Adequate and reliable electricity supply is crucial for sustained development of economy and also for improving social services. Electricity is not available to about 50 per cent of the population (1.5 billion) of the South Asian region. Rural areas are particularly adversely affected, leading to poverty and health problems. Elimination of poverty and enhancement of quality of life of people, with full opportunities for knowledge enhancement and proper health care should be the core objectives of developing energy market in South Asia.
All the countries in the region of South Asia are endowed with huge energy potentials on the one hand and tremendous opportunities to enhance per capita consumption of energy on the other. One of the primary reasons of extreme poverty in many parts of all these countries is lack of access to commercial energy. In today’s world, electricity and energy in general are needed not only for GDP growth but they have also become essential for proper social sector services like health and education. Per capita consumption of electricity in the region varies from about 900 kWh in India to less than 100 kWh in Nepal. Even in India, in a few states, it is less than 100 kWh. For the region as a whole, it may not be more than about 550 kWh compared to global average of 2500 kWh. Resources are enormous. India has 285 billion tons of coal reserve while its present annual production is less than 600 million tons. It has more than 150GW of hydropower potential, the capacity commissioned is 45GW. Nepal has more than 100GW (it may be even 200GW according to some estimates) of hydropower potential but its developed capacity is less than 1GW.

Thus, while huge energy potentials across the region have remained unharmonised, access of people to energy has been so low that a large segment of population (perhaps the largest group of poor in the world) of the region is facing abject poverty. This is the greatest challenge for these governments. It is, therefore, urgent to talk about, articulate and take forward the idea of South Asian Energy Market.

2. Components of Energy Market

The following main ingredients should constitute and characterise the South Asian Energy Market:

- Compatibility of energy policies of the governments in the region with each other so as to enable and facilitate development of a matured energy market.
• Cost effective and environmentally benign development of energy resources (coal, petroleum, water, nuclear, wind and solar etc.) in the region aimed at accelerated growth and enhanced per capita consumption.

• Strong and adequate infrastructure, including connectivity (road, gas pipeline, electricity transmission system, waterways and port etc.) which will promote and accelerate development of energy market.

• Development oriented regulatory framework in each country compatible with each other.

• Bilateral, sub-regional and regional institutional mechanisms to orchestrate and harmonise various processes—policies, practices, programmes and activities.

3. Challenges for Moving Towards Regional Energy Market

The need is there, natural resources are there, and most likely, the market players along with financial resources could also come forward. But, it is the socio political and diplomatic complexities which have stood in the way so far and continue to do so constraining the process. A few good examples of success achieved recently offer not only a ray of hope but also a few good lessons on how to address these challenges. These lessons, however, by no means, are exhaustive and may not apply in all situations and in all cases. Character of bilateral issues differ, nature of sub-regional problems and considerations are different and magnitude of challenge for overall regional integration of energy development and trade has different dimensions. While there are differences in the nature of challenges, there are also some similarities. All these synthesised together may create a menu for optional strategies.
3.1. Approach towards Developing Energy Market

It is important to evolve approach and strategy aimed at achieving the objective, viz. a full fledged energy market. Following underlying principles and considerations could guide this process:

- Full realisation of the vision will be a long term goal presumably for 15 years. The short term (3-5 years), medium term (5-10 years) and long term (10-15 years) approaches may help in outlining or portraying the nature of different ingredients of energy market (see the section on Components of Energy Market above).

- For different countries, bilateral, sub-regional and regional road maps for each of the time frame (short, medium, long term) can be drawn which can guide in taking the process forward. From time to time these road maps may be reviewed based on ground realities.

- Policy advocacy at country level and regional level will be an important aspect of this initiative.

- An important contributor to this process would be properly structured narrative, which will need to be dynamically reviewed and can also be used for advocacy.

- Informal and formal interactions with political parties, bureaucracy and also NGOs in a well calibrated manner may prove quite effective.

- Role of multilateral agencies like the World Bank may be providing inputs, enhancing knowledge, catalysing the process, creating awareness and generating consensus. A policy statement highlighting long term commitment to finance infrastructure and energy projects, linked to regional energy market, can make a big difference.

