Policy Brief #87

Private Sector Engagement and Renewable Energy Investments under CPEC

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Abbreviations

Alternate Renewable Energy (ARE)
Alternative Energy Development Board (AEDB)
Build, Own, and Operate (BOO)
Capital Expenditure (CAPEX)
China Three Gorges Corporation (CTG)
China Three Gorges South Asia Investment Limited (CSAIL)
China-Pakistan Economic Corridor (CPEC)
Construction, Installation, and Manufacturing (CIM)
Cost of Generation (COGE)
Development Finance Institutions (DFIs)
Engineering, Procurement, and Construction (EPC)
Extended Fund Facility (EFF)
Foreign Direct Investment (FDI)
Independent Power Producer (IPP)
Indicative Generation Capacity Expansion Plan (IGCEP)
International Monetary Fund (IMF)
Inward FDI (IFDI)
Khyber-Pakhtunkhwa (KP)
Kilowatts (kW)
Megawatts (MW)
Monitoring and Evaluation (M&E)
National Development Reform Commission (NDRC)
National Electric Power Regulatory Authority (NEPRA)
Operations and Maintenance (O&M)
Outward FDI (OFDI)
Pakistan Poverty Alleviation Fund (PPAF)
Pakistani Rupees (PKR)
Private Power and Infrastructure Board (PPIB)
Public-Private Partnership (PPP)
Regasified Liquefied Natural Gas (RLNG)
Return on Equity (RoE)
Special Economic Zones (SEZs)
Special Purpose Companies (SPCs)
Sustainable Development Goal (SDG)
Transmission and Distribution (T&D)
Abstract

Adequate power supply is essential to achieve sustainable economic growth. Owing to the country’s history of power crisis, privatization is seen as an escape as well as a remedy to help drive investments for energy projects. Moreover, taking a long-run advantage of the benefits offered by the China Pakistan Economic Corridor (CPEC), China has emerged as the largest investor in Pakistan.

The policy brief highlights the major renewable energy projects under CPEC, Chinese local investment trends, and major hurdles discouraging private investment in the energy sector, particularly investment in low-cost renewable energy technologies. It also gives insights for possible future prospects to mobilize private sector investments under CPEC, reasons for low stakeholders’ interest and investor confidence, and modalities of reducing financial risks while targeting domestic private investments along with the non-Chinese investments for renewable energy projects.

It also identifies the key challenges faced by investors that could be turned into opportunities, driving a huge sum of exports, promotion of green jobs, development of Eco-Special Economic Zones (SEZs), and tariff revision vis a vis technological upgradation with regulator’s support. While highlighting the most wanted issues pertaining to the private sector engagement and renewable energy investments under CPEC, it paves the way to reflect on the in-practice actions and missing loops to spur growth and foster economy.

Key recommendations of this policy brief include the development of Renewable Special Economic Zones (RSEZs) under CPEC to help attract private sector investment, as well as making use of policy instruments such as premium tariffs, feed-in tariffs, carbon credits, green certificates, etc.
Introduction and Background

Owing to lack of fuel for energy generation, power shortages have taken a toll on Pakistan’s economy, particularly affecting textiles and agriculture sectors, thereby reducing the country’s GDP growth by 4% (Tao et al. 2022, p.1). The power generation companies and government authorities are keenly exploring ways to mainstream renewables to reduce the country’s dependence on imported fuel and help meet the country’s total energy demand.

Pakistan’s current electricity production depends on four major sources, i.e. thermal, hydro, nuclear, and renewables. According to the Indicative Generation Capacity Expansion Plan (IGCEP), the share of these resources includes 13% coal, 10% natural gas, 17% regasified liquefied natural gas (RLNG), 19% furnace oil, 29% hydro, 7% nuclear and other renewable energy sources (including 3% wind), 1% solar, and 1% bagasse. The total installed generation capacity of the country is 37,949 MW (NTDC 2022). Pakistan’s power sector has historically been in crisis mode due to a huge variability in demand, leading to an undersupply, and sometimes an oversupply, of power. The overall electricity consumption in Pakistan varies season to season, however, the condition has worsened due to a rapid increase in the population and urbanization.

