

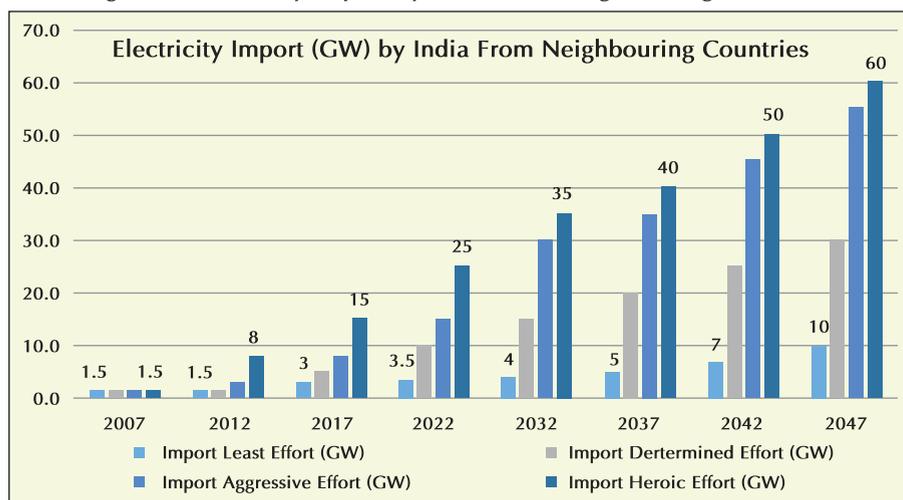
# Institutionalize Cross-Border Electricity Trade

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All the South Asian countries are currently facing power and energy shortages, which are negatively impacting the economies. Adequate supply of energy is pre-requisite for all the development pursuits in the region -- ranging from economic progress to scientific research, education, healthcare, quality of life, and prosperity. In the recent past, South Asia has been one of the fastest growing regions in the world, with an average annual GDP growth rate of 6%. Despite this impressive macroeconomic growth, the energy sector has not been able to keep pace, and continued to experience chronic problems of supply shortage and poor quality of services. Given this dilemma, the only long-term solution is ensuring sustained increase in energy cooperation among the South Asian nations.

Cross Border Electricity Trade (CBET) in the region is currently being undertaken in the form of bilateral trade and is limited to India-Nepal (250 MW approx.); India-Bangladesh (600 MW); and India-Bhutan (1400 MW approx.). The CBET historically has been taking place mainly through bilateral (Government-to-Government) arrangements and based on case-to-case negotiations. In the recent past, however, market-based CBET began

Figure 1: Electricity Import by India from Neighbouring Countries



Date Source: The IESS, 2047, Niti Aayog

in cases of India-Bhutan and India-Bangladesh. It is expected that the CBET in south Asia will be more of market-oriented in future. The region is endowed with vast potential of clean energy i.e. hydropower of 350 GW (of which only 14% has been developed), which can be developed successfully through CBET. It has the potential to improve energy security of the region and provide adequate and affordable electricity.

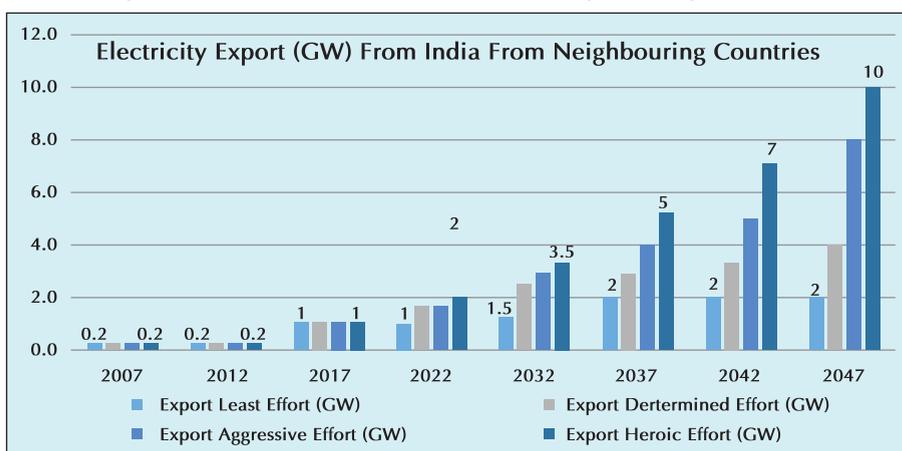
CBET is expected to increase significantly in coming future (Fig 1&2). For facilitating such CBET, several new

transmission inter-connections are being planned/proposed across the region (Fig-3), which is expected to enable greater Integration of Power Systems of South Asian Countries (SACs). Such integration shall also enable trading on a multi-lateral basis wherein two countries having no common border could trade electricity through a third country acting as transit.

