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Solar Rays on the Silk Road

Political risks of China's investments in solar energy through the Belt and Road Initiative

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Executive Summary

In 2019, the Chinese government announced the establishment of the BRI International Green Development Coalition, with the aim of aligning the Belt and Road Initiative with the Paris Agreement. China's global comparative advantage in the renewable energy sector has established a strong basis for China's collaboration in renewable energy with BRI partner countries. Indeed, the first half of 2023 emerged as the greenest in any 6-month period since the BRI's inception in 2013, with approximately USD 4.8 billion invested in renewable energy sources.[1] This report focuses on understanding the patterns of Chinese overseas green investment and uses three case studies on solar energy to highlight the complexities of the energy transition. BRI investments exacerbate existing economic, political, and social constraints while at the same time creating new risk vectors, potentially undermining environmental benefits, straining financial resources, and intensifying local and regional political risk.

BRI Energy Sector Investments unpacks the context of Chinese involvement in overseas renewable energy projects. It illustrates how the BRI is not a coherent policy venture but an indeterminate, experimental agglomeration of fragmented interests within and beyond the Chinese government. China has committed to the UN's Sustainable Development Goals and has sought to improve the environmental performance of the BRI - as part of this, it has invested more heavily in renewable energy. This section analyses BRI investment trends in the energy sector, showing how there has been a shift in investment from fossil fuels to renewables, and this is backed by strong demand by partner countries for such funding.

The first case study examines China's energy sector investments in **Pakistan**. The China-Pakistan Economic Corridor is considered one of the most extensive BRI programmes to date, yet its strategic ambitions to enhance connectivity and economic progress risk being overshadowed by pervasive issues in Pakistan's energy sector, including the inadequacy of grid infrastructure, underperformance of energy projects, inefficiencies, and more generally Pakistan's circular debt problem. The country's first utility-scale solar project, the Quaid-e-Azam Solar Park, is an illustrative example of the challenges of the energy transition in Pakistan.

The second case study examines the relationship between China and **Kenya** in energy sector investments. China is greatly interested in expanding its presence in Kenya due to its strong renewable energy capacity and favourable regulatory environment. The Garissa Solar Power Plant, as the largest grid-connected solar power plant in East and Central Africa, is an example of the promises of solar energy. However, the issues facing the project, including the favouring

[1] Wang, C.N. (2023) *China Belt and Road Initiative (BRI) Investment Report 2023 H1*. Available at: https://greenfdc.org/china-belt-and-road-initiative-bri-investment-report-2023-h1/

of national over local electricity access and limited local employment opportunities are indicative of some of the risks that face large-scale energy investment in the country. An assessment of broader China-Kenya political and economic relations reveals potential risks related to corruption, and the potential for projects to be linked to debt trap diplomacy.

The third and final case study evaluates Chinese energy sector investment in **Vietnam**. Vietnam maintains a careful balance between economic ties with China and competition with China, especially relating to maritime and territorial claims in the South China Sea. Negative general public perception towards China is coupled with suspicion towards investment projects, particularly related to Chinese imposition of loan prerequisites. The benefits of solar energy are also stunted by issues in Vietnam related to fragmentation and policy paralysis in the sector.

BRI Energy Sector Investments

Authors: *Kaki Chan and Milla Gajdos*

What is the Belt and Road Initiative?

China's Belt and Road Initiative (BRI) is an overarching scheme spanning across 18 provinces, 155 foreign countries, and stretching across a multitude of domains in infrastructure, raw materials, trade, technology, education, culture and environment. It is often depicted as a clearly defined, top-down "grand strategy" to assert Chinese dominance in Asia and beyond. This report intends to debunk this myth and argues that the BRI is not a coherent policy but an agglomeration of many competing, fragmented interests. Theories such as "fragmented authoritarianism"[2] or "*de facto* federalism"[3] point out that it is inherently infeasible for the Chinese leadership to meticulously devise a master plan with coherent goals and predictable outcomes. While President Xi Jinping set the broad contours of BRI, its actual content and execution are left to be determined by Chinese provincial governments, state-owned and private enterprises, policy and commercial banks and even the recipient states. The actual outcomes that often evolve from the intricate network of these "sometimes collaborative, sometimes collided" actors, can often diverge from top leaders' intentions and may even undermine China's core foreign policy objectives. A better way to characterise the BRI is that it is a vaguely defined "policy envelope" that accommodates diverse and sometimes contesting domestic interests and agenda, which in turn creates a wide space for subordinate actors to influence, interpret, and even ignore central directives.