In addition, Pakistan ranks 8th among the top 10 climate change-vulnerable countries on the Long-Term Global Climate Risk Index 2021 (David et al. 2021, p.13). Solving climate change-related challenges requires efficient technologies, stringent monitoring, and responsive policy measures. Given such challenges, it is imperative to align the climate and development goals for achieving the Sustainable Development Goal-7 & 13 (SDG 7 & 13) targets; that is, "Ensure access to affordable, reliable, sustainable and modern energy for all", and "Take urgent action to combat climate change and its impacts", respectively.

In line with this goal, the Ministry of Energy (Power Division) has developed a long-term Alternate Renewable Energy (ARE) Policy 2019 (Alternative Energy Development Board (AEDB) 2019) that sets a 20% ARE generation capacity target for 2025 and 30% by 2030, which would require capacity increases of 5,631 MW and 11,692 MW respectively as per the IGCEP. In addition to outlining a target for renewable energy generation, the policy also encourages utilization of renewable technologies in the country. The IGCEP (National Transmission and Despatch Company 2022) 2022-31 further serves as a document that will be updated on an annual basis as per the change in power sector priorities, policies, trends, and technologies.
With the latest power crisis in Pakistan, the private sector intervention was seen as a key to meet the growing energy demand especially on account of production and supply inefficiencies. To further promote private sector investments and facilitate public sector power projects in Independent Power Producer (IPP) mode, Private Power and Infrastructure Board (PPIB) and Alternative Energy Development Board (AEDB) were established as "One-Window Facilitators" in 1994 and 2003, respectively. The AEDB introduced the ARE policies 2006 and 2019 for the promotion of renewables, and is responsible for the recent uptake of solar projects in the country. PPIB regulates the conventional IPPs and AEDB oversees the IPPs using alternative sources of energy (Opitz-Stapleton et al. 2021, p.13).

Privatization of Power Sector

The federal government plans to offload two major full capacity and running R-LNG power plants at Haveli Bahadur Shah and Balloki to balance its fiscal deficit. This transaction will be the largest power sector privatization, carried out on the demand of the International Monetary Fund (IMF) under the $6 billion Extended Fund Facility (‘All set for privatization’ 2022). These two plants represent 7% of Pakistan’s energy requirement (Iqbal 2022).

The private power sector investor confidence has considerably increased during the last few years. With Pakistan’s power sector undergoing major privatization, it has been seen that the private power sector contributed about 61% in 2018 in electricity generation compared to 53% in 2014. This 8% rise in the private sector share suggests an upward trajectory with rising investor interest.
CPEC and Energy Projects

CPEC is the largest single-country investment portfolio under the BRI. Formally launched in 2015, the project aims at meeting the country’s infrastructure and energy needs with a total committed amount of projects worth $50 billion (Siddiqui and Scherzer 2019). These projects fall under two broad categories, including energy ($35 billion) and infrastructure ($15 billion) projects.

The energy sector projects under CPEC are executed following the IPP mode and project financing that is administered under Foreign Direct Investment (FDI). The special purpose companies (SPCs) are set up under the CPEC energy projects, whereby the loans are acquired by SPCs through Chinese banks and other financial institutions against the lender’s own balance sheets (Lenders; Table 1). Most of the SPCs are owned by the Chinese firms, receiving the financing items under the capital and finance accounts. Additionally, the import of equipment and services are catered under the current account (Husain 2018; Downs 2019).
Table 1: Renewable energy projects under CPEC

