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Study on Review of Electricity Laws, Regulations, Policies (EL&R&P) & Legal Structure of South Asian Countries (SAC) to Identify Areas that can Hinder Cross Border Electricity Trade (CBET) and to recommend changes/amendments therein for consideration of the SAC

3rd Meeting of Task Force 1 on "Coordination of Policy, Legal and Regulatory Framework"

4-5 June 2014, Thimphu, Bhutan

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1. SCOPE OF WORK AND METHODOLOGY

Scope of Work

1. ***Review of existing studies/published literatures/reports/data(s)*** on EL&R&P & legal framework prevailing in the SAC; ***identify key issues*** from CBET perspective

2. ***Analyze & determine the gaps, advantages & disadvantages*** in the EL&R&P prevailing in SAC impacting CBET

3. ***Review & Analyze the policies, acts & regulations*** relating to the sustainable development of energy resource available in each SAC in the regional context of CBET.

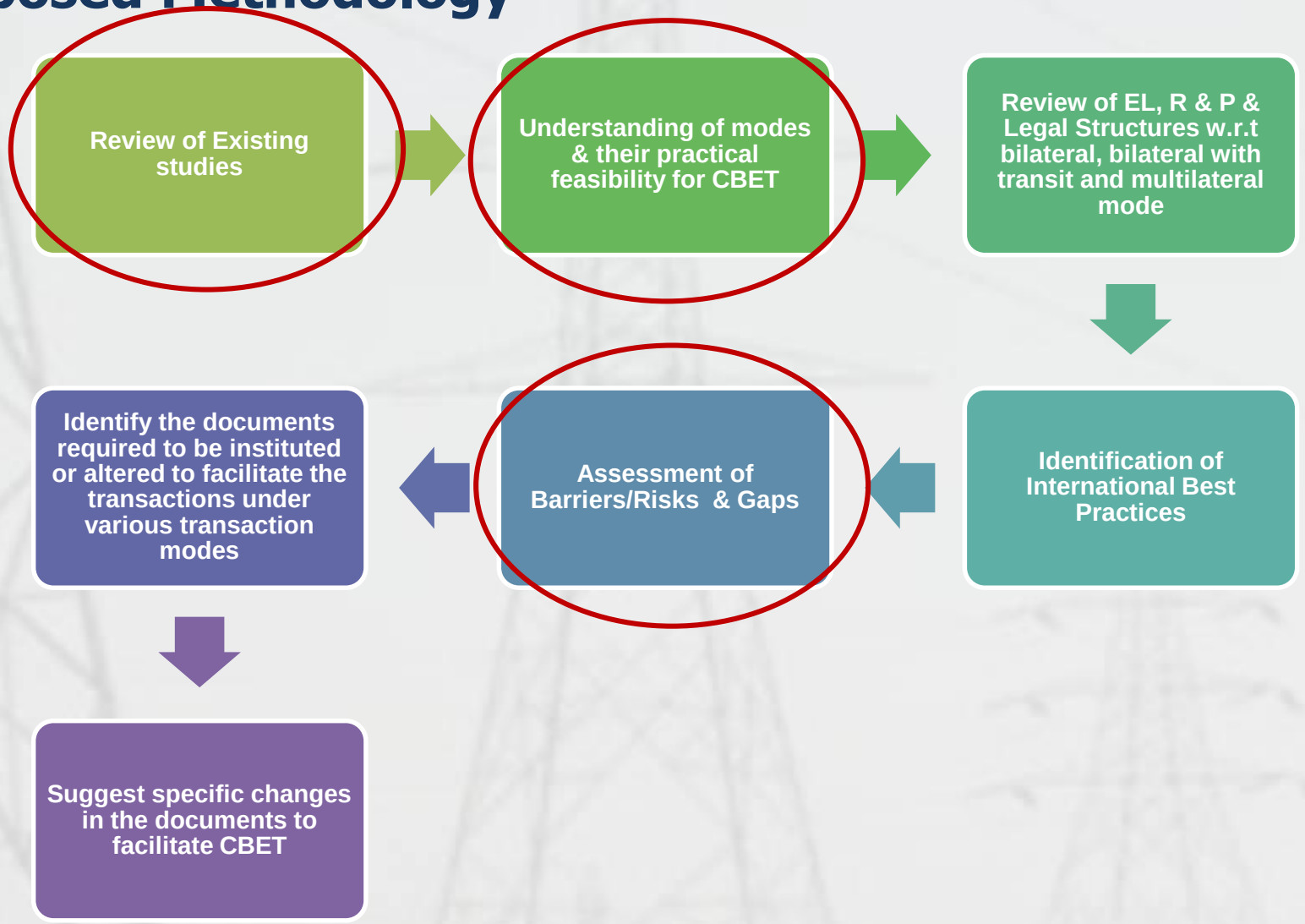
4. ***Review & Analyze international best practices*** w .r .t. harmonization /coordination of L,P,R frameworks for promoting regional power trade.

5. Suggest ***changes/ amendments required in short, medium & long term in the EL&R&P & legal structure*** to promote CBET & sustainable development of energy resources available within the SAC.

6. ***Review, analyze & suggest changes with implementable formulations for promoting CBET & investment*** (such as FDI policies etc.) & to create a secure environment for investors in the SAC & cross border transmission system infrastructure for evacuation & trade of power in SAC with the ultimate objective of enhancing energy security in the region.

7. ***Outline a Country-wise doable strategy, recommendations & road map*** to incorporate the changes in the EL&R&P & legal structure to facilitate & promote cross border electricity trade among the SAC & create a conducive environment for investment in short, medium & long term considering political sensitivity & social environment in each country

Proposed Methodology



2. REVIEW OF EXISTING STUDIES

Review of Existing Studies

Several Studies have been undertaken on various dimensions of CBET. Some of the key studies that have been undertaken for review are as follows:

- *Study on South Asia Regional Power Exchange – Asian Development Bank, 2012*
- Regional Hydropower Plants, Legal Opportunities in Bhutan and Nepal, SAARC 2010
- Regional Electricity Trade: Legal Frameworks of South Asia, SAARC, 2010
- Energy Cooperation in South Asia: Prospects and Challenges - South Asia Watch on Trade, Economics and Environment, 2010
- Energy Trade in South Asia – Asian Development Bank, 2011
- Developing Integrated Energy Policies in South Asia, SAARC, 2008
- Potential and Prospects for Regional Energy Trade in the South Asia Region, ESMAP, 2008

High level observations are mentioned from the review of these studies are mentioned in the subsequent slides while the detailed observations are annexed.

Review of Existing Studies – Key Observations……..(1)

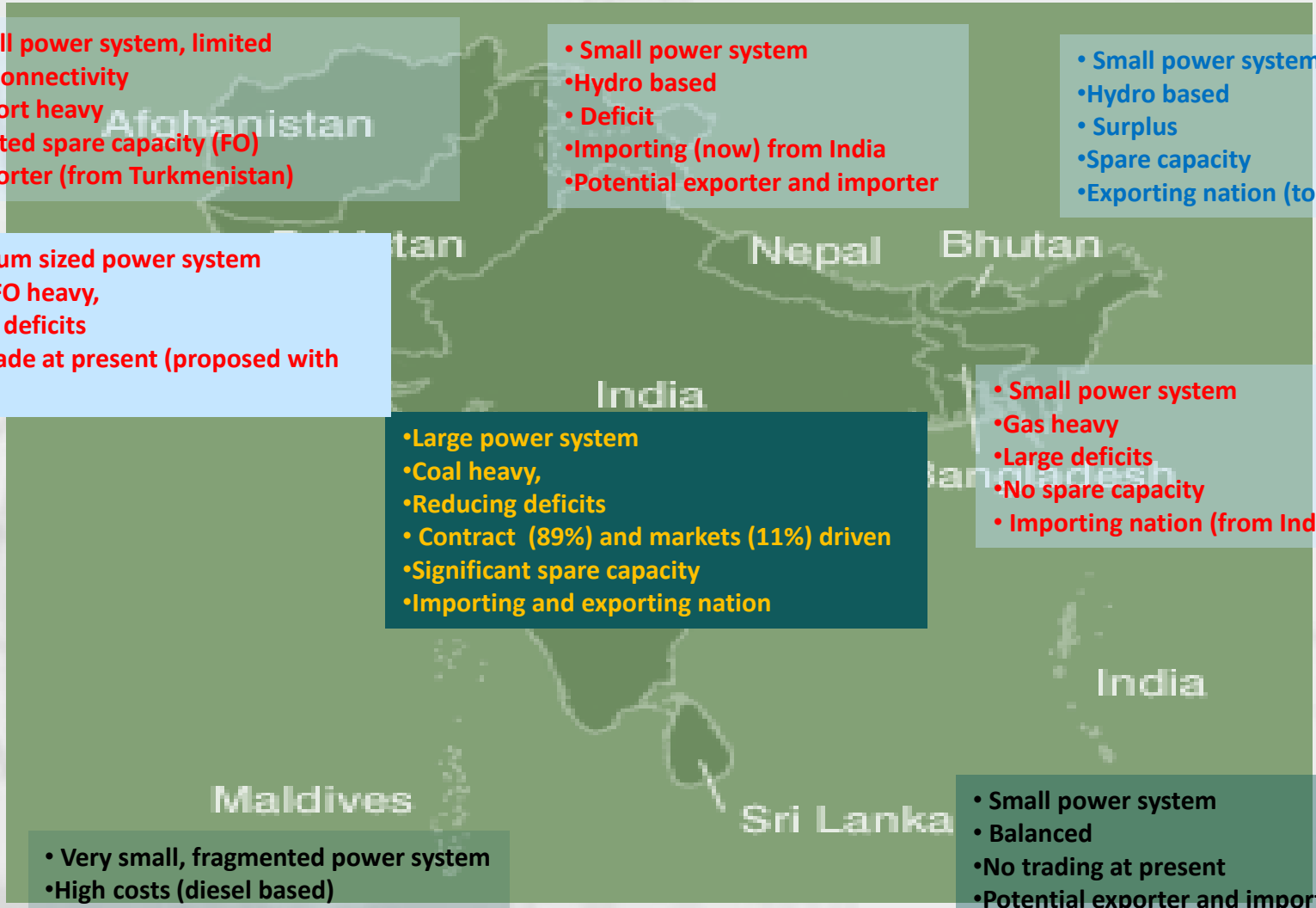
- The ADB 2012 Study is the most comprehensive. Discusses the current status and future prospects of both the bilateral and setting up of a regional power pool.
- It examines both economic and technical requirements of establishing a regional power exchange
- Provides for a model structure and a roadmap for CBET
- Presents an overview of the existing L,P, R from technical, economic, regulatory legal and organizational perspective and maps the high level changes that are required in the L,P, R framework in Long, Medium and Short term.
- The SAARC studies provide a good description of L,P,R across different SAR countries for trade and for investment in hydropower

