



Review of Electricity Laws and Regulations of SAARC Member States

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Foreword

A holistic view of the energy situation in South Asia reveals that optimal utilization of indigenous resources of the Region needs to be prioritized since it would ensure and endure energy security and maximize the socio-economic benefits for the people of this region. Consequently, interdependence in terms of resources and expertise, and sustained cross border power exchanges are the most viable way out for South Asia like rest of the world. No individual SAARC Member State is in a position to cater the rapidly growing electric power demand and further to secure energy security either due to limited financial strength or quickly diminishing energy supplies sources. Energy security could bring invaluable stability in South Asia both in terms of political and development advancement.

Studying and reviewing prevailing electricity laws and harmonizing relevant regulations in the SAARC Member States thus remain the critical pre-requisites for regional as well as bilateral power interconnections to promote competition, rationalize electricity prices and incentivize public and private sector participation in cross border power trade. Through a series of interventions including workshops and studies, SAARC Energy Centre has been working on sensitizing the Member States with the objective with respect to transforming the regulatory regimes seamlessly transcend different power sectors and borders; since diverse sectors would start moving in much needed sync. This study by SAARC Energy Centre is yet another building block in materializing the vision of SAARC heads of state and government for the SAARC Energy Ring. SAARC Energy Centre is highly pleased to acknowledge the funding by the Government of Japan for commissioning this study.

I commend the efforts by the Consultant, Mr. D. N. Raina and the Reviewers M/s T. L. Sankar, Mahendra Kumar Gargin and Rizwan Faiz through this important research study to complement the overall mission of SARC Energy Centre to mitigate energy poverty through creation of SAARC Market for Electricity and Multilateral Energy Cooperation within and across South Asia for a better tomorrow.

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List of Abbreviations

ADB	Asian Development Bank
BERC	Bangladesh Energy Regulatory Commission
BEA	Bhutan Electricity Authority
BPC	Bhutan Power Corporation Limited
BPDB	Bangladesh Power Development Board
BSES	Bombay Sub-Urban Electric Company
CARs	Central Asian Republics
CASA	Central Asia-South Asia
CEA	Central Electricity Authority
CDM	Clean Development Mechanism
CEB	Ceylon Electricity Board
CERC	Central Electricity Regulatory Commission
CNG	Compressed Natural Gas
CPSUs	Central Public Sector Undertakings
DGPC	Druk Green Power Corporation Limited
DHIL	Druk Holdings and Investments Limited
DOED	Department of Electricity Development
GDP	Gross Domestic Product
GOA	Government of Afghanistan
GOB	Government of Bangladesh
GOBh	Government of Bhutan
GOI	Government of India
GOM	Government of Maldives
GON	Government of Nepal

GOP	Government of Pakistan
GOSL	Government of Sri Lanka
GWh	Giga Watt Hour
HVDC	High Voltage Direct Current
IDCOL	Infrastructure Development Company Limited
IGA	Inter Governmental Agreement
IL&FS	Infrastructure Leasing and Financial Services Company (India)
IPPs	Independent Power Producers
ITCs	Independent Transmission Companies
JV	Joint Venture
KESC	Karachi Electric Supply Company
kV	Kilo Volt
kWh	Kilo Watt Hour
LDC	Load Dispatch Centre
LECO	Lanka Electricity Company
MEA	Maldives Energy Authority
MEW	Ministry of Energy and Water
MoEST	Ministry of Environment, Science and Technology
MoICS	Ministry of Industry, Commerce and Supplies
MoP	Ministry of Power
MoPEMR	Ministry of Power, Energy and Mineral Resources
MoP&NR	Ministry of Petroleum and Natural Resources
MoF	Ministry of Finance
MoFT	Ministry of Finance and Treasury
MoU	Memorandum of Understanding
MoWR	Ministry of Water and Resources
MoW&P	Ministry of Water and Power
MMT	Million Metric Tonnes
MNRE	Ministry of New and Renewable Energy
MW	Mega Watt
MWh	Mega Watt Hour
NEA	Nepal Electricity Authority

NERC	Nepal Electricity Regulatory Commission
NLDCs	National Load Dispatch Centres
NGO	Non-Governmental Organization
PGCB	Power Grid Corporation of Bangladesh
PGCIL	Power Grid Corporation of India Limited
PSUs	Public Sector Undertaking
PTC	Power Trading Corporation Ltd.
PUCSL	Public Utilities Commission of Sri Lanka
RGoB	Royal Government of Bhutan
SAARC	South Asian Association for Regional Cooperation
SC	Single Circuit
SEBs	State Electricity Boards
SEC	SAARC Energy Centre
SELF	SAARC Electricity Legal Framework
SERC	State Electricity Regulatory Commission
SFPP	SAARC Fuel Procurement Program
SIFP	SAARC Investment Facilitation Program
SMS	SAARC Member States
SOW	Scope of Work
STDs	SAARC Template Documents
STEM	SAARC Electricity Trading Mechanism
STELCO	State Electric Company Ltd
T&D	Transmission and Distribution
TCF	Trillion Cubic Feet
ToR	Terms of Reference
TSO	Transmission System Operator
UMPP	Ultra Mega Power Projects
WB	World Bank
WAPDA	Water and Power Development Authority
WEC	World Energy Council

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Executive Summary

ES-1: Background of the Study:

South Asia is endowed with hydropower potential of 294,330 MW; coal reserves of 108,961 million tons; large renewable energy resources but relatively small reserve of 95 TCF of natural gas. Despite these resources, access to electricity in the region is very low compared to any other region of world, except for the Sub-Saharan Africa . Despite installed capacity additions in generation, shortages still persist and in certain cases have increased. Frequent and long outages are leading to public outcry and demonstrations that at times have turned violent creating law and order problems. Non-availability of supply has been impacting the economic development and reducing the GDP growth rate of SAARC Member States.

An important feature from the perspective of cross border electricity trade is that the region as a whole has enough resources to meet its electricity demand in the foreseeable future, if it is able to fully develop the available resources. But the spread of these resources as well as the demand patterns are highly skewed. For instance, Bhutan and Nepal have much larger hydropower potential in comparison to their demand and have the potential to export the surplus energy. At the same time, as and when their demand increases, they need to import electricity to meet the winter peak demand due to sharp fall in hydropower generation during winter months. Within the region, the demand for electricity as well as the generation capacity is highest in India followed by Pakistan and Bangladesh. They are in dire need of electricity imports to meet their demand. Even if India exploits its full potential, it will still not be fully able to meet its demand from indigenous sources. The above scenario provides a perfect environment for cross border electricity trade within the region and with neighboring regions.

At present, electricity trade among the Member States is abysmally low, compared to its potential. Cross border transmission interconnections that would help them to partially meet their demand due to seasonal and time-of-day diversity in their load curves are limited in number. The only grids amongst the Member States that are interconnected today are those of India and Bhutan. Member states can bridge the electricity demand-supply gap through the development of their indigenous resources and promotion of electricity trade within and outside regions. While financial viability of electricity trade and the associated infrastructure projects has to be the bedrock for these decisions, economic benefits that add significant value thereto cannot be overlooked.

The study has been launched with the objectives of identifying provisions in the electricity laws and regulations of SMS that might be impeding cross border electricity trade amongst them; to make recommendations for appropriate legal and regulatory changes for consideration of the SMS in this regard and creation of cross border electricity infrastructure to promote and facilitate cross border electricity trade within the region and outside regions.

ES-2: Ongoing Initiatives and Prospects for Electricity Trade in South Asia:

In order to have a better appreciation of the future electricity trade scenario in South Asia, it is essential to take a look at the ongoing electricity trade arrangements of the SMS amongst them and with other countries. A briefly summary of these arrangements is given below:

i. Electricity Trade between Afghanistan and Central Asian Republics (CARs)

Afghanistan meets a major part of electricity demand through imports from Iran, Turkmenistan, Uzbekistan and Tajikistan. Though small in quantitative terms, these imports play a significant role in stabilizing the sector operations in the country. The import volumes rose from 110 million kWh in 2000 to 150 million kWh in 2005 and reached a level of 608 million kWh in 2009.

ii. Electricity Trade between Bhutan and India

As per discussions with PTC ltd.; India imports 1100-1200 MW from Bhutan. New plants are under implementation in Bhutan to enhance the power exports to 5000 MW by 2020. Given the progress of the under construction projects, it is felt that the achievement of this target is well within reach. Electricity trade between Bhutan and India is an excellent example of successful cooperation in the electricity sector in South Asia.

iii. Electricity Trade between India and Nepal:

Fourteen transmission interconnections along Nepal-India border help exchange 50 MW between the two countries in a radial mode. They intend to increase it to 150 MW by building additional transmission systems. The proposed 400 kV Muzaffarpur (India)-Dhalkebar (Nepal) transmission system will interconnect power grids of these countries.

iv. Electricity Trade between Pakistan and Iran:

Pakistan imports electricity from Iran to serve the demand in Baluchistan province. The system is operated in a radial mode. As per the 2002 agreement between the two countries, Pakistan can import up to 39 MW. The actual import recorded was 25 MW in December 2005. In June 2006, WAPDA has signed an MOU with Iran to increase the supply by 100 MW to meet the demand in the Gwadar port area.

v. **Proposed Electricity Interconnection between India and Bangladesh:**

The 400 kV HVDC Bangladesh-India transmission interconnection with a capacity to transmit 1000 MW will be built by 2012. Initially Bangladesh will import 500 MW from India to partly address the significant power shortages in Bangladesh. PGCB, Bangladesh and PGCIL, India will build the respective segments of the line within their respective territories, with a 400 kV HVDC sub-station in Behramara, Bangladesh.

vi. **Proposed Electricity Interconnection between India and Sri Lanka:**

The India–Sri Lanka transmission interconnection will link the national grids of India and Sri Lanka. The project involves the construction of a HVDC interconnection between Madurai (India) and Anuradhapura (Sri Lanka) through the Palk Strait. The link will measure 285 km in length, including 50 km of submarine cables. It will take more than three years to build. The system will have a carrying capacity of 1000 MW.

vii. **Proposed Inter-regional Power Trade between Central Asia and South Asia:**

Central Asian Republics have a large potential to export electricity to South Asia. Tajikistan, Kyrgyzstan, Afghanistan and Pakistan have entered into an agreement to build the CASA-1000 transmission system to help Afghanistan and Pakistan import 1000 MW. Feasibility study for the project has been completed with support from Asian Development bank (ADB) and the World Bank (WB). But of late these institutions are not showing interest in funding the project due to various uncertainties.

Out of the eight SMS, only Bhutan, India and Nepal trade and/or exchange electricity presently, under agreements that predate the prevailing laws and regulation. Being commercial in nature these agreements are not available in public domain; hence cannot be commented upon. It is presumed that since there were no specific provisions in the then prevailing electricity laws and regulations to govern electricity exchanges/trade; these would have taken place on the basis of agreements arrived at between these countries under the provisions of laws governing commodities trade, treating electricity as a commodity in their trade baskets.

ES-3: Review of Electricity Laws and Regulations of SAARC Member States:

A detailed review of all the prevailing electricity laws and regulations of the eight SAARC Member States (SMS) was conducted to identify the specific provisions contained therein that deal with electricity imports/exports and the extent to which these provisions either impede or facilitate electricity trade amongst the SMS. The review was also conducted from the perspective of their implications on creation and operation of cross border electricity infrastructure; reaching commercial agreements to facilitate electricity trade among the SMS and with their neighbors; and how the various provisions in the prevailing laws and regulations will have implications on the creation of an electricity market in South Asia. Findings of the review are summarized below.

i. Findings of the Review of Prevailing Laws and Regulations

The prevailing laws and regulation of the SMS have their genesis in the initiation and implementation of power sector reforms across the region since early 1990's; which brought in structural and operational changes in the sector including setting up of Regulatory Commissions, through the enactment of new legislations. While Bhutan and Nepal incorporated specific provisions to govern the cross border electricity trade in their new electricity laws and regulations, other Member States did not do so. As a result whenever there arises an opportunity for cross border power trade, they resort to the earlier practice of entering in to bilateral agreements specific to each transaction. A case in instance is the recent agreement between Bangladesh and India, wherein Bangladesh will import up to 1000 MW from India.

Smaller volumes of electricity trade can be facilitated by segregating load centers along the border areas from the national grid of the electricity importing country and connecting them to the grid of the electricity exporting country in a radial mode. Import/export of large volumes of electricity require proper technical and commercial arrangements to be put in place; supported by legal and regulatory mechanisms for injecting the imported power into the national grid of the importing country. Non-synchronous operations of the interconnected grids calls for large investment in establishing high-cost HVDC interconnections, which ultimately reflects in retail tariffs that at times, may challenge the economic viability of such transactions.

From the review of the prevailing electricity laws and regulations of SMS, it was observed that no specific provisions, except by Bhutan and Nepal, have been made therein to govern the cross border electricity trade. The law and regulations enacted by other countries deal only with the governance and regulation of electricity sector within the country. Though not directly dealing with cross border electricity trade issues, there are provisions therein that will have implications on cross border electricity trade. These Sections, Sub-sections, Clauses, Sub-clauses, Rules and Sub-rules of the prevailing electricity laws and regulations of each of the SMS, which will have direct and/or indirect implications for cross border electricity trade have been analyzed and commented upon under the respective country profiles in Chapter-III of this report. The major issues that merit attention here are briefly discussed below:

a. Open Access to Transmission Systems

Open access to transmission systems is an essential tool to facilitating free flows of electricity within and across grids. Redundancies in the existing transmission systems will help power imports and also facilitate transit of electricity. As they obviate the need for setting up of new transmission lines to wheel additional electricity flows from the source of supply to the load centers in a given country or for the purpose of providing transit to other countries. This is a big incentive for power traders and utilities.

One of the redeeming features in the prevailing electricity laws and regulations of the SMS is that most of the countries in the region (with the exception of Afghanistan and Nepal who have yet to have electricity regulators), though not specifically from the perspective of cross border electricity trade, have made necessary provisions for Open Access to transmission systems to facilitate their use by sector participants on payment of requisite charges to be fixed by the regulators. While the provision is in the statute, its actual application on the ground has not been satisfactory in India. While the Electricity Act 2003 permits Open Access to transmission systems, but over the years it has been observed that the State transmission utilities have not been permitting Open Access to other participants who wish to evacuate electricity outside the state; in the garb that permitting Open Access will create electricity shortages in the host state, where from the electricity is to flow.

It is, therefore, essential that the member states while formulating the regional mechanism to facilitate electricity trade provide for and implement Open Access to transmission systems in a sincere manner.

b. Restrictions on obtaining generation license in Sri Lank

Section 9 of the Sri Lankan regulation restricts issue of generation licenses to entities other than CEB, local authorities and societies, thereby elimination the participation of private sector in generation. Provisions under Section 10 (1) & (2) mention about exemption from the applicability of Section 9; but the same are not clearly defined. This will act as a dampener for IPPs. Further Section 16 obligates the generators to sell electricity exclusively to transmission licensee thereby eliminating the opportunity to the IPPs to sell electricity directly to third parties within and outside the country. Sri Lanka will have to make necessary change in its laws and regulation if it wants to seek large investments for the expansion of its electricity sector to meet the domestic demand and also to benefit from the regional electricity trade.

c. Regulatory Mechanisms in Afghanistan and Nepal

All other countries except Afghanistan and Nepal have fully functional regulators to govern the electricity sector. Afghanistan will take time to formulate necessary regulation to put in place the regulator for the electricity sector. Nepal is yet to put in place the Electricity Regulatory Commission with full powers to regulate the electricity sector. The bill for the establishment of the regulator is awaiting the approval of the Parliament. Though there is an Electricity Tariff Fixation Commission in Nepal, but its mandate is limited to recommending tariff revision to the GON. Moreover, it has remained non-functional for quite some time due to various reasons. Hence, the regulatory oversight, to the extent it will have implications on the cross border power trade of Nepal with other countries in the region, can be assessed only after the Nepal Electricity Regulatory Commission is established and its role and responsibilities become known.

The major implications of prevailing laws and regulations on cross border electricity trade are given in the next Para.

ii. **Implications of Prevailing Laws & Regulations on Cross Border electricity Trade**

Various provisions in the prevailing laws and regulations for governance, licensing, investment promotion, regulation and tariff setting have implications on adding new capacities, enhancing availability of supply, increasing transmission networks, wholesale and retail tariffs within these countries. Though these laws and regulations do not mention that they will be applicable to cross border electricity trade, but the moment imported power lands in a country, it will be subjected to these laws and regulations, which in turn will have direct impacts on power trade among the member states. Therefore, the laws and regulations prevailing in each country though meant to govern the sector operations within the country will have ramifications on electricity trade and also the decision making for the sector in other countries of the region.

One of the biggest questions today, before the governments in the region is the financial viability of the power sector in each member state, as most of the utilities are losses making. The reasons for that include tariffs that do not fully reflect the cost of supply, high technical and non technical losses, theft of electricity and commercial losses suffered due to poor Metering, Billing and Collection systems¹. The prevailing laws and regulations that were meant to improve the sector performance have either not been implemented in a proper manner or the reform program itself was flawed. Tariff is going to be one of the major issues while negotiating cross border electricity trade transactions. Therefore, the prevailing regulations relating to tariff setting will dictate the success or failure of the cross border electricity deals. So would be the capacity of the member states to attract investments required for the creation of the cross border electricity infrastructure.

a. **Impacts on Project Development and Investment Decisions**

Options of cross border electricity trade will change the dynamics of the domestic electricity markets in South Asia. These options will have implications for generation, transmission and distribution utilities, electricity traders, infrastructure developers and investors including those involved in creation of cross border electricity infrastructure. Cross border electricity trade will create the need for setting up of new transmission systems to handle additional electricity flows within countries, as well as, for providing transit facility for power flows of other countries through their territory. They will also impact the decisions to be made by the power generation and distribution utilities in other countries, as their investment decisions are impacted by the availability of supply and the options to import electricity to meet the demand and export the surplus energy when supply exceeds their demand.

¹ Source: ADB study “Impacts of Power Sector Reforms in South Asia”; authored by D.N.Raina

Project developers and investors look forward to cash flows from projects, whether in generation, transmission or distribution. A larger market that permits free flows of electricity within and outside the political boundaries of the host country, gives more options to project proponents to maximize their revenue streams and minimize the adverse impacts of demand-supply fluctuations in the local electricity market. Such mechanisms also facilitate speedier project development and lower cost of capital resulting in lower cost of generation that can be passed on to the end use consumers.

b. Impacts on Investment Requirement and cost of financing

Provisions in electricity laws and regulations that facilitate cross border electricity trade will impact the overall investments required in the electricity sector in a country. As the demand for electricity can be met not only from the generation facilities located within the host country but also through electricity imports. Similarly electricity exports help nations in attracting large investments to develop their energy resources in an expeditious manner. While the power importing country can avoid making large investment in setting up its own generation facilities, the power exporting country will be able to attract large investments to power export projects. The prime examples of this situation within the region are Afghanistan as an importer and Bhutan as an exporter of electricity.

Lenders closely examine the risks and payment security mechanisms on offer, while funding power projects. These include the risks associated with the failure of the power purchasers to off-take the contracted quantities of power, a situation that may arise due to their inability to pay in time. Export options minimize this risk, thereby making it easy to raise resources at competitive rate for timely completion of projects.

Each power system needs to maintain a spinning reserve to overcome any eventuality of unscheduled shut down of its generation facilities. The need for such a reserve is minimized, if the system operator has the option to import electricity in unforeseen circumstances at short notice; thereby reducing the investment requirement in creating the spinning reserve.

ES-4: Change Required for Cross Border Electricity Trade and Transit:

Trade and transit of any commodity is governed by a set of laws, rules, procedures and regulations. So is true for electricity trade and transit as well. However, an important aspect is that the scientific laws governing electricity flows take precedence over the man made laws and regulations. Therefore, certain technical requirements, operational norms and safety standards have to be met; to avoid power system failure. While each SMS has laws and regulations for smooth management of the power sector operations in the country, there is need to harmonize them with those of other countries in the region to facilitate cross border electricity trade and Transit on a large scale. The need for the same, emanate from the fact that each country has set their own laws, regulations, technical specifications, operational norms and safety standards;

some of which do not match with those set by other countries. The operational and safety standard of the interconnected power grids have to match fully or else technical solutions have to be put in place to overcome the mismatches; thereby requiring additional investments that leads to higher tariffs.

The important requirements that the SMS will have to consider and incorporate in any regional mechanism to promote and facilitate cross border electricity trade and transit in South Asia have been summarized below.

i. Legal Requirements

The regional legal and regulatory arrangements proposed in the recommendations section should provide for: i. Freedom of transit to allow the SMS to wheel electricity through the territory of other member states without unreasonable delays in granting permissions, putting restrictions or through levy of undue charges; ii. Cross border electricity flows to enjoy the same treatment as provided by the host country for its own power flows irrespective of its origin, destination, ownership or pricing; iii. Assurance with regard to non-disruption of supply in case of any eventuality, political or otherwise; iv. Provision of creating new infrastructure in case the existing one is insufficient to meet the requirement; v. Open access to the power transmission systems of the host country to other countries who need to wheel power through their territory, to the extent that:

- the transmission systems have surplus capacities available after taking in to cognizance the requirements for wheeling of electricity for the domestic electricity market and for their own imports and exports of electricity,
- the technical and operational norms of the host country are adhered to by the country that intends to wheeled electricity, through their transmission systems, and vi. Grant the right of way for setting up of dedicated transmission line(s) through the transit State, to wheel electricity between the electricity buyer and the seller Member States, or by a Member State between its two or more regions.

ii. Regulatory Requirements

Regulatory Commissions set up by the six SMS have authority to regulate the electricity sector within the respective country. There is need to put in place an independent regulatory mechanism at the regional level to solely regulate cross border electricity trade and transit in South Asia. The major objectives that the mechanism should, inter-alia, aim at achieving are: i. Minimize the landed costs of imported electricity supply; ii. Mitigate environmental concerns, while creating cross border transmission infrastructure; iii. Creation of the SAARC regional electricity market; iv. Encourage deployment of innovative technologies to reduce system losses; v. System pricing to be cost reflective and elimination of cross-subsidies; vi. Ownership and management of the cross border transmission networks be independent of power generation and

supply companies; vii. Non-discriminatory access to transmission systems, at prices, that reflect the cost of services provided; viii. Benefits that generators provide to the system (e.g., voltage and frequency support, grid reliability and stability, reduction in transmission and distribution losses, and reduced requirements for Spinning Reserve) should be fully and fairly reflected in system pricing; ix. Generators not to be excessively charged for their system impacts; and x. Electricity system, be subjected to market based instruments, for example; emissions trading, energy taxation, and output based standards that fully reflect energy conversion efficiencies and internalize environmental costs of energy conversion.

iii. Technical Requirements

On the technical side the SMS will have to: i. Harmonization of Grid Codes/Standard, Grid Operation Parameter, connectivity Standards for Grid Participants, maintenance schedules and procedures. These will inter-alia include the voltage and frequency level, etc.; ii. Decision on the level of energy flows for the transmission systems, based on detailed Load flow studies, Optimal power flow modeling, Short-circuit modeling, Dynamic stability modeling and Transient modeling; iii. Protection systems to be put in place for load segregation, in the event of any major fault occurring in one of the interconnected systems; iv. Establish an Independent System Operator to manage the system operations; v. Setting up of appropriate communication and monitoring systems; vi. Establishment of AC instead of HVDC interconnections, to save the investment requirement for setting up the cross border transmission infrastructure; and vii. Adoption of common metering standards and other arrangements to measure energy flows.

iv. Commercial Requirements:

As regards the commercial issues, in addition to the pricing mechanism etc., SMS will have to agree upon the: i. Currency to be used for settling accounts; ii. Put in place a payment security and settlement mechanism; iii. Frequency at which the meter readings will be recorded; iv. Periodicity for submission of bills and settlement of accounts; v. Mechanism to record deviations from scheduled energy flows and the incentives or penalties to be imposed for deviations; to ensure maintenance of grid discipline; vi. Dispute resolution mechanism; and vi. Standardization of commercial documentation including bidding documents, contracts etc. to reduce time in award of project and to reduce the transaction costs.

