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EXPLAINING CHALLENGES OF ENERGY CONNECTIVITY IN SOUTH ASIA

Abstract

Ensuring energy security has emerged as one of the key challenges all over the world. To meet that challenge, countries have resorted to increasing cooperation among themselves which resulted in many successful energy connectivity initiatives. In South Asia, countries are facing increasing energy demand with its rapid economic development. The concept of energy cooperation is not new in South Asia and countries have tried to initiate it through many regional and sub-regional forums. However, the success in implementing them has been very limited. This paper tries to understand why energy connectivity initiatives in South Asia has remained elusive. To that end, the paper conceptualizes energy connectivity and identifies enabling factors that help a n energy connectivity initiative. It finds that some of those factors are missing in South Asia, which is why implementing energy connectivity initiatives has been challenging and the challenges are often intertwined. The paper concludes by stressing that energy connectivity is vital for meeting the future energy needs of the region and countries should take a step by step approach to implement it.

Keywords: Energy, Connectivity, South Asia, Energy Cooperation

1. Introduction

Throughout human history, energy has been the driving force for human advancement. Therefore, pursuing energy security has been of central importance for countries. Whether it is coal, oil gas, or hydropower; access and control over energy resources has been one of the central issues of international politics. One way or the other, countries have tried to ensure an adequate supply of energy for their national demand. With time, the use of energy has been increasing rapidly and people's life and national economy are becoming increasingly dependent on the usage of energy. Therefore, ensuring energy security continues to be a major challenge facing all countries of the world.

However, the nature of the energy sector has changed significantly. In the 21st century, global energy challenges are diverse; from connecting more population to the grid who still live without electricity to replacing fossil fuels with cleaner energy sources; the amount and type of energy extracted, traded and used has a profound impact on security and sustainability.[1] With this change, a country's approach

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[1] Aleh Cherp and Jessica Jewell, "Forward", in Kacper Szulecki, (eds.), *Energy Security in Europe: Divergent*

towards ensuring security has also changed. Previously, national energy policies used to be inward-looking and import-substitution–based which gaining aimed at elusive goal of national self-sufficiency.[2] But as globalization and multilateralism became popular, mutual dependence and cooperation are becoming new norms in the global energy scenario.

The end of the Cold War gave the rise of regional institutions all over the world.[3] The rise of regionalism has led to the emergence of regional blocs where internal interdependence became separated from global interdependence.[4] This trend persisted in the energy sector as well, with countries taking initiative to improve energy cooperation within a region or its neighbours. Cross border energy trade and trans-boundary pipelines are being developed between and among countries. In many regions of the world, energy connectivity initiatives have been successfully implemented. Some of those initiatives have been implemented through regional arrangements while others through multilateral cooperation. For example, in Southeast Asia, there is integrated electricity market named the Greater Mekong Sub-region (GMS), in Europe; they have Central and South Eastern Europe Energy Connectivity (CESEC), in Africa and they have South African Power Pool (SAPP). Some of them, such as the SAPP has been successfully functioning for over 20 years.

South Asian countries are also facing similar realities. With increased energy consumption, ensuring energy security has been an important concern for policymakers. The countries, in general, with inadequate availability of indigenous energy supplies and a large population base, are significantly dependent on energy imports. As such, energy connectivity among them is vital for its future prospects since it can significantly reduce the import costs and improve resource diversification avenues.

However, South Asian track record on this particular issue has not been so impressive. Energy connectivity in South Asia has mostly consisted of cross-border electricity trade. Though most of the regional and sub-regional arrangements in South Asia such as the South Asian Association for Regional Cooperation (SAARC), Bangladesh, Bhutan, India, Nepal Initiative (BBIN), Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC)[5] have ventured in the energy sector, progress has been slow and the South Asian energy sector is far from being integrated. While discussions and agreements on energy cooperation are common, little success has been achieved in making progress in implementation.

Perceptions and Policy Challenges, Cham, Switzerland: Palgrave Macmillan, 2018, p.V.

[2] A Ahmed, C M Shahariar and M A Rashid Sarkar, "Energy Cooperation in South Asia: Prospects and Challenges", available at http://bea-bd.org/site/images/pdf/4.pdf, accessed on 27 February 2019.

[3] Andrew Hurrell, "Explaining the Resurgence of Regionalism in World Politics", *Review of International Studies*, Vol. 21, No. 4, p. 331.

[4] Lukas M Müller, "The False Promise of Interregionalism? Assessing the Determinants of EU-ASEAN Complex Interregionalism", *Occasional Paper No*. 25, August 2015, Southeast Asian Studies at the University of Freiburg, Germany.

[5] BIMSTEC has been included in the discussion since five of its seven members are part of South Asia.

Further, there are no major connectivity projects like pipelines, regional power grid or energy markets in South Asia (there is a BIMSTEC grid interconnection in discussion).[6] Given this backdrop, the paper seeks to enquire the major challenges of energy connectivity in South Asia. To do so, the paper seeks to find the enabling factors for energy connectivity initiatives and whether those factors are present in the South Asian context. The paper limits its scope in analyzing the challenges of energy connectivity in South Asia. It does not aim at providing policy suggestions for a way forward.

The paper is qualitative in nature. It uses books, articles, newspapers and online sources for information. Additionally, data from various government and international sources are also used. It is divided into five parts. The second section conceptualizes energy connectivity and establishes a list of enabling factors for successful energy connectivity initiative. The following section overviews the energy cooperation situation in South Asia plus. In the fourth section, it proceeds to explain the challenges of energy connectivity initiatives in South Asia. The fifth section concludes the paper.

2. Conceptualizing Energy Connectivity

Conceptualizing energy connectivity is a challenging task for several reasons. There is a substantial vacuum in the literature dealing with energy cooperation, in terms of the number of studies, theory development and use of methodological approaches.[7] Academic work on the area of energy mostly deals with the concept of energy security and tends to work on the global energy market.[8] On the other hand, the concept of energy connectivity is relatively new and there are only a few academic articles written on the issue, furthermore, most are technical studies. There is also limited employment of theoretical perspective in energy cooperation at the regional level since most of the studies and research were done on the topic is of empirical nature. A recurring theme of these kinds of literature is doing a stocktake of the present scenario of energy cooperation and listing the existing prospects, challenges and ways ahead.[9] The paper tries to address these challenges by looking

[6] "Bimstec Summit: Leaders agree on regional power grid", *The Daily Star*, 01 September, 2018.

[7] Özgür Özdamar, "Energy, Security, and Foreign Policy", in Robert A. Denemark and Renée Marlin-Bennett (eds.), *The International Studies Encyclopedia,* Malden, MA: Wiley-Blackwell, 2010, p. 1416.

[8] André Bengt, Johansson Lars and J Nilsson, "Assessing Energy Security: An Overview of Commonly used Methodologies", *Energy*, Vol. 73, 14 August 2014, pp. 1-14; Robert Copper, "American Energy Security in a Changing Global Energy Market", available at https://www.e-ir.info/2013/07/27/american-energy-security-in-a-changing-global-energy-market/, accessed on 15 March 2019; Françoise Nicolas, François Godement and Taizo Yakushiji, "Asia-Europe Cooperation on Energy Security: An Overview of Options and Challenges", available at https://inis.iaea.org/collection/NCLCollectionStore/_Public/37/121/37121774.pdf, accessed on 15 March 2019.