Review of Existing Studies – Key Observations……(2)

- Besides the ADB study the other studies describe the barriers for CBET & provide a description of good practices/ experience of other power pools.
- Recognize the importance of institutionalization of bilateral ties for steady communication between SAC
- The studies outline the role of funding agencies in facilitating regional energy trade and related investments.
- Discuss the priority actions and initiatives that the governments need to take to promote regional trade
- Further, the studies recognize that capacity building & sustained sector reforms would help to expand & sustain CBET

3. CROSS-BORDER ELECTRICITY TRADE IN SOUTH ASIA: STRUCTURING OPTIONS

South Asia – Characterization of Power Markets



- Small power system, limited interconnectivity
- Import heavy
- Limited spare capacity (FO)
- Importer (from Turkmenistan)

- Small power system
- Hydro based
- Deficit
- Importing (now) from India
- Potential exporter and importer

- Small power system
- Hydro based
- Surplus
- Spare capacity
- Exporting nation (to India)

- Medium sized power system
- Gas/FO heavy,
- Large deficits
- No trade at present (proposed with India)

- Large power system
- Coal heavy,
- Reducing deficits
- Contract (89%) and markets (11%) driven
- Significant spare capacity
- Importing and exporting nation

- Small power system
- Gas heavy
- Large deficits
- No spare capacity
- Importing nation (from India)

- Very small, fragmented power system
- High costs (diesel based)
- Limited trade possibilities

- Small power system
- Balanced
- No trading at present
- Potential exporter and importer

Basis for selection of Structure for Review of Legal & Regulatory Framework (1)

- Project structures are dictated by two broad approaches (a) whether the principal basis of CBET are:
  - ***Bilateral Transactions*** between the countries (with or without transit through third countries) or
  - ***Collective (Power Exchange) Transactions*** that feature platform based power trading
- Expanding Collective Transactions beyond India reported in November 2012 by ADB study team.
- While, there are limitations for large scale power flows between countries based on Px
  - Short term power transactions in India are treated as "incidental" to long term transactions. Have lower priority in Open Access
  - In the absence of adequate priority, recipient countries cannot rely on these markets to deliver to their principal needs for electricity;
  - Generation projects in various countries would find it very difficult to obtain financing on the basis of such thin and uncertain markets.

Basis for selection of Structure for Review of Legal & Regulatory Framework (2)

- Short term transactions and indeed important and beneficial for all market participants and would help all countries in the region when such trading is expanded to
- However Px cannot reliably serve large scale supply needs under the present Indian design.
- Hence, our principal analysis and recommendations follow the long term bilateral contract based CBET arrangements.
- The bilateral contract based trading arrangements can have three basic variants, namely:
  - ***Bilateral without transit***
  - ***Bilateral*** with transit but ***no transit country interconnection***
  - ***Bilateral with*** transit and *featuring* ***transit country interconnection***

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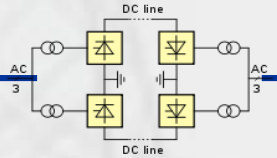
Case A: Bilateral Interconnection Arrangements

Sending SS (AC)

HVDC Back to Back

Receiving SS (AC)



Trader/ Shipper

Physical Border

Contracted Power Plant

Note: Illustrative schematics only.
Network configuration can vary

Bilateral

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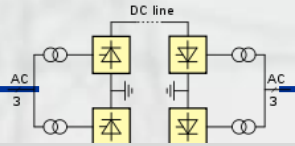
Legal and Regulatory Structures

Export licenses and regulations

Import licenses and regulations



- Conversion Agreement

- Trading Licenses (Required by law)
- Export permissions
- Grid Code Adherence
- Transmission Services Agreement
- Balancing and settlement

- Trading Licenses
- Grid Code Adherence
- Transmission Services Agreement
- Balancing and settlement Arrangements

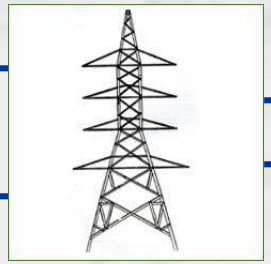
- Generation Licenses (Not required by law in India. Typically required elsewhere)
- Interconnection Agreement

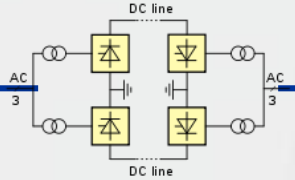
Note: Illustrative schematics only. Network configuration can vary

Case B: Bilateral With Transit

Incremental Charges

- Transit transmission charges– T 1
- Transit Transmission Losses – T 2
- Transit Fees – T 3





Network in Transit Country – NO interconnection with local system

Physical Border 1

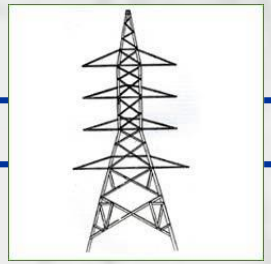
Physical Border 2

Note: Illustrative schematics only. Network configuration can vary

Case C: Bilateral With Transit and Transit Country Interconnection

Incremental Charges

- Transit transmission charges– T 1
- Transit Transmission Losses – T 2
- Transit Fees – T 3



Physical Border 1

Network in Transit Country – Interconnection with local system

Physical Border 2

The nature of transit country transmission charges would vary significantly between Cases B and C

4. IDENTIFYING THE BASE CASE OPTIONS FOR DEVELOPMENT OF LEGAL AND REGULATORY FRAMEWORK

Choice of Reference Framework for Development of Legal & Regulatory Framework for CBET

- Choice will be dictated by:
  - ***Source and destination*** of power (physical geography)
  - ***Quantum*** of power flow desired
  - ***Reliability required***
  - ***Choice of transaction model(s)*** – whether only Bilateral or also featuring market based transactions
  - ***Legal and regulatory structures*** in the countries
- The effectiveness of the mode would be predicated upon:
  - ***Cost structures/cost build-up;***
  - ***Risks to the transactions***
- For relatively small quantum and point to point flow between two adjacent countries, the Bilateral w/o Transit Model (Reference Case A) can be adequate
- For a combination of bilateral trade and market based models the Bilateral with Interconnection in Transit Country (Reference Case C) would be suitable and would possibly be easier to implement than the model without transit country interconnection (Reference Case B)

The legal and regulatory framework instituted needs to take into cognizance the above considerations

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Relative Advantages and Disadvantages of Case Options – Initial Analysis

Attribute	Case A: Bilateral w/o transit	Case B: Bilateral – with transit W/O Transit interconnection	Case C: Bilateral with Transit – With interconnection
Ability to flow power between non-contiguous countries	NA	Yes	Yes
Ability to trade on supply/intermediate country (India) Px	Yes	No	Yes
Possible power flow volumes	Low/Moderate	Low/Moderate	High
Source diversification/hedging possibilities	Moderate (with India)	Low	High
Legal/Licensing/operational challenges in intermediate country	NA	High	Low/Moderate
Exposure to changing transmission charges in supply/intermediate country	Low/Moderate	Low/Moderate	Moderate/High

ILLUSTRATIVE

A detailed Risk Matrix is under development as a part of the project. This would feed into the legal and regulatory change identification

Principles of Risk Allocation

- One of the key features of electricity supply chain in cross-border projects is that a risk arising in one part of the chain can have enormous consequences in another part.
- The question then arises: ***"To what extent should a party in the affected part of the electricity chain indemnify parties in other parts for the losses incurred by them as a result of that risk?"*** In essence the consequence in most instances is a loss of revenue:
  - Loss of bulk electricity sale revenue for the Genco/Trader in the supply country
  - Loss of wholesale revenue for electricity shippers;
  - Loss of tariff revenue for Transmission service providers for the transmission link(s)
  - Loss of revenues for transmission and distribution companies in offtaker countries (including in transit country companies in case of AC links through which the transit country also draws electricity from the CBET arrangements).