ES-5: Recommendations:

Based on the findings of the review of prevailing electricity laws and regulation as discussed in various sections of this report and the requirements listed in the preceding paragraph above, SMS shall have to evolve a regional electricity trading mechanism that takes care of the above factors as well as helps in overcoming other crucial issues that have been impeding electricity trade in the region. SMS may, therefore, consider the following recommendations to promote

cross border electricity trade within the region and with other neighboring countries and regions.

ES 5.1 SAARC Electricity Legal Framework (SELF):

SMS have in place laws and regulations to govern and manage power sector operations within the country. But none of them except for Bhutan and Nepal have provision therein to govern the cross border electricity trade/exchanges. Proposing each country to amend, either specific provisions therein; or through a general amendment thereof to promote cross border electricity trade without reaching a consensus on the requisite amendments may not help achieve the desired results. Because, each member state may like to amend their laws and regulations in a manner that takes care of their own interests and concerns as far the cross border electricity trade is concerned; thereby not meeting the expectations or requirement of other countries. Moreover, every time, the SMS agree upon to incorporate new provisions in their electricity laws and regulations to promote cross border electricity trade based on the actual requirements from time to time; may not materialize in a timely manner; either due to their parliaments not being in session or due to several other reasons. It is, therefore, advisable to have a separate regional electricity legal and regulatory framework to which all the Member States are signatories to; and any change required thereto could be made easily. It is, therefore, proposed that the SMS could consider putting in place a SAARC Electricity Legal Framework (SELF) as discussed below.

SAARC Energy Centre (SEC) has been mandated by the Heads of State of the SAARC Member States to promote regional energy cooperation and trade, including electricity trade. As discussed in Section 5.1 Chapter-V, SEC could draft “SAARC Electricity Legal Framework (SELF)” in consultation with the respective ministries handling electricity as a subject, in each of the Member States. In addition to other issues that may be raised by the concerned ministries of the SMS, SELF should adequately address the legal, regulatory, technical and commercial issues listed under section ES-4 above. Once an agreement on broad parameters of SELF has been reached and adopted at the SAARC level, the Member States would then make necessary changes in their respective electricity laws and regulations, if and wherever required, to align them with the provisions of the SELF. This will be the first stepping stone to encourage electricity trade and transit among the member states. While preparing the SELF, the drafting team/committee of the SEC could draw upon the relevant provisions and experiences contained in similar regional agreements and also design the SELF provisions to adhere to various globally accepted norms for electricity trade and transit. Creation of SELF will obviate the need for going to the negotiation table each time a new electricity trade or transit transaction is to be concluded between the Member States. SELF could comprise of two Parts. SELF Part-I would incorporate all the necessary provisions to deal with the legal, regulatory, technical and commercial issues essential to promote and manage the cross border power trade and transit amongst the member states in a transparent, economical and efficient manner. Part-II of the SELF could make the following provisions mandatory. The need for which has emerged from the findings of the study in its various sections. Implementation of these provisions as part of

the SELF Part-II will help in realizing the goal of creation of the SAARC Energy Ring, which has been mandated by the Heads of States of the SAARC Member States.

ES 5.2 SAARC Regional Power Plants (SRPP):

All the member states have their long-term plans for the development of their energy resources to meet their individual demand, except for Bhutan and Nepal, who have plans to export the surplus energy. The energy generated by the planned power projects of other member states will not be available to cross border trade.

In addition to the potential for electricity imports from other countries and regions; any meaningful large scale electricity trade within the SAARC region will require development of their indigenous energy resources. SMS will need to devise a mechanism through which they can facilitate development of these resources to enhance availability of electricity within the region through the establishment of SAARC Regional Power Projects (SRPP). The rationale for the same has been discussed in sub-section 2.3.2.1 to 2.3.2.3 as well as the recommendations chapter. It is the energy from these regional power projects that will become available for trade in the region; hence a prerequisite for enhancing cross border electricity trade among the member states. Moreover, the spread of risks through the potential of power exports from these plants will make it easier to finance these projects. SELF Part-II could, therefore, make a provision to help set up SRPP. These could include hydro, thermal and renewable power plants.

ES 5.3 SAARC Investment Facilitation Program (SIFP):

As explained in sub-sections 2.1.5 and 2.1.6 herein below; creation of new generation capacities and establishing the cross border electricity transmission interconnections in South Asia have got delayed inordinately. One of the main reasons for that is the funding of these projects. Given the global economic meltdown and risk aversion of international energy majors to make investments in the emerging markets, private sector participation from within the region could facilitate implementing these projects. There are major energy companies within the region, who if given a level playing field, could provide an answer to this issue. One of the provisions in Part-II of SELF could, therefore, make it mandatory for each Member State to permit and facilitate cross border investment in electricity sector from any of the SMSs on a non-discriminatory basis, with same provisions as applied by them to their national investments with added provisions of non-nationalization or takeover of assets created from such investments, repatriation of profits and/or investments and with complete freedom to operate the systems as per SELF Part-I provisions, without any extraneous considerations.

ES 5.4 SAARC Electricity Trading Mechanism (SETM):

As stated in sub-section 3.9.4.3, despite the energy and peak shortages faced by all the countries in the region, there are windows of opportunity for them to help each other in mitigating the shortages due to the varying pattern of their daily and seasonal load curves; resulting from the difference in time, observance of holidays, office timings, weather conditions, generation/

consumption profiles and other factors. Governments in the region are shying away from exchanging or trading electricity even during these periods when it is economically viable and technically feasible to do so. In order to overcome this inhibition, a provision in SELF Part-II could make it mandatory for each Member State to: i. Exchange and/or trade (depending on the situation), energy equivalent to at least 10% of its installed capacity with one or more of their neighboring countries, with a cap that is equivalent to the lower of the installed capacities. Such a mechanism will help create mutual confidence and trust, thereby creating an environment conducive for large volumes of electricity trade; and ii. Setting up of, cross border electricity interconnection to facilities cross border electricity flows.

ES 5.5 SAARC Template Documents (STDs):

One of the factors that have been delaying the power projects in the region is the multiplicity of documents used by the SMS at various stages of project planning through the stage of their execution. To overcome this hurdle, it is highly desirable for the SMSs to adopt a set of documents from amongst the best and time tested ones already in use in one or more of the Member States and adopt them with suitable modifications to be used as the SAARC Template Documents (STDs) for regional power projects. These could be Tender Documents, Project Award Agreements, Power Purchase Agreements, Fuel Supply Agreements, Transmission Service Agreements, and Tolling Agreements. Since these template documents would be pre-approved by all the SMS, their use will make projects happen at a faster pace, saving time, money and expedite the project implementation.

ES 5.6 South Asia Regional Power Exchange (SARPE):

SMS recognize the need for the establishment of a regional power market in South Asia. SAARC Secretariat with the assistance of the Asian Development Bank has initiated a study for the formation of the South Asia Regional Power Exchange (SARPE). SMS need to expedite the establishment of SARPE to facilitate electricity trade in the region. Till the time SARPE becomes operational, the member states could designate one or more power exchanges already operational in India as the regional power exchange to facilitate cross border electricity trade, as a pre-cursor to the establishment of SARPE and then take a call whether to continue with this arrangement or make SARPE the only power exchange to deal with cross border electricity trade in the region.

ES 5.7 SAARC Electricity Regulatory Commission (SERC):

In order to avoid multiplicity of authority with regard to regulation of cross border electricity trade and transit amongst the SMS, it is desirable to create a SAARC Electricity Regulatory Commission to regulate cross border electricity trade and transit. It should have the mandate of the SMSs to discharge its functions in the best interests of the electricity sector from a regional perspective, while honoring the national priorities and commitments. It could also be authorized to monitor the implementation of SELF and also act as a regional body to resolve any issues emanating from the cross border electricity trade and transit.

1.1 Electricity Scenario in South Asia:

1.1.1 Energy Resource Endowments of SAARC Member States:

South Asia is a region endowed with relatively a large hydropower potential of 294,330 MW and large coal reserves of 108,961 million tons. But the oil and natural gas reserves are quite meager in relation to their demand. The region is also rich in renewable energy resources including solar, wind and biomass. The energy resource endowment of the region is given in Table 1.1 below:

Table 1.1: Energy Reserves of SAARC Member States

Country	Coal	Oil	Natural Gas	Hydro	Biomass
	Million Metric Tonnes	Million Barrels	Trillion Cubic Feet	MW	Million Metric
Tonnes					
Afghanistan	440	NA	15	25000	18 - 27
Bhutan	2	0	0	30000	26.60
Bangladesh	884	12	8	330	0.08
India	90085	5700	39	150000	139
Maldives	0	0	0	0	0.06
Nepal	NA	0	0	42000	27.04
Pakistan	17550	324	33	45000	NA
Sri Lanka	NA	150	0	2000	12
Total	108961	5906	95	294330	223

Source: ADB - SAARC Regional Energy Trade Study Tab. 2.2 Page 34

SAARC Member States (SMS) have experienced high GDP growth rate over the past decades. This has somewhat moderated due to the recent recession. But, it is expected to pick up again, once the effects of recession are over. One of the major challenges these countries are facing is their inability to fully meet the investments required to create the necessary electricity infrastructure to support the faster economic growth. Prior to the initiation of power sector reforms within the region, vertically integrated state owned utilities were responsible for

capacity additions in generation, transmission and distribution. But with competing demand for resources, governments are unable to support the investments required for the sector. Private sector is being encouraged to participate in new capacity addition programs.

Due to the uneven distribution of energy resources in the region coupled with relatively small size of their domestic electricity markets in some of the countries, many IPP's want to sell power to other countries or off-takers in the region to ensure the viability of their projects. In the absence of necessary provisions in their laws and regulations of these countries the IPPs are suffering. A case in instance is the desire expressed by IPPs in Nepal who want to access the Indian electricity market.

1.1.2 Access to Electricity:

SMSs have not been able to exploit their energy resources to meet their demand for electricity, except for Bhutan, that not only meets its own demand but also exports relatively a large quantum of electricity to India. As a result, the access to electricity within the region is low compared to the other part of world as indicated in Table. 1.2:

Table 1.2: Electricity Access in 2009 - Regional Aggregates

Region	Population electricity (millions)	Electrification rate %	Urban electrifications rate %	Rural electrification rate %
Africa	587	41.8	68.8	25.0
North Africa	2	99.0	99.6	98.4
Sub-Saharan Africa	585	30.5	59.9	14.2
Developing Asia	675	81.0	94.0	73.2
China & East Asia	182	90.8	96.4	86.4
South Asia	493	68.5	89.5	59.9
Latin America	31	93.2	98.8	73.6
Middle East	21	89.0	98.5	71.8
Developing countries	1,314	74.7	90.6	63.2
World*	1,317	80.5	93.7	68.0

*World total include OECD and Eastern Europe/Eurasia

Source: IEA, Table 1: Electricity Access in 2009-Regional Aggregates, (<http://www.iea.org/weo/electricity.asp>)

From the table given above, one can observe that the performance of South Asia on this front is just above the rates in Africa including Sub-Saharan Africa. The percentage of population with access to electricity in each of the eight countries of South Asia is given in Table 1.3 below:

The percentage of population with access to electricity varies from 20% in Afghanistan to 100% in Maldives. One point to note here is that in the case of Bhutan, it is not the deficiency in the

Table 1.3: Percentage of population with access to electricity (2008-09)

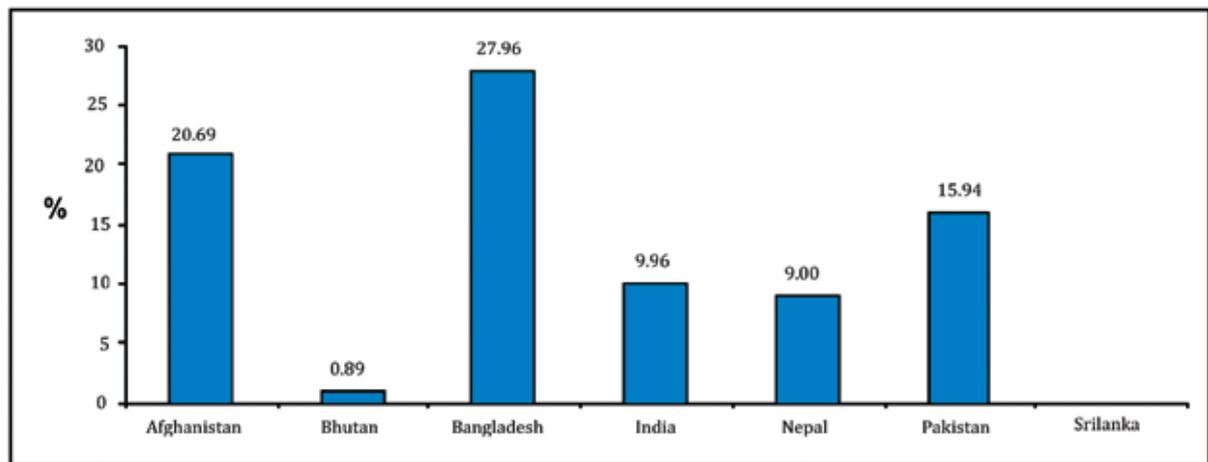
Country	% of population with electricity access
Afghanistan	20%
Bangladesh	42%
Bhutan	40%
India	56%
Maldives	100%
Nepal	25%
Pakistan	70%
Sri Lanka	78%

Sources: ADB - SAARC Regional Energy Trade Study Tab 2.6, Page 40

availability of supply but its topography, extremely rugged and mountainous terrain that is posing a challenge to extend the electricity grid and distribution systems to remote areas to provide electricity to 100% of its population.

1.1.3 Electricity Shortages:

The demand for electricity has steadily been growing across the region. The main reasons being the resolve of the governments to provide electricity to 100% of their population, increased industrial and economic activities, migration of a large segment of population from lower to the higher income brackets with more disposable income and increase in population. Member States have not been able to augment the electricity supply to keep pace with increasing demand.

Figure 1.1: Electricity Shortage in SAARC Countries

Note: Above data is for 2006/07, except for Bhutan for which data is for 2004/05. Data not available for Maldives.

Source: SAARC Regional Electricity Trade Study of the Asian Development Bank, Page 40.

Thus, the demand for power surpasses its supply, resulting in electricity shortages in most of the Member States. Figure 1.1 shows the level of electricity shortages in the region. These range from about 9% in Nepal to as high as 28% in Bangladesh.

Given the above shortage scenario, one may question as to how can these countries trade electricity, when none of them except Bhutan is able to meet their own demand. The answer to that lies in the fact that windows of opportunity exist for electricity trade amongst them, due to the variations in their daily and seasonal demand patterns and load curves; resulting from the difference in time, observance of holiday, office timings, weather conditions, generation, consumption profiles and other factors. But governments in the region are shying away from exchanging or trading electricity even during these periods when it is technically feasible and economically viable to do so. In order to overcome this inhibition a provision in the regional electricity trading mechanism that the member states evolve to promote cross border electricity trade could make it mandatory for each Member State to:

- a. Exchange and/or trade (depending on the situation), energy equivalent to at least 10% of its installed capacity with one or more of their neighboring countries, with a cap that is equivalent to the lower of the installed capacities. Such a mechanism will help create interdependence and mutual confidence, thereby creating an environment conducive for large volumes of electricity trade;
- b. Create cross border electricity interconnection facilities to the extent of 10% of their national grid capacity, at lower of the two lowest transmission voltage levels, of the interconnecting systems; to lay the foundation of the SAARC Electricity Grid.

Another reason to do so is that of the hydropower generation pattern. Hydropower plants are able to generate maximum energy during summer when the demand is low in the Nepal and Bhutan. They can export the surplus energy to the neighbouring countries. To augment the supply, SMS will also need to import larger volumes of electricity from the neighbouring regions as well.

Despite the above limitations, one of the best options before the Member States to reduce the demand- supply gap is to develop the electricity resources across the region from a regional perspective and encourage cross border electricity trade.

1.1.4 Ongoing Power Exchange/Trade among SMS & other Countries

Electricity exchange/traded is presently taking place between Afghanistan with CARS and Iran, Bhutan-India, Nepal-India and Pakistan Iran. These trades are too small to have any major impacts on reducing the demand-supply gap except for that of Afghanistan. A brief summary of these initiatives is given in Chapter-II of this report.

1.1.5 Geopolitical Situation and its Implications on Cross Border Electricity Trade

SAARC comprises of Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Relationships amongst these countries have been waxing and waning and at best

can be described as workable; except between Bhutan and India which have been very cordial and have inter-alia facilitated the development of the hydropower resources in Bhutan, which is of relevance to this study. The three largest and most populous countries in the region are India, Pakistan and Bangladesh. Pakistan came out of the partition of India in 1947 and then Bangladesh came out of the partition of Pakistan in 1971. They have been carrying the burden of history and some perceptual differences about the resolution of certain issues have been impacting their relation despite the lapse of over 60 years of initial partition. These differences have been dominating their bilateral relationship and behaviour at various regional and international fora including that at the SAARC. Electricity systems of Pakistan and Bangladesh were part of the undivided Indian power system prior to partition. There are several electric substations in close proximity along the borders of Bangladesh-India and Pakistan-India which can most economically serve the load centres of the neighbouring country. But politics has been over-riding their economic interests preventing them from cooperating in this area.

Despite all these odds, the Member States will have to cooperate in electricity sector. It is in the best interest of each Member States to provide electricity to the consumers for faster socio-economic development and to prevent the law and order situation getting out of hand. As the power shortages have now been resulting in street protests. One of the most important agenda items before all the governments in the region should, therefore, be to enhance the availability electricity supply; over-riding their political difference with their neighbours.

Of late, SMS have started realising that they share a common destiny and have to cooperate in energy sector development and electricity trade if they want to come out of the clutches of poverty. It was in this backdrop that the SAARC Energy Centre (SEC) was mandated by the Heads of State of the SAARC Member States to promote regional energy cooperation and trade that includes electricity trade and creation of the SAARC Energy Ring and the SAARC Electricity Grid. The first steps towards the recent initiatives in energy sector cooperation are the implementation India-Bangladesh and proposed India-Sri Lanka power transmission interconnections. Both these interconnections will have a transmission capacity of 1000 MW. Bangladesh has already signed an agreement with India to import 500 MW as soon as the line is commissioned. The India-Sri Lanka line is also expected to see a similar pattern. Initiatives of Bhutan to export 5000 MW to India by 2020 seem to be on course.

Nepal needs to expedite the development of the hydropower resources and reap the benefits of power exports. Its dream of becoming a large exporter of electricity will requires considerable improvement in the domestic political situation. Moreover, Nepal needs to broaden its horizon and overcome the perceived Nepal-India relationship limitations.

Afghanistan and Pakistan too have entered in to an agreement to implement the Central Asia South Asia (CASA 1000) transmission interconnection to help them import power from Tajikistan and Kyrgyzstan, despite the prevailing fragile security situation in Afghanistan and along the northern border areas of Pakistan. Even though the India-Pakistan relations that have been going through a rough patch for the past couple of years, Pakistan Prime Minister has announced the intention of government of Pakistan to import 500 MW electricity from India to overcome the shortages.

1.1.6 Financial and Economic Viability of Cross Border Power Trade among SMS

An important factor from the perspective of cross border electricity trade is the cost of generation in the power exporting country and the landed cost of power in the importing country. The generation cost varies significantly with the type of fuel, cost of financing the project and several other factors. Any study to establish the financial and economic viability of power exports between countries or regions are much larger undertakings than this study. Such studies entail detailed analysis of demand-supply scenarios; load growth scenarios; load flow studies to establish the need for setting up of transmission interconnections; analysis of the cost of generation from each power plant, especially the one that would be designated as the potential export generation facility; and the cost of delivery of the imported power to the major load centers in the power importing country. The scope of this study is limited to review of electricity laws and Regulations of the SMS that too from the perspective of cross border electricity trade and to make recommend that would facilitate such trade. Hence, no detailed analysis of the financial and economic viability of power trade between the countries in the region has been carried out as part of this study.

A question may then arise, as to how can, cross border electricity trade among these countries be justified in the absence of the above studies and establishing the financial viability of power trade between them. It is of relevance to add here that even if power trade between countries may not be viable in financial terms; but on adding economic and social benefits thereto, the proposal could become viable. Studies titled “Economic Impact of Poor Power Quality on Industry” carried out under the SARI/Energy program for Bangladesh, India, Nepal and Sri Lanka established that these countries are loosing hundreds of millions of US dollars worth of industrial production due to poor power quality. This in turn, is impeding their GDP growth rate, employment generation and adding other problems. Moreover, the India-Bangladesh and the India Sri Lanka transmission interconnection prefeasibility studies established that each interconnection would generate revenue equivalent to 3672 MU; for a power exchange of 1000 MW for 17 hour a day at a plant load factor of 0.6. The incremental revenues can be shared between the countries. Other benefits will be the improvement in the voltage profile and reduction in transmission losses.

In addition to the above important aspects, the priority of the governments in the region lies in arresting the deterioration in the law and order situation resulting from the load shedding, black-outs and burn-out. Leaving other things aside, electricity imports even at higher prices in South Asia can be justified on the above account alone. The ground reality today is that even with the increasing imported fuel costs, SMS are forced to generate electricity to meet the demand to avoid adverse impacts on their economies and to avoid the creation of law and order problems. It may be pertinent to state here that the distribution companies in India have bought electricity even at Rs. 16/kWh in the recent past, which is nearly 4-5 times higher than the average tariff for different categories of consumers. Both the consumers as well as the governments in the region realise that high-cost electricity is better than no electricity. In the given situation, one of the best options before the Member States to reduce the demand-supply gap is to develop the

electricity resources across the region from a regional perspective and encourage cross border electricity trade within and with outside regions.

1.1.7 Evolution of the Prevailing Electricity Laws and Regulations:

The lack of finance to harness the indigenous energy resources, to fully meet the demand has been a major challenge before each Member State. Up to early 1990s, electricity sector in all the countries in the region was predominantly owned, financed, operated and regulated by the governments, with certain exceptions in some pockets of India and Pakistan. The faster economic growth and the growing aspirations of the people to have access to electricity resulted in its accelerated demand that could not be met through government spending alone. Realizing this fact, the governments in the region initiated power sector reforms in early 1990's to attract private sector participation in the sector. As a result, most of the prevailing laws and regulations governing the sector in each of the SMS were introduced and became effective as part of the power sector reform process.

The prevailing laws and regulations to speed up the development of electricity sector were formulated from the perspective of developing indigenous resources to meet the in-country demand except by Nepal and Bhutan, who have a large hydropower potential, much in excess of their demand projections in the foreseeable future. Bhutan and Nepal are the two countries in the region, which while formulating their new laws and regulations as part of the power sector reform program incorporated provisions for power exports and imports as part of their new legislations. Though demand-supply gap has been widening, leading to long periods of outages in most of the countries, none of them except the above two SMSs recognized the need for cross border power trade and incorporation necessary provisions in their laws and regulations to govern power imports and/or exports. This is in spite of the fact that Afghanistan, Bhutan, India, Nepal and Pakistan have been importing modest quantities of electricity from their neighboring countries for a long time now.

