

THE SCOPE OF SUB-REGIONAL ENERGY COOPERATION IN SOUTH ASIA IN THE PERSPECTIVE OF EMERGING GLOBAL ENERGY SECURITY ARCHITECTURE

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Introduction

The International Energy Agency (IEA) defines energy security as “the uninterrupted availability of energy sources at an affordable price”. Energy security has many dimensions: long-term energy security mainly deals with timely investments to supply energy in line with economic developments and sustainable environmental needs. Short-term energy security focuses on the ability of the energy system to react promptly to sudden changes within the supply-demand balance. Energy security is the ability of a nation to secure sustainable energy supplies to meet its energy needs at reasonable prices—has thus become a major energy policy imperative.

Energy security means rather different things to different people. However, for working purposes, it may be said to include three components: reliability, affordability, and environmental friendliness. Reliability means that a state has regular, non-interrupted access to energy in the amount and shape it needs. Affordability means that it has access to energy supplies at a price that can be sustained economically and promotes economic growth. Environmental friendliness means that a state relies primarily on energy that provides for environmental sustainability and limits destructive social results. It is now also equated by many with the use of forms of energy that do not release climate-changing gasses (Pumphery, 2013).

Energy security is one of the defining policy issues of our day. The predominant focus in policy debates on energy is on “security of supply,” suggesting that states around the world are locked into a competition over access to crucial energy resources that provide the key to continued prosperity and state power. The fundamental energy challenges that individual countries face today are energy security, climate change, and energy access.

The energy security situation is especially acute for South Asian nations, where energy sectors must typically grow by 2-3 percent over the GDP growth rate simply to sustain their economic growth. Each country in the region must therefore address critical energy concerns that will determine not only its national economic expansion plans, but also its ability to bring underserved local populations onto the energy grid and into the economy. South Asia, including Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka, is a region of stark contrasts. One of the most populous regions of the world, it has a relatively small land mass and a high incidence of poverty. While growing populations have kept the per capita income in the countries of South Asia stubbornly below the world average, their economies are expanding and the demand for energy has soared. These nations are trying to meet ambitious poverty reduction goals while their growing industrial, commercial, and transport sectors and urban and middle-income consumers are using energy at unprecedented rates. To unleash the region's economic potential, every country in South Asia will have to face critical decisions, ranging from depleting indigenous energy resources to developing long-term plans to secure national and regional energy needs (Sankar, Raza, Barkat, Wijayatunga, Acharya, and Raina, 2005).

Global Energy Security Architecture

A Common Definition of Energy Security Architecture and Global Governance

Energy security is an umbrella term that encompasses a range of issues linking energy, economic growth and political power, such as the security of energy supply, the level and quality of access and uncertainty over prices. The concept emerged in the 1970s as a consequence of supply disruptions and price volatility, which resulted from OPEC oil embargoes in 1973 and the Iranian revolution in 1979. A commonly used taxonomy for energy security, published by the Asia Pacific Energy Research Centre in 2007, is the “four As” of energy security, namely:

- Availability (geological and physical elements)
- Accessibility (geopolitical elements)
- Affordability (economic elements)
- Acceptability (social and environmental elements)

Energy security can also be part of a broader vision, where energy is generally an element of global security. The concept has evolved over time and is more frequently viewed in relation to the vulnerability of energy systems.

Maps and Flow Chart of different Political and Economic Regions:

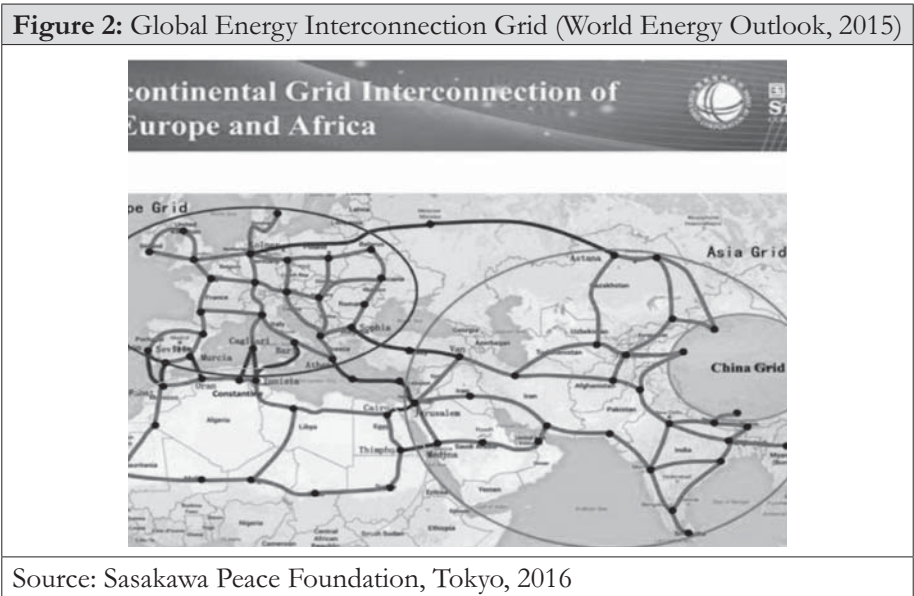
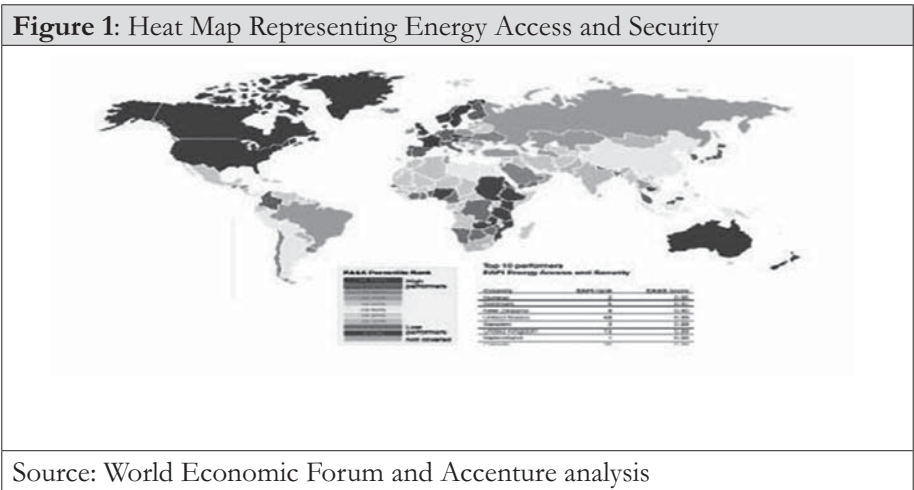


