by the South Asia Forum of planning bodies, and shall be put on its website. This report shall also cover generation by renewable energy sources, including the quantum of energy injected into grid.* **Comments** It is proposed that the last sentence of this clause may be deleted, as the generation from RE resources is within the purview of individual member countries.	**Clause 6.6 (a) –** **Even though renewable energy generation and injection is the individual responsibility of the concerned country, managing the intermittency of such renewable energy sources, on a South Asia basis would lead to optimization. As each South Asian country have set their targets for renewable energy, this would be easier to be managed through expansion of geographical areas. Also, some of the South Asian countries are looking at sourcing of renewable energy from other South Asian nations. Therefore, this is being retained.**
13.	**Clause 6.6 (b) (b).** ***Voltage profile of important substations and sub-stations normally having low /high voltages.*** **Comments** The clause may be replaced by the "Voltage profile of the interconnecting substations"	**Clause 6.6 (b) (b). –** **This suggestion is accepted. We will replace the parameter of voltage profile of important substations and sub-stations normally having low /high voltages, with voltage profile of the interconnecting sub-stations.**

SL no	BEA Comments	SARI/EI/IRADe Response
14.	**Clause 7** **Comments** i). The clause 7.1 through 7.3 needs to be relooked at, as all the member countries in South Asia participating in the cross border trade of electricity cannot be guided by one single country's rule. ii). Clause 7.1 & 7.2 – These clauses may require more deliberation among the South Asian member countries. It is proposed that the DSM mechanism based on the variation of frequency for South Asia Grid may not be directly applicable. A special kind of deviation settlement methods which monitors the total quantum of energy injected in the south Asian grid may be devised for the South Asian grid. iii). Clause 7.4 (b) - for scheduling collective transaction, it is proposed that the respective South Asian country's system operators inform the South Asia Power System Operators on any kind of scheduling, dispatch and congestion of transmission lines. South Asian power exchange shall intimate the collective transaction to South Asia System Operators for final checking and incorporation of schedules after considering the power system constraints. The limit for scheduling the collective transaction may be determined as per the South Asia power system grid guidelines.	**Clause 7.1 to 7.3** – **The main objection appears to be the Deviation Settlement Mechanism (DSM) prevailing in India. DSM is to ensure grid discipline through a financial incentive/disincentive mechanism. This has been proposed, since this is already prevailing in India. However, a different mechanism with or without financial incentive/disincentive mechanism or some other form of incentive/disincentive mechanism for international exchanges can be looked at, and a decision taken after mutual discussion. The remaining part is only the procedure.** **Clause 7.4 (b)** – **This is agreed, since the internal congestion within each country can only be determined by the respective country system operator. Therefore, the second line of the second para would be modified as given below :** **"……Based on the information furnished by the Power Exchanges, NLDC (National Load Despatch Centre), the National System Operator of India, dealing with the subject, shall check for congestion. In case of international transactions, the NLDC shall ask the system operator of the respective country for internal congestion within the grid of that country relating to the transmission corridor on which power would flow across the border, and along with congestion on the Indian side of the transmission corridor, shall assess the congestion on the complete transmission corridor to the respective country".** **Also, the function of coordination for checking for congestion and conveying of the same to the Power Exchange(s), and other coordination work would be done by NLDC only till the time the South Asian Forum of System Operators (SAFSO) is not formed. Once that is formed, all coordination with the national system operators of all the countries, including with NLDC, would be done by SAFSO, instead of by NLDC.**
******End******		

Thank You

Annexure-II

SAFIR
Joint Working Group of BBINS Regulators to Study the Development of a Regional Electricity Market in South Asia

Meeting, May 21, 2021

Update on World Bank-Supported Analysis & Deliverables

Scope of Work

Status of Progress from 3rd JWG Meeting (Jan. 28, 2021) to 4th JWG Meeting (May 14, 2021)

Component 1

- Support member countries through advice and analysis to align regulatory frameworks to increase bilateral and tripartite CBET between BBINS, *inter alia* by facilitating – on competitive terms - investment in transmission and generation infrastructure needed for CBET.
- Deliverables
- Task 1: Legal & Regulatory Framework Due Diligence Reports
    - 5 Country-Specific Reports
    - 1 Synthesis Report
- Task 2: Consultations on Findings and Next Steps
    - Bilateral dialogue
    - Discussion at JWG level – on issues of common interest
- Expected Result:
    - Regulatory issues addressed at country level and where needed at JWG / bilateral mechanisms

Component 2

- Support introduction of regulatory and other measures as early as possible to start participation of Bangladesh, Bhutan, India, Nepal and (when connected) Sri Lanka in regional wholesale trading (Term, DAM, G-DAM, RTM, Ancillary) through a power exchange.
- Deliverables
- Task 1: Simulations of Market Design Options (assess impacts on exchange prices and capacity utilization)
- Task 2: Summary of IRADe Analysis (pros/cons of design options and institutional frameworks)
- Task 3: Exchange of views on findings to inform preferred options, incl. w/ int'l experts
- Task 4: Identify minimum changes req'd for each trading product to enter regional market
- Task 5: Synthesis Report & Broader Consultations as per direction of JWG
- Task 6: Capacity Building in Optimizing National Dispatches to Harness Benefits of CBET

Status

- Funding mobilized
- Component 1
    - 5 Country Reports and 1 Synthesis Report prepared and ready to share for consultations bilaterally
    - Country reports to be shared [June 20121] and WB team to arrange bilateral consultations
- Component 2
    - Task 1 – underway. Deloitte (India) consulting contract executed for simulations / scenario analysis. Planned completion by [June 30]
    - Task 2 – underway. Planned completion by [June 15]
    - Task 3,4,5 – some discussions with Drs Keith Casey (Western EIM), Ben Hobbs (CAISO) and Bill Hogan took place – we will need to formulate a core work plan and discuss with JWG [TBD]
    - Task 6: Dialogue with Bangladesh on examination of dispatch optimization alternatives started. Work plan under discussion with counterparts for their consideration. [TBD]

Component 1 - Task 1

CBET Legal and Regulatory Framework Due Diligence

Cross-Border Electricity Trade Among Bangladesh-Bhutan-India-Nepal-Sri Lanka (BBINS): legal-regulatory-contractual foundations and adequacy for scaling up

Summary of Findings of BBINS Country and Synthesis Reports (Versions: April 2021)

Cross-Border Electricity Trade (CBET) Among Bangladesh-Bhutan-India-Nepal-Sri Lanka (BBINS): Legal-Regulatory-Contractual Foundations and Adequacy for Scaling-Up

- This “Due Diligence” is intended to provide
  - a shared understanding of how CBET was developed thus far
  - what are the current legal and regulatory frameworks relating to CBET
  - while continuing with CBET under the present framework, what may be clarified in the framework to support the next phase of market development, including reflecting lessons learned from present transactions
- Based on a desk review of documents and information available in the public domain and interactions with stakeholders
  - Country Reports prepared on basis of analysis carried out in parallel by two independent legal consultants under the supervision of the World Bank team.
    - The first focused on country-specific legal-regulatory frameworks, their adequacy to enable and expand CBET among BBINS.
    - The second looked at a sample of contractual arrangements (not necessarily country specific) under which CBET has developed over the last 5-7 years with the aim of assessing their adequacy to build buyer and investor/lender confidence in cross-border sources and destinations of electricity supply.
    - Findings include gaps and potential / possible next steps for consideration
  - A Synthesis Report of analysis complements the country reports

Evolution of CBET: Phased Development

Phase I (1950s- 2010)

- Trade limited between India, Nepal and Bhutan, through public sector
- Introduction of JWG's and Power Exchange Committee
- Creation of SAFIR in 1999
- Nepal:
  - Started with River Treaties, 1954
  - Imports through radial lines from border states in India.
- Bhutan:
  - CBET began in 1961 with Jaldhaka Project
  - Chhukha (336 MW) -1986, Kurichhu (60 MW) - 2001-02, Tala (1020) - 2006 – all for exporting surplus power to India
  - Framework Agreement with India in 2006 and 2009 for development of 10,000 MW by 2020.