Principles of Risk Allocation (2)

- The broad principles suggested and adopted in preliminary contractual risk allocation are:
  - *Where the Government of one of the countries accepts responsibility for a political risk, the Government or entity responsible for that risk* indemnifies all electricity chain participants for their loss of revenue.
  - *Where the risk is on account of regulatory actions in any of the countries, the respective entities bear the consequential losses*, unless such regulatory action is on account of political interventions in which case the respective Governments take the risk;
  - *Where a **Genco/Trader as electricity seller or a Discom/Trader** as buyer accepts responsibility for a risk, it indemnifies all electricity chain participants for loss of revenue*.
  - *Where the selling country, transit country or offtaker country **transmission company** accepts responsibility for a risk, it indemnifies the Genco/Trader in the selling country and the offtakers* as the case may be, but limited to the extent of *defined Liquidated Damages*.
- The contractual risk allocation needs to be backed by institutional and inter-governmental arrangements that ensure credibility of proposed structures

The above principles of risk allocation leads to the proposed structures and the risk mitigation mechanisms

Determinants of Trade – DC Interconnections

Instruments / Aspects	Applicability	Grid Codes	Inter Governmental Agreements	EL, P & R	Balancing & Settlement Mechanism
Possible Export Duty/ Import Duty Imposition			X		
Rationalization of laws and regulations		X		X	X
Harmonization of Charges		X		X	X
Open Access provisions harmonization				X	X
Licensing of specific transmission link				X	
Institutional Arrangements (Nodal Agency)			X	X	X
Transit Charges			X	X	

ILLUSTRATIVE ONLY. WILL VARY FOR DC AND AC INTERCONNECTIONS

 Bilateral

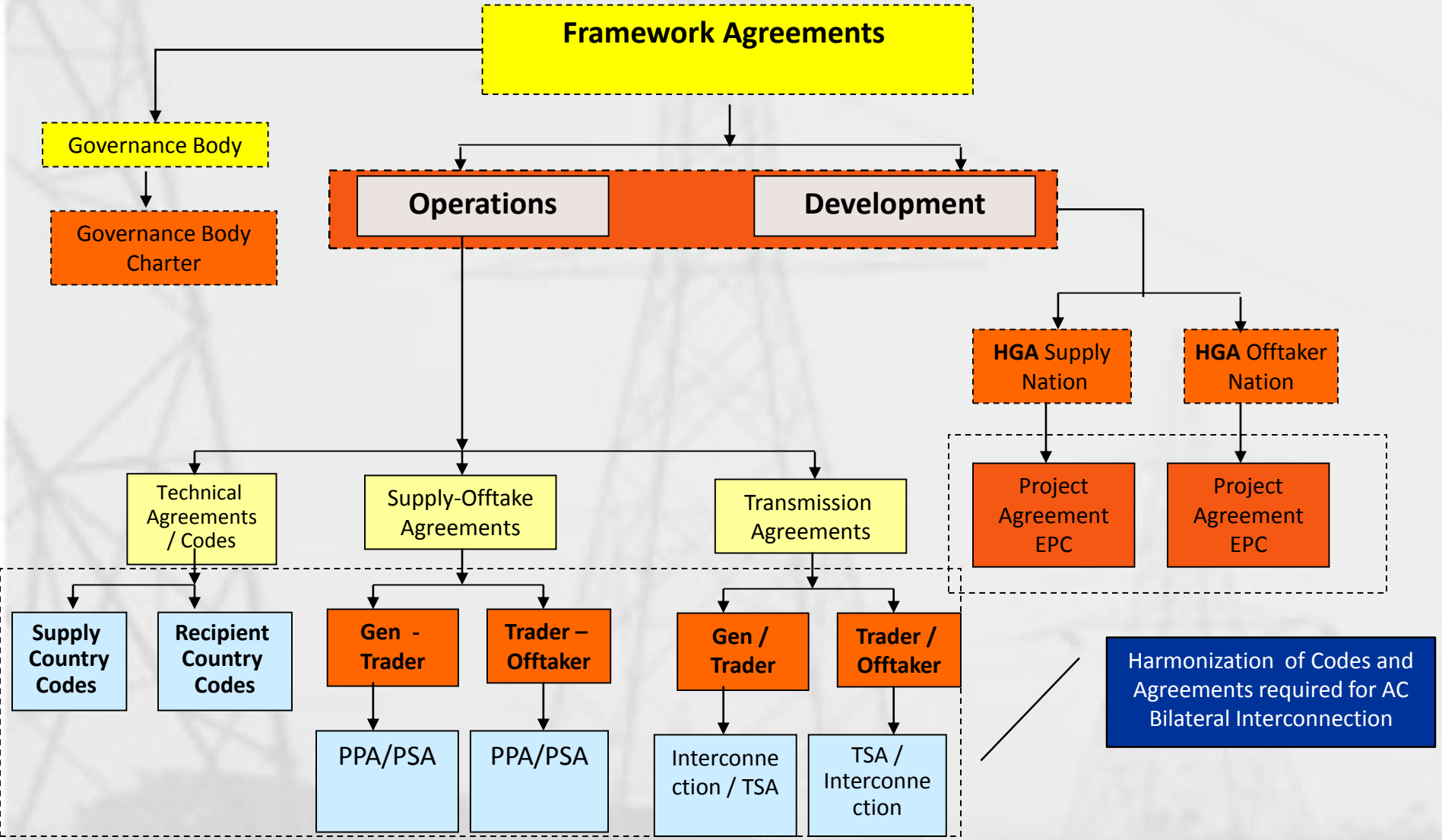
 Bilateral without transit interconnection

 Bilateral with transit interconnection

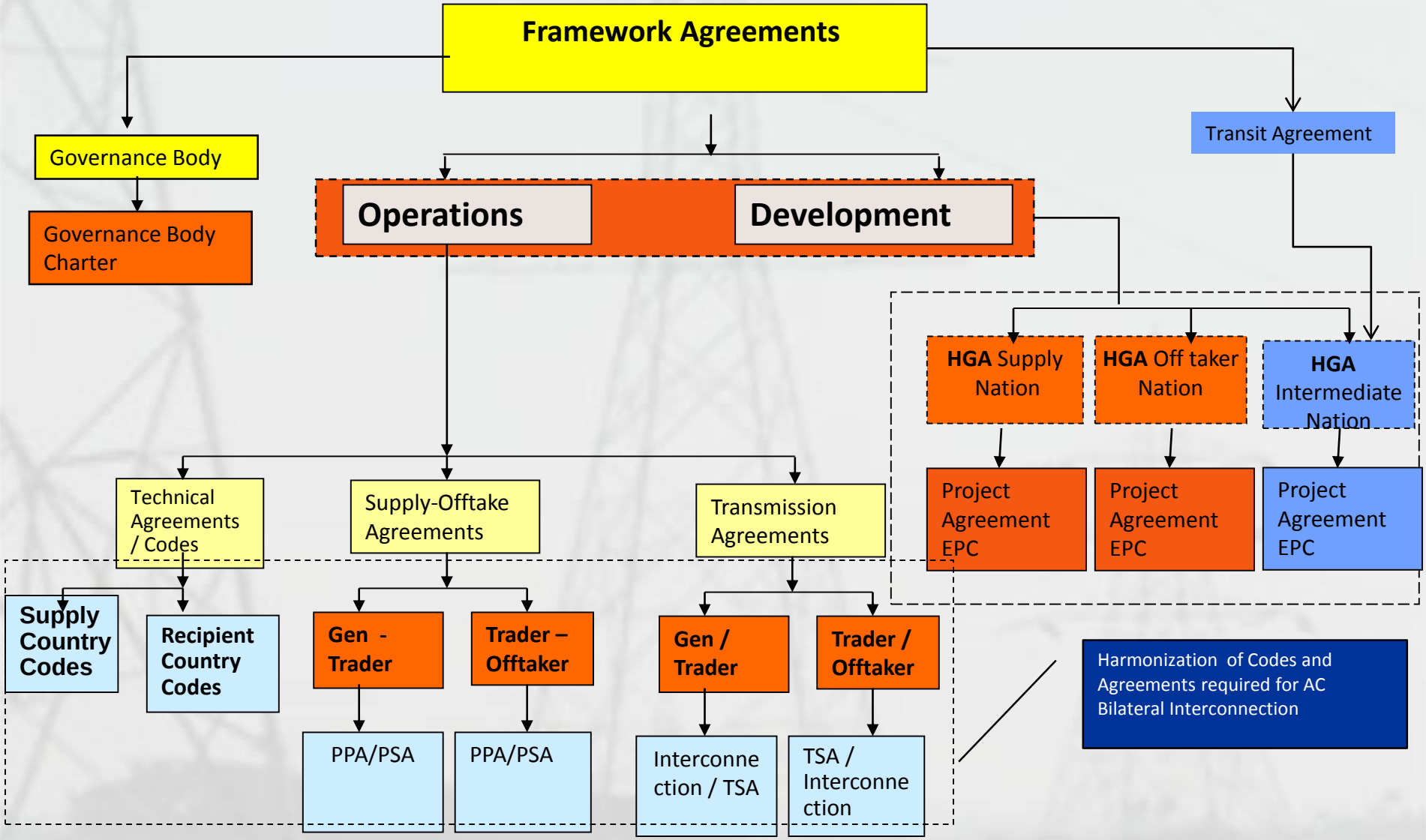
Note: Illustrative only, with DC network assumptions for Case A and B

