



Energy Cooperation in South Asia: Potential and Prospects

The Background

In 2001, Bangladesh, India and Pakistan accounted for 4.50 per cent of the global primary energy consumption and the rate of growth of energy consumption in the last two decades for South Asia was 5.80 per cent per annum. According to the International Energy Agency (IEA), this region will have the highest growth rate of energy consumption by 2010. Thus, the South Asia region is poised to witness a massive increase in energy demand, as it moves towards high-growth path. But the energy production in the region during the last decade has grown only at 2.33 per cent. Given the low growth of production, the deficit has more than doubled during the last decade, which needless to say, had to be met through imports. Yet, the per capita consumption at present (323 kwh) is woefully inadequate compared to world standards and this in turn seems to have resulted in low-growth equilibrium in the region. Furthermore, enormous losses are incurred during transmission and distribution (T&D), where the bulk of the losses are on account of theft and pilferage. The several Tariff Orders passed by the State Electricity Regulatory Commissions indicated that the actual T&D losses are in excess of 40 per cent in most states of India, which is absolutely unviable compared to the world average of 9 per cent. The comparable figures for Bangladesh, Nepal, Pakistan and Sri Lanka, in 2000, were 31 per cent, 21 per cent, 28 per cent and 22 per cent, respectively. In China and Indonesia, the T&D losses are as low as 6 per cent and 12 per cent, respectively.

The South Asian countries depend on biomass fuels in a major way. But with the growing levels of per capita energy consumption, other sources of energy will have to be exploited and this requires coordinated action by all the member countries. For instance, the

hydroelectricity potential can be fully tapped only if an integrated market is developed. Similarly, gas pipelines are an economically viable prospect for the region, but require transit through more than one country to take advantage of the economies of scale. Thus, the energy sector presents tremendous potential for mutually beneficial cooperation. This is because cooperation among the south Asian countries can lead to the development of regional resources in an integrated manner by exploiting the complementarities and optimal utilization of available resources for the welfare of the region as a whole.

Complementarities in the Energy Sector

The South Asian region comprises of countries with high-energy production potential and fast growing energy demand, which in turn opens up avenues for cooperation. Moreover, the region is also endowed with the technical capabilities and skill needed in the field of energy production and distribution. Thus, the prime movers for cooperation in the energy sector come from the lop-sided and hence complementary endowments among the South Asian countries. Moreover, most of the South Asian countries have the advantage of being located on a single landmass, which is convenient for planning and developing integrated power infrastructure like power grids and gas pipelines. Such a network of electricity grid and gas pipelines will increase energy security in the region, reduce cost of fuel transportation and help in the more efficient harnessing of energy resources. Also, for small countries like Nepal and Bhutan, regional cooperation is indispensable as their domestic demand is limited while the production potential enormous.

The region abounds in some of the principal sources of energy like water, forests, coal and gas. The

RIS Policy Briefs are prepared to communicate results of RIS research on specific policy issues to the policy makers.

This Policy Brief builds on a Chapter of *South Asia Development and Cooperation Report 2001/02* (RIS, 2002).

mountainous terrains of India, Bhutan, Nepal and Pakistan have immense hydropower potential. Bangladesh has abundant reserves of gas and can avail of the opportunity for trade in gas with India whose unmet demand would reach 60 bcm by 2010 and thus, earn \$ 6 billion. Other sources of hydropower export could be Bhutan and Nepal as energy demand in Bangladesh rises with rising incomes from oil exploitation. India is rich in coal reserves and has a well-developed coal industry, which can be used to meet the base load demand for power in the region. This would make gas free for meeting the peak load demands in Pakistan and Bangladesh, working to the mutual advantage of all three countries. Pakistan has greatly increased its power generating capacity based on natural gas through independent power producers (IPPs) and can now supply over 3000 MW power to India. Sri Lanka can optimize power supply through a common power grid owing to its links with South India. Similarly, a common grid could lower the transportation costs for supplying natural gas by pipelines and Pakistan could serve as the gateway for supplying natural gas from Iran and Central Asia.

