



## Assessment of Socio-Economic Impact of Cross-Border Electricity Trade in BBIN Region

*As the countries in the Bangladesh-Bhutan-India-Nepal (BBIN) region move towards sustainable development, energy supply needs of the people would go up exponentially. Also, ensuring energy security in the region is imperative for sustainable development. Many countries such as Bhutan and Nepal in the region do not have sufficient resources to meet their energy needs. Consequently, they had to rely on imports from other countries, which take a toll on the economic growth of such countries. Thus, Cross Border Electricity Trade (CBET) is vital for the countries to ensure energy security and economic growth.*

*Studies suggest that CBET in BBIN region has brought in a sense of shared benefits and prosperity amongst the trading countries. However, the progress on CBET in the region is rather slow and currently limited to bilateral small-scale cross-border transmission interconnections and cross-border trading transactions between India-Bhutan, India-Nepal, India-Bangladesh and India-Myanmar. Thus, this paper makes an attempt to assess the socio-economic benefits accruing due to CBET particular on livelihoods and gender, with the objective of creating a strong political narrative on CBET in the region.*

### Introduction

Countries in the BBIN region are typically characterised by moderate but sustained economic growth<sup>1</sup>, coupled with problems of unemployment and poverty, dependence on imports and predominance of fossil fuel in the energy consumption basket. Thus, it is reasonable to assume that with sustained economic growth in the BBIN countries<sup>2</sup> there will be a consequent increase in the demand for electricity in the region.

Subsequently, to meet such increase in demand for energy it is imperative to explore opportunities other than that of traditional source of energy such as Cross Border Electricity Trade (CBET).<sup>3</sup> While the region is well endowed with different energy generation sources<sup>4</sup>, the resources are unevenly distributed. Consequently, to address energy security and sustainability concerns, utilisation of the resources in the region needs to be optimised.

**Table 1: Electricity Demand in BBIN Countries**

Country	Demand (GWH)		CAGR
	Year 2010	Year 2020	
Bangladesh	28,470	67,400	9%
Bhutan	1,749	3,430	7%
India	938,000	1,845,000	7%
Nepal	3,200	6,910	8%

*Source: Wijayatunga, Priyantha, and P N Fernando. An Overview of Energy Cooperation in South Asia working Paper No 19. ADB South Asia Working Paper Series No 19, Mandaluyong City: Asian Development Bank, 2013*

Also, countries in the BBIN region have significant seasonal complementarities in electricity demand<sup>5</sup>. For example, during winter when the run of rivers become dry, Bhutan and Nepal import electricity from India and India imports electricity from Bhutan during summer and monsoon seasons.<sup>6</sup> Furthermore, owing to proximity to Bhutan and Nepal of the Northern and Eastern Grid in India, power trade across the borders can be cost and time efficient.

It is widely argued that CBET brought in a sense of shared benefits and prosperity amongst the trading countries. Also, studies on impact of energy cooperation in other regions suggest that in addition to creation of new jobs<sup>7</sup> due to increased energy access various other job opportunities are created for both women and men folks in the project development and construction activities. Also, electrification of local region brings in a change in the gender roles in the community, especially in case of women.

Also, literature suggests that electricity augments the use of mechanical power for income-generating activities and also ensures reliable supply to households. The burden of household activities on women gets eased up, which upsurges their involvement in economic

and non-economic activities that leads to an increase in their incomes.<sup>8</sup> Further it facilitates education of women and girls and results in safety for women in public places. Thus, it is reasonable to assume that the CBET delivers a major impetus to the local economy and the people.

### Cross-Border Electricity Trade and its Impact on Social and Economic Profile of the Region

As mentioned earlier, CBET leads to the development of infrastructure. However, it has been widely argued that large infrastructure projects are beneficial to local community, provided the adverse impact on environment and ecology caused by the development works are appropriately mitigated.

Recently, CUTS International implemented a study to assess the impact of CBET on gender and livelihoods in Nepal and Bhutan. The study captures the cases of hydro power projects; Rahughat Hydro Power Plant, Nepal and Tala Hydro Power Plant, Bhutan.

