DISCUSSION PAPER

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Prospects and Challenges

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Acronyms and abbreviations

AC	Alternate Current
ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CDM	Clean Development Mechanism
ECSC	European Coal and Steel Community
EU	European Union
GDP	Gross Domestic Product
GMS	Greater Mekong Subregion
GWh	Giga Watt Hour
HVDC	High Voltage Direct Current
IPP	Independent Power Producer
Kgoe	Kilograms of oil equivalent
kV	Kilovolt
LNG	Liquefied Natural Gas
MoU	Memorandum of Understanding
MW	Megawatt
NEA	Nepal Electricity Authority
OECD	Organisation for Economic Co-operation and Development
PTC	Power Trading Corporation
SAARC	South Asian Association for Regional Cooperation
SAGQ	South Asia Growth Quadrangle
SAPP	Southern African Power Pool
SEEREM	South East European Regional Energy Market
SRETS	SAARC Regional Energy Trade Study
Tcf	Trillion Cubic Feet
TGAP	Trans-ASEAN Natural Gas Pipeline
USAID	United States Agency for International Development

Contents

Executive summary

The overall energy need for South Asia is predicted to be three times that of today within the next 15 to 20 years. Power and energy trade in the region were identified as one of the solutions for a crunching energy deficit because the region is unevenly endowed with natural resources and production capabilities. Reliable energy supply is needed to alleviate poverty and achieve sustainable economic growth. This paper assesses the barriers to regional energy cooperation in the South Asia Growth Quadrangle, comprising Bangladesh, Bhutan, India and Nepal. It complements recent research done by the World Bank, the United States Agency for International Development and the Asian Development Bank (ADB) on South Asian power network and energy cooperation through its rich stakeholder input and decidedly comparative analysis.

Taking the case of Nepal as an example, the barriers to stronger regional energy cooperation and trade were found to be of economical, political and social in nature. The key aspects, however, obstructing progress are domestic politics and international politics vis-a-vis the countries' neighbours, as well as institutional incapacities. The lack of separation of economic and political interests has defined electricity as a strategic commodity which has fallen prey to political instability and party politics.

There have been several international good practices of energy cooperation, particularly in establishing regional power grids. The European Union was established out of the European Steel and Coal Community, which demonstrated the success of a supranational institution to which member states surrender some of their sovereignty. Meanwhile, the Southern African Power Pool (SAPP) serves as a role model for pragmatic policy making. Based on the economic advantages of grid connection, SAPP member states managed to separate politics from their common interests in quantity and quality of power supply. Furthermore, the Association of Southeast Asian Nations (ASEAN) Power Grid and the Greater Mekong River Agreement have demonstrated the importance of having qualified technical personnel at all levels of decision making.

Demonstration projects managed to gather the necessary support in order to pass intergovernmental agreements providing a framework for the gradual increase in power trade between the member states. All these initiatives have steady and institutionalized communication between the member states—a very crucial aspect in realizing regional energy cooperation. Furthermore, patience towards the length of the process and a long-term commitment were determinants of the success of regional energy cooperation.

In order to advance beneficial energy cooperation in the eastern South Asian region, stakeholders at the government, civil society and private sector levels should be willing to cooperate. Given the unique geopolitics in the region, it is clear that the first step would be for countries to extend and institutionalize their bilateral ties with India. Through

informal channels and regional fora like the South Asian Association for Regional Cooperation (SAARC) Energy Working Group, communication between officials working in the energy sector should be increased in order to heighten the level of trust, in particular at the highest political level.

At the technical level, utilities, transmission and distribution operators have to sychronize their grids and invest in domestic power generation. Finally, the leadership of India, as the biggest energy supplier and consumer, becomes an absolute necessity.

Some developments, albeit mainly bilateral, are worth noting. Bhutan has been exporting large proportions of its hydropower to India. India and Nepal have signed around 10 memoranda of understanding for transborder power exchanges and are working on constructing a 400kV transmission line. A recent offer by the ADB to provide a US$100 million loan for building a cross-border power grid between India and Bangladesh might contribute to reducing the daily power gap of 2,000 MW in Bangladesh. Simultaneously, the disputed Myanmar-India gas pipeline, which was almost going to bypass Bangladesh, has recently been approved by the new Bangladeshi government under Prime Minister Sheikh Hasina. Therefore, there is reason to analyse the feasibility, barriers and options for energy cooperation between Bangladesh, Bhutan, India and Nepal.

Chapter 1

Introduction

The uneven spatial distribution of natural resources in South Asia has created a need for regional cooperation. The region is very poor in oil reserves—less than 0.5 percent of the world's oil resources are located in the region. While there is broad agreement that energy needs in most South Asian countries are not met under the current setting, the question remains why energy trade has been lagging behind for decades.

The volumes of cross-border electricity trade are insignificant and there is no trade of gas using pipelines across the region, regardless of considerable unexplored resources in Bangladesh and Pakistan, or even transiting from the Central Asian Republics or the Southeast Asian region.

As detailed in Singh (2009), there are significant complementarities and synergies between the energy production and consumption of different South Asian countries.[1] One such complementarity can be observed in Nepal during the summer monsoon months when heightened water resources lead to maximum hydroelectricity production.

During the same period, the northern Indian states face increased electricity shortages. The situation reverses during the dry season around December and January, when Nepal's hydropower plants run at 10 percent of their capacity (Nepal Electricity Authority 2009). Meeting one country's deficit supply with the neighbour's excess production would produce a true synergy.

1.1 Power and natural gas sector in select South Asian countries

There are several possibilities and opportunities for energy cooperation in South Asia. This paper focuses on electricity and natural gas. Trade in electricity and natural gas occurs through power grids and via gas pipelines, respectively. By focusing on only a limited number of countries, namely Nepal, Bangladesh, Bhutan, and India, the potential overlaps of energy interests for these countries can be exemplified. This particular choice of countries allows focus on the great potential of power trade, which has been well-studied in previous researches. There are similar possibilities between India and Pakistan, as well as between India and Sri Lanka.

There are significant complementarities and synergies between the energy production and consumption of South Asian countries.

Regional cooperation means the building up of competition between local and regional power providers by opening up markets to a selected set of member countries. Regional energy cooperation can also be understood in the context of knowledge exchange and economies of scale in decentralized rural electrification (Srivastava and Misra 2006). In South Asia, regional practices or agreements on regional electricity and natural gas trade have not been implemented so far. Instead there are a number of historical experiences on a bilateral basis between India and its northern neighbours Bangladesh, Bhutan and Nepal.

Singh (2009) claims that pressure for energy cooperation is increasing due to the following exogenous socio-economic

conditions: rising urbanization; increasing dependence on fossil fuel imports from the Middle East; vulnerability to external shocks and price volatility; low access to electricity; lack of hydropower markets in countries with excess hydropower like Bhutan and Nepal.

One of the adamant writers on this issue is Dr. Mahendra P. Lama, now Vice-Chancellor of Sikkim University. He claims that there are absolute advantages from regional energy cooperation:

"There already exist considerable networks of inter-connections among the South Asian countries. India's Power Grid Corporation has worked out the inter-connections required, their feasibility and the cost and benefits to the participating countries in the South Asia Growth Quadrangle (SAGQ) region. All these inter-connecting channels will very well match the Indian effort to have integration of all regions to form a National Grid in near future." (Lama 2005)

Energy exchange and trade have a strong correlation with poverty alleviation, nutrition and health.

Representing a theoretical liberal perspective, he conceived that cross-border power purchase will produce measurable benefits:

a) Effective utilization of natural resources;
b) Increase in reliability of power supply;
c) Economy in operation and mutual support during contingencies;
d) Large-scale transformation in the sectors contributing to economic growth;
e) Single most effective building measure through the participation of multiple stakeholders;
f) Regional energy security through fuel diversification and a regional power grid;
g) Benefits from seasonal differential demands;
h) Technological transfer and human resources development; and
i) Regional based practices to reduce environmental hazards.

One of the key preconditions for cross-border trade is investment in generation and transmission infrastructures, whose cost estimates are already available (Table 1.1). The existing high technical losses reflect the lack of investment in the distribution sector. That said, the key reasons for the lack of investment in these infrastructures are political instability, and a non-conducive and often informal political and business environment.

It has been shown that energy exchange and trade, given that they take place at fair tariffs and allow both sides to increase their energy supply, have a strong correlation with poverty alleviation, nutrition and health. This might be the reason why developmental benefits are prominently featured when international agencies get involved in regional integration initiatives. A few of such initiatives are listed below:

a) The World Bank and the Asian Development Bank (ADB) have actively been supporting regional efforts through large-scale infrastructure investment, technical assistance, feasibility studies and advisory services. The ADB helped finance the Upper Seti power plant

Table 1.1 Required financial investment for cross-border energy trade in SAGQ

Country	Investment	Time line	Estimated cost
Bangladesh	Power sector development	10 years	US$5–6 billion
Bhutan	Power system master plan	2003–2022	US$3.36 billion
India	Increase generating capacity, transmission and distribution	Until 2030	US$680 billion (International Energy Agency 2004)
Nepal	Generation and transmission	10 years	US$1.22 billion (Ystegaard 2005)

(27 MW), invested US$17 million in transmission and distribution infrastructure, and helped initiate the Dhalkebar–Muzaffarpur transmission line. Meanwhile, the World Bank is mainly involved in feasibility studies—for instance, analysing the downstream effects of large reservoir plants—and advisory services, improving different sides' negotiation skills.

b) South Asia Regional Initiative (SARI)/Energy Programme: It was funded by the United States Agency for International Development (USAID) starting 1999. In 2003 it adopted four building blocks: energy efficiency standards and labeling; rural energy supply; electricity trading; and power sector reform. SARI/Energy objectives complement ongoing bilateral energy, environmental and economic development programmes such as hydropower development in Nepal, energy sector reforms in Bangladesh, distribution reforms in India and the competitiveness initiative in Sri Lanka (IIE Energy Group 2003: 2). Currently, it is mainly focusing on capacity building.

c) Regional projects: SAARC Energy Centre in Islamabad, and SAARC Energy Working Group.

At the South Asian Association for Regional Cooperation (SAARC) level, a process aiming at energy cooperation was started in 2000. The main milestones achieved so far are listed in Table 1.2.

Table 1.2 Energy cooperation under SAARC

January 2000	Technical Committee on Energy
January 2004	Specialized Working Group on Energy
1 October 2005	First meeting of energy ministers, Islamabad: Formation of Expert Group on energy conservation and efficiency and Roadmap for SAARC region
2006	Establishment of the SAARC Energy Centre in Islamabad
5 March 2007	South Asia Energy Dialogue: Recommendations to promote cooperation
January 2009	Concept of "Energy Ring", Colombo
April 2009	Fifth meeting, Working Group: Establishment of expert groups on a) oil and gas, b) electricity, c) renewable energy, d) technology and knowledge sharing
April 2010	Concept of SAARC Market for Electricity in the 16th SAARC Summit Declaration

One wonders how it is possible that so many statements of cooperation were made but still no actions apart from several small bilateral agreements, mainly export-oriented Indian-financed hydro projects in Nepal and Bhutan, were implemented.

1.2 Policy window

The main reason for policy window being put as the foremost agenda of all research, training programmes and negotiations is that the availability of reliable energy is directly correlated with production, productivity and economic growth of the region's economies. Meanwhile, politicians have been misguided about the effect of regional energy trade agreements on a country's energy security. Increasing sustainable energy provision through trade would in reality contribute to the country's energy security and, in the cases of smaller member states, improve their balance of trade. Bilateral and populist politics are obstructing power and gas trade, depriving citizens of potential gains that can be accrued from regional trade.

Bilateral and populist politics are obstructing power and gas trade.

Responding to climate change presents opportunities and challenges for, *inter alia*, international and intra-regional energy cooperation. With a significantly large proportion of energy needs still being met from non-commercial sources, including firewood, the energy deficit has entailed deforestation, soil erosion, siltation, flash floods and decline in agricultural productivity (Sikkim University 2010). It is symbolic that the 16th SAARC Summit in Thimpu, Bhutan produced a declaration called "Towards a Green and Happy

South Asia", initiating a new focus on climate change in the region.

The rationale for a renewed focus on regional cooperation in the last 5 to 10 years can also be explained through a number of events that opened up a policy window.

a) In 2005 significant gas resources were discovered in Gujarat.
b) Nepal's hydropower potential is 43,000 MW, even under the most conservative estimate. At present, 800 MW is being exploited. More optimistic estimates have been made by Hydro Solutions, as high as 200,000 MW.
c) The South African Power Pool (SAPP) was formed in South Africa in 1995 and has proven to be successful in the long run.
d) Responding to climate change presents opportunities and challenges for, *inter alia*, international and intra-regional energy cooperation.
e) There are large, undeveloped gas resources in Bangladesh and India, hydropower resources in Bhutan, India and Nepal, and wind resources in Sri Lanka (IIE Energy Group 2003: 2).
f) The majority of the region's population is left with unreliable, unaffordable or no access to electricity.
g) Bhutan promotes green energy and generates 47 percent of gross domestic product (GDP) through the power sector.

Regardless of considerable potential, energy cooperation has failed to materialize even at the bilateral level.

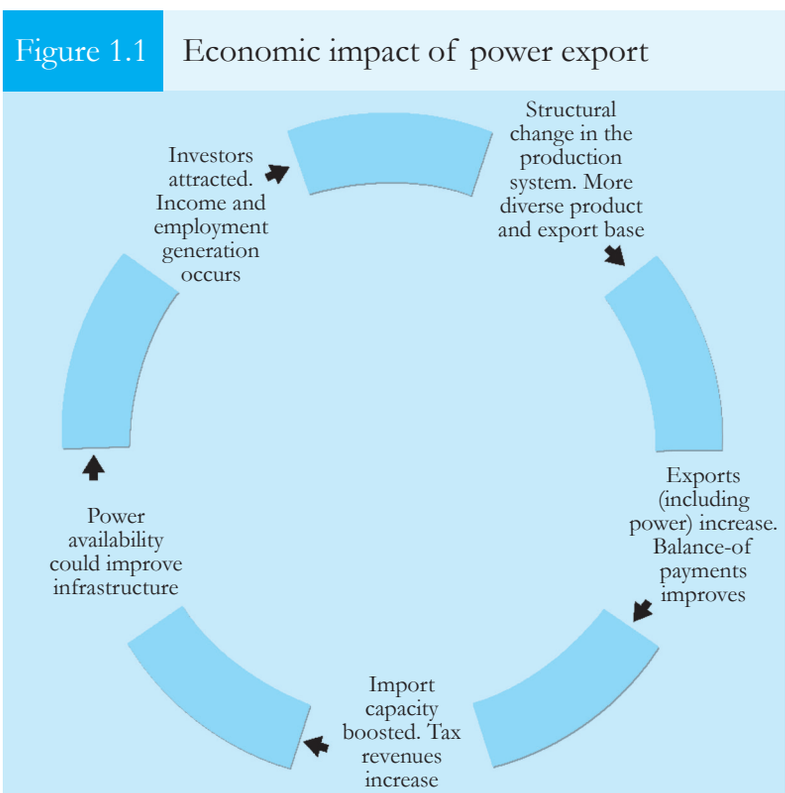
1.3 Literature review

There already is a sizable amount of literature and discussion, mainly within the SAGQ, which includes Bangladesh, Bhutan, India and Nepal. The literature has mainly focused on potential gains from trade, countries' energy resources, and demand and supply structures. Barriers obstructing large-scale implementation projects to date have also been analysed.