[9] Olivia Gippner, "Energy Cooperation in South Asia: Prospects And Challenges", South Asia Watch on Trade, Economics & Environment (SAWTREE), 2010; Priyantha Wijayatunga and P N Fernando, "An Overview of Energy Cooperation in South Asia", *ADB South Asia Working Paper Series*, No. 19, May 2013; Manfred Hafner, Simone Tagliapietra and Lucia De Strasser, Energy in Africa: Challenges and Opportunities, available at https://link.springer.com/content/pdf/10.1007%2F978-3-319-92219-5.pdf, accessed on 12 January 2019.

into energy connectivity in a holistic manner and combining the theoretical and empirical perspectives.

2.1 *Theoretical Perspective*

Connectivity can be defined as the level and effectiveness of networks to facilitate flows of goods, services, people and knowledge across countries. Connectivity initiatives include both 'hard', or physical infrastructure networks and 'soft' infrastructure, such as the policy, legal, regulatory and institutional frameworks.[10] Its main goal is to increase physical and digital infrastructure networks among countries which in turn, open up physical and virtual access to regional and global markets. While economic/trade connectivity is most discussed, connectivity between and among countries in areas such as transport, ICT, energy, people and technology is also considered very important.[11] In fact, on a regional level, connectivity in the aforementioned areas has been seen as the first step of the overall regional integration process.[12] In this regard, energy connectivity includes both energy networks and flows; physical energy connections between countries such as oil, gas, including liquefied natural gas (LNG) pipelines, energy market, particularly cross-border power trade and electricity grids and also topics of renewables and energy efficiency.[13] Initiatives of agreement, treaties and regulatory framework between countries for energy connectivity make up the 'soft' part of energy connectivity; while the physical infrastructure constitutes the 'hard' part.

In international relations theory, the realist perspective believes that the major actors of the international relations are states who are driven by the desire to gain power and they act for preserving their self-interest. The realist view on international cooperation is pessimistic. From a realist perspective, scholarly debates on energy focus on issues related to access and control over resources, while ignoring the economic aspects and marginalizing the role of international cooperation.[14] Realists believe that control over energy resources is an important factor of global dominance. Powerful states try to gain control over energy resources, while energy-producing states use their resources to expand

[10] UNESCAP, *Regional Connectivity for Shared Prosperity*, Bangkok: United Nation Publication, 2014, p. 2.
[11] Ibid.
[12] UNESCAP, *Towards a Sustainable Future Energy Connectivity in Asia and the Pacific*, Bangkok: United Nation Publication, 2016.
[13] European Commission, *Explaining the European Union's approach to connecting Europe and Asia*, Brussels: European Commission, 2018.
[14] Michael F. Keating, Caroline Kuzemko, Andrei V. Belyi, and Andreas Goldthau, "Introduction: Bringing Energy into International Political Economy", in Caroline Kuzemko, Andrei V. Bely, Andreas Goldthau and Michael F. Keating (eds.), *Dynamics of Energy Governance in Europe and Russia*, United Kingdom: Palgrave Macmillan, 2012, pp. 2-3.

their influence abroad; as energy resource importers and transit states seek better relations in order to get access to these resources.[15]

On the other hand neoliberalism theory in international relations believes that states can work for their ultimate benefits, without comparing their relative benefit to other states. It also argues that states consider absolute gains to be made from an agreement, including potential longer-term gains.[16] Thus, neoliberal analysts believe that cooperation in energy will occur in cases where there is a common interest and all will benefit from cooperation and multilateralism.[17] They do not recognize the political factors which impact on international energy policy choices sufficiently.[18] Economists also focus on supply-demand mechanism while studying energy markets and attribute political aspects as an intervening variable or as a cause of market externalities.[19]

However, none of these approaches is comprehensive enough to explain energy connectivity. It has to be kept in mind that dynamics of international energy trade is deeply interrelated with global politics, state's political interest, as well as international law or organizations, or informal norms such as concern over climate change, institutions, or the activities of a state or other non-market actors.[20] In this regard, an interdisciplinary approach such as the international political economy (IPE) is more suited for explaining energy connectivity. IPE focuses on the complex dynamics of the production, flow and trade of the energy commodities.[21] It encompasses both the role played by state actors and non-state actors in the energy sector. It also includes a discussion of political aspects such as institutional governing regimes and trade and energy relations. This approach believes that the energy market reduces the likelihood of conflict among countries and thus has a value of itself. Keating et al. identified four core characteristics of IPE in studying energy: "(1) An interdisciplinary approach, (2) Engagement with a multiplicity of actors and institutions, (3) Recognition of the systematic interdependence of global, regional and domestic 'levels' and (4) Openness to diverse methods and normative concerns."[22]

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[15] Giedrius Česnakas, "Energy Resources in Foreign Policy: A Theoretical Approach", *Baltic Journal of Law & Politics,* Vol. 3, No. 1, 2010, pp. 30-52.

[16] Alexander Whyte, "Neorealism and neoliberal institutionalism: born of the same approach?", available at https://www.e-ir.info/2012/06/11/neorealism-and-neoliberal-institutionalism-born-of-the-same-approach/, accessed on 31 October 2019.

[17] Ayhan Gücüyener, "The Clash of Realism and Liberalism: Understanding the Nature of Cooperation on Energy Security between Turkey-Azerbaijan and Georgia", *The Market for Ideas*, available at http://www.themarketforideas.com/the-clash-of-realism-and-liberalism-understanding-the-nature-of-cooperation-on-energy-security-between-turkey-azerbaijan-and-georgia-a181/, accessed on 5 February 2019.

[18] Keating et al., op. cit. pp. 2-3.

[19] Özdamar, op. cit, p. 1416.

[20] Keating et al., op. cit., p. 5.

[21] Andreas Goldthau and Nick Sitter, "Conceptualizing the Energy Nexus in Global Public Policy and International Political Economy", in Andreas Goldthau, Michael F. Keating and Caroline Kuzemko (eds.), *Handbook of the International Political Economy of Energy and Natural Resources*, Massachusetts: Edward Elgar Publishing, 2018, pp. 23-25.

[22] Keating et al., op. cit., p. 4.

Several authors have taken the IPE approach to empirically examine the factors necessary for energy connectivity in a region to be successful.[23] These studies consider both political factors, such as the role of guiding visions and foresight, number and characteristics of actors and arenas involved in the transition process, and economic factors such as course of institutionalization process, or development of energy and material flow over time.

For the South Asian reality, the IPE perspective is particularly useful in explaining the current energy cooperation situation. Neoliberal theories cannot explain why cooperation does not occur in South Asia, even though there is a mutual benefit to be gained by all countries in successful energy cooperation. While the realist perspective is good for explaining why cooperation does not occur under regional organizations (due to clash of politician interest), it cannot explain why same countries who do not proceed to cooperate under regional organizations agree to cooperate in other energy connectivity initiatives between them. Therefore, the IPE approach, which takes into account both political and economic considerations of states, is better suited to explain the energy connectivity challenges in South Asia.