5. INSTITUTIONAL STRUCTURE FOR SECURE CROSS-BORDER ELECTRICITY TRADE

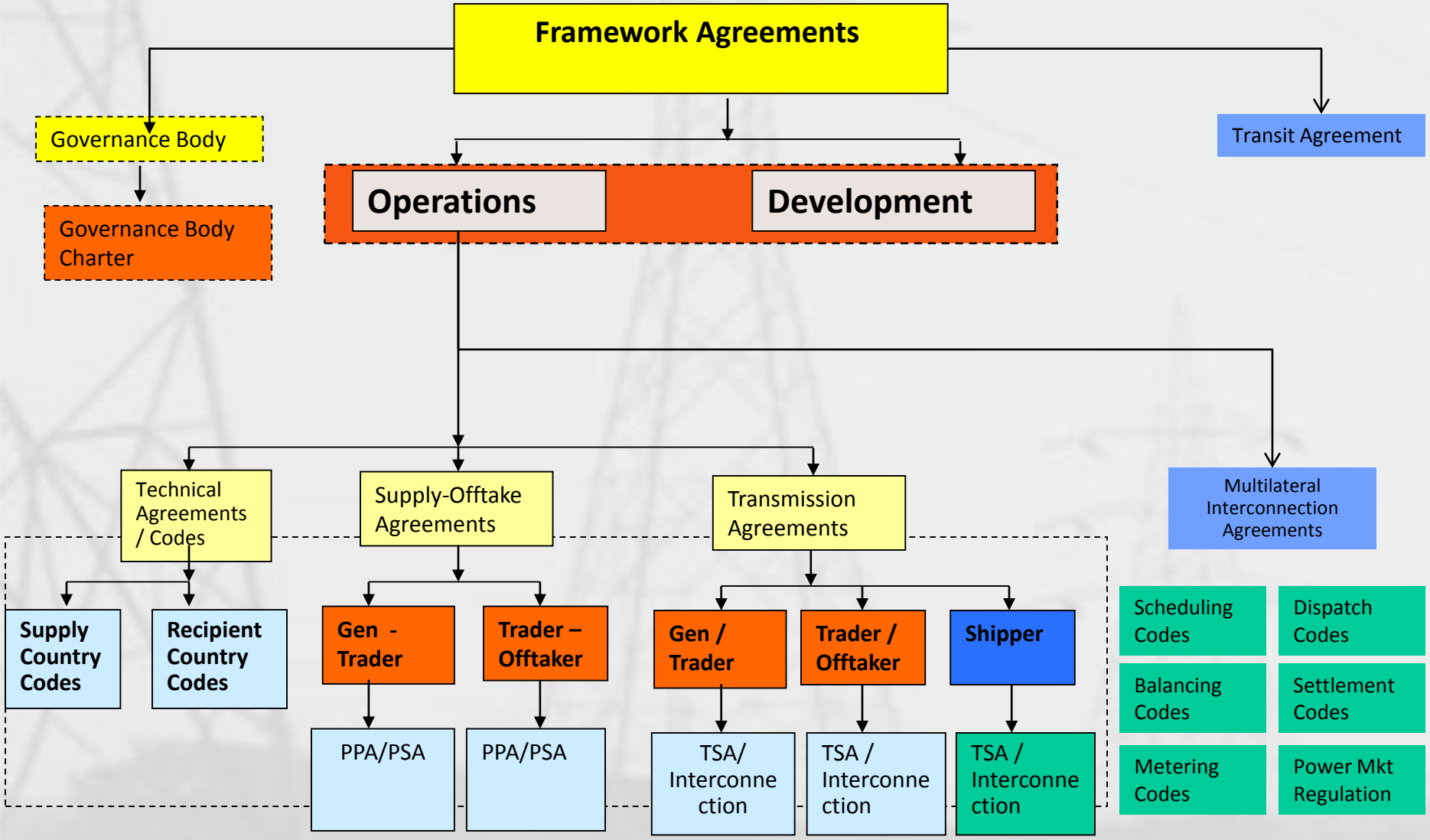
Illustrative Structures for discussion – Bilateral without Transit (DC)



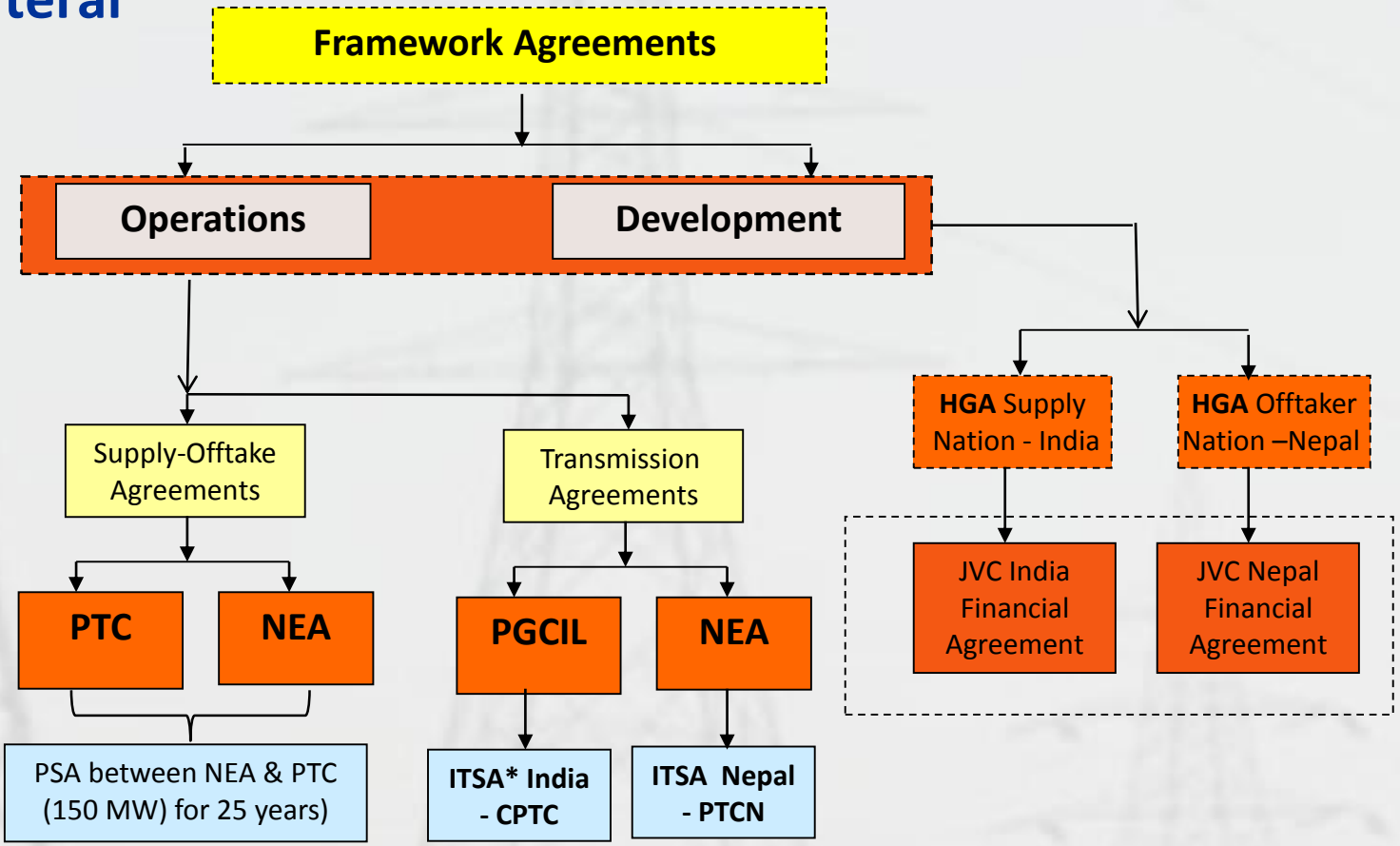
Illustrative Structures for discussion – Bilateral WITH Transit (Without Transit Country Interconnection)



Illustrative Structures for discussion – Bilateral WITH Transit (With Transit Country Interconnection)



Case Study of Nepal - India Dhalkebar – Muzaffarpur Transmission Line - Bilateral



The shareholders of the Cross Border Power Transmission Company Limited (CPTC) are India's IL&FS Energy Development Company (IEDCL: 38%), Power Grid Corporation of India (PGCIL) (26%) and Sutlej Jal Vidyut Nigam (SJVN) (26%), India & NEA (10%) own the Indian Portion

The shareholders of Power Transmission Commission Nepal Pvt. Ltd (PTCN), are NEA (50%), IEDCL(10%), PGCIL (26%) & Hydropower Investment & Development Corporation (HIDC) (14%) in Nepal owns Nepal Portion

***ITSA : Implementation and Transmission Service Agreement**

6. INITIAL CONCLUSIONS AND WAY FORWARD

Conclusions

1. Reliable power flow across South Asian countries would have to rely primarily on long term flows.
   - This is essential for supply reliability and also project financing of the generation and transmission assets
2. Basing on the initial analysis it is apparent that large scale CBET would require an agreed frameworks and agreements that is durable.
3. In case of transit being involved, the transit charges would be a key matter for negotiation
   - There are no defined basis for this. Once agreed must be laid out in the framework agreement
4. Interconnections with the intermediate country (India in most cases) power system would diversify trade options
   - Px based flows can complement long term contract flows in this framework

Way Forward

1. Agree with the Task Force on the preferred mode of bilateral with transit/multilateral CBET transactions (3rd Task Force Meeting, June 2014)
2. Prepare and agree on the detailed Risk Matrix for the CBET transactions. Agree with Task Force (4th Task Force Meeting. Details to be sent in advance to Task Force members)
3. Identify the critical new instruments for CBET. Draw up term sheets (4th Task Force Meeting. Details to be sent in advance to Task Force members)
4. Identify changes in the various legal and regulatory instruments. Develop term sheets (5th Task Force Meeting. Details to be sent in advance to Task Force members)
5. Final report incorporating the above (October 2014)

