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The Power Potential of CPEC: Is it Sufficient?

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Abstract

This paper puts forth the argument that CPEC energy supply alongside non-CPEC government energy projects, some of which have already become functional, will not be sufficient to match the exponentially increasing energy demand in the coming years. Despite the energy supply potential of the CPEC energy projects, a lack of focus on demand-side management and little attention to the adoption and application of energy efficient technologies will render energy production by CPEC and non-CPEC projects inadequate by 2020s when energy demand, especially in the wake of expected accelerated economic development, population increase and higher domestic consumption, will significantly outpace the growth in supply.

Introduction: A Doomsday Prediction

Power shortage is one of the most critical infrastructural problems that Pakistan faces since 2007. It is manifested through scheduled and non-scheduled load shedding, breakdowns, fluctuations and blackouts. According to estimates, citizens face an average of 4 – 6 hours of load shedding a day in urban settings and 10-16 hours in rural. The shortfall is largely caused due to problems like declining water levels and capacity in the dams, increasing population pressures, power thefts, line losses and dearth of well-planned power generation projects.

Power shortages have led to various adverse effects on the agriculture, industrial and social sectors of Pakistan. The economic progress of the country is impeded by the decline in agricultural production as well as industrial production that is more vulnerable to changes in the patterns of power availability. The situation is expected to get worse if a set of comprehensive and targeted interventions involving supply regulation, demand management and operational efficiency gains by the relevant line and sectoral departments of the government is not made.

According to LESCO, the shortfall for summer 2017 was estimated to be around 45% of the total electricity demand . Pakistan has a total electricity demand of 16,000MW, out of which the national grid is able to supply around 11,500MW through multiple sources; 6,000MW from WAPDA and Independent Power Projects (IPP), and 5,000MW from

hydel power. There are 10 power distribution companies that provide 10,000MW of electricity of which 500MW is supplied to KSE and 1,500MW is dedicated to the government departments and high ranking official residences .[1]

Legal and Regulatory Frameworks

The Accor de Paris (French for Paris Agreement) is an initiative started under The United Nations Framework Convention on Climate Change (UNFCCC) which aims to reduce greenhouse gas emissions and work for a better global environment by keeping the average global temperature below 2 °C. The agreement was negotiated by representatives of 196 parties at the 21st Conference of the Parties of the UNFCCC in Paris and adopted by consensus on 12 December 2015. As of June 2017, 195 UNFCCC members have signed the agreement of which 148 including Pakistan have ratified it. The Paris agreement is an environment protection treaty that has a lot to offer in terms of its trade and investment potential and the incentives that it promises efficient and renewable energy and for innovation in the usage of clean power and energy.

Pakistan has huge potential for efficient and environment-friendly power generation that can advance the country on two fronts simultaneously; first is the increase in energy supply levels to eradicate power outages and spur industrial development; second is tangible progress in rationalizing the energy supply mix pursuant to the Paris agreement.

Renewable as Source of Energy

From snowcapped mountains in the north to the warm beaches in the south, Pakistan is a country of great diversity and therefore holds enormous potential in wind and solar energy sectors especially in the provinces of Sindh, Punjab and Baluchistan.

The government has duly begun to capitalize on its wind power potential through private sector projects in the wind corridor along the coast of the Arabian Sea. To that end, Pakistan's 2020 target is to increase its wind power capacity to 5 Gigawatts. In South Punjab, the government has initiated a 6,500 acre solar park to generate 1,000MW; work on which began in the early parts of 2015.

The rivers also provide an opportunity for clean energy development. Since 2013, new some projects have been initiated on River Indus which generate about 84MW of power. The government now seeks to add an additional 3,000 to 4,000MW of clean energy into

[1] Retrieved from: https://www.pakistantoday.com.pk/2017/04/15/pakistan-to-face-another-year-of-load-shedding/

its system through projects expected to be completed by 2019. This entails an annual investment of 3 to 4 billion US dollars.