<table>
<thead>
<tr>
<th>Company</th>
<th>Lender</th>
<th>Borrower</th>
<th>Borrower’s Owner</th>
<th>Investment (USD)</th>
<th>Commercial Operations Date (COD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quaid-e-Azam solar park</td>
<td>China Development Bank, China Eximbank</td>
<td>Zonergy</td>
<td>ZTE Corp.</td>
<td>460 million</td>
<td>July 2016</td>
</tr>
<tr>
<td>United Energy Pakistan (UEP) wind farm</td>
<td>China Development Bank</td>
<td>United Energy Pakistan</td>
<td>United Energy Group, Orient Group Investment Holdings</td>
<td>250 million</td>
<td>June 2017</td>
</tr>
<tr>
<td>Sachal wind farm</td>
<td>Industrial and Commercial Bank of China</td>
<td>Sachal Energy Development</td>
<td>Arif Habib</td>
<td>134 million</td>
<td>April 2017</td>
</tr>
<tr>
<td>Hydro China Dawood wind farm</td>
<td>Industrial and Commercial Bank of China</td>
<td>Hydro China Dawood Power</td>
<td>Hydro China, Dawood Power</td>
<td>112.65 million</td>
<td>April 2017</td>
</tr>
<tr>
<td>Three Gorges Second and Third wind power project</td>
<td>China Development Bank</td>
<td>Three Gorges Second Wind Farm Pakistan, Three Gorges Corporation, SRF, IFC</td>
<td>CSAIL (owned 150 million by China)</td>
<td>June 2018</td>
<td></td>
</tr>
</tbody>
</table>
The CPEC renewable energy projects would add a cumulative 1,400 MW to the national grid as indicated in Table 1 (Sherani 2022).

Post-2020, China has significantly subsidized its FDI regime with specific focus on the investments in the renewable energy sector. Since 2013, China’s investment in the BRI countries has shown a steady increase making a total investment of US$ 139.5 billion from 2013-2020. In 2020, China’s Outward Foreign Direct Investment (OFDI) was US$ 153.7 billion, making it the second-largest investor across the globe accounting for 20% of the global investments. Out of this, Pakistan’s share includes the gross inflow of US$ 7.1 billion, resulting in 5.1% share of the total FDI in the BRI countries. An overview of Pakistan’s net FDI from China is given in Figure 1 (Board of Investment 2022).

![Figure 1: Chinese investments in Pakistan (BOI 2022)](image)

The renewable energy projects under CPEC have a huge potential to promote low carbon development in the country. Therefore, the future repair and maintenance requirements of the renewable energy projects (solar and wind) would further support the development of ancillary industries for long-term operation. It is also important for Pakistan to timely prepare for the future opportunities and risks to avoid turning them into stranded assets.

It has been seen that in 2003, a Wind Power Concession Project was announced by the National Development Reform Commission (NDRC) of China stipulating the requirement of 50% locally produced equipment. Development of this large-scale wind farm set a precedent, spurring the local production of wind turbines from 2003-2010, covering 85% share of the local market (Board of Investment 2022). Similar development avenues are present for the private sector in Pakistan.
leading to an incentivized local production of wind turbines, thus promoting advancements in this sector.

Taking Advantage of the Booming Renewable Energy Sector

Considering the CPEC investments, it is also important for Pakistan to attract FDI beyond China. Since 2015, Pakistan has attracted only 5% of China's OFDI in BRI countries against the high volume of Inward Foreign Direct Investment (IFDI) during CPEC Phase I (Board of Investment 2022). Power generation and infrastructure projects have remained the major focus of post-2015 projects.

Governance issues and unstable security and political scenarios also affect the stakeholders’ interest and investors’ confidence. The major constraints affecting FDI inflows are business environment, regulatory framework, and physical infrastructure (Iqbal & Nawaz 2016). Furthermore, Pakistan is ranked 108th globally with regard to the ease of doing business (Table 2) (World Bank 2019). As a rational approach, it is important to enhance and strengthen the renewable energy industrial base under CPEC renewable energy projects with a strong focus on the technology transfer, local capacity building, and integration with global supply chains. Second, keeping these interventions on track through simplified policies and regulatory procedures, and rigorous monitoring and evaluation (M&E) plans, it is essential to reap the full economic and environmental benefits of the CPEC energy projects. These interventions are important as the Government of Pakistan is still highly exposed to the medium-term financial risk due to “sovereign guarantees” from private sector investments under the CPEC projects.

