

Roadmap for the implementation of SAARC Framework Agreement on Energy Cooperation (Electricity)

September 2020

Strictly private and confidential

Presented by :

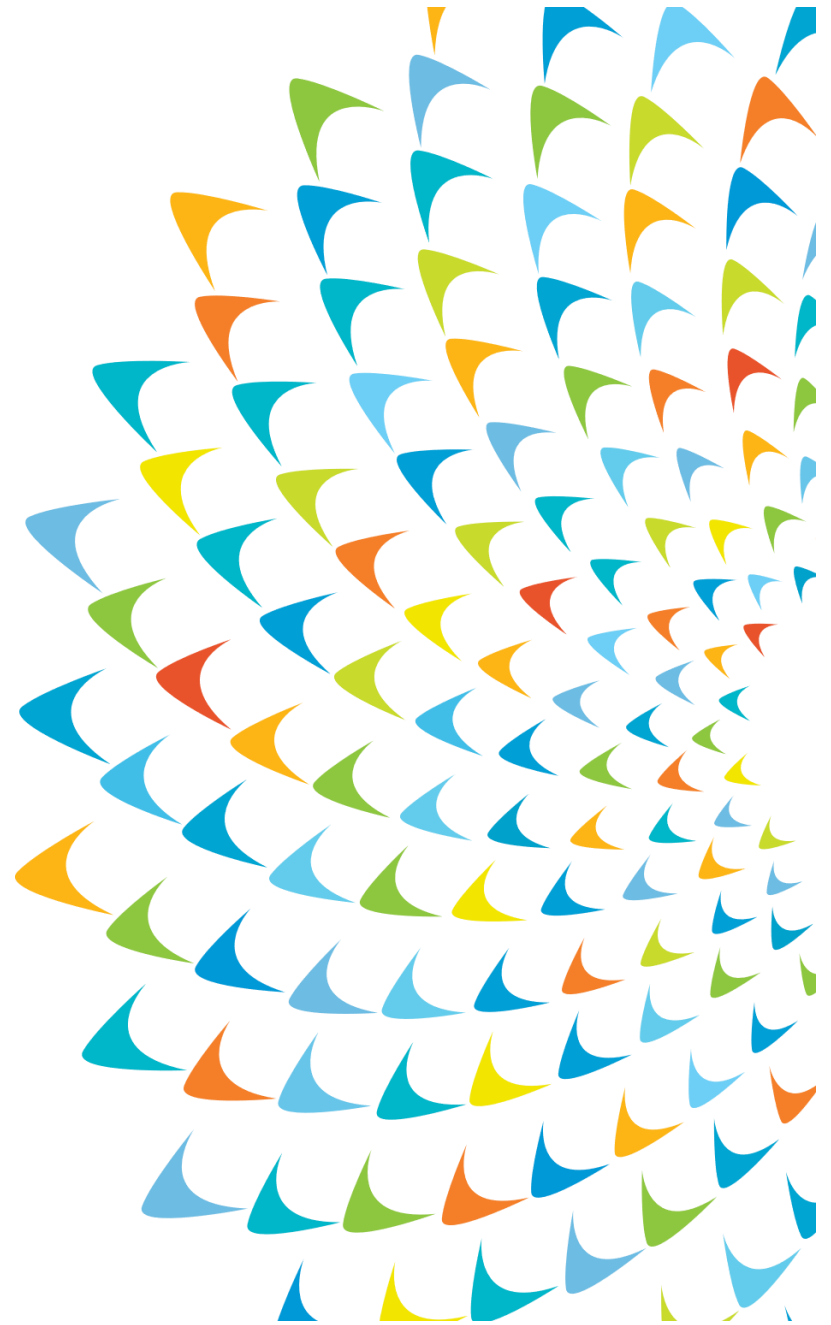
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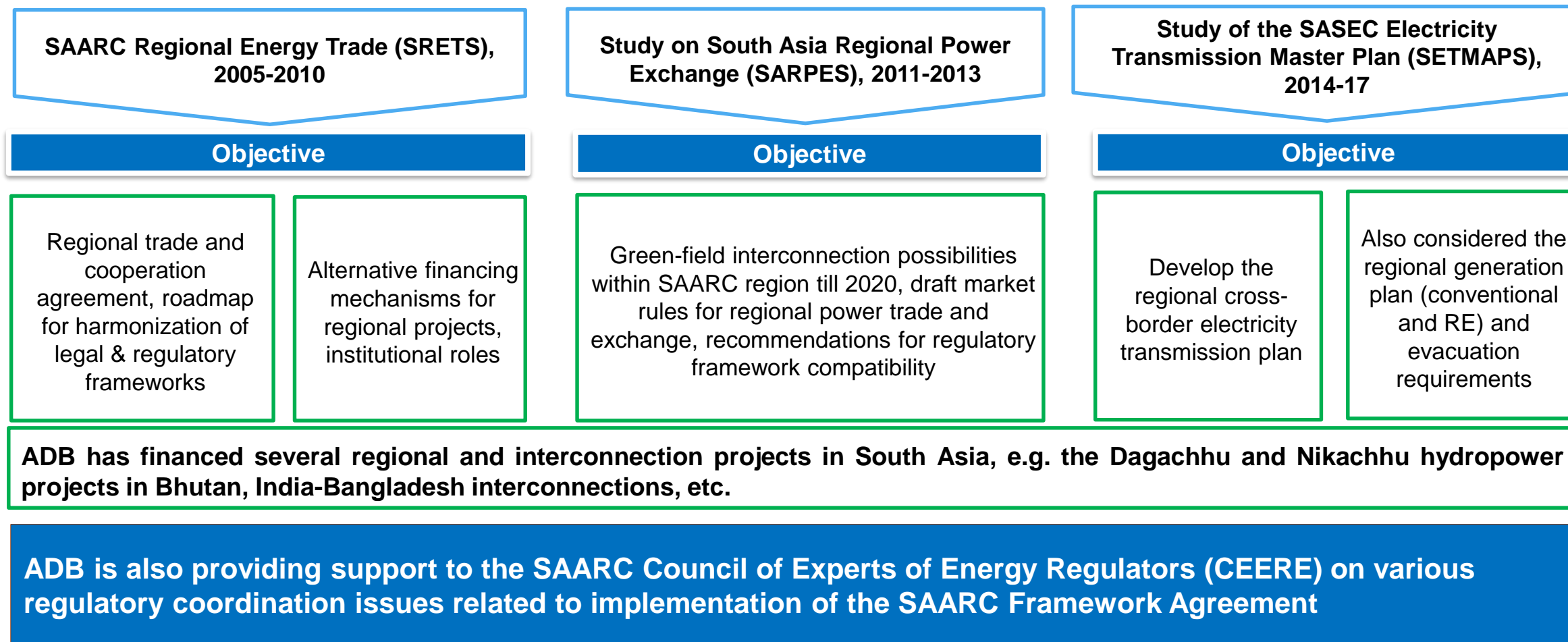
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ADB Support to promote CBET in South Asia