7. Reserve Slides

Review of Existing Studies – Observations on the Reports

Study on a South Asia Regional Power Exchange – 2012 (ADB)

Coverage of the Report

Focuses on cross border electricity trading among the SAARC member countries; Considers the possibility of the SAARC region benefitting from power trade with Central Asia; Discusses in detail the Cost Benefit/ techno-economic analysis of cross border power trading

Observations on the Report

a) Provides an overview of the existing L,R, P framework and highlights the gaps in the existing L, R, P framework w.r.t the CBET & recommends changes required in the Long, Medium & Short Term

b) Identifies and proposes specific legal/ regulatory provisions to be presented as a part of new legislative initiative in respective countries including merits/ demerits and opportunities and challenges for identified priority areas

c) Emphasizes on the need for better regulatory regime & development of power evacuation infrastructure

d) Focuses on development of a regional modern power exchange framework & considers the option of extending existing power exchanges in India for CBET

e) Mentions the current status & benefits of the cross border electrcity trade/integrated regional power systems

f) Discusses the features, functions, mode of operations of the 2 power exchanges in India.

g) Identifies financial and economic benefits of Regional CBET

h) Emphasizes on the opportunity of the a SAARC wide interconnected power system to exploit the hydro potential that exists in Nepal and Bhutan

i) Considers/discusses CBET & the impact of trade policy, custom duty, export tax and other such obligations including provision for exemptions

Review of Existing Studies – Observations on the Reports

Regional Electricity Trade – Legal Frameworks for South Asia - 2010

Coverage of the Report

Electricity Acts, Laws, Regulations, Policies and Legal Structures of the Power Sector of the SAARC Member Countries , viz. Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka

Observations on the Report

a) Review of EL, R, & P on a country wide basis that may or may not be applicable to CBET

b) Need & Importance of South Asia RET

c) Proposes establishment of several agencies on a regional level like Forum of SAARC Electricity Regulatory Commission

d) Proposes development of SAARC Electricity Grid Master Plan; Grid Code; Trade Code; Inter-governmental & Inter-Utility agreement on SAARC Electricity Trade

e) The report does not mention about Trade & Commerce laws may have an implication over electricity trade;

f) Does not mention about power trading directly and the trading possibilities among the nations, gaps/barriers, scenarios and hence the changes needed in legal, policy and regulatory framework

g) Summary & Conclusions are not backed by detailed analysis that support those recommendations

Review of Existing Studies – Observations on the Reports

Energy Cooperation in South Asia: Prospects and Challenges - 2010

Coverage of the Report

Assessment of barriers to regional energy cooperation in the South Asia Growth Quadrangle (SAGQ), comprising Bangladesh, India, Nepal and Bhutan

Observations on the Report

a) Discusses barriers to electricity trade & categorizes them into technical, economic, political, cost, social & environmental barriers & presents the case with a case study based on discussion with several stakeholders

b) Discusses best practices of establishing regional power grids

c) Recognizes the following essential imperatives for RET

   i. Steady & institutionalized communication between member countries

   ii. Need of the SAC countries to institutionalize their bilateral ties

   iii. At the technical level, utilities, transmission & distribution operators have to synchronize their grids & invest in domestic power generation

   iv. Leadership of India as the biggest electricity supplier & consumer is an absolute necessity

Review of Existing Studies – Observations on the Reports

Energy Trade in South Asia: Opportunities and Challenges - 2011

Coverage of the Report

The Report analyses the current interregional Electricity trade & brings forth the Additional Electricity Trade Options such as Regional Power Exchange, Regional Refinery, Regional LNG Terminal. etc

Observations on the Report

a) Overview of the Electricity Sector of the SAARC countries

b) Current Regional Trade & its prospects/ Interregional Electricity Trade Opportunities

c) Potential areas for Cooperation in Regional Electricity Trade

d) Development of a Regional Power Market & approach for its implementation

e) Discusses role of Non conventional Renewable Energy, Smart Grid, etc in CBET

f) Discusses Scope for Private Sector Participation

g) Discusses international experience of South African Power Pool through a case study

h) Provides for high level recommendations for to promote CBET

Summary of key regulatory changes/legal changes needed to facilitate CBET across 7 countries

Key Changes	Afghanistan	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka
Short Term Measures							
Nodal Agency for cross border trading/ Access to Px	Nodal Agency to be identified (DABS)	Nodal Agency to be identified (BPDB)	Role of 'Bulk Supplier' (DGPC) to be limited to commercial cross border electricity transactions	Power exchanges in India to be allowed to accept participation by entities registered in the participating SAARC countries	Nodal Agency to be identified (NEA)	Nodal Agency to be identified (NTDC)	Nodal Agency to be identified (CEB)
Investment Framework	Bilateral/ multilateral investment in cross border transmission links with surplus capacity						
Regulation of Power Procurement from a (regional) Px to be exempted from prior approval and price determination by	Proposed Regulator	By BERC	BEA would not have the power to regulate the prices in case sale of power through the power exchange is for export/import	Section 63 of the EA 2003, Tariff will be adopted by the appropriate commission if it has been determined through transparent process of bidding (including that through a power exchange)	By ETFC/ proposed regulator	By NEPRA	By PUCSL

Summary of key regulatory changes/legal changes needed to facilitate CBET across 7 countries

Key Changes	Afghanistan	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka
Short Term Measures							
Settling Imbalances	Settle imbalances from scheduled cross border trade of electricity as per prevailing UI mechanism in India			Commercial mechanism for treatment of system imbalances from schedule has been successfully operating for about 10 years. This is amenable for adoption of participating countries as in the case of certain commercial electricity trade between PTC and NEA (Nepal)	Settle imbalances from scheduled cross border trade of electricity as per prevailing UI mechanism in India		
Duties & Taxes	No custom duty, export tax or transit tax in regional electricity trade						

Summary of key regulatory changes/legal changes needed to facilitate CBET across 7 countries

Key Changes	Afghanistan	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka
Short Term Measures							
Commercial Trading license restrictions	**Exemption from trade license from relevant commerce ministry** *__Bhutan:__ The license provisions of BPC to include export/import of electricity *__India:__ Repeal / modification of DGFT Notification No. 09/2009-2014 (dated 10th September 2009) which restricts import of electricity *__Sri Lanka__: Generation licensees to be allowed to sell electricity through power exchange						
Dispute Resolution	Bilateral resolution of dispute followed by a regional mechanism						
Tariff Determination	-	-	Exempt from determination of tariff for generation not regulated by a PPA, and selling for a cross border trade	Power procured from a power exchange is exempted from a tariff regulation	-	NEPRA to exempt or pre-approve power acquisition on competitive basis	Transmission and bulk supply license to include power procurement from a regional power exchange

Summary of key regulatory changes/legal changes needed to facilitate CBET across 7 countries

Key Changes	Afghanistan	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka
Medium Term Measures							
Deemed Trading Licenses	Deemed Trading License for generation & distribution licensees to engage in commercial cross border electricity transactions		-	Section 14 EA 2003, generation & distribution licensees can engage in electricity trading as deemed licensee without a separate license	Deemed Trading License for generation & distribution licensees to engage in commercial cross border electricity transactions		
Open Access in Transmission	Non discriminatory open access for transmission			Section 14 ,EA 2003, a CTU or a STU to provide non discriminatory open access to transmission	Non discriminatory open access for transmission		
Commercial Mechanism to Settle Imbalances	Develop a regionally coherent commercial mechanism for system imbalances			UI has been put in place by CERC & select SERC	Develop a regionally coherent commercial mechanism for system imbalances		
Transmission Charges for access to transmission to be developed by	AERA	BERC	BEA	CERC/SERC (including for Bilateral trading or through a power exchange	Ministry/proposed regulator	NEPRA	PUCSL

Summary of key regulatory changes/legal changes needed to facilitate CBET across 7 countries

Key Changes	Afghanistan	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka
Medium Term Measures							
Grid Code	Respective regulatory authorities to develop a grid code for coordinated system operation with neighboring countries			The Indian Electricity Grid Code lays down technical & operational parameters for inter connectivity	Respective regulatory authorities to develop a grid code for coordinated system operation with neighboring countries		
Development of Transmission Plan for cross border transmission linkages	By DABS	By PGCB	By DHPS	CEA in coordination with members of South Asian Countries	By NEA	By NTDC	By CEB
Long Term							
Trading License to Other Parties	Issue of trading license to entities other than generation & distribution licensees			EA 2003 provides for issue of trading license for inter & intra state trading of electricity by respective electricity regulatory commission	Issue of trading license to entities other than generation & distribution licensees		

Comparison of EL,R & P in SAC

S. No.	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
1.	**CBET recognized as a part of its Energy/ Trade Policy by respective governments**	**EA 2001 has specific provisions for CBET** with India and at the regional level	Section: 3.5 of **Hydropower Development Policy 2001**: **recognizes hydropower as an exportable commodity** Section 4.6: mentions to pursue a strategy of bilateral or regional cooperation for hydropower development	**No Specific mention of CBET in EA 2003**	No specific mention of CBET in EA 20 of 2009 & 31 of 2013 (Amendment). **Section 3.2 of National Energy Policy and Strategies of Sri Lanka** :Ensuring Regional Energy Security- cross border energy transfer with neighboring countries	**The revised EA 1910 has provisions for CBET:** Section 1.2 (x) of National Energy Policy (Revised) 2004: **develop a regional energy market for rational exchange** of commercial energy to ensure energy security. Section 6.21 & Section 7.5.17: **Regional Cooperation on energy may be explored** for minimizing the gaps in energy supply of the countries in the region by developing a regional energy market.
2.	**Inter-Governmental Agreements (this is limited to SAC countries; there may be many forms of IGA for in stance, MoUs but ultimate is the treaty, degree of rigor & enforceability also play an important role)**	**2006 Framework Agreement between RGoB & GOI on Hydropower development & Trade** through both public and private sector participation; & GoI has agreed to import 5000 MW of power by 2020	-	**2006 Framework Agreement between RGoB & GOI on Hydropower development & Trade** through both public and private sector participation & GoI has agreed to import 5000 MW of power by 2020 **Other agreements with Sri Lanka & Bangladesh**	Power Grid Corporation of India **(PGCIL), is likely to sign an MoU for developing the Rs 2,500-crore project with Sri Lanka**	**MoU on Cooperation in Power Sector signed in 2010; Agreement on Bulk Power Transmission between PGCIL & (BPDB) in 2010,** for import of power by Bangladesh from India and vice-versa; **PPA for import of 250 MW of power by Bangladesh from India; NTPC & BPDB have signed an MoU** for setting up of JV to establish 1320 MW power plants in Khulna and Chittagong.

