

SOUTH – ASIA GROWTH QUADRANGLE COOPERATION IN THE ENERGY SECTOR¹

A. INTRODUCTION

1. When subregional cooperation in the Greater Mekong Subregion (GMS) was initiated in 1993, there was considerable skepticism about its outcome. There were doubts expressed as to whether the GMS countries (Vietnam, Lao P.D.R., Cambodia, Thailand and Yunnan Province of the People's Republic of China) would put aside their differences and historical rivalries and make it work.

2. To ensure acceptance of the idea that everyone gains from working together and to keep the momentum going, the ADB (as the coordinator and the lead donor agency for this initiative) realized that it was necessary to first commence work on those types of projects that would quickly bring in tangible benefits. Clearly, projects associated with the development of infrastructure, tied to development of the natural resources of the smaller countries, were priorities.

3. This strategy has paid handsome dividends. Although a lot of preparatory studies went into the first round of project identification and discussion before the investments started, today, there is overall acceptance that the GMS is a very beneficial initiative, and that it has changed the way the GMS countries do business with each other. Beyond the individual projects which created power and transport links between the countries, there has been a lot of invisible progress in terms of institutional strengthening, regulation, legal aspects and cross-border trade. Further, the major gains for the future lay not so much in the visible projects but in the more invisible achievements like regular policy exchanges, cooperation at the working level and improved enabling sector frameworks for doing business. Cooperation among the GMS countries has gathered its own momentum and aid-agencies are shifting their assistance away from broad policy, sector and project initiatives and into specific issues that hamper cooperation.

4. The GMS initiative has convinced ADB that any group of countries, with the will to interactively develop with each other, can gain from institutionalized regional cooperation. The next potential grouping for regional cooperation is the so-called South Asia Growth Quadrangle (SAGQ), comprising Bangladesh, Bhutan, the eastern and northeastern states of India, and Nepal. Applying the GMS experience, the first task at hand is to identify the physical investments, which will bring about the first investment projects and benefits for the region. On that basis, the other, invisible side can then be developed. Importantly, open discussions need to be initiated that can sensitize all countries to each other's developmental needs, build up confidence in each other's motives and identify barriers to cooperation that would need to be sorted out in each sector.

B. COOPERATION IN THE ENERGY SECTOR

5. An analysis of the economic, geographical and social situation of the SAGQ countries shows that energy demand and supply, or rather the lack of it, plays a crucial role in the economic growth of the countries. Therefore, it is only logical to assume that energy projects, which could be carried out within the new regional framework, would be a priority as they were in the case of the GMS initiative. A brief summary of the demand and supply situation in each country, and an analysis of its comparative advantages and natural resources is presented

¹ This paper has been authored by S.Chander, Senior Project Engineer in the Energy Division (West) of the Asian Development Bank. The views expressed herein are those of the author only and not of the Asian Development Bank.

below. Based on this analysis, specific projects must be identified and a full-fledged distribution analysis of benefits between the participating countries be carried out. Finally, the enabling framework conditions and the groundwork in each country must be undertaken. Only after commercial arrangements have been completed, technical norms agreed upon, and bureaucratic hindrances eliminated, will it be possible to solicit firm financing for the projects.

1. Bangladesh

6. Bangladesh's energy use in the year 1999 was equivalent to 200 Million Tons of oil equivalent (MToe)² which was met by gas (80 percent), hydro (4 percent), coal (1 percent) and oil (15 percent). This worked out to 97 kgoe on a per capita basis. Self-reliance on primary energy is estimated at about 90 percent. Recoverable gas reserves of about 15 trillion-cubit feet is the only notable domestic source of primary energy. The lack of liquid hydrocarbon reserves means that Bangladesh will have to rely on imported commercial fuels in future to meet the shortfall. The major constraint to the development of its energy resources has been the constraint of finances, especially foreign exchange. Since Bangladesh has a very small industry capability in the sector almost all-key goods have to be imported.

2. Bhutan

7. Despite Bhutan's low level of economic development, its per capita energy consumption is relatively high because its forest resources provide abundant and readily available source of energy. Per capita energy consumption is about 800 kgoe which is the highest in the region. Fuelwood accounts for 77 percent of total energy consumption and for virtually all non-commercial energy consumption. Bhutan has no known oil or gas reserve, and all petroleum products are imported which accounts for about 8 percent of total energy consumption. Bhutan has a gross hydroelectric potential of 30,000 MW of which about 10,000 MW can be commercially exploited. Bhutan's development of its resources is constrained by access to markets. It produces more than enough electricity to meet its demands even 20- 30 years into the future. Currently, it exports most of its production to India.