CPEC Projects

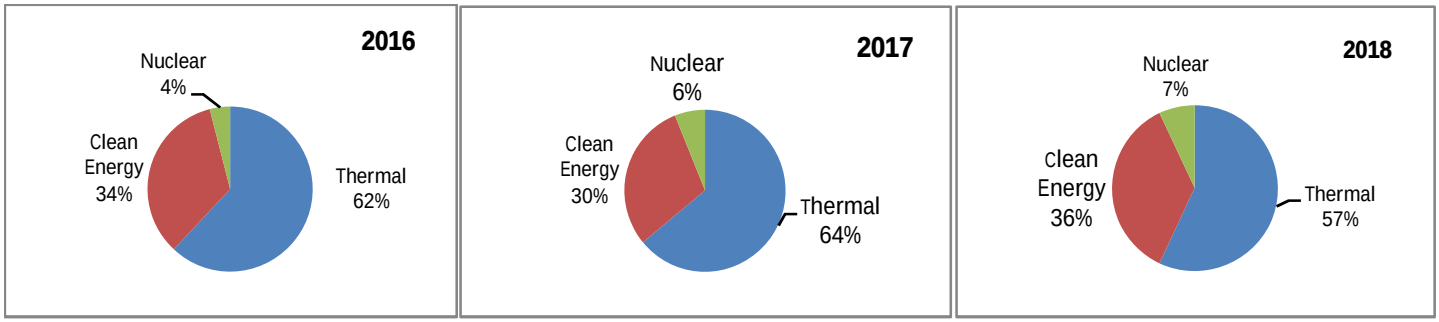
Numerous energy projects have been envisaged under CPEC. The 13 energy projects that currently have the governmental assent and priority will cost approximately US$21 billion and generate 11,110MW of electricity spread across the country. Of these 13 projects, 7 are clean energy that includes hydropower plants, wind farms and solar parks.

Following is the time line for completion of the salient clean energy projects: Quaid-e-Azam 1000MW Solar Park (Bahawalpur) attained 100MW in August 2016; Hydro China Dawood; 50MW Wind Farm (Gharo, Thatta) in 2017; UEP 100MW Wind Farm (Jhimpir, Thatta) in June 2017;, Sachal 50MW Wind Farm (Jhimpir, Thatta) in June 2017; three Gorges Second Wind Power Project and three Gorges Third Wind Power Project in September 2018; Karot Hydropower Station in 2021;, and Suki Kinari Hydropower Station in Naran, Khyber Pukhtunkhwa expected in 2022, . The estimated cost on these clean energy projects is approximately US$5 billion and is expected to generate around 2890MW of electricity. The CPEC Energy actively promoted projects include the Kohala Hydel Project, AJK which is expected to generate 1100MW of electricity at an estimated cost of US$2.3 billion with an expected commercial operation Date of 2023.[2] There are a total of 24 wind power projects at different stages of development/operation. These include both CPEC and non-CPEC projects with a total generation capacity of 1400MW. Twelve wind power projects with a cumulative capacity of 590MW have already achieved commercial operation.

The following is the current share of electricity generation; the 2018 mix has been calculated based on the current operational and under development projects.[3]

[2] Retrieved from: http://cpec.gov.pk/energy
[3] Retrieved from: http://www.finance.gov.pk/survey/chapters_17/14-Energy.pdf

Table.1



According to the energy mix of renewable and non-renewable energy sources provided in Table.1 above, it can be observed that a significant increase in clean energy projects is expected. The share of clean energy as a source is expected to increase from 30% in FY2017 to 36% in FY2018. This is partly due to the supply-side intervention of CPEC in the energy sector of Pakistan. Nuclear energy production has also increased due to operationalization of four nuclear power plants currently providing a gross output of 1100MW, and three nuclear plants under construction that are expected to be functional by end of the current year. By the year 2030, an expected 8,000MW is to be generated via nuclear energy, 11,110MW from CPEC and 4,000MW from non-CPEC projects.