3.2. Short Term Road Map for Regional Energy Market

Several efforts made in the last few years have already started yielding results and there are good success stories like Bhutan
Hydro, Bhutan-India Transmission, Bangladesh Cross-Border Transmission and Central Asia-South Asia (CASA) Project etc. In the short term (3-5 years), the following could be targeted:

- Immediate expansion of 500MW High Voltage Direct Current (HVDC) system of Bangladesh which has been already started.
- Taking Bangladesh-India transmission links further including the one at Palatana.
- Mega scale transmission from North-East India via Bangladesh.
- A few sub-regional projects involving India, Bangladesh, Bhutan and Nepal.
- Development of a few large hydro projects in Nepal for domestic use and export.
- A few strong 400 kV transmission links between India and Nepal.
- A few 132 kV transmission links between India and Nepal.
- India-Bangladesh joint venture hydro projects.
- India-Pakistan transmission system and supply of at least 500MW power.
- Larger transmission links between India and Pakistan.
- Transmission link between India and Sri Lanka.
- Joint venture for hydro projects in Bhutan and stronger transmission links.
- Interactions among sub-regional group to arrive at a framework agreement.
- Policy changes in different countries—enabling framework for power market.
- Gas pipeline connectivity between India and other countries; and
- Policy framework on bilateral and regional gas grid.
4. A Few Good Developments in Last Few Years

The last few years witnessed some good developments in electricity transmission connectivity between India and its neighbours which is evident from the following tables.

**Table 1: Existing Electricity Transmission Connectivity**

<table>
<thead>
<tr>
<th>Country Pair</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>India-Bhutan</strong></td>
<td><strong>Tala-Delhi Power Transmission Project:</strong> It includes construction of five 400 kV and one 220 kV double circuit transmission lines of about 1,200 kilometers, with a capacity of about 3,000MW. The project will facilitate the evacuation of power from the 1,020MW Tala Hydroelectric Project (Tala HEP) in Bhutan.</td>
</tr>
<tr>
<td><strong>India-Bangladesh</strong></td>
<td><strong>Bangladesh-India Electrical Grid Interconnection Project:</strong> It includes i. a 40 kilometer long 400 kV double circuit transmission line from the Bangladesh India border to Bheramara, ii. a 500MW back to back HVDC station at Bheramara; and iii. a 230 kV interconnection with the western grid of Bangladesh.</td>
</tr>
<tr>
<td><strong>India-Nepal</strong></td>
<td><strong>Nepal-India Electricity Transmission and Trade Project (NIETTP):</strong> The objectives of the project are i. to provide Nepal with at least 100MW of additional electricity; ii. to establish cross-border transmission capacity of about 1,000MW.</td>
</tr>
</tbody>
</table>
Table 2: Present Situation of Power Trade

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>India-Bhutan</td>
<td>1500MW</td>
</tr>
<tr>
<td>India-Bangladesh</td>
<td>500MW</td>
</tr>
<tr>
<td>India-Nepal</td>
<td>170MW</td>
</tr>
</tbody>
</table>

Box 1: Important Dates of Cross-Border Transmission Project (HDVC)

January 2010: Agreement on 500MW power supply from India to Bangladesh
May 2010: Tender Process (Two stage bid, OBD 1st stage)
February 2011: Loan agreement with ADB
June 2011: Zero date of project contract with M/s. Siemens
July 2013: Commissioning target
October 2013: Commissioning

Box 2: Saving Out of 500MW Power Import by Bangladesh

- 500MW means about 4,000 Million Units of Power.
- Average price per year 6 Tk/kWh.
- Average price of Liquid fuel power 16 Tk/kWh.
- Per unit saving Tk. 10.
- Annual saving Tk. 40,000 million or Tk. 4000 crore.
Table 3: Regional Connectivity—Work-in-Progress

<table>
<thead>
<tr>
<th>Country</th>
<th>Work-in-Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td><strong>i.</strong> Tripura Interconnection: 400 kV to be charged at 132 kV.</td>
</tr>
<tr>
<td></td>
<td><strong>ii.</strong> Expansion of HVDC at Bheramara to 1,000MW.</td>
</tr>
<tr>
<td>Nepal</td>
<td><strong>i.</strong> Strengthening of 132 kV System—additional 150MW.</td>
</tr>
<tr>
<td></td>
<td><strong>ii.</strong> Dhalkebar–Muzaffarpur: 400 kV DC to be charged at 220 kV to give about 350MW. Final Potential—1,000MW.</td>
</tr>
<tr>
<td>Bhutan</td>
<td>5,000MW additional generation capacity and execution—transmission being planned.</td>
</tr>
<tr>
<td>Central Asia-South Asia</td>
<td>1,000MW.</td>
</tr>
</tbody>
</table>

5. Future Possibilities

5.1. Bilateral and Regional Connectivity

There is likely to be major expansion of hydropower generation capacity in Bhutan and Nepal, though its availability may be possible only in the long term. It would be necessary to evolve consensus on policy and regulatory frameworks through consultations among Bangladesh, Bhutan, India and Nepal. In this context, it is gratifying that diplomatic initiatives have been taken to evolve such consensus among Bangladesh, Bhutan, India, Nepal (BBIN) countries. Such sub-regional cooperation could lead to enormous economic advantages to all.
### Box 3: Bilateral and Regional Connectivity