**Figure 1: Direct Benefits of Electricity to Households**



The study suggests that in addition to creation of jobs due to increased energy access, various other job opportunities arise for both women and men in the project development and construction activities. The direct benefit comes in forms of employment opportunities for the locals and investment by the projects on education, health facilities, among others, in and around the project sites.

### **Electricity trade and impact on livelihood**

There is an intricate relationship between access to electricity and better livelihood as the utility of electricity in terms of improving welfare, increasing productivity at work and generating income is huge.<sup>9</sup> The socio-economic impact study of hydro power projects, Rahughat Hydro Power Plant, Nepal and Tala Hydro Power Plant, Bhutan, has revealed that the access to electricity has predominantly improved the quality of lives of students, housewives (women) and the rural households.

Other similar studies done in other regions of the world to assess the impact of electrification on employment generation had also shown a positive correlation between job creation and electricity access.<sup>10</sup> A study in Sub-Saharan Africa showed that grid connection resulted in employment growth of two per cent.<sup>11</sup>

Electricity access also has associated auxiliary benefits. Development of power projects leads to the development of infrastructure such as expansion of road connections to far flung places leading to increased market access and also helps in bringing down prices of commodities as well. Many a times, hydropower companies invest in initiatives of local community development such as contributions in building local schools, development of healthcare services, construction of drinking water infrastructure among others.<sup>12</sup> For instance, development of Tala Hydroelectric project results in the improvement of infrastructure in the district, as shown in the table below

**Table 2: Demography Profile of Chukha District, Bhutan**

Segment	Parameters	2008	2017
Education	No. Higher Secondary School	2	3
	Student to Teacher Ratio	21	17
Health Infrastructure	No. of hospitals	3	3
	No. of doctors	10	17
Rural Sanitation	Access to safe drinking water (%)	-	96
	Access to improved sanitation	-	96
Livelihood/ Employment	Labour force participation rate	43	62
	Employed in agriculture related activities	19	36
Access to Roads	Farms Roads (km)	25	355
	Urban Roads (km)	-	58

Source: <http://www.nsb.gov.bt/publication/publications.php?id=9>

The socio-economic impact study of hydropower projects in Nepal and Bhutan also suggests that quality of services of basic health units and other services such as transport and communications have also improved tremendously.

Furthermore, such projects contributed immensely in the development of remote places by stirring the rural livelihoods. The optimum energy supply and development brought in by the hydropower projects had been possible due to sufficient flow of investment and timely execution of projects. For instance, a study conducted by the UNDP in Baglung and Kavre districts of Nepal suggests that the project construction phase is responsible for stimulating the local economy.<sup>13</sup> However, the impact of electricity may differ from one region to another based on the geographical differences, socio-cultural variation and economic status, among others.

## Electricity Trade and Impact on Gender

The United Nations points out that:

*"Without electricity, women and girls have to spend hours fetching water, clinics cannot store vaccines for children, many school children cannot do homework at night, and people cannot run competitive businesses"*

Usually in rural areas, major responsibility to gather firewood or make cow dung cakes is largely on women. This disproportionate distribution of responsibilities also negatively affects the opportunity of girl children to attain formal education. Many female student drop-out of school happens because they need to help in daily household chores.

Increase in access to affordable and reliable electricity creates a significant scope for the women folk to participate in income-generating activities.<sup>14</sup> The productivity of individuals gets amplified resulting in increase in income. For instance, in Chhukha district, Bhutan, use of electric cookers and water boilers proved to be extremely beneficial for the women folk. With reduced cooking time, women can be involved in other economic and non-economic activities. Further, it resulted in minuscule exposure to smoke created by fuel wood, which in turn improved the health of the women folk. The quality of social life also improved as the community got access to electricity.