Coming to the studies concentrating particularly on energy connectivity; the UNESCAP has a study[24] focused on the development of energy connectivity in the Asia-Pacific region. This study identifies a number of drivers for energy connectivity, which are: regional mandates for enhanced energy connectivity, development agenda and rising energy demand, resource diversity, sustainable energy for all, energy security and social and environmental drivers, knowledge-sharing, innovation and technology. Similarly, a World Bank study[25] names the mismatch between energy demand growth and energy resource, implications to energy security, benefits to the smaller exporting economies, relief from energy constraints for rapid economic growth, environmental imperatives, climate change imperatives, reduction of supply cost and cash flow implications as the rationale for energy trade. While both studies are influenced by the neo-classical approach, they also acknowledge the importance of political mandate and a state need to serve their national interest in their list of drivers.

Looking into the factors that have been considered as drivers of energy connectivity and trade, it is evident that increased connectivity is a way for countries

[23] Romano Wyss, Susan Mühlemeier and Claudia R. Binder, "An Indicator-Based Approach for Analysing the Resilience of Transitions for Energy Regions. Part II: Empirical Application to the Case of Weiz-Gleisdorf, Austria", *Energies,* Vol. 11, No. 9, pp. 22-63, 2018; Matthias Ruth, Onur Özgün, Jakob Wachsmuth, Stefan Gößling-Reisemann, "Dynamics of Energy Transitions Under Changing Socioeconomic, Technological and Climate Conditions in Northwest Germany", *Ecological Economics*, Vol. 111, 2015, pp. 29–47.

[24] UNESCAP, 2016, op. cit, pp. 14-26.

[25] Energy Sector Management Assistance Program and the South Asia Regional Cooperation Program, "Potential and Prospects for Regional Energy Trade in the South Asia Region", *Formal Report 334/08*, Washington, DC: The World Bank Group, 2008, pp. xvii-xviii.

to ensure their energy security. In this note, questions may arise that why countries cooperate, rather than using force to ensure their energy supply. In explaining why conflict does not break out, Mandel's framework[26] on the occurrence of international conflicts over resources is useful. Mandel, in his 1980 article, lists in the factors that determine the occurrence of transnational conflicts on resources. Here he notes, among other reasons, decreasing global supply; increasing or constant inelastic demand for these resources on a global, rather than national or local level; and a drastic reduction in access[27] as factors for international conflict over resources. While global energy demand is increasing and fossil fuel resources are reducing, many energy resources still remain unexplored (including renewable resources such as solar, wind and wave); which is why countries are choosing to cooperate to increase their energy supply and efficiency.

2.2 *Empirical Examples*

Since the number of academic works on energy connectivity is limited, the paper also explores two empirical examples to better understand the underlying factors that drive energy connectivity initiatives. One of them is an example of an arrangement among four countries, Turkmenistan–Afghanistan–Pakistan–India Pipeline (TAPI) and another one is cooperation under a regional arrangement, Southern African Power Pool (SAPP). These two initiatives have been chosen because, despite the presence of negative factors that are traditionally linked with failure of cooperation (i.e., security concerns and historical rivalry), these energy connectivity projects went ahead. Moreover, the countries operating in these arrangements have similar politico-economic profiles (all are developing countries[28] located in the global South) as those in South Asian countries, thus helps to understand how similar or same countries (in the case of TAPI, three out of the four countries are South Asian) work on energy connectivity.

In the TAPI pipeline project, the starting point of the pipeline is the Galkynysh and adjacent gas fields (Turkmenistan) and it will go through Herat–Kandahar–Chamman–Zhob–DG Khan–Multan and end in Fazilika, India. A large part of the 1,814-kilometre pipeline goes through the UN declared extreme risk zone and the security concerns has been a major barrier in the implementation of the pipeline. On 23 February 2018, the construction work on the Afghan section of TAPI gas pipeline was launched and Turkmenistan has already completed the construction

[26] Robert Mandel, "Transnational Resource Conflict: The Politics of Whaling", *International Studies Quarterly,* Vol. 24, No. 1, 1980, pp. 99-127.
[27] Ibid, p. 101.
[28] "Developing Countries Population (2019-08-28)", available at http://worldpopulationreview.com/countries/developing-countries/, accessed on 11 September 2019.

of the gas pipeline in its section.[29] The pipeline is expected to start its first gas flow in 2020 and will supply gas for 30 years, which is a good source for meeting the energy demand of the importing countries: Afghanistan, Pakistan and India. Turkmenistan has shown strong political leadership in this pipeline initiative, making it became a reality. It was eager to diversify its exports routes and reduce dependency on its traditional buyers. India is also eager to diversify its energy sources. The Asian Development Bank (ADB) is supporting the project with financing which showed a positive influence. The member states worked out various initiatives (such as deploying security forces to guard the pipeline and increasing local participation) to face the security challenges.

On the other hand, the SAPP was founded in 1995, under the aegis of the Southern African Development Community (SADC). The 12 members of the SAPP have created common power grids among them and a common market for electricity in the SADC region. The SAPP constitutes a capacity of 49,877 MW, combining 83 per cent thermal and 17 per cent hydro energy.[30] It has combined two already existing power networks in that region in order to solve the seasonal disparities that the countries faced. One of them is the Southern Network, which connected Namibia, South Africa and Mozambique. This network was dominated by thermal-based power generation. And the other one is the Northern Network, which connected the Democratic Republic of Congo, Zambia and Zimbabwe and was mostly supported by hydropower generation. Despite the historical baggage of conflict, cooperation was possible because of the political will of the SADC countries. Achieving energy connectivity was easier since some of the energy infrastructures were already in place. In 2015, the net import of the SAPP countries were 6393 GWh and the net export 9,854 GWh. The World Bank, Development Bank of Southern Africa and others such as USAID, DFID and DANIDA have been involved in financing for some of its projects.[31] Though there is room for further development of the project, it is considered an example of successful regional energy connectivity.

Based on the existing literature and taking into consideration the two empirical cases, the author applies the IPE approach and suggests that energy connectivity in a region takes place when there is a mixture of the following enabling conditions: a) Adequate energy resource compared to regional demand b) Need for resource diversification c) Guiding political visions and foresight d) Presence of uncomplicated institutional structures and e) Support of international institutions. This list of conditions is not exhaustive, there are other factors that can

[29] Naveed Ahmad Khan, "TAPI most important project in region", *The Pakistan Observer*, 13 February 2019.
[30] Integrated Research and Action for Development (IRADe), "Prospects for Regional Cooperation on Cross-Border Electricity Trade in South Asia", 2013, available at https://sari-energy.org/wp-content/uploads/2016/03/Prospects-for-Regional-Cooperation-CBET-2013.pdf, accessed on 13 February 2019.
[31] Musara Beta, "Overview of the SAPP", available at https://www.usea.org/sites/default/files/event-/SAPP%20Overview.pdf, accessed on 13 February 2019.

also influence energy connectivity, but it reflects the major conditions necessary for energy connectivity. The paper applies this framework to examine the challenges of energy connectivity in South Asia.

3. Status of Energy Cooperation and Connectivity in South Asia Plus

For countries of South Asia, cooperation in the energy sector is not new. Energy cooperation is one of the issues that most regional and sub-regional initiatives have dealt with. Major regional cooperation mechanisms like the SAARC, a sub-regional mechanism such as BBIN and even intra-regional mechanism such as BIMSTEC, have all undertaken initiative in this area. On the other hand, there is also a number of initiatives on the bilateral or trilateral basis. Few of these initiatives also encompass more than two countries. This section overviews the major initiatives taken in the field of energy cooperation in South Asia and measures their success.