Comparison of EL,R & P in SAC

S. No.	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
3	**Trade Policies/Commerce Laws -** Export / Import Duties & Taxes	Section 6.2: **No Sales tax/duty on the export of electricity**	Section 22 (3): **The exporter of electricity shall have to pay export duty to Government of Nepal.**	**No export/import tax,** import of electrical energy will not require authorization as per the government notification dated 5th July 2013	**No export tax** is proposed on electricity trade	**No export tax** is available in the policy framework, however for current trade as per this agreement any incidence of import duty or export tax shall be borne by the purchaser
4	**Modes of Development of projects (MoU, ICB and PPP)**	**Section 11.2 (ii): encourage competition in electricity generation, transmission and supply**	-	**Electricity Act 2003 provides for competitive mode of bidding** for allocation of projects to private developers	-	-
5	**Sharing Risks & Benefits**	-	**Section 6.9 Management of Investment Risks:** **Section 6:.9.1 Hydropower project, transmission system & distribution system established by the private sector shall not be nationalized during the term of the license.** **Section 6:. 9.2 (c) In the case of an export-oriented power project,** cent per cent of the payment of principal & the interest on the loan, profit & dividend may be repatriated in the currency in which the income has been received in the Kingdom of Nepal by selling the electricity	-	-	-

Comparison of EL,R & P in SAC

S. No	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
6	**Legal & Regulatory Framework (Electricity Law/Act) to include:**					
	Open Access provisions & Charges					
i	Non discriminatory open access for transmission	Section 3.5 of Bhutan Sustainable Hydropower Development Policy 2008: BPC provides transmission access to export surplus power to India **Section 11.2 (iii): ensure non-discriminatory access to the transmission and distribution system**	NEA is the licensed entity for transmission. IPPs are supposed to be provided transmission access by NEA, **there is no specific provision for non-discriminatory open access.**	**EA 2003, Mandated open access** for inter as well as intra state transmission lines. Any consumer above 1 MW can avail open access. Full fledged implementation is still an issue, but at the transmission level it is fully operational. **Section 38.2(d)/ Section 39.2(d): Central/state transmission utility to provide non-discriminatory open access to its transmission system for use by any licensee or generating company on payment of Transmission charges & CERC open access regulations**	-	As per the Policy Guidelines for Enhancement of Private Sector Participation "**PGCB and all Distribution Licensees shall provide non-discriminatory open access, to their transmission and/or distribution system for use by any Generation Licensee subject to payment of transmission/distribution wheeling charges determined by BERC" .** **Grid Open access is allowed to enhance market environment**
Ii	Transmission Pricing	Section 14.1 (iii): Bhutan Sustainable Hydropower Development Policy 2008: **BEA to regulate charges for connection to, and the use of any transmission system**; (v) other such prices and charges in respect of goods and services provided by Licensees	-	Section 7.1 of EA 2003 provides for **development of a suitable transmission tariff framework for all inter-State transmission.** Further, The National Electricity Policy mandates that the national tariff framework implemented should be sensitive to distance, direction and related to quantum of power flow.	-	-

Comparison of EL,R & P in SAC

S. No	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
B.	**Trading Regulations/Provisions**					
a.	**Licensing**					
i	Licensing of Electricity Trading	**BEA is the licensing authority for GTD** **BEA has issued license to DGPC for G, supply, import/export or electrical energy.** Section 18; sub-section 18.1: Construction, generation, transmission, system operation, distribution, sale, **export, import of electricity are licensed activities under Bhutan Electricity Act 2001**; **As per Section 4.2.2:. The SPV shall be required to obtain licenses from BEA for construction, generation, sale, export or import of electricity as may be relevant as per the Electricity Act. The SPV shall also be required to take a business license**. Section 11.1.2,: provision of composite license (electricity, water, trade, bulk supply, etc)	Licensing is required for generation and transmission and is issued by Ministry of energy. NEA looks after trading with India. (For various hydro power which are being developed, export is feasible after an agreement between exporter and GoN) Section 6:.12.11 (3) : The license has to be obtained for the transmission and distribution of electricity **Section 6.12.7: License may be granted to export electricity from projects with installed capacity of more than 100 MW and deemed appropriate by His Majesty's Government.** The license for such a project shall be issued by His Majesty's Government through invitation of proposals or through negotiation with the applicant, who has submitted application for the license. Section 6.12.8 & 6.12.9: The license shall be issued by the Ministry of Water Resources and the grounds for granting the license shall be made transparent. Section **6.12.11 Term of the License:** (b) The export-oriented hydropower project: 30 years from the date of issuance of the generation license	EA 2003 delicensed Generation, Including captive generation , Only for Hydro CEA concurrence is required. Transmission(Inter and Intra state): CERC/SERC issues license. **Trading is a licensed activity, inter sate trading license includes import from any other country for resale in any state in India.** Section 12: No person shall (a) transmit electricity; Unless he is authorized to do so by a license issued under section 14, or is exempt under section 13. 1. Clause 2 (k) of Procedure, Terms and Conditions for grant of trading license and other related matters) Regulations, 2009 "inter-State trading" means transfer of electricity from the territory of one State for re-sale to the territory of another State and includes electricity imported from any other country for re-sale in any State of India 2. Procedure, Terms and Conditions for grant of trading license and other related matters) (First Amendment) Regulations, 2012.	PUCSL is the licensing authority for Generation, transmission and bulk supply of electricity.	BERC is the licensing authority (generation, transmission, distribution license) Amended act 1910 mentions CBET: Supports single buyer model, board/ single buyer can trade electricity; Section 27 (1) No person shall engage himself in the following business unless he is empowered by a license or exempted from having it under this Act or any other Act, such as:- (a) power generation; (b) energy transmission; (c) energy distribution and marketing; (d) Energy supply; and (e) Energy storage.

Comparison of EL,R & P in SAC

S. No	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
i	Licensing of Electricity Trading	-	-	-	-	-
iii	Duties & Functions of a trader	-	-	**Section 52. (Provisions with respect to electricity traders): ---** (1) CERC may, specify the technical requirement, capital adequacy requirement and credit worthiness for being an electricity trader. (2) Every electricity trader shall discharge such duties, in relation to supply and trading in electricity, as may be specified by CERC.	-	-

Comparison of EL,R & P in SAC

S. No	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
i	Duties & Functions of a transmission licensee	**Section 38.1: transmission licensee shall provide access to all existing and potential users of the transmission grid** on the payment of fees and other charges for grid services as may be approved by the Authority. Section 38.2: Transmission Licensee shall provide the Authority with such information as the Authority may prescribe to enable the Authority to approve the fees and charges under subsection 38.1		**Section 40. mentions the Duties of transmission Licensees)** Further the EA 2003 also mentions the Obligations of the Licensees **Section 34.:** Every transmission licensee shall comply with such technical standards, of operation and maintenance of transmission lines, in accordance with the Grid Standards, as may be specified by the Authority.	**Section 24 (1) of Sri Lanka Electricity ACT, No. 20 OF 2009 & Tariff Methodology 2011 provide for duties & functions of transmission licensee.** A transmission licensee shall develop & maintain an efficient, coordinated, reliable & economical transmission system; (*b*) procure & sell electricity in bulk to distribution licensees (*c*) ensure that there is sufficient capacity from generation plant to meet reasonable forecast demand for electricity. *Further, Sections 6, 25, 26, 27, 28, 29, 40, 41, 42, 54 and 56 and Schedules I, II and III to the Act shall mutatis 0mutandis, apply to bulk sales of electricity by a transmission*	**Section 31: General duties and powers of the licensee.** a. Every licensee shall make arrangement for the efficient, coordinated, cost-effective production, transmission and supply of energy. b. Every licensee shall maintain international standard and working method at the time of discharging his duties relating to energy operation, maintenance and safety.