Likewise, a study conducted in post-apartheid South Africa also showed that rural electrification resulted in growth in female job opportunities.<sup>15</sup> Electricity access helps in increasing income outputs by providing opportunities for other productive employment. In addition, usage of electronic appliances for household chores frees up time for women so

that they can also get involved in income generating enterprises and it also reduces school drop-out rates of female students.<sup>16</sup>

In addition, access to electricity facilitates storage of medicines and vaccines in rural areas, thus it is reasonable to assume that it improves healthcare facilities for women. Hence, providing electricity to households for tasks such as cooking, which are mostly considered women's work and electrifying public institutions can promote gender equality, and create greater opportunities for women and girls to get access to education, healthcare services, and employment.

## Roadblocks in smooth Cross-Border Electricity Trade

Importance of CBET for collective advantage has been well-established in the BBIN region as in other regions in the world. It not only aids in meeting electricity demand in their respective countries but also improve the socio-economic condition of the society at large. However, for CBET cooperation to be successful at the regional level, policies and investment initiatives should be in coherence with the requisites of native people. The locals must be able to connect themselves with the initiatives under such hydroelectric aforementioned projects.

While such projects are beneficial for the society at large, there may be some people who lose in such infrastructure projects.<sup>17</sup> This is mainly because policy makers and project developers failed to recognise the asymmetry of cost incurred and benefits reaped by the local people. As there would be some local groups such as incumbents providing electricity access to the local people through diesel generator sets would lose their business among others.

Furthermore, to promote CBET, investment in the BBIN region is imperative to explore hydropower potential and also to strengthen power network. Given the poor financial conditions of the public utilities in the BBIN region, it appears that investment should be

pumped in by the private sector. However, investment in the region is limited primarily because of absence of clarity, harmonisation and predictability of policies, technological limitations, rationalisation of electricity tariff and various political concerns.<sup>18</sup>

In addition, it has been observed in the past that electricity trade treaties are not always balanced between bigger and smaller countries. In case of Rahughat Hydroelectric project, Nepal, the labour force for the project has been imported from India. Only one-third of total labour force used in the project was hired from local people.<sup>19</sup>

## Recommendations & Way Forward

While CBET offers huge benefit as discussed earlier but it has multiple technical, political, and regulatory challenges that need to be addressed timely and effectively. In order to overcome technological challenges, it is essential that the power generation system within countries in the region be flexible enough to help them effectively by optimal utilisation of various complementarities emanating out of seasonal variations, consumption pattern and time differences.

As mentioned earlier that benefits of CBET are not limited to electricity cooperation but it should also be directed to the people affected by such projects. Therefore, it is recommended that there is a dire need of bilateral and regional treaties, which promotes equitable benefits.

Furthermore, literature suggests that most of the initiatives undertaken in the region are from the respective governments and fewer by the private investors.<sup>20</sup> However, for the trade cooperation to flourish in the region there is need for investment from private sector. For instance, the Greater Mekong Sub-Region (GMS) where investment was mainly done by private sector not only brought in regional trade security but also enhanced cross-border trade activities. The savings resulting from expanding the interconnection of GMS power systems alone are estimated at US\$14.3 billion.

The studies suggest that direct benefits to women due to hydropower projects are limited.<sup>21</sup> Such projects increase the burden of work on women as these works destroy the forests and grasslands compelling women to travel longer distances to collect firewood and fodder.<sup>22</sup> Similarly, hydroelectricity projects also pollute the source of water during construction and, in many cases, this requires women to travel longer distances to fetch clean water. Thus, to ensure greater benefits

for women, infrastructure projects should also provide skill development training targeted at women.<sup>23</sup>

Last but not the least, in order to create a political consensus it is essential to understand the costs and benefits of CBET at a granular level. Thus, there is an urgent need to communicate the benefits from CBET among various categories of stakeholders to generate greater stakeholder buy-in.

