
SAARC Energy Centre

Study on Action Paper on
“Assessing the Gaps in Current
Laws and Regulations
regarding Cross-Border Trade
and Exchange of Electricity.”

December 2017



[Letter to be enclosed]

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Foreword

Acknowledgements

List of Abbreviations

ABBREVIATION	FULL FORM
ABOM	Agreement Between Operating Members
ABT	Availability Based Tariff
ACER	Agency for Cooperation of Energy Regulations
ACP	Area Clearing Price
ADB	Asian Development Bank
ADRC	Alternate Dispute Resolution Coordinator
AEDB	Alternative Energy Development Board
AEPC	Alternative Energy Promotion Centre
AERA	Afghanistan Electricity Services Regulatory Authority
ALDC	Area Load Dispatch Centre
ASEAN	Association of Southeast Asian Nations
ATU	Area Transmission Charges
AusAID	Australian Agency for International Development
BEA	Bhutan Electricity Authority
BEE	Bureau of Energy Efficiency
BERC	Bangladesh Energy Regulatory Commission
BIMSTEC	Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation
BIPPA	Bilateral Investment Promotion and Protection Agreement
BPC	Bhutan Power Corporation
BPDB	Bangladesh Power Distribution Board
BPM	Balancing Power Market
BRP	Balance Responsible Parties
CACM	Capacity Allocation and Congestion Management
CAREC	Central Asia Regional Economic Cooperation
CASA	Central Asia and South Asia
CASAREM	Central Asia-South Asia Regional Electricity Market
CBEC	Central Board of Excise and Customs
CBET	Cross Border Electricity Trade
CEA	Central Electricity Authority
CEB	Ceylon Electricity Board
CEER	Council of European Energy Regulators
CERC	Central Electricity Regulatory Commission
CPTC	Cross-Border Power Transmission Company India
DABM	Da Afghanistan Breshna Moassassa
DABS	Da Afghanistan Breshna Sherkat
DAC	Day Ahead Contingency

ABBREVIATION	FULL FORM
DAE	Department of Atomic Energy
DAM	Day Ahead Market
DAS	Day Ahead Scheduling
DECs	Decrement Bids
DERA	Danish Energy Regulatory Authority
DFIS	United Kingdom Department for International Development
DFTP	Duty Free Tariff Preference
DGPC	Druk Green Power Corporation
DHI	Druk Holding and Investments Limited
DHPS	Department of Hydropower and Power Systems
DISCOM	Distribution Company
DPR	Detailed Project Report
DRC	Democratic Republic of Congo
DRE	Department of Renewable Energy
DSM	Deviation Settlement Mechanism
DTAA	Double Taxation Avoidance Agreement
ECOWAS	Economic Community of West African States
ECT	Energy Charter Treaty
ECV	Energy Contract Volume
ENTSO-E	European Network of Transmission System Operators for Electricity
ERERA	ECOWAS Regional Electricity Regulatory Authority
ESCCerts	Energy Saving Certificates
ETFC	Electricity Tariff Fixation Commission
EWP	Energy Strategy and Work Plan
FERC	Federal Energy Regulatory Commission
FTA	Free Trade Agreement
FTIL	Financial Technologies (India) Limited
GATT	General Agreement on Tariffs and Trade
GMS	Greater Mekong Sub-region
GoI	Government of India
GOP	Government of Pakistan
HEP	Hydro Electric Project
HHI	Herfindahl-Hirschman Index
HVDC	High Voltage Direct Current
ICC	Information and Coordination Centre
IEA	International Energy Agency
IEX	Indian Energy Exchange Ltd
IFI	International Financial Institutions

ABBREVIATION	FULL FORM
IGMOU	Inter-Governmental Memorandum of Understanding
INCs	Increment Offers
IPP	Independent Power Producer
IRADe	Integrated Research for Action and Development
IRENA	International Renewable Energy Agency
ITSA	Implementation and Transmission Service Agreement
IUMOU	Inter-Utility Memorandum of Understanding
KESC	Karachi Electric Supply Company
LCIA	London Court of International Arbitration
LDC	Least Developed Countries
LDCS	Least Developed Contracting States
LECO	Lanka Electricity Company
LMP	Locational Marginal Pricing
MCP	Market Clearing Price
MEA	Maldives Electricity Authority
MEB	Maldives Electricity Bureau
MEW	Ministry of Energy and Water
MNRE	Ministry of New and Renewable Energy
MoEA	Ministry of Economic Affairs
MoP	Ministry of Power
MoPEMR	Ministry of Power, Energy and Mineral Resources
MOPRE	Ministry of Power and Energy
MOTRACO	Mozambique Transmission Company
MoU	Memorandum of Understanding
NEMO	Nominated Electricity Market Operator
NEP	National Energy Policy
NEPRA	National Electric Power Regulatory Authority
NEPS	North East Power System
NERC	Nepal Electricity Regulatory Commission
NLDC	National Load Despatch Centre
NLDCS	Non-Least Developed Contracting States
NMEEE	National Mission on Enhanced Energy Efficiency
NORDPOOL	Nordic Power Pool
NTDC	National Transmission & Dispatch Company
NVE	Norwegian Water Resources and Energy Directorate
NVVN	NTPC Vidyut Vyapar Nigam
OECD	Organisation for Economic Co-operation and Development
PAT	Perform, Achieve & Trade

ABBREVIATION	FULL FORM
PDA	Project Development Agreement
PDAM	Post Day Ahead Market
PDR	People's Democratic Republic
PEC	Indo-Nepal Power Exchange Committee
PGCB	Power Grid Corporation of Bangladesh
PGCB	Power Grid Company of Bangladesh
PGCIL	Power Grid Corporation of India Limited
PJM	Pennsylvania-New Jersey-Maryland Interconnection
POSOCO	Power System Operation Corporation Limited
PPA	Power Purchase Agreement
PRC	People's Republic of China
PSA	Power Sale Agreement
PSMP	Power System Master Plan
PTA	Preferential Trade Agreement
PTA	Power Trade Agreement
PTC	Power Trading Corporation
PTC	Power Trading Corporation of India Limited
PTCN	Power Transmission Company Nepal
PUCSL	Public Utilities Commission of Sri Lanka
PXIL	Power Exchange India Ltd
REC	Renewable Energy Certificate
RERA	Regional Electricity Regulators Association
RMR	Regional Market Rules
RPCC	Regional Power Coordination Centre
RPO	Renewable Purchase Obligation
RPTCC	Regional Power Trade Coordination Committee
RTEP	Regional Transmission Expansion Planning
RTO	Regional Transmission Organization
SAARC	South Asian Association for Regional Cooperation
SADC	South African Development Community
SAEM	South Asian Electricity Market
SAFER	South Asia Forum of Electricity Regulators
SAFTA	South Asian Free Trade Area
SAPP	Southern African Power Pool
SARCO	SAARC Arbitration Council
SARI/EI	South Asia Regional Initiative for Energy Initiative
SARPES	South Asian Regional Power Exchange Study
SARPEX	South Asian Regional Power Exchange

ABBREVIATION	FULL FORM
SASEC	South Asia Subregional Economic Cooperation
SEA	Sri Lanka Sustainable Energy Authority
SEB	State Electricity Board
SEC	SAARC Energy Centre
SERC	State Electricity Regulatory Commission
SIAC	Singapore International Arbitration Centre
SLDC	State Load Despatch Centre
SLEA	Sri Lanka Electricity Act
SMO	System Market Operator
SNA	Settlement Nodal Agency
SRETS	SAARC Regional Energy Trade Study
STEM	Short-Term Energy Market
TAM	Term Ahead Market
TAPI	Turkmenistan-Afghanistan-Pakistan-India
TLP	Tariff Liberalization Programme
TPA	Transmission Planning Agency
TSECL	Tripura State Electricity Corporation Limited
TSO	Transmission System Operators
TUTAP	Turkmenistan-Uzbekistan-Tajikistan-Afghanistan-Pakistan
UTCs	Up-To Congestion transactions
USAID	United States Agency for International Development
WAPDA	Water and Power Development Authority
WAPP	West African Power Pool
WTO	World Trade Organization
ZESA	Zimbabwe Electricity Supply Authority
ZESCO	Zambia Electricity Supply Company

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Executive Summary

The SAARC Framework Agreement on Energy Cooperation (Electricity) was signed on the Twenty Seventh Day of November, 2014, in Kathmandu, Nepal. The objective was to enable Cross-Border Trade of Electricity on voluntary basis and subject to laws, rules, regulations and agreements of the respective Member States. Smooth implementation of the Framework Agreement required:

- An enabling environment as the most vital pre-requisite;
- An assessment of prevailing laws and regulations; and
- An alignment of the laws and regulations in each member state with respect to Cross-Border Electricity Trade.

The success of this initiative depends upon each of the respective governments' capability to provide leadership and direction on the key energy issues. At present, multiple bilateral agreements exist amongst SAARC and CASA countries. As a pre-requisite for the cross-border electricity trade to flourish in the region, multiple legal and regulatory provisions in the SAARC member states should be harmonized. Efforts need to be directed to a range of technical, commercial, institutional and political issues.

This study focuses on the two major aspects of Cross-Border Electricity Trade (CBET), viz. taxes and duties, and prevailing practices and procedures (including laws and regulations) pertaining to the facilitating (buying and selling) entities. The report lists out all the relevant laws/regulations/acts/ policies that may affect either of the two aforesaid aspects.

At present, in absence of enabling framework for CBET, SAARC countries undertake trading in electricity through bilateral inter-governmental contracts. The primary driver for bilateral trading is to meet the deficit in demand through import of electricity, rather than the need to create a free, transparent and competitive power market. The bilateral contracts are thus negotiated between the two Governments and are not standardized. A review of few existing bilateral agreements between the SAARC member states (including India-Nepal, India-Bhutan, India-Bangladesh and Pakistan-Iran) is covered in this report.

A review of the bilateral agreements reveal that there are no concrete taxes and duties applicable in SAARC countries. Individual country specific laws don't clearly spell out the applicability of taxes and duties on such trades and there are subtle differences in taxation methodology. A few exceptions include - Nepal Electricity Act (that provides for customs duty, royalty and export tax on export of electricity), the Indian Laws (that provided for customs duties but the same are now waived off), and the Sri Lankan Laws (that provide for a customs duty on the export of electricity). The rest of the Member States are yet to come out with concrete laws determining the applicability of the taxes & duties on CBET.

The study of taxes and duties in the international power pools such as SAPP, WAPP, Nord Pool and GMS reveal that most of the countries follow their own local laws for taxation on the entities. These international power pools lay emphasis on taxes and duties as it also forms a significant source of revenue for the member states. Few efforts have been made in the past to facilitate trade by reduction and harmonisation of various taxes. A waiver of all such taxes & duties, in line with SAARC Framework Agreement on Energy Cooperation, 2014, is required to move towards a regime of zero taxation and to facilitate free flow of electricity. This would assist in creating a headroom for the development of a unified regional energy market. An HS Code Comparison for electrical energy as a commodity and the impact of power procurement subsidies on the effectiveness of CBET market has been discussed.

The experience with international power pools and other regional electricity trade arrangements ascertains the importance of comprehensive, well drafted standard contracts that fully incorporate the standard operating procedures, eligibility and licensing requirements, consequences of contractual defaults and emergency events. It has been observed that well-designed PPAs, that explicitly address supply security, increase the prospects of success for large cross-border transactions. This substantially mitigates the many risks that arise due to low or no clarity in the frameworks under which the power pools work. This also leads to a better dispute settlement mechanism and brings in ease of doing business among the various participants of trading. This provides ground for a review of the procedures and practices of these power pool arrangements in the current context, along with their laws and regulations, so as to bring out the best practices across the world.

Exhaustive legal, policy and regulatory provisions and institutional frameworks along with a few other aspects aiding CBET are needed to achieve the goals set by the SAARC Framework Agreement for Energy Cooperation. The SAARC member states and other developing neighbouring South Asian countries are expected to have a steep growth trajectory in the near future, which will be primarily driven by energy usage and electricity consumption. With an increasing energy demand accompanied by climate change agenda taking the front seat, an enabling environment has to be created to even sustain the existing growth rates.

Amongst the SAARC member states, India is the only country with an established power market. At present, the country has two established power exchanges that are serving as trading platforms. The exchanges have aided in better utilization of national resources, reduced unmet demand, and consequently have reduced economic losses and improved the energy security of the nation. Huge bottled up captive generation has also been brought into the Indian Electricity Exchange market to facilitate its most productive use to the economy.

Keeping in view similar international practices, this report identifies the key issues related to buying and selling entities in the context of facilitating and enabling Cross-Border Electricity Trade and discusses their relevance in the current market scenario. The gaps in the prevailing practices and procedures are assessed with respect to the following key aspects:

- Recognition of Electricity as a distinct business activity;
- Designated/Nodal Authorities for licensing/authorising entities to engage in CBET;
- Eligibility criteria and registration of market participants/ buying and selling entities;
- Regulatory Authority for CBET;
- Transmission System Operators (TSOs);
- Transmission planning for factoring CBET;
- Transmission infrastructure for facilitation of CBET;
- Non- discriminatory Open Access/ Access to Transmission infrastructure regulations;
- Trading Procedures/ regulations;
- Access to trading platform;
- Price Determination Mechanism;
- Mechanism for transmission pricing and treatment of losses;
- Imbalance and Deviation Settlement for Buying and Selling entities;
- Dispute Settlement mechanism and arbitration centres;
- Forum and environment for negotiation of terms and conditions;
- Payment security mechanism;
- Qualification of Buyer & Seller;
- Provision for facilitation of business visits (visa) for discussions and surveying/research activity;
- Currency of transaction;
- Policies regarding trading in foreign currencies;
- Foreign Direct Investments (FDI) policies regarding CBET;
- Trading agreements pertaining to CBET; and
- National and Regional standard operating procedures for CBET.

The risks associated with cross-border power trading in South Asia are no different than those in any region consisting of developing countries. These encompass political & regulatory, commercial, financial and technical risks. The key challenges to the implementation of CBET in the SAARC countries have been outlined, along with the enabling environment and mitigation techniques.

A market maturity analysis for the SAARC Member States shows that only India amongst all SAARC Member States is mature enough for CBET and the rest of the countries have to concentrate efforts to reach the optimum level for a mature CBET market. In the action roadmap outlined in the report, the gaps identified which hinder CBET are mapped against activities required to plug these gaps. A responsibility matrix is drawn out for these gaps with indicative timeline requirements.

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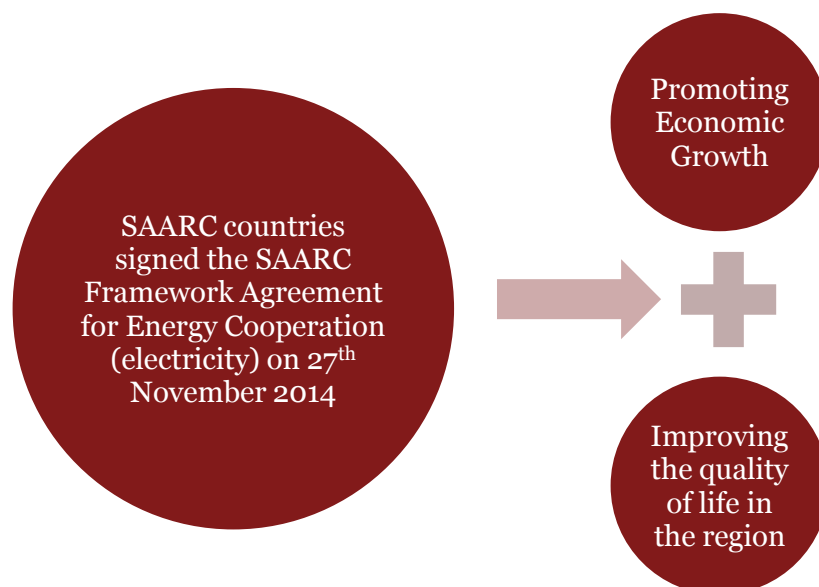
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1. Introduction to the Study

1.1. Background

The SAARC (South Asian Association for Regional Cooperation) Member States, comprising Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka signed the SAARC Framework Agreement on Energy Cooperation (Electricity) on the Twenty Seventh Day of November, 2014, in Kathmandu, Nepal. The objective is to enable Cross-Border Trade of Electricity on voluntary basis and subject to laws, rules, regulations and agreements of the respective Member States and based on bilateral/trilateral/mutual agreements between the concerned states. The SAARC Energy Centre now aims at implementing the SAARC Framework Agreement. An enabling environment is required for smooth implementation of the Framework Agreement. Consequently, prevailing laws and regulations of the member states are required to be assessed and aligned with respect to Cross-Border Electricity Trade.



The SAARC Energy Centre (SEC) has identified two enabling articles of the SAARC Framework Agreement for promoting cross-border trade and exchange of electricity:

- Article 4 refers to the Duties & Taxes which states that “Member States may work towards exempting from export/import duty/levies/fees etc. for cross-border trade and exchange of electricity between Buying and Selling Entities.”
- Article 13 refers to facilitating Buying and Selling Entities and states “Member States shall enable Buying and Selling Entities to engage in cross-border electricity trading subject to the laws and regulations of the concerned Member States.”

Setting the Context

SAARC Framework Agreement on Energy Cooperation (Electricity) was signed among member states in the last week of November 2014. Smooth implementation of the Framework Agreement requires:

- An enabling environment as the most vital pre-requisite;
- An assessment of prevailing laws and regulations; and
- An alignment of the laws and regulations in each member state with respect to Cross-Border Electricity Trade.

The electricity laws and regulations related to power sector are very country specific. Several SAARC initiatives in the past have not succeeded due to inherent differences amongst members and their laws & regulations. Therefore each country implementing the Framework Agreement needs to agree and work towards maximizing the synergies from such implementation. Additionally, the practices across geographies have to be understood and analyzed for the common platform to succeed.

Until the necessary legal regimes are put in place, private investors will be least forthcoming to invest in the power sector projects due to the discouraging nature of the existing frameworks and the changing political circumstances. The governments and the leadership in the SAARC countries should consider this and try to bring in synchronized policies to attract and protect investments.

It has also become increasingly important for the member nations to put in place the necessary technical infrastructure and enhance technology to protect their respective regional grids from faults occurring and spreading to the grids of the other regions.

The success of this initiative depends upon each of the respective governments' capability to provide leadership and direction on the key energy issues. At present, multiple bilateral agreements exist amongst the SAARC and CASA countries. As a pre-requisite for the cross-border electricity trade to flourish in the region, the multiple legal and regulatory provisions in the SAARC member states should be harmonized. Efforts need to be directed to a range of technical, commercial, institutional and political issues.

1.2. Objectives

The Objectives of the Assignment are as follows:

Assess the relevant laws and regulations of each of the Member States to

- Propose exemptions from duties and taxes on Cross-Border trade and exchange of electricity
- Facilitate buying (such as distribution companies) and selling entities (such as generation companies).
- Gaps identified, if any, would be required to be tackled through appropriate amendments as recommended in the Action Paper at the end of this report.

1.3. Scope

The scope of the work for the study has been outlined in Appendix A.2.

1.4. Methodology

The methodology for the study has been outlined in Appendix A.3.

1.5. Limitations

The limitations for the study have been outlined in Appendix A.4.

2. Salient Features of existing, relevant laws and regulations

2.1. List of prevailing laws and regulations in South Asia pertaining to Taxes and Duties on Cross-Border Trade and Exchange of Electricity

The laws and regulations enacted by the SAARC member states are currently designed to deal with the governance of electricity sector within the country premises. There are no laws and regulations pertaining to the taxes and duties on Cross-Border Electricity Trade. Bhutan and Nepal are the only countries to have incorporated specific provisions to govern the Cross-Border Electricity Trade in their new electricity laws and regulations¹, but none of the other member states have done it so far. This has led them to enter into various bilateral or multi-lateral agreements as and when opportunities for cross-border electricity trade arise.

Though the prevailing laws and regulations in most of the SAARC countries do not explicitly contain provisions related to cross-border electricity trade, they directly or indirectly impact the trade itself or the complementing attributes facilitating the trade. This is due to the fact that once power lands in a country and is meant for usage within the country, it will be governed by the laws of the land. Ramifications are caused by the various provisions in the existing laws and regulations related to governance, licensing, investment promotion, tariff determinations, market clearing price determination for exchanges, capacity additions, payment mechanisms, power procurement, transmission access, dispute resolution, deviation settlements, grid codes, financing mechanism, regulatory mechanism, and banking arrangements, amongst others. The previous study on “Review of Electricity Laws and Regulation of SAARC Member States” conducted by SAARC Energy Centre details out the implications of the prevailing laws and regulations on Cross-Border Electricity Trade.

Harmonizing the legal and regulatory provisions in the SAARC member states is a pre-requisite for cross-border electricity trade to flourish in the region. This study focuses on the taxes and duties, prevailing practices and procedures (including laws and regulations) pertaining to the facilitating entities involved in electricity trade.

The list of prevailing laws, regulations and agreement pertaining to Taxes and Duties on Cross-Border Electricity Trade and Exchange of Electricity are listed below:

Table 2-1: List of prevailing laws and regulations in SAARC countries

Afghanistan	<i>Electricity Sector Laws & Regulations</i>
	Law on Electricity Services draft (2009)
	Law on Electricity Services (2015)
	<i>Other Agreements/Policies/Laws affecting electricity trade</i>
	Private Investment Law, 2003
	Customs Law, 2005
Bangladesh	<i>Electricity Sector Laws & Regulations</i>
	Electricity Act, 1910
	Bangladesh Petroleum Act, 1974
	Bangladesh Energy Regulatory Commission Act, 2003
	Gas Law, 2010
	Mines and Mineral Act, 1992
	Emergency Energy & Power Supply Special Act, 2010
	BERC License Regulations, 2006 (Amended 2011)
	BERC Electricity Generation Tariff Regulations, 2008
	BERC Natural Gas Distribution Tariff Regulations, 2010
	BERC Natural Gas Transmission Tariff Regulations, 2010
	BERC Electric Grid Code, 2012

¹ (Review of Electricity Laws and Regulations of SAARC Member States 2010)

	BERC Dispute Settlement Regulation, 2014 (Amendment 2015 under scrutiny)
	<i>Other Agreements/Policies/Laws affecting electricity trade</i>
	Export Policy, 2015-2018 Import Policy, 2015-2018 Industrial Policy Act, 2016
Bhutan	<i>Electricity Sector Laws & Regulations</i>
	Bhutan Electricity Act 2001
	<i>Other Agreements/Policies/Laws affecting electricity trade</i>
	Import Rules, 2002
India	<i>Electricity Sector Laws & Regulations</i>
	The Electricity Act 1910 The Electricity Act 1948 IPP Policy 1991 The Electricity (Amendment) act, 1998 Mega Power Policy 1995 The Regulatory Commission Act 1998 National Electricity Policy Electricity Act, 2003 Electricity Amendment Bill 2014 National Tariff Policy, 2006, with Amendment in 2016 National Electricity Plan, 2005 Energy Conservation Act 2001
	<i>Other Agreements/Policies/Laws affecting electricity trade</i>
	Foreign Trade (Development & Regulations) Amendment Act, 2010 Foreign Trade Policy, 2015-2020 Industries (Development and Regulation) Amendment Act, 2016 Foreign Direct Investment Policy, 2017
	<i>Electricity Sector Laws & Regulations</i>
	Generation, Distribution and Supply Licensing Regulation, 2014 Net metering Regulation 2015 Service Providers Code 2014 (Draft)
	<i>Other Agreements/Policies/Laws affecting electricity trade</i>
	Foreign Investment Act (25/1979)
	<i>Electricity Sector Laws & Regulations</i>
	Electricity Act, 1992 and Electricity Regulation, 1993 Water Resources Act, 1992 and Water Resources Regulation, 1993 Hydropower Development Policy, 2001 Guideline for Electricity Project License, 2015 Electricity Regulation, 2073 (Fourth Amendment)
	<i>Other Agreements/Policies/Laws affecting electricity trade</i>
	Foreign Investment and Technology Transfer Act, 1992 (2049) Industrial Policy, 2011 Investment Board Act, 2011 (2068) Foreign Investment Policy, 2014 Trade Policy, 2015 (2072)
	<i>Electricity Sector Laws & Regulations</i>
	Electricity Act, 1910 Electricity Rules, 1937 Punjab Electricity Act, 1939

Pakistan	Punjab Electricity (Emergency) Powers Act, 1941 The Punjab Electricity (Emergency Powers) (Control of Supply) Act, 1949 The West Pakistan Electricity Duty Rules, 1964 The Electricity Control Ordinance, 1965 The Electricity Control (West Pakistan) Order, 1966 The Sindh Electricity Control Act, 1952 Power Generation Policy, 2015 Transmission Policy Import of Power Regulations, 2017
	<i>Other Agreements/Policies/Laws affecting electricity trade</i>
	Export Policy Order, 2015-2018 Import Policy Order, 2015-2018 Investment Policy, 2013
Sri Lanka	<i>Electricity Sector Laws & Regulations</i>
	National Energy Policy 2008 Sri Lanka Electricity Act 2009
	<i>Other Agreements/Policies/Laws affecting electricity trade</i>
	Imports and Exports (Control) Act, 1969

Agreements signed by the SAARC member states are listed down as follows:

- SAARC Framework Agreement for Energy Cooperation (Electricity)
- SAARC Limited Multilateral Agreement on Avoidance of Double Taxation and Mutual Administrative Assistance In Tax Matters
- Agreement on South Asian Free Trade Area (SAFTA)
- SAARC Agreement on Mutual Administrative Assistance in Customs Matters
- Bilateral electricity trade between India and Bhutan
- Bilateral electricity trade between India and Nepal
- Bilateral electricity trade between India and Bangladesh
- Bilateral electricity trade between Afghanistan and Central Asian Countries

A number of programs and studies have been conducted at different levels to identify the way forward and to understand the various aspects of Cross-Border Electricity Trade in South Asia, and in particular the SAARC nations. A few of them which have been referred to in the course of this study are listed below:

- Review of Electricity Laws and Regulations of SAARC Member States to Promote Regional Power Trade
- South Asia Regional Initiative for Energy Initiative (SARI/EI) framework program
- SAARC Regional Energy Trade Study (SRETS) with Asian Development Bank (ADB) in March 2010.
- SAARC Regional Power Exchange Study, Carried out by ADB in 2013
- ADB South Asia Outlook 2016
- Regional Energy Security For South Asia- Regional Report (USAID)
- ADB South Asia Working Paper Series 2015- Cross-Border Power Trading in South Asia- A Techno-Economic Rationale

2.2. Review of Regional Agreements Related to Duties and Taxes

The Agreements, Laws and Regulations as listed above have been taken up for study in the subsequent sections. The objective is to understand the current practices in the South Asian countries and to derive the road map towards meeting the objectives of the SAARC Framework Agreement.

2.2.1. SAARC Framework Agreement for Energy Cooperation (Electricity)

The SAARC (South Asian Association for Regional Cooperation) Member States, comprising Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka signed the **SAARC Framework Agreement for Energy Cooperation (Electricity)** at the 18th SAARC Summit on 26 November 2014. The agreement has been reproduced in appendix A1.

This Agreement is a major step towards encouraging the SAARC member states to increase Cross-Border Electricity Trade and Exchange. As a point-in-focus for this particular study - the taxes and duties and the facilitating agencies viz. the buying and selling entities are listed down in Articles 4 and Article 13 of the Agreement.² This agreement binds the member states to move progressively towards a zero tax regime as far as cross-border electricity trade is concerned. The same is reviewed in this report in the context of the various existing agreements of the South Asian region and the prevailing laws and regulations of the individual member states.

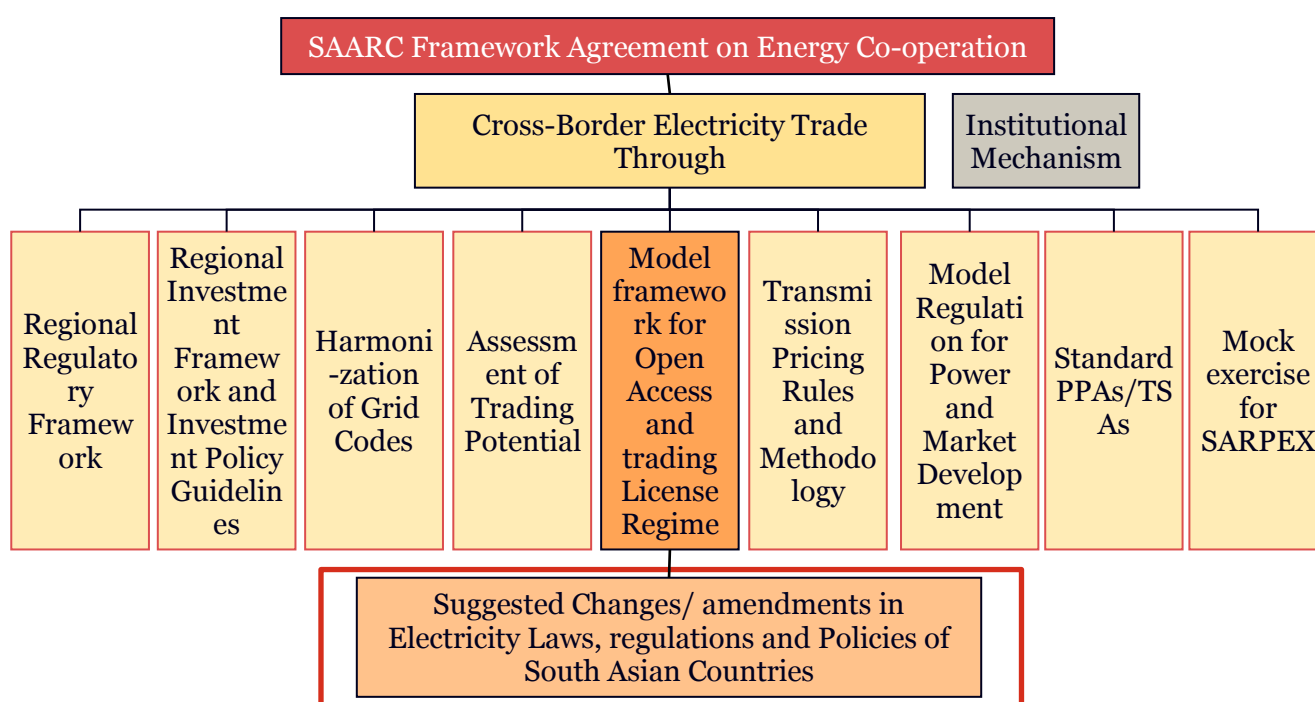


Figure 2-1: SAARC Framework Agreement and its major focus areas

A major step towards creating a regional electricity market is making the environment conducive by facilitating the buying and selling entities. This report reviews the prevailing procedures in the context of individual member states, keeping the international best practices in mind. The gaps are thus identified, analyzed and the roadmap to bridge the same is laid down in the second part of this report.

The suggested changes in the Electricity laws, regulations and policies of South Asian countries have already been covered in the studies of USAID and SARI/EI. Few of the recommendations are already being considered for implementation. Hence, the same aspects are not being detailed out in this report, assuming that the recommendations provided in the submitted reports have been agreed upon.

² (SAARC FRAMEWORK AGREEMENT 2014)

2.2.2. SAARC Limited Multilateral Agreement on Avoidance of Double Taxation and Mutual Administrative Assistance in Tax Matters

On 13th November 2005, the Governments of the then SAARC member states comprising the People's Republic of Bangladesh, the Kingdom of Bhutan, the Republic of India, the Republic of Maldives, the Kingdom of Nepal, the Islamic Republic of Pakistan and the Democratic Socialist Republic of Sri Lanka signed an Agreement at Dhaka, Bangladesh on Avoidance of Double Taxation and Mutual Administrative Assistance in tax matters. Their view was to promote economic cooperation amongst the SAARC Member States. It may be noted here that Afghanistan was not a party to this agreement at the time of signing.

Though there was no direct mention of Cross-Border Electricity Trade in the Agreement, the relevant clauses of the Agreement which directly or indirectly impact Cross-Border Electricity Trade & Exchange are:

- Assistance in collection of taxes or revenue claims;
- Sharing of Tax Policy between member states;
- Conflict of Interest which states that in case of conflict an Agreement signed on later date shall prevail;
- Taxes covered which lists the then existing taxes to which the Agreement is applicable.

The relevant articles are detailed in **Quote 1** of Appendix A.6.

2.2.3. Agreement on South Asian Free Trade Area (SAFTA)

On the sixth day of January, 2004, the Governments of the then SAARC Member States comprising the People's Republic of Bangladesh, the Kingdom of Bhutan, the Republic of India, the Republic of Maldives, the Kingdom of Nepal, the Islamic Republic of Pakistan and the Democratic Socialist Republic of Sri Lanka hereinafter signed the Agreement on South Asian Free Trade Area (SAFTA). The relevant clauses of the Agreement which directly or indirectly impact Cross-Border Electricity Trade & Exchange are listed down in **Quote 2** of Appendix A.6.

The SAFTA Agreement³ has no explicit mention of trading of electricity between the SAARC countries, though it focuses on the generic facilitation of trade among all the nations. The agreement also protects interests of Least Developed Countries (LDCS) and grants special treatment to Maldives. While India, Pakistan and Sri Lanka are categorized as Non-Least Developed Contracting States (NLDCS), Bangladesh, Bhutan, Maldives and Nepal have been categorized as Least Developed Contracting States (LDCS).

Article 7 of the SAFTA Agreement provided for a phased Tariff Liberalization Programme (TLP). Under this programme NLDCS was to bring down tariffs to 20% and LDCS to 30%, within two years from the date of signing of the agreement. Further, the Non-LDCS were to bring down tariffs from 20% to 0-5% within 5 years (exception: Sri Lanka 6 years), while the LDCS were to do so within 8 years. Additionally, NLDCs were to reduce their tariffs for LDC products to 0-5% in 3 years. This TLP covered all tariff lines except those kept in the sensitive list (negative list) by the member states.

Similarly, though the Agreement talks about efforts for facilitating and developing trade in the SAARC region, it does not mention specifically about the Taxes and Duties on the Electricity Trading between the SAARC countries.

2.2.4. SAARC Agreement on Mutual Administrative Assistance in Customs Matters

The Governments of the SAARC (South Asian Association for Regional Cooperation) Member States comprising the People's Republic of Bangladesh, the Kingdom of Bhutan, the Republic of India, the Republic of Maldives, the Kingdom of Nepal, the Islamic Republic of Pakistan and the Democratic Socialist Republic of Sri Lanka signed this Agreement on the 13th of November, 2005.⁴ The Agreement was supposed to come into effect from 1st January 2006. The relevant clauses of the Agreement which can directly or indirectly impact Cross-Border Electricity Trade & Exchange are listed down in **Quote 3** of Appendix A.6.

³ (Agreement on South Asian Free Trade Area (SAFTA) 2004)

⁴ (Agreement on Mutual Administrative Assistance in Customs Matters 2005)

This Agreement lays down the framework of assistance for customs related matters among the SAARC countries w.r.t. administrative issues, information sharing for goods under transit application of customs laws and prevention of customs fraud.

This Agreement has no specific mention about the applicability of taxes and duties on Cross-Border trade. Though this Agreement exclusively deals with assistance in relation to the customs matters for goods, electricity in particular cannot be treated as a good and hence would not exactly fall under the jurisdiction of this Agreement.

2.2.5. Other relevant agreements w.r.t. CBET taxes and duties prevailing in South Asia Region

In this section, a few existing agreements in the South Asian region, in which the SAARC member states are not the only parties, have been reviewed to understand the practices and their impact on the obligations of the SAARC member states, if any.

2.2.5.1. Central Asia and South Asia Regional Energy Market

Kyrgyz Republic and Tajikistan in Central Asia have an abundance of hydro power; on the other hand Afghanistan and Pakistan have power deficit.⁵ The lack of adequate electricity supply is a huge detriment to the economic development and security of Afghanistan and Pakistan. A transmission system to connect all the four countries, called CASA-1000, would help make the most efficient use of clean hydropower resources in the Central Asian countries. This would enable them to transfer their surplus electricity during the summer months to the deficient countries in South Asia. The CASA-1000 project would also complement the countries' efforts to improve electricity access, to integrate and expand markets to increase trade, and to find sustainable solutions to water resource management. The tenders for this project have been floated and successful bidders have been identified.⁶



Figure 2-2: CASA regional energy market

Source: CASA Website

The CASA-1000 project will include:

- 477 km 500 kV AC line from Datka (in the Kyrgyz Republic) to Sugd-500 (in Tajikistan)
- 1300 megawatt AC-DC Converter Station at Sangtuda (Tajikistan)
- 750 kilometer High Voltage DC line from Sangtuda (Tajikistan) to Nowshera (Pakistan)
- 1300 megawatt DC-AC Converter Station at Nowshera

Central Asia - South Asia Regional Electricity Market (CASAREM) is a market conceptualized for developing electricity trade among the countries of the two regions through a set of projects and concomitant investments, underpinned by the relevant institutional arrangements and legal agreements. The four signatory countries are pursuing the development of electricity trading arrangements and the establishment of CASAREM. Since 2005, these four countries have intensified their internal cooperation with a variety of International Financial Institutions (IFIs), including the World Bank. However, it is envisaged that the other Central Asian countries would join the initiative as the trade expands. Kyrgyz Republic, Tajikistan, Pakistan, and Afghanistan have put an important framework in place for making CASA-1000 a reality—the Inter-Governmental Council. Under CASAREM, 1000 MW of power will be transmitted to Pakistan via Afghanistan out of which 300 MW will be used in Afghanistan itself. In addition to the commitment of these four countries, CASA-1000 has the support of the World Bank Group, Islamic Development Bank, United States Agency for International Development (USAID), US State Department, United Kingdom Department for International Development (DFID), Australian Agency for International Development (AusAID), and other donor communities.

⁵ (CASA Energy Trade 2011)

⁶ (The Central Asian Power System 2014)

The first Inter governmental MoU was signed in 2006, following which all four countries signed an Inter-Governmental Agreement in August 2008. Post which, in 2011, Pakistan and Afghanistan signed a joint declaration for the speedy implementation of the project. Additionally, at an Inter-Governmental Council Meeting at Bishkek⁷ in September 2011, a joint MoU was signed by the authorities of all the four countries for the development of CASA1000 Power Transmission Project and the further development of CASAREM. The information on the taxes and duties applicable to the Cross-Border Electricity Trade under the CASAREM or CASA-1000 Project was not publicly available for review. A taxation framework, if not already laid down, may be required once the project achieves a stage of completion at which transactions can be carried out. Hence, the Inter-Governmental Council may look at developing the taxation framework and laying down the procedures for carrying out electricity trade between the countries. The SAARC Energy framework, that promotes a zero-tax regime, may be considered for the same.

2.2.5.2. Central Asia Regional Economic Cooperation (CAREC)

The Central Asia Regional Economic Cooperation (CAREC) Program was established in 2001 as a committed partnership of 10 countries: Afghanistan, Azerbaijan, People's Republic of China, Kazakhstan, Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan and Uzbekistan. CAREC aims to secure energy through a balanced development of the region's energy infrastructure, a stronger integration of energy markets, and economic growth through energy trade. Since Pakistan and Afghanistan are also members to both the CAREC and the SAARC, any obligation of taxes and duties for CBET under the CAREC countries would also impact the laws and regulations indirectly for CBET with SAARC member states. Since 2001, CAREC has invested more than \$6.1 billion in 42 projects, most of which aim to expand bilateral electricity trade and improve the regional power network. CAREC's Strategy for Regional Cooperation in the Energy Sector seeks to enable energy security through a balanced development of the region's energy infrastructure and institutions, a stronger integration of the region's energy markets (to make available adequate volumes of commercial energy to all in a reliable, affordable, financially sustainable, and environmentally sound manner), and economic growth through energy trade. The CAREC Program has adopted an open economy model of growth to achieve its strategic objectives. The Trade Policy Strategic Action Plan, 2013–2017 aims at accession to the World Trade Organization (WTO), greater trade openness with simplified trade taxes and eliminated quantitative restrictions, reducing the trade-impeding impact of technical regulations and sanitary and phytosanitary measures, expanded trade in services, and capacity building and knowledge sharing on trade issues.

As of 2015, at least eight CAREC member countries, except Afghanistan and Turkmenistan have eliminated or incorporated all import taxes and fees into tariffs. Member countries have also reduced average tariffs to 10% or less, capped tariffs at 20%, eliminated or converted quantitative import restrictions into tariffs, and formally acknowledged the importance of the WTO sanitary, phytosanitary and technical barriers to trade agreements. Five member countries including Pakistan have eliminated all remaining discrepancies between taxes applied to domestic production and imports. But these steps have been taken in general trade policies direction and nothing specific to CBET has been framed till date. Specific regulations regarding CBET would facilitate and enhance the free trade of electricity between the countries in the region.

Key Elements of the Energy Work Plan 2016-2020

The long term vision for the region's energy sector is to ensure energy security, energy markets integration, and energy trade-driven growth.

The CAREC Energy Strategy and Work Plan (EWP) 2016-2020 sets thematic priorities to

- *develop and invest in priority projects;*
- *develop sustainable energy resources;*
- *develop capacity, knowledge and demonstration of technology;*
- *establish robust legal and regulatory framework for private investments; and*
- *support cross-border energy trade.*

⁷ (Minutes of the CASA-1000 IGC Meeting in Bishkek 2011)

These priority areas are translated into six elements of actions:

- Developing the East-Central Asia-South Asia regional energy market (E-CASAREM);
- Promoting regional electricity trade and harmonization;
- Managing energy-water linkages;
- Mobilizing financing for priority projects;
- Capacity development and knowledge management; and
- Promoting and prioritizing clean energy technologies.

The two relevant extracts from the CAREC program elements which speak about promoting regional electricity trade, harmonization, developing CASAREM and Cross-Border energy infrastructure projects are detailed in **Quote 4** of Appendix A.6.

2.2.6. Other Relevant Studies/Programs w.r.t. CBET Taxes and Duties Prevailing in South Asia Region

Apart from the prevailing agreements, a few significantly impacting studies and programs that cover the aspect of Cross-Border Electricity Trade within SAARC countries have already been conducted. These studies have formed the base for various programs being implemented and projects being undertaken in the SAARC nations. Reference has been drawn in this report to these studies and programs in the SAARC member states.

2.2.6.1. Review of Electricity Laws and Regulation of SAARC Member States

This study conducted by SAARC Energy Centre observed the terms of legal and regulatory requirements to promote Cross-Border Electricity Trade. Recommendations to bridge the gap are also made in the report submitted by SARI/EI Task force 1. The details of the study are listed in **Quote 5** of Appendix A.6.

2.2.6.2. South Asia Regional Initiative for Energy integration (SARI/EI)

South Asia Regional Initiative for Energy Initiative (SARI/EI) framework program was launched by the US Agency for International Development (USAID) in the year 2000 covering the seven countries of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Afghanistan was inducted at a later point in time. The first three phases of the framework have been carried out by three dedicated task forces, each focusing on different areas and aspects of CBET:

1. Cross-border energy trade (CBET),
2. Energy market formation, and
3. Regional clean energy development.

The areas and aspects focused upon by the different task forces are listed as under:

Table 2-2: Task Forces (TF) formed under SARI/IE and their Scope of Work

TF-1: Coordination of Policy, Legal and Regulatory issues	Study on Review of policies, regulations and laws, preparation regulations etc. (Report has been finalized, Proposed Changes, amendments in electricity laws, regulations and policies Regional Regulatory Guidelines) – Completed
	Study on Investment policies/guidelines for SA countries. (study under progress-Ongoing)
TF-2: Advancement of transmission system interconnection	Study to find out the Trading Potential of South Asian Countries (Draft Final Report prepared-Ongoing)
	Harmonization of Grid Codes (Draft Final Report Prepared-Ongoing)
TF-3: South Asian Regional Electricity Market	“Assessment and recommendation of commercial terms & conditions for Cross-Border Electricity Trade (CBET) and suggesting the model Of Power Exchange in South Asian region” (Draft Report Prepared – Ongoing)

Implementation of Pilot Market-Mock Exercise for SARPEX & Market rules (Process initiated)

The major achievements of the SARI/EI program till date can be listed down as follows:

1. The India-Nepal Power Trade Agreement
2. Enhancement of Cross-Border Electricity Trade in South Asia
3. Promoting investments in CBET and development of Clean Energy projects
4. Launch of “Regional Regulatory Guidelines for harmonization/coordination of electricity regulations in the South Asia region”
5. Launch of “Suggested Changes/Amendments in Electricity Laws, Regulations and Policies of South Asian countries for promoting CBET in the South Asian region”
6. Advocating the need for regional regulatory institutional mechanism such as the South Asia Forum of Electricity Regulators (SAFER)
7. Harmonization of Grid Codes and development coordinated Operating Procedures
8. CBET in Regional Transmission Planning and in national Transmission Plans
9. Facilitating the Creation of Regional Power Market in South Asia
10. Strategic engagement with SAARC and the SAARC Energy Centre

The final phase of the SARI/EI i.e. Phase IV, was launched in 2012 to further the earlier objectives of advancing regional energy integration and increasing CBET. In the five year duration of the program (2012-2017), IRADe, the implementing partner of USAID for the SARI/EI Program, and USAID are working towards promoting integration of energy systems and enhancing Cross-Border Electricity Trade among the participating South Asian countries.

IRADe organized the South Asia Regional Inaugural Conference of SARI/EI on CBET, held at New Delhi on 4th and 5th Oct’2013. It witnessed active and high level participation from both public and private sectors of the eight participating SAARC nations, multilateral development banks like the Asian Development Bank (ADB), World Bank, and the regional SAARC Energy Centre, amongst others. The main objective was to launch the SARI/ EI program, and create the right enabling environment for the establishment of the South Asia Energy Markets (SAEM). The objective of the conference is detailed below:

1. Initiate a concrete and constructive discussion on the vision and road map for South Asian Electricity Market (SAEM) and build consensus among the decision-makers of the region.
2. Identify key areas for policy, regulatory, and technical interventions required in the SA countries for the creation of SAEM
3. To highlight the best practices and experiences from Regional Power System Integration such as Europe, Southern African Power Pool (SAAP), and Greater Mekong Sub-region (GMS).

USAID/IRADe was successful in initially gaining a consensus and support of the key decision makers and stakeholders, which was then followed by a full scale support being extended for the program. The concept of CBET was able to find acceptance in all the participating nations. Based on the extensive deliberations, the summary of the proceedings is given in **Quote 6** of Appendix A.6.

The report submitted by Task Force 1 of USAID recommended a full-fledged course of action. In the current context of study of taxes and duties structure prevalent and required, the relevant recommendations are listed in **Quote 7** of Appendix A.6.

As a part of the study undertaken by IRADe, the Task force submitted a report on changes in Electricity Laws, Regulations and policies titled “Suggested Changes/Amendments in Electricity Laws, Regulations and Policies of South Asian Countries for Promoting Cross-Border Electricity Trade in the South Asian Region”.⁸ The report

⁸ (Suggested Changes/Amendments in Electricity Laws, Regulations and Policies to promote CBET in South Asian region 2016)

suggests that the countries should move towards a zero tax regime as far as Cross-Border Electricity Trade is concerned.

2.2.6.3. SAARC Regional Energy Trade Study (SRETS)

The SAARC Regional Energy Trade Study (SRETS)⁹ carried out by the Asian Development Bank (ADB) was published in March 2010. This study recognized the benefits of establishing a regional Power Market in the SAARC region and enhancing the intra-SAARC energy trading activities. The study identified the options, benefits and constraints of increased energy trade in South Asia that included the potential for cross-border power trading to, inter alia, reduce unserved energy. It specifically recommended fast-tracking of cross-border interconnection projects that had already been identified.

The SAARC Regional Power Exchange Study (SARPES)¹⁰ through ADB carried out a country-wise analysis of the existing legal and regulatory frameworks and suggested a road map for moving towards introducing necessary modifications to facilitate regional electricity trade. The study focuses on balancing the demands and available resources within the SAARC countries, while it also considers the possibility of linking the SAARC region with Central Asia through the proposed CASA 1000 transmission development project.¹¹

The details of the study are listed in **Quote 8** of Appendix A.6.

A few steps have been taken by the member states in this direction to achieve the benefits of regional power exchange. Recently, Nepal, Bangladesh and Bhutan, (apart from the bilateral agreements and trading) have also deliberated trading on the Indian Power Exchange. Neither of the bilateral treaties signed between these countries have imposed any taxes and duties on the trade and exchange of electricity. Though except Nepal and Bhutan, none of the SAARC member nations have explicit laws, regulations or well documented procedures for Cross-Border Electricity Trade.¹² Recently, the Ministry of Power, GoI issued guidelines for increased focus on Cross-Border Electricity Trade in the draft National Energy Policy and the MoP guidelines. In spite of everything, a lot of ground is yet to be covered towards the formation of a wholly integrated regional Power Exchange.

2.2.6.4. South Asian Regional Power Exchange Study (SARPES)

The SAARC Regional Power Exchange Study (SARPES) was carried out in June 2013 with the assistance of the Asian Development Bank (ADB). A thorough techno-economic analysis of Cross-Border Electricity Trade was conducted for six proposed interconnections and for grid reinforcement projects covering almost all SAARC Member States.

The SARPES Report proposed a SAARC-wide interconnected 'power system' for the utilization of the vast hydro-power potential of Nepal, Bhutan, and Central Asia that could meet the growing demand in the other parts of the system. A review of the economics of the power system identified nine specific legal/regulatory provisions to be added/ modified in the existing framework, or to be presented as a part of new legislative initiatives in the respective countries. The same are quoted in **Quote 9** of Appendix A.6.