1.1.8 Need to Align Laws and Regulations to Promote Electricity Trade and Transit

There is a growing realization that inter and intra-regional electricity trade and exchanges is the only way forward for the SMSs to provide electricity to 100% of their population; meet the electricity demand of their industrial and agricultural sectors; support economic growth and accelerate harnessing of the social sector benefits emanating from access to electricity. As such, there is need for incorporating necessary provisions to deal with electricity imports and export in the prevailing electricity law and regulations by each Member State. These changes will obviate the need for protracted project specific negotiations for each individual cross border electricity trade project.

Having robust legal and regulatory frameworks that not only permit but also facilitate power trade/exchanges and transit will create a healthy investment climate conducive for attracting very large investments required by the sector, irrespective of the market size that exists within the political boundaries of each SMS. Investors, Multilateral Financial Institutions, local and

global Capital Market players feel secure in supporting projects that serve a larger market not limited to one political geography. A regional electricity market in South Asia based on market principles will facilitate free flow of electricity across borders and reduce market, political, payment security and other risks; that investors, project developers and the funding agencies are averse to. Creation of the SAARC Regional Electricity Market will make financing the regional projects easy through the spreading of risks and thereby result in lower cost of capital and lower investment requirements. This will lead to competitive tariffs for consumers and a faster financial turnaround of the sector entities across the region.

In addition to the legal and regulatory aspects; a pre-requisite for all this to happen will require establishment of large power plants, especially in Nepal and Bhutan who have very large hydropower resource in comparison to their demand. Other options are importing electricity from Central Asian Republics in the northwest and Myanmar in the east of the region. This will require cross border transmission infrastructure to facilitate free flow of electricity in the region. It is in this backdrop that the Heads of SAARC Member States advised the SAARC Energy Centre to work towards the creation of a SAARC Energy Ring inter-alia comprising of the SAARC Electricity Grid, briefly touched upon below.

1.1.9 SAARC Power Grid:

Transmission interconnections presently exist between Bhutan-India, Nepal-India, Pakistan-Iran, and between Afghanistan and its northern neighbors. Most of these interconnections are relatively small (except for India-Bhutan) as these are aimed at serving loads in the border areas of the importing country. In most of the cases, these systems are operated in a radial mode. But the proposed interconnections between India-Bangladesh and India-Sri Lanka will be HVDC interconnections to safeguard the interconnected systems from any eventuality taking place on either side; despite the fact that establishing HVDC interconnections entail much larger investment as compared to AC interconnections. With the commissioning of these two interconnections, the power grid of four out of the eight SAARC Member States will be interconnected and will facilitate power flows among these countries. In order to give shape to the “SAARC Power Grid” it is essential to establish the Afghanistan-Pakistan-India and India-Nepal power transmission interconnections. These will increase the interconnected systems to seven Member States out of a total of eight of them, leaving only Maldives outside its ambit. The limitations of prevailing technology options, limited demand for electricity in Maldives and the financial viability of such an interconnection do not indicate that this interconnection will take place in foreseeable future. As such, Maldives may have to remain an isolated system, until any innovative and cheaper technology options become available that may make it feasible to interconnect Maldives to the SAARC power grid.

1.2 Objective of the study:

As enunciated in the TOR, the objective of undertaking this study is to review the electricity laws and regulations of the SMS to identify the areas and to make recommendations for appropriate legal and regulatory changes that they may consider for promoting electricity trade/exchange

and to promote creation of cross border electricity infrastructure and attract investments in electricity sector within and the region. Based on the discussions of this and the subsequent Chapters of this report, the last Chapter herein below, contains the recommendations emerging from these discussions.

1.3 Scope of Work

As per the terms of reference, the consultants will accomplish the scope of work for the study, as approved by the Working Group on Energy, reproduced below:

- i. Study the electricity laws and regulatory framework prevailing in the Member States;
- ii. Identify the relevant provisions in the electricity laws and regulations that facilitate electricity interconnections and electricity exchange and trade among the Member States;
- iii. Suggest amendments in electricity laws and regulations of Member States that hinder electricity interconnections and electricity exchange and trade among the Member States and suggest ways to harmonize the relevant provisions;
- iv. Suggest any new provisions which may be required to be considered by the SAARC Member States; and

The consultants will review the Laws and regulatory frameworks of the Member States with the objective of the tasks identified above and will prepare a report on the various aspects listed therein. Submit their recommendations for the consideration of the Member States, that would encourage the sharing of energy resources in the shape of electricity trade/exchange, promote the building of the cross border electricity infrastructure to facilitate the power exchanges/trade and to promote the overall investment climate for the electricity sector in the region.

1.4 Strategy and Methodology for Undertaking the Study and Structure of the report

1.4.1 Strategy

The strategy for the preparation of this report included the review of the laws and regulations of the SMS, the previous studies undertaken till date on regional energy cooperation in South Asia and such initiatives in other regional settings. It took in to cognizance the geo-political, economic, and security situation, trade relations and other conditions prevalent in South Asia and the limitations in attracting capital in the prevailing global economic meltdown. The study laid emphasis on finding solutions that in addition to the legal and regulatory changes required; will help to address the issues of enhancing availability of supply, creation of cross border infrastructure etc., and encourage Member States to allow greater role for private sector participation in promoting cross border electricity trade and creation of necessary infrastructure.

Governments across the world, including those in South Asia recognize that increasing the availability of electricity supply is the key to accelerate the pace of their social and economic

development. Several studies have been and are being undertaken by the SMS to expedite the development of their energy resources and to encourage cross border electricity trade in South Asia to bridge the demand-supply gap. The following studies² are of relevance for the purpose of this study:

- i. Regional Energy Security for South Asia, (Carried out under the SARI/Energy)
- ii. SAARC Regional Energy Trade Study, (Carried out by the ADB for SAARC)
- iii. CASA 1000 Project, (Carried out with the support of the ADB and the World Bank)
- iv. Pre-feasibility Studies for interconnecting the Power Grid of Bangladesh-India and Sri Lanka-India, (Carried out under the SARI/Energy)
- v. Social and Economic Impacts Analysis of Power Trade in the South Asia Growth Quadrangle (comprising of Bangladesh, Bhutan, India and Nepal); and in between India and Pakistan. (Carried out under the SARI/Energy)
- vi. South Asia Regional Power Exchange, (Being carried out by the ADB)
- vii. Economic Impact of Poor Power Quality on Industry for Bangladesh, India, Nepal and Sri Lanka, (Carried out under the SARI/Energy)

The findings of these studies have established the urgent need to develop the indigenous energy resources from a regional perspective through a spirit of cooperation and the establishment of cross border infrastructure to facilitate free flow of electricity in the region. Creation of a SAARC Regional Electricity Market to promote electricity trade among the SMS and with other regions; to tide over the electricity shortages and to address the adverse impacts of non-availability of supply on social and economic development and the law and order situation. Adverse impacts of poor power quality on industry and other areas of their economies. These studies also recognized the limitations of SMS to make large investments to achieve the above goals.

While harmonizing the legal and regulatory regimes of the SMS is a prerequisite to promote cross border electricity trade, other mechanisms to encourage private sector participation and private investment in the sector are equally important. As such, the recommendations contained herein are aimed at promoting private investment in a free market economy, in addition to relying on the earlier mechanisms. This is needed, keeping in view the limitations faced by the Southern African Power Pool (SAPP), in a situation akin to South Asia, where SAAP Members are finding it difficult to meet the investment requirements thereby impeding the expansion of SAAP. The circumstances under which other regional power pools or power trading arrangements have been worked out in developed economies are quite different from the situation prevailing in South Asia. The historical, political and economic relations; economic development, geo-political and social settings prevailing in each region are different and may not be of much relevance in the context for the other regions.

² SARI/Energy study reports referred to at serial number i, iv, v, vii can be located in the Library section on the web page of www.sari-energy.org. ADB studies listed at number ii and vii above though not uploaded by the SAARC on their website are available with the SEC. Report on CASA 1000 at S.No. iii is available on www.casa-1000.com.

In view of the above discussion, the recommendations made herein in addition to the handling of legal, regulatory, technical, operational, financial and commercial issues concerning regional electricity trade; include suggestion for sector development, attracting investment and encouraging cooperation among SMS.

Since most of the electricity laws and regulations of SMS except for Bhutan and Nepal are silent about the cross border electricity trade, this report has identified the clauses therein that either directly deals with; or though not directly related to cross border electricity trade might have ramifications thereon. Only those provisions in the relevant laws and regulations of the Member States have been cited and commented upon in this report.

1.4.2 Methodology

The methodology for preparation of this report included a review of the prevailing electricity laws and regulations of SMS from the perspective of cross border electricity trade provided by the SEC to the author for review and preparation of this report. Identification of provisions therein that may be acting as an impediment thereto; the provisions which though not directly governing cross border electricity trade in South Asia, but will have implications thereon; and the means to overcome them; which is the prime objective of this study. It also included a review of the earlier regional energy cooperation initiatives in South Asia and the progress made there under in order to have better appreciation of what needs to be done to promote cross border electricity trade in the region.

Being a desk type of study and in the absence of South-Asia Electricity Data Base, the information and data contained herein has been assimilated from secondary sources including internet search, relevant studies carried out in the past, especially those pertaining to South Asia. It is due to this reason that some of the data is not most recent.

During the review of the electricity law and regulations of the SMS, it was observed that the electricity laws and regulations have been formulated to govern the sector operations within the respective countries and to meet the demand for electricity from indigenous resources. There is no or little emphasis on cross border electricity trade, except in the case of Bhutan and Nepal; the two countries in the region with a large hydropower potential enough to meet their own demand and to export the surplus energy. As such, only the relevant provisions therein that will have ramifications on cross border electricity trade have been identified, cited and discussed herein.

In addition to the legal and regulatory mechanism, there are a plethora of norms that deal with technical, commercial, financial and operational issues and have to be put in place for cross border electricity trade to take place. All these norms are well known and globally accepted, hence briefly discussed herein. The recommendations contained in the report are based on the findings of this review, globally accepted norms for cross border electricity trade and additional recommendations that the SAARC Member State may consider from a long-term cooperation perspective.

1.4.3 Structure of the Report

This report comprises of five Chapters, each one leading to an understanding of issues involved and the means to address them. Chapter-I gives the introduction and the background for undertaking the study. It briefly summarizes the relevant aspects of prevailing electricity scenario in the region and why cross border electricity trade among the SAARC Member States is essential, despite certain limitations that might question the financial viability of such trade; if seen from a pure pricing perspective. It lists the considerations that outweigh the financial viability limitations and suggests as to why does it makes sense for the Member States to exchange and/or trade electricity despite the fact that each of the member states, at present, is facing energy shortages. It also states the objectives for undertaking the study, the scope of work, the strategy and methodology adopted for undertaking the study and the structure of the report.

Chapter-II gives the details of the ongoing power exchanges and power trades taking place between the SMS and with the neighboring countries. It discusses the backdrop and the legal regimes under which these transactions are taking place. It also covers a brief discussion about the proposed cross border transmission infrastructure projects, trade arrangements on the horizon, the potential for cross border electricity trade within the region and the need for the establishment of the SAARC electricity market. Chapter-III covers the review of electricity laws and regulation of the SMSs from the perspective of promoting electricity trade among the Member States. In the absence of the specific provisions in the prevailing laws and regulations of the SMS to regulate cross border electricity trade, this chapter identifies the relevant provisions in these laws and regulations that will have implications thereon and the need for attracting large investment required for the creation of the requisite transmission infrastructure. An analysis thereof in respect of each member state has been given at the end of each country profile. Summary of findings at the end of this chapter inter-alia highlights the need for change in these laws and regulations. Chapter-IV lists the legal, regulatory, technical and commercial requirements for cross border electricity trade to take place, as these are essential ingredients for the formulation of the any regional electricity trading mechanism. Chapter-V contains the recommendations for consideration of the SMS. These have been based on the findings of the first four chapters and previous regional electricity cooperation initiatives in South Asia. The main recommendation is the creation of SAARC Electricity Legal/Regulatory Framework comprising of two parts. While Part-I of this framework will address the legal, regulatory; technical and commercial issues that are essential to promote and directly related to the governance of cross border electricity trade in the region. Part-II of the framework will have provisions which strictly speaking do not have direct legal or regulatory implications on cross border electricity trade, but the need for which has emerged from the discussions in various sections of this report. These include broader energy cooperation initiatives essential for enhancing the availability of electricity supply, attracting large cross border investments, creation of SAARC Power Market and other recommendations emerging from the findings of this report.

Prospects for Electricity Trade & Transit in South Asia

2.0 Electricity Trade in South Asia

Before one proceeds on to review the electricity law and regulation of the SMS, it is highly desirable to know the electricity trade arrangements that are currently in place among the SMS or with their neighbors and under what kind of legal and or regulatory regimes. Whether these arrangements provide opportunities to promote large scale cross border electricity trade? Will the prevailing arrangements give confidence to the lenders, private sector project developers and other stakeholders to make large investments in creating the necessary electricity generation and transmission infrastructure that would lead to enhanced cross border electricity trade in South Asia? If these legal arrangements do not meet the requirements of the stakeholders referred to above in the present context, the SMS may have to consider making necessary changes in their prevailing laws and regulations to meet the desired results.

2.1 Ongoing Electricity Trade Arrangements

The prevailing electricity trade that is taking place between the member states and with other countries is miniscule as compare to its potential as discussed in Para 2.3 below. The country-wise ongoing cross border electricity trade is summarized in the ensuing paragraphs.

2.1.1 Electricity Trade between Afghanistan and Central Asian Republics (CARs)

Electricity infrastructure in Afghan got destroyed during the protracted war. The generation capacity came down considerably forcing the government to resort to electricity import from its northern neighbors to provide electricity to some of the major cities. Presently Afghanistan imports electricity from Iran, Turkmenistan, Uzbekistan and Tajikistan. The import volumes rose from 110 million kWh in 2000 to 150 million kWh in 2005 and reached a level of 608 million kWh in 2009. Efforts are on to lay new transmission interconnections with the above neighbors so that larger volumes of electricity could be imported to provide electricity to unserved regions of the country. One of the major projects that is under consideration is the Central Asia-South Asia transmission interconnection called CASA-1000, which would help Afghanistan and Pakistan to import 1000 MW electricity from Tajikistan and Kyrgyzstan. Though the feasibility studies supported by the World Bank and the ADB have been completed, no further progress has been made due to the fragile security and geo-political situation and the global economic meltdown. Under the Afghanistan Infrastructure and Rehabilitation Program funded by the USAID, Afghanistan has signed memorandum of understanding and protocols

to import up to 300 MW from each of its northern neighbors, viz. Tajikistan, Turkmenistan and Uzbekistan.

2.1.2 Electricity Trade between Bhutan and India

The Bhutan-India cooperation in electricity sector development³ began with the Jaldhaka Agreement of 1961; that paved the way for the construction of the barrage in the Bhutanese territory and 27 MW Power Plant in West Bengal, India. The plant was commissioned in 1968 by West Bengal State Electricity Board. Several Mini/Micro Hydro power projects under 1st Five Year Plan (FYP) Development assistance under grant assistance from GoI were built up to 1972. Seven cross border transmission interconnection; three from West Bengal and four from Assam helped Bhutan to electricity the villages bordering India during 1970's. Chukha agreement was signed on 23 March 1974 for the development of 336 MW Chukha run-of the river plant. The construction started in 1978 and first unit of 84 MW Capacity was commissioned in Sept. 1986. The project was fully commissioned in 1988. Chukha contributes about Nu 2.8 billion per annum to the Bhutanese exchequer. Kurichhu Agreement was signed on 18 February 1994 for the construction of the Kurichu 45 MW plant to be upgraded to 60 MW later. With the success of the above initiatives, the Tala Agreement was signed on 5 March 1996 for development of the Tala HEP 1020 MW. First Unit commissioned in 31 July 2006 and last of the 6 units in 31 March 2007. The "2006 Framework Agreement on Hydropower development & Trade" was signed on 28th July 2006 between RGoB and GoI. Both the countries are to cooperate and facilitate hydropower development and trade through both public and private sector participation. This agreement provides a market opportunity to export of a minimum quantity of 5000 MW by 2020. Bhutan will harness the CDM benefits by using India's baseline data. Depending upon the water flows, Bhutan is exporting 1100- 1200 MW to India. Construction of power plants has commenced to enhance the power exports to 5000 MW by 2020. Given the progress of the under construction project, it is felt that the achievement of this target is well within reach. This is the best examples of cooperation in electricity sector in South Asia, where the both the electricity exporting as well as the importing countries are benefiting immensely.

2.1.3 Electricity Trade between India and Nepal

Cooperation in the hydropower sector between the two countries began with the Koshi and Gandak Projects in the late 1950s⁴. Kataiya power house of capacity 6.8 MW was built by India for Nepal on the Koshi Canal. Trishuli, Devighat and Phewa Hydropower Projects were built subsequently with the support of India. Power exchange between Nepal and India began in 1971 with limited low-capacity exchange at various locations along the border. Currently 14 power exchange points along Nepal-India border facilitate an exchange of 50 MW between the two countries. Initiatives are on to increase the exchange to 150 MW by setting up of necessary transmission interconnection. Some major hydropower projects were planned in Nepal for joint development for electricity exports to India. These included 10,800 MW Karnali Chisapani Multipurpose Project, Mahakali Pancheswar and Arun III. But, due to fluid political climate in

³ Source: Bhutan Country Report, part of the study titled "Impact of Power Sector Reform in South Asia" by D.N.Raina

⁴ Source: Nepal Country Report part of the study titled "Impact of Power Sector Reform in South Asia" by D.N.Raina

Nepal, none of these projects materialized. The construction of the Upper Karnali Hydroelectric Project being developed GMR (India) received a setback, as one of the political parties expressed its intention not to allow the project to be developed by an Indian company⁵. SMEC, Australia is trying to develop the 750-MW West Seti Project for dedicated export to India. It has initialed a power purchase agreement with PTC India, and is in the process of achieving financial close. Construction will start immediately thereafter. In terms of power trading and power exchange between the two countries, at present, the 132 kV Butwal-Sonauli-Anandanagar transmission line has been identified to be constructed on priority. PTC India and Power Grid Corporation have reached an agreement for construction of the interconnection on the Indian side.

The 400 kV Muzaffarpur (India)-Dhalkebar (Nepal) transmission line connecting the power grids of India and Nepal is expected to be completed in the next two years⁶. Once complete, the 148-km line will enable the transfer of 1,000 MW of electricity between the two countries. A MoU was signed between the two JV companies created for the project - Cross Border Power Transmission Company (CPTC) for the Indian segment and Power Transmission Company Nepal (PTCN) for Nepal. CPTC has equity participation from IL&FS, PTC India Limited and Power Grid (PGCIL), whereas PTCN is a 50:50 JV company of NEA and IL&FS, with a provision to divest 24% of IL&FS equity to financial institutions and Nepali banks. Construction costs of the project are estimated at USD29 million. Of the 148 km total length of the line, 45 km will lie in Nepal and cost USD13 million. NEA has agreed to a PPA for 150 MW through PTC for 25 years and to the implementation-cum-transmission service agreement (ITSA) with India.

2.1.4 Electricity Trade between Pakistan and Iran

As per the WAPDA Power Wing⁷, Pakistan has an installed capacity of 18,167 MW against which the availability is 14,402 MW and 11,102 MW in summer and winter respectively, against a peak demand of 18,000 MW. It has an agreement with Iran to import up to 39 MW for meeting the demand in Baluchistan. Another MOU to import 100 MW for meeting the demand in the port city of Gwadar has also been signed with Iran. Pakistan has indicated its desire to import 500 MW from India as well⁸. Of late (November 17, 2011), Pakistan government has approved the import of 1000-1300 MW electricity from Tajikistan and Kyrgyzstan via Afghanistan⁹.

2.1.5 Proposed Power Trade between India and Bangladesh

The under implementation “Bangladesh-India Electrical Grid Interconnection Project” will interconnect the Eastern Grid of India with the Western Grid of Bangladesh to facilitate a transfer of 1000 MW between the two countries. The project will comprise of 125 km of 400 kV double circuit transmission line between the electric substations at Baharampur in India and Bheramara in Bangladesh, a 400 kV switching station at Baharampur (India) and a 500 MW back to back high HVDC sub-station (400/230 kV) at Bheramara (Bangladesh) along with the associated infrastructure. To begin with Bangladesh will import 500 MW from India starting

⁵ “Maoists not to allow Indian investment in Upper karnali”; The daily “Nepal Republica Media”; May 28, 2011

⁶ Global Transmission Report November 8, 2009

⁷ Source: WAPDA Power Wing – Generation data; <http://www.wapda.gov.pk/htmls/power-index.html>

⁸ Source: India Today: indiatoday.intoday.in/story/pakistan...import-electricity.../158297.ht...

⁹ Source: Pakistan Today, Wednesday, 7 December, 2011 : www.pakistantoday.com.pk/

2012 which can be ramped up to 1000 MW. ADB has approved a loan of US\$100 Million to Bangladesh for this project and the Power Grid Company of Bangladesh has awarded the contract for the construction of the HVDC sub-station.

2.1.6 Proposed Grid Interconnection between India and Sri Lanka

The proposed India–Sri Lanka Grid Interconnection will link the Southern Grid of India with that of Sri Lanka. It will be a HVDC connection between Madurai (India), and Anuradhapura (Sri Lanka), through the Palk Strait. Power Grid Corporation of India Limited and Ceylon Electricity Board will build this 285 km transmission line, including 50 km of submarine cables in two phases. Phase-I will enable the transfer of 500 MW between the two countries and with the completion of Phase-II the capacity will rise to 1000MW. The approximate cost of the project is US\$800 million.

2.1.7 Proposed Power Trade between Central Asia and South Asia

A brief summary of the existing power imports by Afghanistan from Iran, Turkmenistan, Uzbekistan and Tajikistan and also by Pakistan from Iran are given in Para 2.1 and 2.4 above. Pakistan and Afghanistan are contemplating to import 1000 MW from Kyrgyzstan and Tajikistan through the proposed Central Asia – South Asia transmission interconnection, names CASA-1000 project. But the project is not progressing at the desired pace due to the fluid security situation in Afghanistan and paucity of funds to build the project, despite the feasibility studies having been completed with the assistance of the World Bank and the ADB some time back. As per the news paper reports from Pakistan, given the serious power shortages, Pakistan Cabinet approved the project for implementation on November 17, 2011. One of the major attractions for Pakistan and Afghanistan to import electricity from the CARS is the competitive price at which electricity will be available to them from CARS. The cost of generation in the CARS and the potential power importing countries are given in Table 2.1 below:

Table 2.1: Comparison of Marginal Cost in the Export Market

Import Costs from CARs in Target	Marginal generation cost	Generation Options in CARs	Cost of Supply from CARs (US Cents/kWh)
Afghanistan	>10*	Sangtuda I, Rogun I, Talimardjan I and II	2.26 to 3.43
Iran	3.6	Sangtuda I, Rogun I, Talimardjan I and II	2.29 to 3.46
Pakistan	5.6	Sangtuda I, Rogun I, Talimardjan I and II and Kambarata II	2.26 to 3.75
China	3.6	Sangtuda I, Talimardjan I	2.47 to 3.16
Russia	3.0	Sangtuda I, Talimardjan I	2.30 to 2.99

Source: World Bank – worldbank.org/.../REEPS_Main_Report_Final_English...