3.1 *SAARC*

As for the SAARC, it has a long history of energy cooperation initiatives since its inception. However, the cooperation on energy has intensified since the 2000s. Some of the major developments in the energy sector are as follows: in January 2000, a technical committee on energy was set up by SAARC. After that, in 2004, the Council of Ministers of SAARC approved the creation of a specialized working group on energy. The 13th SAARC summit decided to establish the SAARC Energy Center in Islamabad. Energy ministers, in the third meeting held in Colombo, Sri Lanka, on January 2009, approved the concept of a South Asia Energy Ring.[32] In its 17th summit, SAARC declared the formation of an Inter-governmental Framework Agreement for Energy Cooperation and issued a study on the Regional Power Exchange Concept and SAARC Market for Electricity.[33] In the latest development, the SAARC Framework Agreement for Energy Cooperation (Electricity) was signed in November 2014.[34] As described, most of the initiatives taken by SAARC are limited to studies and agreements.

[32] M Ashique Rahman, "Role of Bangladesh in Promoting Regional Cooperation in South Asia", presented in International *Conference on Challenges and Opportunities of the Twenty First Century SAARC* on 04 April 2012, at BIISS Auditorium.

[33] "Saarc summit adopts 20-point declaration", *The Daily Star*, 12 November 2011.

[34] Ministry of Power, Government of India, "SAARC Framework Agreement on Energy Cooperation (Electricity)", available at https://powermin.nic.in/en/content/saarc-framework-agreement-energy-cooperation-electricity, accessed on 19 February 2019.

3.2 *BBIN*

The sub-regional grouping of BBIN countries has focused on hydropower, mostly because two of its member states, Nepal and Bhutan have huge potential in this sector. The BBIN, as an initiative, has a number of joint working groups which work on various issues. one of them is the "Joint Working Groups (JWG) on Sub-Regional Cooperation between Bangladesh, Bhutan, India and Nepal (BBIN) on Water Resources Management and Power/Hydropower". The second meeting of this JWG was held in New Delhi on 30-31 January 2015, where it was agreed that joint efforts would be made to explore harnessing of water resources including hydropower and power from other sources available in the sub-region.[35] In the following meeting of JWGs in 2016, specific hydropower projects under BBIN framework that could be concretized on equitable basis were discussed.[36]

3.3 *BIMSTEC*

For the BIMSTEC, energy has been one of the main focus areas and it has always been very active in the energy sector. Throughout the years, BIMSTEC has taken many initiatives in this area. In 2004, a feasibility study for a trans-BIMSTEC gas pipeline project was undertaken and it organized a task force meeting to decide the terms of reference for a detailed study on the proposed trans-BIMSTEC gas pipeline.[37] As the leader of the BIMSTEC energy initiative, Myanmar has set up an energy information centre in 2011[38] and developed an energy trading network between members. India, Thailand and Myanmar, have also hosted ministerial meetings on energy and organized workshops on issues related to energy. There was also a proposal for construction of a trans-border BIMSTEC pipeline from the Shwe field in the Andaman Sea to India across Thailand and Bangladesh. However, that proposal was not implemented due to a number of issues.[39]

Since 2010, BIMSTEC has put greater attention on the integration of the electricity grid. The organization did a comprehensive study on the energy needs of

[35] Ministry of External Affairs, Government of India, "Joint Press Release-The Second Joint Working Group (JWG) Meetings on Sub-Regional Cooperation between Bangladesh, Bhutan, India and Nepal (BBIN) in (New Delhi (January 30-31, 2015)", available at https://www.mea.gov.in/press-releases.htm?dtl/24746/joint+press+release+the+second+joint+working+group, accessed on 04 March 2019.

[36] Ministry of External Affairs, Government of India, "Third Joint Working Group (JWG) Meetings on Sub-Regional Cooperation between Bangladesh, Bhutan, India and Nepal (BBIN) (January 19-20, 2016)", available at https://mea.gov.in/press-releases.htm?dtl/26284/Third+Joint+Working+Group+JWG+Meetings, accessed on 04 March 2019.

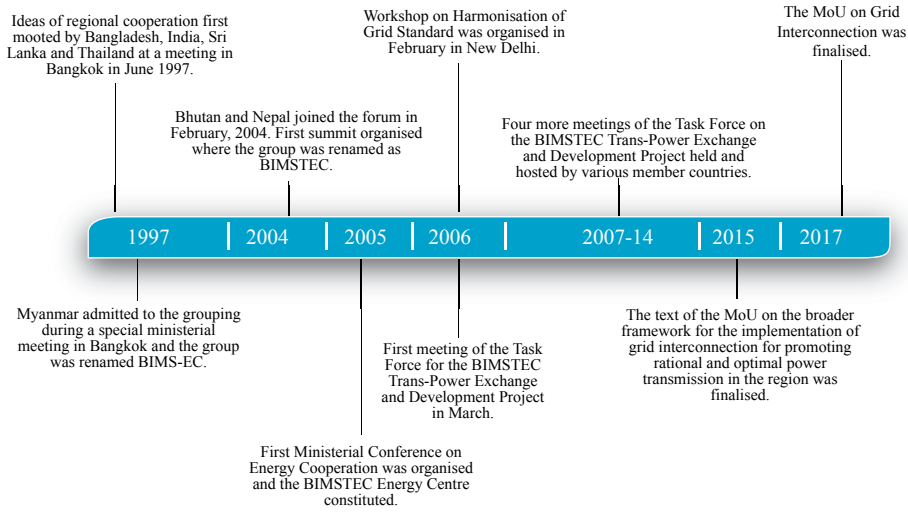
[37] Lydia Powell, "Energy Cooperation Under BIMSTEC: Are Techno-Economic Rationales Sufficient?", *ORF Issue Brief*, No. 206, November 2017, available at https://www.orfonline.org/wp-content/uploads/2017/11/ORF_Issue_Brief_206_BIMSTEC-Energy.pdf, accessed on 25 November 2018

[38] BIMSTEC, "Energy sector", available at https://bimstec.org/?page_id=268, accessed on 4 March 2019.

[39] RIS, *BIMSTEC: The Road Ahead*, RIS: New Delhi, 2016, pp. 25-26.

member countries and a study report titled "BIMSTEC Energy Outlook 2030" was published in 2017.[40] At the 4th BIMSTEC Summit, member states inked a deal for cross-country energy grid interconnection which will facilitate power trade between member countries.[41] Figure 1 shows the timeline of the progress on BIMSTEC energy cooperation over the years.

