

## **Chapter 6**

### **GOVERNMENT ACTIONS AND INITIATIVES FOR PROMOTING ENERGY TRADE**

In the previous chapter, the various potential opportunities for trade in electricity and natural gas both in the eastern and western energy markets were outlined. Studies and preparation for most of the related projects have either already been completed or are under way at different stages. Based on the status of preparation, it would appear that the regional trade projects for priority consideration and action would include: (1) Central Asia-South Asia 1000 MW electricity trade project; (2) West Seti Hydropower project in Nepal; (3) Iran-Pakistan-India gas pipeline project (4) strengthening transmission interconnections between Nepal and India (the 220 kV transmission line projects)<sup>72</sup>; and (5) the “four-borders” project to link the power systems of Bangladesh, Bhutan, India and Nepal. Further analytical work may help to identify specific priority projects on the basis of quantification of economic and environmental benefits (see Appendix 4 for some initial impressions of possible benefits).

Regional trade in electricity and gas should be an important element of a solution to address the mismatch between demand growth and energy resource endowments in South Asia and its neighbors. The trade deals and cross-border projects could be arranged even under the present circumstances and under different levels of development or sophistication of the sector policies, structure, commercial conditions and regulatory arrangements. Trade is essentially a function of the opportunities of arbitrage when lower cost surplus energy is available in one country for sale to another with significant supply deficits and with higher marginal economic costs of alternative supply. Poor commercial performance of the buying entities in the importing country could be mitigated, e.g., through sovereign guarantees, as is being done in the cases of IPPs. Lack of financial and technical resources in the export country can be handled through partnerships with international private sector and measures to attract such investors. Absence of or imperfections in regulatory arrangements could be managed through appropriate contractual instruments (“regulation by contract”). Similarly, other risks can be handled through project-specific arrangements, rather than wait for development of a general trading framework.

Trade commenced with a single bilateral contract or agreement could in course of time evolve into an increasingly integrated regional market through a series of bilateral and multilateral contracts, based on the experience and confidence level gained under each of the transactions, and as the sector reforms advance and capacity for sustainable trade grows. Such “bottom-up” approach, starting from individual bilateral (or multilateral) projects would allow for better risk mitigation through learning and experience and lead to a more integrated, increasingly commercial regional market, to the benefits of all participants. The governments therefore should focus early on the factors which encourage the emergence of the simpler forms of trade (such as bilateral trade), and later, on the factors which would help to sustain and expand such trade and to enable its evolution into multilateral, market oriented and more complex forms of competitive trade.

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<sup>72</sup> The first line will connect Butwal (Nepal) and Ghorakpur (India) and the second will connect Dhalkebar (Nepal) to Muzafferpur (India).

## **6.1 Facilitate Emergence of Trade**

While the energy projects listed in the previous section, and possibly some others, could be implemented under the present circumstances, to facilitate a more vigorous pursuit of regional trade opportunities, the governments may have to focus in the near term on a number of measures, as described below. These measures would signal to the investors the clear political commitments of the governments and would contribute significantly to the mitigation of key risks for investors in such trade projects.

### **6.1.1 Energy Trade to be perceived as Enhancing Energy Security**

National energy policies should analyze and demonstrate how cross border energy trade would actually enhance energy security, by diversifying the forms of energy (fuels) and the sources of supply, apart from augmenting supplies *in the time frames needed* and in a least cost and environmentally sound manner.

The Integrated Energy Policy Report of the Expert Committee of the Planning Commission of India published in August 2006 after a detailed public review process, for example, advocates clearly (a) import of coal not only whenever there are shortfalls domestic supply, but also whenever imports are cost effective; (b) imports of LNG from different sources (c) reduction of supply risks by policy coordination among importing and exporting countries by importing gas through pipelines or getting hydropower from neighboring countries. It views gas pipelines as providing greater security of supply, as the supplying country which usually builds the pipeline has vital stakes in maintaining the supply, as pipelines, unlike the LNG tankers, can not be diverted to other consumers. To find alternate buyers along the route would be normally difficult.

Pakistan's energy documents, likewise, clearly consider electricity imports from Central Asia as an important, cost effective, and timely component of its supply options to meet forecast demand. They also seem to advocate import of piped gas from Central Asia, Iran, and Qatar, as well as LNG imports to meet anticipated decline in domestic production of gas.

Bangladesh on the other hand is somewhat ambivalent about its gas or electricity export ambitions.

Nepal and Bhutan policy documents prominently consider hydropower export as an important source of income for their economies and a major driver of their economic growth, though the former is trying to operationalize the concept for long without much success.

Sri Lanka has looked upon electricity interconnection to the Indian grid as enhancing its energy security, though as a relatively last stage option. Afghanistan has clearly recognized electricity import as a key strategy for consolidating its war damaged economy.

Myanmar has been pursuing the policy of building hydropower projects for electricity export to Thailand and export of gas to Thailand for several years now. It is also looking at export of hydropower and gas to India

The governments may yet need to publicize widely their policy choice and its rationale within their countries and build a base of popular support for the trade policy and the

sector reforms such a policy choice implies. The evolution of such a political consensus within the country and a political commitment to trade greatly helps to conclude successful trade deals. This seems to be rather important in Nepal and Bangladesh.