An example of the deviation between central government and provincial implementation is the role of Yunnan Province in the Myanmar-China Oil and Gas Pipeline Projects[4]. China has long been concerned with the "Malacca Dilemma". Coined by former Chinese President Hu Jintao, it describes the threat of a potential naval blockade by the US or Indian navies (and through other US partners such as Singapore), in the Malacca Strait: a vital, if not most important, sea line of communication for the Chinese economy. As of 2021, 60% of China's total trade flows and over 70% of its petroleum and LNG exports passed through the Strait[5]. During the bid for BRI financing, Yunnan proclaimed the Myanmar-China Oil and Gas Pipeline Project as a way

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[2] Jones Lee. "China's Belt and Road Initiative Is a Mess, Not a Master Plan", *The Diplomat*, 9th October 2020. https://foreignpolicy.com/2020/10/09/china-belt-and-road-initiative-mess-not-master-plan/.

[3] Zheng Yong-Nian. 2007. *De Facto Federalism in China: Reforms and Dynamics of Central-Local Relations*. Singapore: World Scientific.

[4] Audrye Wong. "More than Peripheral: How Provinces Influence China's Foreign Policy." *The China Quarterly* 235 (September 2018): 735-757.

[5] Paweł Paszak. "China and the Malacca Dilemma", *Warsaw Institute*, 28th February 2021. https://warsawinstitute.org/china-malacca-dilemma/

to mend China's energy insecurity, but in reality it had negligible benefits on a national level, while yielding lucrative provincial benefits. Worse still, Yunnan's pipeline policy creates sunk costs for Beijing to pursue warmer relations with Naypyidaw. Project construction has provoked local protests over environmental concerns, forceful relocation and inadequate compensation. Adding to the bilateral friction, Yunnan's pursuit of these pipelines as China's gateway to the Indian Ocean has aroused Naypyidaw's suspicion of Beijing's intentions to exploit Myanmar for geostrategic purposes.

China's bid for global governance via the BRI hinges on two extrinsic variables: First, a peaceful and stable international environment; Second, continuity of political leadership in recipient states. The Ukraine War and potential US-China clashes over Taiwan have prompted BRI countries to consider de-risking from China and bolster their key supply chain resilience through protectionism. For US allies, they are increasingly compelled to trade economic benefits from China for the American security umbrella. The receptivity of BRI projects is largely conditioned by the interests of the host countries' political elites. Malaysia is an example of how domestic political caprices could spill into bilateral relations: the Chinese-sceptic former Prime Minister Mahathir axed two BRI megaprojects, which were legacies left by his rival and predecessor Najib. Intrinsically, China's post-pandemic economic malaise has constrained its overseas spending and reoriented its focus on domestic circulation. It would be inconceivable for the Chinese government to dash out piles of cash to state enterprises for the BRI without triggering domestic repercussions.

In conclusion, the BRI is an indeterminate, experimental venture driven primarily by competing domestic interests. It is susceptible to external uncertainties and reliant on an abundant treasury to fuel the fiscal imperatives.

BRI and GDI: A Continuum of China's Approach to Global Governance

A decade ago, the BRI was introduced as an all-purpose vehicle for Beijing to advance its foreign and economic interests and as a unified brand that links different streams and narratives under one canopy. It arrived at the apex of national optimism following China's ascent as an international financer in the Global Financial Crisis. Economically, China sought to alleviate its industrial overcapacity by expanding overseas markets through BRI investment and infrastructure projects. Geopolitically, China hoped to secure alternative trade routes bypassing the American-influenced Malacca Strait to counterpoise the US's "Pivot to Asia" strategy. It also intended to cultivate economic interdependence between the BRI participating nations and China, thereby aggrandising China's economic and political leverage.