Table 2: Country-wise ranking for ease of doing business (2019) (World Bank 2019)

<table>
<thead>
<tr>
<th>Country</th>
<th>India</th>
<th>Bhutan</th>
<th>Nepal</th>
<th>Sri Lanka</th>
<th>Pakistan</th>
<th>Maldives</th>
<th>Bangladesh</th>
<th>Afghanistan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranking</td>
<td>62</td>
<td>89</td>
<td>94</td>
<td>99</td>
<td>108</td>
<td>147</td>
<td>168</td>
<td>173</td>
</tr>
</tbody>
</table>


The private sector participation has remained relatively low in the transmission and distribution sectors in Pakistan. In 2019, the transmission and distribution power losses have also remained relatively high, i.e. 2.83% (highest since 2014) and 16.86% (against NEPRA’s target of 16.5% distribution losses), respectively (Haq et
al. 2021, p.61597). The grid interconnection for renewable energy projects (e.g. solar) also takes time for approval process. The long approval process acts as a major hurdle for project developers, therefore presenting three potential areas for the private sector intervention under the CPEC projects:

1. Identify the potential areas that have established or do not require substantial construction of transmission lines for power evacuation.
2. Development of mini-grids across the renewable energy hotspots.
3. Power evacuation through a regulated wheeling policy.

A successful example of a solar mini-grid system is a joint venture between a German development bank (KfW Development Bank) and the Pakistan Poverty Alleviation Fund (PPAF). They have set up solar power projects in Swabi (196 kW) and Karak (185 kW) districts of Khyber-Pakhtunkhwa (KPK) catering the energy needs of 434 households, while also creating livelihood opportunities for locals (‘Power for’ 2018).

### State Bank of Pakistan’s Renewable Energy Financing Scheme

The State Bank of Pakistan’s Renewable Energy Financing Scheme (2016) (State Bank of Pakistan, 2019) offers renewable energy financing options for the private sector, and it could be financed by all commercial banks and development finance institutions (DFIs). Given that project is approved from AEDB, a project of 1-50MW could be sponsored for up to PKR 6 billion for 12 years, including a maximum grace period of 2 years from the date of first disbursement. Service charges and rates for end users have been capped, therefore the mark-up rate on this scheme is fixed for end-users at 6% per annum.

As per estimates, the SBP had successfully financed over 1,175 renewable energy projects worth PKR 74 billion with a combined capacity of 1,375 MW till February 2022 (US Department of State 2022). This financing scheme provides an untapped opportunity for local investors and business entities to explore the future avenues of renewable energy investments and act as the leaders in the sector. Two prime examples of companies in this regard are Mahmood Group, largest producer of solar energy in the private sector and Fatima Group, which is the first ever private sector company to invest in power transmission lines. Taking such an initiative will encourage other private sector companies to explore and invest in this area, building a gradual momentum for renewable energy uptake in Pakistan.
Box 1: Successful Private Venture into Renewable Energy - A Case of Mahmood Group

Sustainability is a key element for Mahmood Group. Mahmood Group has installed 22MW of solar power in its private capacity. It is also one of the larger stakeholders in a 50MW solar project in Sindh. Moreover, it has also set up a Leadership in Energy and Environmental Design (LEED) platinum-certified plant. Mahmood Group is also one of the members of the Net Zero Coalition (a national collaboration between pioneering companies, public institutions, and sectoral experts to deliver the goal of net zero carbon for Pakistan by 2050) and all of its certifications today have a huge grading for sustainability and for renewables as well. It has also initiated a smart village program where the village will be converted into a solar hub, with recycling and water conservation measures. The case of Mahmood Group showcases the potential of the private sector in helping scale up access to renewables.