The political climate is becoming increasingly more and more conducive for CBET both at the bilateral as well as multilateral levels as eight-member SAARC signed Framework Agreement of Energy (Electricity) Cooperation. The historic Power Trade Agreement (PTA) signed between India and Nepal opens up a whole range of new possibility for trading electricity between Nepal and India, also giving Nepalese power developers an access to the Indian power market. India-Bangladesh and India-Bhutan are taking steps to enhance quantum of CBET manifold. In the future, Bangladesh is planning to import 6,000-7,000 MW of electricity from the regional grid to meet the power demand.

Policy/regulatory provisions and institutional frameworks are required for promoting/facilitating CBET exist in some of

Figure 2: Electricity Export by India to Neighbouring Countries



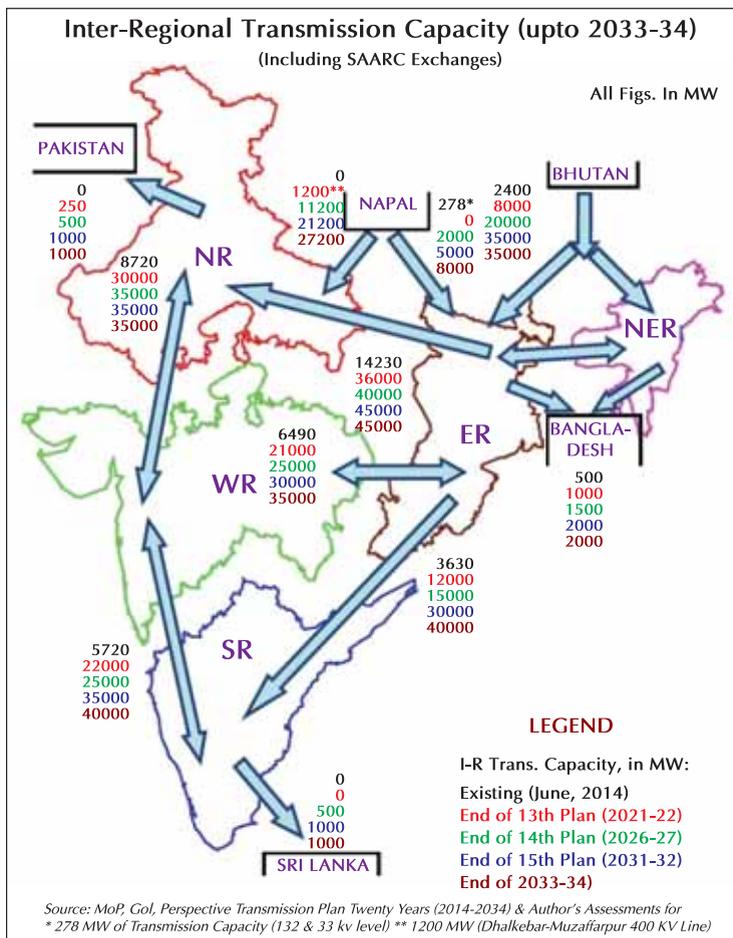
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the SACs, but are not exhaustive in nature. Currently, the SACs are at different stages of power sector reforms and have different electricity regulatory environment. To enhance CBET within two or more countries, there is a need to have common/coordinated set of regulations, which would facilitate/address the mechanism of cross border inter-connection. There is a need to have common/coordinated set of regulations, policies, and legal framework which would address the mechanism of inter-connection, recognize the CBET, open access to transmission network, licensing, imbalance settlement mechanism, coordinated procedures for integrated system operation, dispute resolution, etc. Moreover, the existing electricity regulatory, policy and legal frameworks of SACs primarily address domestic power sector issues and are not necessarily developed to address issues related to CBET.

Without consistent and coherent regional regulatory framework in place, investment opportunities and consequently large scale CBET between nations that could benefit both importing and exporting nations may not happen. In the South Asian regional context, the risks associated with forging an intra-regional CBET project would be greatly minimized if each participating country adopts complementary regulatory frameworks to facilitate cross border inter-connection and electricity trade.

