

## Energy Cooperation is Key to Economic Development in SAARC Countries

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### Abstract

*Energy is one of the basic infrastructures of any country. It is nowadays the most important issue, which is being discussed all over the world as every country is searching for options to attain self-sufficiency. SAARC region basically is energy deficient and low resource based. Only cooperation among the countries can usher a new era in the energy scenario and provide the only hope in the quest for the energy sufficiency of region. It may be in the form of bilateral exchange or in the form of any other treaties formed by the SAARC countries. The socio-economic development will be a reality to the people of the region if energy cooperation among the countries can be ensured. Energy security in this region will have multifaceted social impacts and benefits. These benefits and impacts will produce synergy in economic growth, poverty alleviation, and human development in the region.*

### 1. Introduction

Energy resources are the lifeblood of thriving economies. As one approaches the subject of energy resources for regional economic cooperation one runs into a host of basic questions aimed at understanding the changing nature, scope and dynamics of regional economic relations. Energy development, interpreted broadly to mean increased provision and use of energy services, is an integral part

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of enhanced economic development. Advanced industrialized societies use more energy per unit of economic output and far more energy per capita than poorer societies, especially those still in a preindustrial state. So energy sector development has now got an extra dimension in the modern world, especially in the developing countries of South Asia.

The South Asian Association for Regional Cooperation (SAARC) was officially founded in 1985 to promote the well-being of the populations of South Asia and improve their standard of living, to speed up economic growth, social progress and cultural development. Set up in 1985, SAARC has long passed its disturbing teen phase and now is more responsible than ever before. The attainment of the maturity of SAARC is reflected in the fact that it has expanded itself by admitting Afghanistan as the eighth member state and giving China, South Korea and Japan observer status. At the Islamabad summit of SAARC, January 2004, a major breakthrough came in the framework on the South Asian Free Trade Area (SAFTA) with promises to gradually turn it to a Customs Union, Common Market and Economic Union. In recognition of the role of energy in development, the Heads of State or Government at the 13th SAARC Summit held in Dhaka on November 13, 2005 agreed to the recommendation of the SAARC Energy Ministers to establish the SAARC Energy Centre (SEC) in Islamabad. The South Asia Regional Initiative for Energy (SARI/Energy) program had already been launched in 2000 to promote energy security through increased trade, investment and access to clean sources of power and fuel. Since then, SARI/Energy has reached out to more than 4000 participants in the region on clean energy trade, energy efficiency, rural energy supply, energy regulation, energy statistics, and private sector involvement. SARI/Energy-sponsored training, capacity building, and networking have contributed to the writing of energy sector restructuring laws throughout the region.

The paper is organized as follows: The present energy situation in South Asia is discussed in Section 2. Section 3 spells out the need for promoting energy cooperation and indicates the factors that prevented energy cooperation in the past. Section 4 highlights the existing level of cooperation in energy and provides a rationale for creating an energy ring in the South Asian region. Section 5 suggests what SAARC governments need to do to promote energy cooperation. Vision-2021 of Bangladesh Government on energy security is explained in Section 6, while the lone paragraph in section 7 concludes the paper.

## 2. Energy Detail in South Asia

South Asia is the most densely populated region with a population of 1.5 billion. The region's energy demand as a percentage of the world's energy demand increased from 2.4% in 1987 to 4% in 1998. The US Energy Information Administration (EIA) estimated a 50% growth in the primary energy demand in the period 1990-98. This figure, however, excludes the traditional forms of energy that account for more than half of the energy demand in the region. Despite this growth in energy demand, however, the South Asian region continues to average among the lowest levels of per capita energy consumption in the world, but among the highest levels of energy consumption per unit of GDP.

Discounting "non-commercial" sources of energy including animal waste, wood, and other biomass, South Asia's commercial energy mix in 2003 was 44% coal, 35% petroleum, 13% natural gas, 6% hydroelectricity, 1% nuclear and 0.3% "other." There are significant variations within the region. Bangladesh's energy mix, for example, is dominated by natural gas (85% in 2008) and there is 3% hydropower, 4% by furnace oil, 4% diesel and 4% by coal, while India relies heavily on coal (52% in 2003). Sri Lanka and the Maldives are overwhelmingly dependent on petroleum (84% and 100%, respectively); Pakistan is diversified among petroleum (38%), natural gas (41%), and hydroelectricity (14%).