Figure 3: East bound Russian Gas Pipeline extended towards China (World Energy Outlook, 2015)

Russian Gas Pipelines Will Extend to the East: Recent China Deal

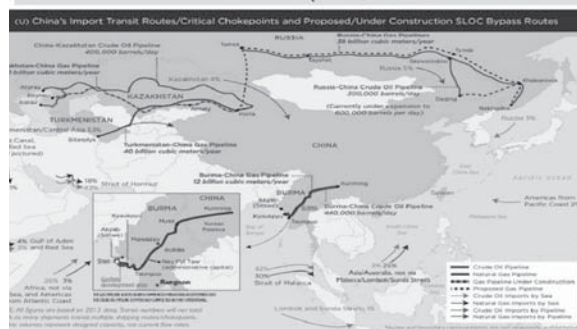


Mid-Term Oil & Gas Market 2010, IEA

Source: Sasakawa Peace Foundation, Tokyo, 2016

Figure 4: China's Oil and Gas Transit through One Belt One Road initiative (World Energy Outlook, 2015)

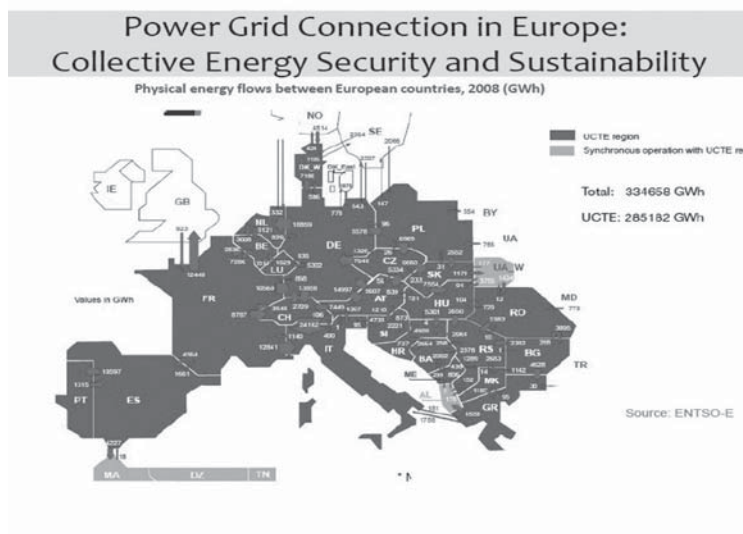
**China's Oil and Gas Import Transit Routes:
One Belt and One Road (一带一路)**



USDOD China Report 2015

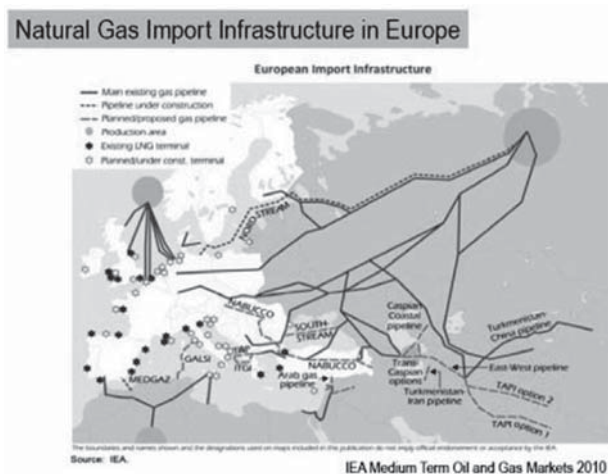
Source: Sasakawa Peace Foundation, Tokyo, 2016

Figure 5: Power Grid Connection in Europe (World Energy Outlook, 2015)