2.3. Duties, Taxes & Royalty in Bilateral Electricity Trade Practice and Potential Complexities in future

Cross-Border Electricity Trade has started gaining momentum in the SAARC countries. Four out of the eight countries have progressed in this respect to form bilateral ties to cater to the needs of increasing energy demand, sustainability and energy security. As per Central Electricity Authority (CEA, India), the total volume of the annual electricity trade between India, Nepal, Bhutan and Bangladesh and Myanmar has crossed 10 billion units in 2015-16.¹³ The trade figures in the table are inclusive of electricity supplied against long-term Government to

⁹ (SAARC Regional Energy Trade Study 2010)

¹⁰ (Study on SARPEX 2013)

¹¹ (Roadmap for South Asian Regional Power Exchange (SARPEX) 2017)

¹² (Review of Electricity Laws and Regulations of SAARC Member States 2010)

¹³ (Accelerating Cross Border Electricity Trade and Hydropower Development between Myanmar and South Asia 2016)

Government (G2G) Power Purchase Agreements and market based one to one medium/short-term contracts. Cross-border trade is going on and is slated to increase. The efforts need to be steered in the direction of a regional electricity market.

Table 2-3: Volume of Cross-border electricity trade between India, Bangladesh, Bhutan and Nepal

Year	From Bhutan to India	From India to Nepal	From India to Bangladesh	From India to Myanmar
	Energy (MU)	Energy(MU)	Energy (MU)	Energy (MU)
2013-14	5,555	702	1,448	-
2014-15	5,109	997	3,272	-
2015-16	5,557	1,469	3,654	-
2016-17	5,864	2,021	4,419	3.23

A few existing and proposed bilateral electricity trade agreements are reviewed in the following sections.

2.3.1. Bilateral electricity trade between India and Bhutan

The framework "Inter-Governmental Agreement between the Royal Government of Bhutan and the Government of the Republic of India concerning development of Joint Venture Hydropower Projects through the Public Sector Undertakings of the two Governments" was signed on 22 April 2014 in Thimphu by Secretary, Ministry of Economic Affairs, Royal Government of Bhutan and Secretary, Ministry of Power, Government of India. The details of this agreement have been quoted in **Quote 10** of Appendix A.6. Three hydro-electric projects (HEPs) totaling 1416 MW, viz., the 336 MW Chukha HEP, the 60 MW Kurichu HEP, and the 1020 MW Tala HEP, are already operational in Bhutan and are supplying electricity to India. Three more HEPs totaling 2940 MW, i.e., the 1200 MW Punatsangchu-I HEP, the 1020 MW Punatsangchu-II HEP and the 720 MW Mangdehchu HEP, are under construction, and are scheduled to be commissioned by 2018.

Hydropower cooperation with Bhutan is a classic example of a win-win cooperation, providing clean electricity to India, generating export revenues for Bhutan, and further strengthening the bilateral economic linkages. NTPC Vidyut Vyapar Nigam (NVVN) has been assigned the role of Nodal Agency for trading of power from Bhutan by GOI.

The present bilateral Agreement between India and Bhutan does not provide for any arrangements or provisions for taxes and duties for Cross-Border Electricity Trade between the two countries.

The Bhutanese Hydro Power Policy 2008, mentions that the Royal Government of Bhutan has the option to avail the royalty power or energy as energy or as cash in lieu thereof based on the highest off-take rate at which the power is sold by the developer to its buyers. There is a concession/reduction of 1% for every year of early completion of the project for the first 5 years after the Commercial Operation Date (COD). Similarly, there is a penalty of 1% for every year of delay in the completion of the project or prorated thereof for the first five years after COD.

2.3.2. Bilateral electricity trade between India and Nepal

The Govt. of India has appointed NVVN as the Nodal Agency for Cross-Border power trading with Nepal. A PPA was signed between NVVN and Nepal Electricity Authority for supply of 80MW power to Nepal through the Muzafferpur-Dhalkabar transmission line.

The present bilateral Agreement between India and Nepal provide for exemptions on import duties and export taxes. Both the nations have agreed to remove tariff, levies, fees, taxes, duties or charges of similar effects under the provisions for taxes and duties for Cross-Border electricity trading between the two countries.

2.3.3. Bilateral electricity trade between India and Bangladesh

The Joint Communiqué issued on the occasion of the visit to India of Her Excellency Sheikh Hasina, Prime Minister of Bangladesh on January 12, 2010 in its 31st point states the points in Quote 12 of Appendix A.6. NVVN is the Nodal Agency for trading of power with Bangladesh. NVVN has signed an agreement with Bangladesh (Bangladesh Power Distribution Board (BPDB)) for supply of 250 MW power for 25 years from various central generating stations of NTPC. The supply has commenced from October 2013 after completion of the transmission link between India & Bangladesh. Power Purchase Agreement has being signed between BPDB and NVVN and back to back Power Supply Agreements have also been signed with Tripura State Electricity Corporation Ltd (TSECL) for supply of 100MW power to BPDB under radial mode.

The present bilateral agreements between India and Bangladesh do not provide for any arrangements or provisions for taxes & duties for CBET between the two countries.

2.3.4. Other proposed/potential Bilateral Electricity Trades within SAARC countries

The Perspective Transmission Plan for 20 years (2014-2034) was prepared in August 2014 by CEA, in association with PGCIL and its subsidiary POSOCO, MoP and GoI. It envisages the Inter-regional capacity in India to grow from the current levels of 76.5 GW to 118 GW by 2022 and peak demand from the current level of 153 GW to about 690 GW i.e. more than four times by 2035-36 implying four times growth in the generation and transmission capacities as well. It further forecasts the energy export demands as given below:

Table 2-4: Inter-regional capacity in India - Perspective Transmission Plan 2014-2034

India : SAARC Exports	2026-27	2031-32	2035-36
Bangladesh	1500 MW	2000 MW	2000 MW
Nepal	400 MW	500 MW	500 MW
Sri Lanka	0 MW	500 MW	1000 MW
Pakistan	500 MW	1000 MW	1000 MW

In the same context a few of the proposed Cross-Border electricity trade arrangements are listed down as follows:

2.3.4.1. Bangladesh Bhutan

India, Bhutan and Bangladesh have conceptualised to build the proposed 1,125 MW Dorjilung hydropower project in Bhutan. Trilateral memorandum of understanding (MoU) on this has been finalised by the three countries. Bangladesh would invest in the Bhutan based project and India would serve as the transit country for power transmitted back to Bangladesh. The taxes and duties arrangement would be very much dependent on the legal existence of the companies implementing and operating the project. The transmission pricing and settlement mechanism would determine the revenue generated by the various participants in the supply chain and hence the applicability of taxes and duties. Clarity on the same is awaited and can be analysed once the Intergovernmental agreement is signed.

2.3.4.2. India Pakistan

The proposed interconnection between India and Pakistan with a carrying capacity of 500 MW is under discussion. This plan includes a transfer of 1000 MW power (500 MW in 1st Phase and total 1000 MW in 2nd Phase) from India to Pakistan. The few highlights of the initiatives taken in this regard are as follows:

- An MoU was proposed between the MoP, GoI and Govt of Pakistan in March 2014
- A proposal for the formation of Joint Technical Committee having agencies from India and Pakistan for feasibility study of transmission line for power transfer was put up.
- The Committee would undertake feasibility study for HVDC line (for transfer of 500 MW) between Amritsar and Lahore (around 40 KMs), requiring a time period of 3 years and an approximate investment of Rs 400 Cr
- World Bank and USAID are supporting the transmission line project.
- Transmission Arrangements

- As a first step, 100-150 MW power transfer may take place in Radial Mode, which can then be updated to HVDC link for 500 MW or above power transfer
- Possible alternatives are Lahore-Amritsar and Mundra-Karachi
- Implementation of transmission link on PPP model like Indo-Nepal transmission link may be explored
- A Nodal Agency is required in Pakistan for last mile connectivity to Pakistan Grid
- Direct connection may be explored between projects in India supplying power to the Pakistan grid
- Power could be exported through a pool of generators and an agency may be nominated from India for undertaking the transaction and assurance of supply to Pakistan
- Commercial Arrangements
 - Buying arrangement should be structured between both the governments for securing commercial risks in transactions.
 - Agencies to be nominated from Pakistan and India for transaction structuring and addressing issues related to off take of power and payment security
 - The Government of Pakistan may take partial ownership in the project, or may use commercial models like tolling (paying for fuel price) in order to secure the complete transaction.
 - The risks associated in the project may be appropriately evaluated and allocated to the transaction stakeholders.

Framework for applicable taxes and duties for CBET may be developed prior to the commencement of trade.

2.3.4.3. India-Sri Lanka

An HVDC interconnection between Madurai (India) and Anuradhapura (Sri Lanka) through the Palk Strait is proposed with a carrying capacity of 1000 MW. This will be a 285 km link with 50 km of submarine cables connecting the national grids of India and Sri Lanka. Both the governments are committed to develop this linkage and MoUs have been signed to this extent. No framework for the applicable taxes and duties for CBET is in place between the two countries. The same may be developed prior to the commencement of trade in future.

2.3.4.4. India-Afghanistan

India has signed a Preferential Trade Agreement (PTA) on March 6, 2003 with Afghanistan, according to which preferential tariff is granted by the Government of Afghanistan on eight items exported from India including tea, medicines, sugar and cement. This agreement might also cover Power if CBET starts between the two countries. No framework for the applicable taxes and duties for CBET is in place between the two countries. The same may be developed prior to the commencement of trade, if it happens in the future.

2.3.5. Bilateral electricity trade between Afghanistan and Central Asian Countries

Afghanistan meets a major part of electricity demand through imports from Iran, Turkmenistan, Uzbekistan and Tajikistan. The import volumes rose from 110 million kWh in 2000 to 150 million kWh in 2005 and reached a level of 608 million kWh in 2009. Information on the applicable taxes and duties for CBET was not available for the study.

2.3.6. Bilateral electricity trade between Pakistan and Iran

Pakistan imports electricity from Iran to serve the demand in Baluchistan province. The system is operated in a radial mode. As per the 2002 agreement between the two countries, Pakistan can import up to 39 MW. In June 2006, WAPDA signed an MOU with Iran to increase the supply by 100 MW to meet Gwadar port area demand and plans to increase to 1000 MW. Pakistan now imports 74 MW after Jakigur 230/63 kV substation project was commissioned. Information on the applicable taxes and duties for CBET was not available for the study. It may be noted that Pakistan has either eliminated or incorporated all the taxes in the tariffs as a initiative of the CAREC countries.

2.3.7. Bilateral electricity trade between India and Myanmar

India sees Myanmar as an important partner in strengthening its energy security. India exports 3MW of electricity to Myanmar. Both the countries have signed the Bilateral Investment Promotion and Protection Agreement (BIPPA), a Double Taxation Avoidance Agreement (DTAA) and Free Trade Agreement. These agreements are aimed at providing an easy flow of bilateral investments and business profits and for taxation-related matters. No taxes and duties are applicable for the CBET between Myanmar and India in the present arrangement.¹⁴

It may be noted that most of the countries, either under bilateral agreements or under regional trade boosting initiatives, have tried to disallow tax disincentives on the trade of energy across the border. Going ahead the same may be formalized as a regional commitment for the SAARC Member States. This would help to ensure that concentrated efforts are made towards CBET as a mechanism to meet the growing electricity demands of SAARC Member States. The Member States may face complexities due to different tax structures in respective countries. But the same may be dealt with by harmonizing the import/export taxes & duties on the HS Code 27160000 which is uniform for all countries as per the UN guidelines.

Summary

Participating countries	Taxes & Duties	Level of Preparedness for CBET	Way Forward
India-Bhutan	No explicit provisions for taxes & duties	Mutually Agreed Framework, Not applicable for competition	The framework for taxes and duties may be outlined
India-Nepal	Provide for exemptions on import duties and export taxes	Favourable	Optimum for CBET implementation
India-Bangladesh	No explicit provisions for taxes & duties	Mutually Agreed Framework, Not applicable for competition	The framework for taxes and duties may be outlined
Bangladesh-Bhutan			
India-Pakistan			
India-Sri Lanka			
India-Afghanistan			
Afghanistan-CASA countries			
Pakistan-Iran	Taxes subsumed in tariffs for CAREC countries. No explicit mention for Pak-Iran bilateral arrangement	Mutually Agreed Framework, Not applicable for competition	The taxes and duties, if any, may be waived off for facilitating CBET
India-Myanmar	No taxes applicable in the current scenario	Favourable	Optimum for CBET implementation

¹⁴ (Minutes of 12th Meeting of the Joint Working Group (JWG) on Cooperation in Power Sector 2016)

3. Salient Features- Existing, relevant international best practices w.r.t. CBET taxes & duties

A review of the historical development of the international power pools shows that trade was initially carried out on a bilateral basis, wherein the offtake of power was based on negotiation of long-term bilateral power purchase agreements (PPAs) between countries. Bilateral trade instils confidence among the participants, thus acting as a basic initial requirement. Subsequently, more countries join in trading thereby marking the evolution of multilateral trade. With surplus capacity available in the system the region then opts for short term trading for balancing and emergency support and finally graduates to a centralized regional trading similar to advanced European Power Pools. This evolution takes place in a conducive environment set up by regional commitments in the form of Sovereign Agreements, Bilateral and Multilateral Framework Agreements, Market Access Agreements/Codes; supported by an appropriate institutional, regulatory and legal framework at the regional level.

The experience of power pools and other regional electricity trade arrangements identifies the importance of comprehensive, well drafted standard contracts that fully incorporate the consequences of contractual defaults and emergency events. It has been observed that well-designed PPAs that explicitly address supply security, increase the prospects of success for large cross-border transactions. This substantially mitigates many risks that do arise due to low or no clarity in the frameworks under which the power pools work. This also leads to a better dispute settlement mechanism and brings in ease of doing business among the various participants of trading. Key observations emerging from an international review study¹⁵ carried out are given in **Quote 13** of Appendix A.6.

Ongoing trades in power pools like West African Power Pool (WAPP), South African Power Pool (SAPP), trade arrangements in Greater Mekong Region (GMS), cross-border trade between Georgia-Turkey etc., are relevant examples of CBET in South Asia. A review of these power pool arrangements in the current context is carried out in this section.

3.1. South African Power Pool (SAPP)

Introduction

The South African Power Pool was created in August 1995 under the aegis of the South African Development Community (SADC). The interconnection between the Hydro Northern Network and the Thermal Southern Network created an opportunity and a platform for regional trade and cooperation. A good generation mix and transmission interconnection network acted as the building blocks to shape the energy trading infrastructure in the power pool.

SAPP Mission - *Aim to provide the least cost, environmentally friendly and affordable energy and increase accessibility to rural communities.*

SAPP Vision- *To Facilitate the development of a competitive electricity market in the Southern African region.*



Figure 3-1: SAPP SADC Grid

Source: SAPP Website

¹⁵ (Suggested Changes/Amendments in Electricity Laws, Regulations and Policies to promote CBET in South Asian region 2016)

The 12 Member Countries participating in SAPP are DR Congo, Tanzania, Malawi, Zambia, Angola, Namibia, Botswana, Zimbabwe, Mozambique, Swaziland, South Africa, Lesotho. South Africa apart from participating in the SAPP also has an internal power pool known as Eskom power pool.

SAPP is moving from a cooperative power pool as of now to a competitive power pool in the future. Uniform market clearing price, billing on scheduled energy, settlement in US dollars and market splitting in case of congestion are salient features of the proposed market design. There are 16 SAPP members participating in the power pool with an installed generation capacity of 62 MW and an available capacity of 47 MW. The peak demand is 55 MW and consumption is ~400TWh.

The operating procedures and practices have been detailed out in section 6.1. We will describe the taxes and duties applicable to cross-border electricity trading in this section.

Taxes, Duties and Royalty

The SADC Protocol on Energy, 1996 aimed at creating a conducive environment for the private sector to fully participate in the regional energy development. As a step towards common policies on taxation, SADC released its “Memorandum of Understanding on Cooperation in Taxation and Related Matters” in 2002. The SADC Protocol on Trade (2005) envisaged the establishment of a Free Trade Area in the SADC Region. The Free Trade Area was achieved in August 2008 with an objective to further liberalise intra-regional trade in goods and services. 13 SADC Member States are part of the Free Trade Area, while Angola and DR Congo are not a part of it. The SADC Free Trade Area seeks to increase regional imports and exports for the private sector and other regional stakeholders.

Each Member State currently collects and administers its own taxes. SADC recognizes that cooperation and harmonisation on tax measures can produce significant benefits for each Member State and the region as a whole. Coordinated tax policies facilitate Trade throughout the region, and coordinated tax incentives encourage Foreign Investment. No customs duties are charged on trade between South Africa and Botswana, Lesotho, Namibia, and Swaziland, as these five countries constitute the Southern African Customs Union.

In SAPP, which is still in its infancy when compared to matured trading pools in Europe, regional trading is largely dominated by South Africa, the largest economy in the region. The key customs/ exercise/ other import-export related duties in this region is controlled by Southern African Customs Union (SACU). SACU which comprises of South Africa, Botswana, Lesotho, Namibia and Swaziland. SACU since its formation has strived to bring in a more liberal trade tax regime to enhance key infrastructure and financial services vital for economic growth.

There are broadly two types of taxes applicable, along the value chain,

- **Value Added Tax (VAT):** VAT is applicable upon sale of electricity. All members of the SAPP have to pay VAT in connection with its membership and Trading/ Clearing activities. Utilities are charged VAT for the electricity they import, however the Utilities are allowed to claim this tax from the consumers at the end of the financial year (“Trade in Electricity Services in SACU). In the SAPP Executive Committee Report (2008), the committee recommends to provide VAT and other tax incentives to promote higher regional trade growth but this has not been institutionalised yet.

The current tax regime is also in line with WTO and GATT. Article II (2) (a) of GATT explicitly recognizes the right of members to impose a charge equivalent to an internal tax in respect of the like domestic product or in respect of an article from which the imported product has been manufactured in whole or in part. However, in pursuing environmental goals, countries could impose high energy taxes on imported electricity produced using environment-degrading technologies, and this is where our second tax comes into play.

- **Generation tax (including CO₂ tax):** This tax is applicable at the source i.e. generators have to pay CO₂ tax in South Africa.

The carbon tax bill in South Africa is still in the draft stage and implementation is expected by 2018. This is being brought into effect to reduce the emissions by 13 - 14.5 percent in 2025. A carbon tax rate of 120 rand per ton of

carbon dioxide-equivalent above certain tax-free thresholds is proposed. South African Utility Eskom has been exempted from carbon tax for 70 percent of the total emission for an initial grace period.

South Africa also imposes a number of withholding taxes - most importantly, a holding tax on dividends paid by South African resident companies and on cross-border interest payments (both at a rate of 15 per cent, although rates are dependent on the existence of tax treaties). To support energy efficiency, the South African government has implemented an electricity levy on electricity generated from non-renewable sources at 3.5 cents/kWh. The levy is paid at source by the electricity producer and recovered in the price to the consumer.

In order to provide boost to the renewable energy generation and decrease emissions, few SAPP Countries like South Africa, Botswana, Malawi and Swaziland have provided fiscal incentives like reduction in sales tax, energy tax, carbon dioxide tax, value added tax and other taxes. Lesotho has provided investment/production tax credits.

Key Learnings

- The SAPP tax regime supports energy efficiency through various ways:
 - Implementation of electricity levy on non-renewable sources of energy by the South African government at 3.5 cents/kWh.
 - The levy is paid at source by the electricity producer and recovered in the price to the consumer.
- Boost to renewable energy generation and decrease emissions through fiscal incentives like reduction in sales tax, energy tax, carbon dioxide tax, value added tax etc. or investment/production tax credits.
- An incentivizing tax structure such as this is necessary to ensure that all players of the power pools strive towards energy efficiency and more sustainable ways of electricity generation. The SAARC Member States may adopt such practices too.

3.2. West African Power Pool (WAPP)

Introduction

West African Power Pool (WAPP) founded in 2000, is a cooperation of the national electricity companies in Western Africa under the aegis of Economic Community of West African States (ECOWAS) Treaty and ECOWAS Energy Protocol.¹⁶ The members of WAPP are working towards establishing a reliable power grid for the region and a common market for electricity. It is an association of 29 member companies including private and public utilities. 14 out of the 15 ECOWAS member states namely, Benin, Burkina Faso, Cabo Verde, Côte D'ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo also serve as members of WAPP. The headquarters of WAPP is located in Cotonou as per the Headquarter Agreement with the Republic of Benin in 2006.

WAPP Vision: *To integrate the national power systems into a unified regional electricity market with the ultimate goal of providing, in the medium and long term, regular and reliable energy at competitive costs to the citizenry of the ECOWAS region.*

WAPP Mission: *To promote and develop power generation & transmission infrastructures as well as to coordinate power exchange among the ECOWAS Member states.*



Figure 3-2: West African Power Pool

Source: WAPP Website

The Technical and Financial Partners of WAPP are listed in the table below

¹⁶ (WAPP Report on competitive electricity markets 2014)

Table 3-1: Technical and Financial Partners of WAPP

World Bank (WB) ;	European Union (EU) ;
Agence Française de Développement (AFD) ;	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) ;
European Investment Bank (EIB) ;	Banque Allemande de Développement (KfW) ;
African Development Bank (BAD) ;	United States Agency for International Development (USAID) ;
Islamic Development Bank (IDB) ;	ECOWAS Investment and Development Bank (EBID).
West African Development Bank (BOAD) ;	

The operating procedures and practices have been detailed out in the section 6.2. We will describe the taxes and duties applicable to the cross-border electricity trading in this section.

Taxes, Duties and Royalty

Tax incentives for the ECOWAS (WAPP) Member States, as mentioned in the “Ecowas Renewable Energy And Energy Efficiency Status Report” are provided in various forms including investment or production tax credits, as well as reduction or elimination of taxes such as import duties, sales, and value-added tax (VAT).

In order to provide boost to the renewable energy generation and decrease emissions, all WAPP Countries except sierra leone and Liberia have provided fiscal incentives like reduction in sales tax, energy tax, carbon dioxide tax, value added tax and other taxes. Burkina Faso and Cape Verde have provided investment/production tax credits. Import duties on renewable energy components have been reduced or removed in Burkina Faso, Ghana, Mali, and Nigeria, while value-added tax reductions for renewable energy projects have been established in Burkina Faso, Ghana, and Mali. In addition, Benin, Cabo Verde, Côte d’Ivoire, the Gambia, Guinea, Guinea-Bissau, Niger, Senegal, and Togo all offer some form of tax incentive for renewable energy.

ERERA in its “Adoption of tariff methodology for regional cost and tariff resolution”¹⁷ states that the transmission companies will be registered in one particular country and the taxation shall apply to that country only. Intergovernmental agreements are required to effect any alternative taxation arrangement.

Key Learnings

- Along with investment and production tax credits for renewable energy generation efforts, the governing body for the WAPP, ERERA also states that the transmission companies will be registered in one particular country and the taxation shall apply to that country only. Intergovernmental agreements are required to effect any alternative taxation arrangement.
- This is a key feature that allows uniformity in the taxation arrangements when a number of different states are involved who engage in cross-border electricity trade.

3.3. Greater Mekong Sub-region (GMS)

Introduction

The Greater Mekong Subregion (GMS) Economic Cooperation Program began its third decade in 2012. The Greater Mekong Subregion (GMS) was designated with the launch of a development program in 1992 by the Asian Development Bank. It includes six states of Cambodia, the People's Republic of China (specifically Yunnan Province and Guangxi Zhuang Autonomous Region), Lao People's Democratic Republic, Myanmar, Thailand, and Vietnam.

¹⁷ http://icc.ecowapp.org/sites/default/files/Transmission%20Tariff%20Methodology%20-%20August%202015-V4_signed.pdf

Energy was identified at the inception of the GMS Program as one of nine areas of sub-regional cooperation. Generation mix in GMS countries is quite different. Laos entirely relies on hydropower, with only few gensets serving as reserve. Cambodia actually relies almost only on thermal power but it has great potential in hydropower development. Vietnam hydropower assures nearly 50% of its present as well as future demand. Thailand relies almost exclusively (95%) on thermal generation and import purchase.

Objectives of the Inter-Governmental Agreement which led to GMS:

- *coordinate and cooperate in the planning and operation of their systems*
- *fully recover costs and share equitably the resulting benefits*
- *provide reliable and economic electricity services to the customers*

There are bilateral intergovernmental agreements under the GMS Program framework of which the energy cooperation in the GMS region works. The GMS Program helps the implementation of high priority subregional projects in transport, energy, telecommunications, environment, human resource development, tourism, trade, private sector investment, and agriculture.

The operating procedures and practices have been detailed out in section 6.3. We will describe the taxes and duties applicable to cross-border electricity trading in this section.



Figure 3-3: Greater Mekong Sub region

Source: ADB

Taxes, Duties and Royalty

According to the Power Trade Strategy Study, World Bank (1999) and the ADB report on GMS Power Trade and Interconnection, governments of the GMS Member states were required to decide their policy on taxation and royalties on exports of electricity and communicate it clearly to all interested parties.

Since its inception the focus of GMS has been more in creating enabling infrastructure, such as roads and transmission lines, rather than providing financial incentives.

Thus there is no clear standard harmonised tax policy or incentive. This has led to differential tax regime in different countries.

- Cambodia and Myanmar have no policy on electricity trade taxation. The actual levy may vary from project to project.
- Lao charges an export tax on exporting electricity.
- Thailand on the other hand provides exemption from VAT.

GMS trade, quite similar to, South Asia is focussed on bilateral cooperation rather than regional cooperation. However the success of regional transport programme in GMS has laid out a structured and clear path for regional cooperation in other infrastructure services including power.

For instance, the Nam Theun 2 Hydroelectric Project of GMS aims to promote economic growth in the region by developing hydroelectric power resources. It involves a 1,070 MW trans-basin diversion power plant on the Nam Theun River, a tributary of the Mekong, in the central region of the Lao PDR. It exports 5,354 GWh of electricity to Thailand and provides 200–300 GWh of electricity for domestic use. It provides revenue to the Lao PDR through taxes, royalties i.e. concession fees., and dividends. It was built by a private company, the Nam Theun 2 Power Company Limited, and structured as a build–own–operate–transfer, with a concession period of 31 years, of which the operating period is 25 years.

Similarly, GMS Nam Ngum 3 Hydropower Project which commenced operation in 2013, also provides revenue flows to the Laos government in the form of taxes, royalties, and dividends. The total estimated revenue is currently pegged at \$771 million over the 27-year concession period.

Key Learnings

- Since its inception the focus of GMS has been more in creating enabling infrastructure, such as roads and transmission lines, rather than providing financial incentives. Thus there is no clear standard harmonised tax policy or incentive.
- GMS trade, quite similar to South Asia is focussed on bilateral cooperation rather than regional cooperation. However the success of regional transport programme in GMS has laid out a structured and clear path for regional cooperation in other infrastructure services including power.
- The key learning from the GMS is the importance it has given to first creating an enabling infrastructure which sets the foundation for cross border electricity trade and then moving on to harmonising tax policies for such trades.

3.4. Nordic Power Pool (NORDPOOL)

Introduction

The Nordic countries' power markets deregulation came in in the early 1990s collaborating individual markets into a common Nordic market. The electricity reforms were initiated in Norway in 1991. Nordic power exchange was established as an independent company in 1993. It established price quotation on a day-ahead basis and in 1993, it established the world's first exchange-based trade with futures contracts. The Swedish electricity market was unbundled in 1996. Thereafter, a common electricity exchange for Norway and Sweden was established under the name of Nord Pool. Finland also completed its electricity reforms by 1996. Two private electricity exchanges that were established in Finland in 1995 merged in 1996 but did not have sufficient liquidity. In 1998, Finland effectively entered into the Nordic Market. Denmark joined the Nord Pool subsequently. Nord Pool was reorganized in 2002. Estonia, Latvia and Lithuania deregulated their power markets, and joined the Nord Pool market in 2010-2013. Currently, Nord Pool Group comprises Nord Pool AS, and the 100% owned subsidiaries Nord Pool AB, Nord Pool Finland Oy and Nord Pool Consulting AS. Nord Pool is owned by the Nordic transmission system operators Statnett SF, Svenska kraftnät, Fingrid Oy, Energinet and the Baltic transmission system operators Elering, Litgrid and Augstsprieguma tīkls AS (AST).

43% of the physical Nordic demand is traded through the Nord Pool Power Exchange; the remaining 57% is traded bi-laterally. This resembles bilateral physical trade but, in reality, it mainly reflects the fact that several generators also have retail arms, and therefore, demand and generation are matched directly within the company.

NORDPOOL Vision: *Pioneering European power market.*

NORDPOOL Mission: *Working with customers to deliver efficient, simple and secure power markets.*

Salient features of the Nord Pool infrastructure are:

- The five largest generating companies in the Nordic market are Vattenfall, Fortum, Statkraft and E.ON Sweden. Vattenfall, owned by the Swedish State, leads the market with a share of 22% in terms of output. Fortum is the 3rd largest power generator after Statkraft and the largest electricity retailer in Nordic countries.
- In Norway, 160 companies are engaged in electricity generation; the 15 largest have an 88% market share of Norway.
- In Sweden, 15 large generators have a market share of 94% of the domestic generation.
- In Finland, 15 large companies have a market share of 95%.
- In Norway, there are about a 100 retail companies; in Sweden and Denmark, out of which 80 companies hold the major market share.

The operating procedures and practices have been detailed out in section 6.4. We will describe the taxes and duties applicable to cross-border electricity trading in this section.

Taxes, Duties and Royalty

All the NordPool member states are also member states of the European Union (EU). The Energy tax directive 2003/96/EC which came into force in 2004 includes a common framework for taxing motor fuels, heating fuels and electricity. It also includes exemptions for use of energy products and electricity (Article 15) and out of the scope provisions for energy products and electricity (Article 2(4)). The Directive then included transitional periods for some Member States to progressively reduce their gap with respect to the new minimum levels of taxation. However, if the difference between the national level and the minimum level did not exceed 3% of the minimum level, the Member State concerned was allowed to wait until the end of the period to adjust its national level. Member States offer companies tax incentives in return for specific undertakings to reduce emissions. A proposal to revise the tax structure was presented in 2011 to modernise EU rules on energy taxation. But the same was withdrawn due to unsuccessful negotiations between the EU Member states.

The EU legislation only harmonises the minimum tax/excise rates for the EU Member States. Member States are free to apply excise duty rates above these minima, according to their own national needs. The Energy Taxation Directive (Annex I) establishes the minimum excise duty rates that Member States must apply to energy products for fuel and transport, and electricity. These rates are pegged at 0.5 Euro/MWh for business and 1.0 Euro per MWh for non business. Member States are also allowed to apply other exemptions or reduced levels of taxation where this will not be detrimental to the proper functioning of the Internal Market and will not result in distortions of competition. Norway levies a value-added tax of 25% to energy consumption, after special taxes have been applied.

A Nordpool member pays any and all VAT and other taxes arising in connection with its membership and Trading/Clearing activities and which is payable by that Member under Applicable Law. Reduced tax rates are applicable to a few consumers of electricity under the ambit of the directives. Article 15(3) mentions reduction in taxes and duties for electricity used for agricultural, horticultural or piscicultural works, forestry while Article 15(1)(e) mentions the same for railways, metro, tram and trolley bus respectively.

Key Learnings

- All the NordPool member states are also member states of the European Union (EU). The EU legislation only harmonises the minimum tax/excise rates for the EU Member States. Member States are free to apply excise duty rates above these minima, according to their own national needs.
- The Energy Taxation Directive (Annex I) establishes the minimum excise duty rates that Member States must apply to energy products for fuel and transport, and electricity.
- Such a system gives the flexibility to the Member States to impose taxes suited to their requirements, while also maintaining a balance to the market as a whole.

3.5. PJM Interconnection

PJM Interconnection is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. PJM does not own any transmission or generation assets, rather acts as an agent to provide fair transmission system access for competing suppliers and electricity users. It functions as a publicly traded company which operates and maintains the transmission system and serves the end use customers directly.

PJM Vision: *To be the electricity industry leader – today and tomorrow – in reliable operations, efficient wholesale markets, and infrastructure planning.*

PJM Mission:

- *As the primary task, to ensure the safety, reliability and security of the bulk electric power system.*
- *Create and operate robust, competitive and non-discriminatory electric power markets.*
- *Understand customer needs and deliver valued service to meet those needs in a cost-efficient manner.*

- *Achieve productivity through the efficient union of superior knowledge workers and technology advances.*

The PJM Energy Market comprises all types of energy transactions, including the sale or purchase of energy in PJM's Day-Ahead and Real-Time Energy Markets, virtual markets made up of increment offers (INCs), decrement bids (DECs) and up-to congestion transactions (UTCs), bilateral and forward markets and self-supply. The price for wholesale electricity can be pre-determined by a buyer and seller through a bilateral contract (a contract in which a mutual agreement has been made between the parties) or it can be set by organized wholesale markets.

Taxes, Duties and Royalty

The PJM Interconnection is quite different from other power pools analysed above. PJM is primarily concerned with power trade among states within a single country while other power pools we have considered are concerned with power trading among multiple nations (who would have different tax policies). PJM states tax rates differ, creating a difference in costs for generators based on the difference in states' tax policies.

PJM does not tax on the electricity transaction in the market. In June 2017, Pennsylvania state legislators have attempted to introduce a gross tax (on virtual transactions), which has been opposed by both PJM and members. In the context of additional taxes on virtual transactions, PJM has recently clarified that it neither proposes, nor supports, any new taxes on any members' transactions billed by PJM.

3.6. Relevant WTO regulations and obligations, where applied

The General Agreement on Tariffs and Trade (GATT) and the World Trade Organization (WTO), do not deal with energy as a distinct sector. This is mainly because of history that has seen electricity as a regulated monopolistic sector in a majority of the countries. Electrical energy qualifies as a good under the WTO law and is, as such, subject to the rules of the GATT 1994. Apart from WTO laws, there are several other international laws addressing energy issues.

The Energy Charter Treaty (ECT)¹⁸ is one such international agreement establishing a framework for cross-border cooperation in energy. Its purpose is to create an open and non-discriminatory energy market in the member states. It lays down rules covering the entire energy chain, including energy trade and transport across various national jurisdictions to international markets. It includes trade, transit, investments, dispute resolution procedures and energy efficiency amongst other commercial aspects of energy. It is legally binding for all signatories, though many members are yet to ratify this charter.

The International Energy Charter was the first step in the direction of achieving the objectives conceptualized by the ECT. 72 countries over and above the European Union, European Atomic Energy Community and ECOWAS signed up at Netherlands in 2015.

All the SAARC countries are not members to the Energy Charter Treaty or the International Energy Charter. Afghanistan is a member of the Energy Charter Conference. All the signatories of the European Energy Charter (1991) and International Energy Charter (2015) are observers to the Energy Charter Conference. Pakistan is a signatory to the European Energy Charter while Bangladesh is a signatory to the International Energy Charter (2015). WTO also shares an observer status to the Energy Charter Conference along with ASEAN, IRENA, OECD, World Bank and IEA amongst other international organizations.

Tokyo Declaration on the Energy Charter was adopted by the Energy Charter Conference in the presence of 68 countries and 9 international organizations, including 33 ministerial-level participants in the 27th Meeting held at Tokyo on 25th November 2016.

No obligations are created by the ECT or WTO to the SAARC Member States. Article 16 of the ECT clearly implies that no terms of this Treaty shall affect the terms of other prior or subsequent agreements. WTO encourages and promotes open economy model for trade enhancement. CAREC Countries have accessed to the WTO policies for greater trade openness with simplified trade taxes and eliminated quantitative restrictions, reducing the trade-

¹⁸ (Energy Charter Treaty 2016)

impeding impact of technical regulations and sanitary and phytosanitary measures, expanded trade in services, and capacity building and knowledge sharing on trade issues. Similar, accession may be carried out by SAARC countries for an open economy with free electricity trading and regional electricity market.

4. Assessment of the gaps in existing, relevant laws and regulations of South Asia w.r.t. CBET taxes & duties in comparison to the best international practices

South Asia and particularly SAARC countries have a huge potential for cross-border energy trading which stands unexploited. In the current scenario, only bilateral trade with case to case negotiations for the energy trading frameworks exist. The existence of CBET in the region is still in primitive stages and needs further development. Exhaustive legal, policy and regulatory provisions along with institutional frameworks and a few other aspects aiding CBET are needed to achieve the goal set by the SAARC Framework Agreement for Energy Cooperation. The SAARC member states and other developing neighboring South Asian countries have a huge growth trajectory in the near future which will be primarily driven by energy usage and electricity consumption. With increasing energy demand accompanied by climate change agenda taking the front seat, an enabling environment has to be created even to sustain the existing growth rates. The Electricity Laws, Regulation and Policies (EL&R&P) structures need to incorporate minimum regulatory/legal/policy requirements that are needed to enhance expansion of CBET, and eventually also incorporate provisions that promote CBET.

4.1. Afghanistan

Institutional Framework, Prevailing laws and regulations

Government of Afghanistan created the state owned power sector in 1968 by taking over Electricity Corporation which was a joint sector enterprise. In 1986, the Government enacted Afghanistan's Usage of Electricity Act, making the Ministry of Water and Power responsible for power sector. The act also defines the Right of electricity and development of new renewable energy recourses. The government also created five autonomous enterprises for management of power sector under the Enterprise Act of 1980.

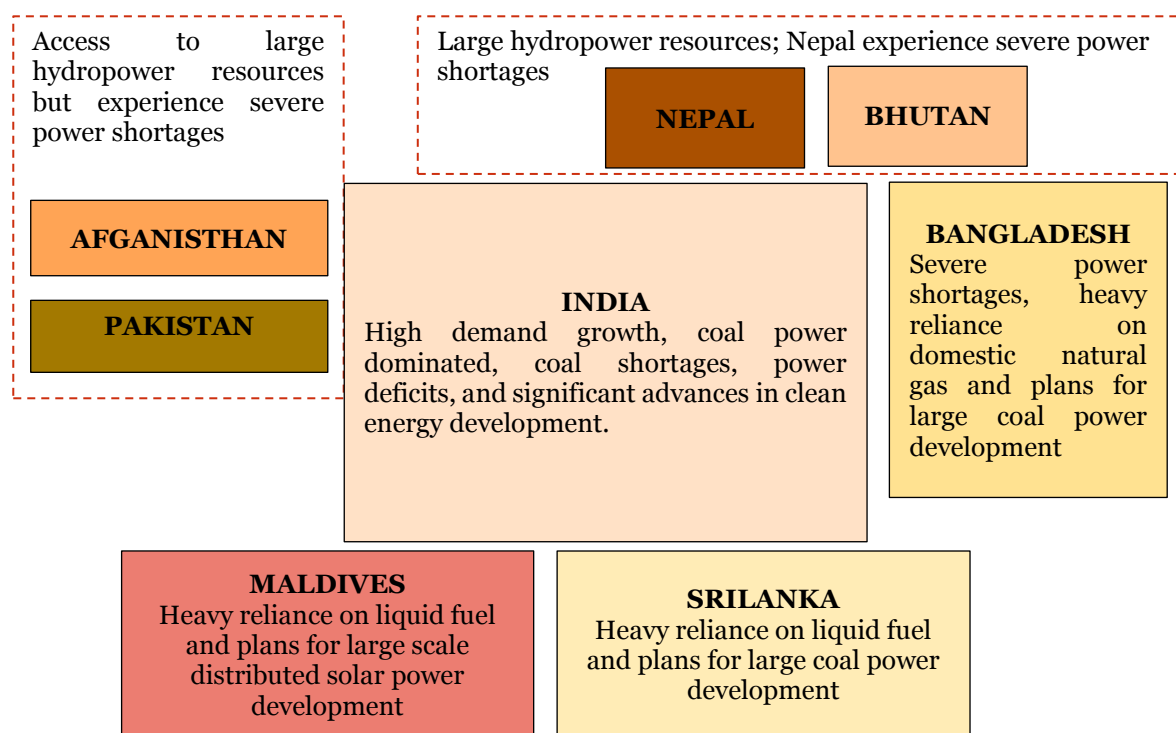


Figure 4-1: Energy resources in various SAARC Countries

DABM (Da Afghanistan Breshna Moassassa) was liquidated by the Ministry of Finance on September 30, 2009. Its assets, staff and other rights & obligations were transferred to DABS (Da Afghanistan Breshna Shekat) on the same date. From 1st October 2009 DABS has assumed vertically integrated responsibility for the management and operation of all electric power assets including generation, transmission and distribution.

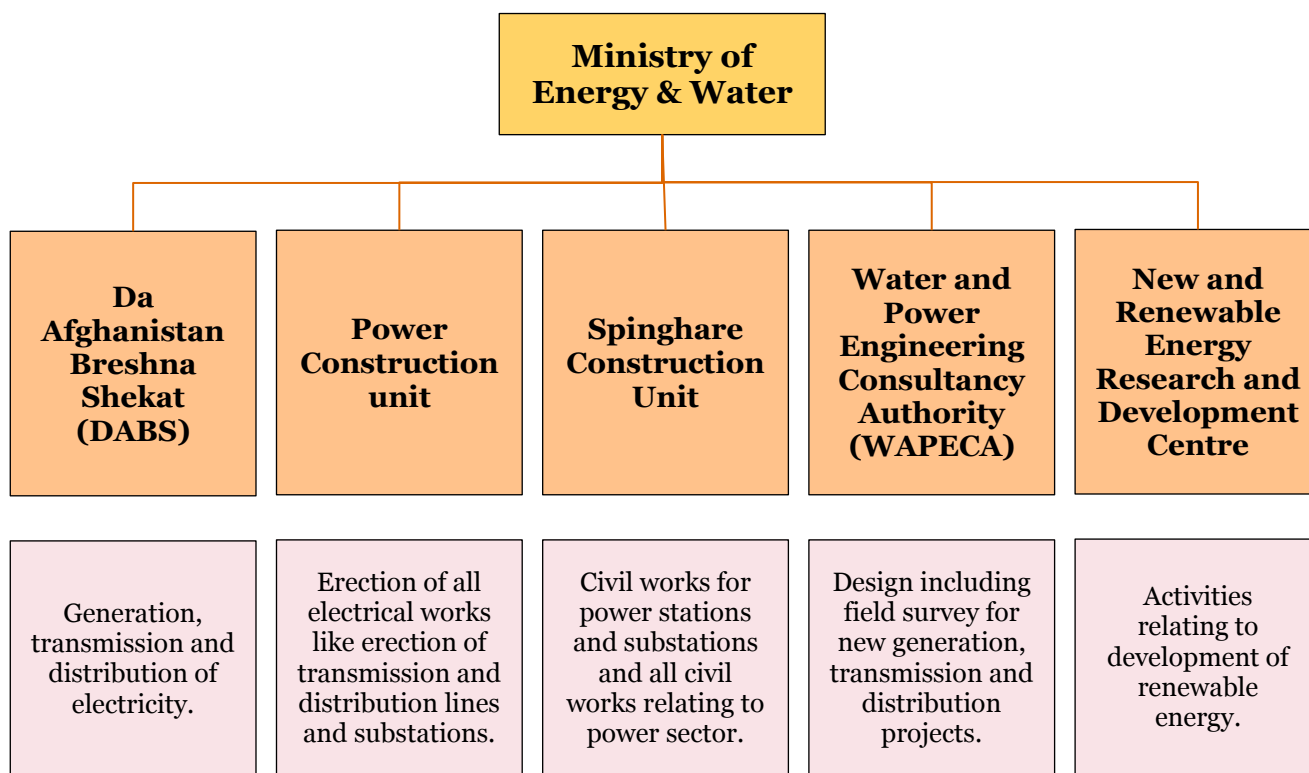


Figure 4-2: Institutional Framework of power sector in Afghanistan

The (MEW) Ministry of Energy and Water is the policy making body in the electricity sector in the country. At present, the policy and regulatory framework governing the electricity sector in Afghanistan is still evolving. A draft law on electricity services was issued in 2009 which was finalized, notified and enacted in 2015. Few aspects related to the scope of this study have been analyzed in section 7.1.

The Turkmenistan, Uzbekistan, Tajikistan, Afghanistan and Pakistan (TUTAP) project intends to meet the energy demands of Afghanistan in its first phase and then transmit sufficient energy to Pakistan, which currently suffers from a severe energy deficit. Pakistan suffers peak electricity shortage during summer while Afghanistan during winter.

Gap Analysis for CBET Taxes and Duties

The newly notified Power Services Regulation Act (2016)¹⁹ in Article 40(2) specifies that taxes will be applicable as per the provisions under the prevailing laws But the laws are silent on the applicability and quantum of taxes and duties on the CBET/ Import/ Export of the Power is not provided. In the absence of any such provision under the laws, it may be assumed that taxes and duties are not applicable on CBET. But a better clarity to the same extent will encourage players in the industry and increase the attractiveness of the sector. The SARPES study recommended a few action points to enable and facilitate CBET and establish the SARPEX. The same are under implementation. The other documents relating to the regulation of power sector in Afghanistan are: Electricity Policy 2003–2010 and the Afghanistan National Development Strategy (Energy Sector Strategy) document which focuses on enhancing electricity supply in the country. While the Electricity Law has been enacted, several policies/regulations such as energy policy, energy efficiency policy, Afghanistan Electricity Regulatory Authority, etc. are still under the draft stage.

¹⁹ (Power Services Regulation Act 2016)

4.2. Bangladesh

Institutional Framework, Prevailing Laws and Regulations

After the creation of Bangladesh in the year 1972, Bangladesh Power Development Board (BPDB) a vertically integrated utility overtook the generation, transmission and distribution of electricity under a special government decree. REB came into being in 1978.²⁰

The licensing and nodal authorities are BERC and the Power Division in MoPEMR (The Ministry of Power, Energy and Mineral Resources). MoPEMR works in close collaboration with a Parliamentary Standing Committee. The Power Division is responsible for formulating policies relating to power and supervising, controlling and monitoring the developmental activities in the power sector. Power Cell assists Power Division in implementing its mandate related to generation, transmission and distribution. BERC regulates the power sector in Bangladesh. The operating entities are Bangladesh Power Development Board (BPDB), Power Grid Corporation of Bangladesh (PGCB), IPPs and Transmission Licensee.

Energy laws of Bangladesh govern the institutional framework for energy generation, distribution and supply of both primary and secondary energy. These laws, statutes, rules and regulations apply to both types of energy.

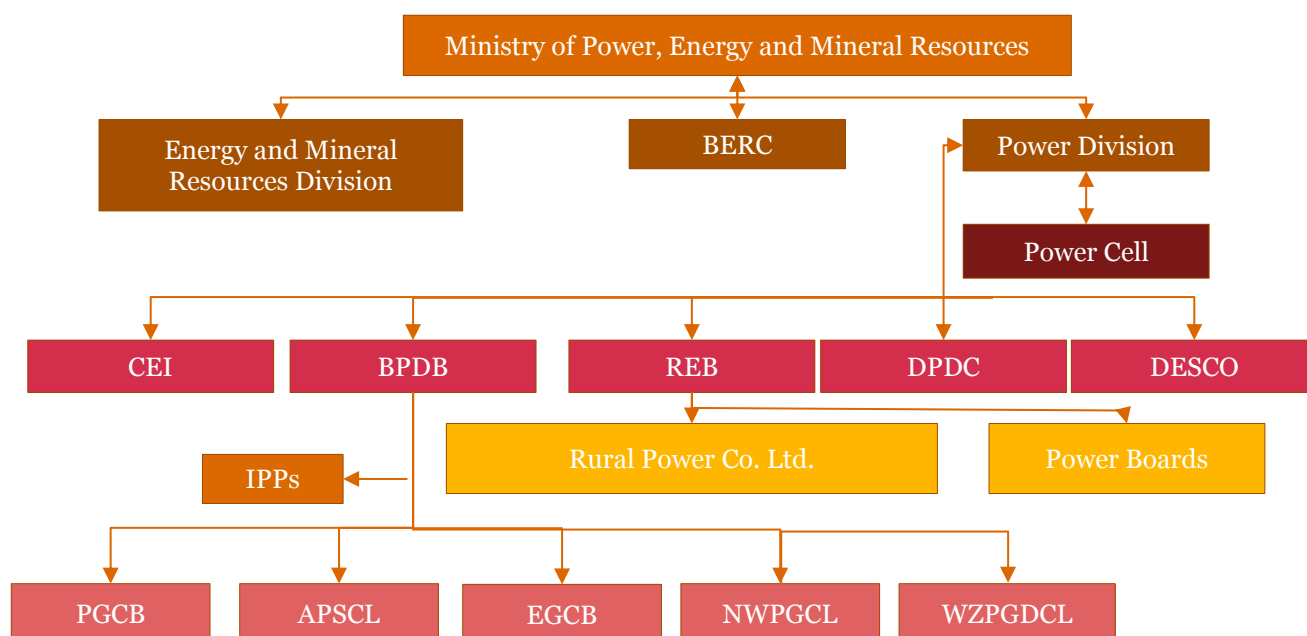


Figure 4-3: Institutional Framework of power sector in Bangladesh

There are six statutory laws and six regulations. The enabling policy framework and acts governing the Bangladesh Electricity Sector are the Electricity Act 1910 (EA 2010), National Energy Policy 2004 and Bangladesh Electricity Regulatory Commission (BERC) Act 2003.²¹

BERC Act, 2003 was enacted to regulate the electricity and gas sector. The Act has taken over all the tasks enunciated in Electricity Act 1910 and given these responsibilities to BERC.