From the above table one can appreciate that Pakistan and Afghanistan will benefit from the power imports from the CARs due to the price difference between the marginal-cost of generation in their own countries as against the cost of supply from the CARs. While the marginal costs of generation in Afghanistan and Pakistan are over US cents 10/kWh and US cents 5.6 /kWh, the cost of supply from CARs would range between 2.26-3.43 and 2.26-3.75 cents respectively, excluding the transmission charges. Even after adding the transmission wheeling charges, the landed cost of power will be considerably lower than the local marginal cost of generation; amply justifying the imports.

2.2 Review of Ongoing Electricity Trade Arrangements

All the above trade arrangements, except for the ones on the horizon now, have been put in place much before the amendment of electricity laws and introduction of electricity regulatory mechanisms in South Asia as part of power sector reforms being implemented since early 1990'. Moreover, these arrangements were made when the governments in the region were the owners, operators and regulators of the sector. As such the legal documentation pertaining to these trades is not in public domain, hence cannot be commented upon. However, for any trade to take place between any two sovereign nations, it is presumed that the agreements would have been covered under the laws/rules governing the trade of general commodities. But with the introduction of new electricity laws and regulations that permit and promote private sector ownership, encourage completion and envisage transparent sector operations, new power trade agreements will have to meet the prevailing legal and regulatory requirements. The findings of the review of the prevailing laws and regulations have been discussed in Chapter-3 of this report.

In addition to the legal and regulatory regimes, it is also essential to examine whether there exist opportunities for cross border electricity trade amongst the member states and with other regions that in turn will encourage investment in the sector and help eliminate the electricity shortages that have been hampering the economic and social development of the region. The potential for such trade is discussed below.

2.3 Potential for Power Trade in South Asia

All the member states have their long-term plans for the development of their electricity sector to meet their domestic demand, except for Bhutan and Nepal, who have plans to export the surplus energy. The energy generated by the planned power project of other member states will not be available to cross border trade, except for certain windows of opportunity due to the variations in their load curves. In addition to the option of electricity imports in to the region, SMS need to enhance their electricity generation capacity through the development of their indigenous energy resources to meet the regional demand. SMS could set up large regional power plants to enhance availability of supply. It is the energy from these regional power plants that will be available for cross border electricity trade among the member states. A brief discussion about the potential for enhancing electricity supply through the development of various indigenous energy resources is given below.

2.3.1 Hydropower

As stated in Section 1.1.1 Table 1 above, the cumulative hydropower potential of the region is 294,330 MW. The countries with a very large hydropower potential are Afghanistan 25,000 MW, Bhutan 30,000 MW, India 150,000MW, Nepal 42,000 MW and Pakistan 45,000 MW; which when added works out to 292,000 MW. This is more than the present total installed capacity of the region. The Member States have been able to exploit only a fraction of their hydropower potential. Assuming that the demand for electricity in India and Pakistan may not permit them to export the surplus energy to other countries in the region, even after the development of their full potential; but Afghanistan, Bhutan and Nepal with a total potential of 97,000 MW can develop their resource and export electricity to other countries in the region. SMS can cooperate and jointly develop hydropower plants with equity participation by the member states and share the electricity generated in relation to the investments made therein. In view of the limitation of the governments to finance these large investments, they could involve private sector for the development of this potential.

2.3.2 Hydrocarbons and other Resources

2.3.2.1 Coal Based Generation

The total coal reserves of the region add to 108,961 Million Metric Tonnes, as indicated in Table-1.1 above. The two countries in the region with large coal reserves are India and Pakistan with a reserve base of 90,085 and 17,550 Million Metric Tonnes respectively. Out of the total installed capacity of 185,496.62 MW in India as on 30.11.2011¹⁰, the coal based generation accounts for 102,863.38 MW constituting 55.45% of the total installed capacity. Pakistan is yet to develop its coal resources for power generation. If these two and other countries in the region set up coal base power plants, they can considerably increase the supply, thereby creating opportunities for cross border electricity trade in a big way.

An important aspect from electricity pricing perspective is the cost of generation from Coal based power plants. Several countries in the region including Afghanistan and Pakistan are generating electricity by burning liquid fuels. The cost of generation from these power plants is much more than the electricity generated from other fuels, such as, gas, coal and other fuels. The region can generate electricity at cheaper rates than liquid fuels. For examples, the successful bidder for one of the Ultra Mega Power Plants(UMPP) in India; Sasan Power Ltd. was awarded the project through international competitive bidding route to supply electricity at Rs 1.19/kWh, as against the average cost of generation of about Indian Rs. 8 to 10/kWh from diesel based plants. The price differentials of this magnitude is certainly a great incentive for enhancing the availability of supply through the establishment of coal fired power plants, which in turn will encourage electricity trade in the region. However, environmental concern has been holding up development of new coal mines for fuel new coal fired plants. Till the time the SMS address the environmental and other concerns that have been hampering the development of

¹⁰ Source: Power Sector at a Glance "All India"; Ministry of Power, GOI. <http://www.powermin.nic.in>

coal mines, they could jointly set up large coal fired power plants based on imported coal to meet the electricity demand in the region.

2.3.2.2 Gas Based Generation

Given the meager gas reserves in the region in relation to the demand for gas and the sensitivities exhibited by some of the member states, setting up of regional indigenous gas based power plants to meet the demand of other countries is not a feasible option at the moment. Unless very large gas finds, much beyond the need of the host country, are discovered. To tide over this situation, the member states could either establish LNG terminals for gas imports or lay gas transmission systems to bring in large volumes of gas to fire jointly developed gas based power generation facilities to meet the electricity demand of the project participant member states. Two major gas transmission systems being explored for quite some time are the Iran-Pakistan-India and Turkmenistan-Afghanistan-Pakistan-India gas pipelines. Member states could reach an agreement to accommodate additional gas supplies while designing these pipelines and import larger volume to meet the gas demand for the regional power plants as well, in addition to meeting their respective gas demand.

2.3.3 Renewable Energy

Large scale application of renewable energy technologies has led to reduction in the cost of electricity generation from renewable sources. SAARC region has a very large potential for development of renewable energy projects, such as, wind, solar and biomass.

Toady India is one of the largest producers of grid interactive renewable energy in the world with a total installed capacity of 21,125.38 MW¹¹ as on 31-08 2011, as detailed in Table 2.2 below. This is more than the total installed capacity of Pakistan individually or the total cumulative

Table 2.2: Cumulative Deployment of Renewable Energy Systems/Devices as on 31/08/2011

Renewable Energy	Target	Achievement	Total	Cumulative
A. GRID-INTERACTIVE POWER (CAPACITIES IN MW)				
Wind Power	2400	266	833	14989
Small Hydro Power	350	21	111.30	3153.93
Biomass Power	460	25	86.5	1083.6
Bagasse Cogeneration		12.5-	111.5	1779.03
Waste to	25	1.2	1.2	20.2
-Industrial		-	-	53.46
Solar Power (SPV)	200			46.16
Total	3435	325.7	1152	21125.38

Source: Report on Major Initiatives and Achievements of MNRE for the month of August 2011.

¹¹ Source: Ministry of New and Renewable Energy resources, GOI, <http://www.mnre.gov.in/>, Achievements as on 31-8-2011

installed capacity of all other countries in the region. India is also one of the largest wind power equipment manufacturers and suppliers in the world and has the capacity to help the member states in developing renewable energy resources to meet the electricity demand across the region.

SMS could identify Renewable Energy projects for joint development that could be undertaken. The energy generated from these plants could be shared on mutually agreed terms or trades across the region.

2.4 Location of Energy Resources

The uneven spread of the energy resources across the region is another important factor that provides an excellent opportunity to encourage electricity trade in South Asia. For example Bhutan has been meeting a large part of its revenue budget from the export earnings from electricity exports to India. Nepal is already planning to develop its hydropower resources in a big way to meet its own demand and to export the surplus energy. Both these countries, as well as, those who would import power from them would benefit from enhanced availability of electricity supply. While India is already exchanging and trading electricity with these countries; Bangladesh and Pakistan have shown keen interest in accessing their hydropower. But this can happen, only if they get access to the electricity markets of Bhutan and Nepal. India will have to play a pivotal role in facilitating the flows of electricity from these countries to Bangladesh, Pakistan and other countries in the region. Similarly Pakistan and Afghanistan would have to help the region to import electricity from the energy rich CAR countries.

2.5 Increasing Realization for Cooperation in Electricity Sector

India is the largest electricity market in South Asia. Even with an Installed capacity of over 182,689.62 MW as on 31-10-2011¹² the energy and peak shortages have hovered between 9.8% to 11.1% and 11.9% to 16.6% respectively during the period 2007-08 to 2010-11¹³; which have been adversely impacting its economic growth. In addition to the massive capacity addition plans, India as well as other countries in the region will immensely benefit from electricity imports at reasonable prices. For this to happen, they have to rely on their neighboring countries and regions to meet the increasing demand for electricity. The cooperation can be in the shape of suppliers and/or facilitators of electricity flows.

Given the demand-supply scenario in India, it is difficult to visualize India as an exporter of electricity in foreseeable future. But the growing realization for cooperation from a geo-strategic perspective, India has agreed to export 500 MW to Bangladesh. One of the major issues that would have been a stumbling block would be the price at which this power trade will take place. Here again in a spirit of cooperation, India has agreed to supply 250 MW from the central pool allocation and the balance 250 MW will have to be procured by the concerned Bangladesh

¹² Source: Ministry of Power Government of India -http://www.powermin.nic.in/JSP_SERVLETS/internal.jsp

¹³ Source: Annual Report 2010-11, Ministry of Power, Government of India

utility by choosing other available options, such as power traders or through the existing power exchanges operational in India. India may have to work out a similar arrangement with Sri Lanka with the construction of the proposed India-Sri Lanka transmission interconnection. As per press reports, even Pakistan has expressed its interest to import 500 MW from India.

2.6 Potential Transit Member States

Afghanistan and Pakistan have the potential of becoming important transit countries for power imports by South Asia from the Central Asian Republics. India which lies at the heart of the South Asian land mass has also to play a pivotal role in facilitating power export by Nepal and Bhutan to other countries in the region. Similarly, Bangladesh has the potential of becoming a transit country for power imports from Myanmar and other countries to the east of South Asia, as and when such opportunities arise. Bangladesh can also play an important role in helping India to wheel about 48,000 MW hydropower potential presently under development in northeastern states of India, by providing it the right of way to lay large transmission systems through its territory. With this, India can bring this energy to its load centers in northern and western part of the country, which are facing huge shortages. As a quid pro quo Bangladesh could get access to electricity exports from Bhutan and Nepal through Indian Territory. All the countries would benefit immensely through this arrangement.

2.7 Need for Creation of SAARC Electricity Market

Given the demand-supply situation across the region and the willingness of industry and other consumer groups to pay for electricity and save themselves from the adverse impacts of non-availability or poor quality of supply; electricity trade in the region is in the best interest of all the member states. Because, otherwise as well, the various consumers have to meet their demand through self generation at much higher cost than the grid connected supply.

SMS will benefit from the above energy resources, only if they are able to attract private investment in a big way for establishing the generation facilities and the creation of the cross border transmission infrastructure. One of the pre-requisites for that to materialize is the creation of a regional power market that can facilitate the off take of the electricity generated from these sources. SAARC has launched a study for the creation of the South Asia Regional Power Exchange with the assistance of the Asian Development Bank. Its establishment will encourage cross border electricity trade among the member states.

Review of Electricity Laws and Regulations of SAARC Member States (SMS)

3.0 Laws and Regulations Reviewed

A detailed review of all the electricity laws and regulation of the eight SAARC Member States provided to the author by the SEC was conducted to identify the specific provisions therein that deal with electricity imports/ exports and the extent to which these provisions contain rules and/or procedures that either impede or facilitate electricity trade amongst the Member States. The review was also conducted from the perspective of their implications on creation and operation of cross border electricity infrastructure and reaching commercial arrangements/ agreements to facilitate electricity trade among the Member States and with their neighbors. From the review, it was observed that no specific provisions have been made by the SMS in their electricity laws and regulations to govern the cross border electricity trade, except by Bhutan and Nepal. It is only these two countries that have made provisions therein to promote and increase electricity exports/imports and facilitate cross border electricity trade.

The laws, regulations and rules of each Member State that have been reviewed as part of this study have been listed at the beginning of the respective country profiles contained herein below. In the absence of specific provisions therein to govern cross border electricity trade and to appreciate the need for either amending them or devising new rules to govern the cross border electricity trade; this Chapter highlights the Sections, Sub-sections, Clauses, Sub-clauses, Rules and Sub-rules of the prevailing laws and regulations of each of the SMS that will have direct and/or indirect implications on cross border electricity trade under the respective country profiles. An analysis thereof and the findings of review in respect of each country have been given at the end of the sub-sections relating to that country. The findings of the overall review of the laws and regulations of the region as a whole have been given in the subsequent paragraphs in this chapter.

3.1 Afghanistan

Despite best effort made by the SAARC Secretariat, SAARC Energy Centre and the author of this report even at the top official levels of the Da Afghanistan Breshna Moassessa (Organization responsible for O & M of Generation, Transmission, Distribution and Sales of Electricity in Afghanistan); neither the electricity laws and regulations nor policy documents could be obtained from Government of Afghanistan. Even the internet search did not result in laying our hands on the copies of any of the above document pertaining to Afghanistan. Hence, a

firsthand review thereof could not be undertaken. The only official document that could be accessed through an intensive search on the internet was the final draft of the “Strategic Policy Framework for the Water Sector” prepared by the Transitional Islamic State of Afghanistan, Ministry of Irrigation, Water Resources and Environment (MIWRE) published in May 2004. It makes a brief mention about the development of the hydropower resources of the country. The other pertinent references to the electricity policy of Afghanistan were found in the following two documents:

- i. Study on “*Setting Legal Basis for Private Sector Involvement in Hydropower in Afghanistan*”, carried out by the GTZ, and
- ii. Technical Assistance Consultant’s Report of the ADB titled: “*Islamic Republic of Afghanistan: Preparing the Small to Medium-Sized Hydropower Development Project*”.

As stated therein, the findings of the study reports referred to above are based on the review of two documents related to the governance of the power sector in Afghanistan namely: Law “for Using Electric Energy” 1986 and the “Electricity Sector Policy” of 2003.

ADB report gives the policy briefing on the power sector of Afghanistan, which is reproduced below:

“Quote”

B. Policy Briefing on the Power Sector

20. The ADB has expressed the need to prepare a policy brief or matrix to address issues such as power shortage in rural and in off-grid areas, demand assessment of power in potential subproject areas, marginal cost pricing, tariff and cost recovery, willingness to pay, affordability, subsidization of consumption, regulation and conflict of uses including an assessment of institutional capabilities for implementing the required policy changes. Such a policy may be found in the report “Transitional Islamic State of Afghanistan, Ministry of Water and Power (MPW) Electricity Sector Policy.

21. The sector would be restructured by (i) separating the utility functions from sector policy and planning functions; (ii) strengthening the role of the MWP in preparing and implementing sector policies, coordinating donor programs, and improving governance in the sector; (iii) establishing an independent regulatory entity, which would set technical, financial and operational performance standards and regulate the power sector; and (iv) developing feasible options for handling certain non-core functions which are currently being handled by MWP or by government enterprises controlled by MWP.

22. Among the topics discussed in the paper is the scope of the Electric Regulatory Entity, which includes i) the implementation of the national policy for the power sector that ensures a fair, transparent and competitive market environment according to international best practices; ii) provision of just and reasonable rates and charges for electricity and promoting conservation of energy; iii) creating an enabling environment for competition and private sector participation; iv) ensuring adequate, reliable,

and economical utility service; v) ensuring least cost planning; vi) setting technical standards regarding interconnection between utility companies to ensure open access on a fair and non-discriminatory basis; vii) ensuring consumer protection, safety, and environmental stewardship; and viii) encouraging and promoting harmony between utility companies and their customers.

23. To implement the above policy, the government will i) develop an updated electricity law (last revised in 1984); ii) create a Program Support Unit to ensure the accountable execution of reconstruction efforts and act as the main implementation interface for donor-funded projects; iii) appoint a Technical Advisory Board to advise the Minister/Deputy Minister; and iv) establish a high-level Reform Task Force to lead the sector restructuring process.

“Unquote”

The GTZ report aimed at examining the electricity laws and regulations from the perspective of encouraging private investment in the Afghanistan power sector states that:

“Quote”

II Evaluation of Existing Law

The consultant was required to conduct an evaluation of the existing laws and regulations for the access of private, independent power producers (IPP) to Afghanistan's energy market after reviewing them. However, a full-fledged review was not possible as most of the relevant body of law was in Afghani language. An unofficial translation of Law “for Using Electric Energy” from 1986 (Serial Number-607) into English was rendered by an official of INTEGRATION and an evaluation of the same is being made hereunder. Similarly, an analysis of the “Electricity Sector Policy” of 2003 also is being conducted in this section.

2.1 Law for Using Electric Energy

This legislation defines and regulates the relationship between the utility and its consumers, like what accessories (including metering device, transformers, etc.) to use, permissible voltage range, categories of consumers, application procedure, penalty for delayed payment, mode of payment, etc. It even specifies that load shedding will be resorted to in case of low generation as well as during force majeure situations and there is also provision for uninterrupted supply of energy, if there is categorical provision for the purpose in the agreement with specific consumers. There is provision also for the allocation of losses between the distance of power net and meters.

The legislation envisages underground cable network and prohibits construction entailing interference with it. There is a separate section devoted to regulation of use of electricity by each category of consumers. It has designated Afghan law for the

settlement of disputes between the utility and its consumers. However, this law does not envisage private sector participation in electric business.

2.2 Electricity Sector Policy, 2003

The policy mentions that “Electricity is the backbone of the economic recovery and availability of reliable power will help stimulate economic growth, raise living standards and restore the traditional sense of community and common purpose that unites the Afghan people” and it infers that “a reliable power system is essential to providing basic services, in attracting new industries, retaining existing ones, and bringing back to the country those that have left.”

The policy has articulated a vision for the Ministry of Water and Power (which has since been transformed into Ministry of Energy and Water), for a limited time till 2010. The vision emphasizes “low cost electric service to all Afghan citizens” and also highlights the importance of being “environmentally responsible.” But the vision is silent about the partnership of both domestic and foreign private sector in the electricity sector.

The main focus of the policy is rehabilitating existing infrastructure and it adds that generation capacity will be increased through the participation of private sector. The policy makes commitment to encourage and attract private sector involvement and mentioned it plan to develop a regulatory framework and to introduce law that would create an independent electricity regulatory entity.

The Government’s chief objective has been mentioned as to set the overall vision for the electricity sector, to create the organizational structure which would allow the transparent execution of all its policies and vision, and to enable the environment for private investment, competition and rapid industry growth. The policy also declares that “the Government itself will no longer be the operator of the electric sector.”

The policy has also laid out a plan to restructuring of the electricity sector entailing separation of utility functions (generation, transmission and distribution/sale of electricity) from sector policy and planning functions. The independent regulatory entity is expected to set technical, financial and operational performance standards and regulate the power sector.

The policy lists that there are nine departments and four public enterprises under the MWP, including DABM. The policy lists activities that the government will undertake to implement the policy, including promulgation of “an updated electricity law.” The policy also envisages setting up a “Reform Task Force,” chaired by the Deputy Minister for Power and reporting to the Minister for Water and Power. The Task Force is reposed with the responsibility “to identify the legal and other constraints (if any) which preclude the divestiture of non-core functions to private owners/operators.”

However, the policy is silent with regard to strategies that will be adopted to implement the policy. It also does not make necessary provisions to encourage the private investors

to participate in the electricity sector. As electricity is a capital intensive venture needing longer term for the recovery of investment with a decent return, the policy should have laid down provisions to make private investors feel confident about their investment and to raise their level of comfort. It should have covered issues like water right, power purchase, facilities regarding rates, tax, duties, etc., if any, and so forth. Similarly, from the perspective of foreign investors, the policy also needs to make commitment regarding repatriation, visa, etc. The policy needs to be fully revamped as it does not even define the term “independent power producer.” Besides, the environmental legal system in Afghanistan is still in its infancy. No overall environmental law is yet in place covering, for instance, control of air-, water- and soil pollution, overall environmental planning, EIA, etc.

“Unquote”

3.1.1 Findings of the Review-Afghanistan:

A reading of the findings of the above two reports clearly indicates the earnest desire of the GOA to put the power sector back on rail through its reform and restructuring and encouraging private investment in the sector. That inter-alia would include cross border electricity trade. Another redeeming feature from the perspective of this study is that Afghanistan is yet to give the final shape to its electricity laws, regulation and policies to have a self sustaining electricity sector and to meet its demand through cross border electricity trade. Afghanistan will certainly be interested in incorporating necessary provisions therein to lay the laws, rules, procedures and regulations to handle cross border electricity trade. Afghanistan is currently importing electricity from its northern neighbor under bilateral agreements which are not in public domain, hence cannot be commented upon.

Afghanistan would benefit immensely as a transit country, if electricity trade between the Central Asian Republics (CARs) and South Asia becomes a reality. For this to happen, Afghanistan will have to play a leading role in convincing the governments in South Asia about its ability to provide security for the inter-regional electricity infrastructure to facilitate such electricity flows from CARs to South Asia. This will help Afghanistan not only in reconstruction of its electricity sector, but give investors the confidence to invest in other sectors of economy of the country.

3.2 Bangladesh

The following laws and regulations pertaining to Bangladesh were reviewed for the purpose for this study:

- i. Electricity Act 1910 (with various amendments made thereto, after the formation of Bangladesh);
- ii. National Energy Policy 1995;
- iii. Power Pricing Framework (Approved by the Government in January 2004);
- iv. Policy Guidelines for the Enhancement of Private Participation in the Power Sector, 2008;

- v. The Bangladesh Power Development Board Order, 1972;
- vi. Bangladesh Energy Regulatory Commission Act, 2003;
- vii. Private Sector Infrastructure Guidelines;
- viii. Policy Guidelines for Power Purchase from Captive Power Plants;
- ix. Private Sector Power Generation Policy of Bangladesh;
- x. Guidelines for Remote Power Supply Systems;
- xi. Rural Electrification Board Ordinance, 1977;
- xii. Renewable Energy Policy of Bangladesh, November 2008;
- xiii. Policy Guidelines for Small Power Plants (SPP) in Private Sector, April, 1998 (Revised November, 2008);
- xiv. Vision Statement of the Government of Bangladesh to Provide Access to Affordable and Reliable Electricity to All by the Year 2020;

There is no reference to cross border electricity trade in any of the above laws, regulations and policy guidelines. All these laws, regulations and guidelines relate to the development, promotion and governance of the electricity sector within the country; without any reference to cross border electricity trade. Since there are no provisions, rules or clauses that would govern cross border electricity trade, they neither encourage nor discourage cross border electricity trade.