Phase II (2010 - 2018)

- Public sector-driven but gradual increase in private sector participation
- Signing of MoU for export of 500 MW power from India to Bangladesh.
- Signing of the SAARC Framework Agreement, 2014
- India-Nepal Power Trade Agreement 2014
- Regulatory and Legal framework for CBET in India from 2016
- Bangladesh and Nepal sign MoU in 2018
- Commissioning of HVDC Transmission Links (Bheramara – Baharampur in 2013, Dhalkebar-Muzzafarpur Line in 2016)
- Since BB CBTL commissioning, 243% increase increase in CBET volume

Phase III (Dec. 2018-present)

- Enhanced Market Development Phase, potentially expanding number of trading products, participants, investors and financiers
- Regulatory and legal framework for CBET in India updated in December 2018 (Guidelines)/March 2019 (CERC Regulations)/Feb 2021 (DA Procedures)
- a new draft law in Nepal in 2019
- 1st Tripartite Transaction progress: Letter of Intent from BPDB to import power from Upper Karnali HPP (Nepal) via NVVN in 2020
- IN-BD JSC in principle undertaking: 765kV CBTL & possibility of synchronization
- new Hydropower Policy in Bhutan in 2021
- Nepal trades on IEX (India) in April 2021

Basis of CBET Development, thus far

- Successful!

- Policy-driven development, via G2G bilateral agreements and mechanisms (JSC, JWG) to oversee CBET development

- CBET transactions executed on basis of commercial contracts: e.g. PPAs, TSAs, PDAs/IAs

- 'Capital-light' – driven by surplus generation in India and power shortages in Bangladesh and Nepal
  - Exceptions
    - Bhutan, 75% of generation exported to India, developed mainly under Inter-Governmental model (bilateral)

- If investment, mostly public sector-owned entities or investors
  - Exceptions
    - Adani Godda Thermal PP PPA with BPDB
    - Upper Karnali HPP tripartite transaction proposed PPA with BPDB

Present CBET 2013/14 – 2020/21 (By Fiscal Year ending March 31)

CBET has moved from disbelief to a mainstay of countries' power systems in less than 10 years

Cross Border Electricity Trade (Gwh): Trend since commissioning of BD-IN Interconnections in 2013								
	Fiscal Year (April 1- March 31)							
	2020-2021	2019-2020	2018-19	2017-18	2016-17	2015-16	2014-15	2013-14
Bhutan (net exports to India)	9,318.17	6,310.73	4,657.07	5,611.14	5,863.58	5,557.07	5,109.48	5,555.18
Nepal (Net Imports from India)	1,865.05	2,373.06	2,798.84	2,388.96	2,021.21	1,469.59	997.17	702.03
Bangladesh (Imports from India)	7,551.99	6,987.94	5,690.31	4,808.83	4,419.61	3,654.40	3,271.89	1,448.19
Myanmar (Imports from India)	9.24	8.61	6.67	5.07	3.20	-	-	-
Total Trade GWh	18,744.45	15,680.34	13,152.89	12,814.00	12,307.60	10,681.06	9,378.54	7,705.40

Source: POSOCO

Recent CBET Highlights

- A **243 percent expansion of trade since 2013-14** (since Bangladesh opened its first high voltage cross border transmission line). from about 7,705 GWh per year (of which 72% was Bhutan exports to India) to about 18,745 GWh per year in 2020-21.
- With **Bhutan** commissioning its 720 MW Mangdechhu hydropower plant in mid-2019, the country's **exports to India have more than doubled** during the wet season (and constitute about 75% of Bhutan's total power generation) to a peak of 9,318 GWh in 2020-21.
- **Bangladesh's imports from India, which began in 2013, now amount to 7552 GWh** (for 12 months ending March 31, 2021) and **constitute about 10% of Bangladesh's total electricity supply**. Approval of the PPA to import 500 MW of power from a planned private hydropower plant in Nepal remains pending. **This "trilateral" transaction avails itself of new provisions in India's cross border guidelines**. Importantly, increased confidence in the cross-border electricity market could enable Bangladesh to defer or avoid constructing planned high-cost and CO_2 intensive coal and LNG power plants;
- **Nepal's** imports from India have grown from 500-1000 GWh/year prior to commissioning of the first HV transmission line with India in 2014, **to a peak of about 3,000 GWh in 2018-19 (about 54%** of its total supply) and 1,865 GWh in 2020-21. For FY20, **Nepal exported 107 GWh of surplus hydroelectricity to India**, a significant increase from 37.74 GWh from FY19. **On April 17 and 19, 2021, Nepal marked a historic milestone of purchasing electricity in the short-term market on one of India's power exchanges, the IEX.**
- **Sri Lanka** had in 2020 completed with India an **updated Detailed Project Report** (technical feasibility study) on a 1000 MW transmission link to reduce supply costs and improve security of supply. However, no further action at this time is anticipated.
- **BBINS transfer capacity is just under 7 GW** and has projects in planning stages that could double transfer capacity to 14,000 MW by ~2025. **The high voltage transmission line in Bangladesh does not appear to have surplus capacity.** All Power Purchase Agreements (PPAs) using this line are long term PPAs between 15 and 25 years at different stages of implementation. New PPAs would not be able to be executed until capacity is released or augmented

Next Phase of Market Development

Market Enhancement Phase is expected to include:

CBET has moved from a Stage of Disbelief to Demonstration to Development (BAU)

- Power shortage / surplus-driven development
- Capital light path – generation developed for host country is offered to CBET market

It is entering a <u>Market Enhancement Phase</u>

- Focuses more on: Cost and resource optimization, energy security, climate mitigation and resilience
- Capital light path plus…
- Capital-intensive path – generation is sized for host countries <u>and</u> CBET markets
- Longer and more CB transmission lines (CBTLs) is on critical path, requiring strengthened coordination in planning and development
- Regulatory frameworks start to become more important to match desired CBTLs and CBET growth rate in volume and product diversity
- Smaller countries may benefit from more developers/strategic investors (from sub-region and beyond), and from access to deeper and wider pools of global financing, to make electricity more affordable

Creation of a Sub-regional Wholesale Electricity Exchange

- India signalled phased access
- Opportunity for CBET countries to optimize short-run generation costs through market based price signals including day-ahead and real-time spot prices at 15 min resolution and a number of other short-term contracts
- Access to a liquid transparent market would bolster confidence in the growing CBET market

New, greenfield (incl. hydro & other RE) generation for cross-border market

- Moves beyond surplus-based trading towards generation investments that are optimized for a larger, cleaner and more competitive sub-regional market
- Expands options for each country to better manage energy security and climate risk concerns

Tripartite CBET

- Moves beyond bilateral CBET to include 3rd countries
- Transmission systems provide technical, policy & regulatory arrangements for market access, and reliable and cost-effective transit

Increased Transmission Capacity and Grid Integration

- Priority given to providing capacity also for short-run CBET trade
- Boosts confidence in cross-border sourcing and sales of electricity, and investment in new generation
- When appropriate, synchronization can reduce costs

Transmission connectivity with Sri Lanka

- Extends BBIN CBET and network to Sri Lanka
- Opens opportunities for Sri Lanka to potentially develop more of its potential in Offshore Wind and reduce costs of power supply

Path to Achieving the Next CBET Market Phase

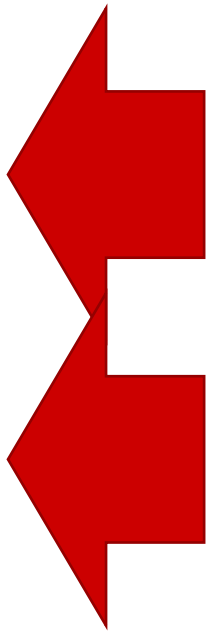
Relies on country-specific and cross-cutting actions

- **Progressively strengthening inter-country transmission connectivity (cross border transmission lines – CBTLs)**
  - Coordinated transmission plan and timeline execution will reduce costs and give generation investors confidence in market access

- **Financing facilities and business models for efficient and cost-effective development**
  - Reducing financing costs of transmission projects
  - e.g. Europe's "Connecting Europe Facility" addresses challenges of realizing cross-country public goods projects through concessional financing of "Projects of Common Interest" at the "European Level"

- **Continue "learning by doing" approach to build confidence in more and diverse transactions (e.g. Nepal in IEX April 2021) while progressively harmonizing inter-country legislative / regulatory frameworks covering CBET**
  - Successful transactions under current system will continue to build confidence in a larger and deeper market
  - Investors in regional generation projects need confidence in market access and appropriate risk allocation

- **Develop system and market rules / institutional framework to enable liquid BBINS regional wholesale spot market CBET**



Main focus of Component 1 (Due Diligence Reports) – Area where SAFIR JWG may potentially be a mechanism for progressive harmonization

Main focus of Component 2 (Design Options)