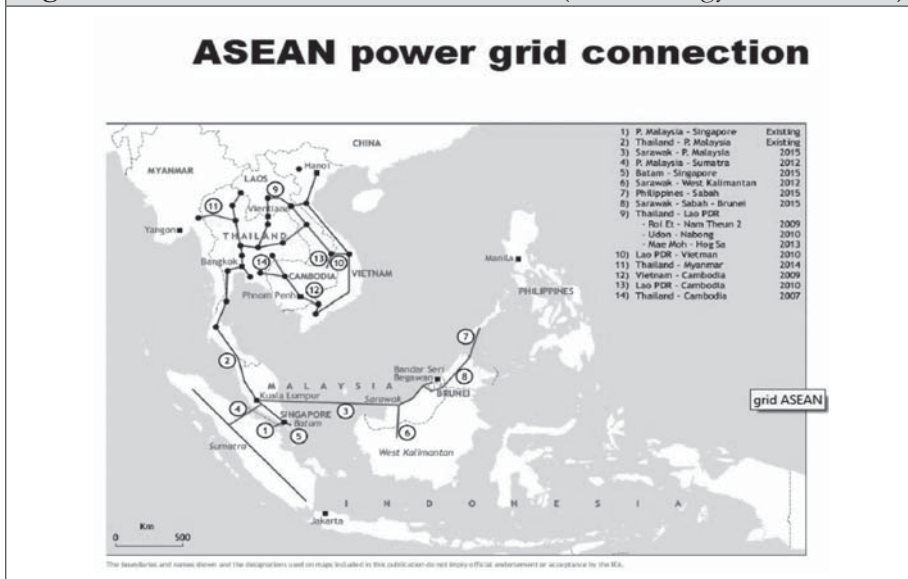
Source: Sasakawa Peace Foundation, Tokyo, 2016

Figure 6: Gas Infrastructure in Europe (World Energy Outlook, 2015)



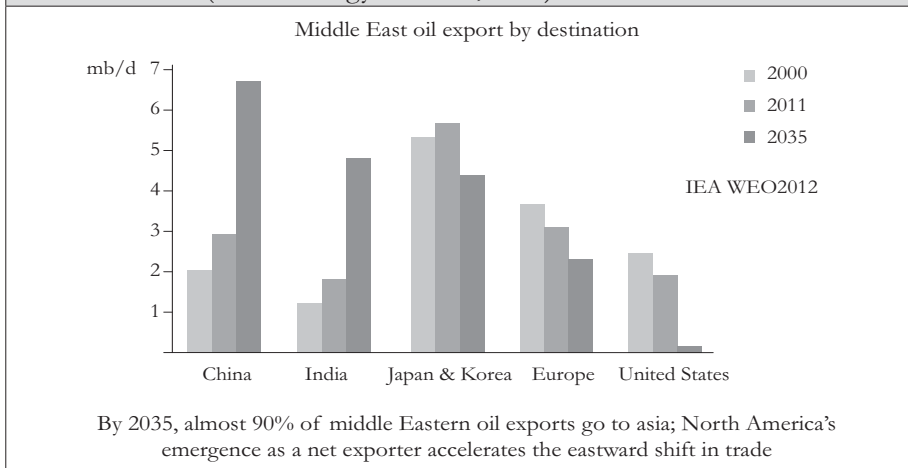
Source: Sasakawa Peace Foundation, Tokyo, 2016

Figure 7: ASEAN Power and Grid Connection (World Energy Outlook, 2015)



Source: Sasakawa Peace Foundation, Tokyo, 2016

Figure 8: Future Growth of North American Energy Independence on Middle East Oil (World Energy Outlook, 2015)



Source: Sasakawa Peace Foundation, Tokyo, 2016

Energy Cooperation in South Asia

An Overview

There is a wide variation in commercial energy resource endowments and commercial energy demand among the South Asian countries. While India, Pakistan, and Bangladesh account for the major natural gas and coal resources, Bhutan and Nepal have large hydropower resources. All the countries have vast renewable energy potential and the sharing of these resources naturally leads to more optimal energy supply solutions for the entire region. South Asian countries need enhanced regional energy transfer to leverage economies of scale through a more vibrant intra and inter regional energy trade structure.

Key issues faced in energy sector cooperation are centered on the need to develop:

- A regional power market
- Energy supply availability
- Energy trade infrastructure, and
- Harmonized legal and regulatory frameworks

Energy Cooperation through SASEC

Energy cooperation is a main focus of the South Asia Sub-regional Economic Cooperation (SASEC) program. The existing intraregional energy trade among the SASEC countries is limited to electricity trade between India-Bhutan and India-Nepal (in 2011, within the framework of SASEC cooperation, it was around 5,600 Gigawatt-hour (GWh) and 700 GWh respectively); and trade in petroleum products between India and Nepal, Bhutan, Bangladesh, and Sri Lanka. The enhanced electricity trade will be based on the expansion of power transfer links between Bhutan and India, and India and Nepal. The establishment of ongoing and proposed new power transfer links between Bangladesh and India, India and Sri Lanka, and between India and Pakistan would further strengthen the regional power trade.

Initiatives for Regional Energy Cooperation

Inter Governmental Framework Agreement for Energy Cooperation

Energy ministers in SAARC nations have decided to finalize the SAARC Inter-Governmental Framework Agreement (IFA) for Energy Cooperation by mid of this year to ease electricity crisis in the region. Reiterating the importance of electricity in promoting economic growth and improving the quality of lives, realizing the common benefits of cross-border electricity exchange and trade among the SAARC member states this agreement was done. The framework agreement would also include the provision of allowing unrestricted cross-border trade of electricity on voluntary basis subject to regulations of the respective member countries. The agreement would allow the SAARC nations buying and selling entities to negotiate the terms, conditions, payment security mechanism and tenure of their power purchase agreements as normal commercial agreements. It would also allow the national grid operators to jointly develop coordinated procedures for the secure and reliable operation of the inter-connected grids of the member states and prepare scheduling, dispatch, energy accounting and settlement procedures for cross border trade. But would also allow transfer of technology related to the power generation, transmission and distribution among the SAARC member states.