A World Bank study (World Bank 2008) on the social and economic impacts of power trade in the SAGQ attests to consistently positive effects on industrial production, finance, revenue, GDP, foreign exchange gains, and, of course, progress in rural electrification (Figure 1.1). Furthermore, it notes that the use of traded electricity is going to benefit farmers, rural assets, health, education, and even demographics and women empowerment. The study predicts the creation of new employment opportunities due to economic growth, rural electrification, new power projects, and increased tourism.

Srivastava and Misra's (2006) study on SAGQ countries shows that regardless of considerable potential, energy cooperation has failed to materialize even at the bilateral level. They propose a multi-pronged strategy for sub-regional cooperation ranging from softer options like confidence-building to institutionalized cooperation on information sharing, research and development (R&D), back-

Figure 1.1 Economic impact of power export



Source: World Bank (2008).

to-back arrangements, and coordinated regulatory and legal frameworks.

Another important source of analysis comes from the SARI/Energy project. In its 2003 mid-term evaluation, the USAID-funded programme conducted an impact assessment at its own initiative. Its main findings centered on the crucial effects of bilateral political tensions between and socio-cultural sentiments in countries involved in the project. Key recommendations concerned the choice of stakeholders: the study emphasized the importance of high-level politicians, parliamentarians, celebrities and the media to be involved in and given ownership of the process of integration.

While a paper by the South Asia Center for Policy Studies (SACEPS) highlighted the potential of private sector involvement, more recently, the World Bank (2008) showed a clear connection between energy cooperation and energy security, in particular for smaller South Asian countries. A report to be published under the ADB's SAARC Regional Energy Trade Study (SRETS) in December 2010 has proposed four concrete courses of action: Creating a (sub-) regional power grid, liquefied natural gas (LNG) terminals, power plant and refinery.

The present literature generally centres on the potential economic, social and political benefits and prospects of increased cooperation. However, it also acknowledges the virtual absence of implementation or success stories. There is also a dearth of detailed economic and technical analysis of concrete cooperation projects.

1.4 Research goal

The goal of this paper is to devise a background of reliable research that will help policy makers to evaluate the obstacles to stronger regional energy cooperation, outline some of the instruments to be used, and lay out a convincing foundation for a regional approach to energy cooperation in eastern South Asia. More specifically it aims to:

a) Refine the framework to outline some of the instruments to be used and serve as a convincing foundation for a regional and pool-based approach to energy cooperation in South Asia.
b) Create an overview of different positions and arguments brought forward by stakeholders.
c) Draw on the experience of successful regional energy cooperation in other regions, with a strong focus on the dynamics of the effective involvement of stakeholders.
d) Shed light on the potential for (international) environmental and sustainability considerations in advancing progress.

1.5 Research design

This paper is application-oriented and centres on an evaluation of the already implemented policies in comparative regions. It uses a mixed-method approach, i.e., in comparing case studies, the aim is to highlight the impact of differing stakeholders' behaviour and subsequent differences on the success of energy cooperation.

High-level politicians, parliamentarians, celebrities and the media need to be involved in and given ownership of the process of integration.

In order to achieve a comprehensive picture, a number of specific methods for assessment have been used:

a) Literature review on the theory of integration, and best practices in South Asia[2], Europe, Southeast Asia and Southern Africa.
b) Wherever possible, an analysis of basic quantitative data available on the economic assessment of SAGQ countries, in comparison with the South African Power Pool (SAPP), the Association of Southeast Asian Nations (ASEAN) and the European Union (EU), is conducted.
c) In-depth semi-structured interviews. The empirical data for this paper were drawn from 14 semi-

structured expert interviews that were conducted between July and September 2010 with members of the government, utilities, donors, embassies, interest groups, energy regulators and members of the scientific community, mainly in Nepal. Remote interviews with stakeholders in Bangladesh and India were carried out via email.

The units of analysis are key stakeholders, individuals and groups since several previous studies, such as the SARI/Energy initiative, identified high-level stakeholders at the political (and private) level to be key during the implementation process.

The time frame of discussion is clearly within the past 5 to 10 years in order to concentrate on present-day issues and solutions. The scenario is highly influenced by the events of domestic and cross-border conflicts, as well as the international economic crisis.

1.6 Analytical framework

Using a comparative approach, experiences and solutions from other contexts are used to help formulate a set of recommendations and areas for intervention. For this purpose, cultural, socio-economic, environmental and political barriers are identified.

The paper is divided into four parts. Following this introductory chapter, Chapter 2 gives a short background of the energy situation and preliminary cooperation initiatives in SAGQ countries. Chapter 3 provides a case study of Nepal, bringing together the results of a series of interviews carried out by the author, highlighting the barriers to energy trade. Chapter 4 provides a thorough analysis of prominent international good practices in Africa, Europe and South-east Asia. Chapter 5 draws on the findings from literature review and primary research to suggest a number of recommendations to the various stakeholders in the region.

Chapter 2

Country profiles

2.1 Bangladesh

Bangladesh's main indigenous source of energy is natural gas. It is mainly used for power and fertilizer production. Within the power sector, industry and households are the major consumers. As the country is in dire need of power and energy for its transport sector, Bangladesh has been importing oil and natural gas for a long time. Currently, the country imports 3–4 million tons of coal and is looking into building its own coal power plants.

In 2006, biomass still remained the main source of energy although its share had decreased from 62 percent in 1990 to 42 percent. Currently, 57 percent of Bangladeshi households do not have any direct or indirect access to electricity (Munim, Hakim and Al-Mamun 2010). The consumption of energy for electricity is growing faster than for other usages such as transport, industry and heating.

Table 2.1 details averages and thereby omits the severe load-shedding spells that Bangladesh has been experiencing in 2010. For instance, the difference between demand and supply on 15 February 2010 was 1,000 MW. The trend is likely to increase in the summer months, when Bangladeshi demand typically rises compared to the winter months.

In 2010, for the first time, Bangladesh embraced the idea of public-private cooperation, and proposed a detailed roadmap to overcome present and future power shortages (Figure 2.1).

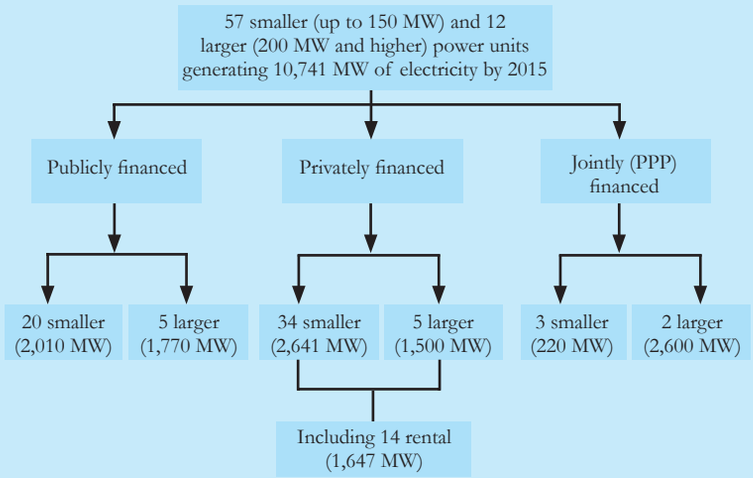
Table 2.1 Bangladesh's power system

Installed capacity	5,376 MW
Present operable capacity	4,714 MW
Present peak demand	4,300 MW
System loss (T&D)	22.06 percent
Generation mix	
Gas	89.4 percent
Hydro	4.5 percent
Liquid fuel	6.1 percent
Electricity growth	7.0 percent on average, since 1990
Transmission lines	8,300 km
Distribution lines	260,000 km
Consumption mix	
Industrial	43.7 percent
Commercial	7.8 percent
Domestic	42.5 percent
Per capita generation	220 kWh
Access to electricity	47 percent

Source: USAID (2009); Bangladesh Power Development Board (2010).

Meanwhile, there is still no consensus on the estimates of gas reserves. While a government source at the Ministry of Finance estimated 28.4 trillion cubic feet (tcf) of total reserves, of which 20.5 tcf are recoverable, the Oil and Gas Journal in 2006 estimated only 5 tcf of proven gas reserves (Munim, Hakim and Al-Mamun 2010: 9). Natural gas exploration and production are done by three state-owned companies, all of which are subsidiaries of Petrobangla:

Figure 2.1 Bangladesh's roadmap to improved power supply



Source: Rahman (2010).

(a) Bangladesh Gas Fields Company Limited
(b) Sylhet Gas Field Company Ltd.
(c) Bangladesh Petroleum Exploration and Production Company

In 1993, the natural gas sector was opened up to foreign and private investment. The leading foreign investor is Chevron (producing an estimated 300 million cubic feet per day). The country is 100 percent dependent on imported oil, although there are a proven 28 million tons of oil reserves. The country's hydropower plant at Kaptai can produce up to 900 MW depending on the water flow, although the installed capacity is only 230 MW. Due to the country's flat terrain and potentially large social and environmental impacts only small-scale exploration is likely in the future (Uddin and Taplin 2006).

Bhutan is the only power-surplus country in the South Asia Growth Quadrangle.

Politically, the government headed by Prime Minister Sheikh Hasina has overseen a change in the country's openness to trade and cooperation. In fact "she attached top priority for smooth supply of power and energy to ensure economic development of the country" (Energy Bangla 2010). The change in government therefore helped pave the way for a cross-country natural gas pipeline to be built connecting Myanmar and India through Bangladeshi territory. Currently there is no export of natural gas from Bangladesh. In 2010, Bangladesh and India decided to jointly conduct a feasibility study on the setting up of two 1,320 MW coal-based power plants, and form a joint venture company to install one of the plants at an investment of US$1.7 billion (Energy and Power 2010). At the same time, an inter-country electricity grid will allow Bangladesh to import 250 MW from India starting 2012.

2.2 Bhutan

Bhutan is the only power-surplus country in the SAGQ. Hydropower aside, the country has no proven gas, oil or coal reserves. This means Bhutan is importing all of its petroleum product requirements (ADB 2009: 123). Growth in the industrial sector has been driving a 6 percent annual GDP growth since 1990. The residential sector, however, registered the slowest growth in consumption, at 1.5 percent per annum. Throughout this period, biomass comprised more than 95 percent of the residential energy consumption (ADB 2009: 124).

The national internal transmission system of Bhutan is at an early stage of development. Transmission lines mainly consist of 132 kV and 66 kV connecting major power stations. The smaller stations use 33 kV lines. Much larger circuits of 220 kV and 400 kV are used for power export to India (USAID 2009) (Table 2.2). All of the power deals with India happen on a government-to-government basis through the Power Trading Corporation India (PTCI) and the Bhutan Power Corporation, which combines transmission and distribution under its roof.

Indian investment is omnipresent in the Bhutanese power sector. In 2006, a joint venture between Tata Power and Power Grid Corporation of India was completed, which constructed a 400 kV double-circuit line of 1,200 km with a transfer capacity of 3,000 MW. At the same time, Bhutan still faces problems with elec-

Table 2.2 Bhutan-India power trade

Export	Transmission lines	Power transfer
Bongaigon (Assam)	66 kV	
Rongia (Assam)	33 kV	
Siliguri (West Bengal)	220 kV	
Export		1,764 GWh
Import		25 GWh

Source: USAID (2009).

tricity distribution. Of its 1,488 MW installed capacity, 80 percent are being exported to India. For the next 20 years, Bhutan's overall industrial policy is going to focus on hydropower development. The estimated earnings from exporting electricity to India amount to US$31 million per annum (USAID 2009).

2.3 India

India is the second largest energy consumer in Asia and the fourth largest in the world. It is also the fourth largest coal producer. Along with the growth of coal-fired power plants, natural gas and nuclear energy consumption have been increasing continuously at a rate of 5 percent and 7.2 percent per year, respectively. The energy production prospect has been rising since India started importing liquefied natural gas in 2004 and also discovered a gas field in the Bay of Bengal. The country has been a net energy importer since 1995 and energy intensity and elasticity have been declining rapidly. This indicates that GDP has been growing faster than energy consumption. At the moment 56 percent of Indian households are connected to the power grid (UNDP 2008).

According to USAID (2009), total interregional transmission capacity in India is currently 17,000 MW. By 2012, the Indian government plans to fully integrate the national grid and double the interregional transmission capacity by 17,700 MW. Table 2.3 contains some of the main characteristics of the Indian power system. Traditionally the Indian power sector used to be divided into five independent grids: Northern Region, Northeastern Region, Eastern Region, Western Region and Southern Region. In 2010, the four northern grids were connected using high-speed synchronous transmission lines. The connections with the Southern Region are still mainly operated on a radial mode.

As the country is planning to increase access to electricity at a time when demand is also rapidly increasing due to high economic growth, the Indian government is exploring options of new energy resources in all directions. It is therefore negotiating agreements to secure natural gas from Central and Southeast Asia and import electricity from its northern neighbours. Its strategy is to negotiate deals on a bilateral basis. Tariffs, interconnections and investments are therefore set individually when dealing with Bangladesh, Bhutan or Nepal. Regardless of its SAARC membership, the country is not strongly fostering a regional approach, based on its natural advantage as the biggest member state and domestic energy security considerations.

Indian government is negotiating agreements to secure natural gas from Central and Southeast Asia and import electricity from its northern neighbours.

Table 2.3 Indian power system

Installed capacity	141 GW
Peak demand	106 GW
Peak shortage	15.6%
Energy shortage	10.4%

Source: USAID (2009).

2.4 Nepal

Notwithstanding the country's enormous hydropower potential, Nepal's domestic electricity supply does not match the demand. According to UNDP (2008), the electrification of households was at a mere 33 percent. The Government of Nepal claims the figure to be around 45 percent in 2010. The overall energy demand has been rising at 9 percent per annum. About 90 percent of total energy is consumed in the residential sector. Biomass energy (fuel wood, crop residues and animal manure) is the dominant fuel type for household use. However, its percentage use fell from 93.9 percent in 1990 to 86.8 percent in 2006.

According to ADB (2009: 139), Nepal's hydro energy increased at an average annual rate of 7.3 percent from 1990 to 2006, and the country is a net importer of electricity from India. The total installed capacity is 659 MW. Presently, less than 1.5 percent of hydro power potential is realized. According to the Nepal Electricity Authority (NEA)'s Annual Report 2009, the highest electricity demand was recorded on 20 January 2009 at 812.50 MW. In fact, in 2009 import from India reduced due to the unavailability of the Kataiya-Duhabi transmission line, leading to a decrease in domestic supply.

The Bhutanese model of financing (40 percent soft loan, 60 percent grant) is not an option due to the sheer size of the Nepali economy.

Nepal's hydropower is mostly run-of-the-river type. There are no significant water storages installed. The main load centre is concentrated around the Kathmandu Valley. A 132 kV line runs parallel to the Indian border from the east to the west of Nepal. All major hydroelectric and thermal power stations are connected to this grid. The power sector in Nepal is dominated by the NEA, a government-owned and controlled utility, in cooperation with several independent power producers (IPPs).

The NEA also transmits and distributes all of the public power supply in Nepal, except for the operations of Butwal Power Company, which supplies and distributes about 2 percent of the national production in the Terai region, mainly around Butwal. "Government has a very close control over NEA management and operations, and the instability of governments in Nepal in recent years has not been conducive to establishing long-term objectives with a steady implementation course" (Khamudkhanov 2008).

While there are currently no efforts for a regional approach, there are three modes of power relations with India:

a) River treaties, where new hydro power projects are developed jointly.
b) Power exchange agreements for up to 50 MW of energy under jointly decided tariff rates.
c) On a yearly basis, the NEA purchases electricity from India (100 MW in the 2010 dry season). In the near future, the construction of a major 400 kV transmission line with the capacity of 1,000 MW is expected. In order to truly benefit from the line, however, a synchronization of the two electricity grids is needed.