The Himalayan countries of Bhutan and Nepal have the highest shares of hydroelectric power in their energy consumption mix at 82% and 37%, respectively, in 2003. South Asian nations are faced with rapidly rising energy demand coupled with increasingly insufficient energy supplies. Most of South Asia is already grappling with energy shortfalls, typically in the form of recurrent, costly, and widespread electricity outages.

**Table 1 : Electricity production in South Asia**

Country	Total Installation in MW	Electricity access of % population
Afganistan	454	6
Bangladesh	5000	33
Bhutan	445	30
India	112058	56
Nepal	552	40
Pakistan	17953	56
Srilanka	1615	64

The demand for commercial energy in India, which by far makes up the dominant share of the South Asian energy demand, is projected to increase by 3.8%-4.3% a year through 2020. In India, there exists a clear seasonality in power generation, particularly in the generation of hydel power. The peak months for hydro power generation are August-September while the lean period is January to June. The thermal plants generation has been mostly designed to match and balance the trough months created by the hydel plants in winter and the pre-monsoon season.

In Nepal, the peak demand of the Integrated Power System is usually during Dec/Jan. This is the period when generation from the hydro power-plants is low. Power demand is maximum during the month of December and is minimum during the month of August. The supply capacity in turn is maximum during the wet months and minimum during the dry months of February/March. The seasonality in energy supply and demand indicates energy surplus. This is where the complementarity in cross border power trade emerges. It is during the period of hot summer months when the Indian system is starved of energy and capacity.

Some estimates indicate Nepal's hydroelectric power potential at 80 million kilowatts—2.6 percent of the world's capacity. Nepal is the major contributor of the Ganga Basin, the five major sub-basins inside. The annual discharge of out-flowing rivers from Nepal to India is about 224 billion cubic meters. In a span of about 100 km, rivers lose a potential height of about 4,000 meters, thus providing a high linear density (33 MW/km).

However, the immense hydro potential in the South Asian region has not yet been fully utilized. Hydro power is the most clean source of energy. So maximum utilization of this very potential is a major challenge. Table 2 portrays the picture of the used hydro potential in South Asia.

**Table 2 : Hydro Potentials in South Asia**

Country	Potential(MW)	Installed Capacity(MW)	Potential Utilized (%)
Afghanistan	23000	304	1.32
Bangladesh	330	230	69.7
Bhutan	30000	1486	4.95
India	150000	36654	24.44
Nepal	42000	545	1.30
Pakistan	30000	6493	21.64
Sri lanka	2650	1332	50.26
Total	277980	47044	17

Bangladesh is said to have a good reserve of natural gas and there are more gas fields to be found. According to US geological survey Bangladesh has gas reserve of 10.6 Tcf. But it has severe electricity crisis during summer as it fails to cope with the demand. The gas is being drawn but it is not becoming adequate for the day to day demand. Now Bangladesh is concentrating on its renewable energy sources.

### **3. Why Energy Cooperation is Needed**

Dynamic growth in the past had been driven by global, rather than regional integration. The intra-regional trade in South Asia was only about 2 percent of its GDP compared to more than 20 percent in East Asia in 2005. Per capita income in the region was still less than \$700 in 2005 and the region's growth has to encompass not merely the services sector (in which remarkable progress has been registered) but also the industrial and agricultural sectors.

The real picture is that only a very small percentage of the hydro potentials have been converted to reality. There will be more crisis for fuel in the immediate future.

Naturally and geographically this portion of South Asia was and is an energy deficient area. In this region there is lack of resources both for fossil fuel and gas. Had there been a single hypothetical country integrating all the areas of the eight SAARC countries, the power crisis might still prevail because the experts said that whatever power potential this region has in store is not sufficient for the entire region. No country is self-sufficient either. So helping each other by exporting power or selling it will not be the unique solution. There must be some sort of power import from relatively sufficient neighboring countries. And here comes the need for cooperation in the field of letting any kind of pipeline or grid through one country to another, other than bilateral import or export and technological support.