SAARC Energy Trade Study (SRETS)

This has been completed with the assistance of Asian Development Bank. It has identified four trade options, which will be considered by the relevant SAARC mechanism in order to make a road map for implementation. As a follow SAARC has commissioned a study on Regional Power Exchange. The study is likely to be completed in 2012. The Study will explore the development of a regional power market involving SAARC countries that already have interconnection, as well as those that have planned interconnections. It will also examine both economic and technical requirements of establishing a regional power exchange that would maximize the potential for power transfers among SAARC regions to reduce power shortages and take advantage of economic benefits.

SAARC Market for Electricity (SAME)

The 16th Summit of SAARC held on 28-29 April 2010 in Thimpu, Bhutan has adopted an Indian proposal for a roadmap to create a SAARC market for electricity. The summit urged the member countries to quickly ratify the trade in services deal to open their service sectors. The leaders noted the proposal from India for preparing a roadmap for developing a SAARC market for electricity on a regional basis, as SAARC is considering electricity trading, supported by enabling markets in the member states. The leaders emphasized the need to undertake studies to develop regional energy projects, promote regional power trade, efficiency, conservation and development of labeling and standardization of appliances, and sharing of knowledge and technologies, according to the declaration. Bangladesh Prime Minister Sheikh Hasina in her summit speech proposed for a regional grid of electricity in the SAARC region. Energy-starved Bangladesh has been in negotiation with India and Bhutan to import electricity from the neighboring countries.

SAARC Energy Centre (SEC)

The creation of SAARC Energy Centre (SEC) came into picture after the Dhaka Declaration in 2005. In this declaration, the Heads of the State or Government welcomed the joint Statement of the first SAARC Energy Ministers meeting held in October 2005 in Islamabad. They agreed to the recommendation to establish the SAARC Energy Centre in Islamabad: to promote development of energy resources, including hydropower; and energy trade in the region; to develop renewable and alternative energy resources; and to promote energy efficiency and conservation in the region. It has started journey from 1st March 2006 in Islamabad. SAARC energy cooperation program provides a major substantive element for economic prosperity of South Asia through meeting the energy demand of the countries. SAARC Energy Centre is converting energy challenges into opportunities for development. It is the platform involving officials, experts, academics, environmentalists and NGOs to tap potentials of cooperation in energy sector including development of hydropower, renewable and alternative energy, promoting technology transfer, energy trade, energy conservation and efficiency improvement in the region.

Energy Cooperation through BIMSTEC

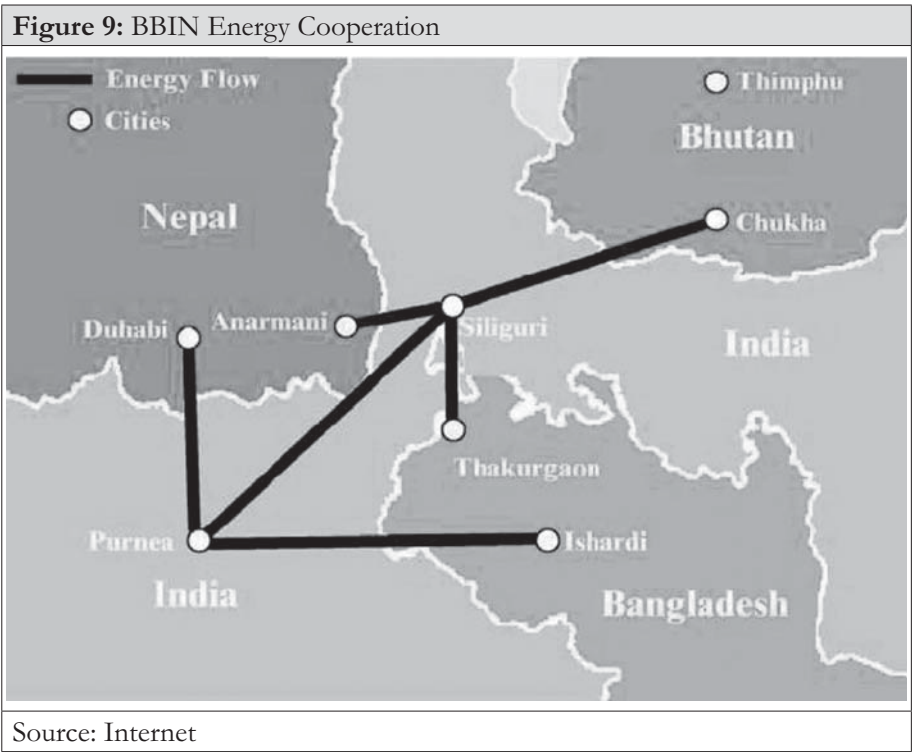
Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) is an international organization involving a group of countries in South Asia and South East Asia. The member countries of this group are: Bangladesh, India, Myanmar, Sri Lanka, Thailand, Bhutan and Nepal. It was formally launched on 31 July 2004 in order to create a link between SAARC and ASEAN. Seven members of BIMSTEC covers thirteen private sectors led by member countries in a voluntary member. Trade and Investment, Transport and Communication, Energy, Tourism, Technology, Fisheries, Agriculture, Public Health, Poverty Alleviation, Counter-Terrorism and Transnational Crime, Environment and Natural Disaster Management, Culture and People to People contact. Out of the seven members five are the members of SAARC and energy is one of the priority sectors.

MOU for Establishment of BIMSTEC Grid Interconnection

Member states of the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) have reached a consensus to sign a Memorandum of Understanding (MOU) soon to exchange electricity among them. The proposed MOU will provide a broad framework for the member countries to cooperate towards the implementation of grid interconnection for the trade in electricity based on bilateral building blocks with a view to promoting rational and optimal power transmission in the BIMSTEC region. It also added that the BIMSTEC trans-power exchange and development projects will be implemented through strengthening of bilateral and intra-regional cooperation within the framework of respective member countries' environmental and electricity laws and regulations. According to the MOU, the member states will coordinate and cooperate in the planning and operation of interconnected systems to optimize costs and maintain satisfactory security to provide reliable, secure and economic electricity supply to the member countries. The issue of imposing import, export, or transit fee, duty, tax, or any other government charges on construction, operation and maintenance of the BIMSTEC grid interconnection will be mutually agreed upon under the MOU.