ADB support to promote regional energy cooperation in South Asia





ADB Regional TA to support SASEC member nations in enhancing power trade in the region

Key Objective: Enhancing regional cooperation in energy sector among the member nations in accordance with the SASEC vision and SASEC operational plan

Activities to be carried out under the TA

Regional Project assessments

Feasibility, costing, safeguards, project benefits

Developing a regional master plan

Update the master plan prepared under SETMAPS

Capacity Building through knowledge sharing workshops

Support CEERE in conducting studies for operationalisation of SAARC Framework Agreement

Regional Framework for Energy Cooperation

Enable members to participate in regional power market

Progress achieved under the TA

- Work towards signing of Regional Power Trade Framework Agreement for increased regional cooperation among SASEC nations
- Assessment of project development options and preliminary viability analysis of various regional flagship projects
- Knowledge sharing on “Best practices on Cross-border Electricity Trade and Regulatory Cooperation” in the 3rd and 4th CEERE workshop in Colombo



ADB support to facilitating CBET through SASEC Power Trade Working Group (SPTWG)

Objective

Facilitating increased cross border power trade among member countries through development of regional projects and suggest measures to overcome challenges w.r.t multi country power trading

To work in coordination and complement the activities of other groups e.g. SAARC Energy Centre/ SAFIR etc

Key Responsibilities

Assist in mobilizing funds for priority projects

- Discussions on project development options
- Scouting potential funding sources

Facilitate discussions among planning agencies, regulators and utilities

- Support in identifying issues with respect to regulatory/policy/ commercial, etc.

Capacity Building & Knowledge Management

- Oversee studies and share best practices on policy, regulatory, technical and commercial/ financial aspects

Maintain and update SASEC priority projects

- Review progress and support in identifying key issues/ challenges

South Asian Power Sector Overview

Opportunities to leverage complementarities in SAARC power sector through regional cooperation

SAARC Power Sector Scenario

Countries	Installed Capacity (MW)	Peak Demand (MW)	Per Capita Electricity Consumption (kWh)	Power Import (MW)	Power Export (MW)
Afghanistan	520	600	149	-	-
Bangladesh	21,000	14,500	336	1,160	-
Bhutan	2,326	400	2,976	-	~2,300
India	3,63,000	1,78,000	1,208	~2,300	~1,660
Maldives	400	-	725	-	-
Nepal	1,177	1,320	190	~500-520	-
Pakistan	36,010	25,000	435	1,000	-
Sri Lanka	4,103	2,616	658	-	-

- Wide variety of generation sources across the sub-region
- Dominance of single energy source for power generation in most of the member countries
- Cost of generation and supply widely varies across the SA nations with countries like Nepal & Bhutan having access to cheap hydro power and India having access to abundant renewable energy
- Member nations have time (peak/offpeak) and seasonal complementarities which may be leveraged through regional co operation
- Scope for channelizing revenue from power export for socio-economic development
- Scope for reducing carbon footprint (increasing RE penetration) - opportunity to support fluctuation from RE with traditional sources



Need for a regional framework agreement to develop energy resources ,meeting electricity demand and enhanced economic benefits for the SAARC region

SAARC Framework Agreement for Energy Co-operation(Electricity)

SAARC Framework Agreement for Energy Cooperation (Electricity) was first signed in 2014 at the 18th SAARC Meeting .The member nations are Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka

Objective: Enable cross-border trade of electricity on voluntary basis subject to the laws, rules and regulations of the respective Member States

Salient Features of the SAARC Framework Agreement

Non-discriminatory access to transmission grids for the purpose of CBET

International coordination in transmission interconnection planning, system operations, and energy accounting