Natural Gas

Natural gas is being touted as the fuel of the century. Unlike large hydro or nuclear power plants, gas-based plants are more environment-friendly and hence tend to be more popular. It is estimated that the demand in India and Pakistan for gas would be 8 billion cubic feet per day by 2010. While a quarter of this demand could be sourced domestically, the rest will have to be imported. If the recoverable reserves of Bangladesh, India and Pakistan are harnessed judiciously, it could change the energy scenario in South Asia. For the profitable exploitation of gas reserves, markets have to be viewed as integrated, cutting across national boundaries.

Natural gas is available in plenty in Bangladesh, 22.9 trillion cubic feet (tcf) as per latest estimates of which 16 tcf is already proven - enough to supply gas for 40-45 years to the region at the current rate of consumption. But its use is sub optimal and greater utilization would require infrastructure for installations and transportation, which in turn needs massive capital investments. The Bangladesh Government has set up the Gas Infrastructure Development Board to augment gas supply and private investment in this sector. Since 1993, many foreign companies have undertaken exploration and development activities. Bangladesh is keen on using its gas for developing the power sector so that other industries crop up, given the backward and forward linkages. Besides developing gas based domestic industries, export of a small proportion of gas (200 mcf gas per year) to India could fetch an annual revenue of US\$ 400 million thus transforming Indo-Bangladesh bilateral trade. Bangladesh's gas reserves are located mainly in the eastern part of the country. In Eastern India too, there is an imbalance, with extensive

gas reserves in Tripura but deficits in West Bengal, Bihar and Orissa. There is a proposal regarding a joint pipeline from Tripura via Eastern Bangladesh, through Western Bangladesh, on to West Bengal. This could turn out to be a very convenient and cheap route for India and also enable gas transfer between the eastern and western portions of Bangladesh. Gas has also been found in Assam but the distance from markets makes it difficult to sell that gas. Here again, Bangladesh could provide a corridor for the passage of gas. Transporting gas or transmitting gas based power from Bangladesh are two comparable options which need to be investigated.

South Asia is located in close proximity to the Persian Gulf as well as Central Asia, both regions being rich in natural gas. Iran has gas reserves of 741.6 trillion cubic tonnes and Turkmenistan of 102 trillion cubic tonnes. Not only does Iran possess 15 per cent of the world's gas reserves, but is also uniquely located on the transit point for the Caspian and the Central Asian gas. If these countries were to supply natural gas via pipelines, it would cost 35 per cent less than the cost of liquefied natural gas (LNG) in India and Pakistan. Iran is keen on building a 2,670 km long onland pipeline to India through Pakistan as it would provide a cheap route to sell its vast gas reserves. Also Afghanistan, Pakistan, and Turkmenistan met in Islamabad in 2002 to revive the project of building the Turkmenistan-Afghanistan-Pakistan pipeline, with a possible extension to India.

Hydro Electricity

As regards hydroelectricity, a large potential exists in the South Asia region. Bhutan and Nepal possess hydroelectric potentials of 30,000 MW and 43,000 MW, respectively. These can be exploited to export power to India and Bangladesh and earn foreign exchange. Currently the two major hydro power projects in Bhutan are the Chukha (336MW) and Kurichu (60MW). In fact, Bhutan is currently exporting 80 per cent of its energy generation to India, which accounts for 30 per cent of its GDP. In return, Bhutan imports all its requirements of petrol from India.

Bhutan received technical and financial assistance from India for hydropower. In fact, with the export of electricity to India from the Chukha plant, Bhutan was able to redeem the entire cost of the project in five years. The other cooperative projects between India and Bhutan include the 60 MW Kuricchu project in Eastern Bhutan for domestic energy use and the 1020 MW Tala project for export of energy to India. However, for a greater access to Bhutanese power, India will have to upgrade its transmission lines to reach the states of West Bengal, Bihar and Uttar Pradesh and may even need help from Bangladesh to allow a corridor for such lines. Similarly, Bangladesh can also be supplied Bhutanese power through India, especially since Bhutan is expected to add another 1080 MW capacity in the next couple of years. With this expanded

power generation and hike in tariff rates to 2.5 cents per unit under way, Bhutan can earn enormous foreign exchange for its developmental efforts.