The NEA is currently actively promoting the closure of an "umbrella" framework agreement with India which would govern the commercial relations between private investors and electricity providers of the two countries.

As an NEA officer explained, Nepal is not trying to follow the "Bhutan path", which aims at expanding the national electricity potential through investment directed towards exports to India. The Bhutanese model of financing (40 percent soft loan, 60 percent grant) is also not an option due to the sheer size of the Nepali economy compared to Bhutanese economy. Instead of establishing government-to-government agreements, the NEA has opened up its market to private foreign investors.[3] This would not only include Indian companies but also Chinese and Korean companies that are interested in investing in Nepal with an aim to export

electricity to the India market. Critics such as former Minister for Water Resources Dipak Gyawali claim that the Electricity Act pending for ratification in the Parliament would in fact "reward exporters of electricity with tax breaks but would penalize those developing hydropower for Nepali consumption. This would push Nepal inexorably towards a neocolonial political economy similar to that of Bhutan's, and away from the slow but self-reliant development path pursued so far" (2010). Triggered by the National Association of Community Electricity Users Nepal (NACEUN), Members of Parliament have tabled 142 fundamental amendments that would redefine the Act towards a self-reliant, "national capacity enhancement model".

2.5 Regional initiatives: Overview

At this point, there are no regional initiatives where trade would involve more than two countries within the SAGQ region. However, there are a number of intra- and inter-regional initiatives being planned on a bilateral basis.

a) Intra-regional cross-border projects (Fernando 2009):

- India-Nepal oil products pipeline
- Power Grid interconnections between Bangladesh and India, and joint ventures for coal power plants
- Nepal-India interconnections 400/220kV
  - o Butwal (Nepal)-Gorakhpur (India)
  - o Duhabi-Purnea
  - o Dhalkebar-Muzaffarpur
  - o Anarmani-Siliguri
- Nepal-India Power Exchange, i.e., no profit (Ramakrishna and Jha 2009): It has so far focused on local cooperation (up to 50 MW) for isolated areas on both sides of the border using radial mode of power transmission.
- Additional power transmission links between Bhutan and India.

b) Inter-regional projects

- CASA 1000 Project for Central Asia-Afghanistan-Pakistan power transmission interconnection.
- Phase-II of CASA: Electricity from Central Asian Republics up to the Indian power grid.
- Iran-Pakistan-India gas pipeline.
- Myanmar-Bangladesh-India gas pipeline.
- Turkmenistan-Afghanistan-Pakistan-India pipeline.

At the moment there is no cross-border natural gas infrastructure. In the power sector, there might be some progress soon. On 5 September 2010, the Asian Development Bank (ADB) assured that it will finance the 400 KV Grid Inter Connection project between Bangladesh and India as soon as the contracts are awarded. While the bids are being evaluated by the Bangladesh Power Development Board, the ADB committed US$100 million (Energy Bangla 2010).

There are a number of intra- and inter-regional initiatives being planned on a bilateral basis.

2.6 Implementation

There are several power transmission agreements implemented between either India and Nepal, or Bhutan and India. A USAID study assessed the potential to far outdo what is being done to date (USAID 2009). Several recent studies have corroborated this point. Table 2.4 shows a summary of presently implemented cooperation.

2.7 Potential benefits

In 2001, one of the first feasibility studies was conducted in the region. The "Four borders study" prepared for the USAID's SARI/Energy programme identified that it is technically feasible to build transmission interconnections in the "Four borders area" that would benefit all four countries in the region. By introducing an interconnection between Bangladesh, Bhutan, India and Nepal, it will be possible to plan generation and transmission system expansion on a regional basis (Nexant 2001).

Benefits can be classified as technical, operational, environmental, financial, economic and social. As the ADB's SRETS study details, the major benefits are:

a) System operational benefits from

- Optimal utilization of natural resources to meet growing energy demand
- Concentration of various types of energy resources in different countries
- Economies of scale
- Improved energy security and reliability
- Optimized transmission network.
- Increased economic efficiency in system operation
- Reduced adverse environmental impact
- Reduced spinning reserves in the case of electricity generation

b) Economic and financial benefits from

- Enhanced industrial productivity
- Increased revenues from trade and industrial activities
- Faster GDP growth rate
- Increased foreign exchange earnings for exporting countries (Nepal, Bhutan)

No country in the world has been able to successfully store large quantities of electricity other than through batteries and water reservoirs.

One of the strongest arguments for regional cooperation is the existence of complementarities, i.e., peak season in one country is matched by non-peak season in terms of energy consumption in another country. It is obvious in the Bhutanese case, where developed power is already being exported to India on a large scale. Nepal could—upon development of those hydropower plants that are currently in the pipeline—export electricity to northern India during the wet season, where Indian demand is highest and not met by domestic production. During the dry season imports from Indian thermal power production could alleviate load-shedding and make up for the reduced hydropower production.

Therefore, the first and foremost reason why trade might be beneficial stems from the fact that till date no country in the world has been able to successfully store large quantities of electricity other than through batteries and water reservoirs. This means that produced electricity has to be consumed immediately. Given the potential complementarities as detailed

Table 2.4 Existing energy trade in SAGQ

Participants	Volume
India-Bhutan (power)	5,620 GWh • The present installed capacity is 1,500 MW, of which approximately 350 MW is used for Bhutanese domestic consumption • The government of India has agreed to import a minimum of 10,000 MW by 2020 (Economic Times 2009) • Such an increase will demand a significant increase in transmission capacity through either alternate current (AC) or high voltage direct current (HVDC)
India-Nepal (power)	Annual 100–150 MW import from India
India-Bangladesh (diesel)	100,000 tons (2008) import from India
India-Nepal and Indi-Bhutan (petroleum products)	Nepal and Bhutan do not have refining capacities. Nepal imports 1.2 million tons per annum, with an annual increase of 20 percent, from the Indian Oil Corporation (Nepal Oil Corporation Limited 2009). Bhutan imports 63,875 metric tons per annum (CIA Factbook, estimate for 2008).
India-Bangladesh (coal)	3–4 million tons of coal import from India

in Table 2.5, one country's surplus could be consumed at a profit by the neighbouring country's grid.

Furthermore, there is considerable potential under the Kyoto Protocol's Clean Development Mechanism (CDM). Bhutan is likely to benefit from it, using India's carbon emissions baseline. For instance, the 114 MW Dagachhu Hydro Power project, which is expected to start operation in 2012, will reduce CO_2 emissions by 529,914 tonnes per year (CDM Projects India 2010). In Nepal, projects under CDM have been initiated only very recently, for example, in the biogas sector. Besides, diversification of energy supplies, through joint investment in new energy sources—for instance, on renewables development—will benefit the cooperating countries. Cooperation at the planning stage also has high potential. If policies and legal frameworks are drafted in cooperation with neighbouring countries, not only the domestic policy will be better but steady communication will allow national authorities to anticipate and cooperate with their neighbours on the basis of a Nash equilibrium. Therefore, there is a need to build trust, coordinate legislation and exchange information for the development of a utilities network.

Dhungel (2010) argues: "The development of LNG and hydroelectricity requires huge investment. An individual country besides India may not be able to afford such large investments in developing these resources. The countries of the region have to realize their energy deficiency and potential of the neighboring countries. Nepal and Bangladesh have been facing technical, financial and geographical constraints. India has relatively high demand for energy in relation to economically high exploitable resources as it has more than 8 per cent economic growth rate since the past decade. To keep this growth rate continuing in the coming years, India is looking for a wide range of market to fulfill her energy needs under which she is working for getting LNG from Iran, Bangladesh and Myanmar through pipelines."

Dhungel (2010) raises two contentious points. The first one is that individual countries, i.e., Nepal, Bangladesh and Bhutan, would not be able to raise the necessary finances from within their own economies. Present estimates by NEA officials state a maximum of 200 MW could be built using the present capital in Nepali banks. In addition, huge amounts of remittances channeled into a few sectors—particularly real estate and housing market—have created a real estate and housing bubble, apart from giving rise to other negative consequences such as excessive dependence on imports, decline in manufacturing sector growth, and migration, leading to a shortage of productive workforce in rural areas.[4] (Sapkota 2010). It means that investment in infrastructure, including hydropower, is not happening as the time to get returns on such investment is substantially longer than in other sectors. The second point is that the Indian market takes the role as the main driver. As has been argued in particular in defense of regionalism, the northern countries would benefit from exporting their LNG and electricity to India.

There is a need to build trust, coordinate legislation and exchange information for the development of a utilities network.

Table 2.5 Potential for cross-border trade

Importing countries	Exporting countries			
	India	Bhutan	Nepal	Bangladesh
India	X	Significant quantities of hydropower being exported	Significant hydropower export possible	Significant amounts of gas or power possible. Some resource uncertainty
Bhutan	Dry season support	X	Unlikely: similarity of resources and seasonal shortages	Small amounts of thermal power and gas; connection via India
Nepal	Thermal power support, dry season support	Unlikely: similarity of resources and seasonal shortages	X	Small amounts of thermal power and gas; connection via India
Bangladesh	Sharing reserves; electricity swaps	Some hydropower; connection via India	Some hydropower connection via India	X

Source: Krishnaswamy et al. (2006).

2.8 Energy security

The issue of energy security takes a special role. Since apart from India and Pakistan, all other SAARC member states are predominantly reliant on one form of energy, trade in other forms gains considerable relevance. Generally, Bhutan and Nepal rely on hydropower while being dependent for imported petroleum products, such as natural gas and oil. Bangladesh relies on natural gas and India still produces most of its electricity from coal.

Trade cooperation excluding India is inconceivable from a realistic point of view.

All countries are dependent on imports of oil and natural gas from non-South Asian countries. In order to address this insecurity, countries could use a two-pronged strategy: restructure internal consumption towards the source that is more readily available; and engage in energy trade to overcome power shortages during dry seasons.

2.9 Trade cooperation excluding India

Trade cooperation excluding India is inconceivable from a realistic point of view. India is the only country that borders all the others, denying any direct connection between Bangladesh, Bhutan and Nepal. In Bangladesh, Prime Minister Sheikh Hasina has started exploring opportunities with Bhutan (Energy and Power 2010) and Nepal, however, without clarifying India's stance on power transit. On a visit to both countries, the Prime Minister's Finance Adviser, Dr. Mashiur Rahman, discussed deals whereby Nepal would export 1,000 MW electricity from its Saptakoshi project (which has not been constructed yet), while Bhutan would export another 1,000 MW from its Sangkosh project to Bangladesh. The necessary transit issues will be clarified at a meeting of Bangladesh's and India's prime ministers in early 2011 (The Daily Star 2010).

Furthermore, Bhutan and Nepal are landlocked countries and depend on India for transit. Meanwhile, although still a highly theoretical issue, trade agreements with China have also been considered. In the case of Nepal, such a development will gain new momentum upon the completion of the new Tibet-Nepal railway connection. China has started the construction of a railway line towards the Tibetan city of Xigaze just across Nepal's border. The railway link across the border is currently in a planning stage (Poudel 2010).

Issues for discussion

- Can there be any realistic progress on regional cooperation while any of the countries is still in energy deficit?
- Is SAARC the right platform for promoting regional energy cooperation?

Chapter 3

Barriers to energy trade

In recent years, discussions on defining and promoting regional markets have been high on policy agendas. In general, there are two streams of thoughts, which to a certain extent determine the strategy pursued by policy-makers to foster cooperation:

a) Regional markets evolve naturally when no or few (technical) impediments exist. Market forces will facilitate this.
b) Political support is the predominant condition for regional integration. If political support is sufficient, then technical and commercial problems will be resolved.

To answer these questions, we have to look at the barriers obstructing regional trade in South Asia.

3.1 Technical barriers

While traditional reasons such as grid compatibility, technology and knowledge coordination made *de facto* export and import difficult in the past, the Bhutan-India model of power cooperation has demonstrated that such barriers can be overcome. Nevertheless, several technical constraints remain, the two biggest ones being:

a) Grid synchronization and grid codes: At this point in time connections between Nepal and India still run on a radial mode and capacities of 13kV, which only allow for limited trade in border areas. A synchronization of the two grids would increase transmission speed and volume. Without new synchronized transmission lines, no meaningful trade is possible. The same is true for the very limited Bangladesh-India exchange, as well as connections between Bhutan, Nepal and Bangladesh, as the so-called "chicken's neck" of Indian territory is hindering any direct connection.
b) Natural gas pipeline technology: "Transmission lines are costly to build because of the investment in land rights and compensation of inhabitants, very large compressors, and huge amount of high-strength, large diameter pipe. The passage of gas is contingent upon computer modeling to enable the pipeline to look ahead and extract gas from storage just in time when needed rather than letting extra unsold capacity build up in the pipeline. As gas is transported over long distances, compressor stations sited at strategic points along the pipeline maintain its pressure. Because of the size of the investment committed, pipeline companies strive to operate as close to maximum capacity as possible" (Khosla 2005: 76).

Without new synchronized transmission lines, no meaningful trade is possible.

At present, except Bhutan, none of the South Asian countries have a surplus energy production. While Bhutan and Nepal have an estimated surplus of hydroelectricity potential, Bangladesh's natural gas reserves are not going to satisfy the

country's local demand, unless further reserves are discovered. In fact, this means Bangladesh is going to import natural gas for the coming two decades (Quader and Gomes 2002).

3.2 Political barriers

In Bangladesh and Nepal, many commentators and some politicians are heavily opposed to electricity trade with India. For instance, they see it as "one more strategic weapon to the Indians against Nepal in their armory" (Shreshta 2009). At the same time, politicization of this issue is obstructing meaningful investment. Recently, the Indian Directorate General of Foreign Trade applied an import duty on electricity and classified electricity as a "restrictive commodity" for trade. The possibility of application of such import taxes creates significant uncertainty for export-oriented projects. When projects are not carried out through government-to-government agreements as in the Bhutanese case, private investors have no protection against sudden increases in tax and final project costs. The situation remains unclear as to whether Indian authorities will discriminate between Indian and Nepali exports in the application of import taxes. The insecurity created has made Nepali investors hesitant to go ahead with their projects.

Negotiations for trading agreements are affected by unequal starting positions.

Furthermore, negotiations for trading agreements are affected by unequal starting positions. Both Bangladesh and Nepal face utter power deficits. While India is also facing a shortage, the country's choice of other sources of energy supply, through pipelines, domestic coal, LNG import and domestic hydropower development, puts it in an advantageous negotiation position. In addition, considerations of energy security are defined differently.

While most Bangladeshi and Nepali interviewees defined energy security merely as satisfaction of domestic demand, the view of Indian ministries suggests an emphasis on control of energy generation sources as well. In the case of Bhutan, India's strong influence over Bhutanese foreign policy and defence puts the country in the position to *de facto* control the security of Indian power supply originating from Bhutan.

Overshadowing all the aspects mentioned in the previous paragraphs is a severe lack of trust between SAARC member states. This can be perceived in almost any aspect of the negotiations, in particular the regional negotiations at the SAARC level. The SAARC Energy Working Group, which is in theory the correct platform to facilitate regional cooperation, has shown rather slow progress. In 2008, a high-level study on regional energy trade was carried out by the ADB. Its endorsement, however, has been repeatedly postponed until the end of 2010. While this is only a preparatory study and further feasibility studies will have to be carried out before any implementation, it does indicate that energy trade has not been high on SAARC's list of priorities.

3.3. Cost barriers

Economic benefits were the main reason for cooperation in other regions, such as the Greater Mekong, the Nordic Pool and Southern Africa. In South Asia, most countries are energy-deficient and lack the capacity to trade in electricity. Instead, large-scale upfront investments have to be incurred for a long-term benefit. That is one of the reasons why both decision makers and the people at large perceive short-term improvements in domestic systems and power availability as superior investment priorities.