Green Jobs

Socioeconomic wellbeing is one of the associated goals in development projects. Though employment generation is not the primary objective of setting up energy installations yet it remains an important aspect, contributing to the project’s success. Generally, the energy projects are divided into 2 parts with respect to their life cycle i.e. construction, installation, and manufacturing (CIM) and operations and maintenance (O&M). Both of these sectors offer a huge job potential. Jobs in the CIM sector depend upon the plant type and capacity (i.e. type of energy in MWs), however the latter is more related to the plant life time and it creates more opportunities with an increase in the plant’s installed capacity (Rashid et al., 2018, p.4).

China Three Gorges South Asia Investment Limited (CSAIL) is an investment holding company formed by the China Three Gorges Corporation (CTG), one of the largest power companies globally. CSAIL has around 200 employees (50% local and 50% Chinese nationals). It operates by building the energy projects in Pakistan on Build, Own, and Operate (BOO) basis (China Three Gorges South Asia Investment Limited 2023). With a target of US$ 10 billion energy investment in the next 8 years, CSAIL remains a relevant and key private stakeholder for Pakistan to engage and tap in renewable energy investments for the promotion of direct and indirect* green jobs. Table 3 provides an overview of job creation potential under CPEC renewable energy projects.

Similarly, there is a potential for the domestic private sector to mobilize renewable energy investments leading to income generation and creation of a local job
market. CPEC also provides an opportunity for the private sector to work with local communities to capitalize on the investment opportunities and help develop eco-friendly entrepreneurial ventures supporting income generation.

*Direct jobs are actual full-time positions created by a business. Indirect jobs are created by other businesses that come into existence due to the economic growth of a business.*
Table 3: Job creation potential under CPEC (Rashid et al., 2018, p.13; CPEC Authority 2022).

<table>
<thead>
<tr>
<th>CPEC renewable energy projects</th>
<th>Location</th>
<th>Installed capacity</th>
<th>Status</th>
<th>Green jobs potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quaid-e-Azam solar park</td>
<td>Bahawalpur</td>
<td>1000MW</td>
<td>Operational</td>
<td>7000 direct and 20,000 indirect jobs</td>
</tr>
<tr>
<td>United Energy Pakistan (UEP) wind farm</td>
<td>Jhimpir, Thatta</td>
<td>100MW</td>
<td>Operational</td>
<td>2800 jobs during CIM and 66 jobs per year during O&amp;M phase</td>
</tr>
<tr>
<td>Sachal wind farm</td>
<td>Jhimpir, Thatta</td>
<td>50MW</td>
<td>Operational</td>
<td></td>
</tr>
<tr>
<td>Hydro China Dawood wind farm</td>
<td>Gharo, Thatta</td>
<td>50 MW</td>
<td>Operational</td>
<td></td>
</tr>
<tr>
<td>Three Gorges Second and Third wind power project</td>
<td>Jhimpir, Thatta</td>
<td>100 MW</td>
<td>Operational</td>
<td></td>
</tr>
<tr>
<td>Cacho Wind Power Project</td>
<td>Jhimpir, Thatta</td>
<td>50MW</td>
<td>Under construction (LOI* stage)</td>
<td>150 jobs during CIM</td>
</tr>
<tr>
<td>Western Energy (Pvt.) Ltd. Wind Power Project</td>
<td>Jhimpir, Thatta</td>
<td>50MW</td>
<td>Under construction (LOI stage)</td>
<td>150 jobs during CIM</td>
</tr>
</tbody>
</table>

*LOI: Letter of intent

CPEC Eco-SEZs

SEZs could be set up in Pakistan under the state's customs territory, by the federal or provincial governments as per the SEZs (Amendment) Act, 2016. SEZs could be established through the private sector, or through collaboration with the private sector under different modes of public-private partnership (PPP). SEZs offer a number of incentives including a ten-year tax holiday, one-time waiver of import duties on plant materials and machinery and streamlined utilities connections (Board of Investment 2016).

However, despite these benefits to both foreign and domestic firms, Pakistan’s SEZs have struggled to attract investment due the lack of basic infrastructure. Since the development of SEZs under CPEC is still at its nascent stage, there is an opportunity for the private sector businesses as well as the regulatory authorities to create a level playing field for the active participation of national
and international investors for renewable energy projects. As per the amended act, the SEZ enterprises would be able to sell their products in the domestic market without payment of customs and other duties. The major SEZs being developed under CPEC are outlined in Table 4.