The Private Sector Generation Policy of Bangladesh provides fiscal incentives, including tax exemptions, as following, to the private players:

- Corporate tax exemption for a period of 15 years;
- Repatriation of equity along with dividends will be allowed freely;
- Tax exemption on royalties, technical know-how and technical assistance fees, and facilities for their repatriation;

²⁰ (Review of Bangladesh's Power Sector and Prospects of Increasing Cross-Border Trade 2016)

²¹ (BERC Act 2003)

- Tax exemption on interest on foreign loans; tax exemption on capital gains from transfer of shares by the investing company; avoidance of double taxation in case of foreign investors on the basis of bilateral agreements;
- Exemption of income tax for up to 3 years for the expatriate personnel employed under the approved industry.

The relevant laws and regulations were studied in the “Review of Electricity Laws and Regulation of SAARC Member States” conducted by the SAARC Energy Center. Few aspects related to the scope of this study have been analyzed in section 7.2.

Gap analysis for CBET Taxes and Duties

All these laws, regulations and guidelines relate to the development, promotion and governance of the electricity sector within the country; without any reference to Cross-Border Electricity Trade. Since there are no provisions, rules or clauses that govern Cross-Border Electricity Trade, they neither encourage nor discourage Cross-Border Electricity Trade.²²

There is no reference to taxes and duties on Cross-Border Electricity Trade in any of the above laws, regulations and policy guidelines. The existing policy framework does not provide for imposition of any export tax or import duties, on electricity. As per a recent PPA between NTPC Vidyut Vyapar Nigam Limited (NVVN), a subsidiary of NTPC Limited and BPDB, the former would sell up to 250 MW electricity to the latter. As per this agreement any incidence of export tax or import duty is to be borne by the purchaser. This arrangement is made through bilateral agreements in the absence of any laws specific to CBET taxes and duties. It is generally a better practice to absorb the various taxes and duties and absorb them in the tariffs, as observed in this case.

4.3. Bhutan

Institutional Framework, Prevailing laws and regulations

The erstwhile Department of Power (DoP) under the erstwhile Ministry of Trade and Industry was responsible for all activities related to the power sector in Bhutan till June 2002. The Electricity Act July 2001²³ enabled major restructuring of the power sector. The main objectives of the Act are:

- Promote a safe and reliable supply of electricity throughout the country; and
- Enhance revenue generation through export of electricity.

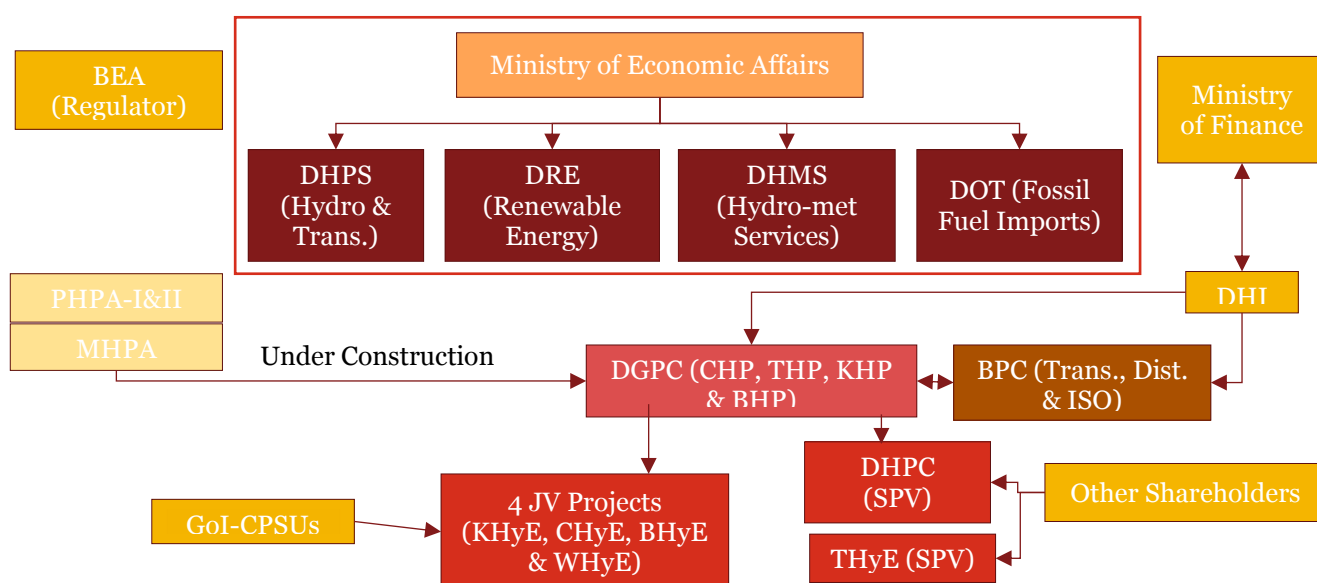


Figure 4-4: Institutional Framework of power sector in Bhutan

²² (Import and Export Policy 2015)

²³ (Electricity Act of Bhutan 2001)

The DoP was split into three organizations, namely:

1. Department of Energy (DoE) for policy making and planning
2. BPC for transmission and distribution of electricity
3. Bhutan Electricity Authority (BEA) for regulating the electricity industry.

Sustainable Hydropower Development Policy of Bhutan 2008 provides the framework and guidelines for accelerated hydropower development. The three Hydro Power Corporations (Chhukha, Basochhu and Kurichhu), which were operating as independent corporations, were merged into a single entity, Druk Green Power Corporation (DGPC) on January 1, 2008. The Department of Hydropower and Power Systems (DHPS) under the Ministry of Economic Affairs (MoEA) formed in 2011 is responsible for developing the long term policies and plans for the energy and power sector. The Department of Renewable Energy (DRE) established in December 2011 under the MoEA serves as the central coordination agency for all matters related to renewable energy development.

The Bhutan Electricity Authority (BEA) established in 2001 functions as the regulator for the power sector in Bhutan. Druk Holding and Investments Limited (DHI) established in November 2007, manages the existing and future investments of the Royal Government of Bhutan. DGPC and Bhutan Power Corporation (BPC) are fully owned by DHI. The Power System Master Plan estimates the overall hydropower potential of Bhutan at 30,000 MW with a production capability of about 120,000 GWh.

The relevant laws and regulations of Bhutan were studied as a part of the “Review of Electricity Laws and Regulation of SAARC Member States” conducted by SAARC Energy Centre. Few aspects related to the scope of this study have been analyzed in section 7.3.

Gap analysis for CBET Taxes and Duties

The Bhutanese Hydro Power Policy 2008, mentions that the Royal Government of Bhutan has the option to avail the royalty power or energy as energy or as cash in lieu thereof based on the highest off-take rate at which the power is sold by the developer to its buyers. The same should be eliminated and absorbed in the tariffs applicable for the hydro power projects. Before power exports, DGPC gives 15% of the power it generates as an energy royalty to the government, which sells it to BPC at discount prices.²⁴ This results in a loss of export revenues and can be considered a subsidy from the export sector to the domestic sector.

The trade policy, in addition to bilateral arrangements for CBET, should also clearly provide for exemption from export tax/import duty/transit tax for cross-border trade of electricity through any other means such as power exchanges. Export, import and transit of electricity should be exempted from licensing by the relevant commerce ministry/department. The same has been discussed separately in chapter 7 of the report.

4.4. India

Institutional Framework, prevailing laws and regulations

Electricity is a concurrent subject as per Entry 38 in List III of the Seventh Schedule of the Constitution of India. The Ministry of Power started functioning independently with effect from 2nd July, 1992 and is primarily responsible for development of electrical energy in the country. Ministry of New and Renewable Energy (MNRE) is the nodal Ministry of the Government of India for all matters relating to new and renewable energy. Department of Atomic Energy (DAE) came into being on August 3, 1954 and has been engaged in the development of nuclear power technology, applications of radiation technologies for use in other fields, and research. State Governments have powers to formulate and implement policies and projects at the state level, in conformity with the national laws. Reforms in the state power sector led to unbundling of the erstwhile State Electricity Boards (SEBs) owned by State Governments, on operational lines (Generation, Transmission and Distribution) called the GENCOs, TRANSCO and DISCOMs. The Electricity Act, 2003 sought to create a liberal framework for

²⁴ (DGPC 2016-2019 Tariff Review Report 2017)

development of the power industry²⁵, promote competition, protect interests of consumers and supply electricity to all, rationalize electricity tariffs and ensure transparent policies and promotion of efficiency, among others.

The main features of the Act have been laid out below:

1. It encouraged more competition in the sector by unbundling SEBs into generation, transmission and distribution utilities;
2. Thermal generation and captive generation were de-licensed;
3. Non-discriminatory open access in transmission was granted to all generators;
4. Mandatory metering, stringent punishment of electricity theft and multi-year tariffs were introduced to curb financial losses of SEBs. Furthermore, state governments were required to provide an advance subsidy to certain target groups through their budgets, if the tariffs were to be set lower than the regulated tariff;
5. The act included a purchase obligation of renewable-based electricity. The amendment of this Act in 2007 loosened some reformative features including the elimination of the cross-subsidy that levies surcharges on industrial consumers to subsidize other groups, particularly agricultural consumers.

The National Tariff Policy, 2006 ensured competitive procurement by specifying that distribution licensees should procure long-term power through tariff-based bids under a multiyear tariff framework with a control period of three to five years.

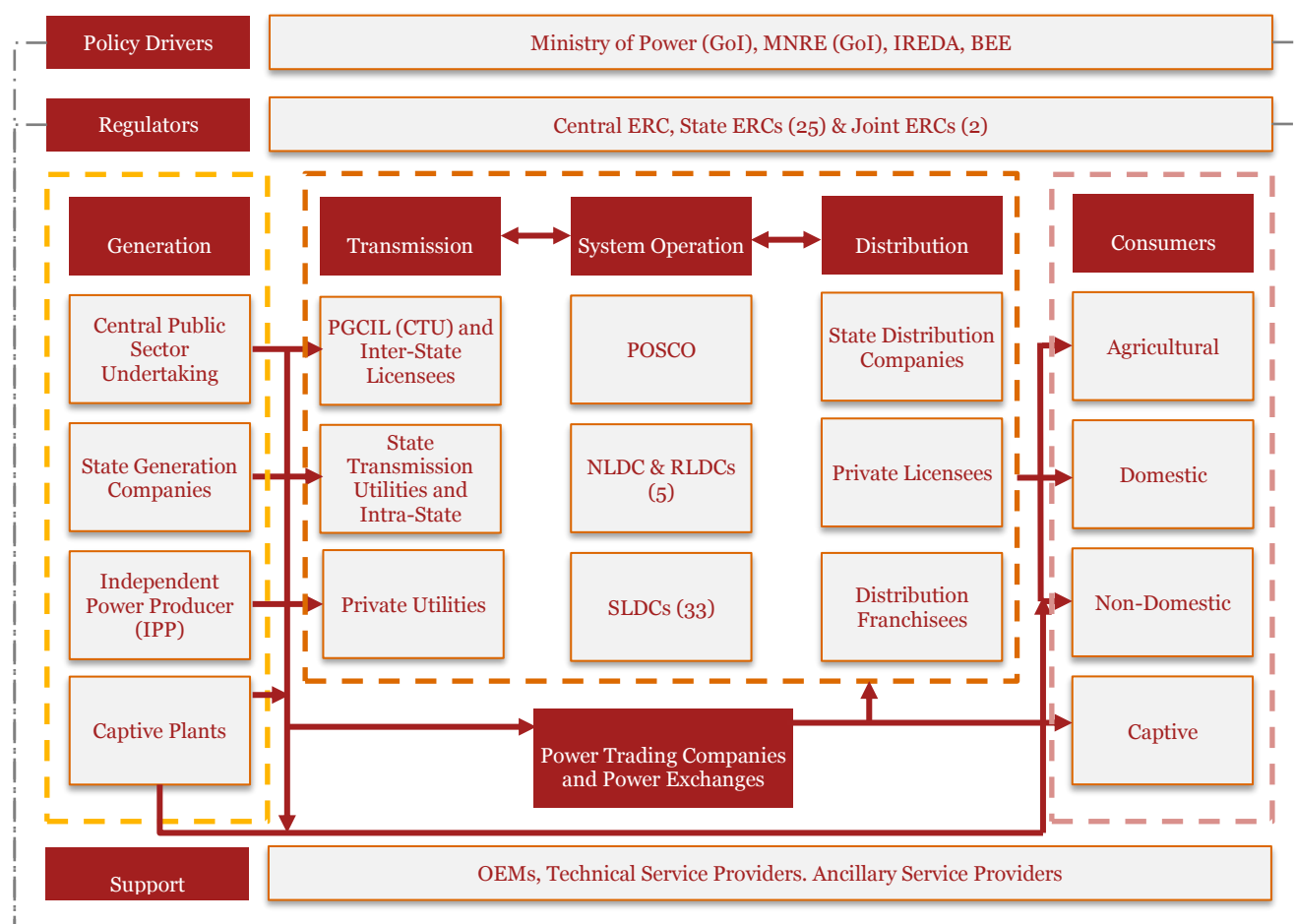


Figure 4-5: Institutional Framework for Power Sector in India

The Amended National Tariff Policy amongst its other objectives, promotes hydro power projects greater than 100MW on cost-plus basis and removes market uncertainty by allowing pass through the impact of any change

²⁵ (The Electricity Act 2003)

in govt. levied taxes or duties in competitive bid projects. Both these impact areas are relevant for Cross-Border Electricity Trade as 4 major countries namely Afghanistan, Pakistan, Nepal and Bhutan have high Hydro Power potentials.

Until 2013, import of electricity to India was in restricted category requiring an import license which had to be renewed every year. Thereafter, cross-border electricity imports has been delicensed/ put under Open General License (OGL) implying there are no imposed restrictions on the trade of such commodity.

The Draft National Energy Policy, 2017 focuses on Cross-Border Electricity Trade under the areas of supply intervention by the government and aims to foster cross-border trade of petroleum products and electricity especially with neighbors (Nepal, Bhutan, Bangladesh, Myanmar, Sri Lanka, China and Pakistan). This would lead to enhancement of our energy security.

The Ministry of Power has already notified the Guidelines on Cross-border trade of electricity²⁶ and the draft Central Electricity Regulatory Commission (Cross-Border Trade of Electricity) Regulations, 2017²⁷ which specifies that taxes, cess, statutory duties and levies shall be payable by the applicants as per the applicable laws of India and the neighboring country in chapter 5, Clause 37.5. Few aspects other than taxes and duties, related to the scope of this study have been analyzed in section 7.4. It is advisable to work towards elimination of discrepancies, and absorption of the miscellaneous taxes and duties in the tariff framework.

	Upstream	Midstream	Downstream
Renewable Energy	<ul style="list-style-type: none"> Enhance capacity and generation, including of nuclear power, large hydro, biomass and offshore wind. 	<ul style="list-style-type: none"> Increased grid integration of renewables and adoption of battery and pumped storage. Efficient market for uptake of renewable electricity. Achieve flexibility in coal power plants. 	
Electricity	<ul style="list-style-type: none"> Higher adoption of ultra super-critical/IGCC. Policy support for decentralised generation/CCS. Promote uranium exploration. 	<ul style="list-style-type: none"> Need for a robust Transmission & Distribution Infrastructure, an efficient Electricity Market and improved financial status of DISCOMs. Achieve Universal Electrification 	
Cross-Border Trade	Fostering Cross-Border Trade of petroleum products and electricity especially with neighbours (Nepal, Bhutan, Bangladesh, Myanmar, Sri Lanka, China and Pakistan) which would enhance our energy security.		

Figure 4-6: Areas of Supply Sector Intervention: National Energy Policy Draft 2017

The relevant laws and regulations for India were studied as a part of the “Review of Electricity Laws and Regulation of SAARC Member States” conducted by SAARC Energy Centre.

Gap analysis for CBET Taxes and Duties

With respect to the Indo-Nepal agreement, there is uncertainty about levy of customs duty on the import of electricity, particularly, in the minds of the IPPs. Electricity import was a restricted item in India until July 2013, requiring an import license. On 5th July 2013, Import Policy of Electrical Energy was amended whereby Schedule 1 (Import Policy) was revised from "restricted" to 'free'. Currently, the import of electricity (HS-code 27160000) into India does not attract any import duty (basic duty, countervailing duty or special countervailing duty). However as per the Customs tariff defined for FY 2013-14, an import duty of Indian rupees 2/- per unit is indicated on the electrical energy imported to India²⁸. This has been exempted to 'nil' under the general

²⁶ (Guidelines on Cross Border Trade of Electricity 2016)

²⁷ (Cross Border Trade of Electricity Regulations 2017)

²⁸Chapter 27, CBEC Customs Tariff 2013-14

exemption no. 165²⁹ by the Central Board of Excise and Customs (CBEC) under Ministry of Finance. The regulations in place are silent on the energy export related taxes and duties. Also, the waiver of the import duty on energy imports may be formalized by repealing the previous orders.

Draft regulations mentioning “taxes, cess, statutory duties and levies shall be payable by the applicants as per the applicable laws of India and the neighboring country” should be waived off for SAARC countries to meet the objective set under Article 4 of the SAARC framework agreement on Energy Cooperation, 2014.

4.5. Maldives

Institutional Framework, prevailing laws and regulations

Since the introduction of electricity in 1949; the Government Department of Maldives under different names like “Department of Electricity” and “Maldives Electricity Board” managed the electricity sector in the country until 1997, when “State Electric Company”, STELCO, was formed. State Electric Company Ltd, STELCO, is wholly owned by the Government. Its core business includes power generation, distribution and retail. It operates 28 power systems in 33 islands, providing electricity to 60% of the population of the country.

The Maldives Electricity Bureau (MEB) is responsible for regulating generation, distribution, and utilization including tariff setting. While the MEB has established the electricity standards by adopting the Singapore standards, it lacks the resources to implement them.

The Maldives National Energy Policy & Strategy, 2010 framed by the Ministry of Housing and Environment also recognizes the limitation that Maldives does not have the option of electricity transfer from even the nearest country i.e. Sri Lanka due to its locational disadvantage. Moreover, Maldives does not have any conventional fuel to generate electricity. Hence the policy lays stress on development of renewable energy resources, energy efficiency and reducing oil imports which is the main source for generation of electricity in the country. Another important challenge that the country is facing is climate change, threatening the submergence of the atolls that the country is comprised of. The energy policy has therefore laid the goal of Maldives becoming a carbon neutral country by 2020.

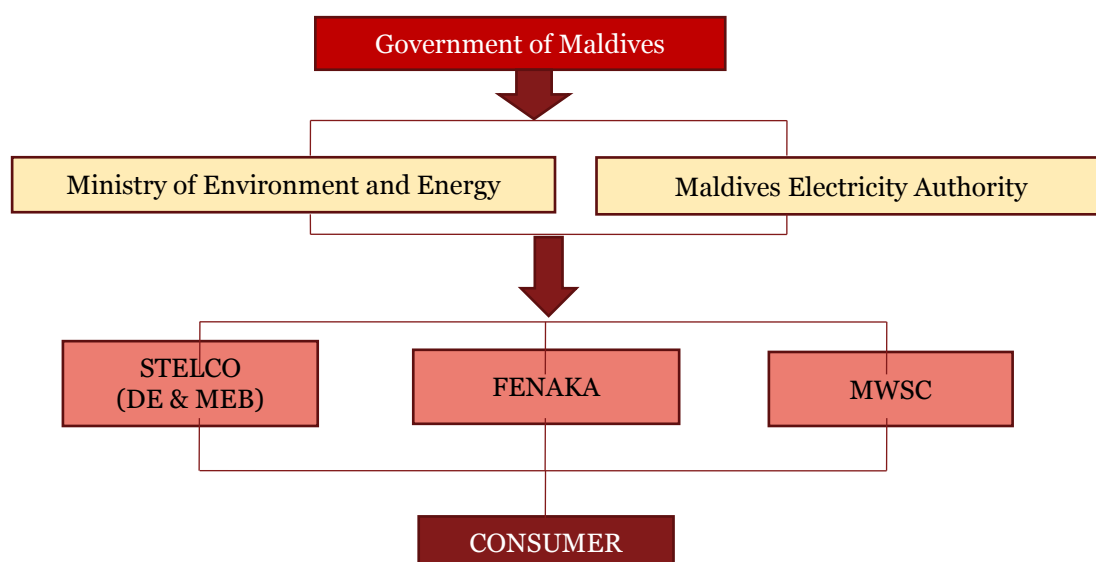


Figure 4-7: Institutional Framework of Maldives Power Sector

²⁹General exemptions, CBEC Customs Tariff 2013-14

Maldives power sector is expected to remain an isolated system far away from the South Asian mainland. It is, therefore, understandable that the government of Maldives has not laid much emphasis on the Cross-Border Electricity Trade aspects while formulating their electricity laws and regulations. SARPES also did not have any specific recommendations for Maldives to facilitate Cross-Border Electricity Trade.

The Maldives Energy Authority (MEA) is an independent regulatory organization affiliated to the Ministry of Environment and Energy. It operates under the guidance of a governing board and is mandated to regulate the energy sector through the implementation of the relevant regulations. MEA is the delegated authority under the public utilities law 4/96 and by presidential decree.

There were no recommendations for Maldives in the SARPES report because of its geographical locational disadvantage to trade in electricity.

Gap analysis for CBET Taxes and Duties

Currently Maldives has no arrangements for CBET due to its geographical positioning disadvantage and hence no formal policy on taxes and duties on CBET exist.

4.6. Nepal

Institutional Framework, prevailing laws and regulations

Electricity sector operations within Nepal are governed by the Development Ministry of Energy through the Department of Electricity Development, Water and Energy Commission and the Nepal Electricity Authority. For the development of renewable energy sources, the GON has established the Alternative Energy Promotion Centre (AEPCC) which is a part of the Ministry of Population and Environment.

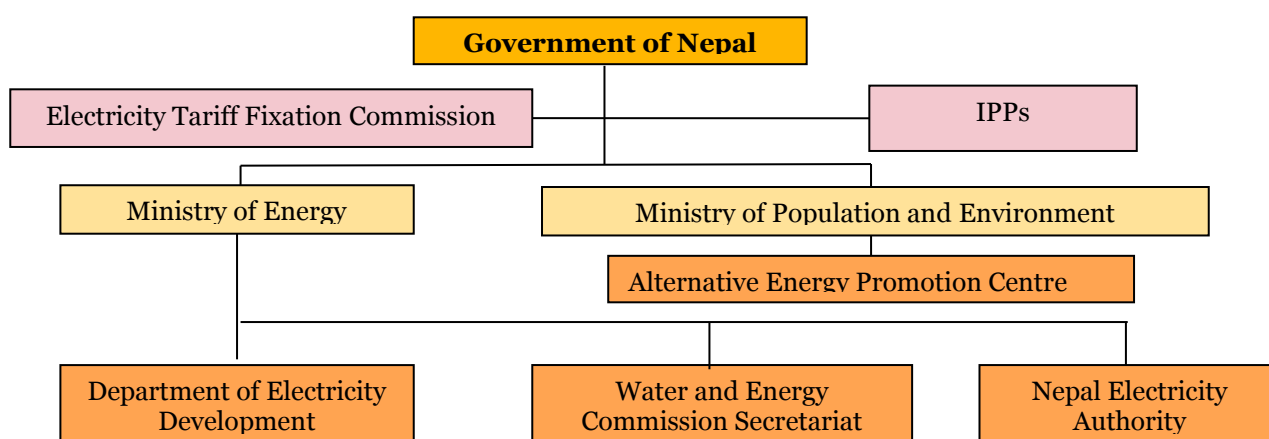


Figure 4-8: Institutional Framework of Nepal Power Sector

The Electricity Tariff Fixation Commission (ETFC) was set up in 1994 with a limited mandate to recommend retail tariff to the government. The bill for establishment of an independent electricity regulatory is still awaiting approval of the parliament. A Proposed Bill for enactment of a new Electricity Act is being envisaged with the main features including:

- Formation of the Electricity Regulatory Commission and Electricity Tribunal.
- Revision of the licensing procedure. Licensing is being proposed through competitive bidding process and also by formulation of screening criteria for developers.
- Preparation of guidelines for hydropower development strategy including identification of projects by surveys, potentials, priorities, export possibility and others issues.

The NERC bill (2008) explicitly recognizes electricity trading and development of a competitive market. The bill has been recently ratified in March 2017 by the Parliament of the Government of Nepal after a lot of delay.

Import and Export of Electricity

Section	Salient Features
Section - 22	<ul style="list-style-type: none"> The licensee desiring to distribute electricity by importing the same within Nepal, may do so by obtaining prior approval of Govt. of Nepal as prescribed. The licensee desiring to export electricity generated on its own to the foreign country may do so by entering into an agreement with the Government of Nepal on such matter. The exporter of electricity pursuant to sub-section (2) shall have to pay export duty as prescribed to the Government of Nepal

Royalty and free power

As per the EA Act 1992³⁰, the licensee shall have to pay royalty to the Government at a rate of Rs. 100 for each installed kilowatt of electricity per year plus 2% of the average tariff per unit (per kilowatt hour) for a term of up to 15 years from the date of generation of electricity for commercial purpose. The initially proposed royalty to be given to Nepal is shown below.

Table 4-1: Proposed rate of Royalty

Type	Up to 15 years		After 15 years	
	Annual Capacity royalty per kW	Energy royalty per kWh	Annual Capacity royalty, per kW	Energy royalty per kWh
Export oriented run-of-river project	NRs 400	7.50%	NRs 1,800	12%
Export-oriented storage project	NRs 500	10%	NRs 2,000	15%

Explanation

- The royalty rates referred above shall be applied on the projects built on a commercial basis with installed capacity up to 1000 MW. In the case of projects with capacities up to 1000 MW and built on a non-commercial basis, 15% (fifteen per cent) of power and energy shall be charged as royalty per annum on the basis of monthly power and energy generation capacity from the date of commencement of production.
- In the case of export-oriented projects with an installed capacity of more than 1,000 MW, the rate of royalty shall be settled by negotiations.
- In the case of hydropower projects which sell energy for internal consumption and exports the remaining energy, the energy fee equivalent to that chargeable for the export oriented project shall be charged on the quantum of energy exported abroad.
- The royalty shall have to be paid in the same currency in which the exported electricity is sold.

The following formula was initially proposed by Nepal to work out the energy royalty and the capacity royalty:

<ul style="list-style-type: none"> Energy Royalty = (Generated Energy-Self Consumption) X Average Selling Price X Energy Royalty Rate. Capacity Royalty = Base Rate X (1+.05)^(year of royalty payment – year of generation license obtained) X Installed Capacity (kW)

It can be seen from the above formula that capacity royalty increases at a compounding rate of 5% year after year. High capacity royalty in later years due to compounding is an issue. However, the matter is still under discussion.

- Free power:** While the royalty is payable in cash, free power is payable in kind. There is no fixed rule for the quantity of free power and it varies from project to project.
- Taxes and duties:** It is understood that there is a provision of 0.5% export tax on electricity.
- Income Tax:** As per Income Tax Act 2002 (including amendment made by Finance Act, 2015), an energy project is required to pay 20 percent of its net (taxable) profit as corporate income tax. Further, this Act also provides 100 percent income tax exemption for the first ten years, and thereafter, 50 percent income tax

³⁰ (Electricity Act 1992)

exemption for an additional five years, if the licensee of the energy project commercially commences its generation, transmission or distribution within 13 April 2024.

- **Value Added Tax (VAT):** Electricity Act exempts payment of value added tax (VAT) on imported plant, machinery and equipment necessary for operation and maintenance and their spare parts for projects involved in generation, transmission and distribution of electricity, in case such machineries and equipment are not manufactured in Nepal. As per Value Added Tax Act, the normal VAT rate is 13 percent which is applicable to sale of goods or services. Pursuant to the VAT Act, sale of electricity by the energy project is exempted from VAT and energy project is not required to be registered under VAT law.
- **Customs Duty:** However, as per the Customs Act 2006 (including amendment made by Finance Act 2015) and the Electricity Act; one percent customs duty is levied on import of plants, machineries, and equipment necessary for operation and maintenance and their spare parts required for generation, transmission and distribution of projects.

The relevant laws and regulations for Nepal were studied as a part of the “Review of Electricity Laws and Regulation of SAARC Member States” conducted by SAARC Energy Centre. Few aspects related to the scope of this study have been analyzed in section 7.6.

Gap analysis for CBET Taxes and Duties

Currently, there is a provision for 0.5% export tax on electricity. This is not in sync with the Article 4 of SAARC Energy Framework to create a zero tax regime. Few reports mention the same being waived off at times. A waiver is needed to further facilitate CBET. Trade policy should exempt export tax/import duty/transit tax for cross-border trade of electricity including that through a power exchange. Export, import and transit of electricity should be exempted from licensing by the relevant commerce ministry/department. Also, provisions laid down for the royalty charged needs to be amended so as to align it to the SAARC framework agreement. Clarity is needed regarding the applicability of taxes, duties and royalty to understand the situations under which they are waived off.

4.7. Pakistan

Institutional Framework, prevailing laws and regulations

Electricity generation, transmission and distribution are under the domain of Ministry of Water and Power, except for atomic power generation, which is under the Atomic Energy Commission of Pakistan. Water and Power Development Authority (WAPDA)’s power wing was restructured through the “Strategic Plan for the Privatization of Power Sector” into twelve distinct autonomous entities under the Companies Ordinance, 1984, comprising three generation companies, one transmission company and eight distribution companies. Post restructuring, WAPDA is now responsible for production and development of electricity from hydro power sources. Electricity is generated, transmitted and distributed in Karachi by the Karachi Electric Supply Company (KESC) since Karachi is not covered under the jurisdiction of WAPDA.

The Alternative Energy Development Board (AEDB) has been formed by an Act of Parliament pursuant to the Alternate Energy Board Act, 2010 (AEDB Act). The National Electric Power Regulatory Authority (NEPRA) was established pursuant to the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997³¹ (“NEPRA Act”) in 1997 to regulate the power sector.

National Transmission & Despatch Company (NTDC) Limited was incorporated on November 6, 1998 and commenced commercial operation on 24th December, 1998 by taking over assets owned by WAPDA. NTDC was granted Transmission License on 31st December 2002 by NEPRA to engage in the exclusive transmission business for a term of thirty years, pursuant to Section 17 of the NEPRA Act.

³¹ (Regulation of Generation, Transmission and Distribution of Electric Power Act 1997)

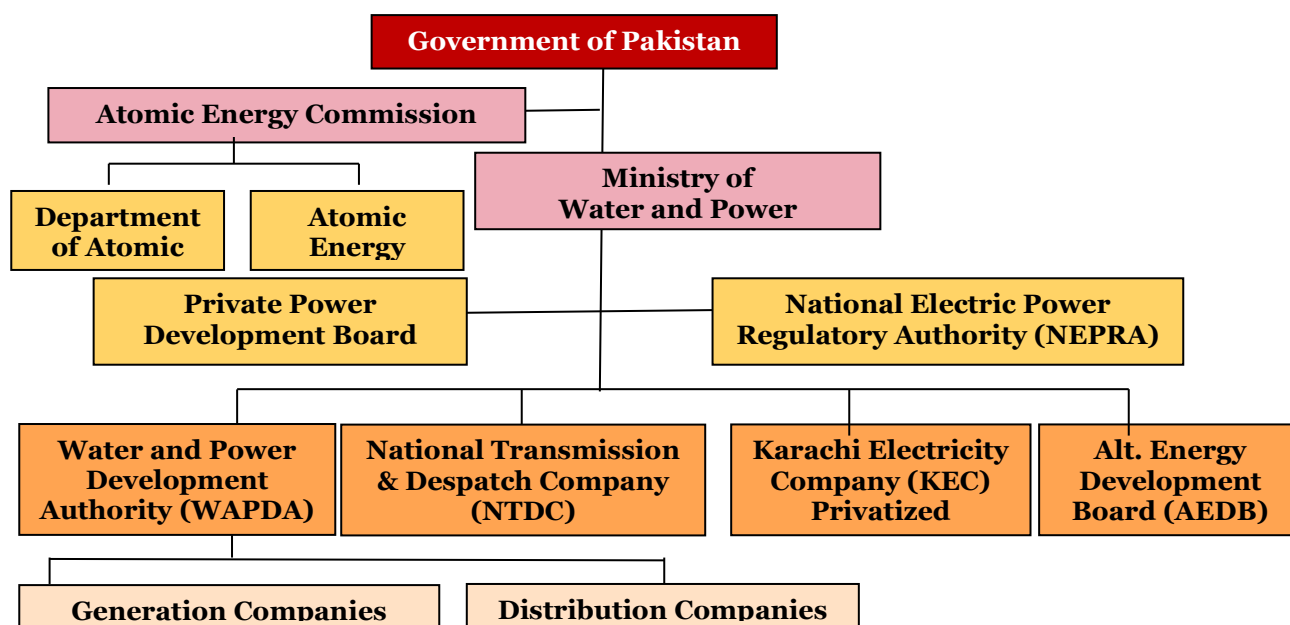


Figure 4-9: Institutional framework of Power sector in Pakistan

The following laws and regulations pertaining to Pakistan were relevant for the purpose for this study:

- Electricity Act, 1910
- Electricity Rules, 1937
- Punjab Electricity Act, 1939
- Punjab Electricity (Emergency) Powers Act, 1941
- The Punjab Electricity (Emergency Powers) (Control of Supply) Act, 1949
- The West Pakistan Electricity Duty Rules, 1964
- The Electricity Control Ordinance, 1965
- The Electricity Control (West Pakistan) Order, 1966
- The Sindh Electricity Control Act, 1952 which is no longer in force, and has been superseded by the Karachi Electricity Control Act, 1952.
- Power Generation Policy, 2015
- Transmission Policy

The subject under discussion is not appropriately addressed in any of the above laws and regulations. The benefits and incentives offered by the 2015 Power Generation Policy include guarantee by the GOP of the payment obligations of power purchaser, in cases where it is a federal entity under the GOP implementation agreements. A protection against changes in the tax and duty regimes has also been provided in Policy 2015. These benefits are available to Hydro, Thermal and PPP mode power projects but not to the renewable energy projects that have been implemented under the Renewable Energy Policy. The Transmission Policy provides fiscal and non-fiscal incentives to prospective investors in transmission line projects offered to the private sector.

The relevant laws and regulations for Pakistan were studied as a part of the “Review of Electricity Laws and Regulation of SAARC Member States” conducted by SAARC Energy Centre. Few aspects related to the scope of this study have been analyzed in section 7.7.

Gap analysis for CBET Taxes and Duties

Currently, there is no import duty levied on import of electricity in the existing arrangement of 100 MW of electricity import from Iran. The CASA framework as well as the CAREC countries TUTAP agreement framework are in advanced stages of formulation. Hence formal regulations should include that Cross-border Trade of Electricity through a Power Exchange should be exempted from export tax, import duty or transit tax by the trade policy. Export, import and transit of electricity should be exempted from licensing as well.

4.8. Sri Lanka

Institutional Framework, Prevailing laws and regulations

The Ministry of Power and Energy (MOPRE) is the main body responsible for the management of the power sector. MOPRE is mandated to formulate and implement policies, programs, and projects pertaining to power and energy.

Established in 1969, the CEB is empowered to generate, transmit, distribute and supply electricity in the country. The Electricity Act of 2009 caused CEB's businesses of (i) generation, (ii) transmission and bulk supply operations and (iii) distribution and supply to be separately licensed. The entire 220 kV, 132 kV and 33 kV network is owned and operated by the CEB.³²

Lanka Electricity Company (LECO) was established in 1983 to distribute electricity in areas previously served by Local Authorities (Municipal Councils etc.). LECO receives electricity from CEB at 11 kV and distributes in LECO franchise areas. LECO serves about 10% of the electricity customers in the country.

Sri Lanka Sustainable Energy Authority (SEA) was established on 1st October 2007 under the Sri Lanka Sustainable Energy Authority Act No.35 of 2007 to consolidate the gains realized through sustainable energy development, in both renewable energy and energy efficiency spheres. Established in July 2003, the Public Utilities Commission of Sri Lanka (PUCSL) is mandated to act as the economic, technical, and safety regulator for electricity industry.

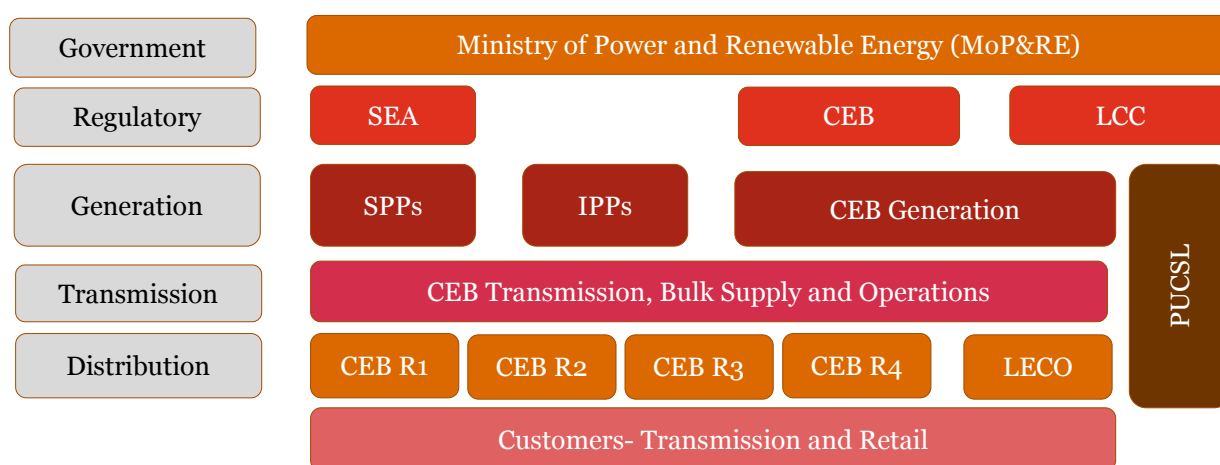


Figure 4-10: Institutional Framework of Sri Lanka Power Sector

According to Section 3.2 of the National Energy Policy, to ensure energy security, the policy emphasized on the promotion of regional cooperation in different forms including viable cross-border energy transfer with neighboring countries.

The relevant laws and regulations for Sri Lanka were studied as a part of the “Review of Electricity Laws and Regulation of SAARC Member States” conducted by SAARC Energy Centre. Few aspects related to the scope of this study have been analyzed in section 7.8.

Gap analysis for CBET Taxes and Duties

Customs duty is levied on the import of electricity into Sri Lanka. The duty can be waived under the Strategic Development Act. Trade Policy should exempt cross-border electricity trade including that through a Power Exchange from custom duty, export tax or transit tax.

³² (Sri Lanka Energy profile 2013)

4.9. HS Code Comparison and Subsidies for Electrical Energy

For all countries, standardization of commodities is extremely necessary for classification of import and export items. HS Codes, which stands for harmonized system codes, came into effect in 1988 and is internationally accepted system of classification and nomenclature of goods & commodities used and traded in global market. These are six, eight and four digit codes and all the goods that are traded globally are categorically classified according to these HS Codes. Information related to these goods are available under their respective HS codes list, which is developed and maintained by an independent intergovernmental organization namely, World Customs Organization (WCO). This list is accepted by over 200 member countries. HS classification, the process of assigning HS codes to the products, is mostly developed to unify the international tariffs and customs for all nations.

HS code classification is used by customs authority, statistical agencies and other governmental organizations for monitoring, and controlling the trading of goods and commodities, collecting taxes, duties and transport tariffs. HS Codes are vital for international traders as all the information about all the goods and commodities traded in international market are available on the basis of these HS codes.

In the current context of trading of electrical energy, it is also essential that electrical energy is classified and accepted uniformly by all Member states, for the purpose of harmonization of taxes and duties applicable on electrical energy.

Electrical Energy is classified under the HS Code list as “HS Code: 27160000” where in “27” means chapter 27 which stands for “Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes” under section 5- Mineral products. Though electrical energy currently can be produced from renewable sources as well, but still the HS code classifies it as a byproduct of the minerals and fossil fuels. In the current scenario, it may be considered prudent to classify electrical energy separately depending on its generating source.

The current classification of electrical energy under the HS code and the various duties applicable on the same in the SAARC Member States are provided in the table below. Sri Lanka and Maldives do not explicitly provide for the HS code of electrical energy in their respective customs tariff lists.

Table 4-2: HS Codes for Electrical Energy for SAARC Member States

India			
Sl. No	HS Code	Item Description	Standard Rate (INR/kWh)
160	2716 00 00	All goods, other than goods mentioned at S. No. 162, 163, 164, 165 and 166.	Nil
161	2716 00 00	Electrical energy originating from Nepal and Bhutan	Nil
162	2716 00 00	Electrical energy supplied from Processing Area of SEZ to Domestic Tariff Area (DTA), generated using-	
		(a) imported coal as fuel	0.40
		(b) domestic coal as fuel	0.65
		(c) mix of domestic gas/RLNG as fuel	0.59
		(d) RLNG as fuel	0.89
163	2716 00 00	Electrical energy supplied from Non-Processing Area of SEZ to Domestic Tariff Area, generated using	
		(a) imported coal as fuel	0.24
		(b) domestic coal as fuel	0.24
		(c) mix of domestic gas/RLNG as fuel	0.18
		(d) RLNG as fuel	0.21
164	2716 00 00	Electrical energy supplied to DTA by power plants of 1000MW or above, and granted formal approval for setting up in SEZ prior to 27th February, 2009.	Nil

165	2716 00 00	Electrical energy supplied to DTA from power plants of less than 1000MW, and granted formal approval for setting up in SEZ prior to 27th February, 2009-							
		(a) imported coal as fuel					0.24		
		(b) domestic coal as fuel					0.24		
		(c) mix of domestic gas/RLNG as fuel					0.18		
		(d) RLNG as fuel					0.21		
Pakistan									
Code	HS Code	If imported from Bangladesh, Bhutan, Maldives or Nepal (LDCs) (%)					If imported from India or Sri Lanka (NLDCs) (%)		
2716	Electrical Energy	5%					5%		
Nepal									
HS Code	Item Description	Customs Duty(for all countries)							
27160000	Electrical energy	Nil							
Bhutan									
HS Code	Item Description	Customs Duty (for all countries)							
27160000	Electrical energy.	Nil							
Afghanistan									
HS Code	Item Description	Volume			Import Duty		SAFTA Import Duty		
2716	Electrical energy	1000 KW			2.50%		2.50%		
Bangladesh									
HS Code	Item Description	CD(%)	SD(%)	VAT(%)	AIT(%)	RD(%)	ATV(%)	TTI(%)	EXD(%)
27160000	Electrical energy.	5	0	15	5	0	4	30	0

Customs Duty : CD Supplementary Duty: SD Value Added Tax: VAT Advance Income Tax: AIT
 Regularity Duty: RD Advance Trade VAT: ATV Total Tax Incidence: TTI Excise Duty: EXD

The disparity as seen from the above table for the treatment of electrical energy for the purpose of customs in SAARC member states should be eliminated to facilitate the Cross Border Electricity Trade and realize the goals set by Article 4 of SAARC Framework Agreement. Similar treatment of electrical energy would facilitate the coherent formation of uniform tax laws for the SAARC region. This would remove the taxation barriers on CBET implementation and also increase the ease of doing business by various buying and selling entities.

Subsidies on Electricity

Subsidies on sale of electricity to end consumers i.e. through retail tariffs largely benefit the consumers. An instance of such subsidy is the Tariff differential Subsidy provided by the Government of Pakistan. Such subsidies are intended to compensate utilities for the difference between their cost-recovery tariffs and lower actual tariffs charged due to political intervention. While a part of these subsidies go to households, a major portion also is allocated to industries and agriculture sector.

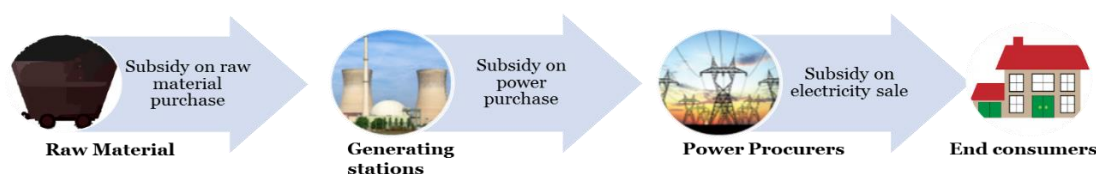


Figure 4-11: Subsidies on Electricity

Similarly, subsidies on the power procurement and raw material consumption are meant to facilitate and provide low cost power generation to the utilities. These kind of special treatment are primarily intended to revive the utilities or to protect them against the growing raw material prices. Such subsidies introduces non-competition amongst the players in the market. Any such treatment to the domestic players may render the other players incompetent in that particular market.

CBET would flourish and grow only if free market trading and competition is encouraged, so that any player can compete with its other domestic as well as international competitors in terms of tariffs. On one hand, subsidies on sale of electricity to consumers incentivize consumption and increase energy demand in low per capita energy consumption countries like SAARC Member States. On the other hand, inefficient subsidies like the one in power procurement sides can lead to fiscal pressure, non- competitiveness, harmful emissions, and potentially hinder sustainable green growth. The SAARC countries have provided power procurement side subsidies in the past. It may be prudent for them to eliminate all such subsidies and encourage a free market economy.

4.10. The Way Forward with respect to managing the minimum, critical gaps as assessed during this study

The SAARC Framework Agreement specifies that “Member States may work towards exempting from export/import duty/levies/fees etc. for cross-border trade and exchange of electricity between Buying and Selling Entities.” The review and analysis of country-specific laws have been presented in the sections prior to this. The current scenario of CBET mostly is in the form of bilateral trade agreements and Memorandum of Understandings between the Governments of two Member States as discussed in Section 2.3.

The establishment of regional electricity trade and a free market mechanism would require incentivization of CBET including, but not limited to abolition/waiver of the taxes/duties/levies/fees or royalty as applicable under the governing laws of the Member State. CBET related regulations and guidelines are being gradually notified/enacted and expedited in the recent past expressing the underlying interests of the Member States to meet its power demand. Under the intergovernmental agreements, taxes are found to be waived off except in a few cases. The income taxes paid by the generation and distribution companies/utilities are not considered for review as they do not engage in the activity of CBET per se. This comes from the understanding of power trading as a distinct business activity and the interlinked requirement of transmission players to execute the same.

Since CBET is at a very nascent stage in the SAARC region, not all Member States have explicitly mentioned about the taxes and duties applicable to CBET and related activities under the relevant laws. Nepal, an exception to this, provides for export duty on electricity, royalty for export-oriented run-of-river and storage power projects as specified in Section 4.6. The Government of Nepal, pursuant to the signing of SAARC Energy Framework Agreement, may work towards abolition/waiver of all taxes and duties including VAT, Customs Duty, Export/Import Duty & Royalty. Similarly, the Government of Sri Lanka should formalize the waiver of customs duty applicable on import of electricity for promoting CBET under CBET related regulations as and when notified (though the same can be waived off under provisions of Strategic Development Act).

Private sector generation policy of Bangladesh provides fiscal incentives including tax exemptions to the private players as listed above. Similar provisions may be made under the laws guiding the CBET principles to encourage private participation in the trading of electricity across the borders. Special focus may be given to transmission service operators and power trading companies.

All other Member States wherein no concrete laws/regulations regarding taxes and duties applicable with respect to CBET prevail should work out the possibilities of waiver of taxes and duties applicable, if any. Appropriate amendment/new regulations to that extent may be brought in or enacted by the respective regulatory authorities.

Uniformity should be brought in the treatment of electrical energy under HS Code for coherent taxation and similar treatment of the commodity in all the Member states. Any subsidies on the power procurement side should be discouraged and eliminated by the respective governments of the SAARC member states as they reduce competition, and hamper sustainable growth of free market economy essential for CBET. All the Member States should frame guidelines and notify appropriate regulations for moving towards a regime of zero taxes and duties to develop the regional SAARC energy market and facilitate interested players by incentivizing them with these fiscal incentives.

5. Salient Features of prevailing procedures and practices including laws and regulations in South Asia³³

According to Article 1 of the SAARC Framework Agreement, Buying and Selling Entities refer to any authorized public or private power producer, power utility, trading company, transmission utility, distribution company, or any other institution established and registered under the laws of any one of the Member States having permission of buying and selling of electricity within and outside the country in which it is registered. Similarly, Buying and Selling Entities find mention in the Articles 3, 4, 9 and 13 apart from the Article 1 reproduced above. According to the same, these Entities must be authorized to enter into transmission service agreements with service providers and are exempted from all export/import duties, levies & fees, to facilitate smooth cross border trading of electricity.

These Entities are significant from a corporate and legal point of view to facilitate the ease of doing business under the provisions of rules and regulations as provided by the law of the country. Enabling these Entities would boost the market sentiment with encouragement of more and more players to enter the business. This would in turn create a self-sustaining ecosystem for the players, with the cooperation of the stakeholders including the government, regulatory bodies, and various public and private players.