Four Borders Project: Reliability Improvement and Power Transfer in South Asia

During 2001-2002, under the USAID sponsored SARI/ Energy Integration 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. 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.



Status of Power and Energy Sector Cooperation among South Asian Countries

Power sector cooperation in the recent time has been one of the hallmarks of Bangladesh-India relations which have been deeply appreciated by the general people in Bangladesh. Establishment of Bheramara (Bangladesh)-Bahrampore (India) grid interlink stands out as a glaring example of our achievements. More such tangible outcomes can infuse new positivity in our relationship. Bangladesh is now striving to expand our power sector cooperation further particularly through sub-regional cooperation. The SAARC Energy (electricity) Agreement would lend fresh impetus to power sector cooperation in the entire region through inter-country power trade and inter-country grid connectivity. All these would go a long way to ensure energy security for our entire region.

Power Sector Cooperation

In the Joint declaration issued during the visit of Indian Prime Minister to Bangladesh in June 2015, both the Prime Ministers expressed deep satisfaction at the level of cooperation and achievements in the power sector between the two countries and agreed to widen the cooperation further. Prime Minister Narendra Modi expressed his appreciation for Prime Minister Sheikh Hasina's untiring efforts in improving the power situation in Bangladesh and her Government's consistent efforts in implementing the 2021 Goal i.e. to achieve installed capacity of 24,000 MW power by the year 2021. He also conveyed that India can be a major partner in achieving this goal and many Indian corporates have the capacity to cooperate with Bangladesh in this endeavour.

Few ongoing and future projects in power sector cooperation are mentioned below:

- **Diesel/ petroleum products supply by pipeline from Numaligarh Refinery:** Bangladesh requested for expeditiously finalizing the tariff and modalities of implementation of the project including construction of pipeline, to commence the project work and supply diesel. For the very first time 2268 MT high speed diesel has been transported/ supplied to Bangladesh (Parbatipur depot of Bangladesh Petroleum Corporation) on 19 March 2016.

- **Tri-nation (Bangladesh-India-Myanmar) gas pipe line:** It is clear that although many options are available to India, pipeline through Bangladesh provides the cheapest route to transport natural gas from Myanmar. Bangladesh can benefit from the pipeline if it can enter into well-argued negotiation in this regard. Bangladesh needs to prioritize its goals and have a long term view of its relations with both India and Myanmar.
- **LNG and LPG Cooperation:** India is presently interested to supply LNG and LPG to Bangladesh and both the countries already signed MoUs in this regard. The protocols and modalities are however yet to be finalized.

Energy Demand Forecast for South Asian Region

India, Pakistan, Bangladesh and Sri Lanka have drawn up long-term plans for their socioeconomic development in the twenty first century and have projected their energy requirements based on these long-term plans. The increase in energy demand in the region in a decade time is highlighted in Table 1.

Table 1: Energy Demand for South Asian Countries			
Country	2010 Demand (GWh)	2020 Demand (GWh)	Percentage Increase
Bangladesh	28470	67400	9
Bhutan	1749	3430	7
India	938000	1845000	7
Nepal	3200	6910	8
Pakistan	95000	246000	10
Sri Lanka	10718	21040	7
Total	1080537	2197830	7.4
Source: Asian Development Bank, 2013			

Renewable Energy Scene in South Asia

In contrast to the situation with fossil fuel energy sources, SAARC countries are endowed with considerable renewable energy sources especially hydro and solar energy. Being in the tropics, SAARC economies are endowed with high levels of solar insolation. An overview of the richness of renewable energy resources in South Asia are given in Table 2.

Table 2: Renewable Energy Resources in SAARC Economies				
SAARC Country	Hydropower Potential (MW)	Biomass Resources (million tons)	Annual Average Wind Speeds (m/s/year)	Annual Average Solar Insolation (kWh/m²/day)
Afghanistan	25,000	18-27	4.3-5.6	4.7-5.47
Bhutan	30,000	26.6	4.4	4.63
Bangladesh	330	0.08	1.9-2.9	4.51-4.99
India	150,000	139	0.9-4.6	3.95-6.07
Maldives	0	0.06	3.7 -5	5.8 -5.88
Nepal	42,000	27.04	2.9-4.6	5.03-5.37
Pakistan	45,000	NA	2.1-5.6	4.02-5.54
Sri Lanka	2,000	12	1.9-5.2	4.8-5.88
Total	294,330	225 (approx.)	22.1-37.9	37.44-43.83
Source: SAARC Energy Centre, Islamabad, 2015				