In the case of Nepal, the NEA, which is a monopsony utility, is the single buyer of all power produced by the country's IPPs. However, consumer prices have been suppressed for over 10 years during which the tariff has not been adjusted even once. Subsequently, the NEA's price paid to power producers is on average only NRs 4.5 per unit.[5] The price they receive for exports is even below that.

Nevertheless, some of the project locations have a very low cost of production and were therefore selected for exports. Overall, though, the cost of developing new projects in Nepal is often higher than a similar investment in Bhutan and India (Jain 2010). Similarly, retail power prices remain subsidized in Bangladesh and northern India.

3.4 Social barriers

A study by USAID (2002) found that Bangladesh's and Nepal's populations have a relatively strong objection to exporting energy to India, even if it would be highly beneficial in the long run. A strong distrust of India among domestic populations influences their actions and voting behaviour. South Asia is the least economically integrated region in the world, owing, *inter alia*, to a recent past of mutual antagonism. Apart from Bhutan, all countries in the SAGQ are power-deficient. However, some claim that this is a simple argument to excuse the lack of copying or following into the example of Bhutan's trade with India. They perceive that for Bhutan the cost of electricity export is its own sovereignty: India has significant influence over both Bhutanese defence and foreign policies.

3.5 Environmental barriers

Hydropower generation and the construction of multipurpose projects are considered to have significant environmental repercussions. Internationally, it is still highly debated whether hydropower is a renewable energy source or not. The construction of multipurpose projects, which include large reservoirs, means a disruption of riverine fauna, and displacement of human settlements and agriculture.

In Nepal, key considerations go towards the economic and social disruption caused by such projects. Another phenomenon is the large-scale speculative resettling in the areas with hydropower development plans. In the tropical regions of the country, large storage plants could negatively affect the population's health. Such projects increase the risk of water-borne infectious diseases. Furthermore, if there is stagnant water, the water quality will decrease (Hennicke and Bodach 2010: 91). The majority of projects in Nepal, however, are in the hill region of middle Nepal, where the climate is sub-tropical at most. To minimize adverse effects, organizations like the World Bank and the Organisation for Economic Co-operation and Development (OECD) have advocated their international guidelines of sustainability, which, if adhered to, would render large hydropower projects as socially and ecologically acceptable as possible (WBGU 2003).

Environmental barriers can be considered significant when they impact the local population's interaction with nature through their farming or herding practices. Traditional considerations of environmental protection and biodiversity are not considered a key obstacle in the South Asian context. This is also partially due to the balancing effect both hydropower as well as natural gas will have. Also, South Asian coal and oil are the dirtiest of the world. The content of ash by far exceeds that of coal found in Europe or the Americas. This means that every unit of electricity produced from sources of water and natural gas will in fact replace a unit produced from coal or oil. Summed up, the balance of environmental impacts will be positive.

Traditional considerations of environmental protection and biodiversity are not considered a key obstacle in the South Asian context.

3.6 Case study: Stakeholder analysis in Nepal

In order to get a true picture of why the seemingly obvious regional energy cooperation is not happening—even on a bilateral basis—the case of Nepal is analysed in more depth. Through 15 semi-structured interviews with stakeholders ranging from the national electricity utility and the private sector to donors, commentators and researchers, the diversity of the picture and of the quality of information becomes strikingly obvious. In an attempt to narrate the complex

lines of argumentation, the discussions centred on what the interviewees think as the key obstacles to cooperation, what options they see in the short and long run, and how feasible they think progress will be the future. Figure 3.1 illustrates the most important and common barriers identified during the interviews.

3.6.1 Political instability

The present state of limbo in the Nepali political sphere is having grave impacts on any progress in energy trade:

Domestic power crisis also creates resistance to electricity exports from Nepal.

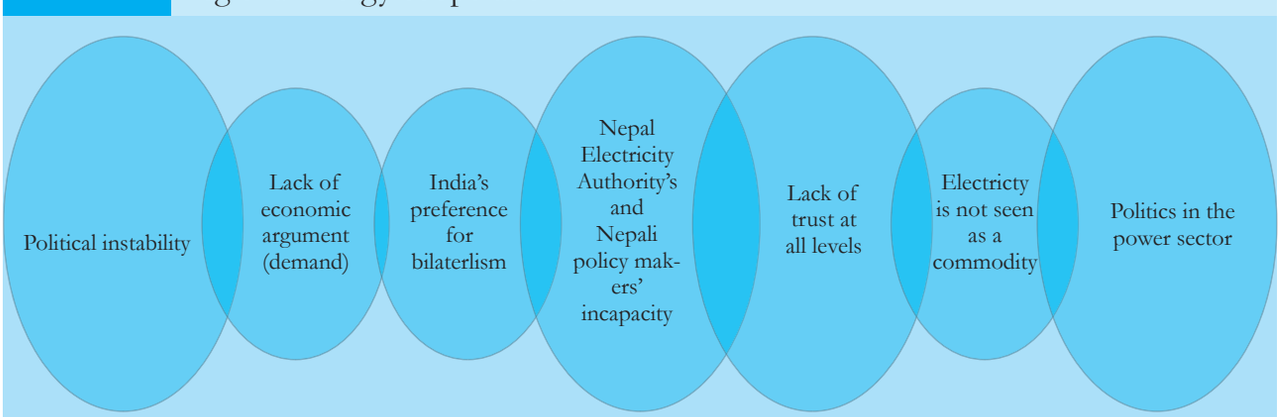
a) Political instability, including frequent changes in government, has had adverse effects on the business and investment climate.
b) Without a constitution, there is little clarity on how compensation for exporting hydropower stations would be disbursed. It has not yet been decided how to compensate indigenous populations if they have to be resettled and how investment for exports are to be perceived.
c) The present stalemate is delaying big policy decisions as well as the formulation of a budget. The NEA, which still combines generation, transmission and distribution in one organization, is providing electricity at a below-market price to the end-consumer. As national budget allocations are reduced or are diverted to priority areas in social policy, the NEA loses its leverage to act.
d) Power trade agreements and negotiations with India and Indian companies fall prey to the exploitation of populist sentiment by political parties at times of political indecision.

3.6.2 Lack of economic argument

As has been pointed out by representatives of the donor community and civil society, the Indian demand will not be satisfied by Nepali electricity. Instead, Nepal's own demand is much higher and has been suppressed. Any investments in export-oriented projects, such as West Seti, Upper Karnali and Arun III, will not abolish the lack of power supply to the Nepali people.

Some of the proposed projects like Upper Karnali, on the other hand, which have a 12 percent component to be supplied to Nepal for free, are deemed to be too small for the potential of the location. Although approved by a Maoist government in January 2008, local politicians led by Khadka Bahadur Bishwakarma of the Unified CPN (Maoist) forcibly stopped the carrying out of a Detailed Project Report (NepalNews 2010). Under unspecified threats to the Indian consortium firm GMR-ITD, he stated that the project is not in the inter-

Figure 3.1 Interviewees' answer to the question "What do you see as the key obstacle for regional energy cooperation?"



est and the welfare of Nepal. The basis for the behaviour is the claim that the 300 MW project in actual fact has an optimum potential of 4,180 MW, when constructed as a multipurpose plant, increasing Nepal's energy security significantly (Shreshta 2010a). Subsequently, the proposed capacity of the project was increased to 900 MW.

3.6.3 India's preference for bilateralism

All the interviewees, except for those from the Indian embassy itself, agreed that India's policy regarding energy trade is bilateral, but not regional. Only a small strip of Indian territory, the so-called "chicken's neck", separates Bangladesh, Bhutan and Nepal from each other. The exclusion of Indian in any trading agreements is impossible. There is a strong perception that Indian negotiators intend to keep the advantageous situation of being able to deal with the neighbouring countries one-on-one. This also implies that tariff rates offered to Bhutan and Nepal are different. Similar is the Indian strategy with power purchase from Bangladesh.

3.6.4 Nepal Electricity Authority's incapacity

It has been pointed out by members of the donor community that the NEA acts as a "bottleneck" for energy cooperation. Investment within Nepal remains public sector-driven. Policy makers are not willing to take risks by either signing a disputed framework agreement with India or else adopt a trial-and-error approach. Most of all, there is a lack of a "holistic view of policy-making", which puts the goal of "increasing the livelihood of the people" at the centre. Projects that will increase power supply to the Nepali population should be seen under this aspect.

Furthermore, officials within the NEA and in decision-making positions often do not have the capacity to assess the complexity of issues regarding energy trade. That is why the SARI/Energy programme of USAID has reoriented its focus entirely on capacity building within the NEA. For instance, the NEA's extremely low electricity tariff has not been changed in the last 10 years. The losses incurred cannot be repaid due to a delayed national budget, leading the NEA to delay payments to IPPs, which are providing around a quarter of Nepal's electricity supply. The non-payment in turn delays new Power Purchase Agreements to fulfil the national demand.

It was also pointed out that the NEA is not equipped with the right human resources during power trade negotiations with India and Indian companies. The NEA plays an important role in negotiating the details of these agreements and in expanding the transmission infrastructure to cater to export projects. For instance, in the case of the Dalkebar-Muzzafarpur transmission line, the USAID provided the NEA with a lawyer for legal advice.

There is a strong perception that Indian negotiators intend to keep the advantageous situation of being able to deal with the neighbouring countries one-on-one.

Similarly, an interviewee from the World Bank suggested that Nepal's leverage for negotiations with India has consistently been underestimated. When Nepali civil society and government decry the fact that India would never give a fair price, it demonstrates, she points out, the lack of trust in their own capacity to negotiate good deals which would include proper compensation, appropriate and competitive tariffs, as well as quality dams and correctly attributed royalties. In the same line, Energy Ministry spokesman Anup Kumar Upadhyay claimed: "Apart from political instability, there is no doubt that the present situation is a result of our work culture and slow decision-making process" (Sharma 2010).

3.6.5 Lack of trust

Within the Nepali media and society, the public debate on energy trade and cooperation is carried out at a highly emotional level. Urban myths about load-shedding being caused by power exported to India are widespread in the population. As the first true cross-border transmission line

(aside from power exchanges near the Indo-Nepal border) is still in its planning stage, as well as export projects like West Seti and Arun III have not yet materialized, no export of power to India is happening. In 2010, Nepal has been a net importer of energy from India (International Energy Agency 2010). During the dry season, Nepal's own production is 250 MW, while 96 MW is being imported from India. This is about half of the peak-time demand of 860 MW in February and March (Sharma 2010). During the wet season, on average, 76 MW is imported from India. Any future cooperation measures by the government have to include a thorough communication strategy. Arguments, including opposition to future export projects, can be based on facts. It seems, however, that politicians from several sides prefer exploiting anti-Indian sentiments to garner political support in other priority areas.

3.6.6 Electricity as strategic commodity

Independent power producers see India's move to list electricity as a restricted commodity as the biggest hurdle.

Representatives from the ADB and the private sector saw one of the key obstacles in the perception of electricity as a social good or in tight connection to water issues. Instead of dealing with the electricity shortage at the commodity level, politicization, market regulation and subsidies are barring an efficient outcome. This government's failure has several consequences:

a) No objective negotiations in hydropower development: Water, irrigation and flood control concerns tend to dominate the public debate above electricity considerations. As yet there have been no studies published supporting the predominance of water-related consequences of hydropower projects.
b) So far no (hydro) power trade agreement has been signed, making the approval of hydropower projects dependent on bilateral treaties and river agreements.
c) The suppressed consumer prices of electricity are in effect barring the market from being attractive for private investors, while depriving NEA of investment capital. Thus, it constrains the potential for increasing internal power production and satisfaction of the Nepali market, one of the important factors for energy export.
d) Both in India and in Nepal, a lack of efforts due to the sensitivity of the issue has stalled trade negotiations.

IPPs see the move of the Indian Directorate General of Foreign Trade to list electricity as a "restricted commodity as the biggest hurdle. As has been reported, it means that Indian buyers of power from Nepali projects need to seek an import license, to be issued for 12-18 months and which has to be renewed annually. Such an additional requirement is likely going to create an additional uncertainty, in particular for investors from Nepal and other third countries. Hydropower projects generally demand high up-front investment. In order to achieve financial closure, life cycle costs have to be assessed; agreements therefore often have a timeframe of up 25 years" (Bagga 2010). It remains to be seen how this tax will be applied to Indian investors and joint ventures.

3.6.7 Politics in the power sector

Within the short-term political cycle, Nepal's political parties, in particular the Maoist party, have learned to perceive the control of power generation as an important instrument to assert their political power. There are several ways to achieve this. In its most general form, electric power determines economic growth, which is the highest objective of any party in power. Interfering with load-shedding schedules and delaying the completion of hydro power projects, if pursued by the competing party, has become a tool of opposition policy. Furthermore, a big part of the population is categorically opposed to exporting power to India (USAID 2002). While it should be clear that economic growth in any form will be beneficial for the sup-

port of the political system as a whole, such holistic thinking has not been adopted at this point in time.

More importantly, however, electric power is seen as political power vis-à-vis India. The Maoists have been blocking many hydropower projects, such as Upper Karnali, on the grounds that it would not benefit Nepal. A similar threat was repeated in September 2010, when the Maoist party published a list of 14 projects to be blocked on the same grounds. They feel that India through its investment in Nepal is trying to look for yet another avenue to control the countries natural resources. Electricity has mainly been perceived as a tool by India within its greater foreign policy and has traditionally been defined as a "strategic commodity". Indian companies are in this context seen by many as agents of the central government.

Finally, anti-Indian sentiment is widespread within Nepal. The Maoist party received popular support for blocking export projects, which are seen as depriving Nepali citizens of access to electricity. The other main parties, the Nepali Congress and the CPN-UML, have been supportive of export projects, in particular during their times in government. There were no obstructionist policies pursued by these parties.

3.7 Public opinion

In Nepal, there are two broad camps on increased power trade with India (no institution is in fact even considering a regional approach) (Figure 3.2).

As has been confirmed by NEA and other stakeholders, during negotiations one of the key issues is to determine India's true interests. Is it only electricity cooperation, or does India desire to control the distribution of water, energy and food security in its neighbours? The answer to this question would be key to defining Nepal's negotiation position. If India is really in a tight position and in desperate need of multipurpose projects to guarantee its water supply, Nepal would be in a highly beneficial position, to make the tariff paid by the Indian consumer to reflect the negative and positive externalities incurred. As can be observed in recent negotiations, however, the Indian side is perceived as having an advantage, a better BATNA (Best alternative to a

Electricity has mainly been perceived as a tool by India within its greater foreign policy.

Figure 3.2 Two key groups on energy trade with India

"Over the last 30 years, Nepal's hydroelectricity potential has been known and literally flown as rivers keep transporting water from the Himalayas to Indian territory. Any further delay of investment and infrastructure is unnecessary and unlikely to yield better results. India is a huge market for electricity and water, justifying exports—may be even improving the two countries' balance of trade."

NEA, optimistic power producers, INGOs

"Nepal has not only unsatisfied demand but even the demand declared as the baseline is in actual fact suppressed demand. Any more deals with India that include an export of the majority of the generated electricity is a crime against the Nepali population and a breach of all development commitments. If development takes place, Indian money is welcome for the creation of the necessary infrastructure, but it does not need the 'big Indian market', since the Nepali market is big enough for many years to come."

Activists and civil society

negotiated agreement), and was able to afford delays in the negotiations on a faster cross-border transmission line, as well as hydropower and energy agreements at the government level.