Key issues pertaining to the prevailing practices and procedures in the SAARC member states which hinder or are a potential hindrance to the free flow of electricity across the national borders are as listed in the table below:

Table 5-1: Key issues/potential issues in prevailing practices and procedures

Key Issues	Relevance/justification for selection of the issues
Registration of Buying and Selling Company	The registration of companies/ organizations under the provisions companies' registration laws of the respective countries are available for all the countries. But to qualify as the buying and selling entities as per the SAARC framework, all the countries provide for special permissions to bodies/entities/agencies to trade in electricity across the borders. Cumbersome registration processes at multiple stakeholders acts as a deterrent to business at times.
Negotiation of terms and conditions	Flexibility in terms and conditions to accommodate the potential differences in the required criteria for trading power and compliances thereafter without compromising on the quality of power and services rendered would incentivize the entities to look forward beyond the national borders.
Payment security mechanism	The settlement and clearing mechanism for Cross-Border Electricity Trade should safeguard the interests of the buyer and seller by protecting them from possible defaults in payments. This may be taken care through a proper payment security mechanism in place.
Tenure of electricity trade	The tenure of trading licenses must be uniform for all participants irrespective of specific country laws. This enables them to compete on an equal footing. A SAARC regional level agreement with provisions to accommodation of deviations would facilitate trade.

³³ With respect to facilitating buying and selling entities to enable them for Cross Border Trade and Exchange of Electricity (Bilateral Agreement / Project Basis Agreement / Exchange Market) as mentioned in the Minimum Contents required of the RFP

Key Issues	Relevance/justification for selection of the issues
Export/import /duty/levies/fees/royalty etc.	The different tax rules of member states should be harmonized to promote a standard tax structure to enhance ease of doing business. Also, as per the SAARC Framework Agreement, it is envisaged to progress towards a zero-tax regime.
Qualification of Buyer & Seller for getting License	Every licensee should make arrangements for the efficient, coordinated, cost-effective production, transmission and supply of energy while maintaining international standards and working methods. Hence, the eligibility criteria to qualify as cross border electricity trading entities, which are currently governed by the respective country laws, should meet the requirements as specified by the other countries.
Competition promotion and non-discrimination	A congenial atmosphere to promote healthy competition amongst the players is essential to protect interests of all existing and potential participants. There exists treaties and agreements designating few countries as the most favored nations for a member state. Promotion of non-discrimination of facilities and provisions while comparing entities of other member states with the entities of own state would encourage healthy competition and fair trade.
Visa policy	Provisions of easy access to non-tourist and business visa for travel requirements pursuant to efforts resulting in exploring cross-border electricity trade opportunities and unleashing the trade potentials should be encouraged. This would facilitate visits of interested parties to conduct the required due-diligence and pursue the opportunities.
Facilitating for negotiation : P-P, P-G and G-G Dialogues	A forum that enables communication between private players and the governments of all member states will facilitate quick negotiations across all channels. It will also facilitate representation of the views and issues faced by the private and public entities to the appropriate authorities for faster redressal.
Currency of transaction & Policies regarding availability of US\$ for payment	A standard, stable currency is essential to reduce exchange rate risks and hedging costs. Also the foreign reserves, permission to trade in foreign currencies and the trade deficit constraints have to be looked as they might hinder or inhibit trade in its free form.
Foreign Direct Investments (FDI)	Foreign private investment laws of member states must allow easy cross-country flow of capital to businesses with best growth prospects for the trade to flourish between the member states.
Trading agreements	The trading agreements of the SAARC member states with other member states, whether bilateral or through the exchange should be in line with regulations as provided under the laws of the respective member states. Apart from this, they should also comply with the objectives of the SAARC Framework Agreement for Energy Cooperation.
Trading Margins	The trading margins differ from case-to-case basis as it takes into consideration the various aspects. Hence, it becomes really important to safeguard the business interests of all the entities.
Recognition of electricity trading as a business activity	Electricity laws of respective countries should identify electricity trading as a business activity to facilitate the setting in of cross border electricity trade.

Key Issues	Relevance/justification for selection of the issues
Licensing / Designated authorities for Cross-Border trading of power	The governmental laws and regulations should provide for a licensing authority who issues licenses or authorizes and recognizes the entities who are willing to trade in electricity. The various roles for participating in a market has to be defined clearly with jurisdictions, duties and responsibilities.
Regulatory Authority	The regulatory authority ensures coordination amongst the various transmission system operators, market participants, governments and planning & investment wings of the various countries to develop the infrastructure in place for the Cross-Border Electricity Trade to grow.
Transmission System Operators (TSOs)	The transmission system operators play a vital role in electricity trade as they identify the transmission capacities available at the national and regional level and accordingly facilitate the bids that are put in by the participant bidders to closure.
Transmission infrastructure	Adequate Transmission capacity has to be in place to allow the participants or member states to trade in electricity with each other. Synchronized generation and transmission capacity planning should take this aspect into consideration.
Open Access/ Access to Transmission infrastructure	Open access to transmission infrastructure is essential as availability of spare transmission capacities incentivizes power traders and utilities to trade in power or permit transit of electricity through the grid.
Trading Procedures/ regulations	Properly drafted procedures and regulations leave less room for disputes and make the system transparent. The clarity in the procedures and put into effect regulations would instill a sense of competitive and fair trading on the platform.
Availability of Trading Platform	The availability of an online trading platform enables all the participants including buyers and sellers to get real time information and also enhances the trading experience.
Price Determination Mechanism	For the price determination mechanism, well laid down congestion management procedures bring in more clarity to the traders and other market participants, enhancing traditional demand-supply pricing mechanisms.
Transmission Pricing and Treatment of Losses	The pricing mechanism for the access to transmission infrastructure has to be incentivizing for the participants to encourage trade. Similarly, the treatment of losses need to be agreed upon by the parties entering into the contract, irrespective of the type of contract.
Imbalance and Deviation Settlement	Provisions of dealing with the deviations and imbalances, including the calculation procedures and methodologies to settle them between the trading entities, would be required for avoiding disputes between the trading entities.
Dispute Settlement	Disputes arising from the cross-border trading of electricity within the member states or across the border must be settled by a mutually agreed international arbitration center with well-defined powers and settlement procedures.

5.1. List of Existing Bilateral Electricity Trade

The SAARC countries before signing the SAARC Framework Agreement on Energy Cooperation in 2014, also carried out bilateral trade in electricity. The trade was carried out in the absence of any regional laws and regulations, operating framework or incentivizing structure. These steps were more driven by the needs of the country, to meet the electricity demand, than to create a free power market for opening up opportunities for all the potential participants. Hence, the initiatives were marked by mutually agreed intergovernmental cooperation through bilateral agreements. A list of such agreements signed for Cross-Border Electricity Trade are listed below:

Table 5-2: Existing Bilateral Agreements between SAARC Countries

List of Agreements
Bilateral electricity trade between India and Bhutan
Bilateral electricity trade between India and Nepal
Bilateral electricity trade between India and Bangladesh
Bilateral electricity trade between Afghanistan and Central Asian Countries
Bilateral electricity trade between Pakistan and Iran

To facilitate the electricity trade that was conceptualized in the above mentioned agreements, respective countries built cross-border transmission link projects at various point of time in the history. Few low voltage cross-border power supply links for electrifying the border based population grew in a radial fashion, while few high voltage dedicated lines were built for power supply from specific power projects. Few existing interconnections are illustrated below:

Table 5-3 : Existing Interconnections between SAARC Countries

	Existing links	Volume traded	PPA/PSA	Expected links
India– Nepal	22 links at 132/33/11 kV	~ 150 MW imported from India by Nepal	Medium Term, commercial transactions	400 kV AC D/C lines by 2016 initially charged at 220 kV
India-Bhutan	400/220kV D/C Links	Import by India from 3 HPPs, Dry season support to Bhutan. 5644 MU import to India in FY2017	Inter-government Agreement	Grid reinforcement with new hydro projects addition.
India-Bangladesh	400kV HVDC back-to-back asynchronous links	500 MW imported from India by Bangladesh	Long and medium term PPAs	Up-gradation of 500 MW link to 1000 MW

In addition to the above, agreements and bilateral electricity trade infrastructure exist between Pakistan-Iran and Afghanistan-Central Asia. Also, links between India-Pakistan and India-Sri Lanka are in the proposed and planning stages respectively. The existing and the proposed interconnections are analyzed in details in the subsequent sections.

5.2. Bilateral electricity trade between India and Bhutan

India imported 5617 MU of power in 2016-17 registering a growth of ~7% over the previous year. Under the present arrangement Bhutan exports 1350 MW power to India. The India-Bhutan Trade and Transit Agreement 1972 established a free-trade regime between the two countries. The Agreement also provides for duty-free transit of Bhutanese exports to third countries and refund of excise duty by GoI on Bhutanese imports from India.

Electricity forms Bhutan's exports to India. India has signed an umbrella agreement with Bhutan under which India provides Project investigation, design and engineering services, constructional supervision and highly concessional finance for the upcoming hydro projects. In return, India is entitled & is committed to purchase all the surplus power, after meeting the needs of Bhutan. Bilateral trade is conducted in Indian Rupees which is fully convertible to Ngultrum at par.

Till date, GoI has constructed three projects in Bhutan covered under the 2006 Agreement on Cooperation in Hydropower and the Protocol to the 2006 agreement signed in March, 2009. Under this Protocol, Government of India has agreed to assist Royal Government of Bhutan in developing a minimum of 10,000 MWs of hydropower and import the surplus electricity from this to India by the year 2020. Energy available for Sale in India would be around 2200 MU by 2020 and 8000 MU by 2026 with completion of 10,000 MW projects, excluding the PPP/ IPP projects. Ten projects have been selected by Government of India and Royal Government of Bhutan for the same. India imports surplus power from 3 projects viz. Chhukha (336 MW) since October, 2002 at a rate of Rs 2.25 per KWh, Tala (1020 MW) since August, 2006 and Kurichhu (60 MW) since October, 2002 at a rate of Rs 1.98 per KWh. The power from these projects is being supplied to Eastern & Northern Indian states as per the allocation determined by Govt. of India through PTC India Limited.

3 more Inter-Governmental(IG) model HEPs namely, 1200 MW Punatsangchu-I (funded at 40% grant and 60% loan at 10% interest by GoI), 1020 MW Punatsangchu-II and 720 MW Mangdechhu (both funded at 30% grant and 70% loan at 10% interest by GoI) are under construction under the same protocol. Inter-governmental Agreement for 4 more HEPs (totaling 2120 MW) have been signed in April 2014 details of which have been provided in section 2.3.1. 2560 MW Sankosh Reservoir project and 2640 MW Kuri Gongri Reservoir project are at a discussion stage.

PTC India Limited, recently signed a Power Purchase Agreement (PPA) with Tangsibji Hydro Energy Limited (THyE)³⁴, wholly owned by the Royal Government of Bhutan through the Druk Green Power Corporation Limited (DGPC), for purchase of power from 118 MW Nikachhu Hydropower Project located on Nikachhu river in Trongsa Dzongkhag District of Bhutan. Power from Nikachhu Hydropower Project shall be supplied to Assam Power Distribution Company Limited (APDCL) to meet its power demand in the state on long term basis.

5.3. Bilateral electricity trade between India and Nepal

The foundation for power exchange between India and Nepal was laid with the signing of river treaties for Koshi and Gandaki in the 1950s. Indo-Nepal Power Exchange began in year 1971 with exchange of about 5 MW of power on the principle of catering to the power needs of isolated local areas on both sides of the border. The power exchange takes place on radial mode. The power exchange takes place between Nepal Electricity Authority and utilities on the Indian side namely Bihar State Power Transmission Company Ltd. (BSPTCL), Uttar Pradesh Power Corporation Ltd. (UPPCL) and Uttaranchal Power Corporation Ltd. (UPCL) India.

PTA signed in 1997 could never come into effect as Government of Nepal could not ratify it from the Parliament. But it was only in 2014 when India and Nepal signed a Power Trade Agreement that the doors opened for Nepal developers/traders to access the Indian power market when Energy Secretary-level talks known as the joint steering committee meeting concluded in Kathmandu. Subsequently, both the countries inked the historic power trade agreement on 21st October 2014.³⁵

Article 2 of the Power Trade Agreement (PTA) lays down rules for connectivity and access in transmission system and harmonized operational procedures. But no developments on developing guide lines on non-discriminatory open access within Nepal or for Cross-Border transmission system has been seen till date. Also Nepal does not have a wheeling charge and loss allocation mechanism and has a royalty imposed on the export projects.

Article 3 of the PTA signed in 2014 opens up avenues for mutually benefitting G2G cooperation regarding development of hydro power in Nepal.

³⁴ (Tangsibji Hydro Energy Limited 2017)

³⁵ (Power Trade Agreement 2014)

Article 4 allows authorized / licensed electricity producers / buyers / traders of each country to engage in cross-border electricity trading, including that through Power Exchanges, and to seek cross-border transmission access as per the laws of the respective country. It also speaks of the removal of the trade barriers to facilitate free flow in both the directions. But tariff and non-tariff barriers are yet to be removed and Nepalese power is yet to be made accessible in India.

Article 5 sets the ground for formation of Joint Working Group and Joint steering committee which have already been formed. It is under these committee initiatives that Indo- Nepal Cross-Border Transmission Master Plan is under preparation. But preparing DPR for the identified Cross-border Tie Line, Technology selection, investment modality and O&M guide lines are yet to start.

The Indo-Nepal Power Exchange Committee (PEC) was set up in 1991 to regulate power exchange between the two countries. In the sixth PEC meeting it was agreed in principle for a 150 MW power exchange. The Government of India has nominated Power Trading Corporation (PTC) as a nodal agency which is not in sync with article 4(a) and 4 (b) of the signed PTA in 2014.

Currently, there are three power sharing arrangements between India and Nepal:

- Koshi Treaty: 50 MW export to Nepal from Katiya in Bihar for electrification of border areas. Although Nepal is entitled to draw 50 per cent of power from the plant on Koshi, it only draws 10 MW because of technical issues.
- Border town power exchange: A power exchange agreement in the 1970s to supply power to the border towns of Nepal and India from the other country's grid. This is under a bilateral Inter-governmental agreement. Tariff fixation, payment, taxes and settlement are reviewed and fixed at the periodic meetings of the PEC
- Mahakali Treaty: A treaty for the integrated development of the Mahakali River including Sarda Barrage, Tanakpur Barrage, and Pancheshwar Project, according to which, 70 MUs free energy from Tanakpur Hydro Electric Plant of NHPC at 132 kV level has to be provided to Nepal via Tanakpur.

Although Nepal and India are connected at 22 points in 132/33/11 kV lines, these connections are radial and cannot export/import significant power between India and Nepal. Further, a 140 km 400 kV Dhalkebar-Muzaffarpur transmission line has been commissioned (funded by the World Bank through a loan) in February 2016. Power Transmission Company Nepal Limited (PTCN) and Cross-Border Power Transmission Company India (CPTC) were established for development of this project. CPTC is a JV Company (Powergrid (26%), SJVN (26%), IL&FS (38%) and NEA (10%)) identified as a developer and granted the license by the CERC, India. This line will be initially charged at 220 kV level supplying 150 MW power to Nepal. It was being operated at 132kV level in 2016. The short-term bilateral contract is through NVVN recently appointed by India as Nodal Agency for settlement of deviations.

The Implementation and Transmission Service Agreement (ITSA) was signed on December 12, 2011. The Power Sale Agreement (PSA) with PTC India for the purchase of 150 MW of power in a long-term basis through Tanakpur Line was signed on December 13, 2011. Transmission access and charges for Nepal are at par with Indian entities.

Following this success, Indo Nepal joint steering committee decided to carry forward other transmission line projects with cross country holdings. Kusaha-Kataiya and Parwanipur-Raxaul both 132 kV cross-border transmission lines also inaugurated in August 2017 enabling Nepal to draw more power from India. Prior to this, Nepal drew 130 MW from the 11kV Kusaha-Kataiya and 10 MW from 33kV Parwanipur-Raxaul. These links which will synchronously connect the Indian and Nepal power grids.

Discussions are under way between the Governments to jointly develop the Pancheswar project (5,600 MW), Sapat Koshi (3,330MW), Karnali (10,800 MW), and Naumure (225 MW) as the total power output from these plants cannot be internally consumed. Feasibility studies for two more 132 kV Cross-Border transmission lines at Butwal (Nepal)-Gorakhpur (India) and Lumki (Nepal)-Bareilly (India) have been agreed by both the governments

High capacity transmission inter-connection needs to be planned for the evacuation and transfer of power from these projects. Project Development Agreements (PDAs) for the following projects have been signed:

Bangladesh and transfer to the NVVN banker in India in INR. The letter of credit has never been invoked. The invoice is raised every month after electricity has been supplied after accounts are published by the regional power committee.

For open market purchases, BPDB invites bids through paper and electronic media (not on the PX) in the Indian market for bilateral contract with BPDB. Bangladesh Power Development Board (BPDB) issued RFP in February 2013 for purchase of 250 MW power from eligible Indian Sponsor(s) (Government/Government controlled utility) at the delivery point being 400 KV level Bohrapur Substation, Murshidabad, West Bengal for a period of 3 years. PTC submitted bid for entire quantum of 250 MW power to be sourced from West Bengal State Utility following which, PTC was declared as Successful Bidder and LOI was placed on PTC for supply of 250 MW power to Bangladesh. PPA was signed between PTC and BPDB in November 2013 and Power supply to BPDB started w.e.f. 3rd December 2013 at a levelized tariff of Rs. 4.45/kWh. Further, PTC has also been awarded LOI for supply of additional 40 MW power to Bangladesh on Medium Term basis, subsequent to the Competitive Bidding Process conducted by BPDB. The billing etc. for the same is done separately by the appointed trader. BPDB has entered in to a separate market based bilateral contract of 100MW for the recently commissioned Tripura-Comilla interconnection with NVVN, India for power trade in radial mode.

Any PPA related dispute between BPDB and NVVN is to be settled in the Singapore International Arbitration Centre (SIAC). The award of SIAC can be enforced by the courts of respective countries. For any transmission or open access related dispute in the Indian transmission grid, BPDB can approach the Indian regulator and as well appeal in the higher court against the award of the regulator. Contractual disputes regarding market based contracts are to be settled as mutually agreed and provided in the contract.

Bangladesh is keen to tie up power from HEPs in the Indian state of Arunachal Pradesh, Bhutan and Nepal. The power import from Tripura side is planned to be increased to 340 MW and the project is planned to be completed by December 2019. Bornagar-Parbitipur-Katihar 765kV Bangladesh -India Grid Interconnection Project is also being planned.

A Memorandum of Understanding (MoU) was signed by Adani Power and Bangladesh Power Development Board (BPDB) in August 2015. As per the MoU, the entire production from the 2x800-Mw project coming up in Godda district in Jharkhand would be supplied to Bangladesh. The supply would be through a dedicated 400 kV HVDC transmission line which would require 100km of transmission lines to transport the power to Bangladesh's Bagura border. The Bangladesh government has agreed to buy power from the Adani Group at 8.7 US cents per unit.

India and Bangladesh have agreed to route a 6000MW HVDC line via north Bangladesh on the west side of Padma River and to set up a 500-1000MW HVDC terminal at Jamalpur/Barapukuria for drawing power for Bangladesh. Power from Jamalpur/Barapukuria would be transmitted to the Dhaka area.

5.5. Bilateral electricity trade between Afghanistan and Central Asian Countries

Afghanistan meets a major part of electricity demand through imports from Iran, Turkmenistan, Uzbekistan and Tajikistan. In 2015, Afghanistan's peak demand was 1,500 MW, and overall consumption was about 5,76 GWh. The electricity imports for Afghanistan constitute nearly 3/4th of the country's energy needs. They originate from Iran (20%) under 1 contract, Tajikistan (31%) under 2 contracts, Turkmenistan (14%) under 2 contracts and Uzbekistan (33%) under 1 contract. Currently, the carrying capacity of total installed transmission lines is 326MW from Uzbekistan, 164 MW from Iran, 433 MW from Tajikistan, and 77 MW from Turkmenistan. The national grid is not synchronized with the systems of the four countries from which Afghanistan imports power, resulting in higher costs and reduced reliability of supply. Afghanistan has PPAs executed with all the 4 countries for the import of power.

There are five transmission lines used for power import which feed into NEPS from Turkmenistan, Uzbekistan and Tajikistan. Three lines import power from Iran. None of these import sources are interconnected to other power systems. All contracts except with hydro-dominated Tajikistan provide year-round firm energy. Tariffs range from 2.0 to 6.0 cents/kWh. Imports from Uzbekistan, which has the highest share in imports, are the most

expensive. The tariffs for planned imports from Turkmenistan and Uzbekistan will be higher than the existing ones. All contracts except the PPA with Tajikistan have a short duration and thus provide little supply security.

Construction of the 500 kV CASA 1000 transmission line between Sangtuda (Tajikistan) and Nawshehra (Pakistan) through Torkham (Afghanistan) commenced in May 2016. Afghanistan announced last year that it would abandon its proposed 300 megawatt share of energy imports via the CASA-1000 project due to a lack of demand. Its allocation would then be transferred to Pakistan, which is now set to receive 1,300 megawatts, rather than the initial 1,000 megawatts proposed. Thus Pakistan would be the main importer of energy under the CASA-1000 project.

5.6. Bilateral electricity trade between Pakistan and Iran

Pakistan imports electricity from Iran to serve the demand in Baluchistan province. The system is operated in a radial mode. As per the 2002 agreement between the two countries, Pakistan can import up to 39 MW against which it is already importing 34MW. 170Km transmission line for the import of 1000MW of electricity from Iran was built in 2009. In June 2006, WAPDA has signed an MOU with Iran to increase the supply by 100 MW to meet the demand in the Gwadar port area. The imported electricity is much cheaper than the electricity produced by the Independent Power Producers (IPPs) because Iran subsidises oil and gas which feed the power plants.

NTDC, Pakistan had signed a memorandum of understanding with its Iranian counterpart Tavanir for electricity trade on May 31, 2012. Further, post NEPRA's nod under the NEPRA Interim Power Procurement (Procedures & Standards) Regulations, NTDC signed an agreement for import of 1,000 MW of electricity from Iran at 8-11 cents p.u. Both the countries agreed to construct 500 kV HVDC transmission line of 678 km (93 km in Iran and 585 km in Pakistan) with Converter and Switching stations at Zahedan and Quetta. Iran will construct dedicated 1300 MW power plant at Zahedan for supply of 1000 MW to Pakistan. The total estimated cost of transmission line project is US\$ 700 million. Iran had agreed to fund 70% of the cost of transmission line in Pakistan's territory while the balance would be funded by NTDC.

Pakistan and Iran were already signatories of PTA (Preferential Trade Agreement) while negotiations are in progress on FTA (Free Trade Agreement). Non existence of banking channels were identified as a major hurdle in the promotion of bilateral trade between the two countries. State Bank of Pakistan has signed a banking and payment arrangement with Iran's central bank, Bank Markazi Jomhuri Islami Iran, to streamline trade transactions between the countries. The agreement reportedly seeks to provide a trade settlement mechanism between the two countries with the mechanism to be used for the payment of trade conducted via letter of credit.

5.7. Other prevailing bilateral trades, if any

India and Myanmar

India is the fifth largest trade partner of Myanmar (3rd largest export destination for Myanmar and 7th largest source of imports into Myanmar). Bilateral trade has been growing steadily since the signing of India and Myanmar trade agreement in 1970. India and Myanmar have signed a BIPPA, DTAA and a Free Trade Agreement. They also have a Joint Trade and Investment committee mechanism in place. In line with the Hong-Kong Ministerial Declaration of December 2005, the Government of India has implemented Duty Free Tariff Preference (DFTP) Scheme for the Least Developed Countries (LDCs) including Myanmar.

Myanmar is importing 3 MW of electricity to Tamu (Sagaing) from Manipur state of India.

Tata Power signed an Memorandum of Understanding (MoU) with Ministry of Electric Power, Government of Myanmar on 11 April 2013 for an imported coal fired power project at Ngayok Kaung in Ayeyarwaddy region, Myanmar. It is expected to be commissioned in 2019-20. Tata Power is also desirous of participating in hydro/gas or renewable generation and also power distribution business opportunities in Myanmar and seek the support of Government of India and Myanmar in this respect.

Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) Leaders' Retreat 2016, held in Goa on 16th October 2016, decided to expedite the signing of the MoU on BIMSTEC Grid Interconnection as a next step to "Plan of Action for Energy Cooperation in BIMSTEC" formulated in 2005.

Eventually, during the 4th meeting of BIMSTEC Senior Officials on Energy held on 11th-12th January 2017, the MoU was discussed and finalized. This MoU will facilitate cross-border power trade interconnections.

Bangladesh and Bhutan

India, Bhutan and Bangladesh may soon formally sign and join hands to build a 1,125 MW hydropower project in Bhutan as trilateral memorandum of understanding (MoU) on this has been finalised by the three countries. The proposed 1,125 MW Dorjilung project whereby Bangladesh invests in a project in Bhutan which in turn exports energy to Bangladesh through India.

5.8. Electricity Exchange Markets

Electricity supply to consumers was mainly by vertically integrated monopolies mainly owned by public companies even after a century post its commercialization.³⁶ This was mainly due to a few:

- a) Monopolistic market of transmission & distribution mainly due to associated high capital cost and profitability only at high economies of scale
- b) Technical coordination with generation companies and high transaction costs for segregated activities
- c) Economies of scale in generation which is again a very capital intensive business
- d) Perspective long term planning was easier with vertically integration of the supply chain with regulated prices to protect the interest of the consumers

The regulated regime made sense due to a lot of risks inherent in the entire supply chain of Electricity such as high gestation periods, cost and time overruns, fuel availability, Off-take, technology obsolescence, credit risk, market demand and prices, investment recovery, manpower availability and planning, default risks from consumers, maintenance prone operations. But this led to inefficiency in operations due to lack of competition. Old inefficient plants continued to function to recover investments and consumers were charged for stranded capacities. Investments, technology, location etc. were often governed by political consideration rather than on sound economic principles.

Hence it became extremely important to bring in competition in electricity by treating it as a commodity. Though electricity being highly perishable with varying intraday as well as seasonal demand patterns, as a commodity was very different from other commodities. Electricity generated at a plant gets pooled on its way to the load centre due to the benefits of economies of scale. Electricity has demand side flaws such as lack of elasticity of demand and provisions to draw power from the grid without a prior agreement with supplier. Therefore, electricity markets are far more complex as compared to other commodity markets as they don't deal with one homogeneous product but simultaneously take care of trading of ancillary services as well such as frequency response, reactive power etc.

Usually, commodity markets evolve with time without a need of institutional intervention. However, electricity comes with a long history of regulated regime leading to concentration of generation, consumer expectancy of regulated prices and complexities in use and pricing of transmission service. These reasons call for a deliberate effort to design electricity markets with rules governing such markets.

Behavior of the buying and selling entities of an electricity market are characterized by:

- Demand and Demand Curves
- Shift in Demand curves
- Supply and supply curves
- Market equilibrium and Equilibrium Price
- Consumers' Surplus due to higher willingness to pay than the market price

³⁶ (Design of power markets: Different market structures and options for India 2003)

- Producers' Surplus due to goods (except for the marginal production) traded at a price higher than their opportunity cost
- Global welfare (sum of Consumer and Producer Surplus) quantifying trading benefits

The various types of market are formed depending on how the buying and selling entities decide to settle on the trading terms such as price, quality, quantity, time of delivery and mode of settlement etc. Few such markets are Spot Markets, Forward markets, Futures Market, Options Market, Contracts for Difference Markets. Power Exchanges have the following characteristics:

- Standardized specifications- Contract structure
- Robust Clearing & Settlement systems
- Risk Management
- Fair, Safe, orderly market
- Transparent price discovery mechanism

Voluntary electricity market co-existing with long-term PPAs provides flexibility to the buyers to optimize their purchase basket without too much risk. A liquid short-term market helps the distribution utilities and consumers to balance their load-supply position in real time which is essential for grid security. Electricity markets can drive private investment, providing relief from power shortages. Regional electricity markets are well established in Europe, but have not grown much in Southern Africa, South West Africa and South East Asia due to the absence of an internal electricity market in the member countries. In the SAARC member states India is the only country which has an established power market with 2 Power exchanges established serving as a platform for power trading.

5.8.1. Electricity Exchange Markets in India

The power sale market in India is clearly segregated into three segments, long term, medium term and short term.³⁷ In order to ensure reliability of supply and optimize costs over a larger frame of time and reduce the burden on consumers, distribution companies primarily procure majority of their power requirements on long term basis. Any balance requirements are met through medium and short term arrangements, which typically try to address any long term power shortfalls or to meet the peak demand.

Power Trading through Exchanges

Power trading through exchange in India was a reality after the Indian Electricity Act 2003 under section 66 recognized "Power Trading" as a distinct licensed activity with an objective to promote optimal utilization of resources and encourage competition. It is an activity of buying and selling of power on Power Exchanges, which are approved by Central Electricity Regulatory Commission (CERC)³⁸, standardized Products are offered to buy and sell power and also buying and selling between a generator and a consumer. The first CERC Open Access Regulations, 2004 provided for transmission capacity reservation and grant of Short term open access on inherent margins. The 2008 and 2009 amendments to OA regulations brought in bilateral transactions through power exchanges, procedure for scheduling collective transactions and Point of Connection method of collecting Transmission charges.

Power market regulations, 2010 defined the role of power exchanges and norms for setting up and operating power exchanges. It also defined the price discovery mechanism for the power exchange including closed double sided bidding, uniform price discovery and market splitting for congestion management.

Two types of transactions are primarily carried out as a part of the trading activity are:

Collective Transaction	Collective transaction refers to a set of transactions discovered in power exchange through anonymous, simultaneous competitive bidding by buyers and sellers. Electricity Power Exchange provides a spot market, mainly day-ahead, for electricity, which like any other
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³⁷ (Role of Power Traders in enhancing market dynamics 2011)

³⁸ (Note on Power Trading in India 2016)

market matches demand and supply for each time block, while providing a public price index.

Bilateral Transactions

Bilateral transaction refers to a transaction for exchange of energy (MWh) between a specified buyer and a specified seller directly or through a trading licensee from a specified point of injection to a specified point of drawl for a fixed or varying quantum of power (MW) for any time period. Bilateral market aims at the following:

- Common price through a negotiated approach
- Price is known to buyer and seller
- Transactions can be on a short / medium or long term basis.
- High Liquidity

Level of Competition: Level of competition among the traders (HHI³⁹ based on volume of trade undertaken by the traders) is shown in Figure-14 for the period 2004-05 to 2015-16. Number of traders, who were undertaking trading bilaterally or through power exchanges or through both, increased from 4 in 2004-05 to 27 in 2015-16. It can be observed from the figure that there is an inverse relationship between number of traders and the HHI. The concentration of market power declined from high concentration (HHI of 0.55) in 2004-05 to non-concentration (HHI of 0.1432) in 2015-16. The competition among the traders resulted in increase in volume and decrease in prices in the short-term bilateral market.

Trading Margins: During the year 2004-05 (when trading started through licensees), the licensees voluntarily charged 5 paise/kWh or less as the trading margin. However, trading margin increased in 2005 and the weighted average trading margin charged by the licensees went up to 10 paise/kWh during April to September 2005 period. CERC then decided to regulate the margin and fixed the trading margin at 4 paise/kWh vide "CERC (Fixation of Trading Margin) Regulations" notification dated 26.1.2006. As a result of these trading margin regulations, the licensees charged trading margin of 4 paise or less from 26.1.2006 onwards until revised Trading Margin Regulations, 2010 came into existence on 11.1.2010 (figure 15).

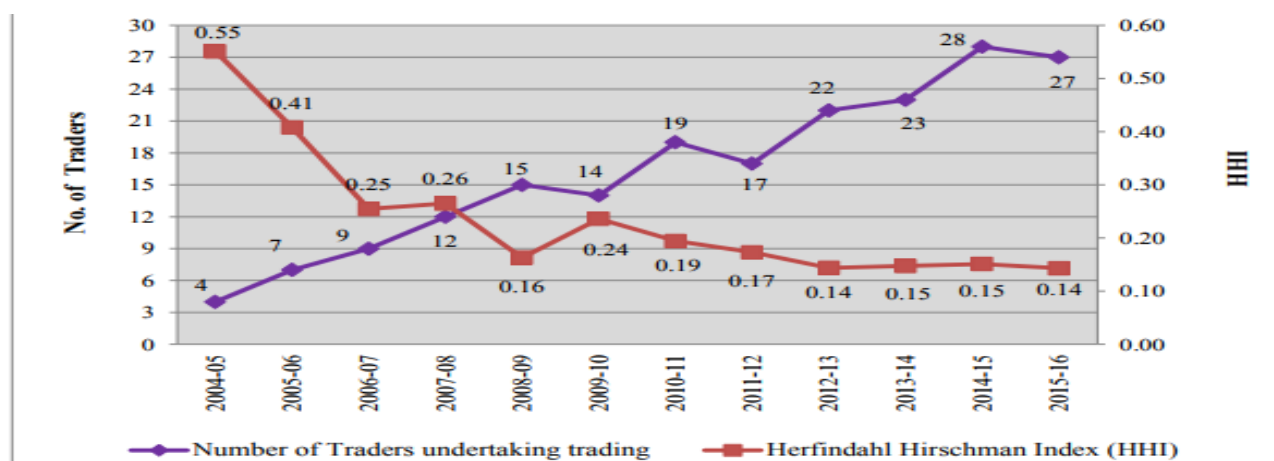


Figure 5-1: Concentration of Market Power: No. of traders and HHI

Source: CERC, India

³⁹ The volume of electricity transacted through traders (traders inter-state bilateral transactions + traders transactions through Power Exchanges) is analyzed using the Herfindahl-Hirschman Index (HHI) for measuring competition among the traders. Increase in the HHI generally indicates a decrease in competition and an increase of market power, whereas decrease indicates the opposite. HHI value below 0.15 indicates dispersion of market power, the value in between 0.15 to 0.25 indicates moderate concentration, and the value above 0.25 indicates high concentration of market power. The HHI, based on the volume of electricity transacted through traders during 2015-16 was 0.1432, which indicates non-concentration of market power among the traders.

Based on feedback and experience with 2006 regulations and considering various risks associated with the electricity trading business, CERC revised the trading margin in 2010. As per the CERC (Fixation of Trading Margin) Regulations, 2010, the trading licensees are allowed to charge trading margin up to 7 paise/kWh in case the sale price exceeds INR 3/kWh, and 4 paise/kWh where the sale price is less than or equal to INR 3/kWh.

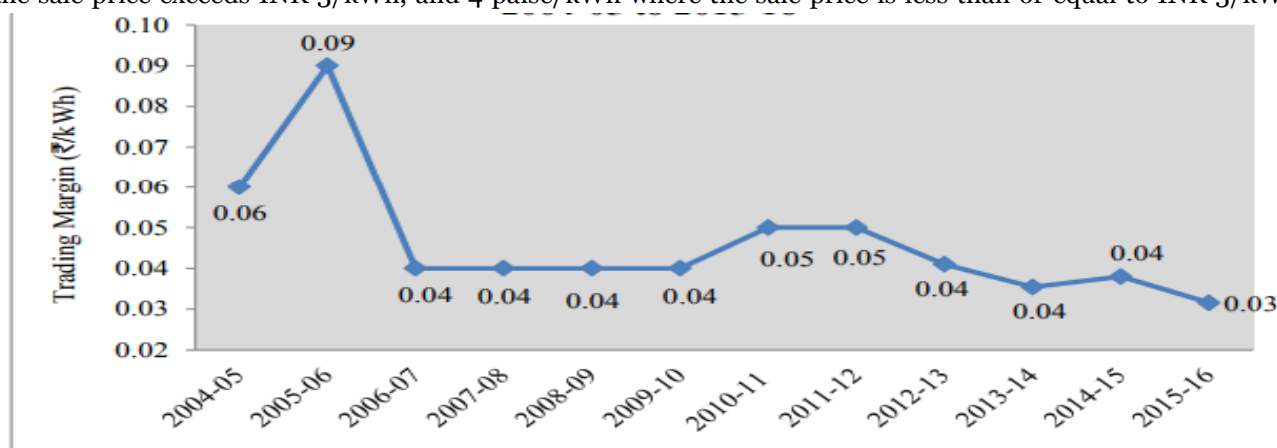


Figure 5-2: Trading Margins in India

Source: CERC, India

The trading licensees have been charging the trading margin accordingly, and weighted average trading margin for bilateral transactions during 2004-05 to 2015-16 is given in table below:

Table 5-4: Weighted average Trading Margin in India- 2015-16

Sale price of electricity transacted by Trading licensees (INR/ kWh)	Weighted average Trading Margin Charged by licensees (INR/kWh)
Sale Price > INR 3/kWh	0.033
Sale Price <= INR 3/kWh	0.021

Note: Weighted average trading margin is calculated taking into consideration all inter-state transactions excluding banking transactions

The responsibility of developing the market in electricity has been vested with the Regulatory Commissions. The open access regulations, inter-state trading regulations, trading margin regulations, power market regulations etc., of the Central Commission have facilitated power trading in an organized manner.

Most of power traders in India are involved in short term power market, which is done in bilateral and also through power exchanges. Due to increase in demand of power, the buyers are very much interested in getting their power through short term power market. The volume of short-term transactions of electricity as percentage of total electricity generation varied from 9% to 11% during the period from 2009-10 to 2015-16.⁴⁰

Short-term transactions of electricity refers to the contracts less than one year for the following trades:

- Electricity traded under bilateral transactions through Inter-State Trading Licensees (only inter-state trades),
- Electricity traded directly by the Distribution Licensees (also referred as DISCOMs),
- **Electricity traded through Power Exchanges - Indian Energy Exchange Ltd (IEX) and Power Exchange India Ltd (PXIL)**
- Electricity transacted through Deviation Settlement Mechanism (DSM).

The exchanges have aided in better utilization of national resources, reduced unmet demand and consequently reduced economic losses and improved energy security of the nation. Huge bottled up captive generation has also been brought into the national market to facilitate its most productive use to the economy. Currently, India has

⁴⁰ (Energy Profile of India (2013) 2015)

transmission networks with Nepal, Bhutan and Bangladesh and power transfer is permitted after the government approval. There are talks of Nepal, Bhutan and Bangladesh gaining access to the IEX for trading of electricity both by Indian and the players of the neighboring countries. IEX has also approached the regulatory commission to allow it to execute the same. This will allow the power producers to directly offer electricity to power distribution companies or to nodal agencies appointed by the neighboring countries through the IEX platform. Domestic consumers can also directly purchase power from designated authorities.

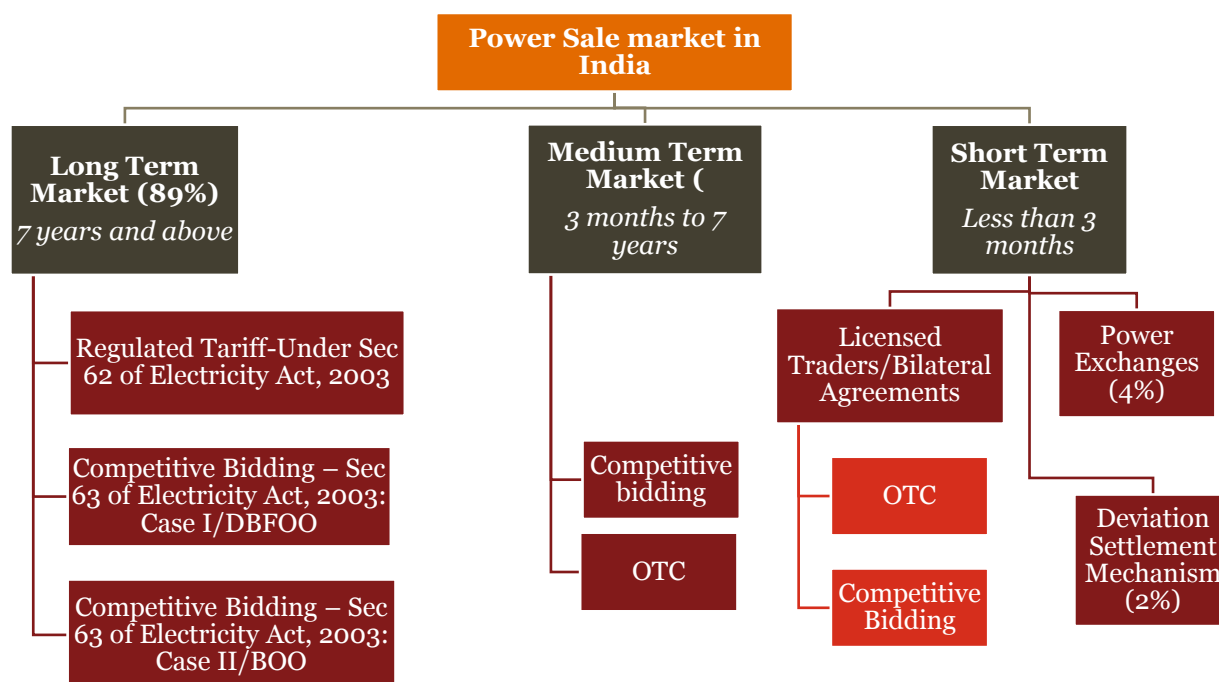







Figure 5-3: Power Sale market in India

5.8.2. Indian Energy Exchange (IEX)

The Indian Energy Exchange is an electronic system based power trading exchange which provides a competitive wholesale market where the buyers and sellers of the Indian power sector come together to trade in energy. IEX was launched by Financial Technologies (India) Limited (FTIL) along with Power Trading Corporation of India Limited (PTC). The Exchange conducts transactions in various product/ product segments as permitted by the Commission under the Electricity Act, 2003.⁴¹

Figure 5-4: IEX Statistics 2016-17

	ELECTRICITY	REC
 Market Share	98.5%	71%
 State Utilities	29 States 5 UTs	17 States 5 UTs
 Generators	400	1000
 Industrial Consumers	3900	2900
 Traded Volumes	Average Daily Volume >109,000 MWh Highest: 158,089 MWh	Total Cleared Volume >1 Crore RECs Highest: 12,87,814 RECs

IEX Data as on 31st Sept, 2017

⁴¹ (Indian Power Market 2014)

Statistics show that 98.5% of the power traded and 71% of the RECs traded through exchanges in India has happened through IEX in 2016-17. It covers 29 states and 5 Union territories with 400 generators and 3900 Industrial consumers registered as traders on the online platform. The average daily volume traded was more than 109 GWh whereas the highest volume traded was ~158 GWh.

Exchange regulation and operation

IEX is approved and regulated by Central Electricity Regulatory Commission (CERC) which is a statutory authority constituted under the Electricity Act 2003 with quasi judiciary role. The activities of IEX are regulated under the various regulations and procedures notified by CERC including the Power Market Regulations 2010, as amended from time to time. The Central Electricity Regulatory Commission (Ancillary Services Operations) Regulations, 2015 provides detailed frame work of scheduling and despatch, withdrawal, energy accounting and commercial settlement of Reserves Regulation Ancillary Services while the fifth amendment to the regulations in February 2017 also covered scheduling and despatch of power of ISGSs for operation of Ancillary Reserve Services, for utilization of un-requisitioned surplus power and for operation of Spinning Reserves. This amendment also specified NLDC as the nodal agency for collective transactions and Ancillary Services including Spinning Reserves.

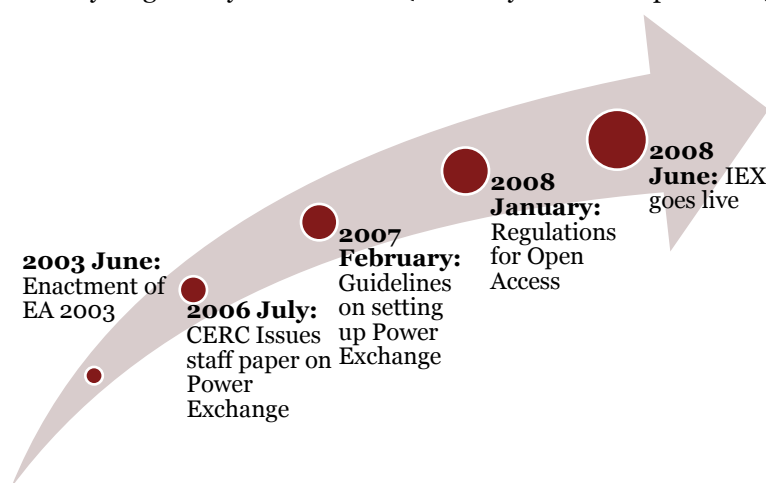


Figure 5-5: Evolution of Power Exchange and IEX in India

Products

Range of Products available in trading market are broadly classified as:

- Day Ahead
- Term Ahead
- Renewable Energy Certificates
- Energy Saving Certificates (ESCerts)⁴²

Further details about these product segments and their detailed features in the Indian Energy Exchange can be found in Appendix A.6. The term ahead and the day ahead markets comprise of various forms of electricity trading instruments as summarized in the table below:

Table 5-5: Characteristics of Energy Exchange Contracts for DAM and TAM

Contract Characteristic	Day Ahead Market	Term Ahead Markets			
		Intraday Contracts	Day Ahead Contingency	Daily Contracts	Weekly Contracts
Delivery	Next day	0400-2400 Hrs same day	For next day	From 4th day to next 7 days	For next week
Auction Type	Closed Auction	Continuous trading	Continuous trading	Continuous trading	Open Auction
Contracts	15 min	Hourly	Hourly	Block of Hours (Fixed)	Block of Hours (Fixed)
Trade Availability	All Days	All days 0030-2000	All Days; 1500-2300	All Days; 1200-1500	Wed & Thurs; 1200-1600

⁴² (Trading on Power Exchange: IEX 2015)

Financial Settlement	Pay-In- D-1; Pay Out – D+1	Pay in: T+1 Pay out: T+1	Pay in: T+1 Pay out: T+2	Pay-In- D-1; Pay Out – D+1	Pay-In- D-1; Pay Out – D+1
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The typical procedures involved in a Day Ahead Market and the timelines for the Day Ahead markets are depicted in the figure below:

Figure 5-6: Day ahead market operations and timeline

Bidding	Matching	Review corridor and funds availability	Result	Confirmation	Scheduling
10:00 am to 12:00 pm	12:00 pm to 1:00 pm	1:00 pm to 2:00 pm	3:00 PM	5:30 PM	6:00 PM
Bids for 15-min each or block bids placed	MCP & MCV calculated	Corridor availability and funds verified	Final ACV & ACP calculated. Market splitting if congestion	Collective transaction confirmation by NLDC	Final Schedule sent to RLDC for incorporation

Trading hours

The Exchange operates on all days except for specified holidays notified by the Exchange well in advance. Exchange runs order books whereby a Member can put his quotes for a Sunday or a public holiday. Specified trading hours exist for various market segments subject to extension, advancement or reduction as deemed fit by the exchange. The exchange provides that the contractual liabilities can be met only by delivery and not by financial settlement.⁴³

Clearing and Settlement Mechanism:

The Exchange has appointed Clearing Banks (HDFC Bank Limited, Indusind Bank Limited and State Bank of India) for electronic transfer of funds between Clearing Members or the Clients, as applicable, and the Exchange.

The Exchange reserves right to include or exclude some of the Banks at its absolute discretion. The Exchange also regulates the processes, procedures, and operations that every Clearing Member shall be required to follow for participation in the clearing and settlement activities and operating their bank accounts with the Clearing Banks.

Delivery Point

Delivery point for the delivery of power is the seam of the respective grid connected entity. However, for the purpose of the contract, the trade schedule is reckoned at the periphery of the regional transmission system in which the grid connected entity is located. The actual schedule at various seams including that of grid connected entities is worked out after incorporation of transmission losses in kind.

Order types

The trading exchange members can submit either of the following types of orders:

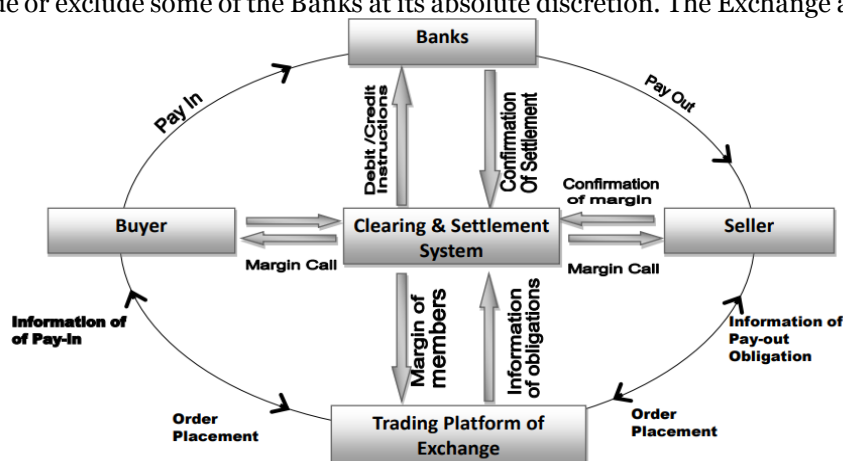


Figure 5-7: Clearing and Settlement System

⁴³ (IEX Business Rules 2015)

Table 5-6: Different types of Bids in the exchange

Single/Portfolio bid	Multiple sequences of price and quantity pairs in a portfolio manner. The quantity shall be assumed to vary linearly between two price pairs. Bids for each 15 min can be entered. This type of bid allows for partial execution.
Block bid	One price and one quantity for a combination of continuous 15 minute time blocks. Selection criterion shall be average of Area Clearing Price (ACP) for the quoted 15 minute time blocks, of the respective Client's bid area. It is an "All or None" type of order
Other bids	The Exchange introduces other types of bids viz. flexi bid as per the requirement of the market. Details of such other possible bids shall be notified by the Exchange from time to time

Bid Matching

Bid Matching is carried out in the exchange in the following manner:

- A) **Open/Closed Auction:** All orders during the call phase are accumulated without any matching and matched after the call period is over. Thereafter, orders are used to calculate the Equilibrium Price. All successful orders matched at Equilibrium Price.
- B) **Continuous Trading:** Price-time priority based continuous matching is carried out. The highest Buy order & lowest Sell order gets the priority in this case. In case the prices are same then priority is given to the time of the order received.

