



# Prospects of Coal Investments and Potential of Renewable Energy Transition in Thar Region of Pakistan



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## Executive Summary [Full Report Available at: <https://bit.ly/3qEBLti>]

In recent years, China has emerged as a major investor in the coal power sector of international markets, financing overseas coal power projects of up to \$21-38 billion<sup>1</sup>. Coal, along with other energy reserves, has provided a foundation for the initiation of energy cooperation between nations – the “Belt & Road Initiative (BRI)” of China being one of them. Saudi Arabia, United Arab Emirates, Pakistan, Kazakhstan, and Russia have been the most ideal choices for China’s energy investment, balancing resource potential and investment environment. However, many resource rich countries have unstable economic structures, political limitations, environmental constraints, and lack relevant technologies, thereby putting investments to risk.

Under the BRI's flagship project, China-Pakistan Economic Corridor (CPEC), more than half of announced projects are reserved for building energy portfolio. From a total of \$62 billion investment under CPEC, around \$34 billion will go towards 22 projects of power production and distribution<sup>2</sup>. Energy sector development under CPEC is the economic priority of Pakistan, and the total installed capacity of these projects is estimated to be 7,240 MW (Megawatt). Nine Commercial Operation Date (COD) projects are being constructed (capacity of 5,320 MW) in phases with a total investment of about \$8.175 billion<sup>3</sup>.

Power projects under CPEC are based on mainly based on Thar coal. Although these projects have contributed to the local, regional, and national development, there are still strong public concerns about the impacts of coal mining on the ecology and socio-economic landscape of the region. Envisioned to improve the energy security of Pakistan, it has raised some serious concerns around the environmental and financial implications of development, as well as the socio-economic issues related to land resettlements and relocation issues. The communities are highly susceptible to climate change, living under high levels of poverty, and there is high dependency of household livelihoods on natural resources. This along with the issues of capacity payments which could reach an unpayable amount of \$9 billion by 2023<sup>4</sup>, and the power surplus could increase the risk of Pakistan being burdened within locked capacity.

Although there are guidance frameworks and international laws for developing these projects, there are existing gaps to identify and manage the potential environmental risks and impacts for the long-term energy planning and economic development of Pakistan. The investments potentially lack stringent environmental guidelines requisite for financing these energy and power projects. Given the typical economic lifetime of coal fired power stations of around 40 years, this infrastructure will lock high emissions and financial sources into an energy system that needs urgent decarbonization.

To overcome these challenges, this research attempts to provide an in-depth assessment of these socio-economic and environmental impacts of coal-based energy in Pakistan. An

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<sup>1</sup> Please see: <https://climatepolicyinitiative.org/publication/slowing-the-growth-of-coal-power-outside-china-the-role-of-chinese-finance/>

<sup>2</sup> Please see: CPEC investment pushed from \$55b to \$62b”, <https://bit.ly/3vGCNWA>

<sup>3</sup> Please See CPEC’s official website “China made total \$12 billion investment in 12 energy projects under CPEC”, <https://bit.ly/3gJWCqA>

<sup>4</sup> Please see: Pakistan faces an unexpected dilemma: too much electricity, <https://reut.rs/3qcsbxq>

evidence-based framework is proposed to support the development and uptake of renewable energy investments and other clean energy sources under China-Pakistan Economic Corridor (CPEC).

Based on the quantitative data and expert views and consultations, the environmental implications of coal-based energy have been analysed through Multi Criteria Decision Analysis and Economic-Environmental assessment models of coal-based plants.