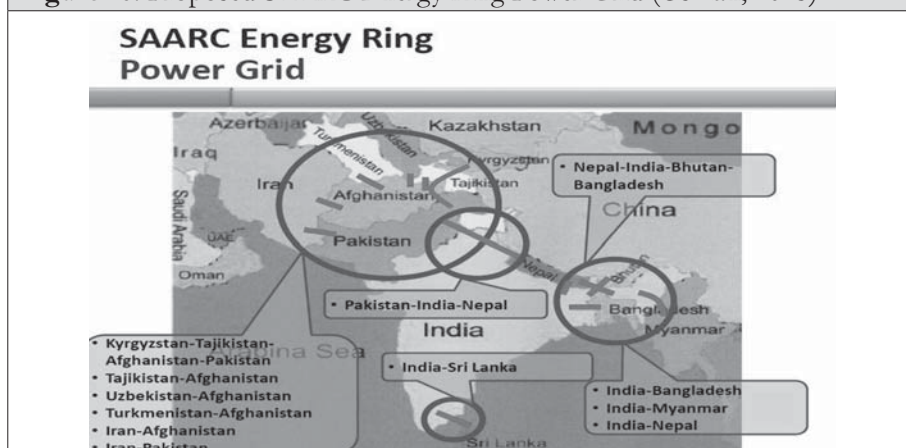
However, despite the rich local resource endowments, SAARC countries have only succeeded in varying degrees to harness their renewable energy potential. Considering that many SAARC countries face electricity shortages in the range of 8-27 percent and are dependent on sources outside the region for their petroleum energy sources, there is a clear need to increase the level of utilisation of renewable energy resources other than hydro, which are widely available in the region (Parthan, 2015)

Hydro Power Potentials of Nepal and Bhutan

Nepal has a huge hydropower potential. In fact, the perennial nature of Nepali rivers and the steep gradient of the country's topography provide ideal conditions for the development of some of the world's largest hydroelectric projects in Nepal. Current estimates are that Nepal has approximately 80,000 MW of hydropower potential. However, an estimated half of it i.e. 40,000 MW is economically viable. The present situation is that Nepal has developed only approximately 600 MW of hydropower. Therefore, bulk of the economically feasible generation has not been realized yet. Besides, the multipurpose, secondary and tertiary benefits have not been realized from the development of its rivers. Although bestowed with tremendous hydropower resources, only about 40 percent of Nepal's population has access to electricity. Most of the power plants in Nepal are run-of-river type with energy available in excess of the in-country demand during the monsoon season and deficit during the dry season.

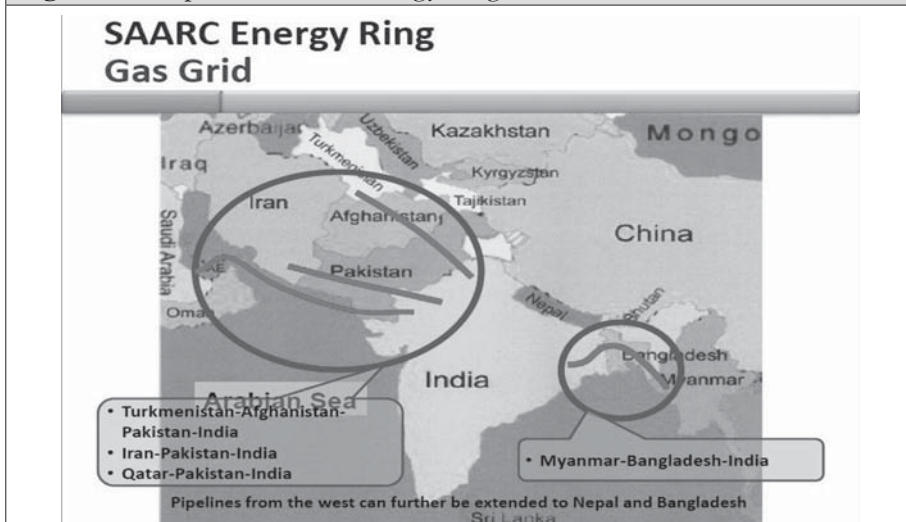
No wonder both Nepal and Bhutan see this as a win-win situation. In 2006, India and Bhutan signed an agreement “concerning cooperation in the field of hydroelectric power”, whereby India agreed to import at least 5000 MW of power from Bhutan. In just three years after this, Bhutan pushed for acceleration, and a Protocol to the 2006 Agreement was signed between the two countries in 2009, wherein India agreed to support Bhutan to create an installed hydro capacity of 10,000 MW by 2020, and import all the surplus electricity. This is the basis for Bhutan’s ambitious 10/20 program, that is, to create 10,000 MW of capacity by the year 2020. This capacity is expected to come from 10 mega projects. Out of these, three – 1200 MW Punatsangchu-I, 1020 MW Punatsangchu-II and 720 MW Mangdechhu – are under construction. The foundation stone for the 600 MW Kholongchhu was laid by India’s Prime Minister Narendra Modi during his visit to Bhutan in June 2014. The rest, which are at various stages of development are the 540 MW Amochhu Reservoir project, 570 MW Wangchu Run-of-the-River project, 180 MW Bunakha Reservoir project, the 2640 MW Kuri Gongri Reservoir project, the 770 MW Chamkharchhu-I HEP (Hydro-Electric Power) project and the 2560 MW Sankosh Reservoir project (Dharmadhikary, 2015). Establishment of joint hydropower projects in some remote and access unfriendly location in both Nepal and Bhutan require critical policy decision and massive investment and in Bangladesh must work with India to harness the huge hydropower potentials of Nepal and Bhutan and onward transmission. The governments are examining the feasibilities of tripartite projects in the two countries.