ANNEXURE

CROSS-BORDER ELECTRICITY TRADE AMONG BANGLADESH-BHUTAN-INDIA-NEPAL-SRI LANKA (BBINS)

LEGAL-REGULATORY-CONTRACTUAL FOUNDATIONS AND ADEQUACY FOR SCALING UP

SUMMARY OF FINDINGS FROM SYNTHESIS AND COUNTRY REPORTS

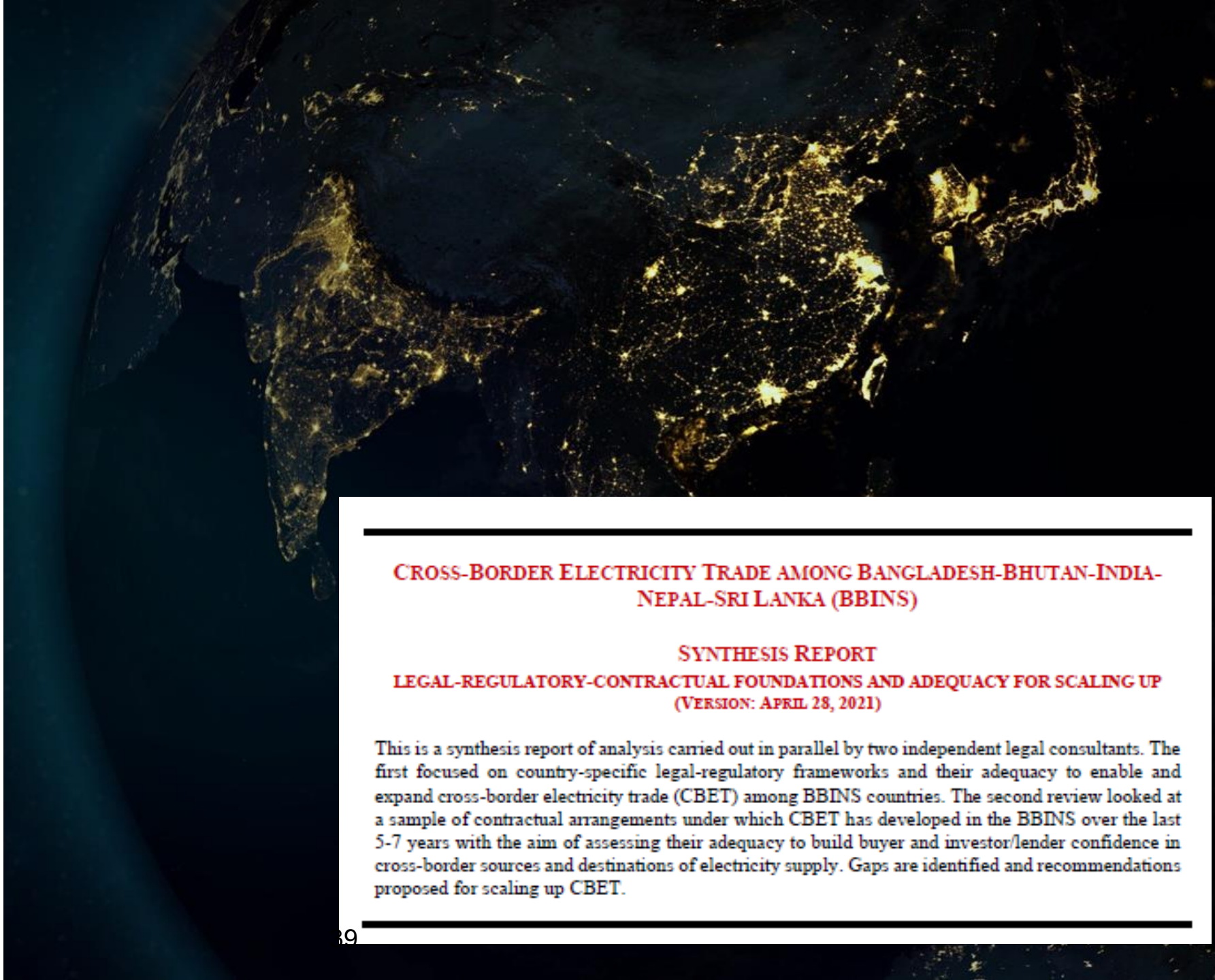
(VERSIONS: APRIL 2021)

Cross-Border Electricity Trade Among Bangladesh-Bhutan-India-Nepal-Sri Lanka (BBINS)

Legal-Regulatory-Contractual Foundations and Adequacy for Scaling Up

Cross Cutting Issues

(Versions: April 2021)



CROSS-BORDER ELECTRICITY TRADE AMONG BANGLADESH-BHUTAN-INDIA-NEPAL-SRI LANKA (BBINS)

SYNTHESIS REPORT

LEGAL-REGULATORY-CONTRACTUAL FOUNDATIONS AND ADEQUACY FOR SCALING UP

(VERSION: APRIL 28, 2021)

This is a synthesis report of analysis carried out in parallel by two independent legal consultants. The first focused on country-specific legal-regulatory frameworks and their adequacy to enable and expand cross-border electricity trade (CBET) among BBINS countries. The second review looked at a sample of contractual arrangements under which CBET has developed in the BBINS over the last 5-7 years with the aim of assessing their adequacy to build buyer and investor/lender confidence in cross-border sources and destinations of electricity supply. Gaps are identified and recommendations proposed for scaling up CBET.

Findings and Potential Next Steps - Cross Cutting Issues

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings and Potential Next Steps
Cross Cutting	1. Prepare cross border transmission development plans to address existing cross border transmission capacity bottlenecks and provide investors clarity and more predictability in cross border transmission capacity. In addition to clarifying the rules for neighbors to access India's electricity exchanges, system planners and transmission utilities from the BBINS countries can prepare and prioritize cross-border connectivity plans. Development partners can help mobilize financing ***[joint institutional / groups and relevant government agencies]***
	2. Seeking to reduce financing costs, initiate discussions on financing strategies for priority projects with development partners (i.e. a program or series of projects for cross border transmission – "green energy corridors"), seeking appropriately evolving business models and risk allocation. ***[joint institutional / groups and relevant government agencies]***

Findings and Potential Next Steps - Cross Cutting Issues

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings and Potential Next Steps
Cross Cutting	3. CBET / CBTL contracts have been negotiated on a transaction by transaction basis and conducted through "regulation by contract" filling gaps in regulatory frameworks which are not yet fully aligned on CBET. Trilateral transactions will involve at least three national jurisdictions. i. Standardizing contracts can be an effective tool to induce transparency, predictability, clarify risk allocation and reduce transaction costs and time. Standardizing contracts can take place at country levels and at bilateral/multilateral levels. ***[joint institutional / groups and relevant government agencies]*** ii. India's CBET policy framework has permitted tripartite trade through its territory. The model is untested thus far, so uncertainties remain on several aspects relating to tripartite transactions, which may potentially be: i. Responsibility for seeking connectivity and open access to Indian grid, and terms thereof ii. Sharing of transmission charges between the selling country, buying country and India, i.e. the intermediary country iii. Underutilisation / relinquishment of transmission capacity iv. Regional energy accounting and deviation settlement mechanism v. Compensation for delay in commissioning transmission infrastructure vi. Mismatch in generation and transmission construction schedules vii. Force majeure / change in law viii. Regulatory jurisdiction over the transactions (including disputes arising therefrom).

Findings and Potential Next Steps - Cross Cutting Issues

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings and Potential Next Steps
Cross Cutting	4. Platforms for cross-border electricity cooperation – policy alignment and project development – have been effective and may be strengthened. Several trading partners have substantial CBET experience and each has a important role in the future direction of CBET within BBINS. Such platforms can be used to develop a shared appreciation of actions needed to align policies, regulations, and legilstation to support CBET Market Enhancement outcomes. Assess whether and how existing forums for dialogue and coordination may be adopted and /or strengthened to support Market Enhancement Outcomes. ***[joint institutional / groups and relevant government agencies]*** i. Bilateral coordination mechanisms under G-to-G agreements (Steering Committees, Joint Technical Committees, Joint Working Groups), as well the informal South Asia Power Secretaries Roundtable and the South Asia Forum for Infrastructure Regulation are playing useful roles in progressively advancing the still fledgling BBINS cross-border electricity market countries. Support for these are being provided by multi- and bilateral development partners (World Bank, ADB, USAID/SARI, and UK). These complementary mechanisms have helped manage asymmetries in capacity, resolve potential disputes, and establish a stable foundation for ramping up CBET within BBIN, and extend it to Sri Lanka.