Though not directly dealing with the issues of regulation of cross border electricity trade, the provision contained in the Bangladesh Energy Regulatory Commission Act, 2003 (BERC Act, 2003) will have implications on electricity imports/export by Bangladesh, in so far as the entities involved in the cross border electricity trade will have to take cognizance of these provisions. Because, these provisions/clauses will have implications while obtaining licenses/permissions and also managing their day-to-day operations. The specific provisions of the said Act that would have direct/indirect implications for cross border electricity trade of Bangladesh along with the relevant sections, sub-section and clauses therein; are summarized in the following tables:

3.2.1 Chapter-4: Functions, Powers and Proceedings of the Commission

Section 22	Function of the Commission
(a)	These inter-alia include the following provisions:
(b)	to ensure efficient use, quality services, determine tariff and safety enhancement of electricity generation and transmission, marketing, supply, storage and distribution of energy;
(c)	to issue, cancel, amend and determine conditions of licenses, exemption of licenses and to determine the conditions to be followed by such exempted persons;
(d)	to approve schemes on the basis of overall program of the licensee and to take decision in this regard taking into consideration the load forecast and financial status;

(f)	to frame codes and standards and make enforcement of those compulsory with a view to ensuring quality of service;
(g)	to develop uniform methods of accounting for all licensees;
(i)	to extend co-operation and advice to the Government, if necessary, regarding electricity generation, transmission, marketing, supply distribution and storage of energy;
(m)	to perform any incidental functions if considered appropriate by the Commission for the fulfillment of the objectives of this Act for electricity generation and energy transmission, marketing, supply, storage, efficient use, quality of services, tariff fixation and safety improvement.
Section 23	Investigation Power
Sub-section (3)	If the Commission is satisfied to the effect that for achieving objectives of this Act or for the sake of discharging duties under this Act, examination of any book, accounts or deed, is necessary relating to power generation, and purchase, production, transmission, distribution supply or use of energy, or activities of such undertaking, or matters otherwise connected, but the same is lying under the custody or control of any person, in that case, Commission may direct the said person to present the book, account or deed to any officer of the Commission for that purpose and may order examination and direct the said person to supply the information within his control to discharge duties under this Act.
Sub-section (4)	If the Commission, during an investigation, or any proceeding under this Act, has reasons to believe to the effect that any book or account involving interest of the unit or person under investigation, presentation of which shall be necessary for investigation, but the same is being destroyed, partially destructed, altered, tampered or concealed or likely to be done so, in that case, the Commission, by an order in writing, empower its officer to enter, investigate and confiscate, as if he is exercising powers of an Inspector appointed under the Companies Act, 1994 (Act No.18 of 1994).

3.2.2 Chapter-5: Relationship between the Government and the Commission

Section 24	Powers of the Government for the Energy Sector
Sub-section (1)	The Government shall have the power of giving policy directives for the development and overall planning in energy sector.
Sub-section (2)	The Government, if necessary, shall issue any policy directive in consultation with the Commission.

Sub-section (3)	The Government shall make policies providing therein the scope for overall planning and coordination for the sake of development of energy sector giving priority to the need of energy for different socio-economic classes, and areas, and to achieve desired level of economic growth, and for conservation of energy as future sources of power.
Section 25	Emergency power to control energy use:
	Government may prohibit the use of energy and make rules relating to distribution for the definite marginal users, to meet the unexpected shortfall, or the emergency condition in respect of availability of energy, but the Government in making such rule, shall ensure that the licensees and others will not be affected.

3.2.3 Chapter-6: Licensing

Section 27	License
Sub-section (1)	No person shall engage himself in the following business unless he is empowered by a license or exempted from it under this Act or any other Act, such as:
	(a) power generation; (b) energy transmission; (c) energy distribution and marketing; (d) e nergy supply; and (e) energy storage.
Section 31	General duties and powers of the licensee
Sub-section (2)	Every licensee shall maintain international standard and working method at the time of discharging his duties relating to energy operation, maintenance and safety.
Section 32	Restrictions to the licensee
Sub-section (1)	No license without having prior permission in writing from the Commission shall acquire any undertaking by purchase or any other means:
	Provided that before making an application for such consent licensee shall serve 30 (thirty) day's notice to the Commission and if the license is for distribution and supply, in that case, to each of the concerned local authorities.
Sub-section (2)	No licensee, without the prior permission from the Commission shall sell, mortgage, lease, exchange or transfer by any other means his undertaking or any part of it.

3.2.4 Chapter-7: Tariff

Section 34	Tariff
Sub-section (1)	Notwithstanding anything contained in any other law for the time being in force, the price of power generation in wholesale, bulk and retail, and the supply of energy at the level of end-user, shall be determined in accordance with the policy and methodology made by the Commission in consultation with the Government:
	Provided that this shall not be applicable in those cases, the tariff of which were determined by the agreement executed between the private company and the Government or by any of its agency before this Act comes into force.

3.2.5 Chapter-8: Commission's Power to Issue Order and Implement its Decisions

Section 36	Emergency Provision
	In consideration of objectives of this Act and the necessity of providing uninterrupted supply of energy to the consumers, subject to the approval of the Government, the Commission, shall be authorized to order any licensee for vesting any undertaking of the licensee, its properties, along with its interests, rights, duties of management and control, to any other person or authority till the completion of investigation and issuance of interim or final order for the preservation of the object as required under this Act and in the interest of safe and uninterrupted supply of energy to the consumers, no question can be raised against such order, but before giving such order, Commission shall provide opportunity to the licensee for hearing in accordance with the provisions of this Act.

3.2.6 Chapter-10: Arbitration - Settlement and Appeal

Section 40	Arbitration – Settlement by the Commission
Sub-section (2)	Commission as an arbitrator may, suo moto, take steps and award adjudication of a dispute or appoint arbitrator for settlement of dispute.

3.2.7 Chapter-11: Offence and Penalty

Section 46	Offence by a Company:
	If an offence is committed by a Company under the Act, the Proprietor, Director, Manager, Secretary or any other officer of the Company

	<p>who was responsible for the operation of the business at the time of commission of such offence, shall be deemed to be an offender unless he can prove that the said offence was committed beyond his knowledge or he tried his level best to prevent the commission of the offence.</p> <p>Explanation - In this section:-</p> <p>(a) “Company” means any statutory public authority, trade organization, association or organization; and</p> <p>(b) in the case of business organization “Director” means any partner or member of the Board of Directors.</p>
Section 47	Cognizance of offence for trial:
	No Court shall take cognizance of an offence under this Act for trial, except a written complaint by an officer who has been authorized by a general or special order in writing by the Commission.

3.2.8 Chapter-13: Miscellaneous

Section 55	Finality of the Commission’s order:
	The order or any decision given by the Commission under this Act, or rules or regulation made under it, shall be deemed to be the final.

3.2.9 Findings of the review-Bangladesh:

The above provisions of the BERC Act, though not directly governing the cross border electricity trade have implications for the cross border electricity traders and cross border electricity infrastructure owners/operators and developers; hence highlighted herein above. The remaining laws, rules and enactments that have been reviewed and listed herein above do not have any provisions that deal with cross border electricity trade. Even though these provisions are applicable for the governance of the sector within the country Sections: 24 -Relation between the Government and the Regulatory Commission under which government can ask the Commission to undertake planning for the sector, thereby making the same body as the regulator as well as the planner for the sector; Section 34-Traiff Fixation to be done by the Commission in consultation with the government, compromising on the independence of the regulator; Section 36-Power of the Commission to vest the properties licensee etc. of an operator to any other person; Section 55-The order or decision of the Commission being final with no provision for further appeal before any court or authority; will have serious ramifications for investments in the sector and thereby on cross border electricity trade as well.

Bangladesh, as other countries in the region, will have to either make necessary changes in their prevailing electricity laws and regulations to clearly specify the rules and procedures to govern

the cross border electricity trade, or in consultation with other SMS formulate a legally binding regional intergovernmental agreement to encourage cross border electricity trade. Such an agreement should have detailed guidelines with regard to the procedure of licensing, ownership, maintenance, operation, payment settlement mechanisms and other relevant provisions for smooth and orderly evolution of a South Asia electricity market.

During the earlier regional cooperation initiatives in electricity sector in South Asia including the USAID South Asia Regional Initiative for Energy Cooperation and Development, Bangladesh expressed its desire to import electricity from Bhutan. For this to happen, there are two important issues that need to be resolved. One, how to bring India on board to allow Bhutanese electricity to flow to other countries in the region using Indian transmission facilities and number two, is Bangladesh willing to pay the optimal price for Bhutanese electricity in the light of the very low generation cost of electricity within Bangladesh due to the highly subsidized natural gas prices, the main fuel for electricity generation in Bangladesh.

Bangladesh and India are now implementing the first cross border transmission infrastructure of 1000 MW Transfer capacity, initially to help Bangladesh import 500MW electricity from India. Due to the intricacies involved in managing power transfers between grids observing different grid codes and having different grid operational and discipline norms, the system being built is a back-to-back HVDC system; involving much high investment than an AC transmission interconnection. Had the countries in the region been observing a common grid code, grid operation norms etc., investment in cross border electricity infrastructure could be reduced substantially.

The recommendations relating to addressing the above and other related issues are contained in the relevant chapter of this report.

3.3 Bhutan

Electricity sector in Bhutan is governed under the Bhutan Electricity Act 2001. The objectives of the Act include, but are not limited to:

- Promote a safe and reliable supply of electricity throughout the country;
- Enhance revenue generation through export of electricity;

Ministry of Energy is the Ministry in-charge for the development of the power sector and to deal with the matters relating to the power exchanges, import and export of electricity. The ministry is headed by the Minister of Powers, whose functions under the Act are to:

- i) Determine general policies, targets and strategies of the electricity industry operation;
- ii) Approve power system expansion plans;
- iii) Set general policies on tariff determination and service provision of Licensee;
- iv) Provide the policy on customer service standards and Licensee standards;
- v) Set the policy encouraging energy service extensions and providing electricity services for the underprivileged;
- vi) Approve the license fee and the fee for the Licensee;

- vii) Approve the operational plan and the budget of the Authority;
- viii) Provide the policy on the protection against and solution to energy shortage;
- ix) Approve the rules and codes of conduct of the Authority;
- x) Provide policy in respect of private participation;
- xi) Grant Licensees permissions for compulsory acquisition of ownership or rights to land and water necessary for implementation and operation of licensed activities; and
- xii) To perform other duties as stipulated under this Act.

The salient features of the Act from cross border electricity trade perspective are summarized below:

3.3.1 Part 3: Licenses

Section 18	Duty to obtain a license
18.1	No person or entity shall engage in, construction, generation, transmission, system operation, distribution, sale, export or import of electricity without a license issued under this Act.
Section 22	Application for license
22.1	A corporation may apply to the Authority for the issue of a license authorizing one or more of the following activities as are specified in the license: <ul style="list-style-type: none"> i) to generate electricity; ii) to transmit electricity; iii) to bulk supply; iv) to distribute electricity; v) to supply electricity; vi) to trade in electricity; and vii) to acquire a license from another party.
Section 25	Factors to be considered for an application
25.1	When granting or rejecting applications, the Authority shall take into consideration, as far as adequate for the project applied for: <ul style="list-style-type: none"> i) the needs for electricity, or revenues for export of electricity, of the country, regions or community;
Section 38	Transmission license
38.1	A holder of a transmission license shall provide access to all existing and potential users of the transmission grid on the payment of fees and other charges for grid services as may be approved by the Authority.

Section 39	System Operator
39.1	<p>The Authority may designate a person to be a system operator, and license the person:</p> <ul style="list-style-type: none"> i) to co-ordinate the power supply system to obtain instantaneous balance between generation and consumption of electricity; ii) to be responsible for dispatching generation installations; iii) to co-ordinate transmission outages; iv) to monitor the import and export of electricity;
Section 40	Bulk Supplier
40.1	The Authority shall designate a bulk supplier who will be responsible for the wholesale supply, including import and export, of electricity.
40.2	The terms and operating conditions of the bulk supplier shall be specified in its sale license or prescribed by regulations.

3.3.2 Part 4: Private Participation

Section 48	Private participants
48.1	Private participants in the electricity supply industry must be licensed as prescribed under Part 3.
Section 49	Principles governing the participation of private parties
49.1	<p>In the event, the Government decides for private participation in the electricity industry, the Authority shall prepare and promulgate regulations in relation to the establishment, ownership, operations and activities of private participants. These regulations and the Government's policy shall comply with the following principles:</p> <ul style="list-style-type: none"> i) the energy policy of the Government shall be clear and published; ii) the regulations prepared and promulgated by the Authority shall be clear, consistent and published; iii) the regulations shall be consistently and transparently applied; iv) solicitation of, and bids for, construction of electricity supply facilities by private parties are competitively sourced and contested in accordance with a published timetable and shall be reviewed independently;

	<p>v) information shall be made available to bidders in relation to preferred sites and technical parameters; and</p> <p>vi) clear mechanisms for currency convertibility and remittances shall be prepared and published.</p>
Section 49.2	The bidding procedures shall be managed by the Authority, which shall give his recommendations to the Minister for final decision regarding the selection of the successful bidder.
49.3	With respect to any unsolicited bids that the Authority may receive, the Authority will deal with these in a manner consistent, where relevant, with the principles set out in Sub-section 49.1

3.3.3 Finding of the Review-Bhutan:

One of the two principal objectives of the Bhutan Electricity Act 2001 promulgated by the Government; clearly state the government's intention to develop the power sector in a manner to enhance its revenue generation through export of electricity. In order to do so, the Act clearly lays down the rules and procedures with regard to (i) duties/obligation of the developers; (ii) licensing norms; (iii) provision of open access on transmission systems on payment of necessary fee to be determined by the BEA; (iv) role/responsibilities of the system operator including those relating to power exports; (v) designation of bulk supplier that includes import/export of power; (vi) intention of the government to set the rules and procedures relating to private sector participation. In essence the Bhutan Electricity Act 2001 is one of the Acts in the region that sets out the legal and regulatory framework to not only facilitate but also to promote cross border electricity trade with other countries in the region. However, the major limitation here is that electricity flows to any country other than India within the SAARC region from Bhutan shall have to be facilitated by India, by providing access to its transmission facilities so that Bhutan's electricity can be exported to other countries. A prefeasibility study was undertaken to interconnect the Bhutanese electricity grid with that of Nepal and Bangladesh, but the proposal has not made any progress so far.

Another important aspect as of now is that most of the major generation facilities established in Bhutan have been built with Indian assistance. The intergovernmental agreements between India and Bhutan have specific provisions that permit Bhutan to utilize as much energy generated from these plants as it needs. But any surpluses will have to be exported to India at mutually agreed prices. This leaves no scope for any electricity exports from Bhutan to other countries from these facilities. The possibility of power export from Bhutan will arise as and when Bhutan will have new power plants built on financing models that permit power export to third countries as well.

One of the mechanisms is to build power plants either with private participation and/or in collaboration with other countries in the region to facilitate sale of electricity to them as well in addition to India. Another option to overcome this barrier is that SMS can make it mandatory

on each country to export and/or exchange, say 10%, of their generation capacity with other countries in the region through a regional power export/exchange mechanism to which all the countries of the region can have access to. Such an arrangement, if put in place will help other neighbors to access Bhutanese electricity in the short run. It will also encourage the SMS to look beyond the obvious and create a spirit of regional cooperation in electricity sector. This recommendation has been made in the relevant chapter of this report.

3.4 India

Before we embark on reviewing the electricity laws and regulations prevailing in India, it is of relevance here and for future undertakings on regional electricity cooperation amongst the SMS, to have an overview of the mechanisms of electricity cooperation between Bhutan-India and Nepal-India. As these deal with the very first initiatives of electricity cooperation and cross border electricity trade in South Asia.

3.4.1 Cooperation in Electricity Sector between India and Bhutan

Electricity cooperation between India and Bhutan began with small imports of electricity by Bhutan from India to electrify its border towns. The major initiatives for exploitation of Bhutanese hydropower resources led to the execution of Chukha – 336 MW in 1974 followed by Kirchhu – 45 MW in 1994 and Tala-1020 MW in 1996 with the assistance from government of India. All these projects were executed through project specific agreements under which India provided concessional financial aid and technical support to government of Bhutan to build these projects with the provision that Bhutan could consume as much electricity from these projects as required and the surplus will be exported to India. With the success of this model, a Framework Agreement on Hydropower Development and Trade between India and Bhutan was signed on 28th July 2006. This agreement laid the basis for broader electricity cooperation between the two countries. The agreement envisages that both the countries will cooperate to facilitate hydropower development and trade through public and private sector participation. Bhutan has identified a market opportunity to export a minimum quantum of 5000 MW to India by 2020. Necessary steps have already been taken to build power projects to help achieve this goal. Bhutan intends to avail of the CDM benefit from the development of these hydropower projects and power exports to India using India's baseline data for the purpose.

3.4.2 Cooperation in Electricity Sector between India and Nepal

India-Nepal cooperation in hydropower development began with the signing of the Koshi Agreement on 25th April 1954 followed by several agreements for development of other small projects. Tanakpur Agreement was one of the bigger cooperation initiatives that led to the setting up of the Tanakpur 40MW hydropower project near the Banbasa Barrage. Some differences about riparian rights and the perceptual unevenness of sharing of benefits from the project led to a stalemate till the two countries entered into the Treaty on Integrated Development of Mahakali River in February 1996. The Mahakali Treaty envisaged the Integrated Development of the Mahakali (Sarda in India) River including Sarda Barrage (existing), Tanakpur Barrage (existing) and Pancheshwar Project (Proposed – under Planning). Pancheshwar Multipurpose

Project (PMP) on the river Mahakali is the centerpiece of the Treaty. Despite the lapse of over a decade, no tangible progress has been made for the development of these projects so far.

3.4.3 Laws and Regulations:

Indian electricity sector continued to be governed by the Electricity Act 1910, even after the partition of India in 1947. The major enactment brought thereafter, until the Electricity Act 2003 came in to effect are listed below:

- i. The Electricity (Supply) Act, 1948 mandated the creation of the State Electricity Boards in the country. Other amendments include the amendment in 1975 to enable generation in Central sector. Amendment to bring in commercial viability in the functioning of SEBs – Section 59 amended to make the earning of a minimum return of 3% Rate of Return on net fixed assets a statutory requirement (with effect from 1.4.1985). Amendment in 1991 to open generation to private sector and establishment of RLDCs. Amendment in 1998 provided for private sector participation in transmission, and also provision relating to Transmission Utilities.
- ii. The Electricity Regulatory Commission Act, 1998 provided for setting up of Central/ State Electricity Regulatory Commissions with powers to determine tariffs. Constitution of SERC kept optional for States. Distancing of Government from tariff determination.

3.4.4 Salient Features of the Electricity Act 2003

The relevant salient features of the Electricity Act 2003, along with section and subsection numbers, though not meant to deal with cross border electricity trade, but would have implications thereon are reproduced below:

3.4.4.1 Role of Government

Section	Salient Features
Section 3	Central government to prepare the National Electricity Policy and tariff policy.
Section 4	Central government to develop the National Policy for rural areas in consultation with states.
Section 5	Central government to formulate National Policy in consultation with states for the bulk purchase of power and management of local distribution through user associations, etc.
Sections 107, 108	Central/state governments to guide appropriate commission in matters of policy involving public interest.

3.4.4.2 Licensing

Section	Salient Features
Section 12	License for transmission, distribution, and trading is mandatory.
Section 14	<ul style="list-style-type: none"> • Appropriate commission to grant license; • Appropriate commission may grant distribution license to two or more persons within the same area; • No license required for generation and distribution of electricity in rural area notified by state government.

3.4.4.3 Generation

Section	Salient Features
Section 7	<ul style="list-style-type: none"> • Free from licensing; and • Requirement of techno-economic clearance for thermal generation removed.
Section 8	<ul style="list-style-type: none"> • Concurrence of CEA required for hydro projects with capital expenditure exceeding limit fixed by central government. • Necessary due to concern of dam safety and inter-state issues.
Section 9	<ul style="list-style-type: none"> • Captive generation set up by any person for his own use or by any co-operative society of association of persons for use of its members free from controls; • Open access to captive generation subject to availability of transmission facility; and • Surcharge not applicable for captive generation.
Section 86 (1)(e)	<ul style="list-style-type: none"> • Generation from non-conventional sources / co-generation to be promoted; and • Minimum percentage of purchase of power from renewable sources to be prescribed by regulatory commissions.

3.4.4.4 Transmission

Section	Salient Features
Sections 12,15(5)(b)	<ul style="list-style-type: none"> • License required to transmit electricity; and • Private transmission companies to be licensed by the appropriate commission after considering the views of the transmission utility.
Sections 26, 27, 31 38, 39	<ul style="list-style-type: none"> • Load dispatch to be managed by a government company/ organization; and • Flexibility regarding keeping transmission utility and load dispatch together or separating them.

Sections 38-40	<ul style="list-style-type: none"> • Open access to transmission lines to be provided to distribution licensees and generation companies; • Provision of surcharge to recover current level of cross subsidies; • Surcharge transitional till the cross subsidies are eliminated; and Transmission utility at center and state to manage and develop transmission system.
Sections 27,31,38, 39,41	<ul style="list-style-type: none"> • Load dispatch center/transmission utility/transmission licensee not to trade in power.

3.4.4.5 Distribution

Section	Salient Features
Sections 12, 14	<ul style="list-style-type: none"> • License required for distribution; • Distribution licensee free to take up generation; and • Appropriate commission may grant license to two or more persons for distribution of electricity through their own distribution system.
Section 42	<ul style="list-style-type: none"> • Open access in distribution to be allowed by SERC in phases; • State commission shall, not later than 5 years, provide open access to all consumers where the maximum power consumed exceeds 1 MW; • In addition to wheeling charges provision for surcharge to cover current level of cross subsidy; and • Surcharge transitional till the cross subsidies are eliminated.
Section 62	<ul style="list-style-type: none"> • Retail tariff to be determined by regulatory commission.
Section 55	<ul style="list-style-type: none"> • No supply of electricity after two years from the appointed date except through appropriate meters.

3.4.4.6 Trading

Section	Salient Features
Section 12	<ul style="list-style-type: none"> • Trading recognized as a distinct activity; and • License required for trading.
Section 66	<ul style="list-style-type: none"> • Regulatory commission to promote development of market including trading.
Sections 79(1) (j), 86 (1)(j)	<ul style="list-style-type: none"> • Regulatory commission may fix ceiling on trading margin.

3.4.4.7 Regulatory Commissions

Section	Salient Features
Sections 38(d)(2), 39(d)(2)	<ul style="list-style-type: none"> • Specify open access at distribution; and • Specify the surcharge for meeting the current level of cross subsidy that is to be reduced gradually.
Section 42(2)	<ul style="list-style-type: none"> • Introduce open access in phases and with conditions to be specified in a year from the appointed date.
Section 82	<ul style="list-style-type: none"> • SERC mandatory; • Constitution of SERC within 6 months from the appointed date; • SERC to have not more than three members; and • Chairman and members of the SERC to be appointed by the state government on the recommendations of the selection committee.
Section 86	<ul style="list-style-type: none"> • The key functions of the SERCs include: • Determine the tariff for generation, supply, transmission, and wheeling of electricity (wholesale, bulk, or retail); • If open access has been permitted to a category of consumers, SERC to determine only the wheeling charges and surcharge thereon; • Regulate electricity purchase and procurement process of distribution licensees including the price of power procured through agreements for purchase of power; • Facilitate intra-state transmission and wheeling of electricity; • Issue licenses to persons seeking to act as transmission licensees, distribution licensees, and electricity traders with respect to their operations within the state; • Promote cogeneration and generation of electricity from renewable sources of energy; • Adjudicate upon the disputes between the licensees and generating companies and to refer any dispute for arbitration; • Levy fee for the purposes of the Electricity Act, 2003; • Specify State Grid Code consistent with the Grid Code; • Specify or enforce standards with respect to quality, continuity and reliability of service by licensees; • Fix the trading margin in the intra-state trading of electricity, if considered, necessary; and • Discharge such other functions as may be assigned to it under the Electricity Act, 2003.