The US-China trade war and the global pandemic have stymied the BRI's progress. Renewed Western hostilities towards China have spurred a spate of counter-offers in recent years, including the UK's Clean Green Initiative[6], the EU-led Global Gateway[7] and the US-led Build Back Better World (B3W) Partnership[8]. All of these initiatives eventually coalesced under the G7 Partnership for Global Infrastructure and Investment (PGII)[9]. There has been increasing wariness towards China's economic enticements and its alleged pursuit of "debt-trap diplomacy", especially among BRI recipient states. An example when Sri Lanka's Hambantota port was leased to China for 99 years in 2017 when Sri Lanka was unable to repay its debts - the port deal is widely cited as a prototype of China's "debt trap" diplomacy through the BRI, and there is also speculation that China is using the port as an overseas naval base. Meanwhile, Western "decoupling" or "de-risking" (which Beijing tactfully remarked as "decoupling in disguise")[10] from China has exacerbated China's fiscal deficit, hence hindering its capability of financing large-scale infrastructure projects under the BRI. To navigate these difficult circumstances, in September 2021, China inaugurated the Global Development Initiative (GDI) at the United Nations General Assembly, which is more agile, less geostrategically focused (at least at its face value) and smaller in budgetary scale.[11]

Although GDI was just as nebulous as the BRI when it was first launched, it would be an oversimplification to conceive the new initiative as "old wine in a new bottle". It is beyond doubt that China intends to use the GDI as a bland label free from Sino-centric suspicions that has bogged down the BRI and reclaim its allure to its Global South partners. It is, however, more than a mere rebranding, as the GDI encapsulates a distinct identity and prioritisation. In contrast to the BDI's reliance on heavy infrastructure construction, the GDI agenda[12] and its

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[6] UK Government. "PM Launches New Initiative to Take Green Industrial Revolution Global," 1st November 2021. https://www.gov.uk/government/news/pm-launches-new-initiative-to-take-green-industrial-revolution-global.

[7] European Commission. "Global Gateway: up to €300 billion for the European Union's strategy to boost sustainable links around the world," 1st December 2021. https://ec.europa.eu/commission/presscorner/home/en.

[8] The White House. "FACT SHEET: President Biden and G7 Leaders Launch Build Back Better World (B3W) Partnership | The White House," 12th June 2021. https://www.whitehouse.gov/briefing-room/statements-releases/2021/06/12/fact-sheet-president-biden-and-g7-leaders-launch-build-back-better-world-b3w-partnership/.

[9] The White House. "FACT SHEET: President Biden and G7 Leaders Formally Launch the Partnership for Global Infrastructure and Investment | The White House," 26th June 2022. https://www.whitehouse.gov/briefing-room/statements-releases/2022/06/26/fact-sheet-president-biden-and-g7-leaders-formally-launch-the-partnership-for-global-infrastructure-and-investment/.

[10] The Global Times. "Washington's 'de-Risking' of China Ties Might Be Just 'Decoupling' in Disguise", *The Global Times*, 28th April 2023. https://www.globaltimes.cn/page/202304/1289958.shtml.

[11] UN Department of Economic and Social Affairs. *Global Development Initiative-Building on 2030 SDGs for Stronger, Greener and Healthier Global Development*. https://sdgs.un.org/partnerships/global-development-initiative-building-2030-sdgs-stronger-greener-and-healthier-global.

[12] PRC The State Council Information Office. "Global Development Initiative: "No country should be left behind" ", 23rd September 2022. http://english.scio.gov.cn/videos/2022-09/23/content_78434399.htm

first batch of announced projects[13] revolve around eight pillars: (1) software upgrading for development, (2) poverty reduction, (3) food security, (4) pandemic response and vaccines, (5) financing for development, (6) climate change and green development, (7) industrialisation, (8) digital economy and "digital-era" connectivity. As observed by Hoang, the GDI consciously captures the economic-centric development needs of the Global South countries, particularly in Southeast Asia, at a time when the US and European democracies are distracted by the war in Ukraine and are increasingly withdrawing from their multilateral commitments[14]. The fiscal scale of GDI is also largely restrained due to its monophonic financing structure. It primarily relies on the Global Development and South-South Cooperation Fund (GDSSCF)[15], amounting to USD 4 billion at present, which is in stark contrast with the multi-trillion, multilateral funding BRI receives[16].