Findings and Potential Next Steps - Cross Cutting Issues

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings and Potential Next Steps
Cross Cutting	5. Scaling up new, greenfield (and renewable) generation investments optimized for a cross-border electricity market will require a progressive expansion in participation by reputable developers and competitive sources of long-term finance. Alignment and strengthening of inter-country policy, legal and regulatory frameworks, including through a suitable treaty framework for BBINS (as envisaged for SAARC Electricity Cooperation), can bolster the credibility of such frameworks. Assess whether a treaty on electricity cooperation among BBINS countries is warranted (drawing from the yet-to-be-ratified SAARC Agreement of Electricity Cooperation and lessons and experience from recent transactions). ***[joint institutional / groups and relevant government agencies]*** i. As BBINS countries move towards Market Enhancement outcomes, alignment of relevant national laws and regulations will become increasingly important for: (a) bolstering importer confidence; and (b) expanding participation on the supply side to a wider pool of project developers and financiers. Market access, change-in-law and termination risks become increasingly critical with rising CBET dependence and higher capital outlays. Such can only be adequately addressed by robust contracts or, if all involved governments are not parties to the transaction, through inter-country treaties. Market Enhancement outcomes are expected to consist of: (a) creating a sub-regional wholesale exchange; (b) new, greenfield (and renewable, including hydropower) generation investments for a cross border market; (c) tripartite CBET; (d) increased cross border transmission capacity and grid integration; and (e) transmission connectivity with Sri Lanka. (See introductory sections)

Cross-Border Electricity Trade Among Bangladesh-Bhutan-India-Nepal-Sri Lanka (BBINS)

Legal-Regulatory-Contractual Foundations and Adequacy for Scaling Up

Bangladesh Country Report
Summary of Findings
(Versions: April 2021)

Cross-Border Electricity Trade Among Bangladesh-Bhutan-India-Nepal-Sri Lanka (BBINS)

Bangladesh Country Report

Legal-Regulatory-Contractual Foundations and Adequacy for Scaling Up

(Version: April 28, 2021)

This is a country report of analysis carried out in parallel by two independent legal consultants under the supervision of a World Bank team. The first focused on country-specific legal-regulatory frameworks and their adequacy to enable and expand cross-border electricity trade (CBET) among BBINS countries (Bangladesh, Bhutan, India, Nepal, Sri Lanka). The second review looked at a sample of contractual arrangements (not necessarily country specific) under which CBET has developed in the BBINS over the last 5-7 years with the aim of assessing their adequacy to build buyer and investor/lender confidence in cross-border sources and destinations of electricity supply. Gaps are identified and recommendations proposed for scaling up CBET. A synthesis report of analysis complements this country report.

Findings - Bangladesh

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Bangladesh	***There is a lack of available transmission capacity between Bangladesh and India. Given the economic benefits, surplus connectivity to facilitate short-term CBET could be made a priority. Coordinated cross border transmission planning could also be strengthened to enable expansion of CBET on the basis of long-term PPAs (including from greenfield hydropower or other clean energy investments).*** 1. The 400 kV D/C Baharampur (India) – Bheramara (Bangladesh) transmission line is the major transmission link for CBET between the two countries. It is one of two HV lines in the regional market (the other is the Dhalkebar (Nepal)-Muzzafarpur (India) line) that were developed with significant initial surplus capacity, i.e. not tied up by long-term PPAs. Until July 2018, the line could transmit up to 500 MW capacity and PPAs were executed with NVVN and PTC to utilise this capacity. After the line was upgraded to transmit a capacity up to 1000 MW in July 2018, PPAs were also expeditiously executed corresponding to the increased capacity. 2. The line no longer appears to have surplus capacity. All PPAs using this line are long-term PPAs (between 15 (fifteen) and 25 (twenty five) years). New PPAs cannot be executed until capacity is released or augmented: 3. The 250 MW PPA executed between BPDB and SGPL could become operational only after the 250 MW PPA between BPDB and PTC expired.

Findings - Bangladesh

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Bangladesh	[continued from previous slide] ***There is a lack of available transmission capacity between Bangladesh and India. Given the economic benefits, surplus connectivity to facilitate short-term CBET could be made a priority. Coordinated cross border transmission planning could also be strengthened to enable expansion of CBET on the basis of long-term PPAs (including from greenfield hydropower or other clean energy investments).*** 4. Adani Power (Jharkhand) Limited is building a dedicated transmission line to export power from its project in India to Bangladesh. 5. India's CBET Framework contains enabling provisions for needed transmission infrastructure to be put in place. Clarifying issues in its framework – surplus/deficit determination, equity ownership of participating entities, non-discriminatory treatment of CBET relative to national trade vis-à-vis utilization of shared infrastructure and services – will add clarity and predictability for expanding CBET on the basis of long-term PPAs. (See Synthesis Report.) The under-consideration 765 kV transmission corridor across Bangladesh is likely to also be structured taking into account hydropower project development in India's north-eastern states. It may offer opportunities to support CBET with Bhutan. 6. Transmission capacity for CBET with Bangladesh has been led by government-to-government level interactions. CBTLs have been developed and operated by respective transmission companies, Power Grid Corporation of India, Limited (PGCIL) and Power Grid Corporation of Bangladesh (PGCB), and a dedicated transmission line for the Godda thermal power project exports is being privately developed. CBTLs and associated facilities developed by state-owned PBCL and PGCB have been financed from corporate resources, budgetary allocations, and loans, including loans from International Financial Institutions. Costs of CBTLs are being recovered through transmission charges paid by BPDB (which are passed through in tariff to retail consumers) or paid by government through BPDB (as a subsidy).

Findings - Bangladesh

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Bangladesh	***Quick Enhancement Act expires in 2021 and this may remove options for the procurement of power via CBET.*** 1. BPDB imports power pursuant to bilateral agreements for CBET and in exercise of its powers under the Bangladesh Power Development Board's Order, 1972 read with relevant procurement laws (including the Quick Enhancement Act). 2. Notably, the Quick Enhancement Act enables BPDB to procure power through the negotiated route against the competitive bidding route as mandated for procuring public goods under Bangladesh's Public Procurement Act, 2006. 3. However, the Quick Enhancement Act is valid until 2021, after which it will expire.
	Bangladesh's laws are silent on equal treatment of imported and domestic power / participants. 1. In Bangladesh, merit-order dispatch is followed for scheduling power (i.e. priority is given to cheaper power). However, there are no laws, regulations, policies or guidelines in Bangladesh whereby an authority is tasked with the responsibility of managing conflicts of interest in terms of ensuring non-discriminatory scheduling and despatch of power such that: i. No preferential treatment is given to domestic users or domestic transactions against foreign parties or cross-border transactions; and ii. Domestic users are not given priority of access to the grid over foreign users, or BPDB does not prioritise its own generating stations over imported power. 2. The absence of such a provision may induce uncertainty and unpredictability and discourage participation and scalability of CBET.

Findings - Bangladesh

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Bangladesh	***The law is silent on the role of BERC in CBET.*** 1. CBET in Bangladesh is primarily governed by the Government of Bangladesh and implemented by BPDB. Under the current market structure, BPDB will be party to a higher volume of CBET transactions both on competitive and potentially on negotiated (e.g. tripartite hydro transactions involving greenfield hydropower investments). Conceivably, it may be difficult for BPDB to remain neutral in procurement decisions vis-à-vis its own or other domestic generation. Even if it retains a neutral position, the perception of a structurally uneven playing field can influence market pricing and participation. 2. As per the BERC Act, 2003, BERC exercises jurisdiction over domestic generation and supply of electricity, but not CBET. BERC determines tariffs for generation (wholesale) and for supply to end users, in accordance with the policy and methodology made by BERC in consultations with GoB, but plays no role in CBET tariff determination. BPDB, in consultation with the GoB determines tariffs. BERC's involvement in CBET is limited to being consulted for any agreement related to international connection to the grid. This is unlike India and Nepal where power sector regulators are involved in regulating some aspects of CBET (for instance in India's Central Electricity Regulatory Commission ("**CERC**") has issued separate regulations for CBET which *inter alia* lay the framework for permissible types of CBET transactions, procedures for open access, and payment of transmission charges. Regulators can be a repository of expertise and knowledge on requirements of national power sectors and have an interest in protecting consumer rights. Regulatory decisions and their rationale are made public, supporting greater transparency.