Comparison of EL,R & P in SAC

S. No	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
d	Develop a grid code	**The Grid Code Regulation 2008 mentions details of grid planning studies. BEA issues the grid code regulation**	Section 6.15.1 (1 a) **The regulatory body shall prepare grid code**	As specified by the commission under clause (h) of sub-section (1) of section 79 : **CERC to specify Grid Code having regard to Grid Standards**	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**	**Section 59 (e): BERC to make different codes and standards**

Comparison of EL,R & P in SAC

S. No	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
e	Tariff Norms	It is the function of the BEA as per section 11.11.1 of the Act; **(i) b: tariff setting, including tariffs for generation not regulated by PPA, Transmission, Distribution and retail sale……** **And clause (iv) to determine or approve tariffs proposed by the licensees and review existing tariffs**	Section 5.5.19: provides for transparent & rational Process for electricity tariff fixation; Section 6: Section 5.15.1 (1 a): **It shall be the function of the regulatory body to fix electricity tariff and wheeling tariff**	Section 3 (1) of the Electricity Act 2003 requires **"The Central Government shall, from time to time, prepare the National Electricity Policy and tariff policy, in consultation with the State Governments and the Authority for Development** of the power system based on optimal utilization of resources. **PART-VII TARIFF Section 61. (Tariff regulations):** CERC shall, specify the terms and conditions for determination of tariff, and shall be guided by the following: **Section 62. (Determination of tariff): by CERC** the Appropriate Commission shall determine the tariff as per EA 2003 Section **63. (Determination of tariff by bidding process**	Tariff Methodology is approved by the Public Utilities Commission of Sri Lanka (Commission) in terms of **Section 30 of the Sri Lanka Electricity Act, No. 20 of 2009.** In this methodology the components are grouped as follows: **The Bulk Supply Tariffs, that include the component of the tariff relating to the use of the Transmission System and component of the tariff related to electricity generation**	**Chapter 7: Tariff** **Section 34 (1) price of power generation in wholesale, bulk and retail, shall be determined in accordance with the policy & methodology made by the Commission in consultation with the Government; (3) Commission by regulation shall make methodology for determination of tariff.** (4) Commission shall determine tariff after giving hearing to licensees and others who have interest in it. (5) Tariff determined by the Commission shall not be revised more than once in a fiscal year, unless there is change in the prices of energy including any other changes.

Comparison of EL,R & P in SAC

S. No	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
7	**Transmission Infrastructure & Interconnection**	**Investments in transmission are approved by MoEA (DHPC) & BEA** **Section 10.1:** The developer shall be responsible for laying transmission lines and connect to the nearest grid sub-station of BPC (Bhutan Power Corporation) beyond which BPC will provide the transmission facilities for wheeling the electricity till the delivery point at the international border in coordination with the country's importing country's transmission entity.	**Section 6.12.12 Any licensee shall be entitled to use the national grid system by paying the specified fee for the transmission of electricity generated by such a licensee.** For this purpose, necessary grid-codes & basis for load dispatch on the use of the national grid system shall be prepared.	The Central Government would facilitate the continued development of the National Grid for providing adequate infrastructure for inter-state transmission of power and to ensure that underutilized generation capacity is facilitated to generate electricity for its transmission from surplus regions to deficit regions. The Central Transmission Utility (CTU) and State Transmission utility (STU) have the key responsibility of network planning and development based on the National Electricity Plan in coordination with all concerned agencies as provided in the Act. The CTU would need to coordinate with the STUs for achievement of the shared objective of eliminating transmission constraints in cost effective manner.	-	-

Comparison of EL,R & P in SAC

S. No	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
8	**Commercial Agreements/ Supply Contract/ Concessions**					
a	Terms of power purchase agreements (PPAs) and transmission	-	Section 6.11.1 Electricity exported abroad, shall be as per the agreement entered into between the exporter & His Majesty's Government. Section 6.11.2 His Majesty's Government , it may, on mutual understanding, purchase the **power up to 10 % of the electricity generated from the export-oriented projects for domestic consumption.** 6.11.3 **Electricity shall be exported by identifying the export oriented projects & developing such projects through the private sector**. For this purpose, necessary study shall be conducted towards extending power system at the bilateral & regional level.	-	-	-

Comparison of EL,R & P in SAC

S. No	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
b	Dispute Resolution Mechanism	**Section 11 (vii): The BEA has the authority to establish a dispute resolution process & settle disputes** between Licensees & between Licensees & customers relating to the enforcement of this Act, regulations, codes, standards & licenses issued under this Act, contracts approved by the Authority and concession agreements entered into between the Minister and Licensees, or otherwise any other arrangement for settlement of disputes which are not determined by the mentioned legal instruments;	-	PART XVI: Dispute Resolution: Section 158. (Arbitration) of EA 2003: Where any matter is, by or under this Act, directed to be determined by arbitration, the matter shall, unless it is otherwise expressly provided in the license of a licensee, **be determined by such person or persons as the Appropriate Commission (CERC)** may nominate in that behalf on the application of either party; but in all other respects the arbitration shall be **subject to the provisions of the Arbitration and Conciliation Act, 1996**.	-	-

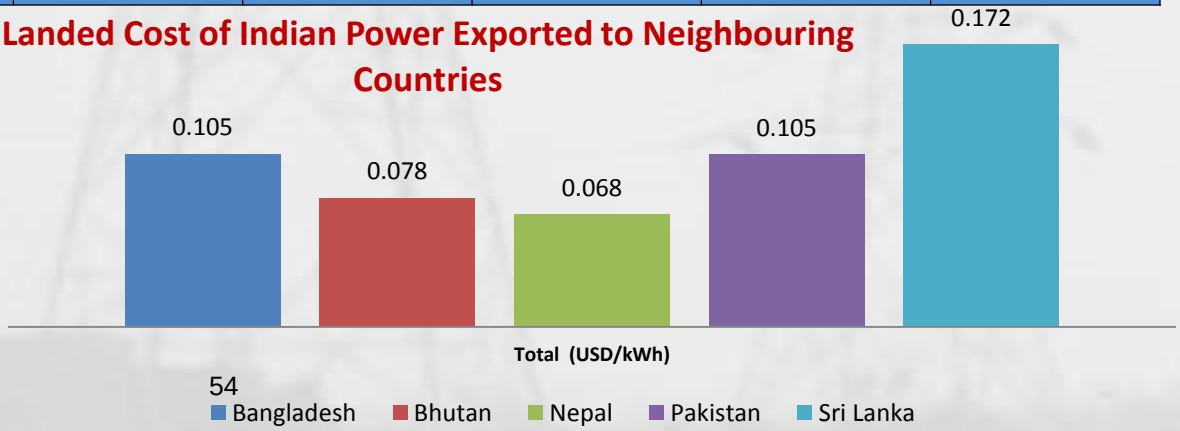
Comparison of EL,R & P in SAC

S. No	Ingredients for CBET	Bhutan	Nepal	India	Sri Lanka	Bangladesh
9	**Institutional Arrangements (Nodal Agency)**					
a	System Operator	Section 39.1: **BEA may designate a person to be a system operator, and license the person**	-	CERC (Indian Electricity Grid Code) Regulations, 2010 provides for the **system operator as RLDC/NLDC/ SLDC and their duties**	CEB Transmission licensee is the designated System Operator	-
b	Designated entity for scheduling and dispatch	Section 40: **BEA shall designate a bulk supplier who will be responsible for the wholesale supply, including import and export of electricity**	-	Section 26& 28 of EA 2003: **Load Dispatch Centers at the National and the state level**	CEB Transmission licensee is the designated System Operator	-
10	**Accounting & Settlement of Imbalances**	Section 35; Sub Section 35.4: **Licensee to keep accounts according to regulations of the Authority** Section 35; Sub Section 35.5: **Licensees undertaking more than one licensed operation to keep separate accounts for each operation.**	-	-	As per the grid code	-

Cost Structure for CBET with India to Other Countries

Charges	Power Flow To:				
From India	Bangladesh	Bhutan	Nepal	Pakistan	Sri Lanka
Generation - A	0.0588	0.0595	0.0595	0.0595	0.0850
Transmission-B					
State Tx charges	0.0034	0.0034	0.0020	0.0046	0.0014
State Tx loss	0.0022	0.0022	0.0011	0.0016	0.0024
POC Injection-charge	0.0020	0.0020	0.0020	0.0020	0.0020
POC- injection loss	0.0006	0.0006	0.0006	0.0006	0.0008
Trading Margins - D	0.0015	0.0015	0.0015	0.0015	0.0015
Export Duties - E	0.0000	0.0000	0.0000	0.0000	0.0000
Import Duties - F	0.0000	0.0000	0.0000	0.0000	0.0000
HVDC Conversion Charges - G	0.0336			0.0336	0.0336
Undergroung Submarine Cable					0.0449
Transmission Charges - H	0.0029	0.0092	0.0017	0.0012	0.0000
Transmission Losses – I	N.A	N.A	N.A	N.A	N.A
Total (USD/kWh)	**0.105**	**0.078**	**0.068**	**0.105**	**0.172**
Total (Local Currency/kWh)	**8.09**	**4.61**	**6.22**	**10.48**	**22.30**

ILLUSTRATIVE



Others → *India*

Cost Structure for CBET with India to Other Countries

Charges (in USD/kWh)	Power Flow From:				
To India	Bangladesh	Bhutan	Nepal	Pakistan	Sri Lanka
Generation - A	0.074	0.024	0.066	0.080	0.101
Transmission-B	0.003	0.009	0.002	0.001	0.000
POC Injection-charge					
POC- injection loss					
Trading Margins - D					
Export Duties - E					
Import Duties - F					
HVDC Conversion Charges - G	0.034			0.034	0.034
Undergroung Submarine Cable					0.045
Poc Withdrawal charges	0.002	0.002	0.002	0.002	0.002
Transmission Charges - H	0.003	0.003	0.002	0.005	0.001
Transmission Losses – I	0.004	0.001	0.001	0.003	0.005
Trading Margins - J	0.002	0.002	0.002	0.002	0.002
Total (USD/kWh)	**0.12**	**0.04**	**0.07**	**0.13**	**0.19**
Total (INR/kWh)	**7.18**	**2.42**	**4.38**	**7.42**	**11.13**