It is rather unfortunate that although the SAARC region is rich in hydel power, only a very small proportion (11 per cent) has been exploited so far. As compared to the total hydropower available in the Hindukush-Himalayan region, less than 1 per cent and 1.5 per cent has been exploited in Nepal and Bhutan respectively, 29 per cent in India, and about 13 per cent in Pakistan. India, Nepal and Bangladesh can benefit from mutual cooperation since Nepal has abundant water and India is well endowed with land. If the water systems of Nepal–Karnali, Gandak and Kosi – are developed for hydropower generation, it could ease the quest for irrigation water and waterways for India and Bangladesh. This is especially true because Nepal is seriously developing its hydropower and has recently got a 144 MW hydropower project sponsored by Japan and the ADB.

Thermal Power and Coal

Thermal power is the dominant source of energy in most of the south Asian countries. It accounts for about 92 per cent of the installed capacity in Bangladesh, 73 per cent in India and 69 per cent in Pakistan. India has a large reserve of coal (206 billion tonnes) accounting for about 7 per cent of the world reserves. In India, 72 per cent of coal was used by thermal power plants in 1998. Pakistan is estimated to have 4.35 billion tonnes of measured coal reserves but imports 30 per cent of its demand. As already noted, the energy demand in these countries is likely to record higher growth during the years to come. In this context there is scope for cooperation among countries for their mutual benefit. Bangladesh, for example, could import coal from Raniganj in West Bengal and reap the benefit of proximity because coal can be transported at minimum cost by rail.¹ There is also potential for cooperation between India and Pakistan in electricity generation using coal. A recent study by TERI has indicated that the cost of electricity generation at coal pitheads for India is around Rs 1.50 per Kwh, whereas the cost of generation and transmission in Pakistan is about Rs. 1.77. This shows that there are possibilities for cooperation which could be mutually beneficial. However, for such cooperation to materialize there are certain preconditions, which include, among others, regional HVDC grid capacity systems for independent management and guaranteed payments.

Non-Conventional Energy Sources

A large parts of the population in South Asia live in remote villages, which are inaccessible to conventional sources of energy. Proper utilization of non-

conventional energy sources (e.g. biogas plants, biomass utilization, etc.) would be an appropriate option in such areas. The South Asian region is blessed with abundant sunlight throughout the year. Also, there are large number of locations amenable to using wind energy for power generation. But given the present state of technology, solar photovoltaic cells are cost intensive and require an integrated market to bring down cost through the economies of scale. India has proven capability in the field of wind energy, with its installed capacity of 900 MW, second only to the United States. This capability needs to be shared with other countries in the region where there is potential for tapping wind energy. In the case of Pakistan, for instance, the Sindh province could make use of the wind power by cooperating with India. India is the only country in the world to have an exclusive Ministry for Renewable Energy Development, which has launched a large and ambitious programme on renewable energy. Till 2001, the contribution of renewable energy to total power generation capacity in India was 3430 MW. The estimated potential is over 1,00,000 MW. Much could be learned by cooperation and sharing of experiences in the field of tapping biomass energy and innovation in energy efficient devices.

Some Success Stories

There are a number of success stories in this area, which are worth mentioning. India and Bangladesh have an arrangement for sharing surplus power under which surplus power from the eastern States of India would be exported to the deficient western region of Bangladesh, while the surplus power from Eastern Bangladesh would be exported to the Northeastern States of India.

The exchange of the Instruments of Ratification of the Treaty between India and Nepal on the Integrated Development of the Mahakali River was a significant step towards mutual cooperation. Nepal has set up four hydroelectric projects – Pokhara, Trisuli, Western Gandak and Devighat – with Indian assistance. The power transactions between India and Nepal take place at 17 points along the border with the voltage level fixed at 132 KV for increased exchange of power. India purchases 50 MW of power from Nepal with reliable transmission assured and provides 70 million units of energy, annually, free of charge to Nepal from the Tanakpur power plant. This exchange of power with India has proved to be a great revenue earner for Nepal and these revenues have increased with the signing of the Mahakali Treaty between India and Nepal in 1996.