In a nutshell, the NEA becomes the connecting factor of the different actors. As progress at the highest level between the two governments is not being achieved, the key interactions are taking place through NEA (Figure 3.3).

There are differing opinions on the size of downstream benefits through Nepali reservoir and multipurpose plants.

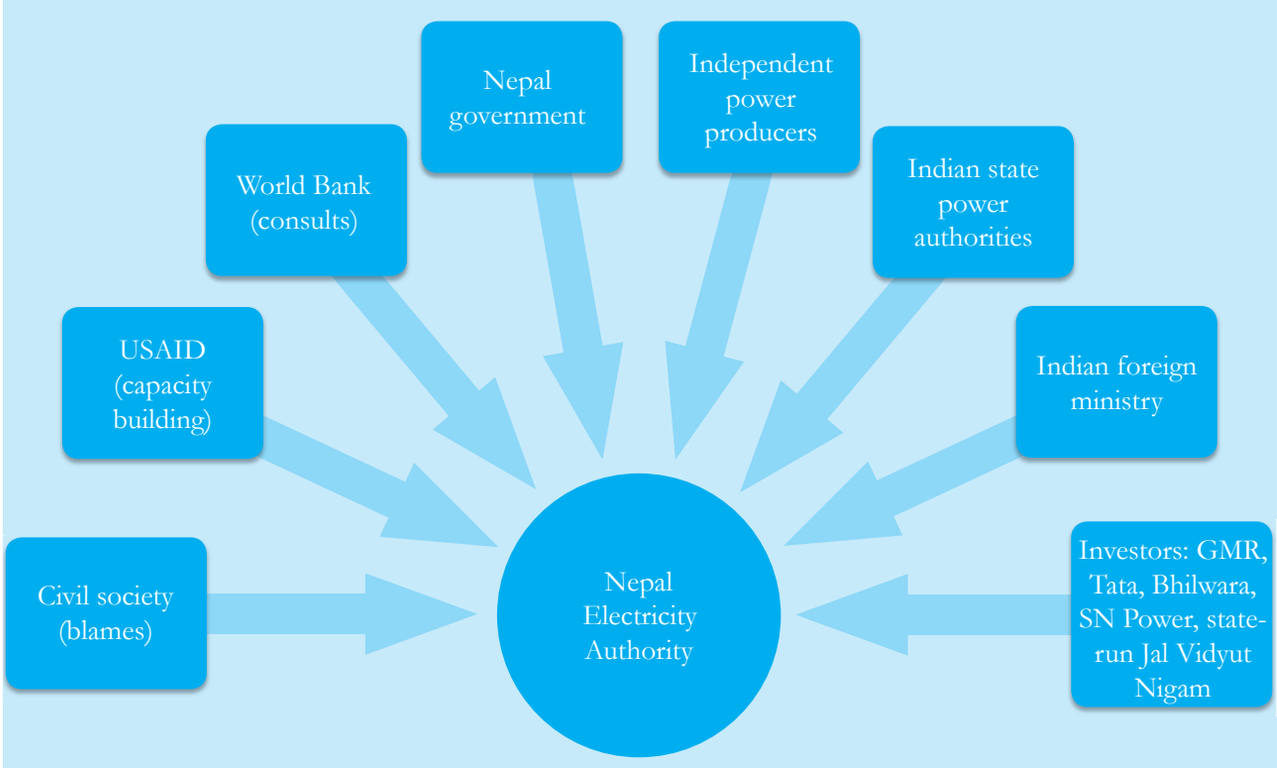
3.8 Way forward

For the purpose of this study, related stakeholders articulated their opinion on how regional energy cooperation could take place in the future. A key to understanding the debate is using a constructivist approach. Each person answered these questions based on his/her own frame of reference. Each argument was valid within its respective paradigm—which includes not only assumptions and ideological orientation but even so-called hard facts and numbers.

For instance, there are differing opinions on the size of downstream benefits through Nepali reservoir and multipurpose plants. A World Bank study to be published by the end of 2010 identifies only 20 percent of power plants' benefits to be associated with water, such as flood control and irrigation during the dry season. A modelling exercise found that mainly the waterlogged Indian downstream regions will be unable to reap the benefits of the increased water flow during the dry season. Critics such as activist Ratna Sansar Shreshta, who used to work with the NEA and is still acting on the board of several power-related bodies, on the other hand, claim more than 50 percent of the net benefits to be associated with flood control and irrigation.

Another highly disputed figure is that of Nepal's hydropower potential. The most-quoted number of 83,000 MW is based on a calculation of river courses (Table 3.1). In terms of economic viability, 44,000 MW is usually quoted as

Figure 3.3 Stakeholder map of Nepal's power sector



a realistic number. On the other hand, Hydro Solutions' Chief Executive cites internal studies which identify 200,000 MW as possible.

The most common responses on the way forward are summarized in Table 3.2. All of these recommendations lie in the medium- and long-term range but have to be initiated today. The ongoing negotiations for the Dhaklebar-Mujaffarpur cross-border transmission line are likely to determine the speed of larger regulatory negotiations on a framework agreement between the two countries.

The interviewees were asked about their views on the outlook for stronger regional or bilateral cooperation to materialize within the next 5 to 10 years. Eight out of 12 respondents expressed their pessimism about large-scale bilateral projects and none of them saw the possibility of a regional approach preceding bilateral developments. In the long run, however, all of the interviewees, except for one, agreed that cooperation, in the form of trade but also in terms of soft cooperation on knowledge sharing, and demand-side policies would be beneficial and therefore will eventually be pursued by the region's member countries, given a favorable political environment, as well as mounting public pressure.

At the political level, the first step would be an India-Nepal power trade agreement.

As a long-term vision, the overall strategy to be pursued by both sides to reap the benefits of cooperation can be con-

Table 3.1 Nepal's theoretical hydropower potential

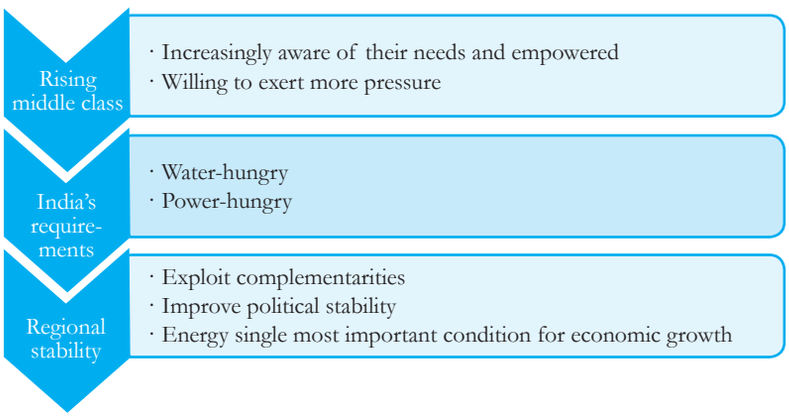
River basin	Potential in MW		Total
	Major river courses having catchment areas above 1,000 km^2	Small river courses having catchment areas of 300–1,000 km^2	
Sapta Kosi	18,750	3,600	22,350
Sapta Gandaki	17,950	2,700	20,650
Karnali and Mahakali	32,680	3,500	36,180
Southern rivers	3,070	1,040	83,290

Source: Water and Energy Commission, Nepal.

Table 3.2 Key recommendations by sample group of stakeholders

Umbrella agreement between India and Nepal	· Basis for cooperation · Deal with the pandemic lack of trust by institutionalizing a process
Reform of the NEA	· Unbundle the NEA · Hike generation tariff (upon increase of retail tariff by the Electricty Tariff Fixation Commission)
Invest in large-scale reservoir project (e.g., Budhi Gandaki, 600 MW)	· Improve Nepali negotiation position on tariff · Match Indian negotiators' capacity and training
Build up regional capacity, e.g., through synchronization of energy grids	· Create the technical conditions through routine updates in the system
Focus on "softer" aspects of cooperation	· Energy efficiency and renewables · Knowledge sharing, e.g. on feed-in tariffs · Spillover

Figure 3.4 Exogenous drivers of regional cooperation



densed into Figure 3.4. Development has to take place at both the negotiations and technical levels. At the political level, the first step would be an India-Nepal power trade agreement, setting framework conditions for any of the proposed export projects. This will enable a slow but steady increase in trade, with the first export projects coming on the grid within the next seven years. Through informal cooperation and formal coordination measures, the two sides can bring their national grid systems into harmonization. This process would be gradual and ongoing. Grid synchronization could be advanced through institutionalized meetings between border states' utilities, transmission and distribution agencies.

As was pointed out in one of the interviews, the power transmission and distribution systems will have to be updated and monitored. Use of compatible technologies and grid codes could be achieved on a step-by-step and mostly cost-effective manner. Even if the move from bilateral to regional trade at the political level will be delayed, a synchronized grid could therefore be achieved. The easy availability of grid connections and harmonized national grids will facilitate integration once a regional consensus can be reached with India.

Simultaneously, power generation for the domestic market has to be increased. By supplying the domestic market with power and reducing load-shedding, the economic rationale for trade will become convincing. At the same time, popular opposition from the Nepali side will be reduced, once their power needs are fully catered to.

This scheme of advancement has been successful in the Greater Mekong and the Southern African region. There are further lessons to be drawn from international experiences of regional energy cooperation, which are analysed in the next chapter.

Issues for discussion

- How can the various narratives of different stakeholders be aligned on a more objective basis and what is the common denominator?
- How can weight be taken off the NEA as a connecting actor?

Chapter 4

Lessons from international practices

There are a number of successful examples of regional electricity grids throughout the world. This paper focuses on the experiences of the Southern African Power Pool (SAPP), the South East Europe Regional Energy Market (SEEREM), the efforts in ASEAN, and the Mekong River Agreement. Other interesting examples are the EU, and the Nordic Power Pool connecting the Scandinavian countries of Norway, Sweden and Denmark.

The choice of experiences is based on the regional blocks' success in achieving a government-level agreement; institutionalizing interaction between different member states and stakeholders; establishment of a supervisory/supranational authority; infrastructure investment and transmission connections; and increased availability (quantity) of reliable (quality) energy for citizens (Table 4.1).

4.1 ASEAN: Communication expert

ASEAN has been active in energy cooperation, in particular in its institutionalization. At several levels of government and depending on the issue (fossil fuels, renewable energy, power utilities, regional policy and planning), the member countries are organized and meet on an annual basis, while their reports are made available to the general public.

Four power grid interconnections are already in place in Southeast Asia.

In 2002, the Memorandum of Understanding (MoU) for the construction of the Trans-ASEAN Natural Gas Pipeline (TGAP) was signed, establishing the ASEAN Gas Consultative Council. For both the gas pipeline and a power grid, an ASEAN Masterplan was completed in 2000 and 2003 respectively (The 22nd ASEAN Ministers on Energy Meeting 2004). Four power grid interconnections

Table 4.1 Criteria for selection of good practices

	Government-level agreement	Institutionalized interaction	Common authority body	Infrastructure investment	Increased energy quantity and quality
India	X	X		X	X
ASEAN	X	X		X	X
GMS	X	X		X	X
SAPP	X	X	X	X	X
EU	X	X	X	X	X
SEEREM	X	X	X	X	X

X indicates that the criterion was present in the analysed context.

are already in place in Southeast Asia: Peninsular Malaysia–Singapore, Thailand–Peninsular Malaysia, Vietnam–Cambodia, Thailand–Cambodia).

ASEAN's strategy is to "encourage interconnections of 15 identified projects, first on cross-border bilateral terms, then gradually expanding to a sub-regional basis and, finally to a totally integrated Southeast Asian power grid system." There are four ongoing interconnection projects and an additional 11 projects are planned for interconnection by 2015. The investment requirement of the ASEAN Power Grid is estimated at US$5.9 billion. A potential saving of about US$662 million in new investment and operating costs is estimated as resulting from the proposed interconnection projects (ASEAN Centre for Energy 2009). A template of how ASEAN is planning its cooperation can be found in Table A6 in the Appendix.

ASEAN has been particularly successful in institutionalizing cooperation through several working groups and frequent meetings.

4.1.2 Natural gas

One of the key projects of cooperation in the ASEAN region is the Trans-ASEAN Natural Gas Pipeline (TGAP). It is now at a length of 3, 952 km in the form of bilateral pipelines between individual countries. In order to implement the TGAP, new investment for 5,100 km (US$14.2 billion) is needed. This has not materialized so far; the question is how likely it is going to happen. There are several obstacles: dearth of expertise in transmitting (so far only exploration to use pipelines has been pursued); the size of gas reserves is uncertain; legislation is needed for gas pricing, legal frameworks, harmonized energy and environment policies; there is a protectionist understanding of energy security; community involvement is needed, which might be difficult in the case of Myanmar; and environmental damages through frequently occurring leakages (Sovacool 2009).

Box 4.1 Major initiatives in GMS Subregion

- 500 kV power transmission line from Ban Sok (Lao PDR) to Pleiku (Vietnam)
- 115 kV single circuit (SC) line from Thailand to supply isolated load centres in Western Cambodia which are currently supplied by diesel units
- 230 kV SC line to transfer power from Nam Mo hydropower in Lao PDR to Northern Vietnam
- 230 kV line along Malutang in Yunnan to Soc Son in Vietnam
- Power transmission lines betwen PRC, Lao PDR and Thailand

Source: SAARC Secretariat (2010: 63).

4.1.3 Lessons useful for South Asia

Wide conclusions can be drawn from the experience in ASEAN. ASEAN has been particularly successful in institutionalizing cooperation through several working groups and frequent meetings which happen on a yearly basis and whose reports are made available online (ASEAN Ministers of Energy Meeting, Senior Officials' Meeting, ASEAN Council on Petroleum, ASEAN Council on Coal, ASEAN Council of Power Utilities, Energy Efficiency and Conservation Network, Renewable Energy Network, Regional Energy Policy and Planning Network). Through its institutionalized interaction, ASEAN countries were able to come up with an action plan and have already seen additional power connections under construction.

4.2 Greater Mekong Subregion: The pragmatic approach

The countries of the Greater Mekong Subregion initiated an informal process towards regional cooperation in 1992. In 1999, the Policy Statement for Regional Energy Cooperation was signed by member countries. It had mainly promotional intentions but was already aiming at the implementation of priority power projects and technical, economic and financial cooperation. It included an Inter-Governmental Agreement. A subsequent MoU provided the legitimacy for the implementation of the Regional Power Trading Operation Agreement.

In addition to the more technical issues of use entitlements, bill sharing, and interconnectors, the MoU also laid

down mechanisms to resolve disputes in each of the areas concerned (Inter-Governmental Agreement on Regional Power Trade in the Greater Mekong Sub-Region, 3 November 2002). Two subgroups were created, one consisting of middle-level official representatives from each country, called Focus Group. The second, Planning Group, combined senior-level officials from each country's Transmission System Operators. A further element for the success of the GMS model is its Masterplan on Power Interconnection.

The well-thought out framework details connection projects, timelines and implementing strategies and delivers a blueprint for regional integration efforts elsewhere. Five major programmes are currently in the pipeline and are listed in Box 4.1. Finally, it is the commitment of the member countries to foster communication and the realization of the benefits by the governments and policy makers at different levels, which are likely to generate rapid progress.

4.3 Southern Africa: Institutional success

The Southern African Power Pool (SAPP) is a cooperation of national electricity companies in Southern Africa under the auspices of the Southern African Development Community (SADC). The members of the SAPP have created common power grids between their countries and a common market for electricity in the SADC region.

The SAPP is considered to be the most successful example of regional energy cooperation.