- Cross border power trade will lead to:
- Consolidate peace and economic stability.
- Enhance integrity rather than being a source of conflict.
- Free flow of goods, services, business, skilled labor and freer flow of capital.
- Alleviate poverty and electricity access to rural areas.
- Reduce supply cost and system loss.

- Confidence building and generating trust among the countries.
- Effective utilization of natural resources.
- Economy in operation and mutual support during contingencies.
- Bring about large scale transformation in the sectors contributing to economic growth.
- More foreign investment.
- Increase in reliability of power supply.

We can see the high usefulness of power trading in the South African Power Pool (SAPP), which brought South Africa, Lesotho, Mozambique, Namibia, Malawi, Zimbabwe and Zambia under the regional cooperation that has opened a new door in the socio-economic arena in that region.

Nowadays everybody is talking about the growing concern of polluting the nature by the power production systems. As we all know, burning fossil fuel causes lots of harmful effects on environment. Gas is a more clean fuel and hydropower is the most clean above all. So trading in energy now needs to get more attention because it is a sensitive matter. Here's a overview of how much CO<sub>2</sub> is produced in different countries (Table 3). But sacrifices might be made in this case, and solutions will need to be found. Exchanging power can usher a way to safeguard the environment.

**Table 3 : Energy consumption and Carbon Dioxide Emissions in South Asian Countries, 2003**

Countries	Commercial Energy Consumption 1							Carbon Dioxide Emissions (million metric tons of carbon)
	Total (Quadrillion Btu)	Petro-leum (%)	Natural Gas (%)	Coal (%)	Nuclear (%)	Hydro-electric (%)	Other 2 (%)	
Bangladesh	0.61	29	67	1	0	2	0	9.7
Bhutan	0.02	9	0	9	0	82	0	0.09
India	14.03	34	7	52	1	5	0.3	279.5
Maldives	0.01	100	0	0	0	0	0	0.2
Nepal	0.06	49	0	14	0	37	0	0.8
Pakistan	1.91	38	41	6	1	14	0	28.5
Sri Lanka	0.2	84	0	0	0	15	0	3.2
Total	16.84	35	13	44	1	6	0.3	322

Sources: Energy Information Administration, International Energy Database, February 2006.

Here every country should realize and decide upon on its win-win chance over any kind of power trade among the countries. There is benefit for everybody, especially for the people living in this region. There are distinct advantages for South Asian countries to cooperate in the energy sector.

### **3.1 Factors Which inhibited Cooperation in the Past**

The most important among the factors that inhibited regional energy trade in the past relate to political tensions, security issues and past economic policy choices. These factors include:

- Prolonged political tension between India and Pakistan over Kashmir, war like conditions in Afghanistan, internal armed conflicts in Sri Lanka and Nepal as well as the political turmoil in Bangladesh.
- Past pursuit of inward looking, import substitution based policy approach aimed at the elusive goal of national self-sufficiency. This approach regarded energy imports as diluting energy security.
- Lack of cross border transmission links and a lack of adequate transmission infrastructure even for transferring power within the large countries themselves, such as India, Pakistan and Bangladesh.
- Poor operational efficiency and lack of creditworthiness (arising from inadequate tariffs, high system losses and poor collections) of most power utilities in the region, which did not encourage trade among them, as payment risks were perceived as unmanageable.
- Pervasive state ownership of the utilities, their poor earnings and the lack of resources to invest for their own domestic needs, let alone the investments for export.

### **4. Existing Level of Cooperation**

Presently there is no cross border pipeline or trade in natural gas. Cross border electricity interconnections and electricity trade are insignificant except for the following:

- Bhutan's export of 5664 GWh in FY 2007 to India from three hydropower projects with total generating capacity of 1,416 MW constructed with substantial grant assistance from India;
- Import of about 430 GWh (or about 28% of the total supply) by Afghanistan from Iran, Turkmenistan, Uzbekistan and Tajikistan;

- Nepal's import from India of 266 .23 GWh (or 9.6% of its total supply) and its export of 101 GWh (or 5% of its total sales) to India.
- Pakistan's import of about 25MW of power from Iran to the isolated grid of Baluchistan near Gwadar deep sea port.