Findings - Bangladesh

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Bangladesh	***CBET / CBTL contracts have been negotiated on a transaction by transaction basis and conducted through "regulation by contract" filling gaps in regulatory frameworks which are not yet fully aligned on CBET. Standardizing contracts can be an effective tool to induce transparency, predictability, clarify risk allocation and reduce transaction costs and time. Standardizing contracts can take place at country levels and at bilateral/multilateral levels. Bangladesh has developed standard contracts for thermal power generation and could consider the same for renewable power.*** 1. Bangladesh's Power System Master Plan, 2016 emphasises the need for 10% (ten percent) share of renewables in the installed capacity by 2041. The plan also acknowledges the challenge of meeting this target domestically. Procuring renewable energy through CBET may be a viable option to meet Bangladesh's renewable goals. 2. While BPDB has issued standard bid documents and agreements for importing thermal power through competitive bidding, similar documents have not been issued with respect to renewable energy.
	Platforms for cross-border electricity cooperation – policy alignment and project development – have been effective and may be strengthened. Bangladesh has substantial CBET experience, including negotiating the first tripartite transaction, and has a critical role in the future direction of CBET within BBINS.

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Legal-Regulatory-Contractual Foundations and Adequacy for Scaling Up

Bhutan Country Report
Summary of Findings
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Bhutan Country Report

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Findings - Bhutan

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Bhutan	***Bhutan has developed its cross border transmission capacity linked to generation projects. Coordinated cross border transmission planning could be strengthened to enable timely expansion of transmission capacity for CBET. Capacity can be optimized not only on the basis of long-term PPAs but also to facilitate short-term CBET and potential to provide value added services – creating efficient "green energy corridors".*** 1. Thus far, the prevailing model for cross border interconnections has been associated transmission lines (ATLs). Tripartite transactions and options to participate in the power exchange may require advance procurement of transmission capacity, though some transmission capacity may be underutilized in the short term. 2. India's CBET Framework contains enabling provisions for needed transmission infrastructure to be put in place. Clarifying issues in its framework – surplus/deficit determination, equity ownership of participating entities, non-discriminatory treatment of CBET relative to national trade vis-à-vis utilization of shared infrastructure and services – will add clarity and predictability for expanding CBET on the basis of long-term PPAs. (See Synthesis Report.)

Findings - Bhutan

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Bhutan	***There are few projects implemented outside of the IG model, whose terms have evolved over time. Diversifying sources of financing and export markets can create new opportunities for evaluating diversified business models for sustainable hydropower development.*** 1. The funding structure for the projects implemented with India has undergone changes. The earlier HEPs (Chukha, Kurichu and Tala) implemented under the IG model were financed with 60% (sixty percent) grant and 40% (forty percent) loan. However, the later HEPs (Mangdechhu) and the upcoming HEPs, are being funded with reduced grant component and increasing debt component (40-30% (forty to thirty percent) grant and 60-70% (sixty to seventy percent) loan). Further, the interest rate on the loans has also been increasing from 5% (five percent) to 10% (ten percent) over the years. 2. There are a few projects being implemented based on the JV and the PPP models. Private sector participation has been envisaged under the Bhutan Sustainable Hydropower Development Policy, 2008 as well as in the PPP model. However, implementation of the PPP model has been limited, thus far. 3. The tariff at which power is exported from majority of the projects in Bhutan is mutually determined between the parties and this takes place after the commissioning of the project. The only exception so far is the Nikachhu project, for which the tariff has been discovered through competitive bidding process.

Findings - Bhutan

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Bhutan	[continued from previous slide]***There are few projects implemented outside of the IG model, whose terms have evolved over time. Diversifying sources of financing and export markets can create new opportunities for evaluating diversified business models for sustainable hydropower development.*** 4. The bilateral agreements (other than for Chukha) are silent regarding the principles which are taken into consideration for determining the tariff. Bhutanese tariff regulations expressly exclude from its scope tariffs for import of electricity from other countries, export of electricity to other countries and sale of electricity from generators under PPAs from the scope of the regulations. While tariffs with respect to PPAs for export of power from Bhutan to India are not regulated in India, power procurement by distribution companies and retail tariffs in India are regulated. Under India's Electricity Act, 2003, distribution companies may either procure power at tariffs determined by the relevant electricity regulatory commission or through competitive bidding process in which case the relevant electricity regulatory commission adopts such tariff. However, Ministry of Power in India had clarified in 2016 that all power should be procured on competitive basis and accordingly most power by distribution companies in India is procured through competitive bidding. In view of the above, electricity regulatory commissions have no role in the transaction between Indian traders and Bhutanese entities. However, the onward sale of power from Indian traders to Indian distribution companies is subject to regulatory scrutiny and approval.

Findings - Bhutan

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Bhutan	***CBET / CBTL contracts have been negotiated on a transaction by transaction basis and conducted through "regulation by contract" filling gaps in regulatory frameworks which are not yet fully aligned on CBET. Bhutan has developed bilateral contracts for its current export markets and plans to expand potentially into trilateral transactions. Working to clarify risk allocation in tripartite arrangements can add predicatility, transparency and reduce transaction costs and time.*** 1. Given the nascent stage of India's CBET regulatory framework and consequently tripartite transactions (the first and only tripartite transaction yet to be finalized is the sale of power from Upper Karnali Hydropower Project in Nepal selling 500MW to Bangladesh), some adjustments may be required to prevailing bilateral export arrangements. 2. Most HEPs in Bhutan have been developed under the IG model with offtake secured to Indian offtakers, as mandated by bilateral agreements (including surplus). The possibility of power exports from Bhutan to other counties by way of tripartite arrangements can only arise as and when Bhutan will have new power plants built on financing models for export to such other countries. 3. India's CBET policy framework has permitted tripartite trade through its territory. The model is untested thus far, so uncertainties potentially remain on several aspects relating to tripartite transactions (see cross cutting issues). ***Platforms for cross-border electricity cooperation – policy alignment and project development – have been effective and may be strengthened. Bhutan has substantial CBET experience, and unique experience in exports to the Indian market. It has a critical role in the future direction of CBET within BBINS.***

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Findings - India

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
India	***Increasing cross-border transmission capacity and grid integration is a low-cost/low-risk pathway to better optimization of existing generation capacity, especially through short-medium term PPAs and unscheduled interchange (including via electricity exchanges)*** 1. Cross-border transmission connectivity between Si Lanka-India, Bangladesh-India and, to a lesser extent, Nepal-India, is the most significant and binding constraint to expanding CBET within the BBINS sub-region. Transmission within Nepal is also a constraint. Bhutan-India transmission is currently adequate, in fact surplus, with transmission having been developed in association with Bhutan's export-oriented hydropower plants (with PPAs with Indian entities structured to cover generation and transmission costs, consistent with CERC regulations). 2. Under construction export-oriented generation projects in Nepal and India (900 MW Arun-III and 1300 MW Jharkhand Godda projects respectively) are responsible to build associated transmission infrastructure to designated pooling points. The first likely tripartite project, 900 MW Upper Karnali in Nepal, has obligation to ensure transmission to pooling point on Nepal-India border, ensure transmission through India, and deliver 500 MW at Bangladesh border. 3. India's CBET Framework contains enabling provisions for needed transmission infrastructure to be put in place. Addressing gaps identified above – surplus/deficit determination, equity ownership of participating entities, non-discriminatory treatment of CBET relative to national trade vis-à-vis utilization of shared infrastructure and services – will add clarity and predictability for expanding CBET on the basis of long-term PPAs. The under-consideration 765 kV transmission corridor across Bangladesh is likely to also be structured taking into account hydropower project development in India's north-eastern states and in Bhutan. 4. Other than above generation based transmission development, the Dhalkebar-Muzaffarnagar and Bheramera-Bahrampur transmission lines are the only two examples of high voltage cross-border infrastructure developed with significant surplus capacity, that is, capacity not initially tied up by long-term PPAs (although fixed costs are covered by appropriate TSAs). **This gap – surplus connectivity to facilitate short-term cross-border trade through unscheduled or exchange-based trading – needs to be given priority, especially to benefit from the vast potential for short-term electricity cost reduction (through better asset utilization)**.