The SAPP was founded in 1995 and is considered to be the most successful example of regional energy cooperation. Its coordination centre is located in Harare, Zimbabwe. Prior to its creation a history of 40 years of cooperation supported its development. Before 1995, two independent networks were already in existence: The Southern Network, which connected Namibia, South Africa and Mozambique, was dominated by thermal-based power generation; and the Northern Network, which connected the DRC, Zambia and Zimbabwe, supported

Table 4.2 Southern African Power Pool, April 2007–March 2008

Country	Utility	Installed capacity MW	Net capacity MW	Maximum demand (MD) MW	MD growth %	Sales GWh	Sales growth %	Number of customers	Number of employees	Generation sent out GWh	Net imports GWh	Net exports GWh	Transmission system losses %	Revenue US$ million	Debtor days	Rate of return %	Net income US$ million
Angola	ENE	742	590	476	12.0	2,006	8.9	155,114	4,347	2,982	19.6	0	13	184.3	75	n/a	-3.11
Botswana	BPC	132	120	434	8.0	2,626	8.7	151,800	2,091	977	2,050.40	0	10	111.4	35.5	-1	18.82
DRC	SNEL	2,442	1,170	1,012	0.0	4,656	13	360,329	6,268	6,904	0	1,800.00	6.3	149	n/a	n/a	n/a
Lesotho	LEC	72	70	101	6.3	420	16	49,171	490	466	39	22	13	34.2	35	5	6.07
Malawi	ESCOM	305	253	251	3.8	970	4	135,000	2,400	1,177	0	0	19	5	110	1	2.218
Mozambique	EDM	233	137	320	12.3	1,380	5.6	417,675	3,215	222	1,870	174	7	126	65	4.2	1.8
Namibia	Nam Power	393	390	490	-0.2	3,199	7.5	2,455	960	1,606	1,948.0	0	8	193	34	0.97	19
South Africa	ESKOM	42,011	36,398	34,807	4.0	208,316	0.2	3,758,931	29,697	221,985	8,643	5,515	8.2	5,926	22	8.4	592
Swaziland	SEB	51	52	188	1.1	855.8	-0.5	58,800	715	125.8	894	0	16	55.5	86	12.7	8
Tanzania	TANESCO	897	680	563	6.0	2,549	10.3	550,863	4,857	3,674	43	0	24	188	92	n/a	n/a
Zambia	ZESCO	1,632	1,630	1,393	4.7	8,116	-3.6	303,618	3,613	9,480	0	505	2.7	207	165	1	-23
Zimbabwe	ZESA	1,990	1,825	1,904	-7.8	10,293	-1.1	579,006	5,773	7,781	4,241	414.582	3.9	130	49	48	-1773

Source: Southern African Power Pool (2008).

mainly hydropower generation (SAARC Secretariat 2010). Mozambique's Cahora Bassa reservoir, which had been commissioned under Portuguese rule, has been connected with the South African border through an HVDC line and had a capacity of 1,920 MW in 2006.

The utilities currently participating in the SAPP are (Turkson und Norbert 2001):

a) Angola's ENE
b) Botswana Power Corporation (BPC)
c) Democratic Republic of Congo's SNEL
d) Lesotho Electricity Commission (LEC)
e) Malawi's Electricity Supply Commission (ESCOM)
f) Electricidade de Mozambique (EDM)
g) Namibia Power (Nampower)
h) South Africa's Electricity Supply Commission (Eskom)
i) Swaziland Electricity Board (SEB)
j) Tanzania's Electricity Supply Company (TANESCO)
k) Zambian Electricity Supply Corporation (ZESCO)
l) Zimbabwe Electricity Supply Authority (ZESA)

Energy cooperation at the intergovernmental level has deepened European integration.

It is a fascinating achievement. When looking at electricity exports, imports and production for all sub-Saharan countries in 1997, 20 out of 42 countries were exporting or importing power. Half of those are members of the SAPP (Energy Information Administration 1999).

As can be seen in Table 4.2, all of the SAPP member countries were either importing or exporting power in 2008. Aside from Angola, Zambia and Zimbabwe (which has a devastating budget deficit), the member states were, furthermore, making profits. The SAPP example demonstrates one of the preconditions for grid integration: the prevalence of competitive electricity trade legislation, which had been decided at an early stage of cooperation.

4.4 Europe: The ideological case

The EU's story of integration can be seen as the mother of all regional agreements. While the EU mainly evolved out of the regional cooperation on coal, steel and nuclear energy under the 1951 European Coal and Steel Community (ECSC) and European Atomic Energy Community (EURATOM) treaties, energy policy has never become a supranational portfolio. Energy cooperation at the intergovernmental level, however, has deepened integration and always been supported by EU institutions. Gas Pipelines like the Nabucco (connecting Europe to the Middle East through Turkey) or North-Stream projects (connecting to Russia through the Baltic) have an inherently European character for importing gas from the EU's eastern and southern neighbours. Before 2007, the EU was divided into regional transmission organizations, coordinating national transmission system operators. Synchronization of the regional grids happened in 2007 (Bower 2003).

An analysis of the role played by energy policy in the overall European integration process will further add to the theoretical approach to regional cooperation in South Asia.

4.4.1 EU integration and neo-functionalism

The founding of the ECSC, although of negligible economic impact, was the first step towards real regional integration. The ideological reasoning followed at that time and later coined as "neo-functionalism" is based on two key ideas (Haas 1958). First, neo-functionalist integration theories associate crucial importance to the establishment of a supranational authority. In 1951, it was the High Authority of the ECSC. Its existence and successful working and efficient decision making are likely to shift the predominantly nationalistic mindset of the political elite. Second, the integration process initiates the highly debated spillover effect: it claims a spillover from

technical sectors to increasingly political and social sectors, i.e., positive "unintended consequences" (Lindberg 1963: 11). As ministers, decision makers and technocrats meet at a higher frequency to discuss issues of common interest, the debate is likely to step-by-step leak into other sectors and policy issues. For this, linkages between different sectors are assumed to be "transmission belts for integration" (Choi and Caporaso 2002: 485).

Thus, the key factors for the success of the ECSC were defined as:

a) Clear division of responsibilities: the six countries surrendered control on tariffs, subsidies, imports and exports from each other, non-tariff barriers and free movement of workers. The High Authority, however, had no say on the countries' trade with outside countries.
b) The High Authority would consult not only governments but also various other parties. *De facto,* this was the transfer of sovereign power to an international body
c) The first example of the supranational principle: Although representatives were appointed by the member states, their mandate was no longer to act in their national interest but solely in the interest of the regional institution.[6]

Only recently has the EU embarked on creating its own internal market for electricity and natural gas. The liberalization process was started in the 1990s and the EU still does not speak with one voice. Nevertheless, it has a common corpus of legislation for energy efficiency, renewables, competition and liberalization. The internal energy market was created through two directives, 2009/72/EC and 2009/73/EC, whose demands were to (Jong 2004; Pollitt 2008):

a) Provide non-discriminatory access to networks of all energy producers (Third-party access).
b) Separate the infrastructure management from the provisioning of services (Unbundling).
c) Effectively manage infrastructure through independent transmission and distribution system operators.
d) Introduce a regulator which is independent of the interests of the industry.
e) Gradually open up the market, allowing consumers to choose between energy suppliers

In 2009, the EU created an authority, the Agency of Energy Regulators. It is planning to complete the internal markets for both electricity and gas in 2011. Since 2004 and 2007, customers had the choice between competing providers. Since 2003, power generation all throughout the EU has to follow common rules. Prior to these developments, there was a lot of resistance, in particular from France. This changed only in the 2000s, and after the Russian gas crisis of 2006, more importance was put on good relations with the transit countries. Although there is no unified power grid as in the case of the Nordic Pool, there is an internal electricity market. The progress report on the internal markets for electricity and natural gas shows lagging implementation, when the Commission opened infringement procedures against 21 countries in gas and 25 in electricity in 2009 (European Commission 2010).

The EU has a common corpus of legislation for energy efficiency, renewables, competition and liberalization.

4.4.2 Case study: Energy integration in South East Europe

In 2005 in Athens, a treaty establishing the South East Europe Regional Energy Market (SEEREM), with the vision of forming it a part of the EU's internal energy market, was signed. One of the key reasons of the EU's strong support for the project was its strategic location. As Renner (2009) put it, Southeast Europe serves as a key corridor to natural gas (Box 4.2). The Energy Community was officially established in 2005 between the EU, Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, Former

Yugoslav Republic of Macedonia, Romania, Serbia and the United Nations Mission in Kosovo on behalf of Kosovo. The EU's motivation was two-fold: on the one hand, it wanted to be able to have influence and monitoring power over the other countries' energy policy and situation. At the same time, it wanted to strengthen cooperation between existing countries in order to create regional stability. Since the member states are former opponents during the war of the 1990s, the European Commission "insists on regional rapprochement".

The mere import of ideas foreign to the region creates a unidirectional process, which does not encourage indigenous integration developments.

The European Commission bases its confidence during the negotiations on historic experiences. "The Energy Community Treaty is consciously modeled on the European Coal and Steel Community that was the genesis of the European Union" (European Commission 2005). In the same spirit, the countries in the Western Balkans see energy cooperation as an intermediate step towards further integration and eventually full EU membership.

Renner (2009) puts high emphasis on the influence of a group of strongly neo-functionalist thinkers in the European Commission at the time of the drafting of the agreement. One of his interviewees from the European Commission argued: "We try to get everybody to agree on a common position and a common way forward. The aim is not necessarily to arrive at a station, but rather to get all on one train. Once we are on the train we can decide where we want to go" (2009: 7). This might be also a perspective that SAARC has adopted to a certain extent.

The case also exhibits the likely painful adjustments that countries will have to make once they agree to regional energy cooperation. Typical problems entail cross-subsidies, politically motivated low level of energy tariffs, missing metering and billing of customers (just like in South Asia), lack of domestic generation and transmission infrastructure. Energy tariffs were used as a social policy in the region. Renner (2009) argues: "In a liberalised energy system, however, energy tariffs should be raised at a cost-reflective level and subsidies should be removed. Yet increasing energy tariffs hurt the poor."

On the positive side, however, all parties implemented the institutional structures. Renner (2009) points out: "The Athens process and the signing and ratification of the Energy Community Treaty are a prototype of how the European Union exports its own rules and regulation." The interests pursued by the senior partner of the agreement, the EU, would be an interesting (normative) comparison to those of India in the SAGQ. Regarding the second neo-functionalist rationale discussed above, the frequency of meetings of the high-level group is low, decreasing the chances for spillover. In the long run, the absence of a court in the context of the Balkans is likely going to preclude most EU-like developments. And finally, the mere import of ideas foreign to the region has created a unidirectional process, which does not encourage indigenous integration developments.

Box 4.2 The treaty establishing SEEREM

The overall principle of the treaty establishing the SEEREM is to extend the EU's internal energy market to the South East Europe region. Therefore, the participating parties agreed to adopt the relevant acquis in electricity, natural gas, environment, competition, renewables and efficiency.

The treaty defined the tasks of the Energy Community, namely to create a stable regulatory and market framework, create a single regulatory space for trade in network energy, enhance the security of supply and provide the regulatory environment for connections to Caspian, North African and Middle East gas reserves, improve the environmental standards, and develop market competition.

Five institutional bodies were created to govern the Energy Community: a Ministerial Council, a Permanent High Level Group, a Regulatory Board, and, last but not least, a Secretariat based in Vienna.

Source: Renner (2009: 11).

4.5 Lessons for South Asia

One of the key arguments given by representatives and commentators in the

SAGQ region is that apart from Bhutan none of the South Asian countries has an energy surplus which would essentially justify regional integration. Europe, however, has always relied on external supply of energy sources to meet its demand. Predictions till 2020 even foresee a dependence of 56 percent of its energy needs. This is due to a peaking in domestic consumption in, for example, the North Sea. By 2020, 77 percent of natural gas will have to be imported, 93 percent of oil, and 8 percent of solid fuel supplies (European Commission 2008). This is why the goal of the EU's energy policy has been in fact exogenously oriented: it is "to build up a wide network of countries around the EU, acting on the basis of shared rules or principles" (European Commission 2007).

Furthermore, the European Commission argues that "the dependency is not a problem in itself. However it requires an active energy security policy, building up internal strengths through a well-functioning internal energy [market] with good interconnections, diversity in the types of energy used, clear regulation for security of supply and mechanisms for cooperation to deal with crisis" (European Commission 2008: 23).

The ideal rationale therefore becomes that common problems may only be solved with transnational solutions. Two ideas can be seen as central to the success of any regional project: the role of a secretariat, and the role of spillover effects.[7]

In theory, India could pursue a similar strategy with its northern neighbours. By persuading SAARC member states to adopt similar energy regimes and to jointly decide on certain standards, the theory suggests that a spillover into other areas of cooperation could not only generate trade benefits but also contribute to economic and political stability in the region. One of the key aspects of such a spillover, the theory claims, is an increasing frequency in the meetings of representatives from different countries. The working together on an initially highly technical issue like energy is likely going to also affect the cultural and social boundaries considered to be a major stumbling block in present cooperation efforts, as became evident in the majority of the interviews carried out for the purpose of this study.

4.6 South Asia: India's internal power market creation

The above examples originated from regions far from South Asian reality. Even within the continent, however, a success story of regional integration can be found. India has recently connected its own different power zones. The country's five regional grids are in the process of integration, which proves that the technical barriers that were identified for grid connections between different countries in the region can be overcome with the technology and expertise available at present.

Two ideas can be seen as central to the success of any regional project: the role of a secretariat, and the role of spillover effects.

The rationale for the Indian grid connection resembles that of a South Asian grid: Natural resources are unevenly distributed and far from the major demand centres in the North, West and South. In May 2004, the "Open Access in Transmission" programme was initiated (Roy and Khaparde 2005). By connecting individual transmission grids, power can now be transported from coal-rich Bihar, Orissa and West Bengal, as well as North and Northeast India, which is rich in hydropower. Like their closest neighbour Nepal, the states of Bihar and Uttarpradesh are suffering from a severe electricity shortage (Ramakrishna and Jha, 2009).

Nevertheless, the regions were interlinked synchronously through high capacity 400kV AC lines. Presently, the Southern Region is lagging behind and is only connected through asynchronous HVDC/radial AC connections. A synchronous link is likely to be completed by 2013–2015, while increasing Southern Region-Western Region Inter-Regional Transmission Capacity through

HVDC back-to-back will become effective by 2010 (Southern Regional Power Committee Bangalore 2007). The goal has been to increasingly interconnect the regional transmission grids to allow for optimum resource utilization and a stable and reliable grid in all regions.

Table 4.3 Summary of good practices

Regional integration projects	Conclusions
ASEAN Power Grid	• Regular communication • Integration of policy makers and technocrats at all levels at least on an annual basis • Bilateral agreements with a regional outlook • Twenty years' outlook and long-term planning • Political will
Greater Mekong River Agreement	• Role of Demonstration Projects • Intergovernmental Agreement as a precondition • Coordination Committee to meet on a regular basis and as an institution • Involvement of technical personnel at all levels • Clarity on policy framework from inception to adoption • Ten years of initial commitment
SAPP	• Need for competitive market pricing • Focus on quantitative and qualitative supply led to disassociation of trade from politics • Establishment of common regulator, Regional Electricity Regulatory Association
Europe	• Building-block approach • Spillover • Importance of a central (supranational) authority/secretariat
Nordic Power Pool	• Difference in the generation mix and subsequent complementarities • Harmonization of legal and regulatory structures; any new participant would have to unbundle electricity markets • Clearly defined roles and responsibilities (also in terms of price mechanism) • Twenty years of initial commitment
SEEREM	• In a situation of great power difference, the bigger partner can take the lead if the political will is there

4.7 Summary of good practices

The case studies show regional projects of interconnected grids at different stages of development. Furthermore, there are a number of professional organizations to provide guidance to operating international transmission networks, such as the Union for the Coordination of Transmission of Electricity in Europe, the North American Electric Reliability Council and the South American Regional Electrical Integration Commission. Such good practices have demonstrated benefits in allowing utilities to "make savings on power plant investment and operating costs as a result of the improved use of the interconnected system" (USAID 2009). Table 4.3 summarizes key lessons from international experiences of regional energy cooperation.