In Bhutan, the 336 MW Chukha hydroelectric project was set up with technical and financial help from India and its surplus power is now lapped up by the contiguous Indian states. During 1960-80, India also constructed a number of micro hydel projects in

¹ A cost comparison needs to be done between the options of importing coal by rail or thermal power through a grid network.

Bhutan. This is a classic case of gains from cross-border deals, built on the basis of common interest and sovereign equality. These cases show how neighbours, irrespective of their size, can gain from cooperating with India, just by virtue of the size of its market. And, the market is going to grow larger and larger as demand for power increases. One of the success stories is the case of The Maldives, where India and Sri Lanka have imparted skills to the local population through study tours and programmes. HRD cooperation is also taking place between India and Bhutan where Bhutanese engineers and technicians are being trained by India since Bhutan is very much concerned about developing its “white gold”, read hydropower.

Policy Perspectives

Joint Development

The high complementarities in energy production among the South Asian countries result from their varying competitive advantage – Pakistan and Bangladesh have an advantage in gas-based power generation, India has in coal-based, for Nepal it is in hydro-based and Sri Lanka is in oil-based. Thus, the need is to transform the complementarities into each other's benefits. To fulfill such an initiative, creation of an apex energy institution of South Asia comprising of companies like Petrobangla of Bangladesh, ONGC and Coal India Limited of India, Sui Gas of Pakistan and Ceylon Petroleum Corporation of Sri Lanka could be a right step. This apex body may join hands for a comprehensive resource assessment of material, manpower and technology in the region, joint R&D, consultancy and HRD activities and sharing of experiences for mutual benefit. There can also be substantial gains derived from the collective promotion of non-conventional sources of energy. Joint studies should be undertaken for better understanding of the issues underlying energy cooperation.

Information Database

Cooperation among the South Asian countries should steer towards setting up of a data bank for preventing the duplication of R&D, especially in the field of renewable energy. Concerted efforts should also be made for trading and manufacturing in energy products and design capability. The official SAARC process is preparing for a specialized Technical Committee on

Energy with the focus on regional cooperation in energy. An information network should be established for exchanging data on demand-supply gaps, policy changes, market conditions, investment opportunities, energy expertise, seismic, geological and environmental data. The inefficient use of energy should be reduced by having uniform standards for regulations, institutions, energy service, products and end-use equipment. Such an effort will not only boost energy trade but also induce trade in energy-related equipments like motors, pumps, climate control equipment and lighting appliances. Demand side management needs to be looked into on a priority basis and energy audits carried out regularly in energy-intensive industries to make them adopt energy efficient technologies.

SAARC Grid

Yet another proposal for energy cooperation relates to the creation of the SAARC grid. It has been estimated that the demand for power has been growing at the rate of 9 per cent per annum, which requires additional capacity of about 100,000 MW. The SAARC grid is a way out for assuring quality power at low cost, besides ensuring mutual support during contingencies. India already has small transmission links with Bhutan, Nepal and Pakistan.

South Asian Energy Dialogue

Private institutions and industries should contribute in energy management by imparting training in designing, manufacture, installation and maintenance of energy systems. NGOs should come forward for promoting regional confidence and understanding. There is a need for discussion on bilateral energy issues within the aegis of a regional forum including members from Pakistan, India, Bangladesh and Nepal. This could take the form of a South Asian Energy Dialogue (SAED) comprising experts, academics, environmentalists, bureaucrats and NGOs. SAED's agenda will be to examine the potentialities for energy cooperation and how they can be brought to bear fruit. Some of the issues that need to be resolved are related to tariff determination for long term multilateral contracts of energy supply, ownership and contractual arrangements, uniform energy codes, technical specifications and standards for all the countries, and socio and environmental impacts.

RIS Discussion Papers, Policy Briefs and RIS Diary are available at RIS Website: www.ris.org.in



RIS

Research and Information System for the
Non-Aligned and Other Developing Countries

Core IV-B, Fourth Floor
India Habitat Centre
Lodhi Road, New Delhi-110 003, India.
Ph. 91-11-24682177-80
Fax: 91-11-24682173-74-75
Email: dgoffice@ris.org.in
Website: <http://www.ris.org.in>