Cross Border Electricity Trade in South Asia: Transitioning from bilateral to trilateral/multilateral trade (Including power markets)

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Content

- Scenario of Cross Border Electricity (CBET) & Outlook in South Asia (SA)
- Key Policy/Regulatory Enablers for Trilateral/Multilateral CBET (TMCBET)
- Regional Power Market & Power Exchange-Commercial/market form of CBET
- Role of CBET in facilitating Clean Energy Integration
- Enablers for transitioning to TMCBET
- Initiatives by SARI/EI
CBET – Increased by 2.6 times since 2012. (~3760 MW*)

Historically CBETs are bilateral, Now trilateral trade envisaged

Bangladesh#- Plan to Import from Bhutan (1 GW), Nepal (3 GW) through India.

Bangladesh issued Lol for import 500 MW of electricity from Upper Karnali (GMR) in Nepal @ 7.71 cents/unit for 25 years ##

LoI - letter of intent
* Power System Master plan 2016 (Final)
## Maximum Peak Trade

Compiled from * India connection with Bhutan, Nepal, Pakistan, Sri Lanka as per the CEA-Perspective Transmission Master Plan, Bangladesh – PSMP-2016

LoI - letter of intent to purchase 500 mw from upper-karnali hydro project

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* Nepal-Bangladesh via India- From Nepal (Purnia-Barakakura) by using Case 3 T/L (initially 400kV AC) 2025, using Case 3 T/L (upgrade to 765kV AC) 2030, Bheramara – Roh MPSMP – Additional extension of Bheramara HVDC Power import from Nepal (Including GMR) 2021

# Bangladesh issued LoI for import 500 MW of electricity from Upper Karnali (GMR) in Nepal @ 7.71 cents/unit for 25 years

## South Asia CBET

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>~3760 MW</td>
<td>2020</td>
</tr>
<tr>
<td>~2986 MW</td>
<td>2018</td>
</tr>
<tr>
<td>~2126 MW</td>
<td>2015</td>
</tr>
<tr>
<td>~1400 MW</td>
<td>2012</td>
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</tbody>
</table>

South Asia Current Power Installed Capacity 441 GW

ASIA CLEAN ENERGY FORUM 2020

44.4 GW Cross Border Grid Interconnection by 2036/2040
Regional Power Market & Power Exchange (PX)-Transitioning to Market form of CBET in SA

- CBTE on Commercials/Market basis increasing ~ 1226 MW of CBET (i.e. ~33%)
- Demand Diversity- Daily, weekly, Monthly, Seasonal
- PXs- Fair, Transparent, Neutral Market Place

- PXs offers a platform for trilateral/multilateral CBET
- SARI-Study on Gains from BBIN Multilateral electricity Trade (Capex reduces by USD 17 billion due to regional trade)

- SARI-Study- SARPEX- Pilot Market Exercise- Demonstrated CBET in DAM in PX Platform
- Bangladesh, Nepal, Bhutan in PXs, the quantum of MCV increased in the range of 5-7% (2015-16)

New power market initiatives in India also offers an opportunity to leapfrog in Cross Border Power Market Design front.
Benefit of CBET in facilitating Clean Energy Integration in SA

Rapid Renewable Energy Expansion

CBET can act as a tool for flexibility, managing RE Intermittency, Grid Balancing, RE Integration

Large Regional hydro potential

~350 GW (19% developed)

Hydro is one of the best Balancing resource
Sharing of reserves

Opportunity for developing Regional Power Market
Trading of balancing services
Ancillary Market

Successful 9 PM, 9 Minute-A generation flexibility of ~ 400 MW was achieved from hydropower plants in Bhutan

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South Asia- Hydro Power Potential (GW) & % Developed

<table>
<thead>
<tr>
<th>Country</th>
<th>Hydro Potential</th>
<th>Developed So far</th>
<th>% Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Asia</td>
<td>350 GW</td>
<td>66</td>
<td>19%</td>
</tr>
<tr>
<td>India</td>
<td>450 GW² by 2030</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bangladesh</td>
<td>7.9 Gw² by 2041</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>50% Generation⁴ from RE by 2030</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
<td>16 Gw³ by 2040</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4 For Sri Lanka 50% renewable energy (including major hydro) by year 2030

http://cea.nic.in/reports/others/planning/irp/Optimal_generation_mix_report.pdf

For 4 http://cea.nic.in/reports/others/planning/irp/Optimal_generation_mix_report.pdf

2

http://powerdivision.portal.gov.bd/sites/default/files/files/powerdivision.portal.gov.bd/page/4811044_1180_5c13276_8fa0e611ce/Revisiting%20PSMP%202016%20%28full%20report%29_signed.pdf

For 2 https://powerdivision.portal.gov.bd/sites/default/files/files/powerdivision.portal.gov.bd/page/4811044_1180_5c13276_8fa0e611ce/Revisiting%20PSMP%202016%20%28full%20report%29_signed.pdf

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http://posoco.in/download/report-on-pan-india-lights-off-event-9-minutes-on-5th-april-2020/?wpdmdl=28819

For 5 https://posoco.in/download/report-on-pan-india-lights-off-event-9-minutes-on-5th-april-2020/?wpdmdl=28819

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Enablers for Trilateral and Multilateral CBET

**Political**
- Regional Outlook/Vision
- Political Consensus
- Intergovernmental agreement(s)

**Regulatory**
- Provision to use intermediary transmission network under open access
- Rules for identification of transmission capabilities & congestion
- Rules for measurement of imbalance & settlements

**Technical and Commercial**
- Standards and grid codes
- Grid Connectivity
- Common understanding on Transmission & transit charge.
- Co-ordinated Grid Planning
- Settlement & payment mechanism
- Dispute resolution mechanism

**Institutional**
- Institutional arrangements
- Regional Coordination Forums are desirable
Various Initiatives by SARI/EI for TMCBET & Regional Power Market Development in SA

**Efforts on Implementation & Institutionalisation**

**Regional Forums**
- Forum of Electricity Regulators
- Forum of Transmission Utilities
- Forum of System Operators
- Electricity Market Forum
- Investment Forum

**Technical-Studies**
- Transition of bilateral power trade to trilateral and multilateral power trade in South Asia.
- Assessing the Benefits of CBET for Affordable Supply of Electricity, Facilitating Grid Balancing, Renewable Energy Integration, and Suggesting a Framework for Ancillary Service Market in the SA Region

**South Asia Regional Power Exchange (SARPEX) Mock Exercise**

**Gains from Multilateral Electricity Trade among BBIN Country**

**Non-discriminatory Open Access in Transmission for Facilitating CBET in SA.**

**Harmonisation of Grid codes, Operating Procedures & Standards to facilitate/promote CBET**

**Framework for Trading Licence Regime to facilitate CBET in SA Region**

**Regional Regulatory Guidelines for Promoting CBET in South Asia Region**

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It always seems impossible until it's done.

Nelson Mandela

Thank You

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