Open Access Charges

The Open Access Charges payable by the consumer are classified in the table below:

Table 5-7: Charges payable by a Trader

PoC charges	Inter-State Transmission charges is payable by the open access consumer
Transmission Charges or STU Charges	Transmission charges are payable to the state transmission utility for the use of the transmission system for availing power through open access
Wheeling charges	Wheeling charges are payable to the Discom for conveyance of electricity through open access as determined by the SERCs
Cross Subsidy Surcharge	Subsidizing open access consumer has to pay a cross subsidy surcharge to the Discom
Others	Additional Charges, if any NLDC application fee, scheduling and operating charges, SLDC Charges IEX transaction charges/Trading Margin

The NLDC Charges such as Application fees are paid in advance while NLDC Scheduling & Operational Charges and Transmission Charges CTU is paid on the day following the trade. Similarly, SLDC Scheduling & Operational Charges, Transmission Charges, Area Transmission Charges (ATU) and Area Load Dispatch Centre (ALDC) charges paid to SLDC is paid on the day following the trade. Application Fees/PoC/SLDC/RLDC charges is paid on Within 3 working days of Acceptance.

Treatment of Losses

Under the Provisions of Electricity market exchange both buyers and sellers are supposed to absorb losses. The Seller injects more than the scheduled transaction or the contracted power and the Buyer draws less than the scheduled transaction or the contracted power. The difference amount for the losses during the transmission so that the power at the periphery of the geographical region in which the entity is located is equal to the scheduled demand or supply.

Market Splitting Methodology

Market splitting is an evolved form of implicit auctioning wherein energy component and corresponding transmission capacity between bid areas are traded simultaneously. It is used for handling congestion in the exchange. In the market splitting methodology areas on either side of congested corridor are identified separately and initially both are cleared as if there is no interconnection between the areas, and then the area which has highest price, draws electricity from the area with the lower price just as much as the capacity of the congested line will allow. Allowing this flow into higher price area will reduce prices in the higher price bid area and would increase prices in the lower price bid area depending upon the bid prices in the respective areas.

Margin Requirements and Collaterals

The Exchange ensures payment security to be highly reliable in its operations by levying margin requirements on all its traders. Margins are required to be brought in to transact on the exchange. A member is allowed to bid only if the margin requirements are met. Once a bid is made margin prescribed for the bid is blocked by the exchange. In case of DAM, margin requirement is at least equal to the average value of transactions done by it for last seven days; or the initial margins prescribed by the Exchange.

In case of TAM, the Member or Client has to meet the following margin requirements from time to time as described below:

- **Initial Margin (Operational Limit):** Initial Margins are computed on the total order value and is blocked automatically from the total available deposits. The trading system will automatically reject orders if initial margin exceeds the balance deposits available.
- **Basis Margin:** Additional Margin is computed as a percentage of the traded value as per the risk curve defined and are collected in different trenches as per the contract specifications.
- **Variation Margin:** The Exchange on a pre decided day also computes the Variation Margin of Members based on their trades (open position).
- **Extreme Loss:** The Exchange may collect any ad hoc margins from time to time in case if it feels that the available margins collected by the exchange are inadequate due to variation in the prices in the Market.

In the REC Market, Margin requirement is equivalent to 100% of the order value made available in cash to place a purchase order

All the margin requirements can be deposited in form of Cash, Bank-guarantee (BG), Fixed-deposit (FD) and Letter of Credit (LC). Non cash collateral towards margin requirements have to be submitted at least three day before (in case of FD one day before) the start of trading day. Non cash collateral can be in the form of:-

- Fixed Deposit (FD)- Minimum denomination for each FD is Rs 2 lacs and value shall be in round figures
- Bank Guarantee (BG)- Minimum denomination for each BG should be Rs 5 lacs and value shall be in round figures
- Letter of Credit (LC)- Minimum denomination for each LC should be Rs 5 lacs and value shall be in round figures

Risk Management

The exchange serves as the counter party for all transactions apart from providing payment security mechanism to all traders. Hence the traders should not worry the risk profile of the party on the opposite side. The Exchange manages this counter party risk by imposing margin requirements before the party is able to transact on the platform. The margin requirements vary for different kinds of products and also depends on the member or client's trading history.

5.8.3. Power Exchange India Limited (PXIL)

Power Exchange India Limited (PXIL) was the second energy exchange established in India. It is promoted by the National Stock Exchange of India (NSE) and the National Commodities and Derivatives Exchange Ltd. (NCDEX). The other equity partners are in the exchange are:

- Power Finance Corporation Ltd. (PFC)
- GMR Group of Industries (GMR)

- JSW Group of Industries (JSW)
- Tata Power Trading Company Ltd. (TPTCL)
- MP Power Trading Company Ltd. (MPPTCL)
- West Bengal State Electricity Distribution Company Limited (WBSEDCL)
- Gujarat Urja Vikas Nigam Ltd. (GUVNL)

It commenced its operations in October 22, 2008. It has pioneered a few power trading products in India which have then been adopted by the IEX. It was PXIL who introduced the 15 minutes power trading block concept in India. It was the first exchange to introduce internet based trading and to propose the minimum volume of 1MW to help the small generators participate in the power trading platform. It took a leading step to the week ahead market in 2010, shaped the policy to trade RECs only on power exchanges and also executed the first solar REC trade in 2012. It signed a Memorandum of Understanding with European Energy Exchange for strategic business development in 2011 and with Korea Power Exchange for key business initiatives in 2012.

Exchange regulation and operation

PXIL is also approved and regulated by Central Electricity Regulatory Commission (CERC). On the same lines as IEX, the activities of PXIL are regulated under the various regulations and procedures notified by CERC including the Power Market Regulations 2010, as amended from time to time.

Products and their salient features

Unlike IEX, PXIL does not trade in the ESCerts. Apart from the other products traded on the Indian Energy Exchange (IEX), PXIL trades in an extra product termed as Any-Day Product. The salient features of the product are listed below:

- Any-day product allows trading of power for 1 day up to 11 Days in advance. This brings in more flexibility for the consumers whose energy demands are not uniform across the week
- Earliest Delivery Starts from the Day after Trade Date.
- Discriminatory pricing mechanism is used as the matching methodology to ensure maximum benefit to both the buyers and sellers of electricity.
- Operations are carried out in accordance with the Procedure for scheduling of Bilateral Transactions' issued by the Central Transmission Utility under provisions of 'CERC (Open Access in inter-State Transmission) Regulations, 2008.
- Trading is on a bilateral basis with financial settlement and clearance taken care of by the Exchange.
- 100% margins taken upfront ensure honoring of trade.

Few more products are proposed by the PXIL and their implementation are subject to regulatory approval. These are:

- Two- day ahead spot Contracts
- Evening- Day ahead Spot Contracts
- Monthly Forward Contracts

Trading hours

This is same as mentioned in the case of IEX in section 5.9.1

Clearing and Settlement Mechanism:

PXIL has appointed State Bank of India (SBI), HDFC Bank and Axis bank as the clearing banks for the clearing and settlement purposes. The buyer has to make the payment to PXIL for his obligation before 11:00 am in his Settlement Account in the designated Clearing Bank on the Pay-in day as prescribed by the Exchange. This pay-in includes the trade value, open-access charges, transaction charges, other charges and taxes as may be prescribed by the Exchange.

The exchange pays to the seller for his pay-out obligation by 11:30 am in the Settlement account in the designated Clearing Bank on the Pay-out day as prescribed by the Exchange. The pay-out consists of the Net traded value

after deducting the open-access charges, transaction charges, other charges and taxes as may be prescribed by the Exchange.

Delivery Point

This is same as mentioned in the case of IEX in section 5.9.1

Order types

This is same as mentioned in the case of IEX in section 5.9.1

Bid Matching

This is same as mentioned in the case of IEX in section 5.9.1

Open Access Charges

This is same as mentioned in the case of IEX in section 5.9.1

Treatment of Losses

This is same as mentioned in the case of IEX in section 5.9.1

Market Splitting Methodology

This is same as mentioned in the case of IEX in section 5.9.1

Margin Requirements and Collaterals

The margin requirements for various products in PXIL are given in the table in Appendix A.6.

On the Verge of Closure:

In January 2017 the Board of the Promoter NSE in its meeting took decision to shut down the Power exchange as it felt was not viable to run the power exchange with less than 5% market share in India. It might be noted here that IEX dominates the power exchange market and captures the lion's share of 98% short term power market trade that happens in India through exchanges. Hence, PXIL is only left with 2% market share. The daily volumes turnover on Power Exchange is around ~5000 MW against IEX's over 1 lakh MW. As per the reports, PXIL is also making heavy losses to the tune of 35 lakhs per month. Lack of aggressive investments in the exchange infrastructure and regulatory overhang are the key reasons that are attributed to the failure of the power exchange. The final activity on the decision to shut down operation is yet to commence.

Power Exchanges in Other SAARC Countries

Apart from India, no other SAARC member states have the provisions or even have shown the intention to establish an internal power exchange for the energy or ancillaries trading purpose. The Indian power exchanges are already pitching for the Cross-Border Electricity Trade to the CERC so that the needed amendment in the regulations can take place to enable them trade power with the nodal agencies appointed by the governments of the neighboring states. This can probably increase their demand profile and bring in more profitability. It may be noted here that only 4-5% of the Indian power trade happens through the exchanges while 89% happens through bilateral long term PPAs. Also, the spot prices in the exchanges have been following a downward trend. The IEX average Market Clearing Price for February 2014 was INR 3.29 per unit, this fell to INR 2.85 per unit in February 2015, then to ₹2.30 per unit in February 2016 and has risen marginally to INR 2.54 per unit in February 2017.

The draft CBET guidelines issued by the CERC, India offer scope of cross-border trade through power exchanges and once the regulations are firmed up, the exchanges would come into play. Some progress is likely to be expected over the next few months.

6. Salient Features of the prevailing international procedures and practices including laws and regulations

6.1. South African Power Pool (SAPP)

The introduction to the SAPP has already been given in the section 3.1. In this section we will discuss the prevailing Practices and procedures (including relevant laws and regulations) pertaining to facilitating the buying and selling entities in the region.

6.1.1. Market Participants

The 16 SAPP members utilities of the SADC member countries who participate in the energy trading are listed in the table below:

Table 6-1: SAPP Member Utilities

Full Name of Utility	Status	Country
Botswana Power Corporation (BPC)	OP	Botswana
Electricidade de Mozambique (EDM)	OP	Mozambique
Electricity Supply Corporation of Malawi (ESCOM)	NP	Malawi
Rede Nacional de Transporte de Electricidade (RNT)	NP	Angola
Eskom	OP	South Africa
Hidroelectrica de Cahora Bassa (HCB)	IPP	Mozambique
Lesotho Electricity Corporation (LEC)	OP	Lesotho
Mozambique Transmission Company (MOTRACO)	ITC	Mozambique
Nam Power	OP	Namibia
Societe Nationale d'Electricite (SNELL)	OP	DRC
Swaziland Electricity Company (SEC)	OP	Swaziland
Tanzania Electricity Supply Company Ltd (TANESCO)	NP	Tanzania
ZESCO Limited (ZESC)	OP	Zambia
Copperbelt Energy Cooperation (CEC)	ITC	Zambia
Lunsemfwa Hydro Power Company (LHPC)	IPP	Zambia
Zimbabwe Electricity Supply Authority (ZESA)	OP	Zimbabwe
N.B.: IPP- Independent Power Producer, ITC = Independent Transmission Company		
NP = Non-Operating Member , OP = Operating Member		

The above table demonstrates the participation of Independent power producers and Independent transmission companies as well in the SAPP framework. Operating Members are the members whose transmission system is interconnected to the SAPP grid. The Non-Operating members.⁴⁴

6.1.2. Market Regulation and Operation

The regulatory support to the SAPP is provided by Regional Electricity Regulators Association (RERA). RERA oversees the SAPP operations but it does not have the authority to check market abuse by the country participants. SAPP and RERA signed a MoU in April 2007 on liaison and interaction between the two parties and are working together to assist in harmonizing regulatory policies, legislation, standards and practices.⁴⁵

Four working committees of SAPP manage the activities of SAPP. They are the Environmental Sub-Committee, the Markets Sub-Committee, the Operating Sub-Committee and the Planning Sub-Committee under a Management Committee which in turn reports to the Executive Committee. The Markets Sub-Committee is a

⁴⁴ (SAPP: The Potential of Regional Power Sector Integration 2009)

⁴⁵ (Update on RE Power in the SAPP 2013)

new sub-committee that was created in April 2007 following the signing of the Revised Inter-Utility Memorandum of Understanding by the SAPP Executive Committee on 25 April 2007.

The SAPP Coordination Centre is the Market Operator for the SAPP Competitive Markets. The SAPP Coordination Centre Board was formed in April 2007 to govern the activities of the SAPP Coordination Centre. Inter-government MOU, Inter-utility MOU⁴⁶ and operating agreements /grid code have been put in place for the purpose of operation of SAPP. Three system operators, ESKOM-TSO, ZESCO and ZESA handle the real-time operations of SAPP. There is no central dispatch. The grid operation in SAPP resembles inter-regional grid operation in India based on the IEGC.

Inter-governmental Memorandum of Understanding (IGMOU) that grants permission for the utilities to participate in the SAPP and enter into contracts, and guarantees the financial and technical performance of the power utilities was signed in 1995 by SADC members, excluding the Democratic Republic of Congo (DRC), Madagascar, Mauritius and Seychelles. DRC was a addition to the list of signatories in the revised IGMOU signed on 23 February 2006.

Inter-utility memorandum of understanding (IUMOU) between participants defines the ownership of assets and other rights such as provision for change in status from participating to operating member. The Revised IUMOU, with a new structure for management and operations of SAPP, was signed by all the SAPP member utilities on 25 April 2007 in Harare, Zimbabwe, with the exception of SNEL of the DRC and TANESCO of Tanzania. TANESCO signed the Revised IUMOU in February 2008 and SNEL in April 2008.

Agreement between operating members (ABOM), determines the interaction between the utilities with respect to operating responsibilities under normal and emergency conditions. Operating guidelines defines the sharing of costs and functional responsibilities for plant operation and maintenance including safety rules. The Operating sub-committee establishes and updates methods and standards to measure technical performance, operating procedures including operating reserve obligations.⁴⁷

The participant enters into an agreement with the Market operator in an participation Agreement. The participation agreement and the Market Book of Rules governs the trading operations and acts as a binding document for the participants.⁴⁸

6.1.3. License/Eligibility to Trade

Participants can only trade directly on the SAPP if they are licensed or authorised to trade by the host country to undertake cross-border electricity trading. The participant has to be further accepted by the SAPP Executive committee and agree to the SAPP Market governance documents. It should be connected to the SAPP control area and have arrangements for the balance responsibility. The participant should also adhere to the requisite trading account requirements and margin requirements as specified by the SAPP rules. The licensing guidelines as mentioned in the Guideline 4 of “ Guidelines for Regulating Cross-Border Power Trading in Southern Africa, 2010” take care to ensure that the license to trade would not undermine the national energy security. The cross-border trade licenses are valid for a certain period and may be renewed or extended by the regulator. These are subject to expiry with the termination of associated cross-border agreement.

6.1.4. Products

The SAPP has been following an evolutionary model with a “learn as you do” approach to slowly transform into a regional electricity market. NORDPOOL has been appointed as consultants for the transformation from a cooperative power pool into a competitive power pool. SAPP operations include scheduling and managing long term (for 1-5 years) and short term bilateral trades (for hours, days or weeks).

Previously the trade was carried out only through only bilateral contracts. But the current arrangements provide for various products introduced at different point of time as the system evolved. Short-Term Energy Market (STEM) was introduced in 2001 while Post STEM (Balancing Market) was launched in 2002. Similarly, Day-

⁴⁶ (Inter-government Memorandum, Inter-Utility Memorandum and Operating Guidelines 1995)

⁴⁷ (SAPP Experience on regional power market development & operation 2016)

⁴⁸ (Guidelines for Regulating Cross-border Power Trading in Southern Africa 2010)

ahead Market (DAM) and Post Day Ahead Market (PDAM) were brought in at 2009 and 2013 respectively. Recent additions to the portfolio in 2015 also listed Forward Physical Markets (MA &WA), Intra Day Market, Weekly Forward Physical Markets and Monthly Forward Physical Markets. Forward Physical Markets further include peak and off-peak hour products. There are plans to add financial markets to the product portfolio as well in the near future.

Contracts can be both firm and non-firm for the different product segments. Firm contracts are non-interruptible, by its virtue of fixed price and quantities have a higher reliability and are charged at a premium. Non-firm contracts are the one which are interruptible with a advance notice. Penalty is levied on the parties if advance notice is not provided.

6.1.5. Existing Transmission Network

Long and short-term bilateral contracts between participants are given priority over STEM contracts for transmission on the SAPP interconnectors on the day of trading. On the day of delivery, Emergency Energy transactions are accorded highest priority over bilateral contracts & competitive markets trades and Non-firm bilateral transactions are given a priority over intra-day market. All the STEM contracts are subject to the transfer constraints as verified by the SAPP Co-ordination Center. Transmission path is required to be secured in advance in the trading mechanism followed in SAPP.

The available transfer limits of different existing interconnections after factoring in the thermal capacities, voltage capacities and the stability transfer limits are depicted in the table below. This depicts the infrastructural readiness of the power pool for transactions between various utilities within the power pool.

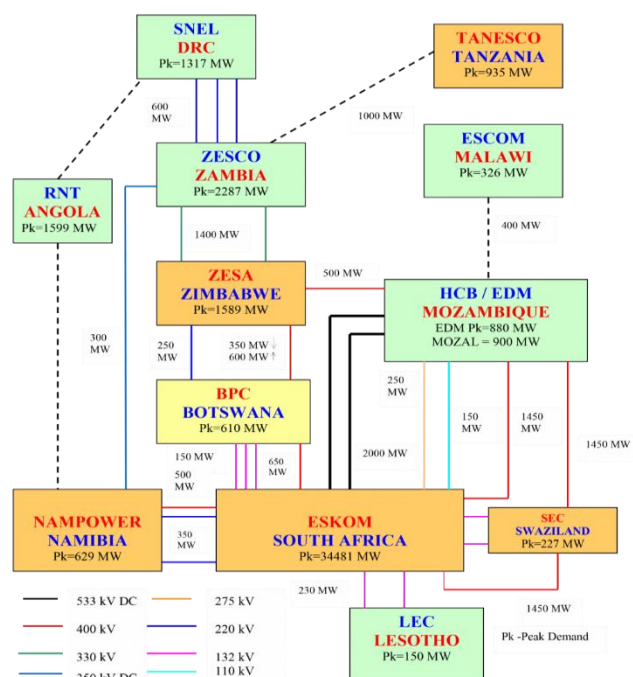


Figure 6-1: SAPP Interconnection agreement

Source: SAPP Website

Table 6-2: Existing SAPP Cross-border Transmission Interconnection Capacities

Utility (From - To)	Interconnection (From - To)	Voltage (kV)	Number of lines	Transfer Limit (MW)
Aggeneis-Kokerboom	North of Hydra	765		1805
BPC - ESKOM	Spitskop-Gaborone South	132	3	245
BPC - ESKOM	Derderport - Dwaalboom	132	1	70
BPC - ESKOM	Gaborone-Spitskop	132	3	110
BPC - ESKOM	Phokoje - Matimba	400	1	190
CEC - ZESCO	Luano - Kariba North			325
ESKOM	South of Hydra	765		1710
ESKOM -EDM_S	Komatipoort-Corumana	110	1	67
ESKOM -EDM_S (MOTRACO)	Arnot-Maputo	400	1	1100
ESKOM -NAM	Aggeneis-Kokerboom	220	2	195
ESKOM -NAM	Aries – Kokerboom	400	1	380
ESKOM -SEC (MOTRACO)	Camden - Edwaleni	400	1	1100
ESKOM-LEC	Tweespruit-Maseru	132	2	90
ESKOM-SEC	Normandie-Nhlangano	132	1	76
HCB -ZESA	Songo-Bindura	330	1	220
HCB-ESKOM	Songo-Apollo	533	1	700

SEC -EDM_S	Komatipoort -Influene	275	1	133
SEC-EDM_S (MOTRACO)	Edwaleni II-Maputo	400	1	1000
SNEL - CEC	Karavia – Luano	220	1	247
SNEL - ZESCO	Karavia – Luano	220	1	247
SNEL - ZESCO	Kolwezi -Solwezi	330	1	333
ZESA	Kariba South- Insukamini	330		220
ZESA - ESKOM	Beitbridge-Messina	132	1	15
ZESA -BPC	Bulawayo- Francistown	220	1	200
ZESA -BPC	Insukamini - Phokoje	400	1	220
ZESA -EDM_N	Mutare - Chicamba	110	1	38
ZESCO	Luano - Kariba North			325
ZESCO - NAM	Livingstone -Sesheke-Zambezi	220	1	180
ZESCO - NAM	Livingstone -Sesheke-Zambezi – Gerus	220	1	180
ZESCO -ZESA	Kariba North - Kariba South	330	2	428

6.1.6. Transmission Charges

Full transmission service charges are recovered for long term contracts pro-rata to capacity used, while for short term trades are charged at a rate of 50% besides according a lower priority vis-à-vis long term bilaterals.

6.1.7. Security/Margin Requirements

As per the operating guidelines of the SAPP, Participants deposit sufficient security margins with the Co-ordination Center before trading commences and separate security is required for each energy contract.

6.1.8. Volume traded

Total traded volumes on the Day Ahead market (DAM), intra-day market (IDM), Forward Physical Market Monthly (FPM-M) and Forward Physical Market Weekly (FPM-W) decreased by 3.5% to 126,795.9 MWh in the month of June 2017, from the May 2017 figure of 131,363.4MWh. A total of USD 7,744,117.48 was exchanged on the DAM, IDM, FPM-W and FPM-M market during the month of June 2017 when compared to a total of USD 7,971,143.56 exchanged in May 2017. The gross generating capacity of SAPP countries is 52743 MW (74% Coal, 20% Hydro, 4% Nuclear, 2% Gas/Diesel), and it is dominated by ESKOM.⁴⁹

6.1.9. Price Determination & Treatment of Losses

Prices for bilateral contracts are negotiated on a voluntary case to case basis and are subject to periodic review for factoring changed circumstances, inflation and contracted volume based on demand/supply. The pricing structure for bilateral contracts is diverse with some contracts having capacity and energy rates which take cognizance of the time of use, peak or off peak. Other contracts have flat energy rates. Power purchase prices are purely set on the basis of bids and offers on the assumption of free transmission access for all eligible generators and their customers. Separate charges are paid for the use of the transmission network.

The uniform market clearing price mechanism is used to determine the clearing price in the market. The transmission pricing system in SAPP has also evolved through many stages including the postage stamp method and the MW-KM method. The current nodal transmission pricing system takes into account the following charges, as mentioned in the Operating Guidelines and other SAPP Contractual documents, which provide standards and operating procedures for SAPP:

- Network charges ensuring recovery of costs for owning and operating the portion of the regional network used for wheeling purposes. These would be more of entry and exit charges
- Losses by either in making up the losses with energy, or through a financial payment.
- In case of no congestion, uniform standard transmission pricing is used. Market splitting methodology similar to the Indian Energy Exchange is used for congestion management.

⁴⁹ (SAPP Monthly Report 2017)

6.1.10. Price Trends

The Monthly Forward Physical Market Non off-peak prices increased by 18.3% from 6.283USc/KWh in May 2017 to 7.432 USc/KWh in June 2017 where as Off Peak prices increased by 20.2% from 3.707 USc/KWh in May 2017 to 4.456 USc/KWh in June 2017

The Weekly Forward Physical Market average price for the Peak period was higher by 47% at 11.10USc/KWh in June 2017 from the May average peak price of 7.551USc/KWh whereas standard period average prices increased from the May 2017 average prices of 4.444 USc/KWh to 6.448 USc/KWh in June 2017. The average Off–Peak price also increased by 29.6% from 2.317USc/KWh in May 2017 to 3.003USc/KWh in June 2017.

The monthly average Day Ahead market clearing price (MCP) was slightly higher during the month of June 2017 at 5.531USc/KWh when compared to the 4.964USc/KWh recorded in May 2017. Below is a summary of the daily average MCPs for the month of June 2017.⁵⁰

6.1.11. Settlement and Clearing

SAPP control center declares the spare transmission capacity on a daily basis for cross-country transmission links. The participants send their bids and offers. The prices are set on matching seller prices i.e. suppliers are paid as bid. Billing is done on the scheduled energy. Mutual agreements between the bilateral parties in the trading arrangements allow them to directly invoice and settle each other. The settlement amounts based on the invoices are payable into the Co-ordination Center's clearing account.

All confirmed trades are settled on scheduled volumes and prices and not on actual flows. Any deviation between scheduled and actual volumes are handled through the SAPP imbalance settlement procedure. Trade cancellations or revisions are done if both seller and buyer did not deliver and receive power.

As mentioned in the Operating Guidelines and other SAPP Contractual documents which provide standards and operating procedures for SAPP participants, have the full obligation to pay for the energy traded and the associated energy costs. It is the responsibility of the Participants (buyers) to ensure that sufficient funds are paid into the clearing account for the Coordination Center to effect payment to the respective Participants (sellers).

6.1.12. Currency of Trade

The choice of currency is either the United States Dollar or the South Africa Rand dependent on the agreement between the buyer and the seller.

6.1.13. Imbalance Settlement

A study of SARI Energy on SAPP Experience On Regional Power Market Development & Operation reveals that imbalance energy is classified into 3 categories viz. Inadvertent Energy, Declared Emergency Energy and other energy imbalance. Inadvertent Energy is the energy imbalance within a tolerance band of +/-25MW. Such kind of imbalances can be settled in the three control areas of Eskom, ZESA and ZESCO. In case of declared emergency, Utility emergency energy rates are used to compensate the supplier unless otherwise specified in bilateral agreements. These rates are declared on a monthly basis by each operating member. The responsibility of verifying the rates lies with the coordination center of SAPP.

Block	System frequency range
A	$f < 49.85$ Hz
B	$f \geq 49.85$ and $f < 49.95$ Hz
C	$f \geq 49.95$ and $f \leq 50.05$ Hz
D	$f > 50.05$ Hz and $f \leq 50.15$ Hz
E	$f > 50.15$ Hz

For other energy imbalances, SAPP uses a specific method of settlement. The imbalances are fit into five blocks of frequencies as shown in the adjacent table. The SAPP average generation cost per MWh is used as the rate of settlement for block C while SAPP highest generation cost per MWh is used for settlement of block A. This rate is determined for winter and summer seasons separately for peak, standard and off-peak periods.

Table 6-3: Imbalance settlement blocks

⁵⁰ (SAPP Statistics 2016)

6.1.14. Dispute Resolution

The Coordination Centre assists in the successful resolution of trading-related disputes between utilities and other pool participants, such as the dispute over reactive power between MOTRACO and Eskom.

6.1.15. Trading Margin

Trading margins have not been specified under the current available set of regulations.

Key Learnings

- **Well-organized structure:** The SAPP has an organized structure with a regulatory authority, market operators and four working committees with distinct responsibilities. This indicates the maturity of the power pool in terms of the regulatory requirements and implementation policies. Such a regional structure may be put in place for the SAARC Member States to avoid conflict of responsibilities, augment the planning and execution efficiency and develop strong regional interconnections.
- **Price determination:** The uniform market clearing price mechanism is used to determine the clearing price in the market. In case of no congestion, uniform standard transmission pricing is used. Market splitting methodology similar to the Indian Energy Exchange is used for congestion management.

6.2. West African Power Pool (WAPP)

The introduction to the WAPP has already been given in the section 3.2. In this section we will discuss the prevailing Practices and procedures (including relevant laws and regulations) pertaining to facilitating the buying and selling entities in the region.⁵¹

6.2.1. Market Participants

There are 29 WAPP members utilities who participate in the energy trading. They are listed in the table below:

Table 6-4: WAPP Member utilities

Full Name of Utility	Abbreviation	Country
National Office of Electricity	ONE	Morocco
Volta River Authority	VRA	Ghana
Transmission Company of Nigeria	TCN	Nigeria
The National Electricity Company of Burkina Faso	SONABEL	Burkina Faso
Manantali Energy Management Company	SOGEM	Mali
National Electricity Company of Senegal	SENELEC	Senegal
Benin Electric Power Company	SBEE	Benin
Nigerien Electricity Society	NIGELEC	Niger
Northern Electricity Distribution Company	NEDCO	Ghana
Nigerian Bulk Electricity Trading	NBET	Nigeria
National Water and Electricity Company	NAWEC	Gambia
Mainstream Energy Solutions Limited	MAINSTREAM	Nigeria
Liberian Electricity Corporation	LEC	Liberia
Karadeniz Powerships Ghana Company	KARPOWERSHIP	Ghana
GTS Engineering Services	GTS Engineering Services	Ghana
The Ghana Grid Company Limited	GRIDCO	Ghana
Electricity Distribution and Supply Authority	EDSA	Sierra Leone
Energy of Mali	EDM-SA	Mali
Electricity Company of Ghana	ECG	Ghana
ContourGlobal	CONTOURGLOBAL	Togo
Cote d'Ivoire Energy Company	CI-ENERGIES	Ivory Coast

⁵¹ (Regional Market Rules for WAPP 2015)

Ivory Coast Electricity Company	CIE	Ivory Coast
Cenpower Generation Company Limited	CENPOWER	Ghana
CENIT Energy	CENIT Energy	Ghana
Togo Electric Power Company	CEET	Togo
Benin Electricity Community	CEB	Togo
GTG Energy	GTG Energy	Ghana

6.2.2. Market Regulation and Operation

ERERA is the regional regulatory authority dealing with the energy trade. It is mandated with authority of developing and recommending rules, enforcing the rules, tariff issues, approval of the regional master plan and dispute resolution capacities amongst others. ERERA is also responsible for the enforcement of the newly adopted Regional Market Rules (RMR) by the WAPP.⁵²

An Inter-governmental Memorandum of Understanding (MoU) was adopted by the ECOWAS Ministers of Energy on the establishment of WAPP in Lome, Togo in September 2000. Mutual obligations of the Parties by the virtue of the MoU paved the way to facilitate formation and operation of the WAPP. The Steering Committee was made up of the Energy Ministers of signatory Parties and the Implementation Committee comprised Chief Executives and General Managers of the national power utilities.

An Inter-utility MoU was signed by the Chief Executives and General Managers of the national power utilities representing the Transmission System Operators (TSO) of the ECOWAS member States at their meeting held in Dakar, Senegal, in March 2001.

The governance structure of WAPP comprises of 4 key bodies namely, The General Assembly, The Executive Board, The Organizational Committees and The WAPP General Secretariat including the Information Coordination Centre and the Planning, Investment Programming and Environmental Safeguards Department.

The WAPP General Secretariat supports the Executive Board on administrative issues and also manages the day-to-day operations of WAPP. The Organisational Committees assists the Executive Board on all matters concerning collective policy formulation functions for developing, maintaining and updating common “rules of practice” on technical, planning, operational and environmental aspects of WAPP. The General assembly is the highest decision making body for WAPP.

Table 6-5: WAPP control areas and Operators

Control Areas	Operators
Côte d'Ivoire-Burkina-Faso	Côte d'Ivoire
Ghana-Togo-Benin	Ghana
Nigeria-Niger	Nigeria
Guinea – Liberia – Sierra Leone	Guinea
Senegal – Mali – Gambia – Guinea Bissau	Senegal

The WAPP interconnected power system is composed of 5 Control Areas with individual control area operators as provided in the adjacent table. Each Control Area specifies, by 1st December every year, its operating reserve policies, including the minimum reserve requirement, the permissible mix of Spinning Reserve and non-spinning reserve, its procedure for applying operating reserve in practice, and the limitations, if any, upon the amount of interruptible load which may be included. The minimum exchange

programming period is 1 hour and the programming time frame is 1 hour. The power exchange shall be a multiple of 1 MW.

The Phase 1 Market as per the roadmap adopted by WAPP is supposed to comprise of bilateral trading only while the phase 2 Market would also include bilateral trading with transit through third countries based on standard contracts. Phase 3 Market is envisaged as a voluntary competitive and liquid market with availability of enough transmission capacity and adequate reserves in the member countries.

⁵² (Development of WAPP Market Design and Market Rules 2011)

Information and coordination centre (ICC) is designated as the independent regional and system market operator for performing the function of market coordination and operations.

The WAPP Operation Manual⁵³ containing policies for operations security and mitigation plan governs the operation of WAPP interconnected network (Grid Code). The rules laid down under RMR specify that only one entity per country would represent the national power sector and regional trade in the power market serving as the Transmission Systems operator for that country.

6.2.3. License/Eligibility to trade

The operation manual for WAPP lays down that WAPP membership is voluntary and is open to any public or private entity, which fall into either of the following category:

- **Transmission Using Members:** They should own/operate generation facilities of at least 20 MW and/or should be involved in distribution and retail supply of electricity
- **Transmission Owning/operating members:** They should own/operate major transmission facilities in the West African region which are physically interconnected and have impact on the coordination of system operations

In addition to the above, petroleum companies, producers and transporters of gas meant for electricity generation, as well as primary power sector investors are eligible for membership.

The west African power pool market rules also known as the Regional market rules govern the commercial transactions pertaining to the Cross-Border trade of electricity that flows through the WAPP interconnected power system. It lays down that EREDA would act as the final approving authority for a market participant. Any IPP with a regional project may be accorded a special approval by EREDA for participation in the market. The approved Market Participant has to enter into a Market Participation Agreement with WAPP. A participant may anytime voluntarily cease its participation by giving at least a year advance notice and fulfilling other conditions as laid down in the Regional Market Rules.

6.2.4. Products

The products in the existing market are bilateral contracts. In phase 1, all the contracts will be bilateral in nature following the model contract terms approved by EREDA. Going ahead Short & Medium term electricity exchanges through day ahead market (DAM) like products are envisaged by the WAPP Market Design and WAPP Market Rules Implementation Road Map for WAPP regional electricity market. Also provisions and model contracts will be made available for Long term, medium term and short term Bilateral agreements as approved by EREDA.⁵⁴

6.2.5. Existing Transmission Network

At present a few interconnection between some of the WAPP member countries do exist at various levels. These form a part of the WAPP interconnected network. The Revised Master Plan is being implemented as WAPP Priority Projects (Generation and Transmission). This aims at the construction of transmission lines to interconnect member countries of WAPP.⁵⁵ Several interconnection projects were taken up as a part of WAPP business plan for 2012-2015 while many are incorporated in the business plan for the period 2016-19. Many of these projects are under construction and are scheduled to be commissioned in 2017 while a few stretch to 2019-20. A world bank funded synchronization project for the interconnected systems and implementation of the Operation Manual is also under implementation.

A Medium Voltage Cross-Border Electrification sub program is also in progress under which various Cross-Border links of medium voltage capacities are under development. This would strengthen the interconnection between the countries further enabling medium voltage transmissions and subsequent reduction in the transmission costs.

⁵³ (Operating Manual for WAPP 2015)

⁵⁴ (Static and Dynamic Analysis of the WAPP interconnected network 2016)

⁵⁵ (WAPP Business Plan 2015)

Table 6-6: Medium voltage Cross-border Interconnections

Interconnection between Countries	Status
Ghana – Togo:	Commissioned in 2011
Ghana - Burkina Faso:	Commissioned in 2012
Ghana - Southern Togo:	Commissioned in 2015
Benin - Northern Togo:	Commissioned in 2015
Ivory Coast – Liberia	Commissioned in 2017

6.2.6. Transmission Charges

Wheeling charges and transmission tariffs is currently mutually decided by the bilateral agreements between the Parties. Going ahead this would be regulated by EREDA by the approved transmission pricing methodology, especially for the new contracts.⁵⁶ All the parties to a particular contract may choose to shift to the new mechanism or continue with the bilateral agreement. The transmission pricing and losses studies will be performed annually by WAPP.

6.2.7. Security/Margin Requirements

Margin Requirements have not been specified under the current available set of regulations.

6.2.8. Volume Traded

The Market is yet to be operational and start trading operations. The existing volumes traded are in the capacity of the bilateral inter country agreements

6.2.9. Price Determination & Treatment of Losses

Transmission pricing for the existing contracts are as per the mutually agreed bilateral contracts between the parties. However, the new contracts are governed by the Regional Transmission Tariff Methodology. The phase 2 Market envisages the transmission pricing regulated by EREDA and no more allowance of bilateral agreements for the same. The Regional Transmission Tariff Methodology selected is described as a point to point MW-Km load flow based Tariff methodology. The Tariff is separately calculated for each and every regional bilateral trade within WAPP. The methodology calculates the tariff in five fundamental steps:

1. Determination of regional transmission assets and asset value
2. Calculation of annual revenue requirements for each Transmission System Operator (TSO) asset used for regional bilateral trading
3. Calculation of use of transmission system and associated transmission losses for each regional bilateral trade
4. Calculation of transmission revenue requirements for each TSO for regional bilateral trades
5. Calculation of transmission tariff and transmission losses for the purchaser of each regional bilateral trade

Congestion is managed on a “first come first serve” basis unlike the Market splitting methodology used in SAPP. This implies that the latest signed regional bilateral trade agreement will be the first to be curtailed.

6.2.10. Price Trends

No price trends are available for WAPP as the market operations are yet to start.

6.2.11. Settlement and Clearing

Settlement of all bilateral contracts is to be carried out as per the schedule of transactions and not as per the delivery. The balancing energy will be settled in kind as per the Article 38. 3 of the Regional Market Rules. Billing and settlements is done on a monthly basis.

⁵⁶ (Transmission Tariff Methodology for WAPP 2015)

6.2.12. Currency of Trade

Currency for trading operations have not been specified under the current available set of regulations. Most of the ECOWAS countries (8 out of 15) have CFA Franc as their national currency. Hence, it may be more convenient for them to trade in the same currency.

6.2.13. Imbalance Settlement

The compensation of inadvertent deviations is performed by using a program of compensation "in kind" within the compensation period - as an import / export of the corresponding amount of energy per tariff period that was accumulated in the recording period. The deviations are calculated by the ICC for every tariff period per day and submitted to the control area operator. The validation and settlement of the deviation is supposed to be completed within 72 hours of being informed by the system market operator(SMO) . If the Transmission system operator (TSO) disagrees with the imbalance information provided by the SMO, it may raise a request within 24 hours. Following this the SMO will have another 24 hours to review and ratify or modify the imbalance calculations. If no agreement is reached, dispute resolution may be triggered.

6.2.14. Dispute Resolution

Dispute related to Cross-Border trading of electricity can be resolved by formation of a dispute resolution panel of 3 members from the governing body structure such as General Secretariat and Executive Board. This is as per the method provided in the Chapter 5 of "Articles of Agreement Of The West African Power Pool Organization and Functions (Accra – October 2005)".

The formation of the governing body structure is discussed in section 6.2.2. The Executive board is comprised of 15 members including 13 Directors General and Managing Directors and Chiefs Executives Officers of ECOWAS national power utilities, the secretary general and a honorary member. The General Secretariat is the administrative and technical organ in charge of the day-to-day management of the activities of WAPP. It is composed of three Departments namely: Department of Information & Coordination Centre , Department of Administration & Finance and Department of Planning, Investments Programming & Environmental Safeguards

ERERA also may be approached for the resolution of the disputes related to Cross-Border trading of electricity. Apart from dispute resolution, ERERA is also responsible for development of the corresponding procedure(s) for solving disputes. Parties may appeal at the Court of Justice of ECOWAS against ERERA's decision.

ERERA is yet to lay down procedures on applicability of either of the mechanisms in various situations.

6.2.15. Trading Margins

Trading margins have not been specified under the current available set of regulations.

Key Learnings

- Inter-governmental MoU adopted by the ECOWAS countries sets mutual obligations for the member countries and facilitates governance and regulation of the Power pool. Inter utility MoUs and operation manuals are in place for facilitating the operations of the power pool
- Well laid down phase-wise road map for the development of competitive and liquid power market.
- Transmission charges are mutually decided through bilateral agreements. Annually reviewed transmission pricing methodology optional for bilateral agreements.
- Congestion management is through "first come first serve basis".
- **Control areas:** The WAPP interconnected power system is composed of 5 Control Areas with individual control area operators. Each Control Area specifies, by 1st December every year, its operating reserve policies. This enhances the operational efficiency of the power pool.
- **Imbalance Settlement:** The compensation of inadvertent deviations is performed by using a program of compensation "in kind" within the compensation period - as an import / export of the corresponding amount of energy per tariff period that was accumulated in the recording period.
- **Settlement** of bilateral contracts is on monthly basis as per schedule of transactions and not delivery.

6.3. Greater Mekong Sub-region (GMS)

The introduction to the GMS has already been given in the section 3.3. In this section we will discuss the prevailing Practices and procedures (including relevant laws and regulations) pertaining to facilitating the buying and selling entities in the region.

6.3.1. Market Participants

The GMS MoU signed states that “The Executive Authorities that shall be entitled by the Government of the GMS member countries to perform the cross-border power trade among the GMS member countries and carry out all the actions needed to achieve it are the entities responsible for the generation scheduling and the supervision and control of the operations of the transmission system of each of the countries involved in the trade (referred as the Transmission System Operators)”. Thus there is no provision for IPPs and Independent transmission network providers to participate in the market.⁵⁷

6.3.2. Market Regulation and Operation

Policy Statement on Regional Power Trade adopted at the Sixth Electric Power Forum Meeting on 28 October 1999. It was subsequently endorsed by the GMS Ministers’ meeting in 2002. An inter-governmental meeting was developed and signed to implement the policy statement. This led to the formation of the Regional Power Trade Coordination Committee (RPTCC). There is a strong need for a regulatory authority for carrying out the roles and responsibilities of the regional regulator. The 20th RPTCC meeting in 2016 proposed Regional Power Coordination Centre (RPCC) to be established as a Regulatory Authority. The coordinating body also proposed the necessity of Independent National Regulators.

The market is currently operated in bilateral governmental agreements for trading of power. The market operating standard procedures are yet to be completely laid down.

An ADB comparison carried out between the SAPP Inter-Utility Memorandum of Understanding (2007) and the Memorandum of Understanding on the Guidelines for the Implementation of the Regional Power Trade Operating Agreement shows that the GMS has a lot of gaps to be covered through documentation. Also, Agreement between Operating Members would be required once further trading begins to take place in GMS.

6.3.3. License/Eligibility to trade

The GMS MoU now provides that executive authorities entitled by the Governments of the member states will be eligible for carrying out cross-border trading in electricity. Hence, the licensing framework is not used here. Neither there is any scope of IPPs and other identified trading bodies other than the TSOs to participate in the trading market.

6.3.4. Products

The GMS market is envisaged to develop in 4 stages out of which the market is currently in stage 1 and rest three stages are planned in the future.⁵⁸

Stage 1: The existing Cross-Border transmission lines are mostly associated with Power Purchase Agreements (PPAs) between a Power Utility and Independent Power Producer (IPP) located in one GMS country selling power to a power utility in another GMS country. This is coupled with balancing arrangements agreed locally between the generators and single buyers.

Stage 2: This stage will enable trading between any pair of GMS countries, eventually using transmission facilities of a third regional country. However in this stage the available Cross-Border transmission capacity is limited and based on surplus capacity of lines linked to PPAs. This stage introduces day-ahead balancing market.

⁵⁷ (GMS Regional Power Cooperation 2014)

⁵⁸ (GMS: Prospects of Energy Resources, Power Industry and Electric Power Cooperation 2014)

Stage 3: This stage is marked by dedicated transmission links for Cross-Border trading. Some GMS countries may have completed a transition to competitive markets, where multiple buyers-sellers are allowed to enter in Cross-Border transactions. This stage anticipates a day-ahead spot market.

Stage 4: In this stage most of GMS countries have moved to a multiple sellers-buyers regulatory frameworks, so a regional wholly competitive market can be implemented.

Stage 5: This stage may see direct contracting between generators and large consumers; and

Stage 6: This stage proposes the creation of a separate Market Operator with market platforms offering day-ahead and intra-day trading opportunities, as well as a forwards and futures market.

6.3.5. Existing Transmission Network

Table 6-7: GMS Interconnections

Countries Connected	Stage of Operation	HV connections (>220 kV)	MV and LV connections (< 115 kV)
Lao PDR - Thailand	Existing	2 links of 500 kV lines charged at 230 kV 2 links of 230 kV lines 1 line 500 KV	6 links of 115 kV lines
	Under Construction	Ban Lak 25–Ubon 3, 500 kV (COD 2018) Xayabuly–Loei 2, 500 kV (COD 2019)	Paklay–Thali, 115 kV (COD 2016)
Lao PDR– Viet Nam	Existing	1 link of 220 kV line	6 links of 22/35 kV lines
	Under construction	1 link of 220 kV line (COD 2016)	
	Planned	1 link of 500 kV line (after 2020) ; 1 link of 220 kV line (after 2020)	
Lao PDR– PRC	Existing		1 link of 115 kV line
	Planned	1 link of 500 kV line	
Lao PDR– Cambodia	Existing		2 links of 22 kV lines
	Planned	1 link of 230 kV line (2017–2018)	
Viet Nam– Cambodia	Existing	1 link of 220 kV line	19 links of 22/35 kV lines
	Planned	1 link of 220 kV line	3 links of 22/35 kV lines
Thailand- Cambodia	Existing		1 link of 115 kV link 7 links of 22 kV lines
	Planned		7 links of 22/35 kV lines
PRC– Viet Nam	Existing	2 links of 220 kV lines	3 links of 110 kV lines
	Planned	1 link of 500 kV line (under study)	
Myanmar– PRC	Existing	1 link of 500 kV line	
		1 link of 220 kV line	

Robust grid structure is not available in some countries thus requiring substantial investments to achieve fully connected integrated transmission networks.

6.3.6. Transmission Charges

The proposed regulator is supposed to develop a package of measures that promotes third-party access to national transmission networks, to promote IPP participation and a simple structure of transmission wheeling charges

that will support bilateral contracts and wheeling through third-party networks. This would include sharing of cross-border assets and handling wheeling charges to support transit flows through a third country. The method of determination of transmission charges is yet to be finalised and notified by the regulator.

6.3.7. Security/Margin Requirements

There are no security margin requirements for the regional market in place. The same would be subsequently developed as the trading procedures and settlement and clearing rules are defined by the regulatory in line with the market design and the proposed revisions to the markets proposed by the consultants based on the feedbacks from ENTSO E and SAPP.

6.3.8. Volume Traded

As per the GMS Master Plan Study the total GMS demand would be 270,000 MW in 2025. The volume traded in 2014 between the various regions are described in the table below:

Table 6-8: Volume of Electricity Traded between GMS countries

Countries	Power	Electricity
CSG to Vietnam	1,100 MW	24.9TWh
CSG to Laos	34.4 MW	0.27TWh
Myanmar to CSG	484 MW	7.65TWh

6.3.9. Price Determination & Treatment of Losses

The same would be subsequently developed as the trading procedures and settlement and clearing rules are defined by the regulatory in line with the market design and the proposed revisions to the markets proposed by the consultants based on the feedbacks from ENTSO E and SAPP.

6.3.10. Price Trends

The prices at which the current trades are taking place are long term bilateral PPAs hence no price trends can be observed.

6.3.11. Settlement and Clearing

Settlement and clearing rules are yet to be finalized based on the recommendations of the consultants' feedback after comparisons with ENTISOE and SAPP power pools.

6.3.12. Currency of Trade

The currency of trade is currently based on the bilateral agreements. For the regional power market they will have to decide on a common currency to facilitate trade between various countries.

6.3.13. Imbalance Settlement

Rules for imbalance settlement would be subsequently developed as the trading procedures and settlement and clearing rules are finalized with the revised market design.

6.3.14. Dispute Resolution

The GMS MOU makes resolution of disputes the responsibility of the affected TSOs, and makes reference to the possibility of involving international arbitration if agreement cannot be reached between them. It is recommended by the ADB study that the RPTCC should take a more central role.

6.3.15. Trading Margins

Currently there are no trading operator and hence there is no trading margin available.

Key Learnings

- No provision for IPPs and Independent transmission network providers to participate in the market.
- Market is currently operated through bilateral inter-governmental agreements.
- Framework for governance and standard operating procedures, Agreement between operating members are yet to be established.
- **Well-defined transition roadmap:** The GMS Power Pool is in a nascent stage and is envisaged to develop into a full-fledged power-trading market with well-defined milestones marking the evolution into the next stage. The SAARC member states must closely observe and imbibe the best practices undertaken to enable this transition.

6.4. Nordic Power Pool (NORDPOOL)

The introduction to the NORDPOOL has already been given in the section 3.4. In this section we will discuss the prevailing Practices and procedures (including relevant laws and regulations) pertaining to facilitating the buying and selling entities in the region.

6.4.1. Market Participants

Power producers, suppliers and traders from 20 countries including Norway, Denmark, Sweden, Finland, Estonia, Latvia, Lithuania, Germany and the United Kingdom trade in the Nord Pool markets. Nord Pool has a huge customer base of 380 customers. Large end-users also prefer buying power directly from Nord Pool by trading on the markets rather than through a supplier.⁵⁹

6.4.2. Market Regulation and Operation

The current ownership of Nord Pool Spot is divided between the TSOs in the underlying markets. The shareholding pattern of the Nord Pool is as given below.