While no security concept has been formally affixed to the BRI, the GDI is part of a triumvirate operating alongside two parallel initiatives, the Global Civilization Initiative (GCI)[17] and the Global Security Initiative (GSI)[18]. Due to their relatively recent founding (with the GSI and GCI being first proposed in April 2022 and March 2023 respectively), it remains amorphous how the synergies will evolve between the GDI and its parallel initiatives. Yet, it is reasonable to deduce that China's audacious quest for post-Pax Americana security in the GSI may disconcert some hedging states to participate in the GDI, as endorsing the economic-oriented GDI could risk antagonising Washington for inadvertently aligning with Beijing's security objectives.

Ten years on, the BRI's lustre might appear to be waning. Yet, it would be premature to conclude that the GDI is meant to replace the BRI. Rather, the transition from BRI to GDI should be framed as a continuum of China's bid for global governance. China's ambition to ascend as a global power remains constant, but the changes in its contextual environment, be it domestic or international, have compelled it to tailor its strategy and response.

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[13] PRC Ministry of Foreign Affairs (FMPRC). *List of First-batch Projects of GDI Project Pool*. https://www.fmprc.gov.cn/eng/wjdt_665385/2649_665393/202209/P020220921624707087888.pdf

[14] Hoang Thi Ha, "Why Is China's Global Development Initiative Well Received in Southeast Asia?", ISEAS Yusof Ishak Institute, September 2023. https://www.iseas.edu.sg/articles-commentaries/iseas-perspective/2023-9-why-is-chinas-global-development-initiative-well-received-in-southeast-asia-by-hoang-thi-ha/.

[15] FMPRC, "Jointly Advancing the Global Development Initiative and Writing a New Chapter for Common Development," 21st September 2022. https://www.fmprc.gov.cn/eng/wjb_663304/wjbz_663308/2461_663310/202209/t20220922_10769721.html

[16] Centre for International Knowledge on Development (CIKD). *Progress Report on Global Development Initiative*, June 2023. https://www.fmprc.gov.cn/eng/wjb_663304/zzjg_663340/ggjjs_665228/xwlb_665230/202306/P020230620670430885509.pdf

[17] CGTN, "Xi Proposes Global Civilization Initiative," *CTGN*, 22nd March 2023. https://news.cgtn.com/news/2023-03-15/Xi-proposes-Global-Civilization-Initiative-1icgxtDI3Go/index.html

[18] FMPRC. "The Global Security Initiative Concept Paper," 21st February 2023. https://www.mfa.gov.cn/eng/wjbxw/202302/t20230221_11028348.html

Greening or Greenwashing the BRI?

Facing mounting attention over BRI's potential environmental repercussions, Beijing has advocated for a flurry of initiatives and policies to rebrand its mega infrastructure programme as the "Green Silk Road". The concept of greening the BRI was first announced in 2017[19]. The objective was further cemented by the inception of the BRI International Green Development Coalition (BRIGC) in 2019, which serves as a multilateral advisory framework aligned with the UN 2030 Agenda for Sustainable Development[20]. Among China's recent efforts to reclaim its global environmental credibility and leadership was the joint issuance of a high-level policy document on the greening of the BRI by four ministries instrumental to BRI project delivery in March 2022[21]. This document reaffirms China's commitment to fully adhere to the Paris Agreement in the BRI, including halting the construction of new coal power plants. It also touched on a broader scope of development on green infrastructure projects in energy, transport, industry and manufacturing, and green finance, as well as better standardisation within the BRI. It also specifically highlighted the need to reduce and control project-level environmental risks[22].

