SAARC cross border electricity trade (CBET) through the Exchanges

South Asia has seen a phase of extremely high growth in the past decade, but the lack of adequate sources of energy in the fast growing region is acting as a roadblock. At this stage to continue the growth story, an urgent need is to cater to the increasing demand and one way to achieve this is by integrating the South Asian Energy markets. With seasonal Hydro availability and stagnant natural gas production and expensive oil imports, it has become critically important to look for alternate resources resulting from higher regional cooperation. The countries in their individual capacities may not be able to mitigate the energy constraints, but the potential lies in the diversity of the resource base; with large untapped hydro capacity in Bhutan and Nepal against a small local demand, huge base of thermal plants in India, lignite and coal reserves in Pakistan and Bangladesh respectively, which along with other complementarities present in the power demand can be optimally utilised to serve the regional requirements and manage the growing energy needs. To harness these complementarities present in the power systems of the South Asian countries, cross border transmission capacities are being developed between India and adjoining countries.

The table below provides the transmission connectivity status and electricity transactions presently happening between India and other countries:

<table>
<thead>
<tr>
<th>Country Pair</th>
<th>Existing Interconnections</th>
<th>Volume traded</th>
<th>PPA/PSA</th>
<th>Expected Interlinks</th>
</tr>
</thead>
<tbody>
<tr>
<td>India– Nepal</td>
<td>22 links of 132/33/11kV</td>
<td>~150 MW imported from India by Nepal</td>
<td>Medium Term, commercial transactions</td>
<td>400 kV AC double-ckt lines by 2016 initially charged at 220 kV</td>
</tr>
<tr>
<td>India-Bhutan</td>
<td>400/220kV D/C links</td>
<td>Import by India from 3 HPPs, Dry season support to Bhutan. 6839 MU exported to India in 2012-13</td>
<td>Inter-government Agreement</td>
<td>Grid reinforcement with New hydro projects commissioning.</td>
</tr>
<tr>
<td>India-Bangladesh</td>
<td>HVDC Link</td>
<td>500 MW imported from India by Bangladesh</td>
<td>Long and medium term</td>
<td>Up-gradation of 500 MW link to 1000 MW</td>
</tr>
<tr>
<td>India–Sri Lanka</td>
<td>No Link</td>
<td>No</td>
<td>N/A</td>
<td>500 MW HVDC Bipole line</td>
</tr>
</tbody>
</table>

**Indian markets as a potential hub for CBET**

Indian power system constitutes more than 90% of operating resources in South Asia and therefore, is hub to South Asian regional electricity market. Over the years, Indian power market has attained a good degree of maturity, in terms of liquidity, competitiveness, diversity in resources as well as diversity in demand. The introduction of power trading and establishment of Power Exchanges (PXs) post enactment of the Electricity Act, 2003 are aiding in robust price discovery and absolving counterparty risk. The extension of these exchanges beyond the Indian shores to facilitate South Asian regional electricity trade will provide a fair, neutral and robust price discovery platform and create an orderly marketplace for all the buyers and sellers in South Asia. There is an opportunity to easily plug in other single buyer markets (neighbouring countries) around this Indian hub and such single buyer markets can draw benefit of liquid pool of electricity resources with minimum harmonisation of rules and developing only minimum conditions for allowing trade across the border. Having gained experiences from this phase, through cooperative regulatory forum at regional level, uniform policies can be developed. Later, the day-ahead markets could get integrated with other markets for higher security and reliability of the grid.

Though with limited available transmission capacities after meeting long and medium term contracts between India and its neighbours Nepal, Bangladesh and Bhutan, one would expect a small quantum of cross-border transactions through the Exchange at least till transmission capacity base expands but with these minimal requirements the CBE can access the competitively priced power available in the short term markets in India by utilising the inherent margins present in the
transmission network. Benefits to be expected from developing interconnections and larger regional cooperation include the following:

- Reduction in capital and operating costs through improve coordination among power utilities;
- Optimisation of generation resources with large units;
- Improved power system reliability with reserve sharing;
- Enhanced security of supply through mutual assistance;
- Improved investment climate through pooling risks;
- Coordination of generation and transmission expansion;
- Increase in inter-country electricity exchanges; and development of a regional market for short term electricity trade;
- As per an analysis done by USAID the annual benefit associated with enhanced interconnection between SAARC countries amounts to 3,917 million USD.

Apart from the other benefits associated with enabling cross border power trade through Exchange mode, it would not only supplet the bilateral trade between the SAARC countries but also encourage all forms of trade by giving more choice and inviting more investments in the sector. While long term Power Purchase Agreements (PPAs) provide certainty to buyers and seller, short term market through the Exchange will allow countries to manage the daily variations in load requirements on a 15 min basis since the prices are discovered for every 15 min in the Day-Ahead Market operated by the Exchange.

For further integration of the markets and a single SAARC exchange most of the South Asian countries have to evolve a competitive framework within their country and will need to develop rules for unscheduled deviation, metering, scheduling, trading, open access charges and treatment of transmission charges and losses etc. At the same time, they can frame policies for cross border trade maintaining consistency and neutrality in treatment of national and cross-border generation and demand portfolios.

Globally, countries have also harnessed the resources by integration and operating single electricity market in the short term across borders. The key drivers for such arrangements include greater system reliability, regionally coordinated investment in generation and optimum utilisation of resources for all the nations. For instance, European Union (EU) is establishing a single electricity market across 28 countries. In 2010, Europe introduced Central West European Market Coupling (CWE) integrating 60% of European Power consumption (~1,816 Billion kWh or BU). It is in the process to further integrate 75% (~2,400 BU) of the European Power market by introducing North-West European Price Coupling (NWE). Nordpool Spot, the most liquid platform in the world based in Oslo, Norway, represents the coupled electricity markets in Norway, Sweden, Finland, Denmark, Lithuania, Estonia and Latvia. It trades more than 70% of total consumption in these countries facilitating more than 400 participants.

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