Figure 1: Cooperation in Energy Connectivity under BIMSTEC[42]



3.4 *Bilateral Initiatives*

The most prominent energy cooperation concerning South Asian countries is between Bhutan and India. With Indian technical and financial assistance, Bhutan has developed its hydropower and that form of energy is its main export to India (about 1,000-1,200 MW).[43] In addition, two 400kV D/C (quad) cross border interconnection lines are under implementation which, upon completion will increase the total transfer capacity to 4250MW.[44]

[40] Integrated Research and Action for Development (IRADe), "BIMSTEC Energy Outlook 2030", December 2017, available at https://sari-energy.org/wp-content/uploads/2018/03/SARI-EI-Report-on-BIMSTEC-Energy-Outlook-2030-low-res-12th-March2018-Rajiv-SARI-EI-IRADe-1-1-1.pdf, accessed on 23 May 2019.
[41] "BIMSTEC Summit: Leaders agree on regional power grid", *The Daily Star,* 01 September 2018.
[42] Adapted from Integrated Research and Action for Development (IRADe), "BIMSTEC Energy Outlook 2030", December 2017, available at https://sari-energy.org/wp-content/uploads/2018/03/SARI-EI-Report-on-BIMSTEC-Energy-Outlook-2030-low-res-12th-March2018-Rajiv-SARI-EI-IRADe-1-1-1.pdf, accessed on 23 May 2019.
[43] Malancha Chakrabarty, "Energy security in South Asia", *ORF Commentary*, February 2016, available at https://www.orfonline.org/research/energy-security-in-south-asia/, accessed on 19 February 2018
[44] Ministry of Energy, Government of India, "Interconnection with neighbouring countries", available at https://

As for Bangladesh, the main energy trade the country does is with India. Since 2013, India has been supplying 500MW of power from the Bheramara-Bahrampur interconnection to Bangladesh. About 160 MW power is also being supplied to Bangladesh using the Tripura-Comilla interconnection. As of June 2018, with doubling the capacity of the Baharampur-Bheramara transmission line from 500 MW to 1000 MW has been done and electricity import from India to Bangladesh has increased to 1,110 MW.[45] There is also a joint initiative by the Bangladesh Power Development Board (BPDB) and India's Reliance Power for 3,000 mw LNG-based power plant in Bangladesh[46] starting with 718 MW liquefied natural gas (LNG)-based power plant at Meghnaghat (Narayanganj district), and a floating storage and regasification unit (FSRU) terminal at Maheshkhali Island (Cox's Bazar district).[47] Other than bilateral cooperation, a trilateral investment of 1,125 MW hydro-power project (Dorjilung hydropower project) in Bhutan by Bangladesh, India and Bhutan, is also under discussion.[48] Aside from this, in 2018, Nepal and Bangladesh signed an MoU for cooperation in the energy sector, where the two sides agreed to cooperate on "hydro-power development, transmission, energy efficiency and development of various types of renewable energy."[49]

India and Nepal share one of the main energy trade initiatives in South Asia between them. In 2014, they have signed an MoU on electric power trade, cross-border transmission, interconnection and grid connectivity. Cross border electricity transmission capacity between the two countries is about 1500MW, with the Dhalkebar (Nepal)-Muzaffarpur (India) 400kV D/C transmission line being the most important transmission point.[50] With assistance from India, Nepal has implemented four hydroelectric schemes which together have an aggregated installed capacity of about 50 MW. The two countries have also signed an agreement worth US$ 1.04 billion under which a 900 MW plant will be built on the Arun River.[51] Recently, they agreed to construct a 40-kilometre pipeline to transport petroleum products from India to Nepal.[52]

powermin.nic.in/en/content/interconnection-neighbouring-countries, accessed on 26 June 2019.

[45] "Another 500MW power import from India from June 10", *The New Age*, 22 May 2018.

[46] "RPower gets approval for LNG-based plant in Bangladesh", *The Hindu*, 04 May 2016.

[47] Aminur Rahman Rasel, "PDB to sign power purchase deal with India's Reliance Power Ltd", *Dhaka Tribune*, 13 September 2017.

[48] "Bangladesh to invest in Bhutan's hydropower sector", *The Daily Star*, 18 May 2016.

[49] "Memorandum Of Understanding (MoU) between the Government of Nepal and the Government of the People's Republic Of Bangladesh on Co-operation in the Field of Power Sector", available at http://www.moewri.gov.np/images/category/MoU-between-Nepal-and-Bangladesh.pdf, accessed on 26 June 2018.

[50] Ministry of Energy, Government of India, "Interconnection with neighbouring countries", op. cit.

[51] Malancha Chakrabarty, op. cit.

[52] Sultan Hafeez Rahman, Priyantha D. C. Wijayatunga, Herath Gunatilake, P. N. Fernando, *Energy Trade in South Asia: Opportunities and Challenges,* Mandaluyong City, Philippines: Asian Development Bank, 2012, p. 43.

In recent times, Sri Lanka and India have signed an MoU with plans of energy cooperation. Specific plans include a 500 MW capacity LNG fired power plant in Kerawalapitiya; setting up a 50 MW solar power plant in Sampur and India assisting conversion of fuel-based power plants to LNG power plants, jointly with the Ceylon Petroleum Corporation (CPC).[53]

There are quite a number of initiatives for energy connectivity in South Asia. Despite those efforts, energy cooperation is still to achieve its expected level. An observable trend here is that most of the multilateral efforts have progressed well in documents and agreements, but could not show results on the field. Even the BIMSTEC, which has been more successful in energy cooperation than other arrangements could not realize the Trans-BIMSTEC pipeline due to disagreement between members. Again, initiatives such as establishment of the energy centre or data sharing may be classified as energy cooperation but they are not connectivity initiatives per se. Thus, energy connectivity initiatives in South Asia under regional and sub-regional arrangements are mostly confined within the 'soft' component of energy connectivity.

On the other hand, bilateral efforts are more successful than regional/ multilateral arrangements. Most of the countries in the region have some bilateral energy cooperation deal but they mostly tend to be limited within cross-border power trade. In most cases, due to its central location in the region, the partner is India. Though there are quite a few bilateral connectivity projects, these have yet to be translated into meaningful influence in enhancing overall energy connectivity of the region. These realities have an impact on the development of energy connectivity in South Asia.

4. Challenges of Energy Connectivity in South Asia

In the South Asian context, there are shared concerns among the countries that can become key drivers for energy cooperation. All of the countries have a fair amount of their population who live outside the grid and need to increase the rate of access to electricity. They all want to reduce the loss of economic output due to power shortages, lower their dependency on fossil fuel and reduce carbon emissions. And they all have seasonal power demand hikes, which can be addressed through cooperation. However, as mentioned earlier, despite energy cooperation being high on the agenda of the countries, energy connectivity remained elusive in South Asia. This section uses the framework developed by the author in section two to explain why energy connectivity has not been successful in South Asia.

[53] Kanika Khanna, "India's Energy Diplomacy", available at http://blog.sunkalp.com/indias-energy-diplomacy/, accessed on 27 April 2019.

4.1 *Adequate Energy Resource to Meet the Regional Demand*

The first factor that drives any energy connectivity is the availability of adequate resources that can fulfil the demands of the countries involved. Energy connectivity initiatives usually need a large amount of infrastructure development which requires a large investment. Therefore, countries are unlikely to be interested in developing energy connectivity projects unless there are enough resources to meet their energy demand substantially or for a long period of time. For example, the TAPI pipeline is supposed to supply gas to the importing countries for over 30 years. In the SAPP, during its inception, South Africa had enough electricity surplus to export to the other members.[54]

Now, if one looks at the energy resource endowment in South Asia, it can be seen that the reserve and potential for energy resources come from a wide variety of options. India and Pakistan, along with Bangladesh, have large coal reserves. Oil reserve has always been a constraint for the region which is rather inadequate to meet its oil demands. Thus, the region will remain dependent on oil imports. The natural gas reserves in Bangladesh, India and Pakistan are sizeable but they are not seen by experts as a dependable source for long term planning.[55] Hydroelectric potentials are pretty high in this region with possible locations being primarily in India, Pakistan, Nepal and Bhutan. Two mountainous countries, Nepal and Bhutan, have the potential to produce power from hydroelectric plants which are far in excess of their current or projected demands. Nepal's unexploited hydropower potential exceeds 43,000 MW.[56] Table 1 shows the energy endowment of South Asian countries.