### **6.1.2 Encourage the Private Sector to Play a Greater Role in Cross-Border Investments and Trade**

The countries with export potential (such as Nepal, Bhutan, Tajikistan, Kyrgyzstan and Myanmar) do not have the public financial resources to make the capital investments in the export projects and may have to rely on foreign investors for the construction and operation of the export facilities. Since the countries themselves do not have much access to the world capital markets and do not enjoy investment grade credit rating, they may need special assistance from the IFIs by way of guarantees and other mechanisms of credit enhancement to access the capital markets. Especially in respect of hydropower projects and dedicated export transmission lines a public-private-partnership type approach may work best. It would be advantageous for any government to select such private partners on the basis of open competitive bidding based on criteria such as their ability to provide investment funds, managerial know-how, successful experience in similar transactions, and credibility of the proposals in terms of construction, operation, export marketing and export prices. It may also be advantageous to associate IFIs in identifying and formulating projects and preparing the bid documents for the issue of RFPs and the evaluation of the received proposals, as environmental aspects (including climate change concerns), resettlement issues, and benefit sharing issues will have to be dealt with adequately in these stages. Governments could also consider proposals initiated directly by entrepreneurs, provided such proposals address adequately all the above concerns. Governments need to create a liberal policy environment conducive to attract and retain such foreign investment. There should be clarity and consistency on royalties on water use, taxation of electricity sales, corporate tax on profits and remittance of post tax profits.

Similarly in respect of transmission lines dedicated for exports such as in the case of the CA-SA 1000 project public-private-partnerships should make it more practical to ensure a neutral transmission operation.

### **6.1.3 Seek Accession to Energy Charter Treaty**

In order to attract private investments in the energy sector for export production and transmission as well as to provide a level of comfort and confidence for the trade partners, it will be useful for the countries in the region to accede to the Energy Charter Treaty.

International trade is carried out under the framework of the treaty, rules and regulations of the World Trade Organization, which supplement and influence the national rules. In order to accede to WTO, each country has to harmonize its laws, rules and regulations with the WTO framework.

A similar organization to provide the multilateral framework specifically for the energy sector cross-border trade and investment has come into existence since 1991 when the Energy Charter Declaration was made. The Energy Charter Treaty provides a broad multilateral framework of rules governing energy cooperation. The fundamental aim of

the Energy Charter Treaty is to strengthen the Rule of Law on energy issues, by creating a level playing field of rules to be observed by all participating governments, thus minimizing the risks associated with energy-related investments and trade.

The Treaty's provisions focus on five broad areas: (i) the protection and promotion of foreign energy investments, based on the extension of national treatment, or most-favored nation treatment (whichever is more favorable); (ii) free trade in energy materials, products and energy-related equipment, based on WTO rules; (iii) freedom of energy transit through pipelines and grids; (iv) reducing the negative environmental impact of the energy cycle through improving energy efficiency; and (v) mechanisms for the resolution of State-to-State or Investor-to-State disputes.

The Energy Charter Treaty and the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects were signed in December 1994 and entered into legal force in April 1998. To date the Treaty has been signed or acceded to by fifty-one states plus the European Communities (the total number of its Signatories is therefore fifty-two). The Treaty was developed on the basis of the Energy Charter Declaration of 1991. Whereas the latter document was drawn up as a declaration of political intent to promote energy cooperation, the Energy Charter Treaty is a legally-binding multilateral instrument, the only one of its kind dealing specifically with inter-governmental cooperation in the energy sector.<sup>73</sup>

The Treaty is open for accession by any country that wishes to participate, that is ready to take on the obligations in the Treaty, and whose application is accepted by the Energy Charter Conference. In order to join the Energy Charter Treaty, a country has to take the first step of signing the 1991 Energy Charter Declaration thus committing itself to the principles of the Charter. By doing this it becomes an observer to the Energy Charter with access to all its meetings and documents. The next step is the actual accession for which the country and the Energy Charter Secretariat must assess the compatibility of its domestic legislation with the provisions of the Treaty. Once the assessment reports are found satisfactory by the Energy Charter Conference, the country is invited to accede to the Treaty and become a full member.

While the Central Asian Republics are already members, Afghanistan, Iran, Pakistan and China are observers.<sup>74</sup> India is believed to have initiated action to become an observer. Bangladesh, Bhutan, Nepal, and Sri Lanka are not yet associated with this Treaty. Since they have substantial potential for energy trade and the need for cross border investments and for attracting capital for such investments to enable and sustain trade, it will be advantageous for them to become members of the Energy Charter Treaty. In particular, the membership of the regional countries in the Treaty would greatly facilitate the private investors in the region making investments at home and abroad to create regional energy import or export opportunities.

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<sup>73</sup> For further details, see [www.encharter.org](http://www.encharter.org).

<sup>74</sup> Pakistan has recently been made a member of the Energy Charter Treaty.