3.4.4.8 Tariff Issues

Section	Salient Features
Section 61	<ul style="list-style-type: none"> • Consumer tariff to progressively reduce cross subsidy and move towards the actual cost of supply; and • Regulatory commissions to undertake regulation including determination of multi-year tariff principles.
Section 62	<ul style="list-style-type: none"> • Regulatory commission to determine tariffs for: <ul style="list-style-type: none"> ➤ Supply of electricity by generating company to distribution licensee; ➤ Transmission of electricity; ➤ Wheeling of electricity; and ➤ Retail sale of electricity. • Regulatory commission to determine tariff for supply of electricity by generating company on long / medium term contracts; • No tariff fixation if tariff determined through competitive bidding or where consumers, on being allowed open access enter into agreement with generators / traders; and • Regulatory Commission to consider cost of generation, transmission and distribution separately.
Section 65	State government to provide subsidy in advance through the budget for specified target groups, if tariff is required to be lower than that determined by regulatory commission.

3.4.4.9 Dispute Resolution

Section	Salient Features
Section 11	<ul style="list-style-type: none"> • Appellate tribunal to hear appeals against the orders of CERC/ SERC.
Section 121	<ul style="list-style-type: none"> • Appellate tribunal may issue orders to any appropriate commission for performance of its statutory functions.
Section 125	<ul style="list-style-type: none"> • Appeals against the order of the appellate tribunal to be placed before the Supreme Court.
Section 143	<ul style="list-style-type: none"> • Appropriate commission may appoint any of its members to be an adjudicating officer for holding an inquiry; and • Adjudicating officer has the power to summon and enforce the attendance of any person.

Section 158	<ul style="list-style-type: none"> • In case of any dispute directed under the Electricity Act, 2003 to be determined by arbitration, it would be determined by such persons nominated by the appropriate commission; and • In all other respects, arbitration shall be subject to the Arbitration and Conciliation Act, 1996.
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3.4.4.10 Other Issues

i. Role of Central Electricity Authority (CEA)

Section	Salient Features
Section 70	<ul style="list-style-type: none"> • To continue as the main technical advisor of Government of India/state government with the responsibility of overall planning.
Section 72	<ul style="list-style-type: none"> • To specify safety standards.
Section 73	<ul style="list-style-type: none"> • Technical advisor to CERC as well as SERCs; and Specify technical standards for electrical plants and electrical lines.

ii. Restructuring of State Electricity Boards (SEBs)

Section	Salient Features
Section 131	<ul style="list-style-type: none"> • Provision for transfer scheme to create one or more companies from SEB.
Section 167	<ul style="list-style-type: none"> • State government may continue with SEB as state transmission utility and Generation Company and Distribution Company.

iii. Consumer Protection

Section	Salient Features
Section 57	<ul style="list-style-type: none"> • Appropriate commission to specify standards of performance of licensees; and • In case of non-compliance by licensees, in addition to the penalty/prosecution, licensee to pay compensation as determined by the appropriate commission.

iv. Anti-Theft Provisions

Section	Salient Features
Section 135	<ul style="list-style-type: none"> • Theft of electricity/electricity lines and materials punishable with imprisonment for a term that may extend to three years or with fine or both; and

	<ul style="list-style-type: none">• Any officer authorized in this behalf by the state government may enter, inspect any place in which he has a reason to believe that electricity has been or is being used without authority.
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3.4.5 Findings of Review-India:

Despite the fact that India has been exchanging electricity with Nepal and importing relatively larger volumes of electricity from Bhutan presently under bilateral agreements, the Electricity Act 2003 with amendment thereto till date; that governs the electricity sector in India is silent about the cross border electricity trade. The only reference to power imports as part of the implementation of the provisions of Electricity Act 2003 has been made in the Notification No. L.7/143/158/2008-CERC issued by the CERC. This notification has been issued by the CERC under Section 178 of the Electricity Act, 2003 (36 of 2008). It deals with the requirements, qualification etc. for obtaining license to become an “Electricity Trader”. Sub-section (k), under Section 2 (Definition and Interpretation) of Chapter-I (Preliminary), of this notification states that: “*inter-state trading*” mean transfer of electricity from the territory of one State for re-sale to the territory of another State and includes electricity imported from any other country for re-sale in India”. However, CERC in its order of February 16, 2009¹⁴, has clarified that the above-noted Notification does not apply to cross-border trade, and India’s present agreements for cross-border electricity trade fall within the exclusive purview of the Ministry of External Affairs, including the bilateral agreements through which the current exchanges are taking place with Nepal and Bhutan. The order further states that in the definition referred to in the previous paragraph, “export of electricity needs to be excluded from the definition of inter-state trading”. The order further states that the Regulation deals with electricity trade “after the stage of import”.

The reason for not including cross border electricity trade under the Electricity Act 2003 could have been two fold. One, that India exchanges/trades electricity with Bhutan and Nepal not under the provision of the electricity laws and regulations that have been in force from time to time, but under mechanisms to deal with commodities trade; treating electricity as a commodity. Moreover, the India-Bhutan and India-Nepal cooperation in electricity development has been under the aid assistance program; hence would have deliberately been kept out of the ambit of the electricity laws and regulations framed under the Electricity Act 2003. Another aspect could be that Government of India is satisfied with the prevailing arrangements, hence did not feel the need to include electricity imports/exports under the ambit of the said Act.

Electricity Act 2003 has brought in several revolutionary changes in the law and rules that govern the Indian power sector. These include liberalization and/or deregulation of licensing in Generation, transmission and distribution. But none of its provisions makes a mention that the revised rules/provision will or will not be applicable to cross border investments and/or assets to be created for cross border electricity infrastructure and cross border electricity trade per say.

¹⁴ Available at [http://www.cercind.gov.in/2009/February09/Statement_of_Reasons\[1\]-Trading-Licence-Regulations-2009.pdf](http://www.cercind.gov.in/2009/February09/Statement_of_Reasons[1]-Trading-Licence-Regulations-2009.pdf)

One of the most important features of the Electricity Act 2003 is the creation of a power market by issue of licenses to power traders and establishment of Power Exchanges that have encouraged the extension of the power market in the country. But the Act does not state whether other countries in the region can participate in these power exchanges. One of the obvious reasons could be that the Act is applicable in India and does not deal with matters beyond the political boundaries of India.

Several ownership changes have taken place in the Indian power sector at the state level, as part of the power sector reforms, which also form part of the Act. As per the Electricity Act 2003, PGCIL has been designated as the Central Transmission Utility to manage and operate the electricity grid at national level, the transmission corporations at the state level have been designated as the State Transmission Utilities. In addition the State, Regional and National Load Dispatch Centers manage the power flows at the regional levels. Another major change brought in by the Act is permitting private sector ownership in transmission sector as well. Tala Transmission System established to evacuate power from Bhutan to India is a joint undertaking between the PGCIL and Tata Power. PGCIL is, therefore, not going to be the sole transmission owner and/or operator for cross border electricity transmission infrastructure projects as well as electricity flows. Even private sector participants have started entering the arena, as in the case of the proposed Dhalkebar-Muzzafarpur transmission line to be built by ILFS and its Nepalese partner NEA.

3.5 Maldives

Maldives Energy Authority is the regulator for the electricity sector in Maldives. It has formulated the regulations to govern the electricity services in Male the capital city and the largest and the most inhabited Island of the country and for outer islands. This regulation is formulated under law number 4/96 (General services law). The main provisions of the law are reproduced below.

1. Provision of electricity services

- 1.1 Electricity service providers will need to be registered and authorized to provide electricity services by the Maldives Energy Authority prior to service provision. Such service providers should adhere to this regulation.
- 1.2 Prior to commencing electricity services, the full specifications of the engines to be used for service provision should be submitted to the Maldives Energy Authority.

Given the limitations of technology available presently, there is hardly any chance to connect the electricity grid of Maldives with any of its neighboring countries. Hence the rules framed there-under do not contain any provisions that would deal with electricity imports.

The Maldives National Energy Policy & Strategy, 2010 framed by the Ministry of Housing and Environment also recognizes the limitations of Maldives (a country comprising of 1190 Islands out of which 190 are inhabited by a total population of 300,000 people) located deep inside the Arabian sea, far from the main Asian land mass does not have the options of electricity transfer

from even the nearest country i.e. Sri Lanka. Moreover, Maldives does not have any conventional fuel to generate electricity. Hence the policy lays stress on development of renewable energy resources, energy efficiency and reducing oil imports which is the main source for generation of electricity in the country. Another important challenge that the country is facing is the climate change, threatening the submergence of the atolls that the country is comprised off. The energy policy therefore has laid the goal of Maldives becoming a carbon neutral country by 2020. The guiding principles of the policy are listed below.

Guiding Principles

The guiding principles of the Maldives Energy Policy are:

- Create an enabling environment for the growth of a reliable and sustainable energy sector and meet the constitutional obligation of Government in the provision of electricity to every inhabited island at reasonable standards commensurate to the island;
- Reduce overreliance of the energy sector and the national economy on fossil fuels through the diversification of energy supplies;
- Improve energy efficiency and conservation of energy use;
- Encourage the adoption of low-carbon technologies in production, distribution and energy consumption through promotion of a healthy lifestyle;
- Exploit local energy resources and renewable technologies;
- Engage private sector participation in the development of the energy sector, energy services and quality assurance mechanisms;
- Ensure energy equity through social protection mechanisms and/ or safety nets for vulnerable groups of the population.

3.5.1 Finding of the Review-Maldives:

Maldives power sector is expected to remain an isolated system far away from the South Asian mainland. It is, therefore, understandable that the government of Maldives has not laid much emphasis on the cross border electricity trade aspects while formulating their electricity laws and regulations.

The limited load requirement and high cost of undersea interconnections will put to question the commercial viability of an interconnection even if built between Sri Lanka and Maldives, its nearest country on the Asian land mass. However, new technologies may emerge that may make the Sri Lanka-Maldives electricity interconnection a reality. It would, therefore, be in the interest of Maldives to join any regional electricity trading mechanism that the SMS may evolve.

3.6 Nepal:

Electricity Act, 2049 (1992) & Electricity Regulation, 2050 (1993) were reviewed a detailed below.

3.6.1 Electricity Act, 2049 (1992)

As stated in Paragraph 1.1.4, the India-Nepal power exchange has been taking place since 1971, while as the laws and regulations formulated to govern cross border power trade have been stipulated under the, Nepal Electricity Act, 2049 (1992), as published in the Official Gazette by Government of Nepal on 17 December, 1992 (2049/9/2). The salient features along with the relevant Sections and/or subsections of the said Act pertaining to Cross Border Trade are reproduced verbatim below:

3.6.1.1 Import and Export of Electricity

Section	Salient Features
Section - 22	<ol style="list-style-type: none"> (1) If the licensee desiring to distribute electricity by importing the same within Nepal, may do so by obtaining prior approval of Government of Nepal as prescribed. (2) The licensee desiring to export electricity generated on its own to the foreign country may do so by entering in to an agreement with Government of Nepal on such matter. (3) The exporter of electricity pursuant to sub-section (2) shall have to pay export duty as prescribed to Government of Nepal.

3.6.1.2 Fixing of Quality Standard of Electricity:

Section	Salient Features
Section-23	<ol style="list-style-type: none"> (1) Government of Nepal may, by a notification published in the Nepal Gazette, fix the quality standard of electricity which is generated, transmitted and distributed pursuant to this Act. (2) While generating, transmitting or distributing electricity, the quality standard prescribed pursuant to sub-section (1) shall be maintained.

3.6.1.3 Voltage Level and Other Technical Matters:

Section-25	(1) For the purpose of electricity generation, transmission or distribution, the voltage level and other technical matters shall be prescribed.
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	(2) The person who conducts electricity generation, transmission or distribution shall maintain the prescribed standard pursuant to sub-section (1).
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3.6.1.4 No Nationalization to be made

Section- 29	<p>(1) The land, building, equipment and structure related to electricity generation, transmission or distribution shall not be nationalized.</p> <p>Provided that the land, building, equipment and structure related to electricity generation, transmission or distribution of 1000 kilowatt or less of hydro-electricity, Government of Nepal may, for the extensive public use, take over such property and develop that itself.</p> <p>Explanation: "Extensive public Use" means the use which serves benefits to larger population than the existing population benefitted from it.</p> <p>(2) Government of Nepal shall pay compensation, as prescribed, to the concerned person for the land, building, equipment and structure which is taken over by the Government of Nepal pursuant to the proviso clause of sub-section (1).</p> <p>(3) The compensation payable pursuant to sub-section (2) shall be determined on the basis of current market price (after deducting wear, tear and depreciation) of the land, equipment and structure taken over by Government of Nepal.</p>
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3.6.2 Electricity Regulation, 2050 (1993):

The regulatory framework was put in place by Government of Nepal by notifying the Electricity Regulation 2050 (1993). The salient features of the said regulations pertinent to inter-alia the cross border electricity trade are reproduced below:

3.6.2.1 Chapter-2: New License to be obtained:

Rule-22	<p>(1) Any person or corporate body who has been undertaking the work of production, transmission or distribution of electricity prior to the commencement of the Act, shall have to give application stating the particular as mentioned in Rule 12, 13 or 14 to the Secretary through the Department of Electricity Development for obtaining the license pursuant to sub-section (3) of Section 4 of the Act.</p> <p>(2) The Secretary, either himself or through the Department of Electricity Development, shall examine or cause to examine the application submitted pursuant to Sub-rule (1) and issue the license to the applicant in the format as prescribed in Schedule-10.</p>
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3.6.2.2 Chapter-2: Permission for Import of Electricity:

Rule-23	<p>(1) If the licensee, who has obtained for production, transmission or distribution in accordance with the Regulation, desires to import electricity into Nepal, he shall have to submit an application together with agreement made thereto to the Department of Electricity Development to get the prior permission of the Government of Nepal.</p> <p>(2) The name of the country from where the electricity is to be imported, standard of voltage of electricity to be imported, quantity, are of transmission or distribution, period of importing the electricity and other necessary matters shall have to be mentioned in the application to be submitted pursuant to sub-rule (1)</p> <p>(3) Government of Nepal after making necessary examination may, upon receipt of application pursuant to sub-rule (1), give its permission to import electricity either in accordance with the demand of the applicant or with required amendment.</p>
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3.6.2.3 Chapter-2: Export Tax:

Rule-27	<p>The export tax payable for exporting electricity, pursuant to sub-section (3) of section 22 of the Act, shall be as determined in the agreement made with the Government of Nepal pursuant to sub-section (2) of the same section.</p>
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3.6.2.4 Chapter-4: Voltage, Frequency and Power Factor of Electricity:

Rules 40 to 47	<p>Rule 40 to 47 of forming part of this chapter lays the above parameters to be maintained by the respective operator of the electricity sub-segment. These rules are also applicable to the importers and exporter of electricity.</p>
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3.6.2.5 Chapters-5: Safety Measure Regarding Electric Devices

Rule 48 to 67	<p>Rule 48 to rule 67 govern the safety measures to be taken regarding electric devices and will have implications on cross border power trade.</p>
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3.6.2.6 Chapters6: Safety Measure Regarding Electric Work

Rule 68 to 74	<p>Rule 68 to rule 74 govern the safety measures to be taken regarding electric work and will have implications on cross border power trade as well.</p>
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3.6.3 Findings of the Review-Nepal:

A review of the Electricity Act, 2049 (1992), and the Electricity Regulation, 2050 (1993) reveals that Nepal has put in place clear cut provisions with regard to import and export of electricity, including the procedures for obtaining license, permits approvals and the agencies from whom, these have to be obtained. The laws and regulations clearly specify the legal and regulatory requirements that an importer or exporter of electricity has to meet. The regulations also specify the technical and operational performance parameters to be abided by the cross border electricity trader. There are no discriminatory provisions within the prevailing Laws and Regulations that would either hinder or act as obstacles or barriers for cross border power trade.

Nepal is yet to put in place the Electricity Regulatory Commission inter alia with full power to regulate electricity tariffs, though the bill for the establishment of the regulator is awaiting the approval of the Parliament. The Electricity Tariff Fixation Commission, which has the limited mandate to recommend the tariff revision to the GON, is not functional, due to various reasons. Hence the regulatory oversight, to the extent it could have implications on the cross border power trade of Nepal with other countries in the region, can only be assessed once the role responsibilities of the Nepal Electricity Regulatory Commission comes in to being and Nepal formulates its policies with regard to the regulation of electricity tariffs for imported power or may be even to regulate the tariff for power exports.

The law also make a mention about government intention to notify the quality and safety standards with regard to voltage level, technical parameter etc. Another important factor is the non-nationalization of electricity assets; assurance given by the government. These steps are expected to have a positive impact on cross border electricity trade facilitation.

3.7 Pakistan

The electricity sector in Pakistan continued to be governed by the Electricity Act 1910 after the formation of Pakistan in 1947. However, several amendments made to the Act thereafter, dealt with the operation and management of generation, transmission and distribution of electricity within Pakistan, but did not incorporate any provision to handle electricity imports or exports. This is not unique to Pakistan alone. Because no other country in the region has made provisions in their new electricity laws and regulations to deal with electricity imports/ exports even after they initiated power sector reforms, except for Bhutan and Nepal. Only Nepal and Bhutan, as part of their power sector reforms brought in new legislations specifically incorporating provision for import/export of electricity. Laws and regulation of rest of countries in the region even post reform period are still silent about electricity import/exports. The major modifications made to the electricity laws and regulations of Pakistan are listed below:

1. The Sindh Electricity Control Act, 1952 [Sindh Act No.XXXI of 1952]
2. The Electricity Act (Punjab Amendment) Ordinance, 1971 Punjab Ordinance No. XXIX of 1971

3. Electricity Rules, 1978 (Sindh Amendment)
4. (KESC) Electricity Control Order, 1978

The most important regulatory changes, though not directly dealing with electricity imports or exports, but that will have implications for cross border electricity trade of Pakistan came in to effect with implementation of the “Regulation of Generation, Transmission and Distribution of Electric Power Act 1997 [Act XL of 1997]”. With the implementation of this Act, the regulatory powers exercised by the government of Pakistan till then, are now vested with the “National Electric Power Regulatory Authority (NEPRA)” herein after called the “Authority” under the Act. The relevant provisions of the 1997 Act that will have implication on cross border electricity trade of Pakistan are briefly summarized below:

3.7.1.1 Chapter II: Establishment of Authority

Section 7	Powers and functions of the Authority
Sub-section 1	The Authority shall be exclusively responsible for regulating the provision of electric services.
Sub-section 2	<p>In particular without prejudice to the generality of the foregoing power, only the Authority, but subject to provisions of subsection (4), shall:-</p> <ol style="list-style-type: none"> (a) Grant license for generation, transmission and distribution of electric power; (b) Prescribe procedures and standards for investment program by generation, transmission and distribution companies; (c) Prescribe and enforce performance standards for generation, transmission and distribution companies; (d) Establish a uniform system of accounts by for generation, transmission and distribution companies; (e) Prescribe fees including fees for grant of licenses and renewal thereof; (f) Prescribe fines for contravention of the provision of this Act; and (g) Perform any other function which is incidental or consequential to any of the aforesaid functions.
Sub-section 3	<p>Notwithstanding the provision of sub-section (2) and without prejudice to the generality of the power conferred by sub-section (1) the authority shall:</p> <ol style="list-style-type: none"> (a) Determine tariff, rates, charges and other terms and conditions for supply of electric power services by the generation, transmission and distribution companies and recommend to the Federal Government for notification;

	<p>(b) Review organizational affair of generation, transmission and distribution companies to avoid any adverse effect on the operation of electric power services and for continuous and efficient supply of such services;</p> <p>(c) Encourage uniform industry standards and code of conduct for generation, transmission and distribution companies;</p> <p>(d) Tender advice to public sector projects;</p> <p>(e) Submit reports to the Federal Government in respect of activities of generation, transmission and distribution companies; and</p> <p>(f) Perform any such function which is incidental or consequential to any of the aforesaid functions.</p>
Sub-section-4	Notwithstanding anything contained in this Act, Government of a Province may construct power house and grid stations and lay transmission lines for use within the Province and determine the tariff for distribution of electricity within the Province.
Sub-section-5	Before approving the tariff for supply of electric power by the generation companies using hydroelectric plant, the Authority shall consider the recommendations of the Government of the Province in which such generation facility is located.

3.7.1.2 Chapter-III Licenses

Section 15	Generation License
Sub-section 1	No person shall except under the authority of a license issued by the Authority under this Act and subject to the conditions specified in this Act and as may be imposed by the Authority, construct own or operate a generation facility.
Section 16	Transmission License
Sub-section 1	No person shall except under the authority of a license issued by the Authority under this Act and subject to the conditions specified in this Act and as may be imposed by the Authority, engage in transmission of electric power.
Section 17	National Grid Company
Sub-section 1	The authority may, after such enquiry as it may deem appropriate and subject to the conditions specified in this Act and as it may impose, grant license authorizing the licensee to engage in the transmission of electric power: Provided that only one such license shall be granted at any one time.

Sub-section 2	The licensee referred to in sub-section (1) shall have exclusive right to provide transmission service in the territory specified in such license except the territory served by the KESC.
Section 17	Responsibilities of National Grid Company
Sub-section 1	The National Grid Company shall be responsible to operate and provide safe, reliable transmission and interconnection services on a non-discriminatory basis, including to a bulk power consumer who proposes to become directly connected to its facilities.
Section 19	<p>Special Purpose Transmission License</p> <p>Notwithstanding anything contained in Section 17, the Authority may, in public interest, grant license authorizing the licensee to engage in construction, ownership, maintenance, and operation of specified transmission facilities on the condition that the licensee shall:</p> <ul style="list-style-type: none"> (a) Provide transmission and interconnection services to the national grid company and others, where necessary, at such rate, charge and terms and conditions as the Authority may determine; (b) Purchase interconnection service from the national grid company as may be necessary and to connect its facilities to the national transmission grid at the rate, charges and terms and conditions determined by the Authority; (c) Make its transmission facilities available for operating by the national grid company consistent with applicable instructions established by such company; (d) Follow the performance standards laid down by the Authority for the transmission of electric power, including safety, health and environmental protection instructions issued by the Authority or any Government agency; (e) Make public the tariff specifying the rate, charges and other terms and condition of service for transmission and interconnection services determined by the Authority; and (f) Maintain accounts in accordance with the manner and procedure prescribed by the Authority.
Section 31	Tariff
Sub-section 1	As soon as may be, but not later than six months from the commencement of this Act, the Authority shall determine and prescribe procedure and standards for determination, modification

	or revision of the rates, charges, terms and conditions for generation of electric power, transmission, interconnection, distribution services and power sale to consumers by licensees and until such procedures and standards are prescribed, the Authority shall determine modify or revise such rates, charges, terms and conditions in accordance with the direction issued by the Federal Government.
Section 32	Investment and Power Acquisition Program
Sub-section 1	The Authority shall within eighteen month from the commencement of this Act, prescribe procedures and standards for the Authority's prior approval of the transmission companies' and distribution companies' investment and power acquisition programs
Sub-section 2	Any procedure prescribed by the Authority under this section shall advance the goal of minimizing the regulatory oversight of the contracts entered into by the national grid company and distribution companies.
Sub-section 3	Any investment program or power acquisition program, approved by the Authority under this section shall take in to account the national energy plan issued by the Federal Government.
Section 35	Industry Standards and Code of Conduct The Authority shall encourage the development of industry standards and uniform code of conduct so as to provide: (a) Planning criteria for safety, reliability and cost effectiveness of the generation, transmission and distribution facilities; (b) Construction practices and standards for such facilities; (c) Operating and standard procedures; (d) Maintenance schedules; (e) Maintenance of adequate spinning reserves and plan to satisfy demand; (f) Equipment specifications and standardization; and (g) Load-shedding and rotational procedures.