Traditional fuels such as biomass and animal waste continue to contribute handsomely in the region's energy mix, but at the same time, nuclear sources provide increasingly sizeable portions of power (in India and Pakistan), so do solar and wind power projects in India. The region as a whole is enriched with assorted energy resources, with enough potential in the renewable energy field. Therefore, it can be seen that the region has quite a few sources of energy in its arsenal, however, most of them are still left unexplored.

[54] Alfonso Medinilla, Bruce Byiers and Karim Karaki, "African Power Pools, Regional Energy, National Power: Political Economy Dynamics of Regional Organisations in Africa", *European Centre for Development Policy Management (ECDPM)*, Discussion Paper No. 244, February 2019.
[55] A Ahmed, C M Shahariar and M A Rashid Sarkar, op. cit.
[56] "Energy Sector Management Assistance Program and the South Asia Regional Cooperation Program", op. cit, p. xxiii.

Table 1: Energy Endowment of South Asian Countries[57]

Country	Coal (million tons)	Oil (million Barrels)	Natural gas (trillion cubic feet)	Biomass (million tons)	Hydro Power (gigawatts)
Afghanistan	440	NA	15	18-27	25
Bhutan	2	0	0	26.6	30
Bangladesh	884	12	8	0.08	0.33
India	90,085	5,700	39	139	150
Maldives	0	0	0	0.06	0
Nepal	NA	0	0	27.04	83
Pakistan	17,550	324	33	NA	59
Sri Lanka	NA	150	0	12	2
Total	108,961	5,906	95	223	349.33

This reality has a number of implications for the region. Since its major energy resources are still unexplored and need a long time and investment to be harnessed, there is a tendency among countries to try to import energy from outside to meet their immediate demands. The natural gas and oil reserves of the region are not enough to fulfil the demands of the region.[58] On the other hand, there are enough hydropower resources in Bhutan and Nepal to substantially meet the demand of India and Bangladesh, but the cost of exploring those resources is high and due to environmental factors involved, the process is rather complicated. Even then, there is a possibility for energy connectivity within the BBIN countries, in fact, they have been in talks about possible future cooperation in this area.

4.2 *Increasing Energy Demand and Need for Resource Diversification*

Another important factor in energy connectivity is the rapidly increasing demand for energy resources in a country, which cannot be fulfilled by domestic resources alone. However, meeting the demands of energy alone itself is not adequate. Countries also try to diversify their energy resources to reduce dependency on a single energy source. Seasonal disparities for energy demand can also trigger energy connectivity initiatives, as it happened in the SAPP, where drought in the countries who were depended on hydro-power fueled the initiative,

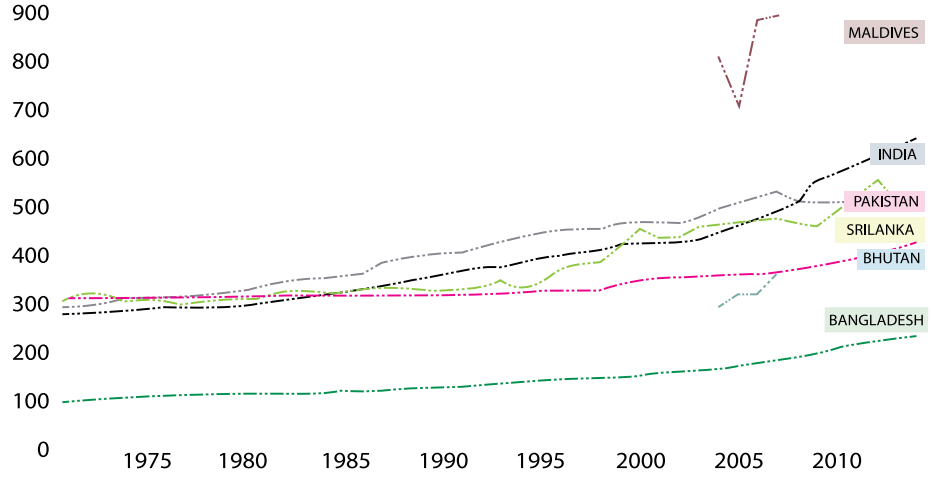
[57] Sultan Hafeez Rahman, Priyantha D C Wijayatunga, Herath Gunatilake, P N Fernando, *Energy Trade in South Asia: Opportunities and Challenges,* Mandaluyong City, Philippines: Asian Development Bank, 2012, p. 15.

[58] K Lahiri-Dutt, "Energy Resources: Will they be the last frontier in South Asia?", *ASARC Working Paper*, No. 10, 2006.

who sought for reliable and affordable electricity when their hydropower capacity was constrained.[59]

In South Asia, all countries are faced with the challenge of meeting increasing energy consumption. As countries grow economically, electric power consumption per capita continues to rise in South Asian countries. As shown in figure 2, the countries have seen a significant boom in their energy consumption in recent years, with Bangladesh, India and Nepal taking the lead. With increased consumption, demand for energy has also risen. It is projected that electricity demand in South Asian countries will grow between 7 per cent to 9 per cent annually.[60] By 2020, in many South Asian countries, the demand will be double or more than what it was in 2010.

Figure 2: Energy Consumption in the South Asian Countries (Energy use-kg of oil equivalent per capita)[61]



In addition to the challenge of the growing energy demand, most South Asian countries depend on a single source to provide more than 50 per cent of total electricity generation. For example, Bangladesh is mostly dependent on natural gas (91.5 per cent), India on coal (67.9 per cent), Bhutan and Nepal on hydropower (99.9 per cent) and Sri Lanka on oil (50.2 per cent).[62] Pakistan has certain levels of diversity

[59]Alfonso Medinilla, Bruce Byiers and Karim Karaki, op. cit.
[60] Integrated Research and Action for Development (IRADe), "Prospects for Regional Cooperation on Cross-Border Electricity Trade in South Asia", op. cit.
[61] Generated from the World Bank database, 2019
[62] M N Iftikhar, F Najeeb and S A Khan, "Sustainable energy for all in South Asia: Potentials, Challenges and Solutions", *Sustainable Development Policy Institute*, Working paper, No. 151, 2015.

in their energy supply sources, while Afghanistan's energy supply is dominated by electricity imports from Central and Western Asia.[63] This sort of dependency on a single source of energy is not sustainable in its nature and makes them vulnerable to supply-side risks.

Thus, it can be said that country-wise, there is a demand for more energy and a need for resource diversification. Most South Asian countries have been looking to diversify their energy resources, especially Bangladesh and India. This thirst for more energy is one of the key drivers for energy connectivity in South Asia. But instead of working with each other to meet their demands, they have been looking for sources outside the region to fulfil their resource diversification needs. Thus, the region having to compete with energy markets outside the region for energy trade, which is a barrier for energy connectivity. That being said, there is significant interest in India and Bangladesh to explore the hydropower in Bhutan and Nepal and Bangladesh has shown interest in India's renewable sector.