#### **6.1.4 Pay Special Attention to the Integrity of the Transit Countries**

When energy trade takes place between two countries separated by a third country – referred to here as a transit country – it is necessary to ensure the integrity of that country and its facilities to enable and sustain trade. By virtue of its location, Afghanistan is a key transit country for the Central Asia-South Asia energy trade and it is in the interests of all the potential participants to ensure the integrity of that country and the viability and operational stability of its energy systems, by providing maximum possible cooperation, assistance and funding. The sooner Afghanistan situation becomes peaceful and the sooner its energy systems are restored, the less will be the risk to the energy trade across that country. Pakistan itself will be a transit country when India imports gas by pipeline from Iran or Turkmenistan. Similarly Myanmar has the potential to be the energy bridge between South Asia and ASEAN energy systems and in the context of interregional trade development might need special attention from all participants.

#### **6.1.5 Prepare for the Commercial Approach to Trade**

The existing electricity trade of Afghanistan with Central Asia and of India with Bhutan and Nepal are based more on *ad hoc* inter-governmental agreements than on commercial contracts. In the case of the former, negotiations for the volume and price of supply still appear to be annual event. Enforcement mechanisms for payment defaults and consequences of failure to supply or receive the agreed volume of energy do not appear to have been spelt out. The transactions between India and its neighbors also appear somewhat informal. Prices are renegotiated periodically without reference to any formal PPA and a set of agreed parameters for price escalation. There is some uncertainty regarding the volume of supply. Bhutan appears to have the freedom to consume whatever it needs and have the obligation to supply only whatever turns out to be the surplus. Transactions with Nepal are under an umbrella agreement allowing power exchange up to 150 MW and settlement is on the basis of whatever is actually exchanged. Sustainable large volumes of electricity trade would be possible only on the basis of a formal and commercial footing involving an explicit contract between the buyer and seller. The contract needs to spell out the volume and pattern of supply, metering and billing arrangements, price details as well as parameters and formula for price revisions. It also needs to specify the obligations of the buyer and seller relating to such aspects as payment defaults, failure to supply or receive the agreed volumes of power. It should also contain provisions for dispute resolution and arbitration. Attention has to be paid to developing such contracts with the help of experienced experts and adopt them for trade related transactions.

With the entrustment of the trade with Nepal and Bhutan to PTC limited, India appears to have initiated the process of commercializing its electricity trade transactions with these countries. It is necessary that the relevant organizations in the governments of the region develop the capacity to prepare, negotiate, implement, monitor and enforce such commercially oriented electricity and gas trade contracts. This type of capacity building would be important for all countries in the region and for the relevant countries in Central Asia, but especially so in smaller economies such as Afghanistan, Bangladesh, Kyrgyzstan, Nepal and Tajikistan with notable export potential. It is worth noting that Pakistan has developed this capacity in relation to the IPP transactions based on its range of experience.

### **6.1.6 Keep the Price Expectations Realistic**

Many of the past attempts for cross border investments or electricity trade could not come to fruition on account of the wide and unrealistic divergence between the price-expectations of the buyer and seller. When Pakistan desired to export surplus power to India, the offered price was 7.2 cents/kWh and the counter offer was 2.5 cents/kWh. In respect of power export to India, Nepal had very high price expectations based on the avoided peak power costs in India, while India was considering a price based on reasonable return on investments relating to the generation project. In the absence of reliable economic price signals from the power markets, which had several layers of subsidies masking true costs, negotiations perhaps could not be meaningful. In respect of India, there is now a range of recent cost data relating private hydropower projects, thermal power projects based on coal, gas and diesel. On top of this there is spot and contract market in the national/regional grids which send reasonably representative price signals at the grid level. The UI rate range, contract prices for interstate trading, and regulated prices of centrally owned large generation utilities do provide a valuable database from which one can judge the price appropriate for different area segments of the Indian electricity market. Similar build up of price data and cost signals in each country would be helpful but probably not easy under the present market conditions. In respect of Pakistan the price paid to the IPPs used to be considered a good indicator of the marginal cost, but they may have become outdated. With the improved competitive bidding and contract procedures, fresh bids for IPP supply could perhaps be lower than the prices agreed to earlier.

Trade materializes and is sustained when both sides perceive gain by the transaction. It is therefore more practical to review all price related information with expert help and keep the divergence between the offer and the counter-offer as narrow as possible.

### **6.1.7 Political Commitment to drive the prioritized Trade Transactions**

Good sector policies and supportive environment are necessary for energy trade initiatives, but not sufficient. Continued and consistent political commitment to enable actual investments in energy trade related assets and their sound operation over their economic lives is an essential key ingredient. Each government has to agree on the prioritization among the available trade opportunities and pursue the priority ones with the establishment of empowered joint ministerial level committee of the relevant governments, underpinned by a joint working group dealing with the details of technical, commercial, financial and legal issues and work towards a time table for concluding the overarching inter-governmental agreement under which the actual transaction between the public sector or private sector entities can take place and result in cross border investment and trade. Between the signing of the inter-governmental agreement and the actual trade flow, myriads of problems and risk perception will be encountered and their resolution would primarily depend on the continued and consistent political commitment to realize trade and perhaps the continued use of the joint ministerial level committee and the joint working groups.