3.7.1.3 NEPRA Licensing (Distribution) Rules, 1999

Rule 12	Power Acquisition contracts and obligations to purchase economically:
Sub-Rule 1	Subject to the provisions of Rule 21 of the distribution license: (i) The licensee shall, pending the approval of the licensee's power acquisition program in term of sub-rule (4), purchase or

<p>Sub-Rule 2</p> <p>Sub-Rule 3</p> <p>Sub-Rule 4</p>	<p>procure all of its electric power supplies from or through the National Grid Company; and</p> <p>(ii) The licensee may, follow the approval of the licensee's power acquisition program in term of Sub-rule(4), purchase or procure all or part of its electric power supplies from or through any one or more licensees in accordance with the licensees power acquisition program.</p> <p>To the extent possible under the applicable document, the licensee shall ensure that:</p> <p>(i) The licensee and any of its affiliates purchase electric power at the best effective price reasonably obtainable having regard to the security, reliability and diversity of the source of electric power; and</p> <p>(ii) The term of any power acquisition contract entered in to by the licensee or any of its affiliates are settled in accordance with and adequately reflect the provision of this rule.</p> <p>Lay the procedure for the determination of the purchase price discovery mechanism</p> <p>The shall, no later than ninety days following the date of notification of the NEPRA rules and regulations, submit its power acquisition program to the Authority for approval subject to and in accordance with the provisions of the NEPRA rules and regulations.</p>
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3.7.1.4 Findings of the Review-Pakistan:

As in the case of Electricity Act 2003 of India; Subsection 1 of Section-7 of the NEPRA Act 1997 states that the Authority shall have the exclusive responsibility of regulating electric services. But it does not state whether the matters relating to electricity imports/exports or electricity wheeled through Pakistan for cross border electricity trade purposes by third countries will fall under the domain of the authority. Sub-section 2 there under inter-alia further defines the powers of the authority to grant licenses for generation, transmission and distribution; prescribe the procedures and standard of their investment program; operational and performance standards. Who will regulate the cross border infrastructure investments again remains open. Subsection 3 of the Section 7 defines the role and responsibilities of the Authority with regard to tariff fixation, review of performance of the sector entities, setting of operational codes and standards among other functions. The Act under Subsection 4 of Section 7 permits the Provincial governments to build power plants and transmission lines; and to determine the tariff for the power generated from these plants and use of these transmission lines. It also states that the Authority would and consider recommendations of the Provincial

governments in determination of tariffs from the hydropower plants located in their states. Section 15 of the Act stipulates that except for the KESC, no person can build, own and operate a generation, transmission facility without obtaining the license of the Authority. Section 19 of the Act permits grant of license for Special Purpose Transmission License, with the caveat that the owners of these lines shall have to provide open access to their systems to other users on payment of specified license fee. Subsection 1 of Section 32 specifies that prior approval of the authority is obligatory for procurement of power by the transmission and distribution licensees. Does this mean that all power imports would have to comply with the norms, rules and procedures of the Act, has not expressly been stated therein?

Here again, as in the case of other countries in the region except for Bhutan and Nepal, the entire set of laws and regulations formulated by Pakistan deal with the governance of the electricity business within the country, without making any reference to the cross border electricity trade.

The laws and regulations are also silent about the ongoing and the proposed electricity trade between Iran and Pakistan. This is despite the fact that Pakistan is already importing a small quantum of electricity from Iran which it intends to enhance by another 100 MW and is also planning to import about a 1000 MW from Tajikistan and Kyrgyzstan. Though Pakistan, Afghanistan, Tajikistan and Kyrgyzstan have entered in to an agreement for the above imports, the same could not be reviewed due to its non-availability in public domain. Pakistan has as recently as November, 2011 expressed its intention to import 500 MW from India, but there have been no specifics relating to this intention available for review.

3.8 Sri Lanka

The electricity Sector in Sri Lanka is governed under the Sri Lanka Electricity Act, No 20 of 2009. The relevant Chapters and sections there-under that will have implications for regional electricity trade, are summarized in the following matrix:

3.8.1 Chapter-1: Preliminary:

Section-2 (1)	The administration of the provisions of this Act shall vest in the Public Utilities Commission (hereinafter referred to as the “Commission”) established under the Public Utilities Commission of Sri Lanka Act, No. 35 of 2002, and the Commission shall exercise, perform and discharge all the powers, functions and duties as are conferred on or assigned to it under this Act.
Section-2 (2)	The exercise, performance and discharge by the Commission of the powers, duties, and functions conferred on or assigned to it under this Act, shall be in addition and not in derogation to the exercise, performance and discharge of the powers, duties and functions that the Commission is given or conferred with by the Public Utilities Commission of Sri Lanka Act, No. 35 of 2002.

3.8.2 Chapter-II: Functions of the Commission:

Section-3 to 6	Defines the role responsibilities and functions of the commission
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3.8.3 Chapter-III, Part-I: Licensing

Section 7	Prohibits any entity to indulge in the business of generation, transmission and distribution of electricity unless authorized to do so by a license granted under the Act or is exempted from obtaining a license under section 10.
Section 9 (1)	No person other than any one of the following shall be eligible to apply for the issue of a generation license, to generate electricity over and above the generation capacity of 25 MW:— (a) the Ceylon Electricity Board, established by the Ceylon Electricity Board Act, No. 17 of 1969; (b) a local authority; (c) a company incorporated under the Companies Act, No. 7 of 2007, in which the government, a public corporation, a company in which the government holds more than fifty per centum of the shares or a subsidiary of such a company, holds such number of shares as may be determined by the Secretary to the Treasury, with the concurrence of the Minister in charge of the subject of Finance.
Section 9 (2)	No person other than the Ceylon Electricity Board, established by the Ceylon Electricity Board Act, No. 17 of 1969 shall be eligible to apply for the issue of a transmission license.
Section 9 (3)	No persons other than any one of the following shall be eligible to apply for the issue of a distribution license:— (a) the Ceylon Electricity Board, established by the Ceylon Electricity Board Act, No. 17 of 1969; (b) a local authority; (c) a company incorporated under the Companies Act, No. 7 of 2007, in which the Government holds more than fifty per centum of its shares; or (d) a society registered under the Co-operative Societies Law, No. 5 of 1972.
Section 10 (1)	The Commission may on an application made for an exemption by Order published in the Gazette, exempt any person or category of persons from the requirement of obtaining a license for generating or distributing electricity, having regard to the manner in which or

	the quantity of electricity likely to be generated or distributed by such person or category of persons.
Section 10 (2)	Every such exemption granted under subsection (1) shall be to such extent, be subject to such conditions and be for such period, as may be specified in the Order.
Section 16 (b)	Without prejudice to the generality of section 15, a license issued to a generation licensee shall include conditions:— (a) prescribing how it shall discharge the functions assigned to the licensee under this Act in so far as such condition is not inconsistent with any provision of this Act: (b) requiring the licensee to sell electricity generated by the licensee exclusively and only to transmission licensees;

Chapter-III: Part II, of the said Act deals with the powers and duties of licensees; revocation and other aspect of licensing. Chapter-III: Part III, Modification and Enforcement of Licenses. This chapter deals with modification of agreement, enforcement of order, procedure and effects of enforcement of orders. Chapter-IV: Consumer Protection. Chapter -V deals with the setting up of new generation plants and overhead lines. Chapter-VI deals with financial aspects. Chapter VII deal with offences and regulations. Chapter-VIII deals with general matters. Chapter IX deals with Interpretation of the law made under the Act. Chapter-X deals with Repeal and transitional provisions.

3.8.4 Finding of the Review-Sri Lanka:

The prevailing Sri Lanka regulation is very restrictive in nature from the perspective of attracting private investment in the sector. Sri Lankan Regulation, Section 9 restricts the issue of license to entities other than to the CEB, local authorities, societies and companies in which GOSL holds more than 50 % equity stake; thereby eliminating the participation of private sector as a majority stake holder in a body corporate to enter the business of electricity generation and transmission business in Sri Lanka. Though Section 10 (1) & (2) make provisions for exemption for issue of the generation and distribution license, they do not lay down the norm for such exemptions. Moreover Section 16 (b), (b) requires the licensee to sell electricity generated by the licensee exclusively and only to transmission licensees. As a result, generator can sell electricity to none other than the transmission company. This would restrict the sale of electricity by the IPPs to third parties or distribution companies directly, posing limitation of choice to sell their electricity. Such provisions would be a major hindrance not only for major investments in the electricity sector in Sri Lanka, but would pose a challenge for the cross border electricity trade amongst SMSs, as well.

One of the reasons for Sri Lanka not to incorporate any provisions in its electricity laws and regulations with regard to cross border electricity trade could have been the lack of opportunity

to do so. There was no certainty of Sri Lanka power grid being connected to the nearest Indian power grid, that would not only allow Sri Lanka trade electricity with India but with other countries in the subcontinent as well. As such these laws and regulation too are silent about the cross border electricity trade. But the creation of India-Sri Lanka power transmission interconnection and development of the power generation facility with Chinese support in the Sri Lanka in due course of time may lead to excess generation capacity in Sri Lanka. Sri Lanka would, therefore, require the creation of the necessary legal and regulatory mechanisms to handle the cross border electricity trade.

3.9 Summary of the Findings of Review

3.9.1 Review of Ongoing Electricity Trade Arrangements

Electricity exchanges between some of the SMS have been going on for several decades now. There were no specific provisions under the then prevailing electricity laws and regulations of the SMSs to govern electricity trade. The trade took place on the basis of agreements arrived at between the concerned countries for each specific transaction. These Agreements, having commercial connotations, are not available in public domain; hence cannot be commented upon. However, it can be safely assumed that in the absence of the relevant provisions in the then prevailing electricity laws and regulations; the Member States arrived at cross border electricity trade agreements under the provisions of laws governing normal commodities trade, treating electricity as one of the commodities in their trade baskets.

SMSs initiated and are implementing power sector reforms since early 1990's that brought in structural and operational changes in the sector through the enactment of new legislations that inter-alia put in place electricity regulatory mechanism as well. Though Bhutan and Nepal incorporated specific provisions to govern the cross border electricity trade in their new electricity laws and regulations, other Member States did not do so. As a result whenever there arises an opportunity for cross border power trade, they resort to the earlier practice of entering in to agreements specific to each transaction. Else they will have to make necessary changes in the prevailing electricity laws and regulations to do so, if they intend to segregate the electricity trade from the general commodities trade. A case in instance is the recent agreement arrived at between Bangladesh and India, wherein Bangladesh is going to import 500 MW from India.

Countries within the region that have been exchanging or trading power do have the existing precedence to fall back upon to work out the deals for new trades as well. For example Afghanistan-CARS, India-Bhutan, India Nepal, Pakistan-Iran have entered in to project specific agreements that have been facilitating cross border electricity trade for decades now and might feel comfortable with the prevailing mechanisms. But with the diminishing role of the governments in adding new capacities in generation, transmission and with the privatization of distribution systems in certain areas, the new mechanisms have to be aligned to meet the expectations and to mitigate the risks perceived by the private sector investors, project lenders and other stakeholders. There is considerable difference in the risk perception of lenders for projects backed by sovereign guarantees as against those being undertaken by

IPPs and private project developers. Since the earlier generation capacities are already tied up, it is the new capacity additions that will allow the SMS to trade electricity amongst them. As a result the existing mechanism of government-to-government agreements will not suffice, if these countries have to promote power trade on a larger scale.

Even arriving at government-to-government agreements to undertake cross border electricity trade between countries in South Asia that are new to the game, have taken very long time to fructify. For example the first pre-feasibility study to interconnect the power grid of India with that of Bangladesh along with Nepal and Bhutan was carried out in 2001 under SARI/Energy project. Similarly the India-Sri Lanka power transmission interconnection was also studied in 2001. Both these pre-feasibility studies had to be re-done in 2006-07. It is only after over a decade of carrying out the first set of studies that these two projects are going to see the light of the day. Had there been specific provision in the electricity laws and regulations of these countries; conceptualization, planning and execution of these projects would have taken place in a much easier manner and at faster pace with private sector participation. SAARC Member States, therefore, need to take a fresh look at their prevailing laws and regulations governing their electricity sector; not only to remove the impediments affecting cross border electricity trade, but also to encourage and facilitate the same.

Another import point to note from the perspective of promoting cross border electricity trade among the SMSs or with other countries outside the region is that smaller volumes of electricity trade can be facilitated by segregating load centers along the border areas from the national grid of the electricity importing country and connecting them to the grid of the electricity exporting country in a radial mode. This kind of arrangement has been in place for most of the existing power imports. But the commissioning of the larger hydropower projects in Bhutan has led to greater volumes of electricity exports to India that led to interconnecting the two electricity grids.

Import and export of large volumes of electricity require proper technical and commercial arrangements to be put in place; supported by legal and regulatory mechanisms that not only help to provide electricity to a particular load center, but for injecting the imported power into the national grid of the importing country. Non-synchronous operations of the interconnected grids calls for vary large investments in establishing high-cost HVDC interconnections as compared to AC interconnections, which ultimately reflects in the retail tariffs that at times can challenge the very viability of such transactions. At the same time, interconnecting the grids through AC interconnection will require the harmonization of their grid codes, operational norms and parameters amongst other things. Large volumes of cross border electricity trade will, therefore, call for thrashing out the legal, regulatory, technical, and commercial issues listed in Chapter-IV.

3.9.2 Implications of Prevailing Laws & Regulations on Cross Border electricity Trade

As stated in the above subsection, the prevailing electricity laws and regulations of the Member States except that of Nepal and Bhutan are silent about the cross border electricity trade. They

neither encourage nor discourage the same. The laws and regulations of Bhutan and Nepal do make a mention about the cross border electricity trade. They lay stress on development of their large hydropower resources to meet the domestic demand as well as to export the surplus energy. In essence these two countries are planning to develop their power sector as an export earning industry to strengthen their revenue base. Processes and procedures with regard to cross border electricity trade too have also been incorporated therein. However, there is scope to further elaborate certain sections and/or sub-sections therein to make them fully address all the issues that would accelerate the development of their export oriented hydropower projects and help them realize the dream of exporting larger volumes of electricity. Moreover, interconnecting their grid with other countries will require harmonization of their grid code and address other issues listed in the net chapter.

The findings of the review of the electricity laws and regulations of SMS, specifically those provisions therein that will have implications on cross border electricity trade have been given at the end of each country profile. All aspects of these laws: licensing, investment promotion, regulation of the operations of the utilities by the regulatory bodies and their tariff setting power will have implications on capacity additions, availability of supply, transmission, wholesale and retail tariffs within these countries. Though most of these laws and regulations are silent about how to address the issues relating to power imports; the imported power, once it lands in a country will be subjected to these laws and regulations, which in turn will have direct impacts on power trade amongst these countries.

3.9.3 Other Important Aspects from Cross Border Electricity Trade Perspective

In addition to the findings of the review of electricity laws and regulations country wise given at the end of each country profile, some other aspects, though not in the order of their importance, that merit attention here are given below.

3.9.3.1 Open Access to Transmission Systems

Open access to transmission systems is an essential tool to facilitating free flows of electricity within a country or with power grids of other countries. Additional capacities available in the transmission systems of the member states will help them to import or permit transit for electricity through their transmission systems. This will be a big incentive for power traders and utilities that are either in need of additional procurement of electricity through imports or those who wish to export the surplus power; provided the Open Access norms are made available for cross border electricity trades as well. The redundancies in the existing transmission systems obviate the need for setting up of new transmission lines to wheel additional electricity flows from the source of supply to the load centers in a given country or for the purpose of providing transit to other countries.

One of the redeeming features in the prevailing electricity laws and regulations of the SMS is that most of the countries in the region, though not specifically from the perspective of cross border electricity trade, have made necessary provisions for Open Access to their transmission systems

to facilitate the use of these systems by other parties on payment of requisite transmission charges to be fixed by their regulators.

But one point that merits attention here is the actual application of this law on the ground. For example, while the Electricity Act 2003 permits Open Access to transmission systems, but over the years it has been observed that the state governments in India have not been permitting Open Access to the traders and other parties who wish to evacuate electricity from one state to the other; in the garb that permitting open will create electricity shortages in the host state, where from the electricity is to flow. It is, therefore, essential that the member states while formulating the regional mechanism to facilitate electricity trade provide for and implement the norms of Open Access to transmission systems in a sincere manner.

3.9.3.2 Restrictions on obtaining generation license in Sri Lanka

Section 9 of the Sri Lankan regulation restricts issue of generation licenses to entities other than CEB, local authorities and societies, thereby elimination the participation of private sector in generation. The provisions under Section 10 (1) & (2) mention about exemption from the applicability of Section 9; but the same are not clearly defined. This will act as a dampener for IPPs. Further Section 16 obligates the generators to sell electricity exclusively to transmission licensee thereby eliminating the opportunity to the IPPs to sell electricity to third parties within and outside the country. Sri Lanka will have to make necessary change in its laws and regulation if it wants to seek large investments for the expansion of its electricity sector to meet the domestic demand and also to benefit from the regional electricity trade.

3.9.3.3 Initial push needed for cross border electricity trade in the region

Despite the energy and peak shortages faced by all the countries in the region, there are windows of opportunity for them to help each other in mitigating these shortages due to the varying pattern of their daily and seasonal load curves; resulting from the difference in time, observance of holiday, office timings, weather conditions, generation profiles and other factors. SMS are not able to exchange electricity even during the period when it is technically feasible and economically viable to do so. The major impediment in doing so is the inhibition of governments to be seen promoting cross border electricity trade when the countries themselves are facing shortages. One of the mechanisms to overcome this barrier could be to make it mandatory on each member state to export and/or exchange, say 10%, of their generation capacity with other countries in the region through a regional power exchange to which all the countries of the region can have access to. The Member countries can make energy for this purpose available during the off-peak periods when the availability surpasses their own demand. Such an arrangement; if put in place will help in smoothening their load curves. It will also encourage the SMS to create a spirit of regional cooperation in electricity sector.

3.9.3.4 SAARC Power Exchange

Implementation of the Electricity Act 2003 in India has created a power market by issue of licenses to power traders and for establishment of Power Exchanges. But the Act does not state

whether other countries in the region can participate in these power exchanges. One of the obvious reasons could be that the Act is applicable in India and does not deal with matters beyond the political boundaries of India. A studies funded by the ADB is under way to help create the SAARC Power Exchange. Till the time that the SAARC Power Exchange is put in place and becomes fully operational, the member states could designate one or more Indian Power Exchanges to facilitate power trade among the member countries.

3.9.3.5 Regulatory Mechanisms in Afghanistan and Nepal

All other countries except for Afghanistan and Nepal have fully functional regulators for the electricity sector. Afghanistan will take time to formulate necessary regulation including the establishment of a regulator for the electricity sector. Nepal is yet to have an Electricity Regulatory Commission with full powers to regulate the electricity sector. The bill for the establishment of the regulator is awaiting the approval of the Parliament. Though there is an Electricity Tariff Fixation Commission in Nepal, but its mandate is limited to recommending tariff revision to the GON. Moreover, the Tariff Fixation Commission has remained non-functional for quite some time due to various reasons. Hence, the regulatory oversight, to the extent it will have implications on the cross border power trade of Nepal with other countries in the region, can be assessed only after the Nepal Electricity Regulatory Commission is established and its role and responsibilities become known.

3.9.4 Implications of Electricity Laws & Regulations on Investments

3.9.4.1 Impact on Project Development and Investment Decisions

Options of cross border electricity trade, supported by legal, regulatory, technical and commercial mechanisms will even change the dynamics of the domestic electricity markets in South Asia. As these laws and regulations will have implications for electricity traders, infrastructure developers and investors involved in the creation of cross border electricity infrastructure. They will also impact the decisions to be made by the power generation and distribution project developers in the region; as their investment decisions will be impacted by the availability of supply and the options to import electricity to meet the demand and export the surplus when supply exceeds the demand. The project developers, investors and other stakeholders look forward to the cash flows from projects, whether in generation, transmission or distribution. A larger market that permits free flows of electricity within and outside the political boundaries of the host country, gives more options to project proponents to maximize their revenue streams and minimize the adverse impacts of demand-supply fluctuations in the local electricity market. Such mechanisms also facilitate speedier project development and lower cost of capital resulting in lower cost of generation that can be passed on to the consumers.

3.9.4.2 Impact on Investment Requirements

Provisions in electricity laws and regulations that facilitate cross border electricity trade have their impact on the overall investments required in the electricity sector in a country. The

demand for electricity can be met not only from the generation facilities located within the host country but also through electricity imports. Similarly electricity exports help nations in attracting large investments to develop their energy resources in an expeditious manner. While the power importing country can avoid making large investment in setting up its own generation facilities, the power exporting country is able to attract large investments. Examples of this nature are the power import by Afghanistan and export by Bhutan.

Lenders and financier of power projects closely examine the payment security mechanisms and the risks associated therewith while funding projects. These include country risks and the risks associated with the failure of the power purchasers to off-take the contracted quantities of power that may arise due to their inability to pay in time. Export options minimize these risks, thereby making it easy to raise resources and at competitive rates, for timely completion of projects.

Each power system needs to maintain a spinning reserve to overcome any eventuality of unscheduled shut down of its generation facilities. The need for such a reserve is minimized, if the system operator has the option to import electricity in unforeseen circumstances at short notice; thereby reducing the investment required for the creation of the pinning reserve.

3.9.4.3 Need to permit and promote Cross border investment

Due to its geographical location India can carry out electricity trade with Bangladesh, Bhutan, Nepal, Pakistan and Sri Lanka without the involvement of the territory of any third country. But all these countries except Afghanistan and Pakistan, who share a common border, will need India's help to facilitate such trade. Similarly India will need the support of Afghanistan and Pakistan to import electricity from the Central Asian Republics. Facilitating free flow of electricity across the region will benefit all the countries in the region. SMS can either allow other Member States to use their existing electricity transmission infrastructure if there are any redundancies in the system or provide them the right of way to build, own and operate the necessary transmission infrastructure. Alternatively, the host country can build the infrastructure to facilitate electricity transit through its territory and levy necessary transmission charges; thereby creating another revenue stream for the host country.

But given the increasing demand on government resources; involvement of private sector in the creation of the new generation facilities, the power generated from which can be available for trade across the region and also for creation of the cross border electricity transmission systems; seems inevitable. In order to give investors the confidence about the security of their investments, the governments in the region will have to allow cross border investments for the creation of necessary electricity infrastructure with the same obligation and rights as provided to their own nationals. It is in view of the above facts; that a specific recommendation to this affect has been made in the relevant section of this report.

3.9.5 Need for Change in the Electricity Laws and Regulations

SMS will have to evolve a regional electricity trading mechanism that facilitates electricity trade and transit in the region. One of the options before them is to adopt an electricity trading and transit mechanism that is in operation in any other region in the world. But the regional setting in each region are unique due to the interstate relations, geopolitics, economics, trade and transit relations among those countries, hence may not fit for the SAARC region. SMS will, therefore, have to work out their own electricity trading mechanism that specifically meets their requirements and takes in to cognizance the prevailing situation in South Asia. This will require necessary changes in their existing electricity laws and regulations, as these are not presently meant to handle cross border electricity trade and transit issues. Though Bhutan and Nepal have made requisite provisions in their electricity laws and regulations from their perspective, but when seen from a broader regional perspective; even their laws and regulations governing the electricity sector including electricity exports will have to be aligned to the regional mechanism. SMS will have to lay down technical parameter and operational norms for governing cross border electricity flows; especially the grid codes, grid operation norms, safety standards, formulate commercial and payment settlement mechanisms inter-alia other requirements. This will put cross border electricity trade and transit on a different footing from the general commodity trade. The need for doing so emanates from the inherent characteristics of electricity; for which the normal laws and regulations governing the commodity import/export regimes are not sufficient to deal with.