The question is: does China practise what it preaches for a greener, more sustainable BRI? Since its inception, Beijing has been accused of outsourcing its pollution-intensive development model to poorer countries via the BRI. Citing findings by the Council on Foreign Relations, 91% of energy-sector loans lent by Chinese banks to BRI recipient states were for fossil-fuel projects between 2014 and 2017. By the end of 2016, China was involved in 240 coal-powered projects in 25 BRI countries[23]. Historically, a number of BRI projects have been halted or cancelled by governments due to environmental risk or distress. For example, in December 2018, the Pakistan government decided to stall a 1,300-megawatt coal project that was planned under the auspices of the flagship China-Pakistan Economic Corridor (CPCC), as

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[19] PRC Ministry of Ecology and Environment (MEEPRC). "Guidance on Promoting Green Belt and Road", 28th June 2017. https://english.mee.gov.cn/Resources/Policies/policies/Frameworkp1/201706/t20170628_416864.shtml.

[20] UN Environment Program. "The Belt and Road Initiative International Green Development Coalition (BRIGC)". https://www.unep.org/regions/asia-and-pacific/regional-initiatives/belt-and-road-initiative-international-green.

[21] PRC National Development and Reform Commission, FMPRC, MEEPRC and PRC Ministry of Commerce. "Opinions on Jointly Promoting Green Development of the Belt and Road", 22nd April 2022. http://en.brigc.net/Media_Center/Updates/Green_Belt_and_Road/202204/t20220408_130595.html

[22] Dimitri De Boer, Christoph Nedopli Wang and Danting Fan. "Interpretation: Opinions on the Joint Implementation of Green Development in the Belt and Road Initiative (BRI) by Four Ministries," Green Finance and Development Centre, 26th April 2022. https://greenfdc.org/interpretation-opinions-on-the-joint-implementation-of-green-development-in-the-belt-and-road-initiative-bri-by-four-ministries/.

[23] Jennifer Hillman and Alex Tippett, "The Climate Challenge and China's Belt and Road Initiative," Council on Foreign Relations, 4th November 2022. https://www.cfr.org/blog/climate-challenge-and-chinas-belt-and-road-initiative.

the project would plunge the country into an inter-generational environmental capacity trap[24]. BRI-backed coal plants have also ignited fierce local protests over pollution in Pakistan, Kenya, Indonesia and Serbia[25].

There is a growing consciousness in the Beijing leadership that environmental sustainability is critical to the success of BRI, and nascent progress has been shown in recent years. While Beijing's greening actions are still at their nascent stage, it would be disheartening to suspect its intention as "greenwashing", neglecting the accelerating progress that has been made so far. The following section evaluates investment trends in BRI energy sector investments.

BRI Energy Sector Investment Trends

A report from the Green Finance and Development Centre (GFDC) at Fudan University in Shanghai reveals significant consolidation in China's efforts to promote environmental sustainability within the BRI. The first half of 2023 emerged as the greenest in any 6-month period since the BRI's inception in 2013[26]. In the first half of 2023, total engagement in the energy sector reached USD 12.3 billion. However, this figure is down 40% from figures in the first half of 2019, when engagement reached approx. USD 20 billion. This drop could be due to a drop in oil and gas related projects. Engagement in oil and gas in 2023 fell to USD 3.8 billion (45% of Chinese overseas energy engagement), USD 1.4 billion through investment, and USD 2.4 billion in construction contracts. Oil-related investments reached their lowest level since the BRI was announced, as they recently dropped to zero.

On 21st September 2021, China pledged that it would stop constructing new coal power plants overseas and support low-carbon and clean energy[27]. This marked a significant departure from previous approaches to overseas energy sector investments for China, which had invested US$52 billion in overseas coal power generation over the past two decades[28]. Between the announcement in September 2021 and April 2022, China had shelved or cancelled 15 BRI-

[24] Khaleeq Kiani. "Govt Puts Major CPEC Power Project on Hold," *DAWN*, 14th January 2019. https://www.dawn.com/news/1457449.

[25] John Vidal, "Are China's Pledges to Green Its Belt and Road Initiative the Real Deal?,"20th September 2022. https://ensia.com/features/china-belt-road-initiative-infrastructure-sustainable-silk-road/.