## 6.2 Enabling the evolution of competitive Regional Energy Market

In order to sustain and expand energy trade on a sound footing and minimize trade risks in the medium to long term, as well as to promote the evolution of bilateral trade into multilateral trade involving market oriented competitive elements, the sector reform efforts of the governments have to focus on creating more appropriate sector structures with financially sustainable entities and predictable and neutral regulatory environment. The key elements to be pursued in this regard would include the following:

### 6.2.1 Create Technical and Commercial Coordination for Regional Trade

In the regional energy trade there is always a need to coordinate the technical conditions and interconnected operation of two or more systems and the associated transit issues (Box 6.1).

#### **Box 6.1: Interconnection Options for Electricity Trade**

Bilateral electricity trade between two adjoining countries is the least complicated option from the technical point of view. If a relatively small part of one country has power shortage and needs import, that part of the grid is disconnected from the main country grid and connected in the “island mode” to the grid of the exporting country. The frequency of the interconnected grid is then regulated by the exporting country grid. This is referred to as the “synchronous island mode operation”. Trading here would be governed by bilateral trade contracts.

When the grids of the two adjoining countries are compatible and fulfill certain technical criteria (such as principles of voltage and frequency regulation, level of reserve capacities, quality standards of supply to customers, communication and protection systems) they can be fully synchronized and operate on the same frequency and submit themselves to the unified common rules of system operation and control. This is referred to as fully synchronized operation, which maximizes the benefits of interconnection. Trading here would be governed by contracts and the bilateral agreement on grid operation and discipline.

Interconnection of two non-adjacent countries through a transit country or interconnection among more than two countries would call for synchronizing all the connected grids with all the discipline going with such synchronous operation and would thus become more complicated as common criteria for system operation and control will have to be agreed among several parties and observed continuously. Trading here would be governed by contracts and multilateral agreements on grid operation and discipline.

When the systems to be interconnected are electrically incompatible, then they could be interconnected by Direct Current (DC) transmission. Converters in the exporting country convert the Alternating Current (AC) into DC and it is then transmitted through DC line. In the receiving country converters convert DC back to AC for normal supply. Such DC options used to be expensive, but in the recent years costs are coming down due to cost effective technology upgrades. Nonetheless the DC interconnection options are more expensive and would require a much larger volume of electricity transmission to become economic than in the case of AC interconnection.

The Union for the Coordination of Transmission of Electricity is a well known example of an arrangement for coordination of the operation of a number of power systems in Europe. Fifty years of joint activities laid the basis for a leading position in the world which the UCTE holds in terms of the quality of synchronous operation of interconnected power systems. Through the networks of the UCTE, about 450 million people of Europe are supplied with electric energy; annual electricity consumption totals approx. 2300 TWh. It is an association of transmission system operators (TSO) in continental Europe, providing a reliable market base for electricity trade by efficient and secure electric "power highways". Each TSO is individually committed: (i) to a common set of rules for

the operation of the interconnection, its development and reliability standards; and (ii) to support the principles of the common electricity market. There is no supra-regional "UCTE control centre" governing the whole system. Rather, the integrated, synchronously connected grids are operated in a decentralized way, with adherence to strict technical and organizational rules and standards by all UCTE members (For more details, see [www.ucte.org](http://www.ucte.org)).

**Figure 6.1: UCTE Area of Operation in Europe**



Source: [www.ucte.org](http://www.ucte.org)

The volume of electricity exported and imported in relation to domestic generation in a respect of a few select European countries is given in Table 6.1.

**Table 6.1: Imports/Exports (TWh) in Selected European Countries in 2005**

Country	Net Generation	Imports	Exports	Net Exchange as % of Avail. Energy
Austria	63.9	20.4	17.4	4.5%
Belgium	82.3	14.3	8.0	7.1%
Czech Rep.	76.2	12.4	24.9	-19.6%
Denmark	34.3	12.9	11.6	3.7%
Finland	67.7	17.9	0.9	20.1%
France	547.8	7.2	67.6	-12.4%
Germany	533.7	53.4	61.8	-1.6%
Hungary	32.3	15.0	8.8	16.1%
Italy	300.2	49.8	1.0	14.0%
Netherlands	96.0	23.7	5.4	16.0%
Switzerland	57.9	43.9	39.4	7.2%

The EU is currently considering whether there should be a regulatory oversight of the operation of the interconnected system at the EU level in the light of some of the

problems recently emerging. UCTE is not the only model available for this purpose. Other models available for consideration include the reliability councils models followed in North America, NORDEL model followed in Nordic countries, Greater Mekong Power Trade Organization model in East Asia, South African Power Pool model enabling multilateral trading and West Africa Power Pool enabling the optimal use of hydro and thermal generating facilities.

### **6.2.2 Strengthen the Role of Regional Cooperation Organizations**

SAARC had been functioning since 1985. It has constituted a Working Group on Energy to focus on regional energy cooperation. Among other things it has decided to give priority to the creation of an interconnected regional power grid. It may be the most appropriate organization for promoting and facilitating regional trade in energy. It has set up a SAARC Energy Centre (SEC) in Islamabad as the regional institution for the initiation, coordination and facilitation of SAARC programs in the energy sector. It is already working on the concept of Energy Ring covering the SAARC countries as such a ring is perceived by SAARC ministers as a key to promote regional energy trade. It could draw on the technical talents in each country and set up a group of officials who could work with consultants and experts provided under funding by the IFIs to harmonize grid codes and evolve common codes and binding technical procedures for the operation of interconnected grids, perhaps, somewhat on the lines of UCTE. Alternatively the energy center group could study the various models of technical and commercial coordination among interconnected grids mentioned in the earlier section and determine which of the models would fit the South Asian situation best and explore the possibility of evolving such common operational conditions and codes of behavior of the interconnected systems, to facilitate the evolution of regional electricity markets.