Findings - India

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
India	***Establish transmission connectivity between Sri Lanka and India - this will complete the BBINS grid, and enable bi- and multi-lateral electricity trade with benefits for all countries*** 1. CBET offers Sri Lanka wider options to reduce electricity costs, green its energy mix and better balance unexpected changes in demand and supply. It also offers Sri Lanka an opportunity to optimize its vast wind energy potential for a larger, sub-regional market than would be possible for only the national market. 2. Bilateral and multilateral (BIMSTEC) G-to-G agreements have signalled an interest by Indian and Sri Lankan authorities to proceed with transmission connectivity and CBET. Feasibility studies are also at an advanced stage of preparation. A Joint Working Group on Cooperation in Power Sector has has met several times over the 2015-19 period; however, the 2020 meeting was postponed and has yet to take place. It may be able to decide on next steps.
	Creation of sub-regional wholesale electricity exchange can enable quick access to low-hanging benefits of CBET and boost mutual confidence 1. India's CBET Framework permits CBET through its wholesale power exchanges; it also states that approvals are given for a maximum period of one year, and only traders registered and licensed in India may participate in the exchange (on behalf of foreign entities). Importantly, CBET via the Indian Electricity Exchange (IEX) was initiated in April 2021 with Nepal's NEA contracting an equivalent of 100-120 MW per day through IEX in its Day-Ahead Market. An **indicative plan** for progressively expanding access to the exchange/s will facilitate better prioritization of transmission interconnection and may also be incorporated within individual country generation/power supply/trade plans.

Findings - India

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
India	***Ambiguity around approval of CBET transactions - to be determined based on India's power surplus / deficit situation – persists but may be clarified, and risks mitigated, progressively through proactive participation of key stakeholders from within India and across borders*** 1. As per the CBET Framework, unless covered by a G-to-G agreements, DA approval of CBET applications will take into consideration availability of surplus power in India (for export) and deficit situation (for imports). However, Framework provides no guidance on: i. how surplus / deficit power situation will be determined ii. whether such assessment will be done once at the time of seeking approval or will be done on a regular basis through the transaction period, and iii. what will be the implication of a surplus/deficit situation post grant of an approval and during a transaction. 2. These open-ended questions can create uncertainty and subjectivity for any CBET transaction. Further, since this situation will not be under the control of any of the parties neither of them can be penalised for any impact it may have on the CBET approval and nor will it be easy to allocate the risk on this account under the transaction documents.

Findings - India

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
India	***Uncertainty around equity ownership of CBET transacting parties and tracing of traded electricity to generating plant – risk-aversion may decline as CBET expands.*** 1. As per the CBET Framework, DA will consider equity ownership of the parties involved – and of the generation sources involved - when processing applications for CBET. Further, any change in the equity ownership is required to be intimated to DA to avoid revocation of the initial approval. i. While the Procedure is not explicit about rejection of certain types of ownership arrangements, it is especially sensitive about entities in the supply chain which are in anyway owned, funded or controlled by third countries with whom India does not have a bilateral electricity cooperation agreement, in particular if the third country is one with which India shares a border. ii. Trading of electricity pooled from multiple generation sources or from parties with short-term surpluses will be especially complicated. 2. DA Procedure regarding ownership creates uncertainty for large scale investments which could benefit from wider and deeper pools of financing and project development. The India Country Report (Annex 2) identifies areas where DA will take action only upon concurrence or approval be Government of India.

Findings - India

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
India	***Transmission system access and payment by neighboring country participants in CBET – providing "national treatment" – with safeguards if necessary – will bolster confidence in CBET*** 1. For eligible national market participants, India's Electricity Act 2003 provides for non-discriminatory open access to the transmission network; where possible, it also encourages competition for, and within, the power market among generatos and traders. While the CBET Framework does not explicitly indicate how CBET will be treated relative to national-only electricity trade (leaving this to be addressed in transaction-specific contracts), The India Country Report Annex 2 details rules for open access which are relevant for CBET and noteworthy gaps in implementation.
	Foreign entity pays for the entire transmission infrastructure for CBET 1. Under existing CBET transactions and CBET Framework, tariff for the Indian portion of the transmission network used exclusively for CBET is payable by the foreign entity. The same principle is applied for electricity exports from Bhutan to India, where Indian consumers absorb the costs of Bhutan's transmission infrastructure used for exports. 2. This model has worked well under current low level of inter-country transmission connectivity. However, in a market enhancement scenario requiring an expansion in inter-connectivity and involving bi- and multi-directional trade, more neutral mechanisms for usage of the Indian portion of the transmission network may need to be explored.

Findings - India

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
India	***Potential for arbitrary curtailment of transmission access for CBET transactions*** 1. There do not appear to be instances of curtailment in present CBET transactions and this may not be an imminent risk. It may become an issue with expansion of the CBET market. 2. Under the CBET Framework, NLDC is empowered to curtail power flow on account of transmission constraints or grid security. India's legal framework provides similar powers to NLDC for domestic transactions. However, there are domestic instances of this power being misused, particularly for renewable energy, and on account of commercial factors and not legitimate grid security/ transmission constraint factors. Curtailment has severely impacted generation projects with single-part tariffs where revenues are based solely on being dispatched (Annex 3).
	Law is silent on equal treatment of imported and domestic power/ participants 1. In India, in principle, merit-order despatch is followed for scheduling power (i.e. priority is given to cheaper power). However, there is no mandate under the CBET Framework or other domestic laws (where any authority is tasked with the responsibility of managing conflicts of interest in ensuring non-discriminatory scheduling and despatch of power) such that: i. No preferential treatment is given to domestic users or domestic transactions against foreign parties or cross-border transactions; and ii. Domestic users are not given priority of access to the grid over foreign users, or country system operators do not prioritise domestic generating units over imported power. 2. The absence of such a provision may discourage participation and scalability of CBET.

Findings - India

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
India	***Scaling up new, greenfield (and renewable) generation investments optimized for a cross-border electricity market will require a progressive expansion in participation by reputable developers and competitive sources of long-term finance. Alignment and strengthening of inter-country policy, legal and regulatory frameworks, including through a suitable treaty framework for BBINS (as envisaged for SAARC Electricity Cooperation), can bolster the credibility of such frameworks.*** 1. Typical mechanisms for creating a favorable national environment for investment (generation/ transmission), offtake and customer protection do not work effectively or fully in a cross-border market. These limitations are further exacerbated when: (a) national legislation – which provides greater policy stability and policy alone - does not address CBET and its enabling provisions; and (b) if governments of all parties to the transaction are not involved at the transaction level, as may be the case in tripartite electricity trade. 2. In the absence of relevant provisions within India's Electricity Act, investment in hydropower projects developed in Bhutan and Nepal for a domestic cum cross-border (Indian) market have been enabled by: (a) by necessary provisions in Bhutan and Nepal legal frameworks; (b) bilateral G-to-G umbrella agreements; and (c) implementation under contractual agreements so far with Indian financing, involvement of Indian public sector enterprises, and application of Indian regulations for Indian grid access and tariff determination. The proposed Upper Karnali hydropower project in Nepal will be the first "test" case of a large (900 MW) private hydro developed for sizeable offtake by the Bangladesh and Indian power markets. 3. India's CBET Framework incorporates the evolving experience from Bhutan and Nepal investments dependent on cross-border trade and also from India's first dedicated export-oriented thermal power project in Jharkhand (1300 MW Godda Project) which will export its production to Bangladesh via a dedicated transmission link and under a long-term PPA with Bangladesh's single buyer. 4. Nepal's electricity sector investments need to accelerate substantially - to an average of US$1.3–$2.1 billion annually - of which a sizeable share of generation and transmission capacity will be for a sub-regional market. Comparable investments are envisaged for Bhutan. 5. A framework for assessing and managing investment risks for a cross-border market is presented in Country Report Annex 3.

Findings - India

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
India	***Enabling tripartite trade, moving beyond bilateral transactions, will allow benefits (and risks) to be spread more equitably and help scale up clean energy development*** 1. Given India's location, entities registered in India (transmission, dispatch, trade) will be parties to all envisaged tripartite trade transactions among BBINS countries. The predictability, fairness and reliability of access to India's transmission system will be critical to building both buyer and generation investor confidence. Regulations which offer as close to national treatment as possible for such CBET will be especially reassuring. 2. India's CBET Framework enables tripartite transactions. The parties are required to seek approval from the DA, and thereafter authorization for open access from the relevant entities. If necessary transmission capacity is inadequate, the Framework is less clear on how system strengthening costs will be apportioned, how delays in commissioning will be compensated, and on procedures for capacity relinquishment. 3. Importantly, Clause 8.3.1 of the DA Procedure stipulates that, an application seeking approval for electricity transamission through the Indian Grid under a tripartite agreement, must be accompanied by a "copy of tripartite PPA/ PSA".
	Platforms for cross-border electricity cooperation – policy alignment and project development – have been effective and may be strengthened. Because it shares national borders with each CBET trading partner, India's participation is critical for sustainable connectivity and CBET. Also instructive has been India's experience of integrating its five regional grids and growth of its electricity trading system.