Changes Required for Cross Border Electricity Trade and Transit

4.0 Changes Required for Cross Border Electricity Trade

SMS have put in place laws and regulations to govern their electricity sector. These, inter-alia, include the technical/operational norms and safety standards in addition to the commercial arrangements etc. for generation, transmission and distribution of electricity within the country. While these laws and regulations have been ensuring smooth sector operations in each country, there is need to harmonize them with those of other countries in the region to facilitate cross border electricity trade and Transit. Harmonizing the laws and regulations of the Member States that govern their electricity sector will accelerate power trade among the Member States through fair play, legal and regulatory certainty. It will: (i) reduce transaction costs and time taken in project planning/execution; (ii) raising financial resources and lowering cost of capital; (iii) reduce investment requirement by reducing the spinning reserve that each system has to maintain when operated independently; (iv) reduce the cost of supply in the long run; and (v) most importantly help reduce the electricity shortages that have become a challenge for the governments to handle. The need for the same, emanate from the fact that each country has set their laws, regulations, technical specifications, operational norms and safety standards; that are not aimed at promoting cross border electricity trade and some of which are not aligned to those set by other countries.

The operational and safety standard of the interconnected power grids have to match fully or else technical solutions have to be put in place to overcome the mismatches; thereby requiring additional investments that lead to higher tariffs.

SMS will, therefore, have to consider incorporating the following provisions in their electricity laws and regulations and shall have to formulate a regional mechanism to promote and facilitate cross border electricity trade and transit in South Asia. Cross border electricity trade should also form a part of their respective energy policies.

4.1 Legal

Though not in the order of their importance, the following changes need to be considered from the legal perspective:

- i. Recognize cross border electricity trade as one of the activities in their respective electricity laws.
- ii. Permit generation companies to sell electricity to entities involved in such trade, while taking cognizance of the domestic demand for electricity.
- iii. Lay down the norms for issue of cross border electricity trade licenses;
- iv. Open Access to transmission systems of the host country to power importers, exporters and other countries who need to wheel power through their territory, to the extent that:
 - the transmission systems have redundancies after taking care of the requirements for wheeling of electricity for the domestic electricity market and for their own imports and exports of electricity,
 - the technical and operational norms of the transit country are adhered to by the system operators who intends to wheeled electricity through their transmission systems;
- v. Freedom of transit that allows wheeling of electricity through the territory of third countries i.e. other than the buyer and seller of electricity; without any unreasonable delays in granting permissions, putting restrictions or through levy of undue charges;
- vi. Cross border electricity flows to enjoy the same treatment as provided by the host country for its own power flows; irrespective of its origin, destination, ownership or pricing;
- vii. Mechanism to ensure non-disruption of electricity supply in case of any eventuality, political or otherwise;
- viii. Provision to facilitate creation of new transmission and generation capacities, in case the existing ones are insufficient to meet the demand from cross border trade perspective;
- ix. Grant the right of way for setting up of dedicated transmission lines through a transit SMS, to wheel electricity between the electricity buyer and the seller within Member States, or between two or more regions of a country; if it is more efficient, economically and/or financially beneficial to lay such a dedicated transmission lines through the political boundaries of the transit Member State(s).
- x. Exempt cross border electricity traded from export tax or import duties.

4.2 Regulatory

Regulatory Commissions set up by the six SMS have authority to regulate the electricity operations within the country. There is need to put in place an independent regulatory mechanism at the regional level to handle exclusively cross border electricity trade issues; to avoid any conflict of interest that may arise due of application of the regulation of a particular country on the cross border electricity flows and also resolution of any disputes. The major objectives that the regional regulatory mechanism should, inter-alia, aim at achieving are:

- i. Create a level playing field for cross border electricity flows and to promote investment for setting up necessary electricity infrastructure for the purpose;
- ii. Non-discriminatory Open Access to the grid to facilitate electricity flows within the region;
- iii. Evolve a mechanism for transmission pricing that is transparent and supports cross border electricity trade;
- iv. System pricing to be cost reflective with no cross-subsidies from one part of the system to another;
- v. Minimize the landed costs of cross border electricity supply within the SMS;
- vi. Address the environmental issues while creating the additional electricity infrastructure;
- vii. Eliminate the possibility of supply disruptions;
- viii. Encourage investment for the creation of the SAARC regional electricity market;
- ix. Encourage deployment of new technologies to enhance supply and reduce transmission losses;
- x. Power generation and supply companies not to have ownership or management interest in the cross border transmission and distribution networks;
- xi. Any benefits that generators provide to the system (voltage, frequency support, grid reliability and stability, reduction in transmission and distribution losses, and reduced requirements for Spinning Reserve etc.) should be fully and fairly reflected in system pricing;
- xii. Equally, generators not to be charged excessively for their system impacts;

- xiii. Electricity systems to be subjected to market based instruments, for example, emissions trading, energy taxation, out-put based standards that fully reflect energy conversion efficiencies and internalization of environmental costs of energy conversion.

4.3 Technical

In order to ensure that electricity trade among the SAARC Member States becomes a reality in a cost effective manner, the following technical issues merit consideration:

- i. Harmonization of Grid Codes/Standard, Grid Operation norms, connectivity Standards for Grid Participants, maintenance schedules and procedures. These should inter-alia include the voltage and frequency level, etc.;
- ii. Decision about the level of energy flows through the transmission systems, to be based on detailed Load flow studies, Optimal power flow modeling, Short-circuit modeling, Dynamic stability modeling and Transient modeling;
- iii. Protection systems to be put in place for load segregation, in the event of any major faults occurring in one of the interconnected systems;
- iv. Establishment of an Independent System Operator to manage the system;
- v. Setting up of an appropriate communication and monitoring systems;
- vi. Establishment of AC instead of HVDC interconnections, to save the investment requirement for setting up the cross border transmission infrastructure;
- vii. Adoption of common metering standards and other relevant arrangements to measure the energy flows.
- viii. Transmission planning to be done by each member states, taking cognizance of the electricity flows required to meet the regional demand.

4.4 Commercial Issues

In addition to arriving at the price at which electricity shall be exported or imported; SMS will have to reach a consensus on the following commercial issues:

- i. Currency to be used for settlement of accounts;
- ii. Payment security and settlement mechanisms for power purchases;

- iii. Security of investments made in building cross border transmission interconnections; unless they are built, owned and operated by the respective governments not for commercial considerations, but to facilitate power transfers from the perspective of energy security. Private transmission companies will build the systems only if it is assured that a certain minimum volume of electricity flows will take place through the system that is good enough to help them recover the return on their investment at their desired hurdle rate.
- iv. Frequency and the intervals at which the meter readings will be recorded;
- v. Periodicity for submission and settlement accounts;
- vi. Mechanism to record deviations from scheduled energy flows and the incentives or penalties if any to be imposed for the deviations from the schedules;
- vii. Standardization of commercial documents. These could include Tender Documents, Project Award Agreements, Power Purchase Agreements, Fuel Supply Agreements, Transmission Service Agreements, and Tolling Agreements; as their use will eliminate uncertainties; reduce the project cycle and transaction costs.
- viii. Dispute resolution mechanism.

4.5 Impacts of above Mechanisms on Cross Border Electricity Trade

A consensus with regard to the legal, regulatory, technical and commercial aspects amongst the Member states; will help in handling cross border electricity trade and transit in a well defined manner. It will remove the uncertainties. Each party to the trade or transit transactions will exactly know its role, responsibilities, the attendant risks and obligations; thereby leading to further cooperation over a period of time; not only in electricity sector but in other sectors of their economies as well.

5.0 SEC Mandate for Electricity Trade amongst Member States

SAARC Energy Centre (SEC) has been mandated by the Heads of State of the SAARC Member States to promote regional energy cooperation that include electricity trade as well¹⁵. In order to increase electricity trade in the region and with other neighboring countries and regions, SAARC has also tasked the SEC to work towards the formation of the SAARC Energy Ring including the SAARC Electricity Grid. Achievement of these goals will require creation of new electricity generation facilities to make energy available for cross border trade and the physical infrastructure to enable free flow of electricity across the region and with other regions. SMS will also have to establish a regional electricity trading mechanism that is in alignment with their electricity laws and regulations to govern such trade and transit. The mechanism should not only help in removing the impediments for electricity trade and transit to take place but it should also create an environment that helps in achieving the goals set forth for the SEC. Keeping in view the findings of the review of electricity laws and regulations contained in Chapter-III, the changes required to facilitate such trade and transit listed in Chapter-IV above and other suggestion that have emerged in other Sections of this report, the SMS may consider the following recommendations.

5.1 SAARC Regional Electricity Legal Framework (SELF)

SMS have in place laws and regulations to govern and manage power sector operations within the country. But none of them except for Bhutan and Nepal have provision therein to govern the cross border electricity trade/exchanges. Proposing each country to amend, either specific provisions therein; or through a general amendment thereof to promote cross border electricity trade without reaching a consensus on the requisite amendments may not help achieve the desired results. Because, each member state may like to amend their laws and regulations in a manner that takes care of their own interests and concerns as far the cross border electricity trade is concerned; thereby not meeting the expectations or requirement of other countries. Moreover, every time, the SMS agree upon to incorporate new provisions in their electricity laws and regulations to promote cross border electricity trade based on the actual requirements from time to time; may not materialize in a timely manner; either due to their parliaments not being

¹⁵ Source: Item number 11 of the Declaration of Fourteenth SAARC Summit; New Delhi, 2007

in session or due to several other reasons. It is, therefore, advisable to have a separate regional electricity legal and regulatory framework to which all the Member States are signatories to; and any change required thereto could be made easily. It is, therefore, proposed that the SMS could consider putting in place a SAARC Electricity Legal Framework (SELF) as discussed below.

SMS need to formulate a regional electricity trade and transit mechanism that could be called “SAARC Regional Legal Framework (SELF)” incorporating the legal, regulatory, technical and commercial requirements, under which cross border electricity trade and transit will take place in South Asia and with other countries and region; as has been done in other regional settings, such as, Southern African Power Pool, ASEAN and others such regional fora. However, straight jacketed replication of any of their documents by SMS might be counterproductive; as the neighborly relations, social, economic, geo-political and security situation in those regions vastly differs from the environment prevailing in South Asia. Such a move is further fraught with consequences that instead of promoting regional electricity trade and transit might act as a major stumbling block thereto.

There are no specific provisions in the electricity laws and regulations of six out of the eight Member States to govern the cross border electricity trade/transit and to address the specific issues that are a prerequisite for carrying out such trade and transit. SAARC Energy Centre (SEC) with in-house expertise or with outside support could draft the SELF in consultation with the respective ministries handling electricity as a subject in each of the Member States. In addition to other issues that may be raised by the concerned ministries of the SMS, SELF must adequately address the legal, regulatory, technical and commercial issues listed under these sub-sections in Chapter-IV above. Once an agreement on broad parameters of SELF has been reached and adopted at the SAARC level, the Member States would then make necessary changes to their respective electricity laws and regulations, wherever required, to align them with the provisions of the SELF. This will be the first stepping stone to encourage large scale electricity trade and transit among the SMS.

In addition to addressing the issues identified above, two major issues need to be taken in to cognizance while formulating the SELF. These are: (i) enhancing the availability of supply and (ii) creation of the physical infrastructure for cross border transmission of electricity. Because, having in place a regional legal and regulatory framework will make sense only if there is electricity to be traded and there are transmission systems to wheel electricity across the region and with other counties and regions.

While drafting the various provisions for incorporation in the SELF, the drafting committee of SEC should take in to consideration the prevailing technical specifications and operational parameters set by each member state for managing their electricity grids. The specifications for managing the cross border electricity transfers should be designed in manner that require minimal changes to their prevailing parameters as well as minimize the investment requirement for setting up new interconnections. Care should also be taken to minimize the number of

changes required in the prevailing electricity laws and regulations of the member states for aligning them with the provisions of SELF. Any drastic changes if suggested, unless they are extremely essential, may unnecessarily furl the feathers and delay the process of formulation of SELF. The consultative process of the SAARC for energy cooperation through SAARC Working Group on Energy will play a pivotal role in guiding the SEC with regard to arriving at a consensus about the needed interventions. While drafting the provisions of SELF, the drafting committee could also draw upon any specific provisions contained in the IGAs of other regional fora that have led to the development of any success stories in cross border electricity trade and transit and that are of relevance and may benefit the SAARC region as well.

SELF could comprise of the two parts. SELF Part-I would deal with the legal, regulatory, technical and commercial issues listed in paragraphs 4.1 to 4.4 of Chapter-IV; which are essential to promote cross border power trade and transit in a transparent, economical and efficient manner. It would also contain necessary provisions that lay the guidelines, systems and procedures for making the SELF operational.

The other broader issues that have been hampering the development of the cross electricity border trade and transit in South Asia are availability of supply that can be traded across the region and the necessary cross border infrastructure to facilitate such trade. SELF Part-II would deal with the issues of enhancing availability of electricity supply, attracting and facilitating large investments for creation of new generation capacities and cross border electricity infrastructure. SELF Part-II would, therefore, contain provisions, which though not directly dealing with the governance of the cross border electricity trade and transit per se; but are essential for such trade to happen and the need for which has emerged from the findings of this study in its various sections listed in the earlier chapters. It would also cover other necessary mechanisms to promote regional energy trade and transit among SMS and with other countries.

One of the major challenges before the SMS will be to fully commit themselves to implementing the provisions of SELF in letter and spirit without any delays on part of any of the member states, as otherwise it will remain on paper and not help achieve the goals that it is meant for.

5.2 SAARC Regional Power Projects (SRPP):

The planned capacity additions of all the member states except for Bhutan and Nepal are meant to meet the domestic demand and the generation from these plants will not be available for the purpose of regional power trade. Therefore, in addition to the potential for electricity imports from other countries and regions; it is extremely essential to establish large generation facilities within the region, to make electricity available for regional power trade, as discussed in section 2.3 Chapter-II above. Given the size of shortages and the need to fully meet the demand for electricity, SMS will have to collaborate to jointly set up or facilitate the setting of large generation facilities by the private sector; that could be designated as SAARC Regional Power Projects (SRPP). The energy generated from these plants would become available for trade within the region. The rationale for joint development of these energy resources is given below.

i. SAARC Regional Hydropower Projects:

SMS have a large hydropower potential of 294,330 MW. Only a fraction of which has been harnessed due to various reasons. Development of the balance potential provides an excellent opportunity for them to meet the in-country demand and export of surplus power to other member states. Given the limitation of financial resources for such large scale development, they need to adopt a regional approach for its development. A two pronged approach could be adopted for the same. First, SMS could identify a shelf of potential hydropower project sites that could be offered for developed as regional electricity projects. Member States could take equity stake in these projects and share the electricity generated, based thereon. The host country of such projects could be compensated through the allocation of a certain percentage of energy generated from these projects, for offering the project sites for the purpose of regional cooperation, in addition to their share of energy that they would be entitled to as equity participants in these projects.

The second could be to offer these projects for development to the private sector developers from within the region, through international competitive bidding to get competitive tariffs; with a caveat that the electricity generated would be traded within the region. Attracting large private sector investment would call for removing the bottlenecks discussed earlier in this report.

ii. SAARC Regional Thermal Power Projects:

On the thermal side, the region has large Coal reserves and relatively small gas reserves. Globally these are the two main fuels used for thermal generation. Out of the eight SMS, as of now, only India has set up a very large Coal based generation capacity. While Bangladesh has embarked on this path; Pakistan is yet to do so, despite having coal reserves of 90,082 million tons. Bangladesh, India and Pakistan have substantial gas based generation. But they are unable fully meet the demand for gas for the existing generation facilities and to add new gas based capacities due to gas shortages. Environmental concern is a major issue hampering the exploitation of the indigenous coal reserves for power sector. SMS will take time to resolve these concerns.

However, given the need for major capacity addition to meet the electricity demand within the region, especially for the purpose of regional power trade, it is highly desirable that the SMS set up large regional thermal power plants based on Coal as well as gas by importing these fuels through a joint fuel procurement mechanism discussed in sub-section 2.3.2.1 and 2.3.2.2 above.

iii. SAARC Renewable Energy Projects:

SAARC region has a very large potential for development of renewable energy projects, such as, wind, solar and biomass. India is one of the largest producers of grid interactive

renewable energy in the world with a total installed capacity of 21,125.38 MW as on 31.08.2011. This is more than the total installed capacity of Pakistan individually or the total cumulative installed capacity of all other countries in the region. India is also one of the largest wind power equipment manufacturers and suppliers in the world and has the capacity to help the member states in developing the renewable energy resources across the region. SMS could identify specific Renewable Energy projects and areas where their joint development could be undertaken and the energy so generated could be traded across the region.

SELF Part-II could incorporate a provision for the establishment of Regional Power Plants that in addition to partially meeting the energy need of the host country would make energy available for regional power trade as well. The host country of these regional power projects could be offered a certain percentage of the energy generated from these plants free of cost for offering their energy resources for development. The remaining energy would be traded on the South Asia Regional Power Exchange, as discussed below.

5.3 SAARC Investment Facilitation Program (SIFP):

One of the major reasons for delay in substantial generation capacity additions and establishment of cross border electricity transmission interconnections in South Asia has been the non-availability of funds. Massive investment, much beyond the mean of the SMS individually, is required for these initiatives. SMS would need to attract private investment in a big way to do so.

Global economic meltdown and the associated risk aversion of foreign investors to invest in emerging economies, they do not find it attractive to invest in South Asian power sector. As discussed earlier in sub-section 3.9.4.3 this report, there is need for evolving a mechanism that facilitates cross border investment from within the region on a large scale. There are several major private power developers in the region who have the capacity and have exhibited their willingness to make large investments in developing power projects in other countries of the region. These include some large Indian power project developers who have been awarded generation projects in Nepal and also the construction of the 400 kV Muzaffarpur (India)-Dhalkebar (Nepal) transmission interconnection to facilitate large electricity transfers between India and Nepal. Similarly Indian private sector has been involved in establishment of Tala transmission project with a transfer capacity of 1000 MW. However, the speed at which the government decision making takes place in the region and the flip flop in the implementation of policies by the implementing agencies with regard to the cross border investments, acts as a major dampener.

To overcome this obstacle, one of the provisions of SELF Part-II could make it mandatory for Member States to permit and facilitate cross border investments in the power sector from any investor belonging to any SMS on a non-discriminatory basis, with same provisions as applied by them to their national investments; with added provisions of payment security, non-

nationalization or takeover of the assets created from such investments (as done by Nepal), repatriation of profit and/or investment and with complete freedom to operate the systems as per SELF Part-I provisions, without any extraneous considerations. This mechanism could be called the SAARC Investment Facilitation Program (SIFP). While this provision in SELF will lay the foundation for its creation; the detailed modalities of establishment of SIFP will have to be worked out by the member states through mutual consultation.

5.4 SAARC Electricity Trading Mechanism (SETM):

As discussed in sub-section 3.9.3.3, SMS are shying away from exchanging and/or trading electricity even during the periods, when it is technically feasible and economically viable to do so; due to the variation in their load curves resulting from daily or seasonal peak demand. Because the governments do not want to be seen as exporting electricity, while the countries themselves are facing shortages. There is need to educate the masses about this aspect of potential for electricity trade or exchanges. To begin with, SMS could make it mandatory to trade and/or exchange a certain percentage of their total generation capacity with their neighboring countries and also establish the necessary cross border transmission links to facilitate such electricity flows. Part-II of SELF could make it mandatory for each Member State to:

- a. Exchange and/or trade (depending on the situation), energy equivalent to say 10% of its installed capacity with one or more of their neighboring countries, with a cap that is equivalent to the lower of the installed capacities. Such a mechanism will help create mutual confidence, trust and thereby creating an environment conducive for larger volumes of electricity trade;
- b. Create cross border electricity interconnection at lower of the two of the highest voltage levels, of the interconnecting systems to enable them to exchange or trade electricity to the extent stated above.

The mechanism could be called SAARC Electricity Trading Mechanism (SETM). SETM will immensely benefit the border regions of all the member states by providing access to electricity from the nearest generation facility irrespective of its location either in the host or the neighboring country. The benefits of electrification of these border areas is also in the broader national interests of the member states, as it will shore up the economic activities in these areas, thereby reducing their dependence on illegal cross border trade, cross border migration and other unwanted activities.

5.5 SAARC Template Documents (STDs):

One of the factors that has been delaying the project planning, award and execution of power projects in the region is the non-standardization and multiplicity of project documents used by the SMS right from the stage of conceptualization to commissioning of power projects. To overcome this hurdles, it is highly desirable that the SMSs adopt a set of documents from amongst the best and time tested ones already in use in one or more of the Member States and

adopt them with suitable modifications to be used as the SAARC Template Documents (STDs) for regional power projects. These could be Tender Documents, Project Award Agreements, Power Purchase Agreements, Fuel Supply Agreements, Transmission Service Agreements, and Tolling Agreements. Since these template documents would be pre-approved by all the SMS, their use will make projects happen at a faster pace, saving time, money and expedite the project implementation.

5.6 South Asia Regional Power Exchange (SARPE):

Bangladesh and India have entered in to an agreement to build the cross border transmission interconnection for export of 500 MW from India to Bangladesh. While government of India has committed to supply 250 MW out of it own resources, the balance 250 MW has to be procured by the concerned Bangladesh agency. The Electricity Act 2003 does not state whether the power exchanges already operational in India can provide access to Bangladesh for the procurement of this energy. So is true of the power traders as well, whose license does not permit them to export electricity. Similar situation may arise when the India-Sri Lanka transmission interconnection get build.

SMS recognize the need for the establishment of a regional power market in South Asia. SAARC Secretariat with the assistance of the Asian Development Bank has initiated a study for the formation of the South Asia Regional Power Exchange (SARPE). In order to facilitate the electricity trade in the region, SMS need to expedite the establishment of SARPE. Till the time SARPE is established and becomes operational, the member states could designate one or more power exchanges already in operation in India as the regional power exchange to facilitate cross border electricity trade; as a pre-cursor to the SARPE. A call, whether to continue with this arrangement or make SARPE the only power exchange to deal with cross border electricity trade in the region, can be taken once SARPE becomes fully functional.

5.7 SAARC Electricity Regulatory Commission (SERC):

The prevailing Electricity Regulations of the SMS, except that of Bhutan are meant to regulate the electricity sector within the political domain of the concerned country. They do not have provisions to govern cross border electricity trade and transit. While at the same time, any imported electricity that lands in to a country will be subjected to the regulation of the power importing country.

In order to avoid multiplicity of commends with regard to regulation of cross border electricity trade and transit amongst the SMS, it is highly desirable to create a SAARC Regional Electricity Regulatory Commission to regulate cross border electricity trade and transit. It should have the mandate of the SMSs to fully discharge its functions in the best interests of the electricity sector from a regional perspective, while honoring the national priorities and commitments. It could also be authorized to monitor the implementation of SELF and also act as a regional body to resolve any issues emanating from the cross border electricity trade and transit.

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