<table>
<thead>
<tr>
<th>Country Pair</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>India-Pakistan:</td>
<td>500MW HVDC—Amritsar (India) to Lahore (Pakistan).</td>
</tr>
<tr>
<td>India-Nepal:</td>
<td>More transmission systems along east to west border.</td>
</tr>
<tr>
<td>India-Bangladesh-Bhutan:</td>
<td>6000/7000MW transmission from North-Eastern states of India via Bangladesh will also evacuate power from Bhutan.</td>
</tr>
<tr>
<td>India-Bangladesh:</td>
<td>Large power project in India with dedicated transmission system to Bangladesh.</td>
</tr>
<tr>
<td>India-Sri Lanka:</td>
<td>Transmission lines.</td>
</tr>
<tr>
<td>Gas Grid:</td>
<td>Bilateral and regional.</td>
</tr>
</tbody>
</table>

In the wake of large scale generation capacity which is in the pipeline, transmission constraints and insufficiency of distribution infrastructure could arise. In the case of Bangladesh, Power Grid Corporation of Bangladesh (PGCB), Rural Electrification Board (REB), Bangladesh Power Development Board (BPDB) and distribution companies need to gear up. Most of them are already preparing to match the evacuation and distribution requirements linked to the power generation capacity. In the next five years, the capacity may rise to 20,000MW and in the next ten years to more than 30,000MW. The transmission and distribution companies of Bangladesh have to plan and develop their networks, preferably to be ahead of generation capacity.

In Bangladesh, more than 10,000MW of additional capacity, based on coal, is likely to be on stream in next five to seven years. Capacity building in terms of training and development of skilled manpower and managers should be a priority area for the policy
planners in the power sector. There is, therefore, an urgent need for creating necessary training infrastructure in the power sector.

5.2. *SAARC Framework Agreement for Energy Cooperation*

In the 18th SAARC Summit at Kathmandu on November 2014, Cooperation Agreements were planned to be signed in many economic and social areas of activities. However, due to lack of unanimity, almost all of these were dropped. Framework Agreement on Energy Cooperation was the only one on which unanimity was achieved and the Agreement was signed. It also shows the importance attached to energy cooperation by top leaders of these countries.

The Agreement opens up enormous opportunities to develop electricity market in South Asia. Its main features are:

- Member states may enable cross-border electricity trade.
- Buying and selling entities may negotiate the terms, conditions and payment security mechanism.
- Work towards exemption from export/import duty, levy, fee etc. for cross-border electricity trade.
- Encourage process of opening up of electricity sector.
- Enable transmission planning agencies of different countries to plan cross-border system through bilateral and trilateral agreements.
- Enable development of coordinated network protection systems.
- Enable non-discriminatory open access to respective transmission grids.
- Enable national grid operators to develop coordinated procedures for secure and reliable operation.
- Develop structure, function and institutional mechanisms to resolve regulatory issues relating to electricity trade.
- Knowledge sharing and joint research in electricity sector.
5.3. Joint Working Group on Sub-Regional Cooperation

The BBIN meeting at Delhi on 30-31 January 2015 discussed the scope for power trade and inter-grid connectivity between the four countries as well as potential for closer cooperation in future power projects. It was agreed that joint efforts would be made to explore harnessing of water resources including hydropower and power from other sources available in the sub-region. It was also agreed to exchange lists of potential future hydropower projects to be undertaken jointly involving at least three countries on equitable basis.

5.4. Underlying Principles to Promote and Develop Energy Market in South Asia

- Have long term vision but disseminate it with caution (it may be seen by some as a game plan of a few).
- Attempt incremental changes aligned to the level of consensus reached rather than being too optimistic.
- Orchestrate positive (or at least neutral) view of all stakeholders. Anyone negative may negate the whole effort.
- Create conditions that India’s approach is on a more positive (somewhat generous) side—likely to get better reciprocation.
- Present only such proposition which is win-win for all—at least to start with.
- Harmonisation of policy and regulatory frameworks of different countries.
- Capacity building support based on proper assessment of needs of each country.
- Bank may support cross border transmission links unrelated to Power Purchase Agreement (PPA) as a pro-active measure.
- Multi-lateral agencies should consider financing such projects in each of these countries which have a regional bias (e.g. hydro projects in Nepal and Bhutan Transmission Interconnections).
6. Conclusion

Energy potential mix located in South Asian countries provides a reasonable rationale to evolve and implement a mechanism of regional energy planning and development. This will not only lead to an optimal mix of cost effective power supply, but will also emerge as a solid answer to the climate change concerns. Highly fossil fuel centric power mix of India, huge untapped potentials of hydropower in Nepal and Bhutan, enormous potential of solar power, wind power and tidal energy in South Asia, need to be captured by such an integrated energy policy. This will require recognition of the need for common understanding, rationale for cooperation and commitment for actions in the overall interest of providing access to power for almost 50 per cent of population in this region who have remained deprived to use commercial energy. Besides, carbon dioxide emission reduction has to be a common goal. Cooperation in energy provides a great opportunity to address this challenge.