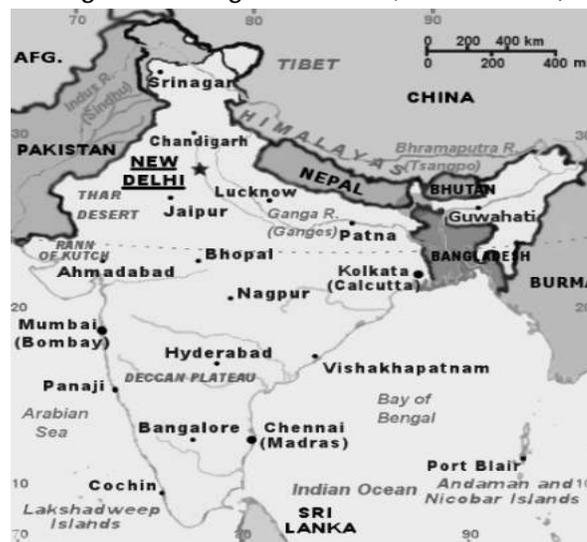
#### 4.1. Energy Cooperation and Creating an Energy Ring

After decades of insignificant volumes of cross-country electricity trade and absence of any trade in natural gas through pipelines among the countries of South Asia, political leaders and businessmen of the region have recently evinced a great deal of interest and enthusiasm in cross border electricity and gas trade, not only within South Asia but also with its neighbors in the west (Central Asia and Iran) and in the east (Myanmar).

So the concept of an “energy ring” has now come into picture and political leaders now realize that to establish a regional energy ring and build an international grid among the countries is necessary. The steady, reliable supply of energy at reasonable cost is one of the key determinants for industrial competitiveness.

A few months ago it would have been unthinkable for Bangladesh to strike any deal on either exporting gas to India or offering a transit pipeline for Burmese gas. Indian officials say with the proposed deal Bangladesh can get a hefty transit fee and eventually Dhaka may also decide to sell its gas. For its part, Dhaka is reportedly trying to extract additional concessions from its big neighbour — like a trade corridor to the landlocked Nepal and Bhutan.

*Figure 1 : Shiliguri Corridor (Chicken Neck)*



The so called “Chicken Neck” or the Shilliguri corridor can play an important role in this case which lies in the state of West Bengal. The city, Shilliguri, is the central node which connects Bhutan, Nepal, north-east India, mainland India and top of Bangladesh. Yes, cooperation through this line is highly a political issue but it definitely joins four countries. So grid transfer and joining by pipeline is possible, at least theoretically.

The two generally accepted power trading mechanisms are:

- i) Bilateral power trade and
- ii) Pool based approach

Cross border power trade on a bilateral basis already takes place widely between India and Bhutan and to a certain extent between India and Nepal. The West Seti power project in Western Nepal is a third type of power exchange which is likely to take place in the region. A unique feature of this arrangement is the involvement of a private agency for the first time as a power generating unit meant primarily for exports to India. This indicates a changing paradigm of power exchange.

The pool based approach also known as agent based integrated simulation can possibly provide support to develop a competitive long run market equilibrium in regional power trade. This approach involves working together of a set of agents (manufacturers), a monitoring, advisory and channelizing regional body in close harmony. These agents develop their own strategies to explore and exploit the capacity and meet other constraints of plant and market. They also evolve their own market clearing as well as settlement mechanisms.

Energy trade opportunities currently being discussed or pursued include:

- Hydropower import from Central Asia to Afghanistan and Pakistan.  
This prominent multilateral trade project is being currently discussed and formulated with the help of multilateral and bilateral development partners led by the World Bank. It relates to the export of 1000 MW of power from Tajikistan and Kyrgyz Republic to Pakistan and Afghanistan.
- Natural gas import by India and Pakistan from Iran (IPI Gas project).  
This project, which is in an advanced state of negotiation, is for importing annually (for 30 years) 33 bcm of gas by India and 21.7 bcm of gas by Pakistan from Iran in two phases. This pipeline can be extended to Bangladesh. Here the decisions are critical and need to be carefully thought about.