4.3 *Guiding Political Visions and Foresight*

If one looks at the South Asian energy scenario, challenges of regional energy cooperation can thus be divided into two categories. One set of challenges is exclusive for energy cooperation itself such as the lack of infrastructure and unexplored resources. The other set of challenges in this area is the common challenges that countries face for any kind of cooperation. In the case of common challenges, there are political problems, geopolitical considerations and historical baggage. These challenges are inherent to South Asia and have been a major blocking factor for regional cooperation.

The two energy connectivity initiatives investigated in the paper are being implemented despite many negative factors being present. The SAPP experience demonstrates that power trade, and the reliable and economical operation of the integrated system, are feasible even in the presence of historical baggage of political differences. The TAPI experience shows that strong political will helps the implementation of connectivity initiative, regardless of security risks. In fact, TAPI countries are thinking about innovative ways to address security risks, including involving the local population. Further, there is hope that the pipeline and its benefits will help the overall stability of the region.

Both initiatives have been successful due to the strong political vision from one of the states within initiative which has played the key role of the region's energy campaign. In the case of SAPP, South Africa played a key role in its establishment

[63] Priyantha Wijayatunga and P. N. Fernando, "An Overview of Energy Cooperation in South Asia", *South Asia Working Paper Series*, No. 19, May 2013, Asian Development Bank.

and remains one of the major political and economic forces behind the SAPP.[64] On the other hand, the TAPI initiative has been pushed to success due to Turkmenistan's strong role, which wanted to compete with the post-sanction Iran for being an energy supplier. It has also taken the role of consortium leader and has a 51 per cent stake in the project.[65]

South Asia also needs to have a country that will play the role of its leader for its energy connectivity initiatives to be successful. With its central geographical location and as an emerging player in the global power politics, it is expected that India should play a leading role in this regard.

However, India's energy policy focuses more on ensuring the overall energy imports for itself. India recognizes that it will remain dependent on oil and gas imports and would also need to import thermal coal in the upcoming years.[66] In an effort for resource diversification, India has its energy cooperation initiatives spread across Africa to Southeast Asia.[67] Further, due to its central location, India can and is enjoying bilateral energy trade with most of its neighbours. Thus, from an Indian perspective, increasing regional energy connectivity, unless it imports energy from outside the region (as is the case for TAPI), does not add much value to its overall goal. Since improving energy connectivity within South Asia is not on the priority list for Indian energy diplomacy, the initiatives do not get that level of importance.

On the other hand, Bangladesh is trying its best to play a positive role in energy connectivity in the region. It has been agreeing to all major energy initiatives and has time and again expressed interest in importing energy, whether it is renewable from India or hydropower from Nepal and Bhutan. However, its efforts often fall short due to the lack of similar level enthusiasm from its partners. Its geographical position also limits its efforts.

4.4 *Presence of Uncomplicated Institutional Structures*

Any sort of connectivity initiative is dependent on infrastructure. For energy connectivity initiatives, this is even more true. Such initiatives need large scale investments for infrastructure development. There are environmental concerns to be addressed. There are also technical barriers such as grid compatibility, lack of advanced technology and knowledge coordination. Ensuring proper legislation for those infrastructures to work is also equally important.

[64] The Infrastructure Consortium for Africa Secretariat, African Development Bank, "Regional power status in African Power Pools - 2016 update", 2017.
[65] Micha'el Tanchum, "Turkmenistan Pushes Ahead on TAPI Pipeline", *The Diplomat*, available at https://thediplomat.com/2015/09/turkmenistan-pushes-ahead-on-tapi-pipeline/, accessed on 27 June 2019.
[66] Peter N Varghese AO, *An India Economic Strategy to 2035: Navigating from Potential to Delivery*, Canberra: Department of Foreign Affairs and Trade, p. 166.
[67] "India's Energy Diplomacy: Key initiates, efforts done so far, way forward", *GKO Today*, available at https://www.gktoday.in/gk/indias-energy-diplomacy-key-initiates-efforts-done-so-far-way-forward/, accessed on 22 June 2019.

Most of the existing energy connectivity initiatives begin when there is some sort of existing infrastructure that can be used as a starting point for further cooperation. The SAPP, for example, used the existing Northern and Southern grids[68] for grid integration and eventually it was upgraded to a competitive regional energy market. The Central and South-eastern European Gas Connectivity (CESEC) is also working to ensure swift completion of cross-border and trans-European projects, which will integrate the central-eastern and southeastern European gas and electricity markets.[69] But they too, are mostly working with already existing lines.

Table 2. Cross-border Transmission Interconnections: Proposed and Under Implementation[70]

Countries	Interconnection Description	Capacity (MW)	Status
Bhutan-India	Grid reinforcement to evacuate power from Punatsangchhu I and II	4250MW (total)	Reinforcement to be completed in 2019
	Tala HEP 400kV line Chukha HEP 220kV line Kurichu HEP 132kV line		
Nepal-India	Dhalkebar-Muzaffarpur 400kV line	950 MW (total)	Under operation
	Various places through 11kV, 33kV, 132kV, and 220kV lines		
India- Pakistan	Amritsar (IND) and Lahore (PAK) HVDC line	500MW	Yet to be formally discussed
India- Srilanka	Interconnection from Madurai (India) to New Habarana (Sri Lanka)		Under discussion
Bangladesh-India	400kV HVDC back-to-back asynchronous link	1200MW	Completed (additional lines are under implementation, which will increase the power transfer capacity to 1540 MW)
	400kV (operated at 132kV) interconnection from Surajmaninagar in Tripura		

[68] Southern Network connected Namibia, South Africa and Mozambique. Northern Network connected the DRC, Zambia and Zimbabwe.

[69] European Commission, "Central and South Eastern Europe Energy Connectivity (CESEC)", available at https://ec.europa.eu/energy/en/topics/infrastructure/high-level-groups/central-and-south-eastern-europe-energy-connectivity, accessed on 26 June 2018.

[70] Compiled by the author from various sources

Now, looking into the South Asian situation, Table 2 shows the major cross border power connections among South Asian Countries. It can be seen that apart from India's trade with Bhutan, the amount of energy trade between the countries is not very significant.[71] As a result, the existence of physical infrastructure is also limited. But physical transmission interconnection is a necessary precondition to have cross border electricity trade in the region, without which the development of energy connectivity will be difficult to achieve. On the other hand, each of the countries has its own legal and regulatory network, which will need to be harmonized for the connectivity process. In the case of exploring hydroelectricity, which is of major importance for energy connectivity initiatives in South Asia especially for the BBIN sub-region, the consideration of environmental factors adds another challenge for building infrastructure.

In recent times, the BIMSTEC is also attempting at regional grid integration. But it is needless to that for the initiative to be successful, it will need to build infrastructures and ensure that the countries' grids are compatible with each other. In this regard, it can learn from the SAPP's experiences and decide legal and regulatory frameworks at an early stage.

4.5 *Support of International Institutions*

Various international institutions and donor agencies have been playing an important part in global development. Institutions such as the World Bank, Asian Development Bank (ADB) and other donor agencies have been supporting development initiatives through financing, technological and advisory support. Energy connectivity initiatives are not out of this trend. Due to the large infrastructure and technological requirement that energy connectivity initiatives entail, support from international institutions works as a positive catalyst.