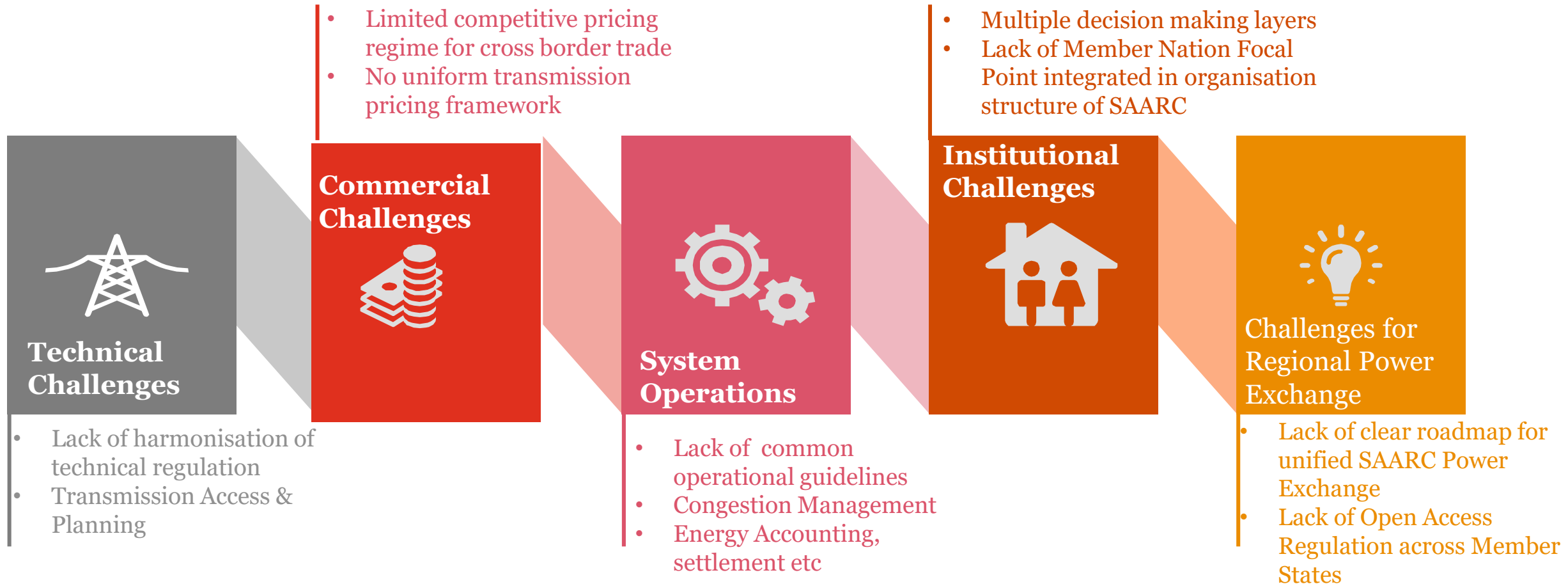
Promotion of information sharing between Member States

Encouraging member states to undertake power sector reforms in their respective jurisdictions, to promote competition

Member states to develop structure functions and institutional mechanisms to resolve regulatory issues

- **SAARC Framework Agreement has been ratified by all member states except Pakistan**
- **Multilateral/trilateral trade is yet to be established among SAARC member nations**

Barrier and Challenges for implementation of framework agreement for CBET



Technical Challenges

Existing Issues/Challenges among SAARC nations 1/3

1 Technical Challenges

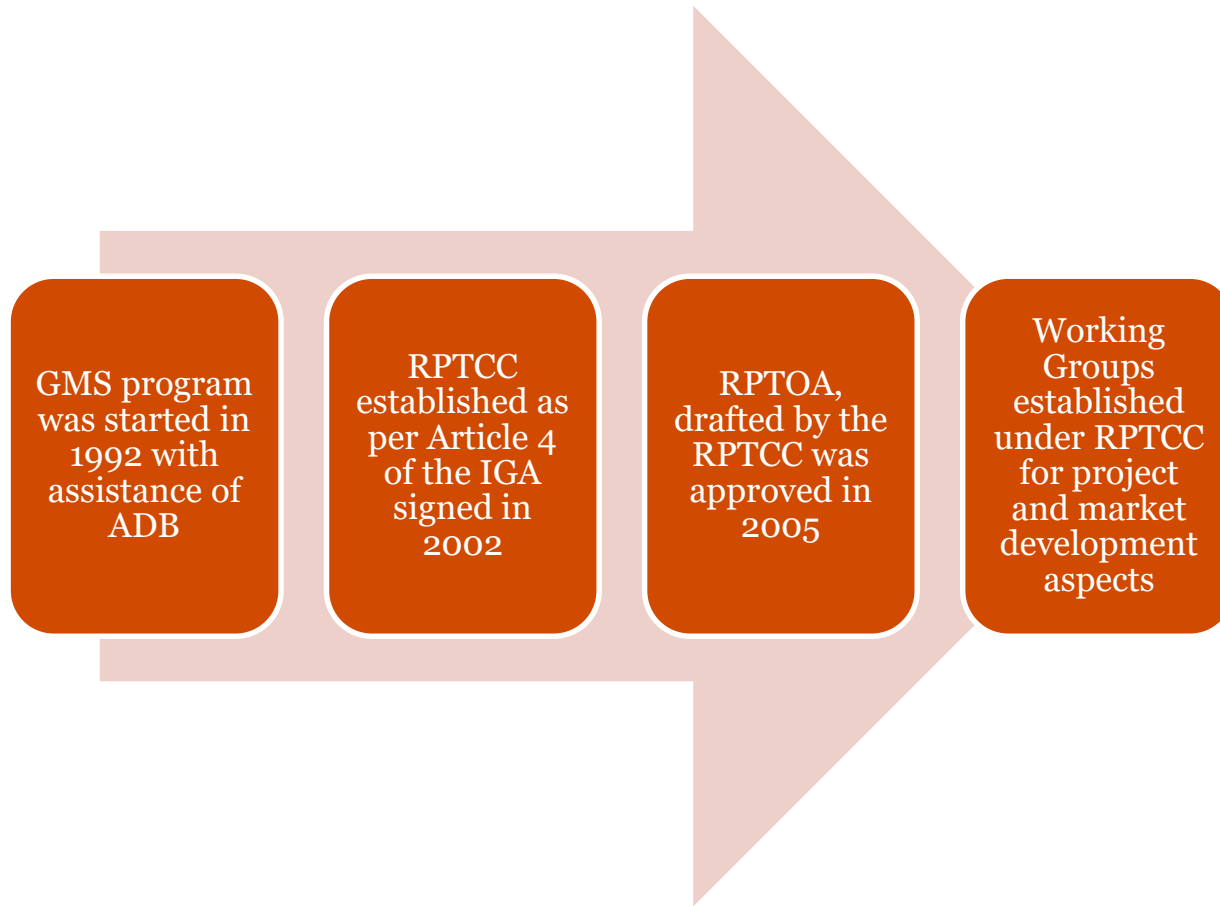
SAARC Framework Agreement	Current Status	Challenges
<p><u>Article 7 Planning of Cross-border interconnections:</u> Enable the transmission planning agencies of the Governments to plan the cross-border grid interconnections through mutual agreements between the concerned states</p> <p><u>Article 8: Build, Operate and Maintain:</u> Enable the respective transmission agencies to build, own, operate and maintain the associated transmission system of cross-border interconnection falling within respective national boundaries</p>	<ul style="list-style-type: none"> • Currently only Bilateral transmission arrangements exist • There is lack of regional transmission planning and project implementation to optimize investments on a regional level • National institutions drives development of inter-connections • Cross border inter-connections planned on a case-to-case basis 	<p>No guidelines available in transmission planning for trilateral/multi country power trade</p> <p>No guidelines or clarity for cross country investment</p> <p>Absence of a regional transmission master plan</p>