Table 4: SEZs under CPEC (BOI 2022)

<table>
<thead>
<tr>
<th>CPEC SEZs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rashakai Economic Zone, M-1, Nowshera</td>
</tr>
<tr>
<td>Allama Iqbal Industrial City, M-3, Faisalabad</td>
</tr>
<tr>
<td>China SEZ Dhabeji, Thatta, Sindh</td>
</tr>
<tr>
<td>Bostan Industrial Zone, Pishin, Quetta</td>
</tr>
<tr>
<td>ICT Model Industrial Zone, Islamabad</td>
</tr>
<tr>
<td>Momand Marble City, Khyber Pakhtunkhwa</td>
</tr>
<tr>
<td>Mirpur SEZ, Azad Jammu and Kashmir</td>
</tr>
<tr>
<td>Port Qasim, Karachi</td>
</tr>
<tr>
<td>Moqpondass SEZ, Gilgit-Baltistan</td>
</tr>
</tbody>
</table>

Renewable Energy Tariffs and Flexibility for Adoption of Better Technology

Under the renewable energy tariffs, the upfront tariff is set by the regulatory authority and the cost-plus tariff is one in which renewable energy IPP is paid its actual cost plus an agreed profit. Under upfront tariff, investors are entitled to keep the project cost/efficiency savings, and thus can attain higher Return on Equity (RoE) compared to the approved amount. On the contrary, under cost plus regime, once the tariff is approved by NEPRA, although the investor may reduce the capital expenditure (CAPEX) through smart intervention in the engineering, procurement, and construction (EPC) or cost of generation (COGE), it still does not stand eligible to receive the savings arising from it and majorly depends on the authority approved return (National Electric Power Regulatory Authority 2016). Under such circumstances, the potential of earning profit is very low under the cost plus regime, thus calling for a higher return offer. Moreover, such conditions also discourage competition in the market for improvement, upgradation, and adoption of renewable energy technologies. Therefore, NEPRA should show some flexibility in reviewing the project upgradation characteristics, and must review the RoE criteria for the same technology for the investors opting for either upfront or cost plus regime. However, Pakistan is now moving towards the Competitive Trading Bilateral Contracts Market (CTBCM) model, which would introduce a level playing field by removing subsidies and preferential treatment. It would also provide a level playing field for international and local investors.
Policy Recommendations

The following policy recommendations are aimed at providing a system to scale up the intake of renewables by encouraging investments from the private sector under CPEC:

- NTDC/DISCOs should move towards smart grids to ensure efficient electricity transmission. Developing a mini/micro grid or stand-alone solar system can help further improve efficiency and flexibility, which, in turn, would help integrate more renewables and increase private sector investment in renewables.
- Grids should be made on the BOT (Build-Operate-Transfer) model to ensure greater ownership that may help increase efficiency and flexibility. The BOT model has not been used other than in Nooriabad, Sindh.
- Renewable Energy Economic Zones (REEZs) or Renewable Special Economic Zones (RSEZs) should be set up to introduce renewable energy policies and incentives at the local level before these reforms are introduced at the national level. The REEZs/RSEZs can be made a part of CPEC and would help attract private sector investment.
- Policy instruments such as premium tariffs, feed-in tariffs, carbon credits, green certificates, etc. are used globally. These instruments can be used for the promotion of renewable energy by encouraging private sector investments.
- Renewable Energy Certificate (REC) policy needs to be devised so as to attract greater private sector funding for renewables, thereby leading to the development of an REC ecosystem.
- There is also an opportunity to unlock greater private sector funding for renewables under the State Bank of Pakistan's 2019 renewable energy financing scheme. However, investors are not always aware of such schemes. Thus, there is a need for capacity building around the funding mechanisms available for private sector investors to invest in renewable energy.
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