This is true for many energy connectivity initiatives. Throughout the history of SAPP, the initiative has received strong donor support. Grant funding has been provided for the creation, development and subsequent operationalization of the power pool. The World Bank, AfDB, KfW (managed by DBSA), NorFund and SIDA are some of the key contributors for the project development work of SAPP.[72] This funding is one of the key strengths for the future growth of SAPP. As for the TAPI pipeline, the ADB is acting as the facilitator and coordinator and has provided funding for feasibility studies; while the Islamic Development Bank agreed to a loan

[71] Anasua Basu Ray Chaudhury, "Regional trade the key to ensure energy security in South Asia", *ORF Commentaries*, available at https://www.orfonline.org/research/regional-trade-the-key-to-ensure-energy-security-in-south-asia/, accessed on 26 June 2018

[72] "Power pool interview with Omar Vajeth", *ESI Africa*, 18 March 2018, available at https://www.esi-africa.com/industry-sectors/transmission-and-distribution/power-pool-interview-with-omar-vajeth/, accessed on 02 June 2019.

of $700 million for the implementation of the pipeline.[73] Support from international organizations has helped these initiatives to move forward.

For South Asia, this is even more important. The region has a number of growing economies who can benefit from increasing energy connectivity. But as mentioned earlier, there is a need for large scale infrastructure investment and technical support. Even exploring the untapped hydropower will require large scale investment. In this regard, international institutions have a huge role to play. So far, support from international institutions in regards to the energy sector in South Asia has mainly been in the form of funding studies. Most recently, the ADB has published a Technical Assistance Consultant's Report in 2017,[74] while the UNESCAP has published another study on integrating South Asia's power grids.[75] Similar report on regional trade integration in South Asia has also been done by the World Bank which included prospects of energy trade.[76] However, involvement of international institutions on specific connectivity projects has not been visible.

Thus, it appears that the challenges for energy connectivity are interconnected with each other. Even though there are energy resources and demand, energy remains untapped due to lack of exploration and grid interconnection. However, building infrastructure for exploration and line connections will require large scale investment which often makes it a less attractive option. This leads to countries looking at outside the region to fulfil their immediate energy needs. As they are looking at outside the region for a solution, there is not enough political prowess to gather support and initiate an ambitious project.

That being said, there are also many incentives for South Asian countries to enhance energy connectivity within them. Specially, Nepal and Bhutan's huge untapped hydropower provides a lucrative prospect. At the same time, improving grid interconnections will also help India to export its growing renewable energy, something that Bangladesh has also expressed interest in importing. Due to varying seasonal and daily load curves, there is a high potential for cross-border power trade in BBIN sub-region. Such arrangements would reduce investment requirements, lower transmission losses, improve reserve margin and enhance the reliability of supply. Again, improved energy connectivity within the region will help the South Asian countries to import energy from outside as well. The TAPI pipeline will transport natural gas from Turkmenistan through Afghanistan and Pakistan to India.

[73] Alex Forbes, "Turkmenistan sees light at the end of the tunnel", *Petroleum Economist*, available at https://www.petroleum-economist.com/articles/upstream/exploration-production/2019/turkmenistan-sees-light-at-the-end-of-the-tunnel, accessed on 02 August 2019.

[74] Dharshana Muthumuni, "South Asia Sub-Regional Economic Cooperation: Cross-Border Power Trade Development, Asian Development Bank, 2017.

[75] UNESCAP, *Integrating South Asia's Power Grid for a Sustainable and Low Carbon Future*, Bangkok: ESCAP Publications Office, 2018.

[76] The World Bank and DFID, South Asia Regional Trade Integration Program: Enhancing Regional Economic Cooperation in South Asia (2012-2018).

Those pipelines could be linked with Bangladesh, who also wants to import natural gas, already expressed interest in joining the TAPI pipeline. Thus, a regional gas grid in the region could help the South Asian countries obtain gas from Myanmar, Central Asia and West Asia.

In both cases, India can benefit in terms of economic benefit and fulfilling its energy demand. Due to its central location, it could provide transit rights and benefit economically through charging fees. Importing energy from outside the region is also beneficial for India. Though bilateral trade is beneficial at present, improving over energy connectivity is essential for keeping up with the increasing energy demand of the region. The recent UNESCAP study also suggests that the economic benefits of grid interconnection exceed the cost and is viable.[77] Thus, it is a good time for countries to re-evaluate the benefits of improving energy connectivity within the region. In this case, the recognition of tripartite arrangements and relaxation of provisions in India's recent cross-border energy trading regulations[78] is a welcome initiative.

5. Conclusion

With the passage of time, challenges concerning the energy sector have changed significantly. Countries worried about energy diversification and cleaner energy resources have resorted to enhancing energy connectivity within the region. In South Asia, countries have been engaging in energy cooperation talks for a long period of time. However, despite the many agreements and initiatives through regional and sub-regional initiatives, energy connectivity in South Asia is not up to the level.

The area of energy connectivity is dominated by policy papers and technical reports but has not been explored academically to a large degree. However, the concept refers to physical energy connection and flows between and among countries that facilitate energy transmission. It includes energy markets, pipelines and grid interconnections etc. It also includes hard and soft sides; physical infrastructures make up the hard part while legal framework and regulation are included in soft. Energy connectivity includes both economic and political considerations, thus are better explained by IPE perspective. Based on the literature and practical examples, it can be said that adequate availability of resources, resource demand and diversification, political will and existing infrastructure and financial support work as enabling factor for energy connectivity.

Most multilateral forums working in South Asia have some sort of energy cooperation initiative. The SAARC and BIMSTEC have been working on this area

[77] UNESCAP, 2018, op. cit, pp. 26-29.

[78] "Nepal, Bangladesh to use Indian grid for power trade", *The Daily Star*, 23 June 2019.

for around 20 years while the BBIN has touched on hydropower. In most cases, the multilateral initiatives do well on paper and agreement but fail to translate that on-ground. On the other hand, several countries of South Asia have been trading power between them, with India-Bhutan being the biggest trading partners. Bilateral initiatives have seen more success than a multilateral one.

The importance of enhancing energy connectivity in the South Asian region is now more important than ever. Especially in a time when energy is also part of the broader strategic equation. Energy cooperation can be both carrot and stick in global geopolitics and also provide a platform for further cooperation. As China continues to pursue the energy element in its Belt and Road Initiative (BRI), India too, need to make sure that the South Asian energy connectivity is improved and that it has a positive involvement in regional energy initiatives.

In this regard, the variation of South Asian energy resource endowment presents prospects for energy connectivity initiatives, but a large part of that energy resource is still unexplored. Countries of the region have a growing demand for energy and need for diversification that can become the base for future energy connectivity initiatives. For any kind of connectivity initiative, including energy, there needs to be strong political leadership, which has been mostly missing in South Asia. At the same time, there is a lack of substantial existing infrastructure that can be used as a base for larger connectivity projects. Lastly, there is a need for huge investment and support from international organizations and donor agencies.

However, despite these challenges, South Asian countries are working for enhancing energy connectivity among them. In the BBIN sub-region, energy trade has been increasing. Taking a step-by-step approach is beneficial for countries in establishing regional energy connectivity process. In this regard, the continued interest of Bangladesh and India in investing in Nepal and Bhutan's hydropower can be a starting point for enhancing energy connectivity. Since, the importance of technical and physical infrastructure is far greater in energy connectivity, which means that there is a need for large investments. Thus, involvement of all actors, including international donors and the private sector is also important. Despite the many challenges, enhancing connectivity in the energy sector is crucial for overall development of the region and should be at the top of priorities for the countries.