This group could also gather the regulators from the member countries and set up a regulators forum to harmonize the regulatory practices among them and also pave the way for creation at the SAARC level a regional regulatory body to regulate the regional electricity and gas trade to the extent such regulation becomes necessary.<sup>75</sup> It may also be productive to arrange for cooperation of this SAARC group with the UCTE secretariat to enable a transfer of knowledge, experiences and best practices in this area. This group should further coordinate its activities with BIMSTEC secretariat and ASEAN energy group to ensure that the interconnection of the Myanmar grid with those of India and Bangladesh is compatible with ASEAN practices. The governments need to make the best use of the existing regional cooperation organizations for the purpose of developing the common rules and operational procedures and codes which should underpin and foster regional energy trade on orderly lines.

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<sup>75</sup> South Asia Forum of Infrastructure Regulators founded in May 1999 with World Bank assistance to serve as a forum for the regulators of infrastructure in the region to exchange views and experience and to provide training and capacity building programs may have a useful role to play in this regard. See its website at [www.safirasia.org](http://www.safirasia.org)

### **6.2.3 Strengthen Transmission Links and Complete the Ongoing Sector Restructuring Process**

In large importing countries the backbone transmission system should be strengthened and expanded to enable imported power to flow to the load centers with demand characteristics appropriate to absorb the imported power. The tariff for transmission service should be fair and transparent.

Going forward, separation of the generation, transmission, distribution, and supply functions, providing open access to the transmission and distribution wire services is generally believed to enable wide spread competitive trade within and across the interconnected power systems.<sup>76</sup> Liberalizing the sector by allowing at least the large industrial consumers (who are forced to pay very high prices for a low quality of supply and thus subsidize agricultural consumers and households in most of the region) the freedom to contract for their supplies with electricity traders or the generating companies is an important step to promote trade.

India is moving rapidly in this direction by creating a new class of licensed electricity traders, increasing the interregional power transfer capacity, enabling third party access in the national and regional grids and creating a power trading market using the ABT and frequency dependent UI charges as well as transparent transmission charges for national and regional grid services. This needs to be followed up by similar reforms by the state electricity boards within each of the five regions and by the state regulatory commissions for maximizing the impact.

The Indian Electricity Act of 2003 obliges the state regulatory commissions to provide transmission and distribution open access within five years to all consumers with a maximum consumption exceeding 1 MW and in a phased manner for other consumers. It also provides for a “cross subsidy surcharge” (to be added to the wheeling charges), to be phased out in line with the phased removal of cross subsidies. These steps designed essentially to promote trade within the country, actually reduce risks for the exporters to India and would accelerate investment in the neighboring countries for exporting power to India. Exporters to India in the next few years should be able to strategically select the area to which they want to sell on the basis of a match between their generation pattern and the demand pattern of the area and be in a position to secure attractive prices. Power from Bhutan which can not be absorbed in the adjoining eastern region of India is being sold a few thousand miles away in the northern and in the western regions.

Similar reforms in Bangladesh and Pakistan would be appropriate and desirable. They need to evolve their own methods based on the structures they have chosen to enable the distribution utilities and large consumers to buy from the generators, traders and importers on the basis of long, medium and short term contracts. Also Bangladesh needs to ensure the autonomous and independent operation of the Power Grid Company and separate fully the distribution function from BPDB. The desirability of separating generation function also from BPDB and allowing it to function purely as a market

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<sup>76</sup> The term “supply” is used to denote retail sales function as distinct from the physical distribution network related functions (construction, operation and maintenance). When the distribution network functions and supply functions are separated and third party access to transmission and distribution networks are ensured, retail consumers could choose their suppliers.

operator should be reviewed. Open access to the transmission grid in Nepal would be needed to enable existing privately owned hydropower projects in Nepal to export their surplus power to India.

#### **6.2.4 Step up the Operational and Commercial Efficiency of the Utilities**

Distribution utilities are the major ultimate bulk buyers of the imported power, and unless they become financially viable and capable of adhering to the payment discipline, it will be difficult to sustain energy imports in the medium to long term, despite the use of transmission companies and power traders as intermediaries. The governments desirous of resorting to sustainable energy trade need to focus on the operational and commercial efficiency of the distribution utilities. Metering, billing and collection efficiencies of the South Asian utilities are far below the industry standards eroding their financial soundness and creditworthiness for trade and investment.