A transparent, stable regional regulatory framework for CBET supported through a regional regulatory institutional mechanism such as forum/agency/association of electricity regulators to take care of CBET regulations is critical for smooth and rapid expansion of trade in electric-

Figure 3: SAARC Regional Transmission Capacity by 2033-34



ity and for creating a conducive environment for investment in CBET.

Integrated Research and Action for Development (IRADe), a regional think tank and the implementing partner of USAID's current phase of South Asia Regional Initiative for Energy Integration (SARI/EI) has recently concluded a study on detailed review of coordination of policies/regulations/legal framework prevailing in each SACs and published Regional Regulatory guidelines (RRGs). The objective of these RRGs (Fig-4) is to provide national regulators/empowered entities of South Asian countries with a common course of action that can be referred to for decision making on CBET in their respective countries. RRGs would ensure consistency in the CBET transactions and remove the constraints that are often plagued or delayed because of the unclear and complicated regimes. In summary, the guidelines and the framework are sufficiently flexible to work

with different national legal, policy, & regulatory frameworks. The provisions allow accommodating different country circumstances, yet have a sufficiently broad application to promote consistent decision-making and for any appropriate updating and modification.

For implementation of RRGs & coordination/harmonization of electricity regulations, CBET needs a strong institutional sponsor and the study has recommended formation of forum of regulators i.e. "South Asian Forum of Electricity Regulators" (SAFER). This Forum of Regulators i.e. SAFER is proposed to manage the process of coordination of regulations with various regional bodies i.e. SAARC Energy Secretariat, regulatory commissions/authorities in each SACs and other relevant institutions in member countries in the area of facilitating cross border electricity trade.

International experiences (Fig-5) also shows that various regional power systems in the globe have taken steps to form regional regulatory institutional structures/mechanisms to coordinate regulations for promoting CBET. In Europe, the Agency for the Cooperation of Energy Regulators (ACER) is an independent agency, which fosters cooperation among European energy regulators and ensures that market integration and the coordination of regulatory frameworks are achieved within the framework of the EU's energy policy objectives and issues non-binding opinions and recommendations to national energy regulators and transmission system operators for facilitating CBET. Similarly, the Regional Electricity Regulators Association (RERA) of Southern African Development Community looks after regulatory coordination and ensure that

the regulatory & contractual aspects done through common set of regulatory guidelines. As per the study conducted by SARI/EI, formation of a Forum of Electricity Regulators i.e. South Asia Forum of Electricity Regulators (SAFER) a neutral and transparent institution will aim to coordinate with various stakeholders to promote regional regulatory guidelines in the form of common regulations, rules and protocols in technical, operational and legal matters for promoting CBET in the South Asian Region.

The SAARC framework agreement for energy cooperation (electricity) also suggests an article 15-member states shall develop the structure, functions, and institutional mechanisms for regulatory issues related to electricity exchange and trade.

Recently, in the 2nd SAARC Energy Regulators' meeting held at Colombo, Sri-Lanka on 8–9 February 2016, the members considered to form a regional