Sustainability Paradigm

The government has managed to initiate quite a few potential energy production projects under CPEC but can these projects sustain in the long-run is the big question. According to Ali Touqeer Sheikh, "the circular debt has refused to disappear, and the overall energy mix is imbalanced and expensive for consumers as well as the economy."[4]

Observing the long-term pattern of climatic changes and the more frequent onslaught of calamities like fatal heat waves across the country's south, one is led to the conclusion that renewable projects might not be sufficient enough for the ever-increasing energy demand. Policy and institutional mechanisms like efficient line management, reduction in theft and an overhaul in the system would be required to keep the supply-demand gaps under check.

[4] Ali Tauqeer Sheikh is a Pakistani development practitioner and founding CEO & National Program Director of Leadership for Environment and Development LEAD Pakistan. He is a leading expert on issues related to developing country environmental policy, especially climate change. He is also the Asia Director for Climate and Development Knowledge Network, a £72 million (US$100 million) initiative that links poor countries with experts on climate change. Retrieved from: http://www.lead.org.pk/lead/postDetail.aspx?postid=346

With a 2.25% increase in population by 2030[5], total demand is expected to increase between 5.6 to 8.2 times over the present year level i.e. 18,883 MW, under normal scenarios the figure would approximately reach 114000MW.[6]

In the context of government's experience with power production, it seems quite unlikely that any projects beyond CPEC or its offshoots would be initiated in the country in the foreseeable future. Especially, the probability of the government embarking on any clean energy projects on its own in the near future is quite low as it has not really done much progress on its own in the past either. And thus, it is safe to say that if it was notfor CPEC, we might have been struggling still with a handful of clean energy projects thereby relying more on the traditional sources of energy.

Conclusion

After the G7 commitment to phase out subsidies, Pakistan will have to make the best use of CPEC energy projects if it wants to catch up with India and China who have embarked upon programs and policies to produce a sizable amount of energy through renewable means. China is currently at 10GW and is expected to achieve 10 folds the generation by 2030. It has already played a vital role in helping Pakistan move towards a cleaner and more efficient way of power generation through the CPEC.

Affordable, scalable solutions are now available to enable countries to leapfrog to cleaner, more resilient economies:

- At policy level it needs to be ensured that the policy mix projected for 2018 continues towards a greater share of renewable energy in the future. Indeed long-term goals need to be established to ensure that the energy mix targets are responsive to changing global or local conditions. This will, a priori, entail commitment at the highest level to provide for necessary financing, institutional and operational arrangements.
- At the institutional level, the government organizations responsible for managing the supply of electricity such as LESCO, WAPDA, K-Electric, NEPRA need to ensure that supply-side pressures such as line losses, power thefts and lack of well managed power projects are dealt with in an efficient and timely manner.
- Particular emphasis should be put on improving the quality of energy statistics, important data gaps related to, among others, the agriculture, forestry and other land use sector should be filled, data on waste and the production of heat and electricity from renewable energy sources needs to be updated.

[5] Retrieved from: http://databank.worldbank.org/data/reports.aspx?source=2&country=PAK
[6] Retrieved from: http://www.ntdc.com.pk/LoadForecast.pdf

- Renewable energy projects such as hydropower plants, wind farms and solar parks need to be completed and at the same time new projects should be initiated through incentive packages by the government to cater the increasing population pressures.
- An effective communication plan needs to be set and awareness campaigns for industrial and domestic consumers need to be organized highlighting the adverse effects of wasting power.

It is critical for the Human Development of Pakistan to be able to meet power demands in an efficient and environment-friendly manner. Clean energy resources are cheaper and more efficient and it is about time that Pakistan moves towards a greener future by managing its power demand and supply levels making use of the help extended by China. The government needs to initiate new non-CPEC projects and fast track current projects to meet the future demand for electricity. It is essential that the government not only aims to meet its 2030 sustainable clean energy goals but also meets the exponentially increasing demand for electricity.

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