- Myanmar Bangladesh India Gas Exchange

India have designed alternative gas pipelines from Myanmar off-shore fields to India—one passing through Bangladesh and the other bypassing that country. Depending on the outcome of discussions with Bangladesh one of these pipelines is expected to be selected.

- Hydropower exports from Bhutan.

Bhutan's unexploited hydropower potential exceeds 23,000 MW and there is a wide shelf of projects to choose from. Feasibility studies for several hydropower projects and many other studies are ongoing.

- Hydropower exports from Nepal.

Construction of two 220 kV links between India and Nepal would help increase the present modest level of power exchange between the two countries and would also enable many of the privately owned IPPs in Nepal to export their surplus power to other countries. Nepal's unexploited hydropower potential exceeds 43,000 MW and it has a large shelf of proposals for run-of-the river and storage projects of large and medium sizes, which have been studied over the last several decades.

## **5. What the SAARC Governments need to do to promote energy Cooperation**

Now the government should find some necessary measure to have some kind of policy established to encourage the power trading. Some guidelines are given below:

- Subscribe to, and become members of the Energy Charter Treaty, as Pakistan has done, in order to place the cross border energy trade on a firmer multilateral footing in relation to investment protection, regulation of cross-border energy infrastructure and flows, provide additional comfort and confidence to all participants, and minimize the political risks to prospective investors.
- Create firm political commitment towards energy trade.
- Transnational energy lines (electricity, gas and oil) for long term should be set up.
- Give attention to adequate training to enhance individual country capability in power sector as well as launch educational program.
- Reduce political tensions within and across the countries, with special

attention to the integrity of transit countries (such as Afghanistan) and the viability and operational stability of their energy systems. Trade flourishes under peaceful conditions.

- Adopt a sustainable commercial approach to trade (rather than a political ad hoc approach) and use standard commercial contracts which allocate risks fairly. Let the private investors and market forces play a major role in actual buying and selling.
- Keep the price expectations realistic based on reliable market signals and ensure that both the buyer and the seller see advantage in the trade.
- To promote private sector investment and public private partnership in power production.
- Cooperation can be in the form of sharing the technology and experience such as India has a good reserve of coal and they have experience in mining, which they can share with Bangladesh, which is facing much difficulty in coal sector.
- Joint procurement strategy can be undertaken for efficient fuel handling and management.
- Adoption of renewable energy systems like bio-gas, solar and wind energy systems must be encouraged.

## **6. Vision 2021 of the Present Government of Bangladesh on Energy Security**

Recently Bangladesh Government has launched a groundbreaking goal for energy sufficiency within the year 2021. This includes the following steps:

- A comprehensive long term policy on energy and electricity will be adopted. Economic usage of oil, gas, coal, hydro power, wind power and solar energy will be ensured. Import of electricity from neighboring countries, arranging 100/150 megawatt gas turbine projects on urgent basis will be done. Power production will be increased to 7000 megawatt by 2013. The Rooppur Nuclear Power Project will be implemented.
- Priority will be given to exploration and exploitation of oil and new gas fields. Arrangements will be made to supply gas in the north and western regions of the country.
- A Coal Policy will be formulated safeguarding national interest. Special initiatives will be taken to ensure economic use of the coal available so far and also to develop coal-based power plants.

Bangladesh Government is very keen to foster cooperation among all SAARC countries to ensure its energy security. The Cooperation and proper nourishing of friendly relations among countries in this region may serve as one of the sustainable tools to ensure the energy security of the SAARC Countries.

### **7. Concluding Remarks**

Energy cooperation is now a demand of time and of the people living in this region, but strong political will of SAARC governments will be needed to forge cooperation in this regard. So peoples of this region along with the political leaders should think and design ways and means for promoting mutual understanding and cooperation, which will pave the pathway for future development of this region.

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