Existing Issues/Challenges among SAARC nations 2/3

1 Technical Challenges

SAARC Framework Agreement	Current Status	Challenges
<p><u>Article 10: Electricity Grid Protection System</u> Enable joint development of coordinated network protection systems incidental to the cross-border interconnection</p>	<p>No common grid code or network regulation. Each country guided by its national electricity laws/policies</p>	<p>Absence of harmonisation may lead to difficulties in system operation with proposed significant increase in power trade</p>
<p><u>Article 12: Transmission Access</u> Enable non discriminatory access to the respective transmission grids as per the applicable laws, rules, regulations and applicable inter-governmental bilateral trade agreements.</p>	<ul style="list-style-type: none"> • Apart from India, open access framework is not operationalized in other SAC • No open access required for power export for IND-NEP and IND-BAN as Nepal, Bangladesh are buyers. • Bhutan has dedicated transmission lines for export of power 	<p>Lack of open access regulation in SA countries will hinder access of transmission and distribution infrastructure to facilitate CBET</p>

Technical Framework for regional cooperation in GMS region

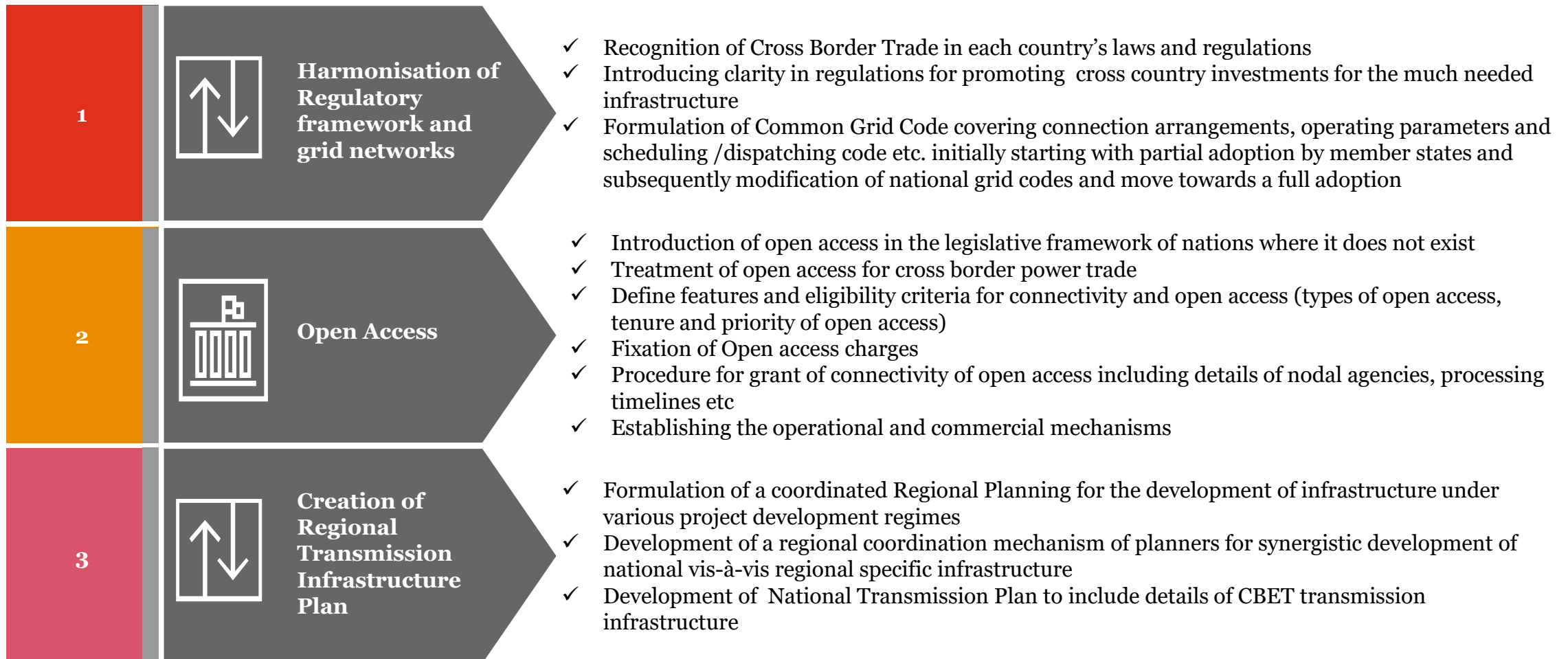


Key Achievements till Date

- Roadmap on transmission pricing methodologies
- Technical assistance to countries on regulatory issues, i.e. transmission company, system operation, wheeling charges, etc.
- GMS performance standards adopted as a reference document in June 2016
- Regional transmission regulations adopted as reference document in Dec 2017
- Work in progress
 - Standard regional metering and communication arrangements
 - GMS Grid Code
 - Regional master plan and FS for priority interconnectors

Existing Issues/Challenges among SAARC nations 3/3

Addressing technical Challenges-Way forward



Commercial Challenges

Existing Issues/Challenges among SAARC nations

2

Commercial Challenges

SAARC Framework Agreement

Article 3 Scope

Member States may enable Buying and Selling Entities to negotiate the terms, conditions, payment security mechanism and tenure of electricity trade under the Government regulatory mechanisms of the concerned states

Article 9: Transmission Service Agreements

Member nations may facilitate entities to enter into TSA with transmission service Provider