3. India

8. India's commercial energy use in the year 1996 was 450 MToe. This was met by coal (53 percent), oil (24 percent), natural gas (6 percent), hydropower (16 percent) and nuclear power (1 percent). Self-reliance on primary energy was about 87 percent. During the 1980s and 1990s, annual consumption of coal, oil and natural gas grew by 5.5, 7.6 and 21.5 percent respectively. Hydro-generation grew by 4 percent and thermal generation grew by 11.6 percent during the same period. Economic liberalization has led to rapid industrial growth in India, especially in the south and west of the country, resulting in high electricity demand. Sustained high industrial growth rate will result in heavy dependence on imported fuel and increase the need for development of exploitable hydro potential. The recoverable/exploitable reserve³ consists of coal (74 billion tonnes), oil (732 million tonnes), natural gas (24.2 trillion cubic feet) and hydro (294 TWh/ year). Hydroelectric potential is capable of generating 84,000 MW electricity of which about 30,000 MW is in the SAGQ subregion. India also has prospects of producing substantial wind energy which can partially meet the high growth of demand in the south and western states. Coal deposits and hydroelectric potential are located in the northeastern region of India while the energy demand is growing sharply in the south and western regions of the India. Though India

² Extrapolated from the World Bank's *World Development Report* for 1999-2000, which indicates a figure of 197 kgoe for 1996 with an average growth rate of 0.9 percent per annum, over 1980-1996.

³ World Energy Council, *Survey of Energy Resources*, 1998.

has the potential of substantial self reliance, the uneven distribution of primary energy resources and required mix of primary energy will force India to rely extensively on imported fuel to meet the energy demand of the south and western regions of the country.

4. Nepal

9. Nepal's commercial energy use in 1996 was equivalent to 6.9 MToe which was met by oil (54 percent), hydro (36 percent), coal (9 percent) and imported electricity (1 percent). Commercial energy forms only 9 percent of total energy. Per capita annual consumption of commercial energy was only 39 kgoe, which was the lowest in all the SAGQ countries. Nepal has to rely entirely on imported oil and coal to meet primary commercial fuel need. The country has exploitable hydro potential equivalent to 179 TWh/ year capable of generating about 42,000 MW of electricity. Nepal's oil and electricity demand grew by about 9 and 14 percent respectively in the 1980s and 1990s and is expected to grow at a similar rate in future. To satisfy the demand will require heavy reliance on imported oil. The alternative method of meeting the growing demand is for the country to develop its hydro-potential. Nepal's constraint is both of technology and capital particularly foreign exchange.

5. Cooperation in Energy Development

a. The GMS Experience

10. In 1992, ADB started a technical assistance program for promoting subregional cooperation among Cambodia, the PRC, Lao PDR, Myanmar, Thailand, and Viet Nam, called the Greater Mekong Subregion (GMS). An Electric Power Forum (EPF) was established as a result of decisions taken at the GMS Ministerial Conference held in Yangon in April 1995. The aim was to have an advisory body to the Ministerial Conference as well as to provide an institutional framework for coordinating regional power sector development. The Forum consists of two members from each country, one from the government agency responsible for energy policy matters and the other from the largest national power utility. The Forum has met annually since its inaugural meeting in Myanmar in 1995. Meetings have taken place in Vientiane, Kunming, Hanoi, Bangkok, and Phnom Penh.

11. During this time, from 1995 to 1999, significant developments have occurred in the regional power situation. Cooperation among the members have steadily increased resulting in the development of a number of subregional power projects such as Theun Hinboun and Houay Ho in the Lao PDR, which are exporting power to Thailand. Another project of regional importance, the Nam Leuk Hydropower Project, also in the Lao PDR, has been commissioned in April 2000 and is now exporting its output to Thailand.

12. A number of studies related to regional power sector development have been completed by ADB as well as other multilateral and bilateral agencies under the GMS Program. These include the Subregional Energy Sector Study, which provided initial guidelines for regional power sector development and the Se Kong-Se San and Nam Theun River Basin Hydropower Development, both of which were financed by ADB. Then there is the Mekong Integrated Transmission Study, financed by JICA and implemented by the Mekong River Commission Secretariat and the Power Trade Strategy Study carried out by the World Bank. In addition, feasibility studies on Nam Theun 2, Nam Ngum 2, Nam Ngum 3, and Jing Hong hydropower projects have been

undertaken by the concerned project developers and are at various stages of implementation. Under the GMS Program, we have also studied some national projects of regional significance such as establishing a national grid company in the Lao PDR and the Nam Ngum 500 kV Transmission Project.

13. The latest developments under this program include establishing an Expert Group on Power Interconnection and Trade to advise EPF on facilitating cross-border power trade, adoption of a Policy Statement, later endorsed by the Ministerial Conference in 1999, and commencement of a study to update regional transmission planning.

b. Potential for Cooperation in the SAGQ

14. The SAGQ region has an undeveloped hydropower potential of around 50,000 MW, compared to its 1992 aggregate peak demand of about 10,400 MW and the anticipated peak demand of about 18,000MW by the year 2000 and about 26,000 MW by the year 2010.