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Findings - Nepal

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Nepal	***Nepal has plans to sell its surplus electricity to the CBET market. Coordinated cross border transmission planning could be strengthened to enable timely expansion of transmission capacity for CBET. Capacity can be optimized not only on the basis of long-term PPAs but also to facilitate short-term CBET and potential to provide value added services – creating efficient "green energy corridors".*** 1. The 400 kV Dhalkebar (Nepal)-Muzzafarpur (India) line is the major transmission link for CBET between Nepal and India. It is one of two HV lines in the regional market (the other is the 400 kV D/C Baharampur (India) – Bheramara (Bangladesh) transmission line) that were developed with significant initial surplus capacity, i.e. not tied up by long-term PPAs. 2. There are some reports that suggest Nepal is unable to fully utilize the line, if needed, due to transmission and distribution bottlenecks in its national grid. It has issued development plans for grid expansion. 3. There are several cross border transmission lines under development, including two dedicated transmission lines (400 kV each) to evacuate power from 900MW Upper Karnali and 900MW Arun III (reportedly, 679MW Lower Arun would be evacuated via the Arun III line). In addition, India and Nepal have agreed to develop a second 400 kV CBTL New Butwal (Nepal) – Gorakhpur (India) via a joint venture model. Other cross border transmission lines are also planning (see report). 4. India's CBET Framework contains enabling provisions for needed transmission infrastructure to be put in place. Clarifying issues in its framework – surplus/deficit determination, equity ownership of participating entities, non-discriminatory treatment of CBET relative to national trade vis-à-vis utilization of shared infrastructure and services – will add clarity and predictability for expanding CBET on the basis of long-term PPAs. (See Synthesis Report.)

Findings - Nepal

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Nepal	***The Draft Electricity Act (2019), when enacted, will change the licensing regime that will facilitate CBET but gives rise to some ambiguities that could be clarified in the revised law or subsequent CBET guidelines and/or subsequent regulations. (1)*** 1. The Draft Act (2019) introduces electricity trading as a distinct licensed activity but restricts a single entity to engage in only one licensed activity (i.e. generation, transmission, distribution, electricity trade or consumer service). Licenses for more than one activity may be issued in limited cases where the national grid has not reached or is unable to provide a service, for self-generation, and in the case where entities have been engaged in multiple functions prior to the Draft Act, 2019. In a separate section of the Draft Act, 2019, approval is required for exporting power, but the Draft Act, 2019 also mentions that if the condition of export of power is mentioned in the generation license, a separate approval for engaging in export of power may not be required. In this context, ambiguities arise when considering the participation by a company with expertise in multiple activities, or whether direct engagement in CBET could facilitate more competitive and smoother transactions. 2. The Draft Act, 2019 anticipates the need for further clarifications via directives, procedures and standards regarding regulation and management of electricity trade, including cross-border, competition, use and open access of transmission and distribution lines, and rehabilitation and resettlement – explicitly providing a mandate to MoWERI to issue the same. This establishes a clear process by which clarifications can be made on issues raised above and other adjustments as the framework is implemented. 3. Under the current legal framework, an export license has been issued to power projects intending to directly transact in CBET. It is not clear if such export oriented project licenses establish a legally binding precedent.

Findings - Nepal

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Nepal	***The Draft Electricity Act (2019), when enacted, will change the licensing regime that will facilitate CBET but gives rise to some ambiguities that could be clarified in the revised law or subsequent CBET guidelines and/or subsequent regulations. (2)*** 1. In the Draft Act (2019), a least-cost generation plan is required to be prepared by the Water and Energy Commission. However, it is not clear whether power imports will also be factored in the least cost generation plan.
	1. The Draft Act, 2019 provides for non-discriminatory open access to Nepal's distribution and transmission grid, open access will need to be implemented in letter and spirit as experience in the region suggests that even with open access mandated legally, it can be unevenly implemented. For instance, delays in granting open access even when granted and curtailment have been challenges. 2. Even with open access provisions, the Draft Act, 2019 does not have any provision to clarify whether when scheduling power, domestic and foreign power will be treated equally. 3. While Nepal aims to export surplus energy, its domestic demand is also rising. Curtailment may also be an issue for exporting power during an unexpectedly dry season when generation may be insufficient to meet domestic demand and also meet contracted exports. 4. The objective of non-discriminatory open access will be defeated if in practice power from projects is not scheduled. Backing down or curtailment of power can have a significant adverse impact on the expected revenue stream of a power project and therefore increase unpredictability and uncertainty on cash flow and investment decisions.

Findings - Nepal

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Nepal	***The current legal framework allows the levy of an export duty and royalties for exporting power.*** 1. The levy of export duty and royalties for exporting power are established under Nepal's Electricity Act, 1992 and Rule 27 of Electricity Rules, 1993. 2. For Upper Karnali and Arun III projects (export-oriented license), the project companies are required to pay 0.005 percent of revenue accruing from the sale of capacity and energy in the export market as export sales tax. Such taxes are factored into the tariff under PPAs.
	Under the current legal framework or under the Draft Act (2019), there is no deviation settlement mechanism. 1. The electricity law of Nepal does not provide for a deviation settlement mechanism in case of deviation from the scheduled power. 2. For CBET transactions with India, the deviation settlement is done following the CERC DSM Regulations (Indian regulations). 3. Based on the CBET framework in India, the delivery point is defined to always be in India. This arrangement may pose challenges and require further clarity for the following scenarios: i. If the delivery point is in Nepal when Nepal starts exporting power to India ii. If Nepal exports power to Bangladesh via India's grid

Findings - Nepal

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Nepal	***Nepal and India have established an energy banking arrangement. Under what conditions energy banking will be used as compared to short-term, medium-term and long-term supply contracts could be clarified.*** 1. Once operational, the Nepal Power Trading Company is expected to implement or cause to implement energy banking, buy and sell power generated and sold by domestic / foreign generation and suppliers, import power and sell or cause it to be sold in Nepal, export and sell power purchased from domestic private or public sector generators, promote power exchange and trading with neighboring countries or at the regional level. 2. On or about January 2019, it was reported that Nepal and India set up an energy banking mechanism and draft guidelines were developed by NEA and CEA (India) and to be discussed at a subsequent Joint Steering Committee Meeting led by respective Power Secretaries. 3. In principle, energy banking trades dry season imports for west season exports with India on an energy basis (physical units) with a predetermined clearing price. Further details of this arrangement are not discovered in public domain.
	CBET / CBTL contracts have been negotiated on a transaction by transaction basis and conducted through "regulation by contract" filling gaps in regulatory frameworks which are not yet fully aligned on CBET. Standardizing contracts can be an effective tool to induce transparency, predictability, clarify risk allocation and reduce transaction costs and time. Standardizing contracts can take place at country levels and at bilateral/multilateral levels.
	Platforms for cross-border electricity cooperation – policy alignment and project development – have been effective and may be strengthened. Nepal has substantial CBET experience (Power Trade Agreement with India, JV model for CBTL, Negotiating the first Tripartite Transaction) and has a critical role in the future direction of CBET within BBINS.

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Legal-Regulatory-Contractual Foundations and Adequacy for Scaling Up

Sri Lanka Country Report
Summary of Findings
(Versions: April 2021)

Cross-Border Electricity Trade Among Bangladesh-Bhutan-India-Nepal-Sri Lanka (BBINS)

Sri Lanka Country Report
Legal-Regulatory-Contractual Foundations and Adequacy for Scaling Up
Version: April 28, 2021

This is a country report of analysis carried out in parallel by two independent legal consultants under the supervision of a World Bank team. The first focused on country-specific legal-regulatory frameworks and their adequacy to enable and expand cross-border electricity trade (CBET) among BBINS countries (Bangladesh, Bhutan, India, Nepal, Sri Lanka). The second review looked at a sample of contractual arrangements (not necessarily country specific) under which CBET has developed in the BBINS over the last 5-7 years with the aim of assessing their adequacy to build buyer and investor/lender confidence in cross-border sources and destinations of electricity supply. Gaps are identified and recommendations proposed for scaling up CBET. A synthesis report of analysis complements this country report.