Current Status

- For projects developed under Inter-Governmental Agreement, the tariff is determined through G to G negotiations
- Gradual evolution from G-G to commercial CBET (~30% of the power trade)
- Transmission pricing currently governed by bilateral TSA.
- Transmission pricing involving Indian & interconnected grid is done as per CERC regulations



Issues/Challenges

- Along with the prevalent G2G model for power sale, there is need for more commercial focus and competitive price discovery
- Need of standard framework for Transmission Charges/ Pricing
- Need for development of model/standard TSA
- Need for framing uniform guiding principles on transmission cost sharing /transit fee arrangement

Existing Issues/Challenges among SAARC nations 3/3

Addressing Commercial Challenges-Way forward

Contents

1

Competitive Pricing Discovery

- ✓ Gradual transition from G-G bilateral arrangements to more competitive market driven arrangements
- ✓ Promotion of power trade through exchanges to improve price discovery and improve transparency

2

Common Norms for transmission pricing, payment security, and other commercial terms

- ✓ Setting up principles and mechanism for determination of economically efficient transmission pricing mechanism and gradually introduce concept of local specific pricing
- ✓ Evolution of an appropriate transit fee mechanism with a possible start using cost plus principles

International Example: GMS

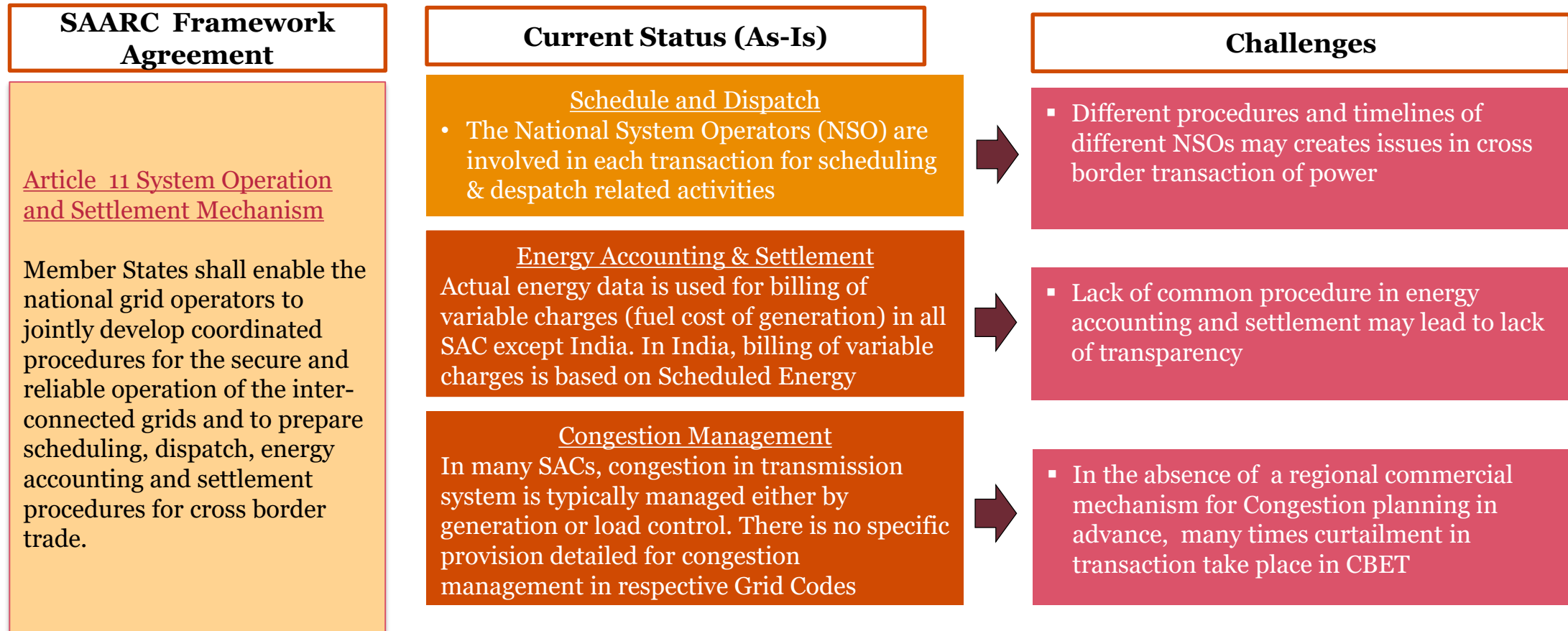
- Presently transmission methodology varies across countries; in case of using third country network wheeling charge for that country as well as system loss to be recovered through end tariff. RPTCC under GMS Secretariat presently working on **common CBET transmission pricing methodology**
- Methodologies agreed to enhance present postal stamp method prevalent in some countries of Greater Mekong Region for transmission pricing are
 - Differentiation of charge by time of year to reflect hydrological variations
 - Differentiation of charges by capacity and energy,
 - Introduction of charges to generators and consumers
- **Electricity Tariff** for power export and **wheeling charge** is determined as per bilateral PPAs. **Cost plus model** is used for determination of tariff

System Operation Challenges

Existing Issues/Challenges among SAARC nations

3

System Operation Challenges



Existing Issues/Challenges among SAARC nations

Addressing System operation Challenges-Way forward

Scheduling & Dispatch

Formulation of common grid code to standardize operation and scheduling with pre defined timelines

Energy Accounting

- In case of multiple transmission interconnection points, it is envisaged that scheduling would be carried out separately for each transmission link through a defined procedure
- A separate commercial mechanism for imbalance settlement may be established

Congestion Management

Feasibility of implementing a commercial mechanism may be explored wherein, users causing congestion pay penalty and users relieving congestion receive incentive at predetermined rate