[26] Wang, C.N. (2023) *China Belt and Road Initiative (BRI) Investment Report 2023 H1*. Available at: https://greenfdc.org/china-belt-and-road-initiative-bri-investment-report-2023-h1/

[27] Volcovici, V., Brunnstrom, D. and Nichols, M. (2021) *In climate pledge, Xi says China will not build new coal-fired Power Projects Abroad*, *Reuters*. Available at: https://www.reuters.com/world/china/xi-says-china-aims-provide-2-bln-vaccine-doses-by-year-end-2021-09-21/

[28] *China Overseas Finance Inventory Database - DATA: World Resources Institute* (no date) *Data*. Available at: https://datasets.wri.org/dataset/cofi

backed coal power projects in the pre-financial closure and pre-construction stages[29]. There has been a noticeable reduction in the number of active projects involving coal-fired power plants in BRI investments. However, this is not to say that the announcement to end coal investments directly translates to perfect implementation. In January 2023, the Pakistan government approved a 300-megawatt coal power plant in Gwadar to be built by China, which was excluded from a dataset by the Green Finance and Development Centre because it had not reached financial close[30]. Moreover, the environmental governance of BRI is in a quasi-anarchical state, where there is no unanimity between a slate of actors regarding their environmental commitment. While China espouses green principles for the BRI projects, it is ultimately host government policies that regulate their execution[31].

China's need to meet soaring power demand while simultaneously aiming to decrease reliance on coal and gas has spurred substantial growth in its renewable energy sector over the past decade. China's comparative advantage starts with its significant experience in renewable energy supply chains. Notably, China dominates the global markets for renewable manufacturing, accounting for 72%[32] of global solar manufacturing and 50%[33] of global wind turbine production. This scale-driven dominance translates into cost efficiency. China not only benefits from the advantage of cheaper-than-world-average[34] wind and solar equipment, and an efficient and low-cost equipment supply chain[35], but the country has also established its competitiveness in the international market as an Engineering, Procurement, and Construction contractor and equipment supplier in the international renewables market. Between 2008 and 2017, the global average annual growth rate of wind and solar power installed capacity averaged 19% and 46% respectively. By comparison, China's annual growth rates for wind and solar power installed capacity averaged an impressive 44% and 191% respectively[36]. These remarkable growth rates have established a strong basis for China's collaboration in renewable energy with nations participating in the Belt and Road Initiative.

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[29] Krista Charles. "China's No New Coal Power Overseas Pledge, One Year On." China Dialogue, 29th September 2022. https://chinadialogue.net/en/energy/chinas-no-new-coal-power-overseas-pledge-one-year-on/.

[30] "300MW Coal Power Plant Okayed for Gwadar," *The News International*, 3rd January 2023. https://www.thenews.com.pk/print/1027065-300mw-coal-power-plant-okayed-for-gwadar.

[31] Jackson Ewing, "Making the Belt and Road Environmentally Sustainable," *The Diplomat*, 3rd May 2019. https://thediplomat.com/2019/05/making-the-belt-and-road-environmentally-sustainable/.

[32] Goldie-Scot, L., Zindler, E. and Lezcano, P. (2021) *Solar PV Trade and Manufacturing A Deep Dive*. Available at: https://csis-website-prod.s3.amazonaws.com/s3fs-public/Solar%20PV%20Case%20Study%20-%20BloombergNEF.pdf?wDUUlXhfxWtA0lLU66HdshX539MvZHDI

[33] Mackenzie, W. (2022) *China's renewables boom year poses major challenges to western markets*, *Wood Mackenzie*. Available at: https://www.woodmac.com/press-releases/chinas-renewables-boom-year-poses-major-challenges-to-western-markets/

[34] Ibid.