## Endnotes

- <sup>1</sup> World Bank Study, <http://www.worldbank.org/en/news/press-release/2018/04/15/south-asia-focus-growth-lead-jobless-growth-create-more-jobs>
- <sup>2</sup> Supra
- <sup>3</sup> [https://www.isas.nus.edu.sg/wp-content/uploads/media/isas\\_papers/37\\_WP.pdf](https://www.isas.nus.edu.sg/wp-content/uploads/media/isas_papers/37_WP.pdf)
- <sup>4</sup> <http://documents.worldbank.org/curated/en/392431468000898918/pdf/WPS7328.pdf>
- <sup>5</sup> The Benefits of Expanding Cross-Border Electricity Cooperation and Trade in South Asia, World Bank Project Number P143029, March 2016.
- <sup>6</sup> *Ibid*
- <sup>7</sup> <https://www.adb.org/sites/default/files/institutional-document/33872/files/assessment-gms-subregion-energy-sector-development.pdf>
- <sup>8</sup> [http://www.undp.org/content/dam/undp/library/gender/Gender%20and%20Environment/TM4\\_AsiaPacific\\_Capacity.pdf](http://www.undp.org/content/dam/undp/library/gender/Gender%20and%20Environment/TM4_AsiaPacific_Capacity.pdf)
- <sup>9</sup> Attigah, Benjamin, and Lucius Mayer-Tasch. "The Impact of Electricity Access on Economic Development: A Literature Review." In *Productive Use of Energy (PRODUSE): Measuring Impacts of Electrification on Micro-Enterprises in Sub-Saharan Africa*, by L. and Mukherjee, M. and Reiche, K. (eds.) Mayer-Tasch. Eschborn: GIZ, 2013.
- <sup>10</sup> Id
- <sup>11</sup> Goedhuys, M. and Sleuwaegen, L. "High-Growth Entrepreneurial Firms in Africa: A Quantile Regression." *Small Business Economics* Vol. 34, 2010: 31-51.
- <sup>12</sup> *Shrestha, Shyam Sundar. Study for Development of a Potential Regional Hydropower Plant in South Asia. Islamabad, Pakistan: SAARC Energy Centre, 2016*
- <sup>13</sup> Legros, Gwénaëlle, Kamal Rijal , and Bahareh Seyedi. Decentralized Energy Access and the Millennium Development Goals: An analysis of the development benefits of micro-hydropower in rural Nepal. Warwickshire, UK: Practical Action Publishing Ltd, 2011.
- <sup>14</sup> *Ibid*, Note 29
- <sup>15</sup> Dinkelman, T. The Effects of Rural Electrification on Employment: New Evidence from South Africa. Mideo: University of Michigan, 2008.
- <sup>16</sup> UN DESA. Multi-Dimensional Issues in International Electric Power Grid Interconnections. New York: United Nations, 2006.
- <sup>17</sup> <http://cuts-ccier.org/CBET/htm>
- <sup>18</sup> [http://www.cuts-international.org/IACP/base\\_energy\\_cooperation.html](http://www.cuts-international.org/IACP/base_energy_cooperation.html)
- <sup>19</sup> [https://www.orfonline.org/wp-content/uploads/2016/05/Issue-Brief\\_138.pdf](https://www.orfonline.org/wp-content/uploads/2016/05/Issue-Brief_138.pdf)
- <sup>20</sup> <http://documents.worldbank.org/curated/en/392431468000898918/pdf/WPS7328.pdf>
- <sup>21</sup> Supra, Note 30
- <sup>22</sup> Id
- <sup>23</sup> Id

---

This Briefing Paper is written by Arpit Tiwari, Assistant Policy Analyst, CUTS International

© CUTS International 2018. This Briefing Paper is published by CUTS Centre for Competition, Investment & Economic Regulation (CUTS CCIER), D-217, Bhaskar Marg, Bani Park, Jaipur 302 016, India. Ph: +91.141.228 2821, Fax: +91.141.228 2485, E-mail: c-ccier@cuts.org, Web: [www.cuts-ccier.org](http://www.cuts-ccier.org). Also at Delhi, Calcutta and Chittorgarh (India); Lusaka (Zambia); Nairobi (Kenya); Accra (Ghana); Hanoi (Vietnam); Geneva (Switzerland); and Washington DC (USA).

CUTS Briefing Papers are to inform, educate and provoke debate on specific issues. Readers are encouraged to quote or reproduce material from this paper for their own use, but CUTS International requests due acknowledgement and a copy of the publication.