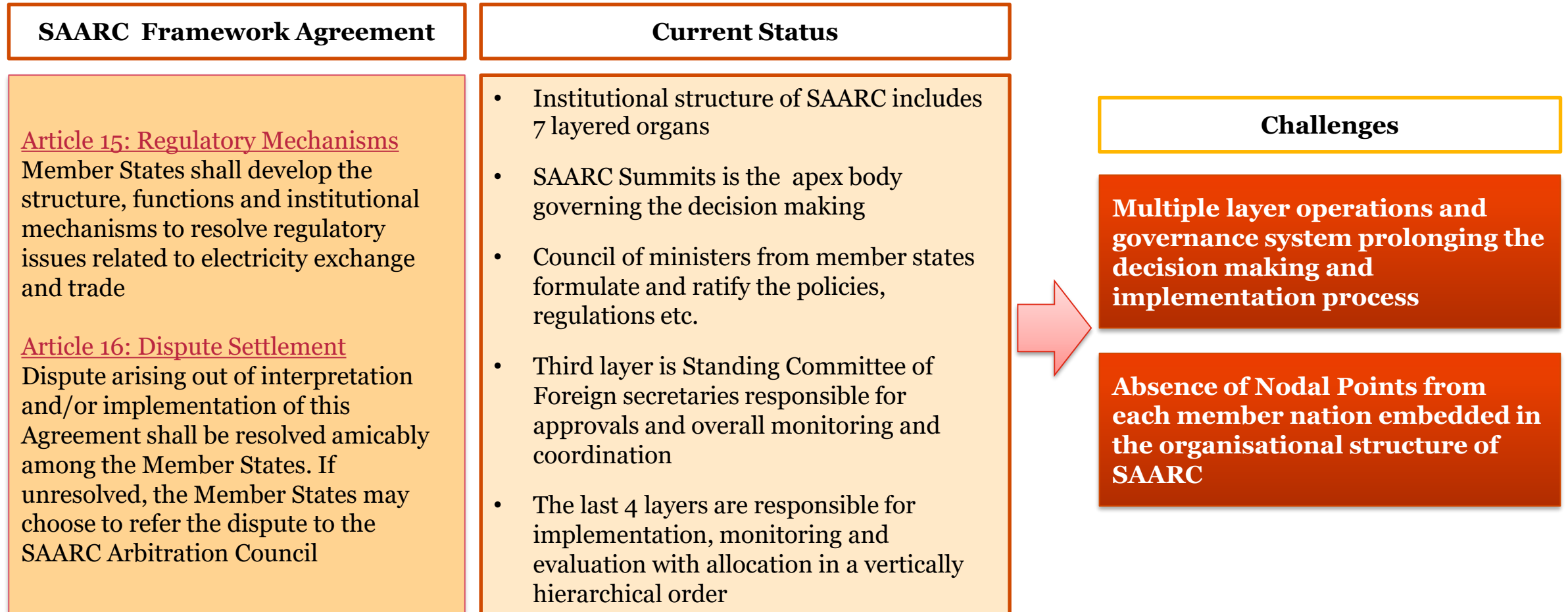
International Example: South African Power Pool

- Operating guidelines for SAPP issued in 2012. The areas covered are:
 - System control: *Generation/ voltage/ time & freq. control, equipment*
 - System security: *Active/ reactive supply, relay coordination, connection & operation of IPPs*
 - Emergency operation protocol: *Over/ under generation, load surge, load shedding, system restoration,*
 - Operating personnel: *Responsibility, training*
 - Operations planning: *Normal, short/ long term emergency*
 - Telecommunications: *Facility, controller*

Institutional Challenges

Institutional Challenges amongst SAARC Nations

Current Status and Challenges



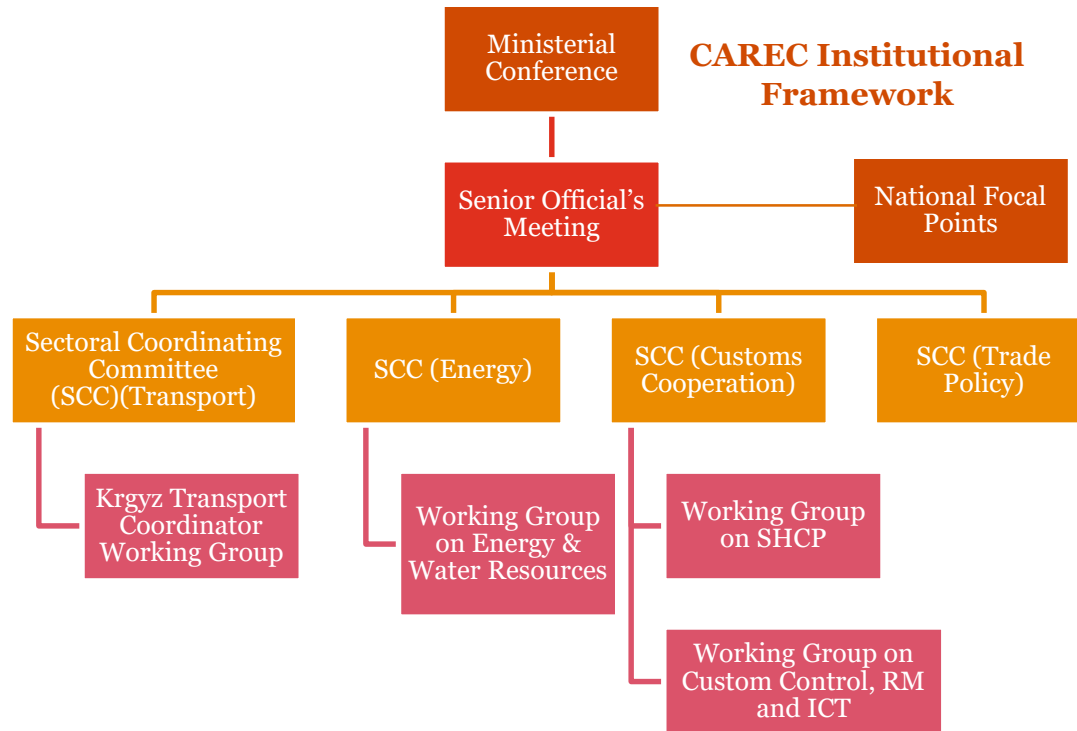
Institutional Challenges amongst SAARC Nations