Figure 10: Proposed SAARC Energy Ring Power Grid (Usman, 2015)



Source: The 8th Japan-SAARC Energy Symposium on Medium Term Vision for Energy Connectivity in the SAARC Region, Islamabad, 2015

Figure 11: Proposed SAARC Energy Ring Gas Grid



Source: The 8th Japan-SAARC Energy Symposium on Medium Term Vision for Energy Connectivity in the SAARC Region, Islamabad, 2015

Myanmar, the New Frontier of South Asia Energy Cooperation and the New Silk Road

The Missed Opportunity Turned to a Costly Affair

The proposal for a gas pipeline from Myanmar to India through Bangladesh territory was first tabled in 1997 by the Dhaka-based private firm Mohona Holdings. This 900km, one billion dollar pipeline was meant to transfer an estimated 5 billion cubic metres of gas from the Swe field off the Bay of Bengal through the Rakhine State in Southern Myanmar, from where it would turn east to enter the Indian state of Tripura. The pipeline would then enter Bangladesh at Brahmanbaria and traverse the country till it exited at Jessore and terminated at the West Bengal state of India (Ali, 2013).

The deal however, could not be implemented purportedly because India did not agree to Bangladesh's demands of i) transmission of hydroelectricity from Nepal and Bhutan to Bangladesh through Indian territory; ii) corridor for supply of commodities between Nepal and Bhutan and Bangladesh through Indian territory; and iii) to take necessary measures to reduce trade imbalance

between the two countries. Though these were discussed on the sidelines of the tripartite deal and even a formal joint bilateral press statement was issued by the Indian and Bangladeshi Ministers with some very positive views on these demands by the former, the entire deal collapsed. It essentially became a deal between India and Myanmar which never took off. Bangladesh's demands looked very reasonable, particularly in the context of the conspicuous trend of steady liberalisation and economic integration the region has recorded in the last decade or so. The Singh- Hasina agreements of 2010 and 2011 have in fact proved that Bangladesh was asking for what India would have in any case agreed upon. Though this tripartite agreement looks fizzled out at the moment, India lost a major opportunity even in terms of literally handing over the gas fields to China. Even if the gas is made viable to India by Myanmar once again, India could do so now only at a very heavy cost of diverting this gas pipeline through its own territory in Assam. It has also forgone a good opportunity to make substantive geo-strategic and socio-economic gains in the long run. The goodwill and diverse stakeholders generated by this project could have been used by India to resolve its longstanding demands vis-à-vis Bangladesh. This includes getting a better access to energy projects in Bangladesh and transit facilities to reach its North-Eastern States. It could have triggered a number of projects in Bangladesh with large scale development and social impact. This could have in turn in some ways even discouraged the Bangladesh- India cross border movement of people in search of better livelihood. The Bangladesh transit corridor could have been used as a major route to enter into the South East Asian countries via Myanmar under the Look East policy. A transit corridor through Bangladesh is very vital for India (Mainstream, 2013).

One Belt One Road Initiative: A Ribbon of Roads, Rails, Waterways and Energy Projects to Help Increase Trade

In just 30 years, China has developed from a poor inward-looking agricultural country to a global manufacturing powerhouse. Its model of investing and producing at home and exporting to developed markets has elevated it to the world's second-largest economy after the USA. Now faced with a slowing economy at home, China's leadership is looking for new channels to sustain its appetite for growth at a time when developing neighbours are experiencing rapidly rising demand. At the heart of One Belt One Road (OBOR) lies the creation of an economic land belt that includes countries on the original Silk Road through Central Asia, West Asia, the Middle East and Europe, as well as a maritime road

that links China's port facilities with the African coast, pushing up through the Suez Canal into the Mediterranean. The project aims to redirect the country's domestic overcapacity and capital for regional infrastructure development to improve trade and relations with ASEAN, Central Asian and European countries (Lee, 2016). In its way the Pearl of String of the new Maritime Silk Road will connect South Asia to Middle East, African costs, and to the Europe through the Suez at one end and South East Asia and China at the other. The One belt, one road will add a new dimension in supper connectivity in the entire region of the three continents, as well as energy trade and security to South Asia (Lee, 2016).

China's "One Belt, One Road" project aims to make Central Asia more connected to the world, yet even before the initiative was formally announced China had helped to redraw the energy map of the region. It had built an oil pipeline from Kazakhstan, a gas pipeline that allowed Turkmenistan to break its dependence on dealings with Russia and another pipeline that has increased the flow of Russian oil to China. Chinese companies have funded and built roads, bridges and tunnels across the region. A ribbon of fresh projects, such as the Khorgos "dry port" on the Kazakh-Chinese border and a railway link connecting Kazakhstan with Iran, is helping increase trade across central Asia. China is not the only investor in central Asian connectivity. Multilateral financial institutions, such as the Asian Development Bank, the European Bank for Reconstruction and Development and the World Bank has long been investing in the region's infrastructure (Farchy, Kynge, Campbell and Blood, 2016).

Figure 12: The New Silk Road Economic Belt



Source: MERICS, DW, December 2015

Research Findings

In the backdrop of the emerging global energy architecture and governance all the countries of South Asia have to step up a regional energy charter for ensuring own energy cooperation. Cooperation like SAARC and BIMSTEC has been formed and these have been active regarding the energy situation. The 2010 SAARC Regional Energy Trade Study (SRETS) carried out by the ADB suggests four ways of moving forward in regional energy cooperation. The four areas for successful regional cooperation were identified as:

- Regional/Sub-regional Power Market
- Regional/Sub-regional Refinery
- Regional/Sub-regional LNG Terminal and Gas Transmission Expansion
- Regional/Sub-regional Power Plant

Also a free market approach can be adopted, once the essential preconditions for any region to trade in a competitive market are fulfilled, which are:

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

The attainment of these conditions affects the final timeline of market opening in SAARC region. Each individual country should pursue its trading interests. The key issue remains as to get a connection through the chicken's neck area, where Bangladesh, Bhutan and Nepal are separated by only a narrow strip of Indian Territory. Bangladesh is pursuing with India for a connection to the hydropower centers of its neighbors, Bhutan and Nepal. At the same time, the Bangladesh government should support natural gas pipelines from Southeast Asia connecting its own infrastructure if the opportunity comes again. While they are necessary for regional cooperation to happen, they are not sufficient yet. There need a strong political will and commitment for the quick establishment of greater and multipurpose regional and sub-regional connectivity. Once the technical knowledge and feasibility are attained, policy makers and experts of all countries involved must take bold and coordinated steps to implement the policy decisions.