Peak Power Demand in SAGQ Subregion (in MW)⁴

Year	Bangladesh	Bhutan	India (E&NE)	Nepal	Total
1992	1,950	19	8,198	216	10,383
2000	2,800	72	15,000	326	18,198
2010	5,000	120	20,000	800	25,920

15. The demand-supply forecast for these countries should be viewed only as broad orders of magnitude. According to current assessments, the scenario over the next two decades is that Bhutan is expected to have surplus in power generation while Nepal is likely to be deficient in the near term but have surplus in the long term. Bangladesh could be surplus if gas reserves are developed fast enough, and the east and north-east regions of India are expected to be surplus but supplying energy to the deficient north, south and west regions beyond the year 2000. The daily demand pattern and generation mix of these countries are also different. Given the pattern of demand, all the countries could benefit in the long term by optimally developing and scheduling their generation capacities in an integrated manner through regional cooperation. This will also help the countries avoid having to build transmission grids across high mountains and major rivers. Trading of electricity would widen the resource base and the market for electricity in the region thereby facilitating development of least cost larger hydroprojects.

16. Bilateral cooperation exists between India and Nepal for the transfer of electricity. Nepal is exporting about 23 GWh electricity to the eastern region of India and importing 60 GWh electricity from the eastern and northern region of India. This is helping both countries avoid the construction of high cost transmission grids across mountainous areas. Nepal is also planning to develop large hydropower projects to meet its own demand and for export of surplus power to India. In January 1996, India signed an agreement with Nepal for sharing the water of the Mahakali River. They have agreed to commission a project report for a 1,200 MW dam on the Kosi River and are discussing a 6,000 MW project at Pancheshwar on the Mahakali River and a 600 MW project on the Burhi Gandhak River.

⁴ Staff estimates.

17. Bilateral cooperation also exists between Bhutan and India for hydropower projects. The Chukha hydro scheme (336 MW) was financed, designed and executed by India for Bhutan under an agreement to purchase surplus electricity by Eastern Grid of India on long term basis. This project has had a major impact on the availability of energy in Bhutan and on the country's exports. Success of this project has led to the commencement of work for the 1,020 MW Tala (Chukha-II) hydroelectric project, planning of Chukha-III (900 MW) project and investigation of 1,525 MW Sunkoshi (Wangchu) project. For longer-term access to sustainable energy sources, Bangladesh could profitably join India and Bhutan in developing hydropower projects in Bhutan.

18. The least cost short-term option for Bangladesh is to import power from West Bengal (India) where surplus capacity presently exists. This will help Bangladesh avoid high investment costs for generation plants. India has installed generation capacity of 12,000 MW in the eastern region. Limited capacity transmission lines can be easily built to transfer power linking the grids in West Bengal and the eastern region of Bangladesh. Cooperation between India and Bangladesh can commence with transfer of electricity on a small scale initially – 150 to 200 MW from the East Zone of India to West Zone of Bangladesh. Simultaneously, Bangladesh may consider exporting about 50 to 100 MW of power to Tripura state in Northeast India from its eastern side. In Tripura, low electricity demand does not justify installation of an economic scale power station. Simultaneously, consideration could be given to develop about 3,000 MW of hydropower in Meghalaya and Arunachal Pradesh states of India to supply Bangladesh.

19. Notwithstanding the potential for developing hydropower in the Northeast states of India, cooperation in small-scale power transfer will benefit both Bangladesh and India. The feasibility of such a power exchange project is being supported by ADB under the India - Bangladesh Electricity Exchange Project.

20. Natural gas is the predominant hydrocarbon sector in Bangladesh, which has proven recoverable reserves of about 15 trillion cubic feet.⁵ The country has successfully invited private sector participation in the upstream side through production sharing contracts. This has, however, led to constraints on “monetization” of the additional gas produced on account of the limited market for gas in Bangladesh and the unavailability of foreign exchange to pay for the repatriation of profits. This constraint can only be overcome by exporting a limited amount of gas to India to help pay the sector's dues to the production sharing contractors as well as for the development of the transmission and distribution systems and gas market in the country.

21. A key factor in the development of natural gas sector in Bangladesh is that, till now, it had been confined to the eastern part of the country. This had widened the economic disparity between it and the western parts of the country. With the commissioning of the Bangabandhu Bridge and the 30-inch gas pipeline across it, potential has been created to develop gas markets in the western areas also. Studies have indicated potential for establishing fertilizer and cement factories for domestic consumption of these commodities, apart from domestic and commercial consumers in the western side. Such an expansion would also lead to reduction in deforestation and better environment management in cities as well as saving on imported liquid fuels currently being used in these areas.