Table 6-9: Ownership of Nord Pool

TSO	Shareholding
Statnett (Norway)	28.2%
Svenska Kraftnät (Sweden)	28.2%
Fingrid (Finland)	18.8%
Energinet.dk (Denmark)	18.8%
Elering (Estonia)	2.0%
Litgrid (Lithuania)	2.0%
AST(Latvia)	2.0%

Nord Pool is a designated NEMO under EU Commission Regulation 2015/1222 of 24 July 2015 which establishes a guideline on capacity allocation and congestion management (CACM).⁶⁰ Each country have their own national regulators whereas NordREG, a forum of national regulators, acts as a regional level regulator. Agency for Cooperation of Energy Regulations (ACER) and Council of European Energy Regulators (CEER) are responsible for harmonious pan European level cooperation. The national level regulators are Norwegian Water Resources and Energy Directorate (NVE) for Norway, Energy Market Authority for Finland, Energy Markets Inspectorate for Sweden and Danish Energy Regulatory Authority (DERA) for Denmark. NordREG is a cooperative body between the Nordic energy regulatory authorities. The Regulatory Council has representatives from regulators in

⁵⁹ (Learnings from Nord Pool Region: Power Market Development 2016)

⁶⁰ (The Nord Pool Market Model 2016)

the Nord Pool spot areas and the executive management. ACER coordinates regulation by the European regulators, monitors regional collaboration between TSOs in the electricity and gas sectors and monitors the single European markets for gas and electricity.⁶¹

Nord Pool in consultation with the Market Council (for the GB Market) or Customer Advisory Board (for the Nordic/Baltic Market) and such other consultation procedures as Nord Pool may establish from time to time (for the Central European Market) lists or delists the products from any Physical Market.

Within the Nord Pool Spot exchange, all the external transmission lines capacity is handled by Nord Pool Spot through implicit auction during price calculation. Nord Pool Spot prohibits two players in different bidding areas to trade electricity within themselves as it handles all the trading capacity on the cross-border links, on behalf of the Nordic TSOs. Two players can only trade electricity if they are within the same bidding area. They have to trade power on Nord pool spot for any Cross-Border trading. Financial electricity market is used for trade between Nordic players in different bidding areas.

Nord Pool Spot operates the following leading markets for buying and selling power in Europe:

- Elspot day-ahead market in the Nordic and Baltic regions
- Elbas intraday markets in the Nordic and Baltic regions
- N2EX market in the UK

Each Nordic country is divided into bidding areas depending on the transmission capacities and hence the areas are decided by the TSO for the country. The number of Norwegian bidding areas can vary from time to time. As of now Norway has 5 bidding areas, Sweden has 4 areas and Denmark has 2 areas namely, Eastern Denmark and Western Denmark. Finland, Estonia, Lithuania and Latvia constitute one bidding area each.

The price for each bidding area is calculated for each hour of the following day. The different bidding areas help indicate constraints in the transmission systems, and ensure that regional market conditions are reflected in the price. Due to constraints in the transmission system, the bidding areas may get different prices called area prices. This system also secures that no market members are assigned privileges on any bottleneck, which is an important feature of a liberal market.

6.4.3. License/Eligibility to trade

Entities have to enter into a Participant Agreement with Nord Pool to perform Trading on any Physical Market. Also the entities must be eligible as counterparty under the Clearing Rules start trading on the platform. Participants further have to be approved as Client Representatives for such Clients for undertaking client trading operations. Final approval of the participants or clients vests with the Nord pool

6.4.4. Products

The day-ahead market (Elspot-market) is primarily used for trading power and accounts for 77% of total energy consumption in Nordic countries. Here, contracts are made between seller and buyer for the delivery of power the following day, the price is set and the trade is agreed. The day-ahead market at Nord Pool is an auction based exchange for the trading of prompt physically delivered electricity. Great Britain follows 48 half-hourly delivery period for the auction where as others follow 24 hourly delivery periods. It has over the years produced a robust and credible reference price and transformed into Europe's most liquid market.

Nord Pool offers a continuous intraday market covering the Nordic, Baltic, UK and German markets. Transactions are matched automatically when concurring orders are registered in the Trading Platform. The intraday market supplements the day-ahead market and helps secure the necessary balance between supply and demand in the power market for Northern Europe. Prices are set based on a first-come, first-served principle, where best prices come first – highest buy price and lowest sell price. The intraday market is becoming more vital since renewable energy share in the energy mix is increasing dominated by the wind power.

⁶¹ (20 years operation of the Nordic electricity market 2014)

The Balancing Power Market (BPM) is operated by the respective TSOs where final adjustments are made to achieve balance between supply and demand. It acts as a further balancing mechanism even after the 30 minutes adjustments made by the intraday market. Capacity bids with minimum bid quantum of 25 MW are invited by the TSOs after carrying out load forecasting and analysis from the intraday and day ahead markets. Bids submitted for BPM are executable within 15 minutes after TSO notifies the bidder. The bids are sorted in merit order by the TSOs and help in clearing the internal congestions.

Nord pool also trades in financial contracts used for price hedging and risk management. These contracts have a time horizon up to six years, covering daily, weekly, monthly, quarterly and annual contracts. The system price calculated by Nord Pool is used as the reference price for the financial market in the Nordic region. There is no physical delivery for financial power market contracts. Cash settlement takes place throughout trading – and/or the delivery period, starting at the due date of each contract, depending on whether the product is a futures or a forward. Technical conditions such as grid congestion and access to capacity are not taken into consideration when entering financial contracts. However, buyers and sellers can with the help of the financial (forward) power market manage the risks associated to the physical market prices.

Ancillary Services Market is used for purchase of primary, secondary and tertiary reserves. These reserves and hence, the market varies from country to country and are determined by the TSOs.

6.4.5. Existing Transmission Network

- The inter-connector capacity between Norway and Sweden is 3620 MW over nine different AC lines.
- Sweden and Finland are interconnected with 2230 MW over five AC lines. Sweden and Denmark east are interconnected with 1810 MW over four AC under marine cables. Sweden and Denmark west are interconnected with 670 MW DC cables.
- Norway and Sweden are interconnected with 1000 MW sub-sea DC connection.
- Norway and Finland are interconnected with single 100 MW AC line.
- Nordic market in turn is also interconnected with neighbouring markets of Germany, Poland and Russia.

6.4.6. Transmission Charges

As per the SARI/EI study on the Nord Pool titled Learnings from the Nord Pool Region Power Market Development, Nord Pool countries use the point-of-connection tariff mechanism of determining the access charges to the grid. These charges intend to recover the costs for managing the transmission network and are controlled by national TSOs.

Market coupling method is used for integrating markets allowing two or more wholesale electricity market areas to merge into a single market area, provided adequate transmission capacity is available. On the basis of usage of transmission capacities in the auction mechanism they are classified into the following types:

- **Explicit Auction:** The transmission capacity is auctioned separately and energy is traded separately. The later are dictated by the results of the former.
- **Implicit Auction:** The energy and the associated transmission capacity is traded together. This improves liquidity and electricity flows from low-price areas to high-price areas.

6.4.7. Security/Margin Requirements

Each Clearing Member is responsible for ensuring that an appropriate amount of Collateral is posted and maintained with Nord Pool at all times in accordance with the Clearing Rules. Nord Pool determines the initial and daily collateral requirements or calls taking into consideration the type and volume of the clearing transactions to be performed by the member. For each Intra-day Only Member, Nord Pool determines the Intra-day only Collateral Requirement in addition to the collateral calls on a continuous basis on each Intra-day Market Clearing Day. Intra-day only collateral is calculated in a similar way as the collateral call. The collaterals can be deposited with Nord pool in the form of cash collaterals, Letter of Credits or Bank Guarantees.

6.4.8. Volume Traded

The total volume traded in 2016 was 505 TWh out of which Nordic/ Baltic day ahead market accounted for 391 TWh and UK day ahead market accounted for 109 TWh. The Intraday market accounted for 5TWh of energy traded on the platform. The intraday volume traded has been more or less constant for the last 3 years. The pool recorded a trading volume of 489 TWh in 2015 with UK day-ahead volume of 110 TWh and Nordic/Baltic day-ahead volume of 374 TWh. The volume is forecasted to further grow with Nord pool expanding into more countries with additional NEMO authority from France, Belgium, Netherlands, Austria, Poland & Ireland and servicing countries like Bulgaria and Croatia.

6.4.9. Price Determination & Treatment of Losses

Price is determined by the balancing the demand and supply. The transmission capacities is also factored in the Elspot market. Weather or power plants not operating at full capacity can also impact power prices. Transmission capacity auctioning mechanism can be implicit or explicit as described in previous sections.

Different methodology for “loss pricing” are followed in different countries. Norway uses differentiated tariff based on marginal loss rates at each connection point, while Denmark follows differentiated postage stamp (tariff changes according to the time period of the transmission) only to consumers. Losses on interconnectors are covered by the TSOs often shared equally. Each TSO recovers losses according to the approved regime in the respective country.

Structural congestions are removed or reduced by grid investments whenever socioeconomically viable, otherwise market splitting is applied. Temporary congestions are handled by counter trade (redispatching). The income from congestion management is used for investments in transmission.

6.4.10. Price Trends

The average hourly system price in the Nord pool without taking the trading capacities into account have followed a haphazard downward trend in the long run. The average hourly system price was 26.91 Eur/MWh in 2016 while it was ~21 Eur/MWh in 2015 and ~30 Eur/MWh in the preceding year.

6.4.11. Settlement and Clearing

Cash Settlement for all delivered transactions take place as follows, irrespective of Product:

- **Intraday Market:** Each invoice with net Cash Settlement amounts owing to Nord Pool are settled within 48 hours of delivery whereas each invoice with net Cash Settlement amounts owing from Nord Pool are settled within 72 hours of delivery.
- **Day-ahead Market:** Each invoice with net Cash Settlement amounts owing to Nord Pool is settled on the day of delivery whereas each invoice with net Cash Settlement amounts owing from Nord Pool is settled the following day.

Nord Pool offers an automated Cash Settlement arrangement whereby Nord Pool will effect instructions to debit or credit a Cash Settlement Account as part of the Cash Settlement on each Banking Day. Clearing Members wishing to utilise such arrangements for their Cash Settlement Account(s) must enter into and maintain such banking arrangements as Nord Pool may reasonably require from time to time.

Nord Pool will act as the counterparty to each original buyer or seller (as the case may be) and replicate and replace all the rights and obligations of the original counterparty to such buyer or seller.

6.4.12. Currency of Trade

The currency used for trading in the Baltic/ Nordic region and Germany is Euro while the currency used in the Great Britain market is GBP.

6.4.13. Imbalance Settlement

SARI/EI study on the Nord Pool titled Learnings from the Nord Pool Region Power Market Development mentions that production imbalance volume is calculated as the deviation between metered productions, planned production and imbalance adjustment. Consumption imbalance is calculated as the deviation between metered consumption, planned production, trades and imbalance adjustment. Both the imbalance are settled in line with the financial contracts.

6.4.14. Dispute Resolution

Disputes, if any, shall be referred to and finally resolved by arbitration under the LCIA Arbitration Rules as mentioned in the Nord Pool Rules and Regulations- unified rulebook. The number of arbitrators shall be three. The seat, or legal place, of arbitration shall be London. The language to be used in the arbitral proceedings shall be English and the arbitration award shall be written in English.

6.4.15. Trading Margins

The Nord Pool Members pay fixed annual fees to Nord Pool and variable fees for trading. The fixed fees are different for Participants, client representatives and Clients. These fixed charges are also specified separately for the Day-ahead market and intraday market. Access to various markets at different levels entitles payment of specific charges as laid down in the Nord pool fees schedule. The fees schedule for the Nordic/Baltic region, Great Britain and Germany are different. Provisions for trade cancellation and view only licenses are also made in the fees schedule. The settlement fee for Nordic/Baltic Countries and Germany is capped at EUR 200 000 per member per country. Great Britain Fees Schedule does not explicitly mention any settlement fees.

The Variable fees paid by the Nord pool members differ as per the region they belong to and are listed in the table below:

Table 6-10: Variable Fees Schedule for Germany

Trading fee (Intraday Market)	EUR/MWh 0.11
Settlement fee (Intraday Market)	EUR/MWh 0.006

Table 6-11: Variable Fees Schedule for Nordic/ Baltic region

Day-ahead Market	EUR/MWh 0.04
Intraday Market	EUR/MWh 0.11
Settlement fee (Day-ahead Market and Intraday Market)	EUR/MWh 0.006
Gross volume fee	EUR/MWh 0.0035
Currency service fee for trading in local currency (SEK/DKK/NOK) in Day-ahead Market	0.01% of traded value

Table 6-12: Variable Fees Schedule for Great Britain

Day-ahead Market	
Combined Trading & Clearing	0.0200 GBP/MWh
OTC Clearing	Not available
ECV Notification (net fee per Energy Account)	0.0005 GBP/MWh
Gross Volume Fee	0.0035 GBP/MWh
Maximum Gross Volume Fee (per calendar year)	GBP 60 000

Intraday Market		
<i>Transactions matched and registered before 19:00 on D-1</i>	Combined Trading & Clearing	0.0240 GBP/MWh
	OTC Clearing	Not available
	ECV Notification (net fee per Energy Account)	0.0005 GBP/MWh
<i>Transactions matched or registered after 19:00 on D-1</i>	Combined Trading & Clearing	0.0500 GBP/MWh
	OTC Clearing	Not available
	ECV Notification (net fee per Energy Account)	0.0005 GBP/MWh
<i>Additional fees</i>	Additional Trading Portfolio Day-ahead Market	GBP 1000
	Additional or new RSA SecurID® token	GBP 250
	Additional Intraday Portfolios (per annum)	GBP 1100
	Additional Vasko token for Intraday	GBP 75
	Intraday Market Trade Cancellation Fee	GBP 1000

Key Learnings

- Huge customer base of 380 customers indicates highly competitive market with large consumers directly buying from the Nord Pool.
- Ownership of the Nord Pool lies with the TSOs.
- **Segregated bidding areas:** Each Nordic country is divided into bidding areas depending on the transmission capacities and hence the areas are decided by the TSO for the country. The different bidding areas help indicate constraints in the transmission systems, and ensure that regional market conditions are reflected in the price. Due to constraints in the transmission system, the bidding areas may get different prices called area prices. This system also secures that no market members are assigned privileges on any bottleneck, which is an important feature of a liberal market.
- Initial and daily collateral requirements are determined by the clearing rules.
- Price determination is based purely on demand and supply balancing and also factors the transmission capacities. Loss pricing methodology is different for different countries
- Settlement mechanism is an automated cash settlement arrangement for all delivered transactions.
- **Availability of advanced products:** The Nord Pool offers a wide variety of products like financial contracts that are used for price hedging and risk management. Technical conditions such as grid congestion and access to capacity are not taken into consideration when entering financial contracts. Such features of an advanced power market should be adopted when the SAARC power pool becomes mature.

6.5. PJM

Pennsylvania-New Jersey-Maryland Interconnection as it was named in 1956

6.5.1. Market Participants

As a regional transmission organization, PJM operates a wholesale electricity market that spans all or part of Delaware, Illinois, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. PJM has 1019 members from various sectors.

Table 6-13: PJM Market Members

Sector	Affiliate Member	Voting Member	Ex Officio Member	Total
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Generation	200	95	-	295
Distribution	5	43	-	48
Transmission	39	14	-	53
Other Suppliers	199	362	-	561
End Customers	5	21	14	40
Total	448	535	14	997

Apart from these 19 Associate Members and 3 Special members. Associate Members may attend stakeholder meetings, but do not have voting privileges, and may not transact in PJM's markets. Affiliates may vote at senior task force and lower level standing committee meetings. Ex Officio Members comprise of legal bodies and state utility boards.

A few important Transmission Owners are listed below:

FULL NAME	SHORT NAME
Pennsylvania Electric Company	PENELEC
Allegheny Power	APS
PPL Electric Utilities Corporation	PPL
Metropolitan Edison Company	ME
Jersey Central Power and Light Company	JCPL
Public Service Electric and Gas Company	PSEG
Atlantic City Electric Company	AEC
PECO Energy Company	PECO
Baltimore Gas and Electric Company	BGE
Delmarva Power and Light Company	DPL
Potomac Electric Power Company	PEPCO
Rockland Electric Company	RE
Commonwealth Edison Company	ComEd
AEP East Zone	AEP
The Dayton Power and Light Company	Dayton
Duquesne Light Company	DL
Virginia Electric and Power Company	Dominion
American Transmission Systems, Incorporated	ATSI
Duke Energy Ohio, Inc. and Duke Energy Kentucky, Inc.	DEOK
East Kentucky Power Cooperative, Inc.	EKPC

6.5.2. Market Regulation and Operation

The PJM is regulated by Federal Energy Regulatory Commission (FERC) which is composed of up to five commissioners appointed by the President of the United States with the advice and consent of the Senate. These commissioners serve five-year terms, and have an equal vote on regulatory matters. PJM has agreements with members, independent system operators, regional transmission organizations, the Federal Energy Regulatory Commission and the North American Electric Reliability Corporation to ensure the reliability of the electric power grid.

PJM complies with various government entities in order to ensure the reliability of the power grid. PJM is regulated by the Federal Energy Regulatory Commission, an independent agency that regulates the interstate transmission of electricity, natural gas, oil, hydropower and natural gas projects. PJM also complies with all applicable standards set by North American Electric Reliability Corporation (NAERC) and North American Energy Standards Board (NAESB) as well as Reliability First standards. PJM is also required to comply with the SERC Reliability Corporation, a nonprofit corporation responsible for promoting and improving the reliability, adequacy, and critical infrastructure of the bulk power supply systems in all or portions of 16 central and southeastern states.

PJM currently has interregional planning arrangements with New York Independent System Operator, the Independent System Operator of New England, Midcontinent Independent System Operator (MISO), North Carolina Transmission Planning Collaborative, Duke Energy, Tennessee Valley Authority (TVA), and Southeastern Regional Transmission Planning (SERTP).

PJM identifies the economic benefit of proposed transmission projects by conducting production cost simulations which show the extent to which congestion is mitigated by the project for given transmission topologies and generation dispatch. The benefit metrics are determined by comparing future year simulation with and without the proposed transmission enhancement.

PJM has a committee structure, wherein issues are examined and potential solutions are identified and discussed in order to develop a consensus. These committees and groups enhance communication among the members and with PJM management and the PJM Board. PJM's stakeholder process employs committees, subcommittees, user groups and task forces to conduct business. They are integral to developing and refining PJM's rules, policies and processes. PJM's two senior committees are the Members Committee and the Markets and Reliability Committee. Reporting to the MRC are three standing committees – the Market Implementation Committee, the Operating Committee and the Planning Committee – that are focused on their respective areas.

The PJM manages the operation of their facilities, in accordance with the PJM Operating Agreement. Each Transmission Owner in PJM is a signatory to the PJM Open Access Transmission Tariff. They collectively have delegated the responsibility to administer the PJM Open Access Tariff to PJM. FERC which also regulates PJM, approves its open access transmission tariff for the wholesale electricity market.

6.5.3. License/Eligibility to Trade

Eligible members are required to sign to the PJM Operating Agreement⁶² which grants members certain rights and obligations – such as the right to vote at PJM stakeholder meetings. This Agreement allows players to qualify in the five sectors of the industry to facilitate voting and other activities of members in the PJM stakeholder process. These five sectors are transmission owner, generation owner, electricity distributor, end-use customers and other suppliers.

6.5.4. Products

The PJM Energy Market procures electricity to meet consumers' demands both in real time and in the near term. It includes the sale or purchase of energy in PJM's Real-Time Energy Market (five minutes) , Day-Ahead Market (one day forward) and ancillary market.

Virtual transactions are made up of increment offers (INCs), decrement bids (DECs) and up-to congestion transactions (UTCs) that only exist in the Day-Ahead Energy Market. INCs are offers submitted in the Day-Ahead Market to sell energy at a specific locations if the clearing price at that point is equal to or exceeds the offer and to buy back that energy in the Real-Time Energy Market. DECs are bids submitted in the Day-Ahead Market to buy energy at a specific locations if the clearing price at that point is equal to or below the bid and sell that energy in the Real-Time Energy Market.

An Up-To Congestion (UTC) transaction is a bid in the Day-Ahead Market to purchase congestion and losses between two points. The UTC bid consists of a specified source and sink location, MW quantity and a "bid spread"

⁶² (Operating Agreement of PJM Interconnection 1997)

that identifies how much the market participant is willing to pay for a congestion and loss position between the source and the sink.

6.5.5. Existing Transmission Network

PJM uses a fifteen-year planning horizon for planning transmission system upgrades. PJM's Regional Transmission Expansion Planning (RTEP) process considers forecasts of load growth and additions of demand response, interconnection requests for new and planned retirements of existing generating plants, and possible solutions to mitigate congestion on the transmission system. In case of a new transmission line, local siting decisions involving the route of the new line are determined by the owner of the line and the state government.

A snapshot of the the transmission infrastructure of the PJM is provided in the figure below:

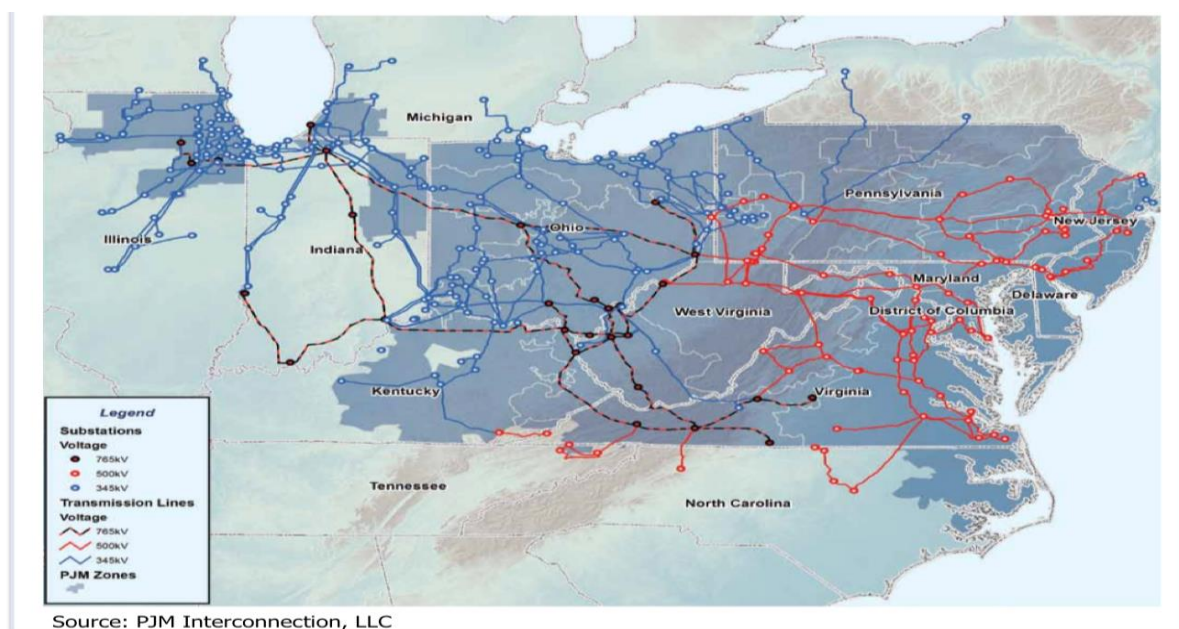


Figure 6-2: Existing PJM Interconnections

6.5.6. Transmission Charges

The PJM manages the operation of their facilities, in accordance with the PJM Operating Agreement. Each Transmission Owner in PJM is a signatory to the PJM Open Access Transmission Tariff.⁶³ They collectively have delegated the responsibility to administer the PJM Open Access Tariff to PJM. FERC regulates PJM and approves its open access transmission tariff for the wholesale electricity market.

When the transmission system operates under constrained conditions, or as necessary to provide third-party transmission provider losses, the Office of the Interconnection calculates Transmission Congestion Charges for each Network Service User, Market Participants in the PJM Interchange Energy Market, and each Transmission Customer. The Office of the Interconnection also calculates Congestion Prices in the form of Day-ahead Congestion Prices and Real-time Congestion Prices for the PJM Region.

6.5.7. Security/Margin Requirements

PJM's credit provisions are administered by the PJM Credit Department. PJM requires its participants to maintain credit equal to the highest exposure experienced in the past year, which is generally the sum of the highest three consecutive weekly bills during that time.⁶⁴

⁶³ (Open Access Transmission Tariff (Revised) 2017)

⁶⁴ (Credit Requirements Overview 2017)

PJM establishes and monitors credit requirements on two general levels: long-term and short-term. While the prior establishes the credit that a Participant must maintain with PJM, the latter measures current obligations and compares them with a Working Credit Limit for breach of exposures.

PJM also has special credit provisions for certain markets or activities. Virtual transactions, RPM, and the FTR markets are each subject to special credit provisions. PJM may carve out a portion of a Participant's credit in order to satisfy these provisions, but such carve-out does not restrict PJM's ability to apply the credit to any obligations of the Participant in event of default.

6.5.8. Volume Traded

PJM average day-ahead demand in 2016, including DECs and up to congestion transactions, increased by 14.1 percent from 2015, from 111,644 MW to 127,390 MW.⁶⁵

PJM average day-ahead cleared supply in 2016, including INCs and up to congestion transactions, increased by 14.6 percent from 2015, from 114,889 MW to 131,634 MW, primarily as a result of an increase in UTC volumes.

6.5.9. Price Determination & Treatment of Losses

As mentioned in the PJM open access transmission tariff regulations (attachment k: Chapter 1 and Chapter 2), PJM Interconnection uses a system called Locational Marginal Pricing (LMP) to establish the price of energy purchases and sales in the PJM wholesale electricity market. LMP takes into account the effect of actual operating conditions on the transmission system in determining the price of electricity at different locations in the PJM region.

Locational marginal pricing reflects the value of the energy at the specific location and time of delivery as explained below:

- When the lowest-priced electricity can reach all locations, prices are the same across the entire PJM grid.
- When there is congestion – heavy use of the transmission system – the lowest-priced energy cannot flow freely to some locations. In that case, more expensive electricity is ordered to meet that demand. As a result, the locational marginal prices are higher in those locations.

PJM calculates the total hourly transmission loss charges by summing the day-ahead and balancing loss charges for each market participant plus the spot market value of losses, including an adjustment for the inadvertent interchange loss value.

PJM allocates the total hourly transmission loss charges as hourly transmission loss credits for each market participant based on their hourly real-time load plus exports ratio share.

6.5.10. Price Trends

PJM real-time energy market prices increased in the first six months of 2017 as compared to the first six months of 2016. The load-weighted average real-time LMP was 10.01 percent higher in the first six months of 2017 than in the first six months of 2016, \$29.81 per MWh versus \$27.09 per MWh. Energy prices were higher primarily as a result of higher fuel prices. An opposite trend was found before wherein load-weighted average real-time LMP was 39.5 percent lower in 2015 first half than in 2014.

The load-weighted average day-ahead LMP was 9.8 percent higher during the same time period, \$30.02 per MWh versus \$27.33 per MWh. It was observed that the load-weighted average day-ahead LMP was 38.8 percent lower in 2015 as compared to 2014 figures.

6.5.11. Settlement and Clearing

All members of PJM are also automatically members of PJM Settlement Inc., a subsidiary of PJM Interconnection LLC and a Pennsylvania nonprofit corporation. The subsidiary provides counterparty rights to PJM on behalf of its members in pool transactions. It handles all settlement activities of PJM members. Additionally, the

⁶⁵ (State of the Market Report for PJM 2017)

subsidiary has a clearly defined legal standing to collect unpaid balances of a member if they should declare bankruptcy.

Although there is a rate structure for its services, the fees from PJM Settlement Inc. “net to zero” when balanced with credits from PJM, resulting in no additional charges to members. PJM has filed the detailed arrangements for PJM Settlement Inc. with the Federal Energy Regulatory Commission (FERC). This clarity will also enable PJM compliance with a FERC ruling for grid operators on credit policy requirements.

6.5.12. Currency of Trade

The choice of currency in the PJM market is the United States Dollar (USD).

6.5.13. Imbalance Settlement

Each Transmission Owner, Transmission Customer, and Network Customer must purchase Energy Imbalance Service through the Transmission Provider, with PJMSettlement acting as the Counterparty, or make alternative comparable arrangements, which may include use of non-generation resources capable of providing this service. For purposes of Energy Imbalance Services, if a Point of Delivery serves more than one Transmission Owner or Network Customer, the Energy Imbalance Service and any associated charges will be computed by the Transmission Provider for the Point of Delivery and the allocation of the service and associated charges shall be the responsibility of the meter operator of the Point of Delivery.

6.5.14. Dispute Resolution

Any dispute between a Transmission Customer, an affected Transmission Owner, or the Transmission Provider involving transmission service under the Tariff are referred to a designated senior representative of each of the parties to the dispute for resolution on an informal basis as promptly as practicable. This excludes the rate or any other change applications and disputed legal interpretations as they are presented directly to the Commission for resolution. Each party to a dispute designates an executive with authority to resolve the matter in dispute to participate in undertaking good-faith negotiations for dispute resolution. If the designated representatives are unable to resolve the dispute within thirty (30) days (or such other period as the parties to the dispute may agree upon) by mutual agreement, such dispute may be submitted to arbitration and resolved in accordance with the external arbitration procedures. The same is mentioned in the PJM open access transmission tariff regulations (part 1 – Chapter 12).

The Parties choosing external arbitration procedure (also known as Alternative Dispute Resolution Method) have the right to demand for arbitration through a written demand to the Alternate Dispute Resolution Coordinator (ADRC) designated by the Office of the Interconnection. The parties have the freedom to choose or appoint an external arbitrator. In case they fail to mutually agree on a single arbitrator provision are made for selection of arbitrators from the qualified list of arbitrators prepared by the ADRC.

6.5.15. Trading Margins

Details of trading margins for the participating entities in the PJM Market were not available in the public domain for assessment.

Key Learnings

- **Well-defined credit requirements:** PJM establishes and monitors credit requirements on two general levels: long-term and short-term. While the prior establishes the credit that a Participant must maintain with PJM, the latter measures current obligations and compares them with a Working Credit Limit for breach of exposures. This helps create an airtight system with minimal default risks.
- **Efficient dispute resolution mechanism:** The dispute resolution procedure provides for speedy resolution of disputes internally. If that fails, external arbitration procedures are sought to resolve such disputes. The SAARC Member States may also lay down such a mechanism for all disputes arising between parties.

7. Assessment of gaps in prevailing procedures and practices including current laws & regulations in South Asia

The table below showcases the key issues as identified in Chapter 5 and the present level of preparedness of the indicators in the SAARC Member States with respect to the facilitation of buying and selling entities for encouraging CBET.

Legend:

Does not exist/ Not favorable
 Partially exists/ Partially favorable
 Exists/favorable

Key Issues	Afg	Ban	Bhu	Ind	Mal	Nep	Pak	Sri
Electricity is not recognized as a distinct business activity	lightgreen	lightgreen	lightgreen	lightgreen	red	lightgreen	red	red
Designated/Nodal Authorities are not identified as licensing authorities for electricity trading	lightgreen	red	yellow	lightgreen	red	yellow	yellow	yellow
Eligibility criteria for trading entities/ buying and selling entities are not crystallized.	lightgreen	red	red	lightgreen	red	lightgreen	red	red
Regulatory Authority for CBET are not identified	yellow	yellow	lightgreen	lightgreen	red	yellow	yellow	red
Transmission System Operators (TSOs) are not designated	yellow	yellow	yellow	yellow	red	yellow	yellow	yellow
Transmission planning for CBET is not a current practice	red	red	red	yellow	red	red	red	red
Transmission infrastructure for facilitation of CBET is not available	red	yellow	yellow	yellow	red	yellow	yellow	red
Non- discriminatory Open Access/ Access to Transmission infrastructure regulations are not in place	yellow	yellow	yellow	yellow	red	red	red	red
Trading Procedures/ regulations are not well laid down	yellow	red	red	yellow	red	red	red	red
Access to trading platform is not available	red	red	red	lightgreen	red	red	red	red
Price Determination Mechanism is not in place for the Member States	red	red	red	yellow	red	yellow	red	red
No definite transmission pricing mechanism and treatment of losses in place	red	yellow	yellow	yellow	red	red	red	red
Imbalance and Deviation Settlement for Buying and Selling entities are not crystallized	red	red	red	yellow	red	red	red	red
Dispute Settlement mechanism and arbitration centers are not the same as per country-specific regulations	yellow	yellow	red	yellow	red	red	red	red

This section assesses the gaps in the prevailing procedures and practices with respect to facilitating buying and selling entities to enable them to engage in cross-border trade and exchange of electricity keeping in view similar international practices.

The gaps in the prevailing procedures and practices of the SAARC countries, including laws and regulations other than the taxes and duties are assessed in this section with respect to the indicators as mentioned in the above table. The relevance of the indicators justifying the importance of these indicators in measuring the maturity and levels of preparedness towards CBET in the region are as follows:

- **Recognition of electricity trading as a business activity**

Electricity trading is required to be identified as a business activity under the electricity laws of the respective countries for enabling the market entities to trade in electricity both within the country and across the borders. Thus, it may be considered as a basic regulatory and legal need for the cross-border electricity trade to set in.

- **Licensing / designated authorities for cross-border trading of electricity**

The sovereign governments and/or electricity regulatory bodies of the SAARC member states should identify, nominate and authorize agencies or bodies who are eligible for cross-border trading of electricity. The governmental laws and regulations should also provide for a licensing authority who issues licenses or authorizes and recognizes the entities interested to trade in electricity. The various roles for participating in a market has to be defined clearly with jurisdictions, duties and responsibilities. This would clarify the eligibility criteria and also address the trust issue which might creep in if unauthorized agencies enter the trading environment. The nodal agencies should also be specified for the cooperation between countries in this regard.

- **Regulatory Authority**

The regulatory authority at SAARC region level has a very vital role of ensuring coordination amongst the various transmission system operators, market participants, governments of various member states and the trading infrastructure in place. It also has to cooperate with the planning and investment wings of the various countries to develop the infrastructure in place for the Cross-Border Electricity Trade to grow.

- **Transmission System Operators (TSOs)**

Every country has its own grid operators. In few countries the grid is fragmented while few countries have managed to achieve a single grid for the entire country. The transmission system operators have a very important role to play in the cross-border electricity trade as they have to identify the transmission capacities available at the national and regional level and accordingly facilitate the bids that are put in by the participant bidders to closure. The nominated/authorized TSOs in few countries might also have an additional responsibility to divide the nation into certain static or dynamic bidding areas to deal with congestion management. Settlement procedures under pricing mechanism decided for congestion relief, such as the market splitting arrangements, has to be agreed by various participants/TSOs for the effective implementation of the same.

- **Transmission infrastructure**

Adequate Transmission capacity has to be in place to allow the participants or member states to trade in electricity with each other. Transmission related constraints may lead to arbitrage leading to an unhealthy competition between the participants.

- **Open Access/ Access to Transmission infrastructure**

Open access to transmission infrastructure is essential for facilitation of free flow of electricity within a country or across the borders. Available spare transmission capacities incentivizes power traders and utilities to trade in power or permit transit of electricity through the grid.

- **Trading Procedures/ regulations**

Properly drafted procedures and regulations leave less room for disputes and make the system transparent. The clarity in the procedures and put into effect regulations would instill a sense of competitive and fair trading on the platform. Prioritization rules for transmission access, bidding procedures, trading hours, settlement and clearing rules, eligibility and licensing norms, collateral or margin requirements must be well defined before commencement of the trade of electricity.

- **Availability of Trading Platform**

The availability of an online trading platform enables all the participants including buyers and sellers to get real time information and also enhances the trading experience. The entire bidding process can be made hassle-free and transparent by making it online. This would bring in more trust and efficiency into the system.

▪ **Price Determination Mechanism**

Usually the demand and supply determine the pricing curve and hence the energy price for trading. But congestion management procedures and well laid down procedures for the price determination mechanism bring in more clarity to the traders and other market participants.

▪ **Transmission Pricing and Treatment of Losses**

The pricing mechanism for the access to transmission infrastructure has to be incentivizing for the participants to encourage trade. Also the transmission network owners can participate in the trading mechanism as independent bodies to provide transit for the electricity traded between the producers and consumers. Similarly the treatment of losses need to be agreed upon by the parties entering into the contract, irrespective of the type of contract.

▪ **Imbalance and Deviation Settlement**

Scheduling and delivery of power as per the well laid down contracts and terms defined therein would still have deviations. Provisions of dealing with these deviations and imbalances, including the calculation procedures and methodologies to settle them between the trading entities, would be required for avoiding disputes between the trading entities.

▪ **Dispute Settlement**

Classification of the disputes type, their settlement procedures, place of arbitration, jurisdiction of the judiciaries have to be specified in the prevailing laws and procedures for resolution of the disputes arising from the cross-border trading of electricity within the member states or across the border.

At the Meeting of the Council of Ministers held in 2014, it was agreed to incorporate “SAARC Arbitration Clause” in all future bi-lateral or multi-lateral agreements signed between member states. Hence it was incorporated into the “SAARC Framework Agreement for Energy Cooperation” signed at the Kathmandu Summit in 2014.

Member States were required to encourage its citizens to include the Model Clause in to their commercial and/or trade agreements because SAARC Arbitration Council (SARCO) arbitrators being from the region, will understand the nuances which are unique to the region when settling disputes.⁶⁶

The rules of procedure required for the conduct of Arbitrations & Conciliations at SARCO are based on the United Nations Commission on International Trade Law (UNCITRAL) Model Law and hence are accepted globally. All the SAARC member states except the Maldives are also a party to the New York Convention on Enforcement of Foreign Awards in 2015. All the SAARC states have their domestic arbitration laws in place, pursuant to which an Agreement for establishment of SARCO has been signed and ratified. The enforcement of the same is yet to be realized in the agreements between the member states.

▪ **Harmonization of Grid Codes**

The harmonization of Grid codes is essential for the facilitation of players and enable a free market for trade of electricity within and across the borders. The Task Force 2 of the SARI/EI study conducted by IRADe has recently submitted its report “Harmonization of Grid codes, Operating Procedures and Standard to facilitate/promote Cross-border Electricity Trade in South Asia Region: Framework Grid Code Guidelines”.⁶⁷ The study found out that except Afghanistan and Maldives all other country have Grid codes with similar voltage levels acceptable voltage deviations. But the permitted frequency deviations are different and are required to be synchronized. This aspect is not discussed in the gap assessment for the individual countries.

⁶⁶ (SAARC Arbitration Council 2016)

⁶⁷ (Harmonization of grid codes, operating procedures & standards to facilitate CBET in South Asia 2017)

7.1. Afghanistan

Recognition of electricity trading as a business activity
The Electricity law notified in 2015 recognizes international power trade. It covers aspects on licensing, technical standards and dispute resolution, network interconnection and access etc.
Licensing / Designated authorities for Cross-Border trading of power
The electricity law provides MEW the role of coordinating and engaging in negotiation of electricity sector treaties, develop policies governing international power trade, and facilitate talks regarding international trade agreements. The Afghanistan Electricity Services Regulatory Department (AERD) in collaboration with MEW is required to issue license for Domestic trade (Sales volume for one supplier >2% of total market of Afghanistan) and trading of electricity. ⁶⁸ Export, import and transit of electricity should be exempted separate licensing from the relevant commerce ministry/ department.
The AERD shall determine the energy consumption tariffs, has authority to register, issue, extend, suspend & revoke the activity licenses and provides for FDI under the law. The law provides for separate licenses for each of the activities- generation, transmission, distribution, import & export; with provision of a financial guarantee for different tenures.
Regulatory Authority
The enacted law has provisions for setting up of the Regulatory Authority and defines its power and duties. But the same has not been implemented yet. As per the SARPES recommendations “ Procurement/sale of electricity through a regional power exchange to be exempted from prior-approval and price determination by the proposed regulator”
Transmission System Operators (TSOs)
The Power Construction Unit has the responsibility of the erection of all transmission and distribution related infrastructure. While DABS has the authority to look after the transmission network of the nation. Hence, DABS can be nominated as a TSO for the country for all the network grids within Afghanistan.
Transmission infrastructure
Afghanistan’s transmission grid operates in nine islands fed from different supply sources and hence is not integrated into a single grid. Afghan Power Infrastructure is categorized into 4 general networks:
<ol style="list-style-type: none"> 1. North east power system consisting of grid linking 17 load centres around Kabul with Uzbekistan and Tajikistan (220kV and 110 kV) 2. South East Power System consisting of Khandahar etc. linking kajaki (110 KV) 3. Herat System linking the Herat zone with Iran (132 kV, 110 kV) 4. Turkmenistan system linking Herat, Akina, Andkhai East/ West, Shirin Tagab, Mimana, Khoja Doko, Sarepul, Shibirghan, Mazar-e-sharif (110 kV)
Afghanistan Power System Master Plan proposes interconnection of all grid segments is proposed by year 2032. The transmission infrastructure should be developed with surplus transmission capacity for cross-border trading of electricity. Cross-border interconnections should be facilitated and provisions for private independent players to set up the transmission network and provide services to the entities trading in electricity (both within the country and across the borders) should be made within the electricity laws.
Open Access/ Access to Transmission infrastructure
The newly effected law has provisions for access to transmission infrastructure. The same has to be extended to CBET to facilitate Cross-Border trading and access cross-border transmission infrastructure.
Trading Procedures/ regulations
The law also supports CBET but the critical aspects of CBET such as rules, processes, mechanisms technical standards and Grid Codes have to be elaborated by the regulatory body and few important aspects such as imbalance settlement has to be added.
Availability of Trading Platform
There is no trading platform available within the country. However, the SARPEX can solve the purpose of the online platform for cross-border trading within the SAARC countries.
Price Determination Mechanism

⁶⁸ (Afghanistan: Power Sector Master Plan 2013)

The price determination is currently based on bilateral contracts. The same should evolve to a demand supply based free market mechanism for encouraging the establishment of a national or regional power market. The Power traded through the Regional Power market should not be regulated by the proposed regulated authority.

Transmission Pricing and Treatment of Losses

Afghanistan Electricity Regulatory Authority (AERA), the proposed regulator, should establish transmission charges for access to the transmission network for electricity trading. It should also lay down the mechanism for calculation and treatment of transmission losses, congestion management rules & procedures and identify the periphery for measurement of power in the contracts to be entered by the market participants.

Imbalance and Deviation Settlement

The trading regulations, trading hours/timelines standard operating procedure and the mechanism for settlement of contracts, clearing rules, imbalances & deviation calculation, monitoring of bilateral and other contracts, deviation settlement procedures etc. have to be laid down once the trading environment and the trading platform is conceptualized and implemented.

Dispute Settlement

The electricity law covers the aspects of dispute resolutions empowering the Disputes Resolution Board of MEW amongst others, in case mutual negotiations don't work out. But the same has to be extended to electricity trading especially bringing cross-border electricity trading under its purview. Pursuant to the incorporation of the Model Arbitration Clause in the SAARC Framework Agreement for Energy Cooperation, SARCO should be chosen for resolving issues related to cross-border disputes involving two or more countries.

7.2. Bangladesh

Recognition of electricity trading as a business activity

The National Energy Policy (NEP) first issued in 1996 provides guidelines for the overall energy sector. Though the NEP deals with country specific energy sector issues, it does make a mention about development of a regional energy market for the rational exchange of commercial energy to ensure energy security, and to provide and secure energy resources for all.

The policy further provides and recognizes the possibility of regional cooperation in energy trade. It emphasizes examination of the possibility of cross-border electricity trade among neighboring countries and establishing linkages of local utilities with those in other countries for exchange of experience in power sector development and training of human resources and the possibility of cooperation of utilities across the region to promote experience sharing and capacity development.

Power System Master Plan (PSMP) 2010 recognizes Cross-Border power trade as a realistic option. The PSMP further recognizes the huge potential of importing hydro-power from Nepal, Bhutan and Myanmar. The Power system Master Plan 2016 has envisaged power import to go up to 9000 MW. The plan intends to increase power import from the current levels of 500 MW to 9000 MW of electricity to the national grid by importing electricity from countries in the region.

Licensing / Designated authorities for Cross-Border trading of power

The electricity act should be amended (or a new regulation might be introduced) to provide for trading license. BERC Act, 2003 should also have provisions for enabling BERC to issue trading license after scrutinizing and accepting applications from the entities willing to trade in electricity.

Export, import and transit of electricity should be exempted separate licensing from the relevant commerce ministry/ department to ensure single window clearance of the applications from interested participants of the power trading market.

Regulatory Authority

BERC regulates the power sector in Bangladesh. The same body may be also considered to regulate the cross-border power trade in Bangladesh. The same can be notified in the prevailing electricity laws of the country.

Transmission System Operators (TSOs)

Currently BPDB through PGCB and other IPPs controls all the transmission network in Bangladesh. Hence, as recommended in the SARPES study, BPDB may be identified as the nodal agency for Bangladesh.

Transmission infrastructure
<p>There are existing cross-border linkages with India both on the eastern and the western side. Also there are future plans to increase the transmission capacities. Cross-border interconnections should be facilitated and provisions for private independent players to set up the transmission network and provide services to the entities trading in electricity (both within the country and across the borders) should be made within the electricity laws.</p> <p>The future capacity expansion for interregional connectivity may consider surplus transmission capacities to take care of the transmission infrastructure requirements for cross-border power trade.</p>
Open Access/ Access to Transmission infrastructure
<p>Policy Guidelines for enhancement of Private Participation in the Power Sector, 2008 allows Open Access on Power Transmission Systems, under the heading Wheeling of Power. The policy also envisages, making transmission of electricity, produced by the private sector seamless.</p> <p>Provisions for Non-discriminatory open access are required to be included in the Electricity laws (or a new regulation may be introduced for the same) to facilitate regional cross-border electricity trading.</p>
Trading Procedures/ regulations
<p>The current trading arrangements are through bilateral intergovernmental agreements with Indian counterparts. The electricity laws are required to include critical aspects of CBET such as rules, processes, mechanisms technical standards and few important aspects such as imbalance settlement has to be added. This will strive towards a competitive free market enabling eligible power traders and other market participants to take part in the cross-border power trading.</p>
Availability of Trading Platform
<p>There is no trading platform available within the country. However, the SARPEX can solve the purpose of the online platform for cross-border trading within the SAARC countries.</p>
Price Determination Mechanism
<p>As recommended by the SARPES study, “Procurement/sale of electricity through a regional power exchange to be exempted from prior-approval and price determination by the BERC.”</p> <p>Currently the prices are determined through intergovernmental bilateral agreements. Laws and regulations with well-defined procedures may be laid down to facilitate price determination for various entities based on demand & supply conditions prevailing in the market for electricity traded through Regional Power Exchange.</p>
Transmission Pricing and Treatment of Losses
<p>Policy Guidelines for enhancement of Private Participation in the Power Sector, 2008 provides for the Power Grid Company of Bangladesh (PGCB) and all other distribution licensees to extend non-discriminatory open access to their distribution infrastructure or system on payment of a fee determined by BERC. Hence BERC determines the prices for transmission within the country. Transmission charges from the Indian power generating stations as of now is at par with that charged to Indian entities and hence determined by CERC. On Bangladesh side it is determined by BERC.⁶⁹</p> <p>Similar provisions should be clearly laid down for all the Cross-Border Electricity Trades. Also the calculation and treatment of losses, congestion management rules & procedures, the periphery at which the delivered power will be measured should be identified with clarity under the CBET laws and regulations.</p>
Imbalance and Deviation Settlement
<p>The regulatory authority should develop a regionally coherent commercial mechanism to treat system imbalances from scheduled transactions. The trading regulations, trading hours/timelines standard operating procedure and the mechanism for settlement of contracts, clearing rules, imbalances& deviation calculation, monitoring of bilateral and other contracts, deviation settlement procedures etc. have to be laid down once the trading environment and the trading platform is conceptualized and implemented.</p>
Dispute Settlement
<p>BERC dispute settlement regulation applies to settle disputes between the licensees or between licensees and the consumer. Recently the High Court division of Bangladesh Supreme Court decided that all such disputes shall be referred to the commission.</p>

⁶⁹ (Electricity Tariff Schedule 2007)

The same needs to be extended to the Cross-border trade of electricity explicitly. Amendments to incorporate the same may be brought in by the regulatory authority. Pursuant to the incorporation of the Model Arbitration Clause in the SAARC Framework Agreement for Energy Cooperation, SARCO should be chosen for resolving issues related to cross-border disputes involving two or more countries.

7.3. Bhutan

Recognition of electricity trading as a business activity

The Electricity Act July 2001 has an objective of enhancing revenue from power generation through export of electricity. Hence, electricity trading is recognized as a business activity. Also Bhutan has been exporting power to India from various HEPs under the intergovernmental bilateral arrangements.⁷⁰

Licensing / Designated authorities for Cross-Border trading of power

Generation licensees are already permitted to engage in export and import of electricity as per the comprehensive license issues by BEA and Electricity Act of 2001. BPC who is responsible for transmission and distribution in the country, owns and operates the transmission network under license from BEA.