Recommendations

The key issues for regional energy cooperation

The South Asian countries should carry the key responsibility for advancing regional energy cooperation. Without the highest-level approval, progress is not possible and the government has to believe in the success of these types of cooperation. The recommendations for South Asian governments can be condensed into five key ones:

- Separate national utilities, distribution and transmission systems operators;
- Sign more agreements to harmonize and synchronize the grids, which will also facilitate conventional imports and exports;
- Update domestic power grids to allow for feed-in and prepare for future power supply;
- Become the prime project sponsors to create an environment of security for private and foreign investors, as well as upgrade regional infrastructure under different blocks and economic platforms;
- 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.

Power trading

The South Asian governments should take immediate steps to promote regional cooperation. The governments should find some necessary measure to have some kind of policy established to encourage the power trading. Some guidelines are as below:

- Subscribe to, and become members of the Energy Charter Treaty, as Pakistan has done with number of its neighbours, in order to place the cross border energy trade on a firmer multilateral footing in relation to investment protection, regulation of cross-border energy infrastructure and flows, provide additional comfort and confidence to all participants, and minimize the political risks to prospective investors;

- Create firm political commitment towards energy trade and cooperation;
- Give attention in adequate training to enhance individual country capability in power sector as well as launch educational program under all the regional and sub-regional economic umbrellas;
- Reduce political tensions within and across the countries, with special attention to the integrity of transit countries (such as Afghanistan) and strengthen the viability and operational stability of their energy systems;
- Adopt a sustainable commercial approach to power and energy trade rather than a political ad hoc approach, and use standard commercial contracts, which allocate risks fairly;
- Encourage the private investors and market forces to play a major role in actual buying and selling;
- Keep the price expectations realistic based on reliable market signals and ensure that both the buyer and seller see profitable energy trade;
- Increase high level technical cooperation and best practices with developed and leading countries in the field of nuclear energy and its safe and efficient management;
- Give more emphasis on the production and distribution of affordable, green and renewable energy;
- Promote private sector investment and public private partnership in power generation and distribution.

Long term strategy requirement

To increase energy cooperation, some of the important future steps which need to be taken are:

- Develop a structure for a regional power exchange after reviewing the power system structures in individual countries, along with their operational procedures and regulatory and commercial requirements for cross-border trade;
- Improve investment environment for the private sector for both electricity generation and transmission, particularly in Nepal and Bhutan by streamlining the approval processes and establishing independent regulatory environments;

- Identify the technically and economically feasible cross-border interconnections based on a scenario analysis and possible financing options;
- Legal and regulatory frameworks dealing with cross-border trade along with an Energy Charter Treaty for greater security for cross-border energy transfer related investments and transactions; and
- Considering the geopolitical reality of the region the smaller countries like Bangladesh should establish alternate energy cooperation with other potential neighbours beyond South Asia, like Central Asia, China and Southeast Asia.

Conclusion

Energy security is a critical component of regional stability and plays a key role in supporting economic development and national security. Recent events, such as the political uprisings in the Middle East and Africa; the 2011 Japan earthquake and tsunami, which led to the crisis at the Fukushima Daiichi Nuclear Power Plant; and the economic instability and other crisis in the Eurozone, and the situation in Europe after Brexit, have enlarged the risks and compounded the uncertainties related to energy supply and demand.

In the South Asian regional context, the risks associated with forging an intraregional, cross-border energy cooperation, which include policy, legal, institutional, regulatory, and infrastructural barriers that would be greatly minimized if the economic and environmental benefits were better understood. Other barriers to robust trade include the lack of trans-regional energy infrastructures, such as transmission networks and gas pipelines; inconsistent regulatory framework for regional planning; weak contract enforcement and payment risks; riparian rights and water sharing issues; incongruent pricing policies and access regulations; differences in energy subsidization policies; and the lack of coordination and communication among regional transmission utilities. Balanced against these risks and barriers are several benefits of regional energy cooperation. In theory, cross border trade among the South Asian countries could lead to lower relative prices and the improved welfare of participating countries, because nations would enjoy the comparative advantage of their neighbors' relative energy resource endowments and technologies.

To accomplish its energy demand, Bangladesh needs to focus on both bilateral and regional cooperation. At the bilateral level, India, Myanmar, Nepal, Bhutan, Russia, Japan and Middle Eastern countries are important while at the regional

level, Bangladesh can take lead in the organisations like SAARC, BBIN, BIMSTEC, and BBIN. However, Bangladesh should be aware of the regional and global politics related with energy issues. An uninterrupted energy supply is a compulsion for Bangladesh to continue its economic progress and development to become a Middle Income Country by 2021 and by 2041 a Developed Country of the world by benefiting from energy cooperation with all its neighbouring countries. The scope of energy cooperation in South Asia is really tremendous and bound to happen for the mutual growth of all the countries in this region.

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Director General Shah Ahmed Shafi is a passionate reader of fiction and cosmology. Amongst his dozens of hobbies, prominent are watching movies, sports, travelling, photography, interfaith dialogue, and social networking.