**Figure 4: Brief Summary of Regional Regulatory Guidelines**

<b>Licensing CBET</b>	<ul style="list-style-type: none"> <li>* Recognition of Trading as a Separate Licensed Business Activity</li> <li>* Grant of Licence for CBET Through a Well Defined Process</li> <li>* License Requirements and the Underlying Rules/Limitations</li> </ul>
<b>Non-Discriminatory Open Access</b>	<ul style="list-style-type: none"> <li>* Setting of Fair Rules &amp; Procedures for Non-Discriminatory Open Access</li> <li>* Modification/Amendment of Applicable Regulations &amp; Gradually Legally Binding Provisions</li> <li>* Defining Application Process, Eligibility Criteria, Priority order &amp; Nodal Agency for QA</li> </ul>
<b>Transmission Pricing</b>	<ul style="list-style-type: none"> <li>* Transmission Pricing Mechanism Based on a Country's Requirement &amp; Acceptability</li> <li>* Setting up Principles &amp; Mechanism for Determination of Economically Efficient Transmission Pricing Regime Based on Concept of Location Specific Pricing</li> <li>* Adoption of Tariff Framework in Respective Country Power System Through Enabling Regulations</li> </ul>
<b>Transmission Planning</b>	<ul style="list-style-type: none"> <li>* Development of Regional Coordination Forum of National Transmission Utilities to Coordinate Between Member Countries on Transmission Planning Aspects</li> <li>* Development of a Database of Information That Enables Coordination &amp; Cooperation Towards Transmission Planning</li> <li>* National Transmission Plans to also include details of Cross Border Transmission Lines (Specially for CBET) &amp; Associated Infrastructure</li> <li>* Sharing of the National Transmission Plan at the Regional Level and Progress Towards Developing a Regional Level Master Plan.</li> </ul>
<b>Imbalance Settlement</b>	<ul style="list-style-type: none"> <li>* Member Countries to Develop a Common Set of procedures for Imbalance Settlement for CBET Transactions</li> <li>* This will Include Preparation of Scheduling, Dispatch, Energy Accounting &amp; Settlement Procedures for Both AC-AC &amp; AC-DC Interconnections in the Region</li> </ul>
<b>Harmonization of Codes</b>	<ul style="list-style-type: none"> <li>* Harmonization Through Formulation of Guidelines on Technical Standards for Interconnection of Power Systems on Aspects related to Voltage Standards, Frequency Tolerance, Thermal Limits etc.</li> <li>* Sharing of technical Characteristics &amp; System Specific Data Among the Member Countries</li> <li>* Rules on Metering Standards, Communication Technologies, Protection Schemes etc.</li> </ul>
<b>Dispute Resolution</b>	<ul style="list-style-type: none"> <li>* Dispute Resolution process Should Primarily be in Accordance with the Agreements or Through Amicable Settlement</li> <li>* Referring the Disputes to the SAARC Arbitration Council in Case The Member Countries are Unable to Resolve Disputes Through Amicable Settlement</li> </ul>
<b>Taxes &amp; Duties</b>	<ul style="list-style-type: none"> <li>* Countries to Gradually Move Towards a Zero tax Regime</li> </ul>

energy body/ forum (electricity). Therefore, formation of an institutional mechanism such as forum/association/agency of electricity regulators is critical for the success of CBET in South Asian region.

While there is a consensus on the need of a regional regulatory institutional

mechanism for coordination/harmonization of electricity regulations and for developing a regional regulatory framework for CBET in the South Asian region, the time has come to institutionalize the process by formally establishing regional regulatory institutions such as Forum of South Asia Energy (Electricity) regulators or any other appropriate institutions, identifying it's role, responsibilities, structure etc., which is also critical for bringing much needed investment in CBET projects in the south Asian region.



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**Figure 5: International Best Practices on Regional Regulatory Institutional Mechanism**

<b>ACER</b> (Agency for the Cooperation of Energy Regulators)	<b>RPTCC</b> (Regional Power Trade Coordination Committee)	<b>RERA</b> Regional Electricity Regulators Association of Southern Africa	<b>ECOWAS Regional Electricity Regulatory Authority (ERERA) in West Africa</b>
ACER in European Union Issues Non-binding Opinions & Recommendations to National Energy Regulators, Transmission System Operators	RPTCC in Greater Mekong Subregion High Level Body Responsible for Coordinating & Guiding the Market Development	RERA in Southern Africa (SAAP) Responsible for Cooperation on Regulatory & Contractual Aspects Through Common Set of Regulatory Guidelines	Ensure the Regulation of Interstate Electricity Exchanges & to give Appropriate Support to National Regulatory Bodies or Entities of the Member States.
<ul style="list-style-type: none"> <li>• Fosters Cooperation Among European Energy Regulators,</li> <li>• Ensures Market Integration &amp; Harmonisation of Regulatory Frameworks</li> <li>• Formulates Framework Guidelines Related to Regulation on System Operation, Connection &amp; Capacity Allocation etc. leads to network codes.</li> <li>• Harmonization of Transmission Tariff</li> </ul>	<ul style="list-style-type: none"> <li>• Specifying Basic Rules &amp; Guidelines for Power Trading Among Parties</li> <li>• Providing Recommendation for the Overall Policy &amp; Day-to-Day Management of Regional Power Trade.</li> </ul>	<ul style="list-style-type: none"> <li>• Regional Guidelines for Regulating Crossborder Power Trading.</li> <li>• Making Compatible Regulatory Decisions</li> <li>• Approving Crossborder Agreements in Transit Countries Promoting</li> <li>• Transparency in the Regulation of Crossborder Trading</li> </ul>	<ul style="list-style-type: none"> <li>• Framework for Cross Border Electricity Trade.</li> <li>• Regulatory Coordination &amp; Harmonization of Regulations.</li> <li>• Various Regulation &amp; Guidelines Related to the System Operation, Transmission Tariff etc.</li> </ul>