India is trying to tackle this at two different levels. At the central government level the generating companies, the national and regional grid and dispatch operate at industry standards of efficiency. Payment discipline by the state electricity boards to the centrally owned generation, grid services and fuel supply companies has been significantly raised by the one time restructuring of past debts, through bond issue and system of recourse to the state funds in the Reserve Bank for payment defaults (see Section 4.3). At the state level reforms are sought to be achieved through reorienting the Accelerated Power Development and Reform Program (APDRP) to tackle comprehensively the consumer and system metering using smart meters and billing and collection problems through the introduction of better technology and incentives (see section 4.5 for details). The base line data generated by these efforts can also be used to design meaningfully distribution privatization models to achieve viability more speedily. These efforts need to be pursued with determination and with the full cooperation of the state governments in a federal polity. The privatization of the distribution system in the Delhi State seems to have resulted in significant reduction of overall ATC losses and improvement of the sector in the state. Recent attempts by the Ministry of Power and the Power Finance Corporation of India to use outside bodies such as the Indian credit rating agencies CRISIL and ICRA to measure annually efficiency improvements and financial viability of all the electricity boards and rank them on the basis of over a hundred criteria seems to have a salutary effect instilling a sense of competition among the electricity boards to do better. Generation of such reliable evaluative data comparable over time and across the utilities would greatly aid the task of improving their performance and needs to be kept up.

Pakistan has privatized KESC and the performance of the new owners in terms of governance and operational improvements needs to be closely monitored. The nine new distribution companies created in the rest of Pakistan have yet to emerge as entities responsible for their performance. Their finances are wholly in the hands of WAPDA which receives all their revenues and pays most of their bills. Some of the senior managers are still in WAPDA's payroll rather than the payroll of the distribution companies. At current tariffs at least four of the distribution companies will not be viable and the rest will be marginally viable. Though these companies were created as far back

as 1998, the sector still operates largely as vertically integrated. Though financial restructuring had been done through debt to equity swaps, to enable them to have a reasonable balance sheet to start with, the tariff framework, subsidy framework and revised tariffs have not been finalized. The thorny question of whether the retail tariff will be uniform all over the country or whether it will vary as a function of the cost of supply faced by each company has not yet been fully resolved. These matters need to be resolved to make these entities capable of operating in a sustainable manner. Meaningful privatization would be possible only thereafter. NEPRA should have full authority and support to promote efficiency upgrades of the distribution companies through devices such as performance benchmarking. Achieving a measure of financial solvency and payment discipline on the part of the distribution entities is a necessary requisite for sustainable and expanding trade.

In Bangladesh, the distribution operations of BPDB and DESA are still far below industry standards and the institutions are not financially viable. Bhutan's BPC gets a very low price from the generating companies and yet is not financially sound. In all these cases, governance improvement is necessary to reduce losses and improve collection. The arrears of the government agencies and public sector entities must be settled and continued payment discipline ensured.

Programs focusing on the use of GPS mapping, smart meters capable of remote reading (and with ability to disconnect supply to the defaulters through remote controls) and the use of computerized metering, billing and collection system are likely to be productive when combined with effective laws against electricity theft providing for speedy trials and stern punishments. Governance focusing on operational and commercial improvement of the distribution segment appears to be most urgently needed in most of the countries in the region.

### **6.2.5 Adopt Sustainable Tariff and Social Protection Framework**

Electricity tariffs broadly reflecting the true economic cost of supply in both electricity exporting and importing countries is conducive to the financial viability of the parties to the transaction and therefore is also conducive to sustainable and expanded electricity trade. Practically all the countries in the region and its neighbors in Central Asia have levels of tariff well below costs of supply and structures of tariff skewed heavily in favor of households and agriculture. In the case of exporting countries there is a tendency to keep the overall level of domestic tariff substantially lower than the export tariff. In Bhutan, for example, the supply tariff for BPC is only 15% of the export price to India. Such a distorted tariff base will not promote efficient consumption and would soon seriously erode the surplus available for export. In Bhutan things are made even worse by the adoption of a policy of attracting power intensive industries with a low electricity tariff to make up for labor costs and a lack of raw materials. The sustainability and wisdom of this type of industrialization is open to question. These approaches are somewhat similar to those followed in the hydropower rich countries such as Tajikistan and Kyrgyz Republic.

In the countries such as India, Pakistan and Bangladesh (potential importers) tariff below cost of supply and extensive subsidies seriously cut into the financial soundness of the

sector, thereby reducing the attractiveness of the market and eroding the sustainability of trade. Programs to raise the tariffs (in a phased manner over a reasonable time frame) to cover the cost of supply and to minimize the cross subsidies by carefully tailoring the lifeline block and the lifeline tariff and making it available only to the consumers in the lowest block and not to all consumers need to be carefully considered for adoption. Further, subsidies to any particular class of consumers should come directly from the state budget without distorting the price structure. To ensure credible energy accountability all consumers whether subsidized or not (or even if they receive free power) should be metered. *Inter alia*, this is necessary for effective governance of the utility and the sector.

Introduction of time-of-day metering and differentiated peak and off-peak electricity prices at least for larger consumers in all the countries would be helpful not only as a load management tool, but also to trade intelligently for peak or off-peak energy and capacity. These considerations are equally important for importing and exporting countries. The use of smart/intelligent meters providing the remote meter reading capability should be of great help in this regard.