However, BEA under section 40 of the electricity act is authorized to designate a single "bulk supplier" for import/export of electricity. This significantly limits market participation. The SARPES study suggests amendment to Section 40 should limit the role of the designated "bulk supplier" only in the context of generation plants owned by the Royal Government of Bhutan. Multiple suppliers in the power trading market will increase the competitiveness and bring in fair pricing. Also, the Bhutan government shall take care to facilitate single window issuance of licenses from the licensing authority and the market participants should be exempted from separate licensing requirements.

Regulatory Authority

BEA is designated as the regulatory authority for the power sector in Bhutan. Since Bhutan's power sector also recognizes power trading, hence it is implied that BEA is the regulatory authority for CBET.

Transmission System Operators (TSOs)

As per the Electricity Act of Bhutan 2001, BPC is also designated to be the system operator, although BPC has not yet received the license to be the system operator. Hence, the license for being the TSO may be issued to BPC to carry out all the duties and responsibilities required by the national transmission operator and a nodal agency for the regional power market.

Transmission infrastructure

There are existing cross-border linkages with India through which India imports power from HEPs in Bhutan. There is a proposed interconnection wherein Bhutan will export power to Bangladesh, whereas India will provide the transit transmission infrastructure services.

Cross-border interconnections should be facilitated and provisions for private independent players to set up the transmission network and provide services to the entities trading in electricity (both within the country and across the borders) should be made within the electricity laws. Also, The future capacity expansion for interregional connectivity may consider surplus transmission capacities to take care of the transmission infrastructure requirements for cross-border power trade.

Open Access/ Access to Transmission infrastructure

The section 38.1 of the electricity Act, 2001 enables open access but does not provide for non-discriminatory characteristic of the same. Provisions for Non-discriminatory open access are required to be included in the Electricity laws (or a new regulation may be introduced for the same) to facilitate regional CBET.

Trading Procedures/ regulations

The current trading arrangements are through bilateral intergovernmental agreements with Indian counterparts. The electricity laws are required to include critical aspects of CBET such as rules, processes, mechanisms technical standards and few important aspects such as imbalance settlement has to be added. This will strive towards a competitive free market enabling eligible power traders and other market participants to take part in the CBET.

⁷⁰ (Impact of Cross-Border Electricity Trade on Bhutan 2016)

Availability of Trading Platform

There is no trading platform available within the country. However, the SARPEX can solve the purpose of the online platform for cross-border trading within the SAARC countries. Also, the Bhutanese government can mull registering on the Indian Power Exchange as maximum of its power trade happens with India as its counterpart. This will strengthen the BBIN sub-regional power market.

Price Determination Mechanism

Currently the prices are determined through intergovernmental bilateral agreements for Cross-Border trade of power and are regulated for the internal power trade by BEA. Laws and regulations with well-defined procedures may be laid down to facilitate price determination for various entities based on the demand and supply conditions prevailing in the market for the power traded through the Regional Power Exchange. Hence, Sections 11.1 (i) (b) and 14.1 (iv) should explicitly exempt determination of tariff by BEA for electricity sold through a Power Exchange. Internal markets may continue to be regulated.

Transmission Pricing and Treatment of Losses

Provision for Open access is provided in the laws of Bhutan. Also tariff determination methodology are in place for various projects. But the tariffs of the exported energy is determined by intergovernmental meetings. The transmission infrastructure is developed by the governmental joint ventures, thereby procedure determining the charges for accessing the transmission network is not in place. The same may be outlined to make a level playing field for independent transmission network providers to invest in Cross-Border projects and recover the transmission costs.

Also the calculation and treatment of losses, transmission loss sharing, congestion management rules & procedures, the periphery at which the delivered powered will be measured should be identified with clarity under the cross-border electricity trade laws and regulations.

Imbalance and Deviation Settlement

Bhutan Electricity Authority (BEA) should formulate a regionally coherent commercial mechanism to deal with the calculation and settlement of imbalances post-delivery of the scheduled amount of power.

Dispute Settlement

Provision for bilateral dispute resolution for cross-border trade should be laid down under the electricity laws either through amendment to the existing laws or introduction of new laws. Pursuant to the incorporation of the Model Arbitration Clause in the SAARC Framework Agreement for Energy Cooperation, SARCO should be chosen for resolving issues related to cross-border disputes involving two or more countries.

7.4. India**Recognition of electricity trading as a business activity**

Indian Electricity Act 2003 under section 66 recognized "Power Trading" as a distinct licensed activity. Draft Central Electricity Regulatory Commission (Cross-Border Trade of Electricity) Regulations, 2017 has been notified for public comments and are expected to be finalized soon. Prior to this, Guidelines On Cross-Border Trade Of Electricity were issued by the Ministry of Power, Government of India to facilitate cross-border trade of electricity in line with the SAARC Framework Agreement for Energy Cooperation (electricity), 2014.

Licensing / Designated authorities for Cross-Border trading of power

Until 2013, import of electricity to India was in restricted category requiring an import license which had to be renewed every year. Now, cross-border electricity trade has been delicensed/ put under OGL. The existing trading operations within the country has licensing framework in place. The CBET Guidelines issued in December 2016 mentions the following:

- Ministry of Power, Government of India shall designate an Authority (Designated Authority) for facilitating the process of approval and laying down the procedure for Cross-Border transaction and trade in electricity.
- Any other participating entity shall be eligible to participate in Cross-Border trade of electricity after obtaining approval of the Designated Authority on case to case basis.

Regulatory Authority
The Indian power exchanges are regulated by the regulatory body Central Electricity Regulatory Commission (CERC) which is a statutory authority constituted under the Electricity Act 2003 with quasi judiciary role. ⁷¹ The same body is also entitled to regulate Cross-Border trading activities. The guidelines on CBET in December 2016, have designated CERC as the body to frame regulations in accordance with the issued guidelines.
Transmission System Operators (TSOs)
In India, PGCIL is the Central Transmission Utility. But trading arrangements with Bangladesh has NNVN as the nodal agency, while agreements with Nepal, Bhutan and another agreement with Bangladesh has PTC India As the Nodal Agency. The nodal agency for the CBET with various neighboring countries may be notified.
Transmission infrastructure
National Transmission Plan should seek coordination with entities in participating countries for developing cross-border transmission linkages. The guidelines on CBET specify that Transmission systems developed for Cross-Border trade would normally be part of the integrated transmission system on the Indian side. The future capacity expansion for interregional connectivity may consider surplus transmission capacities to take care of the transmission infrastructure requirements for CBET.
Open Access/ Access to Transmission infrastructure
Provisions for Open Access is available under Indian Electricity Act, 2003. Transmission Access priority for Cross-Border trade of electricity is to be determined by CTU as per the CERC regulation on Cross-Border Trade of Electricity. The draft regulations of cross-border electricity trade has General provisions for Connectivity, Long term Access, medium term open access and short term open access. The same is yet to be put into effect.
Trading Procedures/ regulations
India Energy Exchange and the Power Exchange of India Ltd. have trading procedures defined and required regulations are in place. The same may be extended to the cross-border electricity trade entities under CBET regulations. The draft regulations on CBET has provisions for Transmission Planning Agency (TPA) and Settlement Nodal Agency (SNA).
Availability of Trading Platform
Two trading Platforms IEX and PXIL operate within India for trade of electricity. The CBET guidelines issued states that any participating entity with approval from the designated authority can trade on the Indian Power Exchanges in Term Ahead Contracts, Intra Day Contracts/ Contingency Contracts. The eligibility may be extended to other products by approval from the appropriate authority.
Price Determination Mechanism
Present Indian Cross-border electricity agreements determine prices through inter-governmental agreements. But the internal power markets determine prices by meeting demand supply equilibrium. The same methodology should be extended to the cross-border electricity trading as well. As mentioned in the CBET guidelines, trading volume for Cross-Border trade of electricity in Indian Power Exchanges shall be prescribed from time to time by the Designated Authority.
Transmission Pricing and Treatment of Losses
The draft regulations for CBET lays down procedures for calculation and pricing for the access to transmission network, congestion management rules & procedures, payment of transmission charges and procedure for sharing of transmission losses apart from the system operator charges and payment security mechanism. The same has to be enacted in the final regulations.
Imbalance and Deviation Settlement
A well laid down procedure of Imbalance and deviation settlement exists for the Indian power exchanges which is limited to the entities within the territory. The same may be extended to all the entities engaging in cross-border trade of electricity as well.
Dispute Settlement
The guidelines issued on CBET prescribe disputes within Indian territory to be settled as per the provisions of Electricity Act, 2003. The disputes involving entities of separate countries may be settled through SARCO,

⁷¹ (Power Market Regulations 2010)

pursuant to the incorporation of the Model Arbitration Clause in the SAARC Framework Agreement for Energy Cooperation. The same has to be established by the CBET regulations laid down by the Ministry of Power.

7.5. *Maldives*

Due to its geographical location disadvantage, The Maldives is not very well positioned to trade in electricity with any of its neighbors. As of now, there is no such concept under planning or implementation. Hence, it does not make sense for the Maldives government or the Maldives Electricity Authority and Ministry of Environment and Energy to facilitate the prevailing practices and procedures, including the laws and regulations in favor of Cross-Border trade of electricity.

7.6. *Nepal*

Recognition of electricity trading as a business activity

NEA has been importing power to India under the intergovernmental bilateral arrangements as it is a licensee recognized by India. EA 1992 did not recognize electricity trading. But, NERC Bill, 2008 explicitly recognizes electricity trading as a business activity. The same has been ratified in by the Government of Nepal in 2017.⁷²

Licensing / Designated authorities for Cross-Border trading of power

The provisions for licensing for trading of power is available. But for trading of power (exporting) the licensee needs to obtain prior permission from the Government and enter into a separate agreement with the Government of Nepal. This may be avoided by appointing NEA as the designated authority for issuing cross-border electricity trading licenses without entering into a separate agreement.

Nepal Electricity Regulatory Commission Bill 2065 (2008) should empower the proposed regulator, NERC, to issue license for trading including terms and conditions for the same, and introduce provision for deemed trading licensee status for generation and distribution licensees.

Regulatory Authority

NERC is the proposed regulator for the cross-border trade of electricity. The same should be put into effect.

Transmission System Operators (TSOs)

NEA, Nepal has entered into joint ventures with PGCIL, India and IL&FS to form Power Transmission Company Nepal Limited (PTCN) which has commissioned the cross-border Indo-Nepal transmission line project from Nepal side. But there are no designated TSOs by NERC or NEA to act as the nodal agency for the regional power trading. Hence, a TSO or a nodal agency has to be identified and authorized to perform the duties of the TSO.

Transmission infrastructure

Nepal and India are connected at 22 points in 132/33/11 kV lines, these connections are radial and cannot export/import significant power between India and Nepal. Further, a 140 km 400 kV Dhalkebar-Muzaffarpur transmission line has been commissioned (funded by the World Bank through a loan) in February 2016.

Cross-border interconnections should be facilitated and provisions for private independent players to set up the transmission network and provide services to the entities trading in electricity (both within the country and across the borders) should be made within the electricity laws. Also, The future capacity expansion for interregional connectivity may consider surplus transmission capacities to take care of the transmission infrastructure requirements for cross-border power trade.

Open Access/ Access to Transmission infrastructure

Power Trade Agreement (PTA) lays down rules for connectivity and access in transmission system and harmonized operational procedures. But no developments on developing guide lines on non-discriminatory open access within Nepal or for Cross-Border transmission system has been seen till date. The PTA also allows authorized / licensed electricity producers / buyers / traders of each country to engage in cross-border electricity trading, including that through Power Exchanges, and to seek cross-border transmission access as per the laws of the respective country.

Provisions for Non-discriminatory open access are required to be included in the Electricity laws (or a new regulation may be introduced for the same) to facilitate regional cross-border electricity trading.

⁷² (Electricity Regulations (Fourth Amendment) 2016)

Trading Procedures/ regulations

The current trading arrangements are through bilateral intergovernmental agreements with Indian counterparts. The electricity laws are required to include critical aspects of CBET such as rules, processes, mechanisms technical standards and few important aspects such as imbalance settlement has to be added. This will strive towards a competitive free market enabling eligible power traders and other market participants to take part in the cross-border power trading.

Availability of Trading Platform

There is no trading platform available within the country. However, the SARPEX can solve the purpose of the online platform for cross-border trading within the SAARC countries. Also, the Government of Nepal can mull registering on the Indian Power Exchange as maximum of its power trade happens with India as its counterpart. This will strengthen the BBIN sub-regional power market.

Price Determination Mechanism

Currently the prices are determined through intergovernmental bilateral agreements. The Power Exchange Committee formed for the overseeing of the power trading operations between the two countries meets periodically to decide on the volume, price and future development plans.

Going ahead, Electricity Tariff Fixation Commission (ETFC)/proposed regulator should not determine tariff for electricity sold through a Power Exchange. Laws and regulations with well-defined procedures may be laid down to facilitate price determination for various entities based on the demand and supply conditions prevailing in the market for the electricity traded through Regional Power Exchange.

Further, special provision may be needed for cases where the Regulatory Commission shall not determine the tariff, as per the current legal provision, where royalty is also associated with tariff of electricity.

Transmission Pricing and Treatment of Losses

Nepal does not have a wheeling charge and loss allocation mechanism. The same has to be laid down place under specific cross-border electricity trade laws and regulations. It should cover at least the calculation and treatment of losses, identification of the periphery at which the delivered power will be measured, Transmission pricing, congestion management rules and procedures and transmission loss sharing etc.

Imbalance and Deviation Settlement

The NERC or the regulatory authority should formulate a regionally coherent commercial mechanism to deal with the calculation and settlement of imbalances post-delivery of the scheduled amount of power.

Dispute Settlement

Provision for bilateral dispute resolution for cross-border trade should be laid down under the electricity laws either through amendment to the existing laws or introduction of new laws. Pursuant to the incorporation of the Model Arbitration Clause in the SAARC Framework Agreement for Energy Cooperation, SARCO should be chosen for resolving issues related to cross-border disputes involving two or more countries.

7.7. Pakistan**Recognition of electricity trading as a business activity**

Power Trading is not yet recognized as an explicit activity. Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 is required to be amended to recognize trading as a distinct activity to facilitate cross-border electricity trade. Also Policy for Power Generation Projects should be amended to enable power generation companies export power.⁷³

Licensing / Designated authorities for Cross-Border trading of power

The existing utilities including KESC and 8 other power distribution companies should be allowed to participate in cross-border electricity trade through appropriate licensing framework. Private participation of IPPs and independent transmission network provider companies should also be encouraged. A designated authority must be identified, nominated and authorized for scrutiny, approval and issue of the license for cross-border trading of electricity.

⁷³ (Overview of Electricity Sector in Pakistan 2012)

Regulatory Authority
National Electric Power Regulatory Authority (NEPRA) is in charge of regulation of power sector in Pakistan. Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 should be appropriately amended to bring cross-border electricity trading into the purview of NEPRA.
Transmission System Operators (TSOs)
National Transmission & Despatch Company (NTDC) Limited is the only body engaged in the transmission business in the country with a transmission business license for 30 years. It is also empowered as the central power purchasing agency to procure power on behalf of all the 8 distribution companies except KESC. NTDC should be nominated as the TSO who shall act on behalf of all the distribution companies/ agencies whether private or public, for power procurement under cross-border trade – either through bilateral contracts or a power exchange.
Transmission infrastructure
The NTDC should plan cross-border transmission linkages with the regional countries. Cross-border interconnections should be facilitated and provisions for private independent players to set up the transmission network and provide services to the entities trading in electricity (both within the country and across the borders) should be made within the electricity laws. Also, The future capacity expansion for interregional connectivity may consider surplus transmission capacities to take care of the transmission infrastructure requirements for cross-border power trade.
Open Access/ Access to Transmission infrastructure
Provisions for Non-discriminatory open access are required to be included in the Electricity laws (or a new regulation may be introduced for the same) to facilitate regional cross-border electricity trading.
Trading Procedures/ regulations
The current trading arrangements are through bilateral intergovernmental agreements Iran. The electricity laws are required to include critical aspects of CBET such as rules, processes, mechanisms technical standards and few important aspects such as imbalance settlement has to be added. This will strive towards a competitive free market enabling eligible power traders and other market participants to take part in the cross-border power trading. ⁷⁴
Availability of Trading Platform
There is no trading platform available within the country. The trade happens with various countries like Iran and Afghanistan though bilateral agreements. However, the SARPEX, as conceptualized, can solve the purpose of the online platform for cross-border electricity trading within the SAARC countries.
Price Determination Mechanism
Currently the prices are determined through intergovernmental bilateral agreements. Procurement or sale of electricity through a Power Exchange should be exempted from prior-approval and price determination by the NEPRA, Section 32. Laws and regulations with well-defined procedures may be laid down to facilitate price determination for various entities based on the demand and supply conditions prevailing in the market for the electricity traded through Regional Power Exchange.
Transmission Pricing and Treatment of Losses
NEPRA should determine a separate price for use of transmission assets of a transmission licensee for electricity trade and procedure for determination of transmission loss associated with power exchanges.
Imbalance and Deviation Settlement
NEPRA should formulate a regionally coherent commercial mechanism to deal with the calculation and settlement of imbalances post-delivery of the scheduled amount of power.
Dispute Settlement
Dispute settlement mechanism for cross-border electricity trading should be incorporated. Pursuant to the incorporation of the Model Arbitration Clause in the SAARC Framework Agreement for Energy Cooperation, SARCO should be chosen for resolving issues related to cross-border disputes involving two or more countries.

⁷⁴ (Market Operator Registration, Standards and Procedure Rules 2015)

7.8. Sri Lanka

Recognition of electricity trading as a business activity
Electricity trading should be recognized as an explicit activity under the Sri Lanka Electricity Act (SLEA), 2009. ⁷⁵ Appropriate amendments should be carried out.
Licensing / Designated authorities for Cross-Border trading of power
Sri Lanka Electricity Act (SLEA), No. 20 of 2009 and Public Utilities Commission of Sri Lanka (PUCSL) Act 2002 should be suitably amended to provide for trading license (including amendment in Section 17 of PUCSL Act).
Amendment to Section 43.2 (SLEA, 2009), which allows the Transmission & Bulk Supply Licensee to procure electricity only through a competitive tendering process, is required to include power procurement from a regional power exchange as a means of competitive power procurement.
Amendment to Section 16 (b) of (SLEA, 2009), which obligates a generation licensee to sell all electricity generated to a transmission licensee, should allow a generation licensee to sell electricity through a competitive platform such as a power exchange.
A designated authority must be identified, nominated and authorized for scrutiny, approval and issue of the license for cross-border trading of electricity.
Regulatory Authority
A regulatory authority should be empowered with the responsibility of regulatory affairs for the cross-border trade of electricity. The Sri Lanka Electricity Act should be amended appropriately to make it binding for all the participants.
Transmission System Operators (TSOs)
Ceylon Electricity Board (CEB) looks after the transmission, bulk supply and operations of the transmission utility in Sri Lanka. It is advisable to designate CEB as the TSO for the country for the purpose of cross-border electricity of trade.
Transmission infrastructure
Ceylon Electricity Board (CEB) should be mandated to develop a plan for cross-border transmission linkages in coordination with entities in participating countries. Provisions for private independent players to set up the transmission network and provide services to the entities trading in electricity (both within the country and across the borders) should be made within the electricity laws. Also, The future capacity expansion for interregional connectivity may consider surplus transmission capacities to take care of the transmission infrastructure requirements for cross-border power trade.
Open Access/ Access to Transmission infrastructure
Section 23 of PUCSL Act should be appropriately amended to provide for Non-discriminatory open access for transmission
Trading Procedures/ regulations
The electricity laws should include critical aspects of CBET such as rules, processes, mechanisms technical standards and few important aspects such as imbalance settlement has to be added. This will strive towards a competitive free market enabling eligible power traders and other market participants to take part in the cross-border power trading.
Availability of Trading Platform
There is no trading platform available within the country. However, the SARPEX can solve the purpose of the online platform for cross-border trading within the SAARC countries. The only proposed Cross-Border power trade option under consideration is with India. Hence, trading on the Indian Energy Exchange is also a feasible option after the transmission infrastructure is established.
Price Determination Mechanism
Laws and regulations with well-defined procedures may be laid down to facilitate price determination for various entities based on the demand and supply conditions prevailing in the market for the electricity traded through Regional Power Exchange.

⁷⁵ (Sri Lanka Electricity Act 2009)

Transmission Pricing and Treatment of Losses

The charges determination for usage of the transmission carriers separately should be provided as per the electricity laws of the country to facilitate electricity trade. Hence, a cross-border electricity trade specific regulation may be brought in to incorporate open access, tariff determination methodology, calculation and treatment of losses, transmission loss sharing and congestion management rules & procedures. Also, the periphery at which the delivered power will be measured should be identified.

Imbalance and Deviation Settlement

PUSCL should formulate a regionally coherent commercial mechanism to deal with the calculation and settlement of imbalances post-delivery of the scheduled amount of power.

Dispute Settlement

Provision for bilateral dispute resolution for cross-border trade should be laid down under the electricity laws either through amendment to the existing laws or introduction of new laws. Pursuant to the incorporation of the Model Arbitration Clause in the SAARC Framework Agreement for Energy Cooperation, SARCO should be chosen for resolving issues related to cross-border disputes involving two or more countries.

7.9. The Way Forward with respect to managing the minimum, critical gaps

The section above describes in detail the provisions under the country specific laws pertaining to the prevailing practices and procedures, including laws and regulations for facilitating Buying and Selling entities.

Apart from the Acts/Laws/Regulations and prevailing documents related to the Electricity Sector, few other Acts/Laws/Regulations that may have an impact over the CBET were studied. A brief summary of a few identified regulations is given below:

Table 7-1: Review of Acts/Laws/Policies/Regulations pertaining to other sectors impacting CBET.

Country	Act	Provision/Recommendation for CBET
Afghanistan	Afghanistan Customs Law, 2005	Electricity is not recognized as an export/import commodity. Provisions must be made for the same while a waiver of the customs duties should be considered for facilitation of Cross-Border electricity trade.
Bangladesh	Import & Export Policy, 2015-2018	Electricity is not recognized as a trade commodity. The same should be considered for inclusion in the list of 'Highest Priority sectors' for trade. Licensing fees & custom duties should be considered for a waiver.
Bhutan	Import Rules, 2002	Electricity is not listed as an import commodity since Bhutan is a deemed power surplus country.
India	Foreign Trade Policy, 2015-2020	Section 5.01 (g) states no authorization will be provided for import of capital goods to facilitate export of electricity. This policy needs reconsideration to facilitate efficient cross border electricity trade to provide level playing field.
Nepal	Foreign Investment and Technology Transfer Act, 1992 (2049)	Provisions are made for easy access to business visas for foreign nationals who wish to carry out research for investment purposes. ⁷⁶ The same may be extended to CBET This would uncover cross border electricity trade opportunities. Other member states may also make provisions under the respective CBET guidelines/regulations to follow suit.
	Trade Policy, 2015 (2072)	The policy does not list electricity as an export commodity. ⁷⁷ The same may be incorporated with appropriate amendments to the rules and regulations for facilitating CBET.
	Industrial Policy, 2011	Provisions have been made for industries to sell excess electricity to the national grid. Also, power generation and distribution are prioritized industries with income tax benefits. ⁷⁸ Industries engaged in hydro power generation and transmission, shall be entitled to 90% exemption in the income tax to be charged for seven years from the date of commencement of transaction. Power transmission and trading companies may be also brought into the ambit of the policy.
Pakistan	Strategic Trade Policy Framework, 2015-18	Trade facilitation measures for reducing cost of doing business has been provided for railways and inland water navigation. Similarly, export tax refund provisions have also been specified in the same. The policy also identifies Iran, Afghanistan, China & European Union as focus markets.

⁷⁶ (Foreign Investment And Technology Transfer Act 1992)

⁷⁷ (Trade Policy 2015)

⁷⁸ (Industrial Policy 2011)

		While similar trade facilitation measures can be extended to CBET, other SAARC countries can also be brought under the focus markets.
Sri Lanka	Imports and Exports (Control) Act, 1969	The act provides for the licensing of the entities engaged in import/export for goods & services. ⁷⁹ As recommended in the other sections, licenses for electricity trading as a distinct business activity should entitle the entity with the authority to trade across the border as a special provision, if applied for. Separate licensing requirements should be considered and waived off. Also, electricity must also be listed as an import/export commodity.

The following section sums up the issues and provides the way forward recommendations related to the issues mentioned therein.

Table 7-2: Gaps Identified and Recommendations Pertaining to Buying and Selling Entities

Identified Gaps	Recommendations
Recognition of electricity trading as a business activity	Electricity trading is required to be recognized as a distinct business activity with provisions for the trading in power exchanges as well as bilaterally (G-G, P-P & P-G) under the respective country-specific laws for regulation of the electricity market. Bangladesh needs to clearly mention the same by amending the BERC Act (2003) appropriately, though PSMP (2016) & NEP (1996) recognizes regional energy market and cross border power trading. Similarly, Pakistan, pursuant to its Import of Power Regulations (2017) ⁸⁰ should consider amendments in its Electricity Act, 1910 as amended from time to time. Similar provisions may be laid down under SLEA, 2009.
Licensing / Designated authorities for Cross-Border trading of power	All the Member States shall work towards increasing the ease of doing business by making it hassle-free for the interested participants/entities to enter the market. The licensing provisions, whether through authorized nominations or through interests expressed by free market entrants, should encourage single window activities. Need for separate agreements with the respective Governments should be discouraged for a free market to flourish.
Regulatory Authority	The Member States have designated respective Regulatory Authorities for the regulation of power sector. Cross Border Electricity Trade should also be brought under the jurisdiction of the Regulatory Authorities. Prior approval for entering into transactions and price determination of electricity should be kept out of the ambit of Regulatory Authority. This shall facilitate market forces to determine the price, demand and enable the entities to take instantaneous decisions by monitoring market conditions.
Transmission System Operators (TSOs)	Few Member States have unified national grids while it is disintegrated in others. The responsibility of monitoring, planning, scheduling and dispatching of power should be integrated at the national levels owing to the limited number of cross border interconnections. This calls for designation of national level TSOs to coordinate between themselves and facilitate CBET as they control the national grids.
Transmission infrastructure	Transmission Infrastructure is integral to the materialization of CBET. Dedicated cross border transmission interconnections have to be built up for transfer of power arising out of the unfulfilled demands of the Member States. These infrastructures have to be planned in sync with the upcoming generation facilities with long-term, medium-term and short-term goals. Prioritized sections need to be focused while capitalizing on the existing interconnections. Future capacity planning of the Member States should

⁷⁹ (Import and Export (Control) Act 1969)

⁸⁰ (Import of Power Regulations 2017)

	factor in regional energy market and infrastructure requirement for timely facilitation of the same.
Open Access/ Access to Transmission infrastructure	Non-discriminatory open access is a pre-requirement to use the power transmission systems of the country. While the Sri Lankan PUCSL Act, Pakistan Electricity Act, Nepal NERC Act need to lay down the provisions for non-discriminatory open access, Member States like Bhutan, Afghanistan and Bangladesh may appropriately amend existing regulations for open access or provide for a new regulation to facilitate the same.
Trading Procedures/ regulations	Countries like Pakistan, Bhutan, Bangladesh and Nepal currently carry out power trading through bilateral agreements. These agreements are entered into on a case-to-case basis and do not cover all the aspects of CBET. Provisions for imbalance settlement, price determination mechanism, settlement and clearing mechanism, payment security mechanism, transmission planning, regulatory and operating entities/agencies have to be clarified to create interest and facilitate free trade.
Availability of Trading Platform	Apart from India, no other Member State has a trading platform at the national level. While efforts may be made towards creation of national electricity trading platforms, appropriate provisions under the law envisaging the SARPEX and possibility of trading through SARPEX cannot be avoided.
Price Determination Mechanism	The current practice of governmental review and approval of the prices at which electricity is traded with the counterparty should be discouraged. Minimal Government intervention could facilitate free market price determination based on the market demand and supply situation. This would encourage healthy competition among the Buying & Selling Entities.
Transmission Pricing and Treatment of Losses	The CBET related laws and guidelines may clearly state the pricing mechanism for use of transmission services and treatment of losses enabling them to take informed decisions. A best practice in the treatment of losses is determination and identification of the periphery where the contracts are entered into. The contracted demand and supply have to meet the actuals at the periphery resulting in both the buyer and seller paying for the losses in kind.
Imbalance and Deviation Settlement	All the Member States need to provide for Imbalance and Deviation Settlement mechanism under the CBET related laws. This may clearly mention the calculations of imbalances/deviations which are inevitable in case of power trading. Smooth facilitation of settlement for these deviations should protect the interests of all the trading entities providing least space for disputes.
Dispute Settlement	Pursuant to the incorporation of the Model Arbitration Clause in the SAARC Framework Agreement for Energy Cooperation, SARCO should be chosen for resolving issues related to cross-border disputes involving two or more countries. Appropriate amendments may be carried out in CBET related regulations.
Registration of Buying and Selling Company	Registration of Buying and Selling Entities engaged in electricity trading activities should be prevalent as per the companies' registration regulations of the country, thereby requiring no separate procedures to be followed. This can be facilitated by identifying these entities as a different business category during their incorporation.
Negotiation of terms and conditions	The Countries should enable the entities to resolve the issues related to CBET by entering into dialogues with governments and counterparties in other Member States through appropriate forums. This would enable them to negotiate better on the terms and conditions in bilateral contracts.
Payment security mechanism	A proper payment security mechanism would protect the Buying and Selling Entities against the possible defaults made by counterparties to the trade. This also puts in place a credit history based on which the limit of power traded with the counterparty is decided. In case of trade on exchanges, the

	exchange forms the counter party and should not bear the losses thereby affecting the profitability of the exchange. Hence, the bilateral agreements/ contracts of CBET should properly lay down the payment security mechanism including the form of securities- Non cash or Cash based specified to details of banks allowed to provide the Letters of Credits and Bank Guarantees.
Export/import /duty/levies/fees/royalty etc.	All the Member states should provide for the facilitation of free trade of power between themselves through preferential trade agreements at bilateral or regional level. The waiver of export/import/duties/ levies or fees and royalty as applicable under the laws of the Country should be waived off appropriately to encourage the Buying and Selling entities to perform CBET.
Qualification of Buyer & Seller for getting License	The eligibility criteria for the licensing of Buying and Selling entities in one member state may differ from another hence prohibiting the entity from trading in the other country. A mutual standard should be agreed upon and set forth to acknowledge the eligibility of the Buying and Selling entities in the Member States other than the country in which it is registered and licensed. A mutually exclusive regional agreement may be a solution to this issue.
Competition promotion and non-discrimination	All the Member states may provide for the non-discrimination between the entities registered in their own state against the ones registered in other Member States. This would create a level playing field for all the Buying and Selling entities in the SAARC region.
Visa policy	Business Visa Policies as provided under the FITTA Agreement between India and Nepal enabling the entities with business interests and their authorized personnel to travel to the country of interest should be encouraged. The Provisions for the on-arrival limited period business visa with single window clearance without any other approvals needed from other departments of the government should be incorporated in the CBET related laws and guidelines of all the Member States. The same may be coordinated with the External Affairs Ministry of the respective Member States for any provisions required under the laws.
Currency of transaction & Policies regarding availability of US\$ for payment	The Member states should factor in the bilateral agreements and the CBET related guidelines and regulations to provide for a common standard stable currency for carrying out the settlements of the trading transactions. Also, the additional requirements of government approvals, if any as in the case of Nepal, for trading in foreign currencies should be appropriately addressed under the provisions of the law. This would require considering the currency deficits of the Member state.
Foreign Direct Investments (FDI)	The FDI Policies of the Member States should also consider the CBET and Electricity Trading as a priority sector to boost the business environment and incentivize foreign players with expertise and capabilities to enter the market.
Trading agreements	Standard Model Trading agreements may be framed by the close coordination between the Member states to standardize the clauses and bring in parity. This would enable the facilitating buying and selling entities to factor in the Country risk of the business and appropriately mitigate them.

8. Key Challenges to implementation of Cross-Border Electricity Trade

8.1. List of key challenges and hurdles to implementation

The risks associated with the cross-border power trading in South Asia are no different to those in any region consisting of developing countries. These encompass political, commercial and technical risks. In this section, the key challenges to the implementation of Cross-Border Electricity Trade in the SAARC countries are outlined.

- **Achieving political consensus is a big challenge** to gather regional cooperation & recognition for Cross-border Electricity trade in the national policy & laws. Still post 2014 the subject matter has gather some momentum. Various agencies like USAID, IRADe and SAARC Energy center working collaboratively with national governments to bridge the gaps and lay down the roadmap to achieve the objective.
- **Government led initiatives, commitment & policy coordination** between SAARC countries are lacking. The impetus to work towards framing regulatory policies requiring harmonization of regulatory, commercial, operational and legal
- **The demand growth in the SAARC countries is very slow** and hence the capacity additions are not taking off
- **Meeting financial challenges** such as investment, financial viability for the cross-border projects is becoming a crucial bottleneck. This is mainly due to long gestation periods arising out of uncertainty in completion timelines, political and bureaucratically dampened efficiencies.
- **Weak regional, institutional and regulatory framework** for regional planning adds to the difficulties due to lack of coherence. Transmission planning is not in sync with generation capacity addition and demand growth.
- **Investment financing, investment protection, contract enforcements, policy and commercial risk mitigation** is significant for projects to take off and deliver

Technical Risks

Lack of transmission infrastructures
Not harmonised Grid codes
Unsynchronised rules and operating processes

Political & Regulatory Risks

Country Risk
Legal and regulatory Risk
Dispute resolution risk
Security Risk
Currency Transfer restriction Risk

Financial Risks

Financing Risk
Business and funding Risk
Investment Risk
Ease of Doing Business

Commercial Risks

Supply Risk
Pricing
Exchange Rate Risk
Payment & Settlement Challenges

Figure 8-1: Risks/Challenges in CBET Implementation

- Grid interconnection mechanism and technical parity among the Grid codes and standard operating procedures of all the SAARC countries is still an issue to be resolved, even though multiple studies have been carried out and road maps have been agreed. Implementation of the action plan is a key to the successful implementation of the action plans.
- Various market forms of energy trading exist in practice in the world. A few regions have resorted to power pools whereas few have experimented with free regional electricity market structures. Many of them are in an evolving stage and hence success is yet to be established.

- Guidelines and focus on meeting contractual obligations, to honor country-wise obligations is not yet worked out for gaining clarity amongst participants.
- Open Access in transmission is not yet enacted by the regulations of all the countries. Hence, free access to transmission infrastructure is still a constraint.
- Ambiguity in transmission charges/pricing and treatment of losses is still a inhibiting factor for participants to decide on their business and investment plans
- Commercial mechanisms to settle imbalances has to be discussed and regionally agreed for a common standard practice to prevail in the region.
- Dispute resolution mechanisms between countries related to cross-border electricity trade should find place in the law books of the country to facilitate resolution of issues between countries, parties to trade or any other participant in the energy chain.

8.2. Political & Regulatory Challenges

There is a significant level of political risk in some of the countries in South Asia particularly in the context of cross-border power trading which could lead to uncertainties in policy, legal and regulatory regimes. With changing political scenario in the SAARC nations the political will to carry on the ongoing projects is put at risk.

The political and regulatory think tanks in the nations should realize the importance of Cross-Border Electricity Trade for the development of the energy scenario. This should lead to an obligatory framework which should aim towards achieving unstoppable and continuous growth of electricity trade between the SAARC member states. The development of harmonized/coordinated policies to facilitate competitive CBET is a building block towards achieving efficiencies and synergies linked to the resources and meeting customer demands of the neighboring nations.

Change in political regimes should not affect the national intention towards growth, development and bilateral relationships between the SAARC member states. The risks associated with CBET Projects would be reduced to a large extent, if the member states adopt complementary policy and regulatory frameworks enhancing cooperation free from political influence. The SAARC Inter-Governmental Framework Agreement (IGFA) also calls for the need for institutional mechanisms for the coordination of regulations for promoting CBET in the South Asia region.

Security Risk including territorial disputes, terrorism and border disputes pose a considerable threat to the trade potentials and practices pushing the successful completion of the CBET projects into uncertainty. Also significant amount of damages can be inflicted to the existing assets of CBET due to security threats. There have been sporadic attempts to build up a body of law and practice on security issues in the region. For instance, a SAARC Regional Convention on the Suppression of Terrorism was signed as early as 1987. But these attempts have proved ineffective without extradition and other arrangements, and in the absence of political will.

Regulations in member states also impose restrictions on transfer of currency. The import and export of currency require pre-approval of the regulatory authority. These also inhibit and dampen the spirit of free trade.

8.3. Financial Challenges

Lack of financial cooperation at the regional level hinders the ability of the SAARC members to achieve the Cross-Border Electricity Trade potential available in the member states. The SAARC Chamber of Commerce & Industry, in its recent seminar, stressed for a mechanism based on strong, sound, coherent and synchronized financial system regarding it an integral component of regional economic cooperation. This would facilitate cross-border trade, investment and encourage flow of capital amongst SAARC member countries.

Investment Scenario and Investment Financing is very much dependent on the political stability and the willingness of the government to focus on the projects. Importance and priority of Projects are seen to change with changing regimes in the SAARC member states.

Single window Clearance of Projects and Ease of Doing Business is also crucial aiding the attractiveness of the projects. The member states should facilitate easy approval with proper due diligence of projects. Many instances

illustrate projects lingering for the approvals of various government departments due to loose coordination between the departments.

Bilateral Investment Promotion Agreements (BIPA) have seen considerable efforts from the member states to initiate Cross-Border trade. But the same are yet to see any significant efforts in the field of Cross-Border Electricity Trade. There are few BIPA that exist between the SAARC member states which can be extrapolated to the electricity trade for realizing the investment potentials in the sector.

8.4. Commercial Challenges

The currencies of all the SAARC member states are different except for Bhutan which is linked the Indian rupee. The transactions and settlement which take place between two different countries are in different currencies. Since all the countries are developing countries, the currencies are volatile with respect to any stable currency in the world. Hence, there is an inherent exchange rate risk for the settlement amounts for the transactions which is required to be mitigated through proper hedging measures. These hedging measures add to the cost and increase the complexity of the trade. Agreeing to a common stable currency for transactions would alleviate this challenge.

Taxes, duties & transaction costs, pricing mechanisms of both carrier and the content for the trade between various countries with various counter parties are different. The clarity of these taxes and duties is not evident in laws and regulations of few member states.

Repatriation of earnings for the investments made in the territory of a member state by another member state attracts various operating procedures which are not standardized. These along with the unstandardized scheduling, payment and settlement mechanisms of the member states bring in complexities which calls for harmonization of various practices and procedures.

Many of the commercial risks can be mitigated through appropriate provisions in the legal agreements for power purchase and the use of the transmission network services supported with by necessary payment security structures, commercial risk guarantees and specified dispute resolution mechanisms.

8.5. Technical Challenges

All SAARC member states follow similar, if not exactly the same, technical standards in power system planning and operation due to the impact of British colonialism in the past. They all derive their standards from British technical standards. Hence, technical risks can be minimized through harmonization of standards, operating procedures, loss calculation mechanisms and Grid codes related to cross-border trading. In case of Bangladesh India cross-border interconnection, both the member states independently manage their grid in their territory. In case of India-Bhutan interconnection and India-Nepal interconnection two different JVs were formed for the implementation of the project on either side of the border.

Usually, joint technical studies on interconnections are carried out to reduce the information asymmetry risk. In certain cases, it is also found that joint working groups/committees and joint steering committees are formed to discuss, monitor and overcome the challenges. These mechanisms are well established by the agreements, in the absence of regulations, to resolve, avoid or minimize technical issues.

Lack of transmission infrastructures and lack of synchronised planning of transmission with generation addition is also a significant challenge towards realisation of the regional electricity market. The regional trade in electricity initially may evolve from bilateral contracts but will eventually move towards free market which may involve in transit countries providing only carriage services.

Table 8-1: Risks and Mitigation

	Risks	Mitigation
Technical	Unsynchronized operating processes and Grid codes	Harmonization of standards, operations, loss calculation mechanisms and grid codes

	Lack of transmission planning and infrastructures	Incentives to collaborate, plan and build a solid infrastructure for synchronized transmission plans keeping the upcoming future generation capacities in mind.
Political & Regulatory	Changing political regimes affecting ongoing projects	Adopt regulatory frameworks enhancing cooperation free from political influence
	Security risks from border disputes and terrorism	Mechanism and regulatory framework well established to deal with all security threats and protect the interests of the buying and selling entities
	Currency transfer restrictions	Ease regulations on currency import/export to promote free trade and designation of a specific universally accepted stable currency
	Lack of financial cooperation at the regional level locks CBET potential	Develop mechanism based on a strong and sound financial system to encourage flow of capital for investment and facilitate CBET. Investment & trade promotion, technology transfer collaborations, preferential trade agreements to consider electricity as a trading potential.
Financial	Long gestation periods and approvals from various departments makes doing business difficult and reduces attractiveness of projects	Design a single window for Project clearance to facilitate easy, coordinated approvals with proper due diligence of projects
	Exchange rate risk underlying cross-country transaction and settlements	Agree to a common stable currency to reduce hedging costs and trade complexity
Commercial	Unstandardized pricing, payment and settlement mechanisms bring in complexities	Clarity on taxes in all states, determination of prices through common laid down mechanisms and harmonization of various procedures related to payment settlement and clearing mechanism

Enabling Environmental Factors for the smooth implementation of CBET

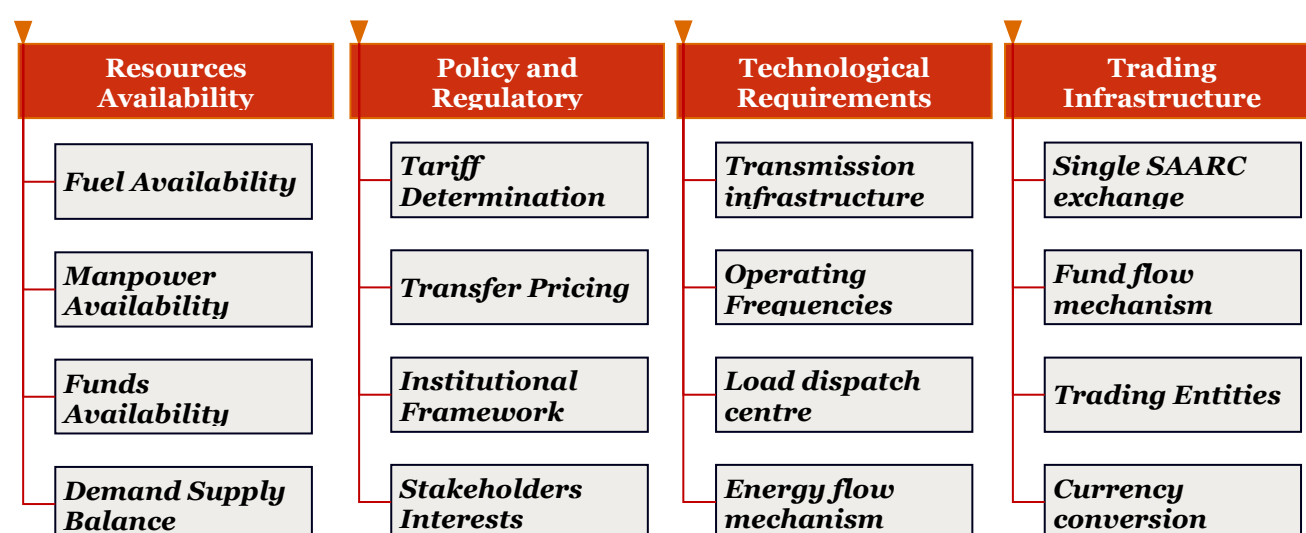


Figure 8-2: Enabling Factors for CBET Implementation

9. Preparation of Action Paper: Roadmap through an action matrix indicating prerequisites with roles and responsibilities and proposed timeframe for implementation

9.1. Electricity Value Chain & Institutional Set-up

The current institutional setup in all the SAARC Member states is provided below to help us identify the key stake holders responsible for various roles in the Electricity Value Chain in the light of the action paper.

Country	Policy	Regulation	Generation	Transmission	System Operation	Distribution	Trading
Afghanistan	Ministry of Energy and Water	Afghanistan Electricity and Regulatory authority (AERA) proposed	DABS	DABS	DABS	DABS	DABS
Bangladesh	Ministry of Power, Energy and Mineral Resources (MPEMR)	Bangladesh Energy Regulatory Commission (BERC)	BPDB, EGCB, APSCL, NWPGC, IPPs, SPPs, Rental Plants	PGCB	PGCB	BPDB, WZDPC, DPDC, DESCO, REB	BPDB
Bhutan	Ministry of Economic Affairs (MEA)	Bhutan Electricity Authority	Druk Green Power Corporation	Bhutan Power Corporation (BPC)	BPC (NLDC)	BPC	-
India	Central: Ministry of Power (under GoI) State: Power/Energy Department under the State Government	Central: CERC State: SERCs, JERCs	Central: NTPC, NHPC, NPCIL, UMPPs, IPPs, MPPs State: State owned GENCOs, IPPs, CPPs	Central: Powergrid, Private/JV licensees State: STUs, Private/JV licensees	Central: POSOCO (NLDC and 5 RLDCs) State: SLDCs	Central: Nil State: State Owned DISCOMs, Private Licensees, Distribution Franchisees	Central: Inter-State Licensees State: Discoms/Trad Cos (Including State holding cos)/ Intra-state licensees
Maldives	Ministry of Environment and Energy (MOEE)	Maldives Energy Authority	STELCO, FENAKA	STELCO, FENAKA	STELCO, FENAKA	STELCO, FENAKA	
Nepal	Ministry of Energy (MOE)	Electricity Tariff Fixation Commission (ETFC) under Department of Electricity Development	Nepal Electricity Authority (NEA), IPPs	NEA	NEA	NEA	NEA
Pakistan	Ministry of Water and Power (MOWP)	National Electric Power Regulatory Authority (NEPRA)	State owned generating companies formed after restructuring of WAPDA & other IPPs	National Transmission and Despatch Company (NTDC)	NTDC	KESC and Distribution Companies formed after restructuring of WAPDA (total 10 in nos.)	
Sri Lanka	Ministry of Power and Energy (MOPE)	Public Utilities Commission of Sri Lanka (PUSCL)	Ceylon Electricity Board (CEB), IPPs	CEB Transmission Licensees	CEB Transmission Licensees	CEB Distribution Licensees (1-4 LECO)	

Figure 9-1: SAARC Member States Institutional Set-up

9.2. Exemption from export/import duty/taxes/levies/fees, etc. for Cross-Border trade and exchange of electricity between buying and selling entities

While most of the Cross-Border Electricity Trade in the SAARC member states is at a very nascent stage, there is a lot of movement seen towards encouraging and utilizing the untapped energy potential in the region. Expedited action in this direction has been seen in the past few years. Still there is a lot of ground to be covered as the roles and responsibilities are yet to be clearly defined. This study aims at the preparation of the action paper listing down the responsibility matrix and the time frames within which they can be achieved. But, in the current scenario and context of this study specific to cross-border electricity trade, the SAARC Member States have only started recognizing electricity trading as a distinct activity. Only a few patchwork guidelines and power Import/Export regulations have been drafted as makeshift arrangements to facilitate CBET.

In such a position, making a pin point action paper and responsibility matrix would not be appropriate due to the following reasons:

1. Most of the Member States are yet to bring in laws/regulations/policies on CBET. The existing electricity sector governing laws still does not have CBET under its purview. While one of the possible ways is to amend the existing electricity sector governing laws of the respective member states, the other smoother way might be enacting new laws/regulations/policies specifically for CBET.
2. The current institutional set-ups have regulatory bodies/authorities/agencies for the incorporation of laws, bringing in new policies, planning and executing the roadmaps. But the same regulatory bodies are yet to be empowered under the electricity sector governing laws/regulations of respective member states for regulating the CBET and CBET related activities.
3. The approach framework, competitiveness and flexibility in the working of the stakeholders in the electricity sector is different for each Member State, Hence a common timeline may not be realistic for all the Member states to implement the desired changes to address the identified gaps.

Hence, in this study, the adopted approach aims to identify the gaps and the corresponding activities required to plug the gaps. In a sense, this action paper provides a to-be state for the Member state that is to be attained for free CBET to flourish in the SAARC region. The flexibility is suggested to be left with the respective Member states and their current regulatory authorities. This flexibility includes:

- i. Identification of the relevant laws⁸¹ which may be amended or new laws to be enacted to execute the activities listed down in the action paper.
- ii. Allocation of the responsibility to a specific body/authority/ agency to perform the activities identified in the action paper.

In this particular section related to the actionable for moving towards a regime of zero taxes and duties, in accordance with the Article 4 of the SAARC Framework Agreement for Energy Cooperation, the gaps identified and the requisite activities for their redressal, possible responsibility allocation and tentative timelines are provided in the table below. The responsibility allocation may be done taking into consideration the country-wise institutional members as provided in section 9.1 or any new/other body as may be conducive to the affairs of the respective Member State.