C. PRINCIPLES OF COOPERATION

22. Based on the experience gained by ADB in the GMS, the following broad principles have emerged for success in moderating planning and execution of projects. They are:

⁵ This estimate is expected to rise sharply in the future after completion of prospecting by international oil companies that have entered into PSCs with the Government for prospecting and development of natural gas.

1. Implementation

23. There is a tendency for cooperating countries to treat cross-border projects as special projects which need more political rather than commercial decision making. This is not true. While the governments of the participating countries make policy decisions whether or not to cooperate in a particular sector, micro project planning and execution should be left to commercial organizations. The governments concerned should provide the political umbrella by way of enabling agreements covering the sector as a whole. The project deal-making itself should purely be commercial if it is to be self-sustaining in the long-term. Commercialization, coupled with distancing of the governments from the deal-making, also makes the deals transparent, and the sponsors accountable for their commercial decisions. It has to be borne in mind that subregional cooperation is, at least in the first phase, essentially economic cooperation, not a political one. Depoliticization of deals also suppresses unnecessary national prejudices and facilitates focussed discussions.

2. Policies

24. Once it has been decided that a particular project or sector will be a candidate for subregional cooperation, the participating countries have to analyze their respective laws dealing with the subject, analyze them with reference to the concerns the other countries may have, and after discussions with stakeholders, both inside and outside the country, seek to amend them so as to facilitate subregional cooperation. It must be noted that although such plans should be long-term and comprehensive in order to enable stable sector policies for at least some time, such policies must also be flexible enough to accommodate possible teething problems that may arise in the first few years of its implementation. Key to the success of such policies will be that they are transparently implemented with basic objectives behind their framing kept in view, rather than a narrow interpretation based on the letter. Other pitfalls to be avoided are the tendency to make the policies too long-winded and obscure, and not finalizing the policies by having endless debates, both in the name of comprehensiveness. Lest it be forgotten, the “perfect” is generally the enemy of the “good”. Simplicity and transparency in underlying policies go a long way to generating interest in projects.

3. Social Acceptability

25. The worst that can happen to any large infrastructure project, is for it to stall halfway through its implementation. This pushes up costs making the project financially unviable, even after its eventual completion. Often such delays are caused by inadequate planning on addressing social concerns related to the project, which are complicated by perceived concerns (quite often mistakenly) that the costs are being borne by one country while the project benefits another. Hence, when an infrastructure project is planned, it is better to spend time upfront in ensuring a wider debate among stakeholders and a genuine attempt to mitigate valid concerns.

4. Sharing of Benefits, Costs and Risks

26. It goes without saying that no subregional project can be taken up if there is no benefit to each participating country. But the benefits may not be in the same areas. For example, a project to export hydroelectric power from Nepal to India, has different benefits to the two countries. To Nepal, it could mean expansion of its markets and sharing of developmental risks, which could make implementation of a large project possible. To India, it could mean an increase in its resource base, and a competitive source of power. Benefits need not even be in the same area or sector. A hydroelectric plant in Nepal may simply benefit India and Bangladesh through flood control and increased navigation, and thus be worthy of support.

27. An important criteria for success of cross-border projects is an appropriate risk-reward allocation between the participating entities. Since these projects are typically long-term ones, short-term benefits should not be the goal. A sense of injury or being cheated in a participant would spoil development of further projects in the sector for a long time, and vitiate the atmosphere which could affect all the sectors.

28. Finally, the key test of a good project is whether it supplies goods/ services at a competitive rate, vis-à-vis the rest of the world. In today's increasingly globalizing economy, simple comparison's with the best in the participating countries is not sufficient. Subregional cooperation is also a vehicle for development, of doing away with conventions and dogmas that exist in any one country and looking at issues with a fresh and open mind. Hence, efforts should be made to establish projects to international standards of efficiency.

5. Project Issues

29. Experience in the GMS and elsewhere has shown ADB that the following types of issues need to be discussed and sorted out early on in the development of the project so as to ensure smooth and speedy implementation.

- (i) Legal framework;
- (ii) Structure of taxes and duties;
- (iii) Technical and commercial standards;
- (iv) Environment and social considerations;
- (iv) Risk-reward allocation; and
- (iv) Pace of development.

Each of these issues are sector and project specific, and also are dependent on prevailing conditions in the regions/ countries where the Project is situated.

D. CONCLUSION

30. Experience has shown that regional cooperation is beneficial but slow to organize. Therefore, the first candidate projects should be those that have high priority in the smaller countries and also have shorter-term gains that are visible. Great potential exists for cooperation in the energy sector in the South Asian Growth Quadrangle comprising Bangladesh, Bhutan, Nepal and the Eastern and Northeastern regions of India. However, several issues need to be addressed in order to make this cooperation structured and equitably beneficial to all participants. It is not necessary that all beneficiaries need be benefited in the same manner or even to the same extent, and this needs to be reflected in the costs to be borne by each participant.