Similarly there is a clear need to reform the pricing of gas in India and Pakistan. In India a very complicated administered pricing mechanism is adopted for the use of domestically produced gas and relatively market oriented approach for the imported LNG. In the context of private investors entering the business with substantial quantities of their own production and in the context of the anticipated large increases in LNG imports and gas imports by pipeline, the pricing approach has to be made more market oriented. Present postage stamp methodology for gas transmission tariff is not conducive to transmission system expansion or for industries to locate themselves closer to the sources of supply. For the domestic gas, re-gasified gas from LNG terminal and the imported gas by pipeline a cost plus regulation needs to be considered. Transmission tariffs should be reoriented to take into account the distance and congestion aspects. More importantly GAIL being the owner of the transport network and the largest marketer of gas is not conducive to competition and nondiscriminatory third party access to the pipelines. Third party access question needs to be sorted out and separation of transmission operation and sale of gas should be carried out to derive the full benefits from gas trade. Further, a medium term strategy needs to be worked out to phase out the massive gas price subsidies enjoyed by the fertilizer and power industries.

In Pakistan gas supply for power at around \$4 per million btu does not appear to be unduly subsidized, while the households and the fertilizer industry are heavily subsidized. Till mid 2006 the price for the lowest block of gas consumption for household had a tariff which did not even fully cover the commodity price of gas. The lowest block then accounted for 85% of the total consumption by households. Corrective action for these appears to have been initiated in the tariff revision of June 2006 when the number of blocks for households was increased from four to five and the new lowest block was defined with an upper consumption limit of 50 cubic meters per month, compared to the previous limit of 100 cubic meters. The rate for the new lowest block has been increased by 5% while all other rates have been increased by 10%. However in the most recent

price revision of March 2007, the prices for all categories appear to have marginally declined, while the structure has been retained. Further reforms towards cost reflective tariffs need to be pursued.

### **6.2.6 Improve the Credibility, Competence and Accountability of Regulation**

Fair, independent and neutral regulatory bodies functioning on the basis of principles incorporated in energy law can be of great help in promoting the health of the domestic energy sector as well as the energy trade. They could ensure the separation of generation, transmission and distribution business and their arms-length and contract-based relationship. They could provide transparent tariffs for transmission and distribution wires services. Apart from the obvious role they play in tariff setting, they could use regulatory incentives and penalties to improve the sector operational efficiency, especially in the distribution segment and help sustainable trade. They have a key role in fostering competition and regulating the power market, which among other things, can buy from and sell to the interconnected adjoining country power systems. They can regulate the orderly functioning of electricity traders. They can ensure the adherence to the grid code and technical standards by all market participants. Sound and efficient regulatory arrangements promote expanded trade in a sustainable manner.

The central electricity regulatory commission and the state electricity regulatory commissions (in 27 out of 29 states) have been operating in India during the last several years. The central commission and many of the state regulatory commissions are maturing rapidly and the Electricity Act of 2003 has provided the basic content for their role in promoting trade and competition and more importantly, for their improved accountability by creating the Appellate Tribunal for Electricity (ATE) to hear appeals against the orders of the central and state regulatory commissions.<sup>77</sup> The existence of such a tribunal is widely perceived as improving the accountability of the regulatory bodies.

Many of the state regulatory commissions still need significant capacity upgrades in terms of modern approaches to promote competition, sector efficiency and trade and in areas relating to finance, accounts and economics. The capacity building task in the regulatory commissions should be the focus of the central government perhaps with technical assistance from the aid-community or through cooperative arrangements with the regulatory bodies in select developed countries.

Gas sector regulation in India still appears to be in the nascent stage and needs to be built on a sound basis.

The electricity regulatory organization in Pakistan would still need substantial improvement in its capacity and the scope of its functions needs to be expanded to include monitoring of the sector performance. Another major area for reform relates to

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<sup>77</sup> The ATE has a chairman with the rank of a Judge of the Supreme Court and three members with the rank of a judge of the High Court. Two of these are to be from the judiciary and the remaining two are to be persons with a distinguished technical background. Each bench constituted to hear appeals must have at least one judicial and one technical member. Since July 2005, when it started functioning, it has decided on 108 of the 249 appeals filed. See the website of ATE [www.aptel.gov.in](http://www.aptel.gov.in) for more information

the fact that decisions on tariff by the regulatory body are not binding without government approval and notification, although the Government may not notify tariffs without receiving the regulator's decisions. Pakistan had succeeded in getting the formal structural reform right. It now needs to put substance in the reform effort and make all the new entities function in the manner they are expected to function, if it has to reap the full benefits of the reform. Bangladesh's regulatory body is dormant since its creation and needs to be made fully operational as soon as possible.

Nepal's regulatory body has only a limited role of fixing the retail tariff of NEA and is not widely perceived to be doing a credible job. In the context of the existing IPPs and the future IPPs wanting to trade directly with export markets, transmission access and transmission tariff questions will gain significance and the regulatory body needs to be involved in providing the answers to them. Also there is a good case for Nepal to have licensed electricity traders. A thorough review of the regulatory system with a view to enhance the scope of regulation and upgrade the capacity and independence of the regulatory body needs to be undertaken and the findings followed up.