As-is Situation of the SAARC Institutional Structure

Order	Principal Organ	Key Features	Roles and Responsibilities
1	SAARC Summits	<ul style="list-style-type: none"> Meetings of the Heads of State or Government of Member States Held biennially hosted by a Member State in alphabetical order 	<ul style="list-style-type: none"> Declaration consisting of decisions and directives Approval of reports of the Council of Ministers
2	Council of Ministers	<ul style="list-style-type: none"> Comprises Ministers of Foreign /External Affairs of the Member States CoM meetings conducted before the Summit and between two Summits CoM reports submitted to meeting of Heads of State or Government 	<ul style="list-style-type: none"> Formulation of policies of the Association Review of progress of cooperation under SAARC Establishment of additional mechanism under SAARC
3	Standing Committees	<ul style="list-style-type: none"> Comprises of the Foreign Secretaries of the SAARC Member States Standing Committee can meet ad hoc basis Conducted during Summit for CoM is convened in between two Summits 	<ul style="list-style-type: none"> Overall monitoring and coordination of programme Approval of projects and programmes and mobilize resources Determination of inter-sectoral priorities
4	Programming Committees	<ul style="list-style-type: none"> Comprising of the Heads of SAARC Divisions of Member States Meets prior to the meetings of the Standing Committee 	<ul style="list-style-type: none"> Considers the Calendar of Activities Administrative and Financial Matters of the Secretariat
5	Technical Committees	<ul style="list-style-type: none"> Comprises of 6 Technical Committees for SAARC activities Work on their respective areas to provide support to SAARC activities 	<ul style="list-style-type: none"> Implementation, coordination and monitoring of programmes Formulation of programmes and preparation of projects
6	Working Groups	<ul style="list-style-type: none"> Carry out the directives emanating from SAARC higher bodies Comprises of 4 Working Groups 	<ul style="list-style-type: none"> Formulate and over see programmes and activities Coordinate, monitor and evaluate programmes
7	Action Committees	<ul style="list-style-type: none"> Comprising of Member States concerned with the implementation of projects involving more than 2 but not all Members 	<ul style="list-style-type: none"> Support in the implementation of project as a support to WG

Benchmarking with Other Regional Body from Asia

CAREC has relatively flatter and shorter hierarchy with only 4 layers of decision making bodies or organs which can facilitate expeditious resolutions and approvals



Body	Scope of Work
Ministerial Conference	<ul style="list-style-type: none"> Provide overall strategic guidance to the process of economic cooperation in the Central Asia Region Decide on new regional initiatives (involving two or more nations)
Senior Officials Meeting	<ul style="list-style-type: none"> Effective implementation of the policy decision made by Ministerial Level Conference (MLC) by reviewing and articulating issues Making relevant recommendations and assessing issues
Sectoral Coordination Committee	<ul style="list-style-type: none"> Set-up on an ad-hoc basis as determined by the MLC to coordinate sector wide issues, activities including plans for sector development. Works in close coordinate with National Focal Point
Working Groups	<ul style="list-style-type: none"> Project specific working groups to facilitate the preparation, implementation, monitoring and progress
Focal Point	<ul style="list-style-type: none"> Member nation designated point of contact responsible for coordination amongst concerned govt. agencies and other parties

Way Forward

- Learnings can be taken from other international cases to simplify and flatten the hierarchy to expedite the decision making process
- Introduction of an additional external body viz. the nodal focal point from all the member nations which can act as single contact point for all coordination, monitoring, oversight and decision making purposes for pertinent project nations
- Structured institutional mechanisms/committees/forums at the level of regulators, planning authorities etc

Challenges in Regional Power Exchange

Regional Power Market Challenges amongst SAARC Nations

Existing Cross Border Power Trade between member nations

Existing Bilateral Trade

India → Bangladesh (1160 MW)	Source	Type	Trader	Tenure
	250 MW NTPC	G-G	NVVNL	25 years
	250 MW Market	Commml	PTC	3 years
	160 MW Tripura	G-G	NVVNL	5 years
	500 MW Market	Commml	NVVNL Sembcorp	15 years
	40 MW Market	Commml	PTC	2 years
Bhutan → India (2260 MW)	Capacity*/Source	Type	Trader	Tenure
	1020 MW Tala	G-G	PTC	35 years
	336 MW Chhukha	G-G	PTC	
	60 MW Kurichhu	G-G	PTC	
	126 MW Dagachhu	Commml	TPTCL	25 years
	720 MW Mangdechhu	G-G	PTC	35 years
India → Nepal (500-520 MW)	Source	Type	Trader	Tenure
	237 MW India	G-G	-	Long Term Contract
	80-120 MW Market	Commml	PTC/NVVN	-
	160 MW Market	Commml	NVVN	Renewed every year
Afghanistan → Pakistan (CASA - Project-1000 MW)	Source	Type	Trader	Tenure
	Afghanistan → Pakistan (1000 MW)	CASA Project	Bilateral	Yet to commence

Emerging Trilateral Trade

900 MW Upper Karnali HPP

The Cabinet Committee on Public Purchase (CCPP) in Bangladesh has approved a proposal for importing about **500 MW electricity from the proposed 900 MW Upper Karnali Hydroelectricity Project** being developed by GMR in Nepal.

1125 MW Dorjilung Project

Bhutan, Bangladesh and India intend to propose 1125 MW Dorjilung project as a trilateral project . The DPR of the project has been approved by RGoB. Transmission interconnectivity options between Bhutan and Bangladesh through India is being currently explored

Bangladesh PSMP 2016

Bangladesh proposes to import >5 GW of hydropower from Bhutan, Nepal and Myanmar

Regional Power Market Challenges amongst SAARC Nations...(1/2)

Current State of Affairs to Progress towards Regional Power Market

SAARC Framework Agreement

Article 15: Regulatory Mechanisms

Member States shall develop the structure, functions and institutional mechanisms to resolve regulatory issues related to electricity exchange and trade

Article 16: 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.