Summing up, true integration in South Asia will require considerable long-term commitment and patience. Following a building block approach, bilateral trade with India will have to be established first and then regional integration should follow. Some have argued that in order to combat the significant lack of trust between the smaller SAARC member states and India, any regional multi-country initiative will be able to generate more buy-in from the smaller countries. Key importance is given to the harmonization of legal, policy and regulatory regimes, which has in the good practices discussed been facilitated by the establishment of a relatively independent secretariat.

A truly regional market is only possible when price discrimination is eliminated and electricity is traded based on market dynamics. Clearly defined roles between the market players, through unbundling, and acceptance of electricity as a commodity and not an instrument for social policy further facilitate efficient and therefore economically viable cooperation. This also includes security of payments, which has to be accorded utmost importance. Payment compliance has to be a top national priority

but can be improved through cross-border cooperation.

There is in fact considerable potential for economies of scale as in the case of SEEREM, where infrastructure is more economical when the countries share its usage. Such infrastructure benefits can consciously be supported when building integrated projects, such as joint ventures between different countries for common usage. Softer ways of cooperation are information sharing and trust building. Similar findings were derived by the SAARC Energy Working Group, which is in the process of publishing its policy-directing SAARC regional energy trade study by the end of 2010.

Issues for discussion

- How can a South Asian model of regional energy cooperation be developed?
- What specific conditions need to be addressed which were not present in the examples discussed in this chapter?

Chapter 5

Policy recommendations

5.1 Governments

The governments of all countries carry the key responsibility for advancing regional energy cooperation. Without the highest-level approval, progress is not possible, as has been demonstrated in the South Asian context. The recommendations for South Asian governments can be condensed into four key ones:

a) Unbundle national utilities, distribution and transmission systems operators.
b) Sign agreements to harmonize and synchronize the grids, which will also facilitate conventional imports and exports.
c) Update domestic power grids to allow for feed-in.
d) Become the prime project sponsors to create an environment of security for private and foreign investors, as well as upgrade regional infrastructure.

Given the state of energy deficiency in Bangladesh, India and Nepal, the key to cooperation lies not only in the import and export of power and gas to exploit complementarities but also in many softer areas of cooperation that are still lacking significantly. These are energy efficiency, rural electrification, smart grid, grid harmonization, renewable energy and technology transfer, e.g., through exporting solar photovoltaic technology.

More concretely, the 2010 SAARC Regional Energy Trade Study (SRETS) carried out by the ADB suggests four ways of moving forward in regional energy cooperation. As the document was not endorsed by the SAARC member states at the time of writing this paper, the following details are based on a presentation made by project speaker PN Fernando in Colombo. Details on the proposed plans can be found in Table A4 in the Appendix. The four areas for successful regional cooperation were identified as:

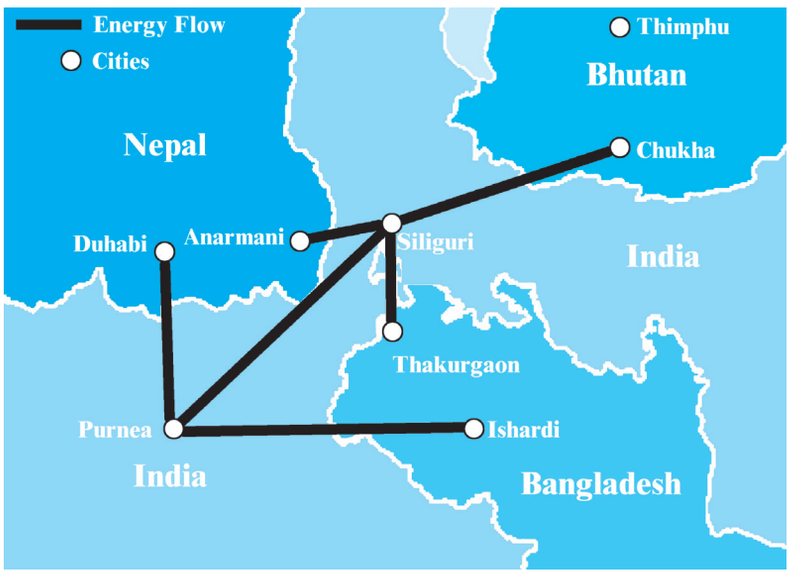
a) Regional/Sub-regional Power Market
b) Regional/Sub-regional Refinery
c) Regional/Sub-regional LNG Terminal and Gas Transmission Expansion
d) Regional/Sub-regional Power Plant

The key to cooperation lies not only in power and gas trade to exploit complementarities but also in many softer areas of cooperation.

During 2001–2002, under the USAID sponsored SARI/Energy programme, Nexant conducted a study on the "Four Borders Project: Reliability Improvement and Power Transfer in South Asia", which suggested connecting Siliguri (India) to Anarmani (Nepal) and Thakurgaon (Bangladesh) initially by 132 kV lines, capable of being upgraded to 220 kV as the volume of interchange increases.

It also suggested the alternative of connecting Purnea (India) to Duhabi (Nepal) and Ishurdi (Bangladesh). Further connections are possible from Chhukha (Bhutan) to Siliguri and then on to Purnea (Figure 5.1). The cross-border flows would be around 500 MW and these would represent a relatively low-cost initiation of power trade, which could be extended later (USAID 2009: 25).

Figure 5.1 Proposed power connections



Source: USAID (2009).

On a more general note, the individual countries should pursue their trading interests. The key remains a connection through the chicken's neck area, where Bangladesh, Bhutan and Nepal are separated by only a narrow strip of Indian territory. Bangladesh needs to lobby hard for a connection to the hydropower centres of its neighbours, Bhutan and Nepal. At the same time, the Bangladeshi government will have to support natural gas pipelines from Southeast Asia connecting its own infrastructure.

Pursuing a regional approach will help India garner trust among its neighbours.

India, on the other hand, is the key stakeholder. If the country pursues bilateral and regional negotiations in all directions, it will also prove to its own benefit. Pursuing a regional approach will further help the country to garner trust among its neighbours. Eventually, this is in India's ultimate interest. Trust, and stable and prosperous neighbours are also important in other areas of national security and immigration.

Altogether, a feasible step-by-step approach would be to start with short-term trading on a multilateral basis, provided that the necessary interconnections are completed. It should be followed by a day-ahead market, which will finally be replaced by a spot market, as implemented in other developed power systems. The final market approach can be adopted, once the essential preconditions for any region to trade in a competitive market are fulfilled, which are:

a) Adequate redundancy in generation and transmission
b) Electricity sales price reaching its economic value
c) Level playing field
d) Mechanism for market surveillance to guard against abuse of power

The attainment of these conditions affects the final timeline of market opening. While they are necessary for regional cooperation to happen, they are not sufficient. When technical knowledge and feasibility are attained, policy makers on all sides and in particular India have to take the leadership role.

5.2 International actors

Donors and actors like the World Bank have been criticized for being unsuccessful in fostering regional energy cooperation. According to a former Nepali Minister for Water Resources, Dipak Gyawali (2010), in the Nepali context, donor-funded projects have become mere "cemeteries" of energy cooperation. Regardless of such criticisms, the USAID, the World Bank and the ADB are continuing their assistance on the issue. The USAID has been focusing on capacity building in the NEA. The World Bank is giving legal assistance to the NEA and carrying out feasibility studies on the consequences of electricity trade. The ADB is willing to assist in future transmission lines and integration. There remain a number of areas where their involvement is likely to benefit overall progress in energy cooperation.

5.2.1 Stakeholder target groups

The SARI/Energy programme, which has been re-orienting its work towards capacity building from more technically oriented support, found that it is not enough to target mid-level officials and

technocrats. They already understand the benefits and potential of regional and bilateral trade is already in place. This has been confirmed by utility officials. Training and other capacity-building measures have to target higher levels in the decision-making hierarchy.

Instruments

There are a number of areas in which the expertise of international donors and organizations can be useful. These are:

a) Capacity building of policy makers
b) Fostering interaction of decision makers at the highest level
c) Support of negotiations through provision of advisory and legal services
d) Research support
e) Payment mechanisms

5.2.2 Technical assistance

At a conference in New Delhi, Shri S Padmanabhan, the regional director of SARI/Energy explained how imported hydropower and natural gas would help in moderating the increase in fossil fuel requirements. He enumerated the following roles of SARI/E: to promote regional cooperation together with governments and the private sector (i.e., think regionally, act domestically); to bridge the gap of barriers and distrust; to provide counterpart funding, resources and unbiased support for regional initiatives; and to showcase examples of the benefit of regional cooperation" (Sikkim University 2010).

Unlike more recent directional changes in development assistance, there remains a considerable aspect for technical assistance to be fulfilled. The debates on regional cooperation have remained at the policy level. What is needed is a detailed feasibility study estimating possible trade volumes, transmission lines required and citizens affected. Similarly, financial and economic calculations of the poverty-alleviating benefits surrounding the construction of export projects weighed against their true social costs have to be provided. This will facilitate goal-oriented negotiations between India and its future energy trading partners, as well as in the long run at the multilateral level. Box 5.1 lists some potential areas for research and initiatives.

Box 5.1 Potential areas for resarch and initiatives

- Assessment of positive and negative externalities of hydropower projects
- Assessment and predictions of bilateral trade and regional exchange volumes
- Infrastructure investments in transmission networks
- Technical and financial feasibility to connect generation and transmission for export and domestic consumption
- Information collection and sharing
- Knowledge networking and technology cooperation in rural energetization
- Building greater energy efficiency
- Enhancing the role of the private sector in energy development and trade
- Evolution of coordinated legal and regulatory frameworks
- Back-to-back arrangements
- Lagged cooperation (like a futures/swap arrangement)
- Joint R&D

Source: Srivastava and Misra (2009).

5.4 Education

Educational institutions can play a key role in supporting regional cooperation. As in the case of Sikkim University, universities are able to provide neutral platforms for discussions, since they are both centres of research and ideas. Through executive training specifically on energy trade, higher-level officials can be targeted and representatives from the different countries be brought together. One of the key advantages of the encouragement of education institutions to work in the area of energy cooperation is their neutrality and acceptability for most stakeholders.

Educational institutions can play a key role in supporting regional cooperation.

5.5 Leadership

It is clear in the case of energy cooperation that the challenges faced by

stakeholders and advocates are not of a technical nature. The issues here are the lack of initiative, leadership and ownership of the issues. Interventions require problem solving following the strategy of adaptive leadership, when problems cannot be clearly defined and solutions not easily found. Instead, the process of regional energy cooperation has gone a long way, during which problems and obstacles have not been constant. Even to define the problem and subsequently find the solution requires significant capacity and willingness to learn.

India's commitment and leadership can push the stalled process of regional energy cooperation forward. However, prudent diplomacy from other member states can play an important role in setting the policy agenda. A strong alignment of these members can help bring India on board. An important step would be to accept the responsibility for the shortcomings of the past and build a consensus to move forward.

Table 5.1 presents a recommendations matrix.

Table 5.1 Recommendations matrix

Barriers	Instruments to mitigate	Good practice	Timeline	Stakeholders	Outcome	Effects on climate change
Technical	• Governments to update national transmission grids	SAPP	Gradual	Transmission authorities,	Compatible grids capable of connection	Reduction of energy losses
	• Construct interconnectors	SAPP	Short/medium term	Transmission authorities	Start actual trade	Replacement of dirty fuels
	• Investment in national generation	GMR	Gradual	Utilities, IPPs	Improve supply, negotiation position	CDM potential; in general, more harmful impact
	• Joint investment projects	SAPP	Medium term	Governments, private sector	Large-scale projects, trust building	Project location in least harmful place
	• Common R&D	ASEAN, EU	Short term	Governments, education institutions, research centres	Common statistics, objective analysis and negotiations	Climate change considerations tackled on a regional platform
Political	• Decouple politics from energy	EU	Medium term	Governments, opposition parties	Objective debate and negotiations	
	• Framework agreements	SAPP	Short/medium term	Governments, international institutions	Conducive business environment, legal certainty, more investment, speeding up of project process	Incorporation of environmental considerations at institutionalized level
	• Engage in regional fora	EU, ASEAN	Short term	SAARC, member states	Trust building, spillover	Likely going to focus on climate change issues
	• Common definition of energy security	SAPP, EU	Medium term	Politicians, media, international institutions	Trust building, common goal	
	• Joint capacity building at the policy makers' level.	EU	Short term	Education institutions, international institutions	Level playing field, spillover	More harmful impacts

Economic	• Focus on complementarities, construction of transmission lines	SEER-EM	Short term	Governments, bureaucracy	Increased supply, reliability enhancement	Increased production will have mainly harmful impacts; however, replacement of traditional biomass fuels will be beneficial
	• Investment in large joint projects	SEER-EM	Medium term	Governments, private investors	Economies of scale	
	• Conducive investment environment	EU, ASEAN	Short/medium term	Governments	Foreign (direct) investment, domestic project completion	
Social	• Regional body	EU, SAPP	Short term	Member states	Regional interaction will build trust and public support	Regional strategy
	• Indian leadership	SEER-EM	Short term	Indian government		
Environmental	• Use of creative compensation, energy supply or monetary compensation	GMR	Short to medium term	Governments, private sector, research institutions	Local support for infrastructure projects	Less beneficial for local biodiversity
	• Cooperation on environmental and safety standards	EU, ASEAN	Short term	Governments, bureaucracy, international institutions	Level playing field	Minimum protection
	• Regional cooperation on renewable energy sources, energy efficiency and conservation standards	EU, ASEAN, SAPP	Short term	Governments, bureaucracy, international institutions	Common strategy, mutual monitoring, spillover	Mitigation effects
Summary	Engagement, pooling of resources, framework agreements, creation of business and investment environment, joint research and investment	EU, ASEAN, SAPP, GMR, SEER-EM	Achievable in the short and medium term	Governments, bureaucracies, research and education institutions, media	More reliable energy supply, level playing field, more effective communication, common base of research and objective analysis, trust building and common strategy, spillover potential	More energy generation will have many harmful effects. Replacement of dirtier fuels and biomass, and reduction of system losses will benefit the environment

5.6 Conclusion

At the outset of this paper, a central question was asked as to whether market forces or political support are the key drivers of regional energy cooperation. Based on the case study in this paper, the answer would be that once the circumstances of political stability and commitment to cooperation are established, technical and commercial problems can be resolved. In the present phase, technical problems can indeed be overcome with the tools and measures available in the global market. Political support at the government level, however, remains the predominant condition for regional integration.

As Professor Shri B G Verghese, Centre for Policy Research, New Delhi, puts it, "the logic of optimal development and,

now, the imperative of climate change, compel the countries for regional energy cooperation." It is up to researchers to provide the necessary knowledge towards that end. Without doubt, international pressure for more regional cooperation will increase. The present SAARC structure or a subregional form as proposed by this paper will be the probable platform for progress.

As the debate on regional energy cooperation is going to continue, there are a number of questions that have to be taken up in the near future (see issues for discussion below).