The newly created regulatory body in Bhutan from the ministry needs to be made operational soon. The four borders project which seeks to link the systems of Bhutan, Nepal and Bangladesh to the Indian system will make sense in the context of the four countries having autonomous and competent regulation. The autonomy and competence of the regulatory bodies in Tajikistan and Kyrgyz Republic need also to be improved to enable investments needed to increase their export supplies.

Sri Lanka needs to make up its mind on the regulatory reform and implement it before the interconnection project to India materializes to enable meaningful trade in base-load, intermediate-load and peak-load power with India and derive optimal benefits from such interconnection.

For regional trade to expand there should be effective electricity market regulation developed throughout South Asia and its neighbors. For India the basis of such market regulation, including cross border electricity trading, is provided by the Electricity Act of 2003. Similar legislation may be needed in the other countries of the region, broadly compatible with the Indian Electricity Act 2003 and the general principles it is based on.<sup>78</sup> Such compatibility of regulatory frameworks, trading rules and grid codes across the countries is important to foster trade.

### **6.2.7 Make the Best Efforts to Reach International River Basin Agreements and Improve Water Management Capacity and Practice**

The most urgent need of the importing countries of the region is for peaking and load-following capacity, to cope with both daily and seasonal variations in load demand. This need could in part be met by import of power from storage hydroelectric projects. Though the region has significant storage hydropower potential, little progress has been

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<sup>78</sup> See *Indian Electricity Act, 2003- Implications for Regional Electricity Trade* (September 2004) prepared for USAID SARI-E program available at the program's website <http://www.sari-energy.org/> for a further discussion of these aspects.

made with any of them.<sup>79</sup> The focus has shifted heavily towards run-of-the-river projects. While run-of-river schemes are needed and have a number of important advantages (generally lower environmental and social impact; simpler to develop, implement, and operate; lower safety risks; etc.), a disproportionate shift away from storage projects may result in the potentially sub-optimal utilization of water resources, decreased flexibility in managing hydropower production, and more costly balancing of the electricity supply and demand. Hydropower storage projects offer multiple uses and benefits, such as irrigation, flood control, sediment management, drinking and industrial water supply, tourism, fisheries, etc., which often have a higher priority over power generation. They also help manage hydrological variability, the feature which is likely to assume even greater importance over time as the variability could increase as result of climate change.

Storage projects, on the other hand, may also have potentially significant adverse environmental, social and economic impact, especially in the reservoir area and downstream, which needs to be mitigated and which make the planning, design, and operation of such projects a very sensitive matter. The allocation of costs and benefits among the various uses and beneficiaries, and compensating those that are adversely affected can be – and usually is -- very contentious. While in the 1970s policies were adopted to compensate people and communities impacted by such projects (the so-called safeguard policies which mandate that development should “do no harm”), there is an increasing recognition that policies based on the principle “do no harm” are not good enough, and that communities should unambiguously benefit from the exploitation of their territory for hydropower generation. There is experience throughout the world with various benefits-sharing mechanisms, ranging from “one-off” payments and construction of community assets, to streams of payments such as royalties, to equity-sharing. The concept of benefits-sharing can be extended spatially to include regional development or river-basin-wide development.

Clearly, individual reservoir projects on the same river basin cannot be considered in isolation of each other, not when the river basin is within the same country, and even much less so when the river basin crosses international boundaries. Problems relating to reaching agreements on water sharing and benefit sharing, river basin planning, selection of reservoir location and size, reservoir operation and water release regimes, and other issues related to exploitation of international rivers, have to be tackled with determination and a spirit of cooperation, to make any progress in building storage hydropower projects.<sup>80</sup> It should be recognized that, in order to maximize economic and social returns of such a key resource, comprehensive river basin agreements among all relevant riparian governments is necessary for much broader set of concerns than power generation alone, whether for domestic use or for export.

The Indus River Basin Treaty between India and Pakistan with the World Bank in a mediatory role has proven a good example over a period of several decades. It will be advantageous for the governments of the region to undertake similar river basin and reservoir agreements in the areas where the potential storage project sites exist. These

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<sup>79</sup> A notable exception would be the West Seti Storage Hydropower Project in Nepal, which is expected to reach financial closure in the next few months after 12 years of preparation by the sponsors.

<sup>80</sup> See World Bank, *Water and Energy Nexus in Central Asia*, February 2004 for a discussion of these concepts in relation to Central Asia.

agreements should be environmentally and socially responsible and fully recognize the links with global issues (clean energy agenda, climate change, changes in precipitation patterns, the shrinking of Himalayan glaciers with disastrous consequences to the people in the hills and plains). They should also create a framework for meaningful benefit sharing among all water users and riparian states/provinces in respect of projects, built for domestic use or for export of energy and water services. They should further be consistent with regional strategy for the integrated river basin management.

An important issue is building sufficient expertise and institutional capacity to tackle these problems, both at the national and regional levels.

Pricing of hydropower, especially for peaking and firm supply, is another key issue that needs to be properly addressed in order to induce optimal use of water potential for power generation, at national as well as regional level. The resources that can meet peak demand should command higher price, as they have higher value. Similarly, storage projects that could offer some firm power should also be properly compensated, taking into account higher value of such power in comparison with run-of-river generation, whose availability is completely driven by hydrology and is, thus, subject to a greater degree of uncertainty.