Gaps Identified	Activities	Responsibility	Timelines	Priority
Electricity is not recognized as a distinct business activity	Recognizing electricity trading as a distinct business activity in the Electricity Laws of the Individual Country	Regulatory Authority of respective member state	Short term (<1 year)	High
Electricity is not under the list of commodities to	Inclusion of Electricity under the list of Commodities to be	Regulatory Authority of respective member	Medium Term (1-3 years)	High

⁸¹ Hints may be taken from the country-wise scrutiny of gaps and laws/regulations specific comments in chapter 7 of this report.

be traded for all the Member States	traded and amendment of the relevant Acts/ policies	state/ Commerce and Industry Related Ministry/ Government of Member State		
Taxes & Duties and their applicability on CBET and related entities is not very clear	Identification of applicable taxes on electricity trade across the border and notification of the same to facilitate market participants.	Government of Member State	Short term (<1 year)	High
Applicability Export/import /duty/levies/fees/royalty etc. on CBET and their waiver	Waiver/Relaxation/Exemption of the taxes and duties as applicable under the law to move towards a regime of zero taxation	Government of Member State / Regulatory Authority of respective member state	Short to medium term (<1 year)	High
Differentiation between domestic generation and imported power	Eliminate discrepancies between taxes applied to domestic generation and electricity imports	Government of Member State / Regulatory Authority of respective member state	Medium Term (1-3 years)	Medium
Multiple variable taxes over and above the tariffs resulting in complexity of the tariff structure, pricing and taxation framework	Eliminate, or incorporate into tariffs, all miscellaneous taxes/duties/levies/cess / royalty etc. applied to imported power	Government of Member State / Regulatory Authority of respective member state	Medium Term (1-3 years)	Medium
Non- competitive power tariffs due to applicable taxes /duties /levies / cess/ royalty and quantitative restriction equivalents.	Reduce to eliminate the average tariff (after taxes/duties/levies/ cess/ royalty etc. and quantitative restrictions equivalents are included)	Government of Member State / Regulatory Authority of respective member state	Medium Term (1-3 years)	Medium

9.3. Facilitating buying and selling entities to engage in Cross-Border electricity trading subject to the laws and regulations of the concerned Member States

Maturity of the Market for CBET

The above section has identified the gaps to be bridged as a part of the roadmap to Market Maturity of the SAARC Member States. The gaps can be further assessed by measuring select indicators - Competition, Openness of market (de-licensed regime), Access to infrastructure, and No. of players in the market as per the following criteria:

Table 9-1: Market Maturity Indicators

	Competition	Openness of Market	Access to Infrastructure	No. of Players
High	Fully Competitive Market, Determined by Market Forces	De-licensed Market	Open Access implemented	More than 50 Players

Medium	Semi-competitive Market, Regulated	Licensing Required, but Independent Regulator	Open Access Provisions available but not implemented	More than 10 players but Less than 50 players
Low	No Competition/ Monopoly	Stringent Requirements	Licensing No Provision for Open Access	Less than 10 Players

Based on these indicators the market maturity of the International power Pools and the SAARC Member states are assessed as specified by the color codes in the table below.

Legend:

	Low		Medium		High
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	Competition	Openness of Market	Access to Infrastructure	No. of Players
International Power Pools				
SAPP	Evolving Market	Medium	High	Medium
WAPP	Evolving Market	High	High	Medium
PJM	Evolved Markets	Medium	High	High
GMS	Yet to Evolve	Not open for IPPs and TSOs	Low	Medium
Nord Pool	Evolved Markets	Medium	High	High

In comparison to the above classification of the International power pools, the SAARC Member Countries have been scored in line with the indicators selected in Chapter 7 that measures the level of preparedness and maturity of the Market for CBET.

Select Indicators		Afg	Ban	Bhu	Ind	Mal	Nep	Pak	Sri
Competition	Designated authorities for CBET	5	1	3	5	1	3	3	3
	Established Trading Procedures	3	1	1	3	1	1	1	1
	Price Determination Mechanism	1	1	1	3	1	3	1	1
	Transmission pricing and treatment of losses	1	3	3	3	1	1	1	1
Market Openness	Recognition of electricity trading as a business activity	5	5	5	5	1	5	1	1
	Regulatory Authority	3	3	5	5	1	3	3	1

	Imbalance and Deviation Settlement	1	1	1	3	1	1	1	1
	Dispute Settlement	3	3	1	3	1	1	1	1
No. of players	Presence of TSOs	3	3	3	3	1	3	3	3
	Availability of trading platform	1	1	1	5	1	1	1	1
Access to Infrastructure	Availability of infrastructure	1	3	3	3	1	3	3	1
	Open Access/ Access to Transmission infrastructure	3	3	3	3	1	1	1	1
Score		30	28	30	44	12	26	20	16

The selected indicators have been regrouped and mapped to the four indicators for market maturity - Competition, Openness of Market, Access to Infrastructure and No. of Players. The current status of the indicators have been weighted as high (5), medium (3) and low (1). The total score for the market maturity of the respective Member States are then determined to find out the relative market maturity. Optimum market maturity is calculated with all the indicators at medium levels and is shown by dotted line in the adjacent graph. Thus it may be considered that only India amongst all SAARC Member States is mature enough for CBET and the rest countries have to concentrate efforts to reach the optimum level for a mature CBET market.

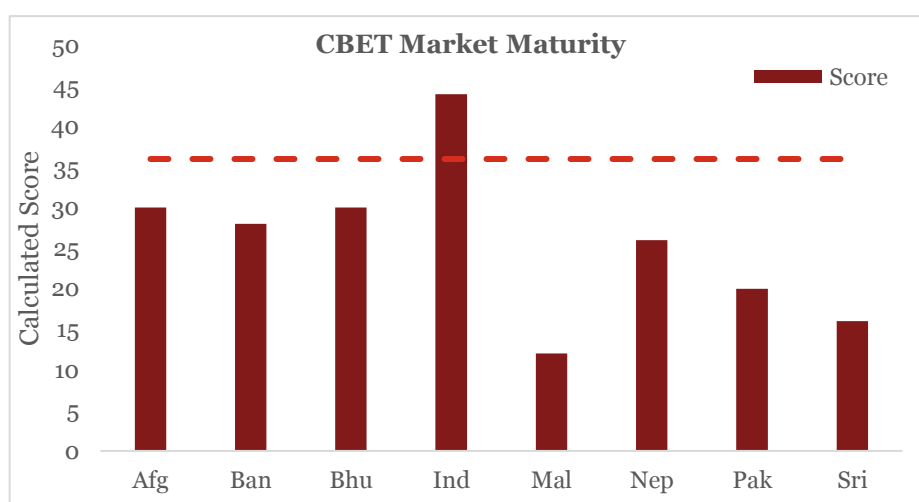


Figure 9-2: Market Maturity for CBET for SAARC Member States

Apart from the indicators mentioned in chapter 7, a few other key issues are common to all countries but have not been explicitly provided under the existing laws/regulations. These issues hinder the trade facilitation for the buying and selling entities. These issues are generic in nature and are applicable for all SAARC Member States in the context of facilitating CBET. The addressal of these issues, along with those mentioned in Chapter 7, will result in increased level of preparedness and would serve as indicators measuring the progress of the SAARC Member states towards implementation of CBET. Few such issues are listed below.

- Separate registration/authorization other than incorporation as a company for buying and selling entities dealing in CBET
- Forum and environment for negotiation of terms and conditions pertaining to trade are not available/conducive for CBET
- Payment security mechanism to protect the interests of the entities is provided under the law.
- Qualification of Buyer & Seller for getting licenses is not uniform in all countries
- Policies are not favoring entities of other member states to engage in trading activities on foreign land
- Provision for facilitation of business visa for carrying out visits, discussions and surveying/research activity prior to engaging in CBET is not available
- Currency of transaction for CBET is not standardized & Policies regarding availability of US\$ for payment / trade in foreign currencies requires prior government permissions

- viii. Foreign Direct Investments (FDI) policies are not treating electricity trading and CBET related activities as a focus sector
- ix. Trading agreements are not standardized
- x. National and Regional standard rules and standard operating procedures for CBET have not been framed and notified

Actionable for Facilitating buying and selling agencies, in accordance with the Article 13 of the SAARC Framework Agreement for Energy Cooperation, the gaps identified and the requisite activities for their redressal, possible responsibility allocation and tentative timelines are provided in the table below. The responsibility allocation may be done taking into consideration the country-wise institutional members as provided in section 9.1 or any new/other body as may be conducive to the affairs of the respective Member State.

Gaps Identified	Activities	Responsibility	Timelines	Priority
Electricity is not recognized as a distinct business activity	Recognizing electricity trading as a distinct business activity in the Electricity Laws of the Individual Country	Regulatory Authority of respective member state	Short term (<1 year)	High
Designated/Nodal Authorities are not identified as licensing authorities for electricity trading	Designating licensing and regulatory authority for CBET	Government of Member State / Regulatory Authority of respective member state	Short term (<1 year)	High
Eligibility criteria for trading entities/buying and selling entities are not crystallized.	Defining the Market Participants and setting out the eligibility Criteria	Regulatory Authority of respective member state	Medium Term (1-3 years)	Medium
Regulatory Authority for CBET are not identified	Extension of Jurisdiction of regulatory authorities to encompass CBET or Identification of Regulatory body to oversee CBET specifically	Government of Member State	Short term (<1 year)	High
Transmission System Operators (TSOs) are not designated	Designation of National level TSOs for coordination and planning.	Member State Ministry/ Regulatory Authority of respective member state	Short term (<1 year)	High
Transmission planning for CBET is not a current practice	Regional and Country level master plans to be drawn out with upcoming generating capacities and demand forecast for at a regional level. Countries develop their master plans taking into consideration the regional master plan.	Designated TSOs	Medium Term (1-3 years)	Medium
Transmission infrastructure for facilitation of CBET is not available	Setting up transmission infrastructure in line with the master plans and the regional demand capacities by the TSOs	Transmission Companies	Long Term (>3 years)	High
Non-discriminatory Open Access/ Access to Transmission infrastructure regulations are not in place	Lay down provisions for non-discriminatory open access to transmission infrastructure of the member state under the country specific laws	Regulatory Authority of respective member state	Medium Term (1-3 years)	High
Trading Procedures/regulations are not well laid down	Drafting and standardization of trading procedures & regulations to cover all aspects of CBET (Imbalance	Regulatory Authority of respective member state & TSOs	Medium Term (1-3 years)	Medium

	settlement, price determination mechanism, settlement and clearing mechanism, payment security mechanism, Operational and Scheduling guidelines including computation of Available Transfer Capability (ATC) , Deviation settlement mechanism, Charges of losses, Congestion management, Demand estimation for operation)			
Access to trading platform is not available	Setting up national and regional level electricity trading platforms and/or providing access to these to the buying and selling entities	Regulatory Authorities of respective member state / Government of Member State/ Regional bodies	Medium Term (1-3 years)	Low
Price Determination Mechanism is not in place for the Member States	Market determined prices should be encouraged rather than the government influenced/regulated prices. The prices may be subjective to the approvals of regulatory authority in case of bilateral contracts, but should be more determined by market forces of demand and supply for exchange trading.	Regulatory Authorities of respective member state	Medium Term (1-3 years)	Low
No definite transmission pricing mechanism and treatment of losses in place	Drafting of well-defined procedures to determine transmission prices as the transmission infrastructure would be passing through at least two countries. Similarly loss determination and treatment of losses should be clearly defined in the procedures. Incorporation of the same under CBET related regulations	Regulatory Authorities of respective member state	Medium Term (1-3 years)	Low
Imbalance and Deviation Settlement for Buying and Selling entities are not crystallized	Laying down procedures for Imbalance and deviation settlement and Incorporation of the same under CBET related regulations	Regulatory Authority of respective member state	Medium Term (1-3 years)	Medium
Dispute Settlement mechanism and arbitration centers are not the same as per country-specific regulations	Extension of Dispute settlement mechanisms to CBET at national and regional agreement on the same under the contracts. Acceptance of SARCO as the arbitration center for CBET under relevant laws/regulations	Regulatory Authority of respective member state	Medium Term (1-3 years)	High
Separate registration/ authorization other than incorporation as a company for Buying	Single window mechanism for registration of buying and selling entities with provisions	Regulatory Authority of respective member state/ Ministry involved in	Short term (<1 year)	Low

and Selling entities dealing in CBET	empowering them to carry out CBET.	registration of Companies		
Forum and environment for negotiation of terms and conditions pertaining to trade are not available/conducive	Setting up forums for negotiating terms and conditions between governments and private players, where entities (private and government) can discuss their issues similar to the Business forums set up by GoN	Member Government	State	Short term (<1 year) Low
Payment security mechanism to protect the interests of the entities is provided under the law.	Drafting of regulations under the CBET related laws and laying down procedures and mechanisms of payment security to the buying and selling entities	Regulatory Authority of respective member state		Medium Term (1-3 years) Medium
Qualification of Buyer & Seller for getting licenses is not uniform in all countries	Mutual recognition and standardization of eligibility criteria for the trading entities so that they are acceptable in all the SAARC member states	Regulatory Authority of respective member state and Government of Member States		Medium Term (1-3 years) Low
Policies are not favoring entities of other member states to engage in trading activities on foreign land	Competition promotion and non-discrimination to non-domestic entities for CBET.	Government Member States	of	Medium Term (1-3 years) Low
Provision for facilitation of business visa for carrying out visits, discussions and surveying/research activity prior to engaging in CBET is not available	Provisions for On-arrival business limited time visa to facilitate the research and business interests of the entities in CBET.	Government Member States	of	Short term (<1 year) Medium
Currency of transaction for CBET is not standardized & Policies regarding availability of US\$ for payment / trade in foreign currencies requires prior government permissions	Agreement to a standard stable currency for all CBET transactions and discouragement/repeal/waiver of additional approvals required under the laws of the country through special provisions for entities engaged in CBET.	Government Member States	of	Medium Term (1-3 years) High
Foreign Direct Investments (FDI) policies are not treating electricity trading and CBET related activities as a focus sector	The National FDI, trade and technology transfer policies should include CBET as a focus sector through various fiscal and non-fiscal incentives.	Government Member States	of	Short Term (<1 year) Medium
Trading agreements are not standardized	Internalization and agreement on standard contract templates and contract procedures	Regulatory Authority of respective member state		Medium Term (1-3 years) Low
Standard rules and procedures for CBET are not framed and notified	Framing of exhaustive Standard operating procedures (SOPs) for all activities required for an entity to carry out and engage in CBET.	Regulatory Authority of respective member state		Medium Term (1-3 years) Medium

Appendix A. - Laws and Regulations Impacting Cross-Border Electricity Trade

A.1. SAARC Energy Framework For Energy Cooperation

- **Recognizing** the importance of electricity in promoting economic growth and improving the quality of life;
- **Realizing** the common benefits of Cross-Border electricity exchanges and trade among the SAARC Member States leading to optimal utilization of regional electricity generating resources, enhanced grid security, and electricity trade arising from diversity in peak demand and seasonal variations;
- **Convinced** of the need of increasing economic cooperation and creating new opportunities in electricity sector;
- **Recalling** the decision of the Sixteenth SAARC Summit held in Thimphu (2010), to enhance cooperation in the energy sector to facilitate energy trade, development of efficient conventional and renewable energy sources including hydropower;
Emphasizing the need to promote regional power trade, energy efficiency, energy conservation and development of labeling and standardization of appliances, and sharing of knowledge;
- **Recalling** further the decision of the Seventeenth SAARC Summit held in Addu City Maldives (2011), which directed the conclusion of the Inter-governmental Framework Agreement for Energy Cooperation;

These eight countries, therefore, in the spirit of solidarity and mutual cooperation, and subject to laws, regulations and international obligations of the Member States, wherever applicable, have agreed as follows:

Table 9-2: SAARC Framework Agreement

Article 1 Definitions Buying and Selling Entities	Buying and Selling Entities means any authorized public or private power producer, power utility, trading company, transmission utility, distribution company, or any other institution established and registered under the laws of any one of the Member States having permission of buying and selling of electricity within and outside the country in which it is registered.
Article 2 Objective	Member States shall enable cross-border trade of electricity on voluntary basis subject to laws, rules and regulations of the respective Member States.
Article 3 Scope	Member States shall enable Buying and Selling Entities to negotiate the terms, conditions, payment security mechanism and tenure of electricity trade.
Article 4 Duties & Taxes	Member States shall work towards exempting from export/import duty/levies/fees etc. for cross-border trade and exchange of electricity between Buying and Selling Entities;
Article 5 Data updating and sharing	Member States shall share and update technical data and information on the electricity sector in an agreed template.
Article 6 Promoting Competition	Member States shall encourage the process of opening up of electricity sector guided by respective national priorities with the aim of promoting competition.
Article 7 Planning of Cross- border interconnections	Member States shall enable the transmission planning agencies of the Governments to plan the cross-border grid interconnections based on the needs of the trade in the foreseeable future through studies and sharing technical information required for the same.
Article 8 Build, Operate and Maintain	Member States shall enable the respective transmission agencies to build own, operate and maintain the associated transmission system of cross- border interconnection falling within respective national boundaries and /or interconnect at mutually agreed locations.

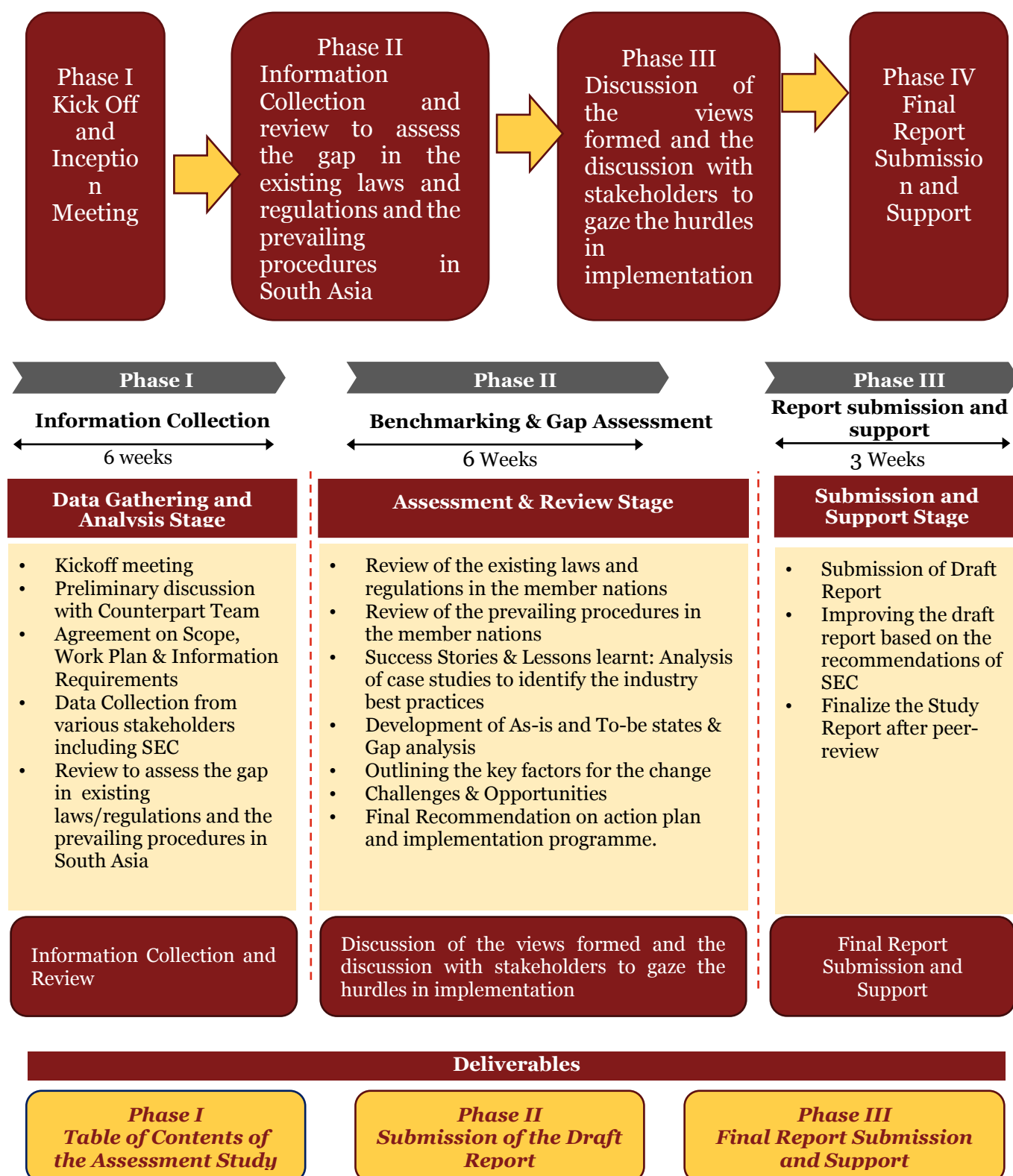
Article 9 Transmission Service Agreements	Member States shall enable authorized entities to enter into transmission service agreements with the transmission service providers for the purpose of cross-border electricity trade.
Article 10 Electricity Grid Protection System	Member States shall enable joint development of coordinated network protection systems incidental to the cross-border interconnection to ensure reliability and security of the grids of the Member States.
Article 11 System Operation and Settlement Mechanism	Member States shall enable the national grid operators to jointly develop coordinated procedures for the secure and reliable operation of the inter-connected grids and to prepare scheduling, dispatch, energy accounting and settlement procedures for Cross-Border trade.
Article 12 Transmission Access	Member States shall, for the purpose of electricity trade, enable non-discriminatory access to the respective transmission grids as per the applicable laws, rules, regulations and applicable inter-governmental bilateral trade agreements.
Article 13 Facilitating Buying and Selling Entities	Member States shall enable Buying and Selling Entities to engage in cross-border electricity trading.
Article 14 Knowledge Sharing and Joint Research in Electricity Sector	Member States shall enable and encourage knowledge sharing and joint research including exchange of experts and professionals related to, inter alia, power generation, transmission, distribution, energy efficiency, reduction of transmission and distribution losses, and development and grid integration of renewable energy resources.
Article 15 Regulatory Mechanisms	Member States shall develop the structure, functions and institutional mechanisms for regulatory issues related to electricity exchange and trade.
Article 16 Dispute Settlement	Any dispute arising out of interpretation and /or implementation of this Agreement shall be resolved amicably among the Member States. If unresolved, the Member States may choose to refer the dispute to SAARC Arbitration Council.
Article 17 Withdrawal	Any Member State may withdraw from this agreement at any time after its entry into force. Such withdrawal shall be effective six months from the day on which written notice thereof is received from the SAARC Secretariat, the depository of this Agreement. The rights and obligations of a Member State which has withdrawn from this Agreement shall cease to apply as of that effective date with the exception that ongoing proceedings at the time of termination shall nonetheless be completed in accordance with the provisions of this Agreement.
Article 18 Entry into Force	This Agreement shall enter into force on completion of formalities including ratification by all Member States and upon issuance of a notification thereof by the Secretary General of SAARC.
Article 19 Amendment	Any amendment to this Agreement may be submitted by a Member State to the SAARC Secretariat and recommended by consensus to the Meeting of SAARC Energy Ministers. Such amendment(s) will be effective upon deposit of the instruments of acceptance with the Secretary General of SAARC.
Article 20 Review	The Member States shall meet in order to review this Agreement on request or at the end of five years from the date of its entry into force; unless they notify one another in writing that no such review is necessary

A.2. Scope of the Assignment

- Scope of work for the study covers the following topics/aspects:

1. Collect, list and review laws and regulations existing in SAARC Member States pertaining to Taxes & Duties on Cross-Border Trade and Exchange of Electricity including but not limited to
 - a. SAARC Framework Agreement for Energy Cooperation (Electricity)
 - b. SAARC Limited Multilateral Agreement on Avoidance of Double Taxation and Mutual Administrative Assistance In Tax Matters
 - c. Agreement on South Asian Free Trade Area (SAFTA)
 - d. SAARC Agreement on Mutual Administrative Assistance in Customs Matters
 - e. Bilateral electricity trade between India & Bhutan, India & Nepal, India & Bangladesh, Afghanistan & Central Asian Countries, other bilateral electricity trade practice and potential complexities
2. Collect, list and review international practices with respect to existing laws and regulations pertaining to Taxes & Duties on Cross-Border Trade and Exchange of Electricity (up to three case studies) including but not limited to the following
 - a. South African Power Pool (SAPP)
 - b. West African Power Pool (WAPP)
 - c. Greater Mekong Sub-region (GMS)
 - d. Nordic Power Pool (NORDPOOL)
 - e. Relevant WTO regulations and Obligations , where applied
3. Assess the gaps in current laws and regulations regarding the Taxes & Duties on Cross-Border Trade and Exchange of Electricity for each of the SAARC Member Countries and the way forward to bridge the gaps.
4. Collect, list and review of prevailing procedures and practices in South Asia with respect to facilitating buying and selling entities to enable them for Cross-Border Trade and Exchange of Electricity including but not limited to Bilateral electricity trade between India & Bhutan, India & Nepal, India & Bangladesh, Afghanistan & Central Asian Countries, Pakistan and Iran, bilateral electricity trade practices if any and Electricity Exchange Markets (including IEX and PXIL)
5. Collect, list and review of prevailing international procedures and practices with respect to facilitating buying and selling entities to enable them for Cross-Border Trade and Exchange of Electricity (up to three case studies) including but not limited to the following
 - a. South African Power Pool (SAPP)
 - b. West African Power Pool (WAPP)
 - c. Greater Mekong Sub-region (GMS)
 - d. Nordic Power Pool (NORDPOOL)
6. Assess the gaps in current laws and regulations, in South Asia, if any, with respect to Facilitating Buying and Selling Entities to enable them to engage in Cross-Border Trade and Exchange of Electricity, keeping in view the similar international practices for each of the SAARC Member Countries and the way forward to bridge the gaps.
7. Preparation of Action Paper (roadmap through a matrix indicating required actions with roles and responsibilities and proposed timeframe for implementation with respect to the following:
 - a. Exemption from export/import duty/taxes/levies/fees, etc. for Cross-Border trade and exchange of electricity between buying and selling entities
 - b. Facilitating buying and selling entities to engage in Cross-Border electricity trading subject to the laws and regulations of the concerned Member States

A.3. Methodology



We propose to deliver the engagement through a mutual coordination approach wherein the tasks envisaged under the Scope of Work have been categorized into broader modules/heads for ease of delivery. Accordingly, we will regularly submit the progress of the study on a fortnightly basis to SEC for coordination and timely feedback from the Program Coordinator.

A.4. Limitations

- Our analysis and data collection would be based on public sources of information such as industry studies, journals, publications and various research databases;
- We would also rely on data/information/report shared by SEC relevant for the study;
- The study undertaken would be limited to secondary sources and discussion only and no primary research would be undertaken for the assignment except explicitly outlined in our scope of work.
- During the course of analysis and benchmarking we would rely on widely acceptable norms in case the actual information is unavailable;
- PwC will use in house information to the extent that it is permissible to do so;
- The reports is for the Client and not to be circulated to any third party without prior written consent from PwC;
- The scope does not include any audit/fund raising services.

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A.6. References

Quote 1 (Section 2.2.2):

ARTICLE 6: ASSISTANCE IN THE COLLECTION OF TAXES states that *the Member States shall lend assistance to each other in the collection of revenue claims. The Competent Authorities of the Member States may, by mutual agreement, settle the mode of application of this Article.*

ARTICLE 11: SHARING OF TAX POLICY Each Member State shall endeavor to bring out a yearly report on changes made in its tax laws. This may also cover introduction of new systems or techniques for circulation among the Member States.

PROTOCOL: On formalization, this SAARC Limited Multilateral Agreement on Avoidance of Double Taxation and Mutual Administrative Assistance in Tax Matters shall be applicable only in the Member States where an adequate Direct Tax Structure is in place. Further, in case of a Member State where such a structure is not in place, this Agreement shall become effective from the date on which such a Member State introduces a proper Direct Tax Structure and notifies the SAARC Secretariat to this effect.

CONFLICT OF INTEREST: Further that in the event of a conflict between the provisions of this Limited Multilateral Agreement and that of any bilateral Double Taxation Avoidance Agreement between the Member States, the provisions of the Agreement signed or amended at a later date shall prevail.

TAXES COVERED: The then existing taxes to which this Agreement shall apply :

1.	In Bangladesh	Taxes on income that is direct tax
2.	In Bhutan	Income Tax imposed under Income Tax Act 2001 and the rules thereof
3.	In India	Income Tax, including any surcharge thereon
4.	In Maldives	Taxes on income that is direct tax
5.	In Nepal	Income Tax imposed under the Income Tax Act, 2058
6.	In Pakistan	Taxes on Income
7.	In Sri Lanka	Income tax including the income tax based on the turnover of enterprises licensed by the Board of Investment

Quote 2 (Section 2.2.3):

Contracting Parties shall eliminate all quantitative restrictions, except otherwise permitted under General Agreement on Tariffs and Trade (GATT) 1994, in respect of products included in the Trade Liberalization Programme.

Additional Measures: Contracting States agree to consider, in addition to the measures set out in Article 7, the adoption of trade facilitation and other measures to support and complement SAFTA for mutual benefit. These may include, among others:

- simplification and harmonization of import licensing and registration procedures;
- simplification of banking procedures for import financing;
- removal of barriers to intra-SAARC investments;

Quote 3 (Section 2.2.4):

Scope of the Agreement:

The Contracting States shall through their Customs Administrations provide each other administrative assistance under the terms set out in this Agreement, for the proper application of Customs law and for the prevention, investigation and combating of Customs offences.

This Agreement only covers mutual administrative assistance between the Contracting States and is not intended to have an impact on mutual legal assistance agreements between them.

Scope of assistance:

- *The Customs Administrations shall provide each other, either on request or on their own initiative, with information and intelligence which helps to ensure proper application of the Customs law and the prevention, investigation and combating of Customs offences.*
- *The Customs Administrations shall, in making inquiries on behalf of the other Customs Administrations, act as if they were being made on its own account or at the request of another authority in that Contracting State.*

The Customs Administrations shall:

- *Assist each other with respect to the execution or provisional measures and proceedings, including the seizing, freezing or forfeiture of property;*
- *Dispose of property proceeds or instrumentalities forfeited as a result of the assistance provided for under this Agreement, in accordance with the national legal and administrative provisions of the Contracting State in control of the property, proceeds or instrumentalities.*

Quote 4 (Section 2.2.5.2):

Element 1: Developing the East-Central Asia-South Asia Regional Energy Market

The EWP will continue to support cross-border energy infrastructure projects and developing options aimed at integrating the thermal and hydropower resources of Central Asian countries for power supply to Afghanistan, and onward to Pakistan. Cross-border energy infrastructure projects under implementation in the CAREC region are

- i) *Turkmenistan-Afghanistan-Pakistan-India (TAPI) gas pipeline,*
- ii) *Central Asia and South Asia (CASA)-1000 power transmission line, and*

- iii) *Turkmenistan-Uzbekistan-Tajikistan-Afghanistan-Pakistan (TUTAP) power transmission project.*

Element 2: Promoting Regional Electricity Trade and Harmonization

The EWP will continue the economic study of electricity trade in Central Asia to identify actions that could be undertaken at little cost to help re-establish some trade patterns. Further studies will be undertaken on potential legal, regulatory, and governance mechanisms for future power trade; unplanned power flows and international best practices; and metering automation and unification of international energy trade.

Quote 5 (Section 2.2.6.1):

- **Trading** as an activity is recognized in policies and laws of most countries. However, a detailed definition of trade in respective laws may be desirable.
- **Nodal Agencies** exist in most of the SAARC countries.
- Trading is a **licensed activity** in most of the countries. The approval process unless very long should not be a constraint to cross-border trade.
- Generation is a licensed activity in most cases but does not pose concern unless the process of obtaining license is too long.
- Currently there is **no custom duty, export tax or transit tax** in regional electricity trade that poses a restriction on cross-border electricity trade.
- **Transmission Plan:** Almost all countries have transmission plans either separately or as a part of their power sector master plans (in some countries CBET has been recognized). However, the linkages with all countries where trade could be possible has not been defined.
- **Open Access to Transmission Network** is crucial: Non-discriminatory access to transmission system networks is one of the most important prerequisites of CBET. Apart from India, Bhutan and Bangladesh no other country recognizes OA.
- **Mode of Interconnection and Harmonization Required:** While AC interconnection (e.g. India-Bhutan) would require harmonization of codes and system standards; DC interconnection (e.g. India-Bangladesh) would require installation of HVDC system (to convert AC to DC) which would in turn entail significant capital cost.
- **Transmission Pricing:** Apart from Afghanistan, rest of the countries have some entity for determination of tariff either in the form of a regulator or a separate body. Transmission tariffs are either embedded in the retail tariff or are separately determined based on some mechanism. In CBET transmission pricing will involve two elements – transmission charges that are linked to asset commissioning and recovery of costs; transit fee which is largely driven by political motives and hence matter of negotiations. Clarity on both these aspects will be required.
- **Commercial Mechanism to Settle Imbalances** exists only in Afghanistan, Bhutan and India, but is contract specific. For CBET to evolve, a common set of principles to settle imbalance across different countries would be needed where there is AC-AC connection.

Quote 6 (Section 2.2.6.2):

Policy and Regulations:

- *Electricity to be recognized as trading commodity and policies related to pricing and subsidies need to be aligned in the context of CBET.*
- *Different countries follow different regulatory practices, which leads to difference in electricity pricing in the region. This calls for need for harmonization/coordination.*
- *Review of respective electricity import and export policies by the participating nations for facilitating CBET.*

- Distorted prices due to subsidies to sizable population of poor in the SA region can be a constraint for investments in power sector which impacts the scope of CBET, therefore needs to be reviewed.
- Need for advancing policy reforms at national level with special focus on taxation and duties.
- To establish guidelines for trade and dispute resolution mechanism as pre requisite for establishing energy market.

Investment in power sector:

- Requirement of investors to take up large projects in hydro sector for sustainable cash flows which can be done by investment friendly policies in the region.
- Identifying geographical locations in the region for possible interconnection points to facilitate Cross-Border electricity exchange.
- Coordinated and shared investment in generation and multi-country owned cross-border transmission connections to be explored for CBET.
- Greater role envisaged for private sector including Public Private Partnerships as the governments alone will not be able to bridge the demand-supply gap. Some basic policy reforms are needed to achieve this.
- Stress on cooperation of the concerned states within the countries to address issues related to energy transit and security of supply. This also translates to requirement of adequate transmission infrastructure.

Economic benefits:

- Harnessing complementarities of resources of the region and diversity in demand and supply (seasonal, peak load variation) makes the scope for CBET which can bring economic benefits to the SA region.
- India's experience of interconnecting its five regions over three decades can provide some lessons and pointers for economic development of regional grid in South Asia.

Regional power Grid and development of power exchanges:

- The grid codes and technical standards need to be coordinated to ensure reliable regional power system operation.
- Requirement of South Asia regional power grid and establishments of power exchange.
- Learning from the best practices from established international energy markets for establishment of SAEM.
- Formulating market rules for cross-country power transmission.

Quote 7 (Section 2.2.6.2):

Harmonization of Taxes and Duties: Currently there is no custom duty, export tax or transit tax in regional electricity trade that poses a restriction on cross-border electricity trade. However, going forward as the region transcends to more complex trade forms (multilateral, centralized trading platform) complete harmonization of taxes and duties with respect to CBET across South Asia would be required through some formal arrangement.

Quote 8 (Section 2.2.6.3):

The study made the following important suggestions on legal and regulatory aspects:

- No custom duty on import of electricity

- No export tax on export of electricity
- Apart from charging for transmission services (including application of losses), no other transit charge for transferring electricity through any country
- Import, export and transit of electricity should be exempt from licensing
- Electricity procured from power exchange should not require prior approval of the regulator. The price discovered in the exchange should be accepted
- A bilateral mechanism for resolving disputes related to cross-border electricity trade, and eventually, developing a regional dispute resolution mechanism
- Extending the membership of India's power exchange to other SAARC nations for voluntary short-term trading

Quote 9 (2.2.6.4):

Regulatory/Legal changes	Merits / Opportunities	Demerits / Challenges
Nodal Agency to engage in cross-border trading	An early takeoff for regional trade possible. Reduce shortage of electricity. Help optimal use of idle/excess generation capacity in the region.	Limited market access and competition till deemed/trading licenses enhances participation.
Trading License and Generation De-licensing	Generation de-licensing would bring greater investment. Trading license would open avenues to use unutilized generation capacity. Reduce shortage of electricity. Enhance competition in power markets.	Scheduling trading transactions would need improvement in system operation procedure and energy accounting.
Open Access of Transmission Network	This would truly operationalize competition and access to electricity.	Need to develop transparent regulations for granting open access. System operation to take care of open access customers.
Coordinated System Operation and Treatment of System Imbalances	Improved grid discipline. Low equipment failure due to grid stability. Adoption of region's best practices and experience sharing.	Metering and IT integration
Regulatory Framework and Transmission Planning	Improvement in system reliability due to system integration including support during power crisis. Bilateral transmission linkages to have excess capacity to support cross-border trade.	Investment in transmission interconnections and system strengthening. Land acquisition.
Energy Accounting, Clearing and Settlement	Advantage of improved system for domestic energy accounting and settlement as well. Adoption of region's best practices and experience sharing.	IT integration, training and migration to improved system.
Policy for Regional Electricity Trade	Better economic development of South Asian region. Improved access to power in South Asian region. Better utilization of region's resources. Increased investment in power sector in the region.	Graduation from bilateral to regional agreement.
Import Duty, Export Tax and Transit Tax	Enhanced energy trade across region.	Expected loss in tax revenue could be offset by economic gains due to higher economic growth, better electricity access and greater investment in the sector.

Dispute Resolution

Overall improvement in investment climate in the power sector as investors' risk perception would reduce.

Graduation from bilateral to regional agreement.

Quote 10 (Section 2.3.1):

The Inter-Governmental agreement provides the framework for implementing four HEPs totaling 2120 MW, subject to completion of the due process of appraisal of their DPRs including techno-economic viability, on a Joint Venture-model between Public Sector Undertakings of the two countries, as follows:-

Hydro Electric Project	Capacity	JV partners
Kholongchu HEP	600 MW	SJVN Ltd. of India and Druk Green Power Corporation (DGPC) of Bhutan (50:50 JV, 70:30 DER)
Bunakha HEP (with 230 MW downstream benefit from Tala, Chukha and Wangchu HEPs)	180 MW	THDC Ltd. of India and Druk Green Power Corporation (DGPC) of Bhutan (50:50 JV, 70:30 DER)
Wangchu HEP	570 MW	SJVN Ltd. of India and Druk Green Power Corporation (DGPC) of Bhutan (50:50 JV, 70:30 DER)
Chamkarchu HEP	770 MW	NHPC Ltd. of India Druk Green Power Corporation (DGPC) of Bhutan (50:50 JV, 70:30 DER)

Source: PIB, MEA

Quote 11 (Section 2.3.2):

- **Import taxes and fee exemptions & Energy export financial incentives:** *The Parties shall cooperate on the various aspects of policy harmonization for the realization of cross-border interconnections, grid connectivity and power trade. Both parties shall work towards removing and mutually resolving issues relating to, barriers, including tariff, levies, fees, taxes, duties or charges of similar effects, if any, in the Cross-Border exchange and trading of electricity.*
- *The parties shall allow the authorized/ licensed electricity producers/buyers/traders of each country to engage in Cross-Border electricity trading, including that through power exchanges, and to seek Cross-Border transmission access as per the laws of the respective country.⁸²*
- **Electricity wholesale markets:** *The Parties shall facilitate the sale and purchase of electric power in respective countries depending on the potential to generate and demand of electricity as may be applicable.*
- *The parties shall put in their best efforts to ensure unrestricted flow of power subject to safety, security, stability and reliability requirements of their power grids as per the applicable standards*
- **Public Private Partnerships:** *The Parties shall take necessary measures to speed up interconnection planning and construction by inviting and facilitating governmental, public or private sector enterprises of the two countries.*
- **Investment climate development:** *The Parties shall encourage and facilitate investments, including joint venture investments between the two countries, in power sector on mutually agreed terms in accordance with their laws in force to enhance power trade.*
- **Open Access:** *The Parties shall allow non-discriminatory access to the Cross-Border interconnections for all authorized/licensed participants in the common electricity market.*

⁸² (Economic Benefits from Nepal-India Electricity Trade 2017)

Quote 12 (Section 2.3.3):

- *The Prime Minister of India agreed to supply to Bangladesh 250 MW electricity from its grid. In this context, both Prime Ministers emphasized the need to expedite inter-grid connectivity. They also agreed that the two countries shall cooperate in development and exchange of electricity, including generation from renewable sources, and may set up joint projects or corporate entities for that purpose.*
- *With a view to encouraging imports from Bangladesh, both countries agreed to address removal of tariff and non-tariff barriers and port restrictions and facilitate movement of containerized cargo by rail and water. In this context, Bangladesh welcomed India's initiative to provide duty-free access to SAARC LDCs to the Indian market. Bangladesh also welcomed the reduction of the number of items from India's negative list that were of direct interest to Bangladesh and requested for further reduction in the list.*

Quote 13 (Chapter 3):

- *Inter-Governmental Commitment and Coordination has been addressed through Treaties, MOUs, Energy protocols, Inter-Governmental Agreements on trade, Policy Statement on Regional trade etc. Further, Cooperation on Regulatory and Contractual aspects have been addressed through Common set of regulatory guidelines, Electric Power Forums, Regional Power Trading Coordination Committees, Cooperation between regulators etc.*
- *Transmission Planning/infrastructure Development through creation of Regional Master Plans, Prioritization of export oriented projects, Private sector participation etc.*
- *Mechanism of Interconnection based on nature of power system. AC interconnection for synchronized systems and HVDC for unsynchronized and distant networks. Power system synchronization could be possible through harmonization of codes and system standards.*
- *Third party Open Access could be achieved through political commitment to liberalization; Legislative provisions for third party access, Conducive market structure (ownership separation), independent system operation, economically efficient pricing, Well organized transmission planning etc.*
- *Transmission Pricing aspects have been dealt through specific mechanisms. While in advance power pools countries have adopted economically efficient pricing techniques based on Locational Pricing or Nodal Pricing recognizing the importance of location specific congestion costs; pools which are still in their early stages have continued with the historical methods of Postage Stamp or MW-km based pricing.*
- *Settlement of Energy Imbalances in most of the bilateral arrangements have been addressed through terms and conditions in the PPA. However, in some regions short term trade arrangements include provisions of Balance Responsible Parties (BRP)*
- *PPA/Contracts have been dominated by bilaterally negotiated long term agreements. Terms and conditions of contract – Pricing, payment, security, transit charges, settlement, dispute resolution etc. form part of the contract. In some cases, bilateral contracts are also complemented by short term contracts in the form of day ahead and intra-day contracts.*
- *Funding for CBET has largely been done through IFIs, Multilateral Development banks, Concessional debt financing and technical assistance, National contribution etc.*
- *Dispute Resolution aspects have been addressed through settlement procedures being part of Treaties and Agreements, Option for amicable settlement, International arbitration etc.*

IEX Table (Section 5.8.2):**Product Segments in the Indian Electricity Exchange**

Products	Characteristics
Day Ahead Markets <i>Since June 2008</i>	<ul style="list-style-type: none"> ▪ Double-sided anonymous bidding process ▪ Nation-wide, on-line, automated trading platform ▪ 15 minutes block day-ahead contracts ▪ Based on Physical delivery ▪ Clearance obtained from SLDC by buyers and sellers based on availability of network and ABT meters ▪ The intersection between the aggregated sale and purchase curves defines the market clearing price (MCP) ▪ Congestion Management through market splitting and determining Area Clearing Price (ACP) specific to an area ▪ 13 bid areas have been defined for the purpose ▪ Risk management through the requisite Margin, including any additional Margin as specified for the respective trading segment or the type of contracts ▪ Trading hours:10-12 am bidding ▪ Bid types: Single or Block Orders ▪ Minimum bid: Re.1 for 0.1MW ▪ Minimum Price & Volume Step = 0.1p * 0.1 MW ▪ Volumes/prices published for each 15-min block ▪ Pool based (collective) scheduling of traded power by NLDC ▪ 0.1 MW min NOC required
Term Ahead <i>Since September 2009 for Forward electricity contracts</i> <i>24X7 TAM started since July 2015</i>	<ul style="list-style-type: none"> ▪ Day-Ahead Contingency-Trades power for an entire day on hourly basis, 1 day ahead on continuous auctions. Separate provisional window 3-5 PM is available for the same. Extended Market: Trading window increased to 1500-2300 Hrs ▪ Intra-Day- Trades power for the same day starting 2 pm on an Hourly basis on continuous auctions Extended Market: Trading window increased to 0030 – 2000 Hrs for same day delivery, with delivery starting at 0400 Hrs ▪ Daily- Trades power for an entire day for rolling seven days (delivery starting after 4 days) in a continuous auction ▪ Weekly- Trades power for an entire week (Monday-Sunday) in an open type auction
Renewable Energy Certificates <i>Since February 2011</i>	<ul style="list-style-type: none"> ▪ Closed double-sided uniform price auction ▪ Green Attributes are sold as Certificates ▪ Sellers : RE generators not under feed in tariffs ▪ Buyers: Obligated entities such as Distribution Companies , Open Access Consumers & Industries consuming Captive Power and Voluntary entities such as Individuals and Corporates under CSR ▪ 1MWh is equivalent to 1 REC (Minimum order volume limit) ▪ Validity of REC is 1095 days after issuance

Energy Saving Certificates (ESCCerts)

- Floor Price (Minimum Price or Guaranteed Price) and Forbearance Price (Penalty for Non-Compliance or the Maximum Price) are regulated by CERC time to time. It is different for Solar and Non-solar RPOs
 - State nodal Agency authorizes the RE Generator and recommends for Registration
 - Registration is through the NLDC
 - Entity receives RECs for the amount of electricity injected in to the grid as certified by SLDC.
 - Trading and Redemption of the RECs happens through Power Exchanges
 - Pre-trade phase By 12.00 Hrs
 - Order Accumulation or Bidding phase Between 13.00 Hrs and 15:00 Hrs of the Trading Day
 - Order matching and trade finalization phase : Between 15:00 Hrs and 17:00 of the Trading Day
 - Settlement and Delivery phase: Between 17:00 Hrs and 18:00 of the Trading Day
 - Post-auction phase: Between 17.00 and 18:00 Hrs of the Trading Day
-
- Tradable Certificates under National Mission on Enhanced Energy Efficiency (NMEEE) is Perform, Achieve & Trade (PAT) mechanism, launched by Bureau of Energy Efficiency (BEE) under Ministry of Power on 4th July, 2012, a market based mechanism designed to enhance energy efficiency in energy intensive industries.
 - The scheme covers 478 Designated Consumers (DCs) from eight energy-intensive sectors—thermal power, aluminium, cement, fertilizer, iron and steel, pulp and paper, textiles and chlor-alkali. These eight sectors account for 25% of GDP and about 45% of India's primary energy consumption and consume 165 million tonnes equivalent of energy consumption annually.
 - **Administrator:** Bureau of Energy Efficiency
 - Minimum Order volume limit: 1 ESCert
 - Closed double-sided uniform price auction
 - Pre-trade phase By 12.00 Hrs
 - Order Accumulation or Bidding phase 13.00 Hrs to 15:00 Hrs of the Trading Day
 - Order Verification phase By 15.30Hrs
 - Confirmation from Registry By 16.00 Hrs
 - Order matching and transaction finalization phase By 17:00 of the Trading Day
 - Settlement and Delivery phase Between 17:00 Hrs and 18:00 of the Trading D
 - Compliance to ESCerts is Mandatory
 - Target Entities: Designated Consumers
 - **Buyers:** Industries not achieving target
 - **Sellers:** Industries achieving beyond target
 - **Target:** 6.6 million toe for 1st phase Cycle i.e. from 1st April, 2012 to 31st March, 2015
 - **Mechanism:** Cap and Trade

- **Phase Cycle:** 3 Years
- 1 ESCert = 1 MTOE (Metric Tonne of Oil Equivalent)
- **Penalty:** As per Energy Conservation Act, 2001
- **Banking** of ESCerts is allowed for two consecutive cycles
- **Compliance Period:** 3 Years for Designated Consumers

PXIL Table (Section 5.8.3):

Margin requirements for various products in PXIL

Product	Margin	When collected	Buyer	Seller
DAS/DAC	Equivalent to Bid value, other charges and taxes applicable.	T day at the time of Bid	100%	NIL
	Equivalent to Bid value, other charges and taxes applicable.	T day post matching.	100%.	NIL
Intra Day	105% of Bid value.	T day at the time of Bid	105%	NIL
	Equivalent to Bid value, other charges and taxes applicable.	T day post matching.	100%.	NIL
Week Ahead	Bid Security	T day at the time of Bid	Rs 0.10/Kwh	Rs 0.10/Kwh
	Margin matching after	T+1 day by 11 AM	Equivalent to 3 days Matched Trade value	Rs 0.10/Kwh
	Margin scheduling after	Immediately after scheduling	Adjusted to 3 days Approved trade value	Rs 0.10/Kwh
Regional Week Ahead	Bid Security	T day at the time of Bid	Rs 0.10/Kwh	Rs 0.10/Kwh
	Margin matching after	T+1 day by 11 AM	Equivalent to 3 days Matched value having maximum obligation which is unsettled.	Rs 0.10/Kwh
	Margin scheduling after	Immediately after scheduling	Adjusted to 3 days approved trade value having maximum obligation which is unsettled.	Rs 0.10/Kwh
Any Day	Equivalent to Bid value, other charges and taxes applicable.	T day at the time of Bid	100%	NIL
	Equivalent to Bid value, other charges and taxes applicable.	T day post matching.	100%.	NIL

REC	Equivalent to Bid value, other charges and taxes applicable.	T day at the time of Bid	100%	NIL
	Equivalent to Bid value, other charges and taxes applicable.	T day post matching.	100%.	NIL