Current Status (As-Is)

Phase – I (Bilateral Power Trade)

This phase aims at establishing bilateral trade connections between member nations. Currently most of the CBET ties amongst SAARC nations is in Phase-I

Phase-II (Trilateral Power Trade)

This phase is gradual progress towards Trilateral/Quadrilateral connections to establish trilateral market setup in the region. SA region is slowly transitioning towards trilateral trade with joint initiatives e.g. GMR Upper Karnali Project, Dorjilung Hydro Power Project

Potential Status (To-Be)

Phase – III (Sub Regional Power Market)

The subsequent phase post trilateral market ties would be development of sub regional grids & sub-regional power markets which would lead to formation of clustered market within regions sharing common operating and technical standards

Phase – IV (Harmonized Regional Power Market)

Final phase is unification of sub-regional power markets or sub-regional clusters and formation of an integrated grid and common market pool with harmonised grid standards

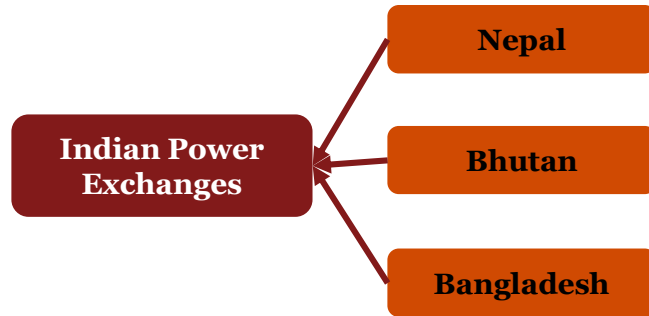
Regional Power Market Challenges amongst SAARC Nations...(2/2)

Current State of Affairs to Progress towards Regional Power Market

Challenges	Way Ahead	Regional Power Market Potential	
Lack of clear roadmap for governing the transition of CBET from Bilateral to Trilateral/Multilateral	<ul style="list-style-type: none"> • Development of a comprehensive roadmap for the phase wise transition of the bilateral trade to trilateral and conclusively multilateral trade system • Development of a robust strategy for inclusion of nearly all the member nations to the PXs platform • Development of planning for the adoption of open access regime by all member nations 	Option	Regional Power Exchange PXs offers a platform for multilateral Cross Border Electricity Trade facilitating an opportunity to leverage the generation of generation assets across SAARC Region
Lack of strategy for the progress of the Regional Power Exchange with involvement of more than four member nations i.e. beyond BBIN		Value Proposition	Considering the electricity demand has diversity on seasonal, monthly, weekly and even daily level, PXs can play a transformational role to provide electricity at a fair, transparent and neutral platform with competitive price discovery
Lack of Open Access Regulation across Member Nations		Regional Driver	Progressive regional power market initiatives to drive regional power market growth viz. Bangladesh having green power (hydro) power import from Bhutan-Nepal, trilateral power agreements (Bhutan-India-Nepal) etc.
		Progress	In the SAARC region, India is currently playing a catalytic role by taking preliminary steps towards the development of Regional Power Exchange. Introduction RTM market and establishing rules and regulations allowing participation of other SA nations.

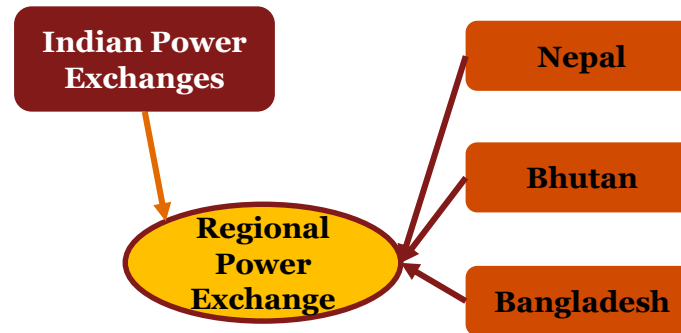
Potential Options of the Cross Border Trade of Electricity (CBTE) in SAARC Region

Option 1: Extend operations of established Power Exchanges in India



- Create separate bid area for each SAARC Member nation or include member nations in nearby existing bid area depending upon technical feasibility
- To begin with, include member nations having existing grid connectivity;
- Subsequently add other members as and when they get connected with Indian grid

Option 2: Set-up Regional Power Exchange



- Creation of a Regional Power exchange viz. Regional PXs where South Asian Nations can participate
- Regional PXs can receive bids from member nations and, depending upon technical feasibility, it can receive either separate direct bids from Indian sellers and buyers or only uncleared buy bids and sell bids from Indian PXs

Proactive Initiatives to facilitate CBTE

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

- Import/export of electricity between India and neighboring countries possible through bilateral agreement, bidding route or mutual agreement route.
- Import/Export through bilateral agreement between two countries, the Government of India may designate an Entity for import/export of power
- Disputes involving multiple Entities of separate countries can be settled through the International Arbitration Centre

CEA Draft Conduct of Business Rules of Designated Authority for CBTE (2019)

- Indian entities trading in DAM in PXs will not require any approval from designated authority
- Approval from designated authority not necessary if import/export is taking place under the Inter Govt. Agreement signed by India and neighboring country for specific projects

CERC Cross Border Trade of Electricity Regulations, 2019

- Sale and purchase of power between India and neighbouring countries allowed under bilateral agreement, bidding route or mutual agreement
- Electricity trading licensee of India may trade in Indian PXs on behalf of entity of the SA nation by obtaining approval from MoP designated agency

Conclusion

Conclusion and Way forward

**Transitioning from
Bilateral to Trilateral and
conclusively to Multilateral
CBET in South Asian
Region**

**Deepening CBET leads to
Clean Energy Transition
and Sustainability, Climate
Change Mitigation**

**Focus on power market
development including
ancillary services
(establishment of regional
PX)**

**De-risking CBET
infrastructure Projects,
Enhancing Bankability of
Projects, Investment
Mobilisation**

**Need to strengthen the
process of Policy and
Regulatory Harmonisation
and Institutional Capacity**

Thank you