The result implies that the Levelized Cost of Energy (LCOE) (based financial model) of coal powerplants on average is around PKR 12.5/kWh (kilowatt hour) (Capacity Factor of 85%). However, if average values of emissions cost are incorporated, this value goes beyond PKR 16.5/kWh. This means that around 32% of the total external costs, associated with the impacts on natural capital and socio-economic indicators (such as the impact on water pollution, toxic coal waste, air pollution, and long-term damage to ecosystem and human health cost) is not considered<sup>5</sup>. Based on the analysis of the ecological assessments, it has become evident that the risks of water scarcity and quality due to coal mining activities can bring major constraints to social wellbeing, ecosystem health, and economic development in the mining region of Thar coalfield. This would have an impact on the functionality of downstream ecosystems and its services, considerably affecting local communities who rely on these resources for their livelihood.

On the contrary, the tariffs for power generation through solar and wind have drastically changed with an average wind power expected to be produced at a rate of \$0.0486/kWh and an average solar power at \$0.034/kWh<sup>6</sup>. These values highlight the high potential of renewable sources providing a relatively much cheaper alternative to both local coal and imported fuel, to increase the energy security of Pakistan.

In addition, the research highlights that that the energy production from recently added energy sources has ended up in having 65% more CO<sub>2</sub> emissions than that of the normal trend. As per the increased share of coal in the first draft of Indicative Generation Capacity Expansion Plan (IGCEP) 2047 plan, the total CO<sub>2</sub> emissions from Thar Coal Power plants will be around 51 million tons annually. However, to be able to be on track with meeting the climate commitments of the Paris Agreement, the share of investments for renewables in Pakistan should be around 65% (global average).

The study suggests that the Renewable Energy (RE) investments in Thar would provide long-term benefits considering many social, economic, and environmental benefits. China becoming an important space in evolving green finance system and tackling climate change, can play an important role in improving the understanding of interdependencies and transmission channels the financial sector and environmental sustainability in CPEC investments. Being currently the world's largest producer of wind and solar energy, the country places a priority on investing in renewable energy primarily because it enables the country to tackle problems of air and water pollution and mitigate risks of socioeconomic instability. Considering the objectives of recent

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<sup>5</sup> Please See: <https://bit.ly/2SbVBiA>

<sup>6</sup> Please See: Haneea Isaad, "Evaluating the emissions impact and economic feasibility of coal power plants under the China Pakistan Economic Corridor (CPEC) in Pakistan."

Pakistan's Alternate and Renewable Energy (ARE) policy 2019, increasing the share of Renewables to 30% and 30% hydro power by 2030, it is apparent to realize that the energy cooperation and response to the two-fold challenges of climate change and (clean and green) energy security, has to be a mutual aspiration of both Pakistan and China.

To build a solid case for renewable energy transition of investments in Thar, it has to ensure a Just, Equitable and Transparent, ensuring greater techno-economic resource suitability for replacing coal mining jobs. For Pakistan, this shift will require massive step-in policies and measures. Pakistan needs to encourage a state level market outcome by putting its focus on technology build-up for renewables. It could be through tax breaks for producers and consumers, or it could be in the form of Chinese subsidies like low electricity rates or government-set pricings. Pakistan needs to come up with Renewables Portfolio Standards (RPSs), tradable certificate schemes, reliable framework for Feed in Tariffs (FITs), auctions, framework for decentralized systems, financial models, and some non-regulatory policies to work along with it. This includes providing tax incentives, capital grants and subsidies, attractive loans, and mitigation of associated risks.

Both countries must find a common framework for the environmental risks' evaluation and reporting of financial institutions. Guideline frameworks for investment banks to develop and implement a well-defined roadmap to better evaluate and mitigate Environmental and social risks. Pakistan policy makers must prepare a plan with a more concrete timeline to introduce the Environmental and Social Risk Management Systems in CPEC projects with green development regulations and evaluation standards including green financial performances.

Additionally, Private sector could play a major role in implementing these practices and frameworks to be able to comply with their sustainability initiatives, bounded by nature/climate related disclosure policies. These options should be leveraged by aligning the sustainable investment priorities with climate and green financing strategies such as green bonds, debt for nature swaps, social investment bonds, and other financial tools.

All these opportunities would support the clean energy transition in CPEC for sustainable future of Pakistan.

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