Findings - Sri Lanka

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Sri Lanka	***Without an interconnection, Sri Lanka cannot be involved in CBET transactions. The basis of the due diligence is an assumption of a gradual commencement and growth and diversification of CBET – a building blocks approach*** 1. Sri Lanka assesses CBET's role in its power system and how it can contribute to its sector development objectives, chooses a win-win interconnector business model and adapts its legal and regulatory framework to enable its development, and foster initial CBET. i. Sri Lanka's CBET development will be formed in the context of substantial experience gained in interconnecting regional grids in India, developing cross border interconnections and procuring medium term and long term bilateral cross border power purchase agreements. Successful cross border trading can take place at different stages of market development and readiness. This is already demonstrated in the region. 2. After the interconnector is developed and initial experience with CBET is commenced, growing bilateral and trilateral CBET could be used as building blocks for growing and deepening its participation in a regional BBINS market in the near term. 3. Sri Lanka could also consider participating in the emerging regional wholesale spot market in the medium term, and if there is interest in this, be active in the recently activate multilateral dialogue on this. 4. As more bilateral and the first few trilateral arrangements are put in place, this experience will end itself toward a shared understanding of how to make a more seamless and stable operation of increased CBET flows. Such questions include (i) more coordinated planning, development and operation of cross-border infrastructure; (ii) evolved tariff regimes, across the various aspects of CBET, including CBTLs and sale of power; (iii) coordination and where necessary gradual alignment of regulatory practices such as transmission access, congestion management, system operation, and energy accounting; (iv) standardized commercial arrangements to reduce transaction costs; (v) introduction of fair, open, non-discriminatory and reciprocal access to the transmission grids, and addressing safeguards concerning management of electricity flow during shortages in the host state. 5. Sri Lanka's participation in the platforms on CBET would ensure its voice and concerns are reflected as it develops the interconnector, prepares for CBET and gains experience and optimizes the use of CBET for imports and exports.

Findings - Sri Lanka

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Sri Lanka	***CBET has grown successfully in other countries once policy guidance by respective Governments was provided and mandates to develop initial CBET have been provided.*** 1. National Energy Policy and Strategy of Sri Lanka (Energy Policy) issued by Ministry of Power, Energy and Business Development, 2019, inter alia states that: i. Feasibility of cross border electricity transfer with countries in the region will be studied by MoPE and documented by end 2021; and ii. a viable cross-border electricity transmission and cooperation with countries in the region will be pursued on the basis of multilateral power pool operation. 2. A Detailed Project Report is reported to be finalized for a 400 kV New Madurai (India) – New Habarana (Sri Lanka) Interconnector Project by a Joint Technical Team (including Power Grid Corporation of India, Ltd. and CEA) under the oversight of the Joint Working Group; however, there is no documentation identified as to whether the Joint Working Group has reviewed progress of the DPR. 3. A number of studies find strong economic rationale for CBET, including reduction of power supply costs and access to clean electricity supply. 4. Feedback received by the team suggests that interim mandates from the GoSL may be an option while time is taken to enact legal foundations for CBET. This is beyond the scope of this due diligence report.

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	In addition to providing a mandate, there are several development models for CBTLs have been effective in the region and which can be used for new CBTLs. The models are likely to evolve based on the nature of CBET (i.e. linked or not to specific generation projects) and its desired scale. 1. Various models may be considered for the CBTL. BBIN have used (i) Assets-In-Country; (ii) Joint Venture; (iii) Dedicated (Associated) Transmission development models. India also has limited experience with Public-Private Partnerships. These models have attracted regional investors and lenders but no investors outside the region other than some limited IFIs. The models are discussed in the Country Report.

Findings - Sri Lanka

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Sri Lanka	***CBET in BBIN has grown under respective governments' leadership – it has been made to happen even with varying clarity in regulatory frameworks for CBET. In Sri Lanka, establishing a legal basis for CBET and development the CBTL appears to be necessary to get started.*** 1. With the exception of the Energy Policy, which envisages exploring viable cross-border electricity transmission, the legal and regulatory framework for the electricity sector in Sri Lanka is silent on CBET. The Electricity Act (EA) does not envisage CBET explicitly or the transmission of electricity across or beyond Sri Lanka's territorial borders. Absent statutory recognition, CBET is not permissible. 2. There is no explicit legal basis for the development of a CBTL outside of Sri Lanka, nor is CEB legally authorized to do so. CEB is authorized to construct TLs within the country (see below). 3. The EA requires the Single Buyer (CEB) to procure power from entities licensed under its provisions. Presently, entities supplying electricity from outside the territorial boundaries of Sri Lanka would not have such a license. 4. The EA establishes the Long-Term Generation Expansion Plan as the basis for CEB's procurement of electric power supply. CBET is not presently considered in the LTGEP. 5. CEB is required to comply with the approved 'long term transmission development plan' (LTTDP) when designing and operating the transmission and distribution system. In this regard, CBET is presently not considered in the plan.
	1. In Sri Lanka, it is settled law that a statutory body only has the powers which are explicitly granted by a statute. CEB, being a statutory body, does not appear to have the power to procure or sell electricity by CBET. CEB, a statutory entity, is not specifically empowered by its parent statute to buy or sell power by means of CBET. 2. Therefore, CEB, being a statutory body, does not appear to have the power procure or sell electricity by means of CBET. 3. There is presently no explicit legal basis for the development of a cross border transmission line outside the territory of Sri Lanka, nor is CEB legally authorized to do so (though it is empowered to construct transmission lines within the territory of Sri Lanka).

Findings - Sri Lanka

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Sri Lanka	***Participating in Platforms for cross-border electricity cooperation – policy alignment and project development – have been effective and may be strengthened.*** 1. Bilateral joint working group have been used oversee CBET/CBTL development and facilitate resolution of potential disputes. Bangladesh used its bilateral Joint Working Group for power sector coordination to oversee development of its first CBTL. Nepal also is using its bilateral JWG to oversee development of its 2nd high voltage CBTL. Bilateral instruments help to clarify overarching inter-governmental framework for CBET; set out principles underpinning the trade; help to resolve potential disputes and hence to some extent, in the absence of treaties or other international agreements, provide some comfort to investors and market participants. 2. India's CBET framework allows for tripartite transactions and trade on its wholesale spot market – commercial and regulatory arrangements are under development by participating countries. 3. A Joint Working Group for the study of market development (including spot market) is functioning in SAFIR to which PUCL is a participant. This will inform each regulatory framework on issues and actions that can be taken to align and gradually harmonize frameworks to foster CBET. 4. Informal mechanisms such as the South Asia Power Secretaries Roundtable complement formal mechanisms to facilitate dialogue and exchange of experience on issues of mutual technical interest.

Findings - Sri Lanka

For discussion (Component 1 – Prevailing CBET Arrangements)

Country	Findings (Possible Next Steps not included and to be discussed with counterparts)
Sri Lanka	***CBET / CBTL contracts have been negotiated on a transaction by transaction basis and conducted through "regulation by contract" filling gaps in regulatory frameworks which are not yet fully aligned on CBET. Standardizing contracts can be an effective tool to induce transparency, predictability, clarify risk allocation and reduce transaction costs and time. Standardizing contracts can take place at country levels and at bilateral/multilateral levels.*** 1. CBTL operation and CBET will be based on commercial contracts. Given the absence of CBET transactions, Sri Lanka does not have any standard documents for the same. 2. As a result, transaction documents would have to be negotiated on a case-to-case basis, or, in case of competitive procurement by CEB, as per the terms stipulated by CEB for specific instances of procurement. 3. Experience has shown that CBET transactions are often delayed due to the multiplicity of documents being used, and the resultant need to negotiate each transaction on its own terms – this, in turn, creates imbalances stemming from the relative negotiating strength of the parties to the transaction. 4. Standardized documents for transactions (PPAs, TSAs) are an effective tool to induce transparency, predictability and reduce transaction costs and time (by lowering the time spent on negotiation) and clarifying risk allocation (thereby given financiers and lenders comfort). Notably, Bangladesh Power Development Board has issued standard bid documents and agreements for importing thermal power through competitive bidding process. 5. In the absence of legal and regulatory provisions, CBET has been conducted through a "regulation by contract" approach, including determination of tariffs (guided by India's CBET framework) and dispute resolution for CBET and CBTLs. Bilateral instruments could clarify inter alia recourse to government to government resolution efforts, clarify overarching intergovernmental CBET frameworks, set out principles underpinning CBET and hence provide predictability and certainty to investors and market participants. This can avoid transaction costs. It can also help to introduce international best practices (i.e. using international arbitration panels rather than national arbitration provisions for resolving disputes, after failure of mutual resolution.)