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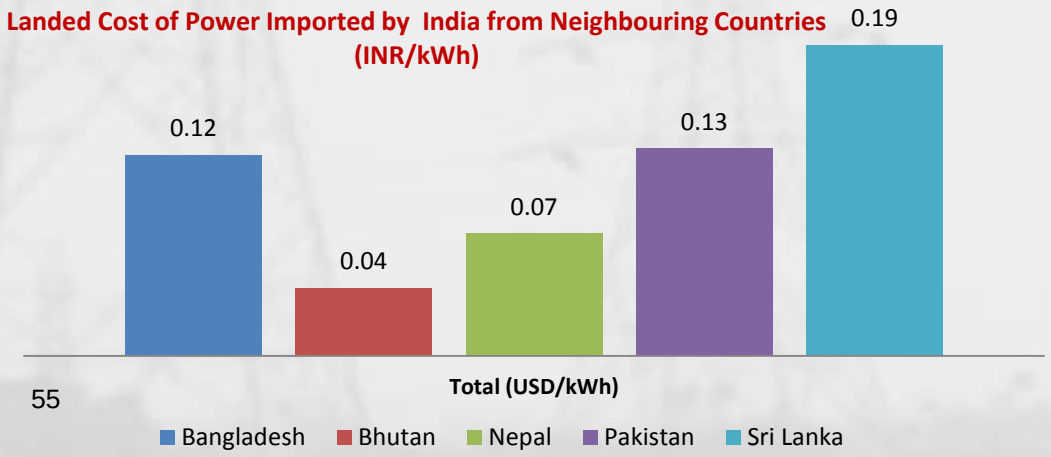


Data Source & Assumptions

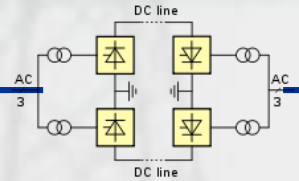
India		
	Generation Cost	Either based on cost of generation of a TPP located in Border State or price of Short Term power in the region *(If the trade is of seasonal in nature)* For e.g. *(i) In case of CBET to Bangladesh cost of generation of a typical TPP in W.B is considered. (ii) In case of CBET to Nepal, current ST prices on power exchange in the region is considered; Source: State Tariff Orders, IEX*
	Transmission charges & Losses	Based on Transmission tariff orders of respective States; Source: State Tariff Orders, State Regulatory Commissions Website
	POC charges & Losses	The injection and withdrawal charges are available for Bangladesh only. The same is assumed for other countries Source: Applicable POC charges and Losses document; POSOCO Website
	Trading Margin	There is no cap for long term transaction margin. Assumed as Rs. 9 paise/kWh
	Import/Export duties	Though there exist provision e.g. India-Bhutan exim duty. However, currently the value is kept zero. For all cases it is assumed to be zero
	Undersea Submarine Cable	Based on cost estimates of Proposed India- Sri Lanka undersea submarine (Rs. 5000 Cr (tentative)). Applicability to Sri Lanka only.
	HVDC Conversion charges	Based on cost estimates of under construction India-Bangladesh HVDC Link (Rs. 1180 Cr (tentative)). Conversion charges applicable for Bangladesh, Pakistan and Sri Lanka. For Nepal and Bhutan transmission to happen through AC link
Other Countries	**Generation Cost**	Source: Bangladesh: Per unit cost of generation, BPDB Annual Report 2012-13 Bhutan: www.bea.gov Nepal: Nepal Electricity Authority Pakistan: Average cost of generation from Natural Gas, http://www.dawn.com/news/1093016 Sri Lanka: PUCSL, Average generation cost for May 2013; http://www.pucsl.gov.lk/english/wp content/uploads/2013/08/Electricity-Sector-Cost-Report-08-08-2013-.pdf
	Transmission charges	Data available through other secondary research

Bilateral

Applicable Charges

• Export Duties – (NIL or NOT APPLICABLE?) - E

• Import Duties (NIL or NOT APPLICABLE?) - F



• Conversion - G

• Transmission tariffs– B
• Transmission Losses - C
• Trading margins - D

• Transmission charges– H
• Transmission Losses – I
• Trading Margins - J

• Tariff (Two-part? Or Single Part?) - A

Bilateral With Transit

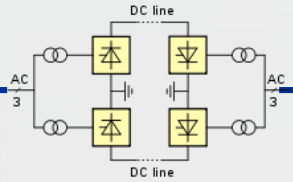
Applicable Charges

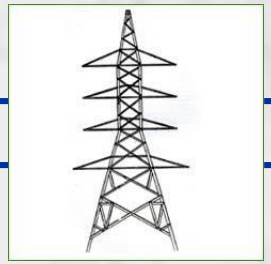
Export Duties – E

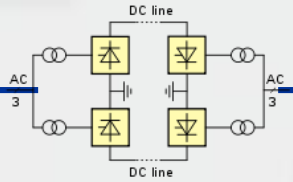
Import Duties (NIL or NOT APPLICABLE?) - F

- Transit transmission charges– T 1
- Transit Transmission Losses – T 2
- Transit Fees – T 3

- Conversion – G T







- Conversion - G

- Transmission tariffs– B
- Transmission Losses - C
- Trading margins - D

Network in Transit Country – Interconnection with local system

- Transmission charges– H
- Transmission Losses – I
- Trading Margins - J

Physical Border 1

Physical Border 2

- Tariff - A

Risk Register (non Force Majeure)

		Principal Risk Bearer and Impact		
Risk Event	Risk category	Bilateral	Bilateral – W/O Transit interconnection	Bilateral with Transit – With interconnection
Generation costs increase in sending country due to regulatory awards/interventions				
Trading margins are altered on account of regulatory awards/interventions				
Transmission charges/losses change due to methodology change or change in system configuration				
Power flow is restricted due to transmission denials/restrictions in sending country				
Export is denied/restricted due to political conditions in sending country				
Export duties are imposed/enhanced				

ILLUSTRATIVE

Risk Register (non Force Majeure)

		Principal Risk Bearer and Impact		
Risk Event	Risk category	Bilateral	Bilateral – W/O Transit interconnection	Bilateral with Transit – With interconnection
Transit is denied/restricted due to political reasons				
Transit charges/losses are imposed/enhanced				
Power flow is restricted due to transmission denials/restrictions in transit country				
Power is diverted in transit country				

Risk Register (non Force Majeure)

		Principal Risk Bearer and Impact		
Risk Event	Risk category	Bilateral	Bilateral – W/O Transit interconnection	Bilateral with Transit – With interconnection
Import duties are imposed/enhanced in receiving country				
Receiving country charges are changed				
Power flow is restricted due to transmission denials/restrictions in receiving country				
Import is denied/restricted due to political conditions in sending country				

ILLUSTRATIVE

Possible Risk Mitigation Framework and Instruments

		Mitigation Instrument		
Risk Event	Risk category	Bilateral	Bilateral – W/O Transit interconnection	Bilateral– With Transit interconnection
Generation costs increase in sending country due to regulatory awards/interventions				
Trading margins are altered on account of regulatory awards/interventions				
Transmission charges/losses change due to methodology change or change in system configuration				
Power flow is restricted due to transmission denials/restrictions in sending country				
Export is denied/restricted due to political conditions in sending country				
Export duties are imposed/enhanced				

ILLUSTRATIVE

Possible Risk Mitigation Framework and Instruments

		Mitigation Instrument		
Risk Event	Risk category	Bilateral	Bilateral – W/O Transit interconnection	Bilateral with Transit – With interconnection
Transit is denied/restricted due to political reasons				
Transit charges/losses are imposed/enhanced				
Power flow is restricted due to transmission denials/restrictions in transit country				
Power is diverted in transit country				

ILLUSTRATIVE

Possible Risk Mitigation Framework and Instruments

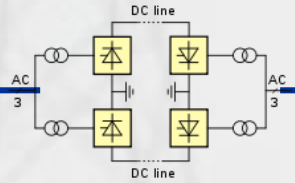
		Mitigation Instrument		
Risk Event	Risk category	Bilateral	Bilateral – W/O Transit interconnection	Bilateral with Transit – With interconnection
Import duties are imposed/enhanced in receiving country				
Receiving country charges are changed				
Power flow is restricted due to transmission denials/restrictions in receiving country				
Import is denied/restricted due to political conditions in sending country				

ILLUSTRATIVE

Applicable Charges – Case A

• Export Duties – (NIL or NOT APPLICABLE?) - E

• Import Duties (NIL or NOT APPLICABLE?) - F



• Conversion - G

• Transmission tariffs– B
• Transmission Losses – C
• Trading margins - D

• Transmission charges– H
• Transmission Losses – I
• Trading Margins - J

• Tariff - A

Cost Structure for Transit

	Without transit system interconnection	With Transit System Interconnection
Generation - A		
Transmission Charges - B		
Transmission Losses - C		
Trading Margins - D		
Export Duties - E		
Transit country transmission Charges – T1	As per line characteristics	As per intermediate country (PoC mechanism in India)
Transit country transmission Losses – T2	As per line characteristics	As per intermediate country (PoC mechanism in India)
Transit Fees – T3	Negotiated	Negotiated
Conversion Charges - GT	NA (no conversion involved)	As per costs
Import Duties F		
Conversion Charges - G		
Transmission Charges - H		
Transmission Losses – I		
Trading Margins - J		
Total		

ILLUSTRATIVE