Issues for discussion

- How can governments be engaged to interact at the highest level, i.e., the ministry level, to interact and work together on a institutionalized basis?
- How can relations be institutionalized and progress through the SAARC Working Group be advanced?
- How can progress proceed even without short-term political stability?
- How can the private sector be supported in pursuing cooperation without government guarantees?
- How can electricity become a commodity, and generation and transmission be treated as services?
- How can bilateral trust—both at the public and professional levels—become a reality?

Endnotes

[1] Of course, such calculations are to a large extent based on potential numbers of energy production rather than real numbers.

[2] The integration of regional independent power grids of Indians are also used as an example, since its dynamics can be used to understand how the technical barriers to regional grids can be overcome.

[3] However, it is refraining from signing grand export deals with the Indian electricity authorities. In the case of the planned 400 kV transmission line from Dhalkebar to Muzzaffarpur, the NEA has created two Special Purpose Vehicles, in which PTC Nepal and CPTC hold equity, in order to be able to sign a Power Purchase Agreement and a Transmission Service Agreement.

[4] In Nepal consumption makes up 90 percent of the GDP, compared to 9.7 percent domestic savings.

[5] 1 NPR = US$0.013885; 4.5 NPR = 6.25 US cent.

[6] Supranational institutions have voting rules like parliaments, i.e., simple or qualified majority is sufficient for decisions to pass. In contrast, intergovernmental institutions require unanimous voting.

[7] The theory of spillover is in no way undisputed. While it was hailed in the early years of the ECSC towards the European Community, the nationalist years of politicians like De Gaulle and during the oil crisis have been seen as its contradiction. The neo-functionalist paradox was formulated: On the one hand, non-controversial arenas have to be politically relevant in order to expect any further expansion; on the other hand, if the proponents choose an issue with a greater potential and capacity or attract the efforts of a wider set of actors, governments of member states might choose to refuse to enter such arrangements in the first place or pull the plug before the process has advanced too far (Schmitter 2005, 262f). The success of the Single European Market in the 1990s, however, is regarded as the victory of neo-functionalist ideas in the long run.

Appendix

Table A1 Energy snapshot, 2010

Countries	Coal	Oil	Natural gas	Hydro
	Million tonnes	Million Barrels	Mtoe	MW
Afghanistan	440	NA	2	25,000
Bhutan	2	0	0	30,000
Bangladesh	884	12	39	330
India	90,085	5,700	996	150,000
Maldives	0	0	0	0
Nepal	NA	0	0	42,000
Pakistan	17,550	44	612	45,000
Sri Lanka	NA	150	0	2,000
Total	108,961	5,906	1,649	294,330

Source: Various Country Reports for the ADB's SRETS; and Solar and Wind Energy Resource Assessment, Ministry of New and Renewable Energy, Government of India.

Table A2 Import dependence

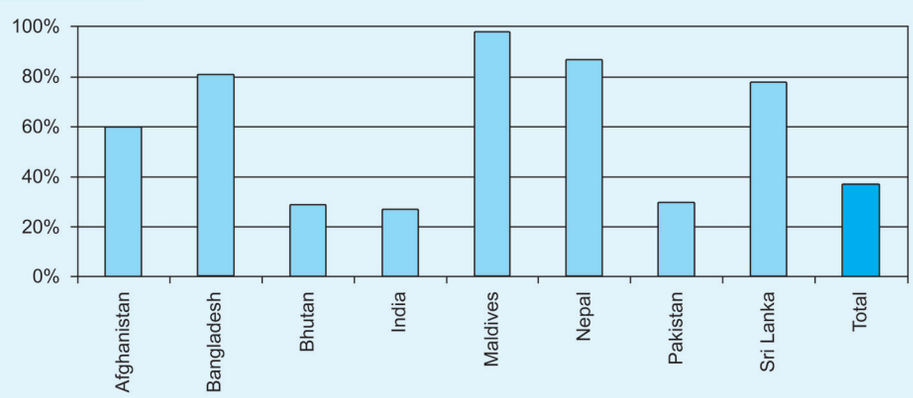


Table A3 India's regionwise installed capacity (MW) of power utilities

S.N.	Region	Thermal				Nuclear	Hydro (Renewable)	R.E.S. (MNRE)	Total
		Coal	Gas	Diesel	Total				
1.	Northern	22,575.00	3,563.26	12.99	26,151.25	1,620.00	13,430.75	2,690.62	43,892.62
2.	Western	29,155.50	8,143.81	17.48	37,316.79	1,840.00	7,447.50	4,849.93	51,454.22
3.	Southern	19,172.50	4,690.78	939.32	24,802.60	1,100.00	11,210.03	8,329.67	45,442.30
4.	Eastern	16,895.38	190.00	17.20	17,102.58	0.00	3,882.12	334.91	21,319.61
5.	N. Eastern	60.00	787.00	142.74	989.74	0.00	1,116.00	218.19	2,323.93
6.	Islands	0.00	0.00	70.02	70.02	0.00	0.00	6.10	76.12
7.	All India	87,858.38	17,374.85	1,199.75	106,432.98	4,560.00	37,086.40	16,429.42	164,508.80

Captive genrating capacity connected to the Grid (MW) = 19,509
RES = Renewable Energy Sources, includes small hydro project, biomass gas, biomass power, urban and industrial waste power, and wind energy.

Table A4 Recommendations of SAARC Regional Energy Trade Study

The 2010 SAARC Regional Energy Trade Study (SRETS) carried out by the ADB suggests four ways of moving forward in regional energy cooperation. As the document was not endorsed by the SAARC member states at the time of writing, the following details are based on a presentation made by project speaker PN Fernando in Colombo. The SRETS study identified four areas of successful regional cooperation: Regional/ Sub-regional Power Market, Regional/ Sub-regional Refinery, Regional/ Sub-regional LNG terminal and gas transmission expansion, Regional/ Sub- regional Power Plant.

1. Regional/Sub-regional Power Market

- Optimal exploitation of energy resources
- Reduction in generation reserve requirements
- Reduction in overall cost of supply
- Improved system reliability, energy security
- Incentives to resource-rich countries to accelerate power development
- Cross-border connectivity, a prerequisite

Next steps

- Adopt broad agreement at the governmental level for multilateral power exchanges
- Undertake power system studies for short, medium and long term to identify possible quanta of power transfer, transmission system requirements
- Review regulatory provisions including grid codes to ensure reliable interconnected operation
- Pricing of traded power and transmission and payment security mechanisms

2. Regional/ Sub-regional Refinery

- Region import dependant for crude and products
- All member states except India import diesel
- Limited refining capacity except in India
- Jointly owned refinery, preferably at a port, with maximized diesel output to supply part of regional petroleum product need with economies of scale
- Additional revenue stream in terms of profit sharing
- Improved supply security with lower product import
- Enhanced transportation arrangements needed

Illustrative benefits

- 23 MMTPA refinery, producing 65 percent diesel
- Expected net revenues – US$2.75 billion
- Payback period – about 3 years
- Participating countries may share the net revenues based on investments done
- Refinery a joint venture of the participating countries with each having a shareholding
- Technology for the refinery may be provided by India

3. Regional/ Sub-regional LNG Terminal

- Opportunity for smaller member states to add natural gas to diversify supplies
- Fuel substitution for power generation and other applications
- Cannot justify separate small LNG terminals
- Joint venture of member states or private sector LNG terminal as a common facility

SAARC is a natural gas deficit region
Bangladesh – 1 mtoe deficit
India – 16 mtoe deficit
Bangladesh and Pakistan heavily dependent on natural gas
Increasing natural gas deficit from current 8 mtoe to 139 mtoe by 2020

- LNG vs. natural gas pipeline—not an either-or situation; both need to be pursued
- SAARC Region well located to receive LNG
- Clean resource especially as compared to coal
- Economies of scale
- Transport economics and availability of requisite port facilities important determinants
- Backbone local pipeline netwotk—a prerequisite
- LNG terminal dedicated to bulk power generation an option

4. Regional/ Sub- regional Power Plant

a. Jointly owned
b. Exploit economies of scale
c. Location determined on fuel used (LNG/coal) and transmission issues
d. Enhanced regional connectivity a prerequisite
e. Sourcing of LNG far more economical due to better bargaining power
f. Economically favourable compared to diesel-based generation
g. Natural gas-based generation favourable to coal based generation after internalizing emissions

Short-term interventions

- India-Nepal oil products pipeline
- Power grid interconnections between India and Bangladesh
- Butwal (Nepal)–Gorakhpur (India) power transmission interconnection
- Duhabi (Nepal)–Purnea(India) power transmission interconnection
- Dhalkebar(Nepal)–Muzaffarpur(India) power transmission interconnection
- Anarmani (Nepal)–Siliguri (India) power transmission interconnection
- India-Sri Lanka power transmission interconnection
- Pakistan-India power transmission interconnection
- Feasibility studies for joint development of regional hydropower, gas- and coal-based power plants
- Development of wind power projects
- Feasibility study for setting up of joint LNG terminal(s)
- Feasibility study for the creation of a SAARC strategic petroleum reserve
- Strengthening of in-country gas transmission systems
- Preparation of a "Least Cost Energy Sector Master Plan for SAARC Region"

Medium-term interventions

- CASA 1000 Project for Central Asia–Afghanistan–Pakistan power transmission interconnection
- Phase-II of CASA—Electricity from Central Asian Republics up to the Indian power grid
- Iran-Pakistan-India gas pipeline
- Myanmar-Bangladesh-India gas pipeline
- Additional power transmission links, Bhutan-India
- Creation of SAARC Strategic Petroleum Reserve
- Turkmenistan-Afghanistan-Pakistan-India pipeline
- Creating an enabling environment
- Develop a SAARC Regional Energy Trade and Cooperation Agreement
- Harmonize the Legal and Regulatory Frameworks
- Build a comprehensive/reliable energy database
- Develop a regional energy trade treaty similar to the Energy Charter Treaty
- ADB can provide technical assistance support for SAARC owned regional projects and build on analysis approaches covered in the SRETS
- Technical assistance for expanding operations of the Indian Power Exchange—possible start

Table A5 Power profiles in South Asia

Key Indicator														
Country	Interconnection status	Grid structure in the country	Federa-level transmis-sion utility name	Organi-zation structure	Regulatory regime	Installed capacity	Power system dispatch authority	Voltage profile						
								Bi Pole	Back to Back	765 KV	400 KV	220 KV	132 KV	66 KV
India	Internally doesn't operate as united system, only four out of five internal grids are interconnected. Externally interconnected with Bhutan and Nepal, intercon-nection with Sri Lanka is under development	Federal-level and state-level transmis-sion utilities	Power Grid Cor-poration of India Limited (PGCIL)	Public limited	Regulated by Central Electricity Regulatory Commis-sion	141,000 MW	One national and five regional LDC Every state has its own state LDC	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Afghani-stan	Power system is fragmented. Externally inter-connected with Central Asia	Fragment-ed and discon-nected	The Da Af-ghanistan Breshna Moas-sessa (DABM)	National utility	None	470 MW	Dispatch functions under DABM					Yes	Yes	
Bangla-desh	Currently no external inter-connections	Single entity	Power Grid Corpora-tion of Ban-gladesh (PGCB)	Public limited	Regulated	5,255 MW	Under PGCB					Yes	Yes	Yes
Bhutan	Externally interconnected	Vertically integrated utility	Bhutan Power Corpora-tion	National utility	Regulated by Bhutan Electricity Authority	4,484 MW	Under Bhu-tan Power Corpora-tion				Yes	Yes	Yes	Yes
Maldives	Not intercon-nected	Non-exis-tent	Electric Com-pany Ltd. (STEL-CO)	National utility	Regulated by Maldives Electric-ity Bureau (MED) -	106 MW	NA						Yes	
Nepal	Externally interconnected with India	Vertically integrated utility	Nepal Electricity Authority (NEA)	National utility	Tariffs are approved by Tariff Fixation Commis-sion	618 MW	Under NEA							
Pakistan	No external interconnection at this time. Interconnections with Central Asia via Afghanistan and with Iran are under discussion	Two vertically integrated utilities —WAP-DA (func-tionally unbound-ed) and KESK	National Transmis-sion & Dispatch Company (NTDC)	Public utilities	Regulated by NEPRA	15,055 MW	National Dispatch Com-pany under NTDC				Yes (500 KV)	Yes		

Key Indicator														
Country	Interconnection status	Grid structure in the country	Federa-level transmis-sion utility name	Organi-zation structure	Regulatory regime	Installed capacity	Power system dispatch authority	Voltage profile						
								Bi Pole	Back to Back	765 KV	400 KV	220 KV	132 KV	66 KV
Sri Lanka	No external interconnections at this time, but interconnection with India is under develop-ment	Vertically integrated utility	Ceylon Electric-ity Board	National utility	Regulated by PUC of Sri Lanka	2,435 MW	Under ECB					Yes	Yes	Yes

Source: USAID (2009).

Table A6 ASEAN power grid

Objective : To facilitate and expedite the implementation of the ASEAN Interconnection Master Plan and to further harmonize technical standards and operating procedures as well as regulatory and policy frameworks among the ASEAN member states.

Strategy	Action
1. Accelerate the development of the ASEAN Power Grid Interconnection projects, namely: i) 3 APG projects are under construction: ii) 8 APG projects and their completion dates are as follows: 1) Project No 3: Sarawak – Peninsular Malaysia * Survey and Detail design (2015) 2) Project No 4: Peninsular Malaysia – Sumatra * Detail Design completed (2012) 3) Project No 5: Batam - Bintan - Singapore * Study in progress (2015) 4) Project No 6: Sarawak - West Kalimantan * Study on Cross Border issues (2012) 5) Project No 7: Philippines - Sabah * Study in progress (2015) 6) Project No 8: Sarawak - Sabah - Brunei * Study in progress (2015) 7) Project No 11: Thailand - Myanmar * Under negotiation (2014) 8) Project No 15: East Kalimantan - Sabah * Under study	• Work on the full functioning and operationalization of the APG Consultative Committee (APGCC) towards the realization of the interconnection projects • Conduct studies to address barriers to interconnection, cross-border trade and investment by the 8 HAPUA WGs, such as, but not limited to the following: i) Harmonization of technical standard codes or guidelines for APG in the areas of planning, design, system operation and maintenance ii) Harmonization of legal and regulatory framework for bilateral and cross-border power interconnection and trade and formulation of institutional and contractual arrangements for cross border trade to include taxation, tariff and Third Party Access (Wheeling Charge) iii) Identification and recommendation of Financing Modalities for realizing the APG • Review and update the AIMS by incorporating new elements of AMS's long-term power demand forecast, optimization of regional long-term power development plan (with interconnection scheme), identification of feasible interconnection project and implement the recommendations of the updated AIMS
2. Optimize the generation sector vis-a-vis the available indigenous energy resources in the region	• Conduct further optimization studies on the most economic operation and possible reserve sharing scheme within the region • Promote the optimal development of generation resources within the ASEAN region in line with the ASEAN Fuel Policy for power generation to be formulated by REPP-SSN
3. Encourage and optimize the utilization of ASEAN resources, such as funding, expertise and products to develop the generation, transmission and distribution sectors	• Conduct study and identify areas where ASEAN resources can be fully utilized to benefit the ASEAN region • Implement the AIMS recommendation and pursue the appropriate options for ASEAN Member States • Encourage the private sector to jointly develop power projects within ASEAN region, notwithstanding the importance of the interconnection projects

Source: ASEAN Centre for Energy (2009).

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South Asia Watch on Trade, Economics and Environment (SAWTEE) is a regional network that operates through its secretariat in Kathmandu and member institutions from five South Asian countries, namely Bangladesh, India, Nepal, Pakistan and Sri Lanka. The overall objective of SAWTEE is to build the capacity of concerned stakeholders in South Asia in the context of liberalization and globalization.

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