[35] Blackburne, A. (2022) *China's increasingly cheap wind turbines could open new markets*, *S&P Global Homepage*. Available at: https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/china-s-increasingly-cheap-wind-turbines-could-open-new-markets-72152297

[36] (2020) *Belt and Road Renewable Energy Development: the Path to Cooperation and Mechanisms for Promoting International Cooperation*. Available at: https://research.hktdc.com/en/article/MzYyOTU2OTIx

The demand landscape is favourable too. BRI partner countries represent over 63% of the global population and 61% of global greenhouse gas (GHG) emissions but only 38% of global GDP[37]. This means that they will play an increasingly significant role in limiting global warming, with prognosed rapid population and GDP growth in the coming decades. They also typically possess significant capacities for renewable energy, like wind, solar, water, and tidal energy. For instance, numerous nations in Central Asia and West Asia enjoy extended periods of sunshine, intense light, and considerable potential for solar energy development. Similarly, many countries in Southeast Asia and South Asia have water resources, such as waterfalls and rivers that can be used for generating hydropower.

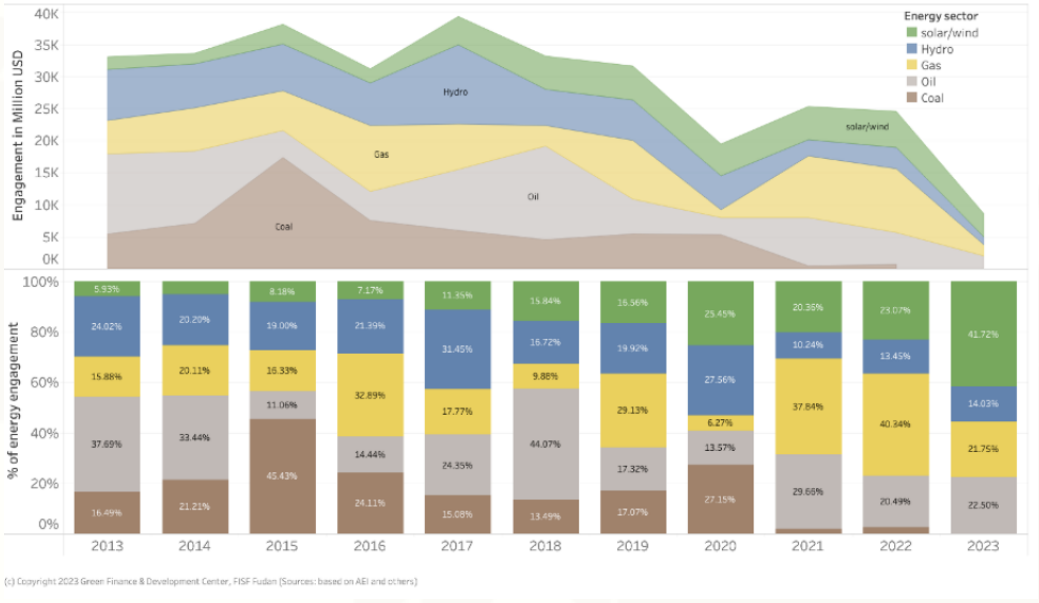

Figure 1: *Chinese total energy engagement in the Belt and Road Initiative (BRI) 2013-2023 H1*. Source: Christoph Nedopil Wang (2023)

In the first half of 2023, China's engagement amounted to approximately USD 4.8 billion in renewable energy sources, including solar, wind, and hydropower as outlined by the report. 41% of the country's total energy investment went into solar and wind and a further 14% into hydropower. This shows an increase of 26% from USD 3.8 billion in the first half of 2022. Looking only at investments, there is a decrease from USD1.3 billion in the first half of 2022 to USD 990 million by the first half of 2023. However, construction projects related to green

[37] *New Analysis of Belt and Road Initiative (BRI) countries identifies synergies across societal goals, policy priorities, and low-carbon transition potential* (2022) *Center for Global Sustainability*. Available at: https://cgs.umd.edu/news/new-analysis-belt-and-road-initiative-bri-countries-identifies-synergies-across-societal-goals

energy (including hydropower) have increased from 1.6 billion in the first half 2022 to USD 2.6 billion in the first half of 2023. Comparing H1 2022 total green energy engagement with H1 2021, there was a drop of 22%. However, looking at the whole year of 2022, China experienced a notable 50% year-on-year surge in its investments in renewable energy in solar, wind, and hydropower projects, within regions connected to the BRI.

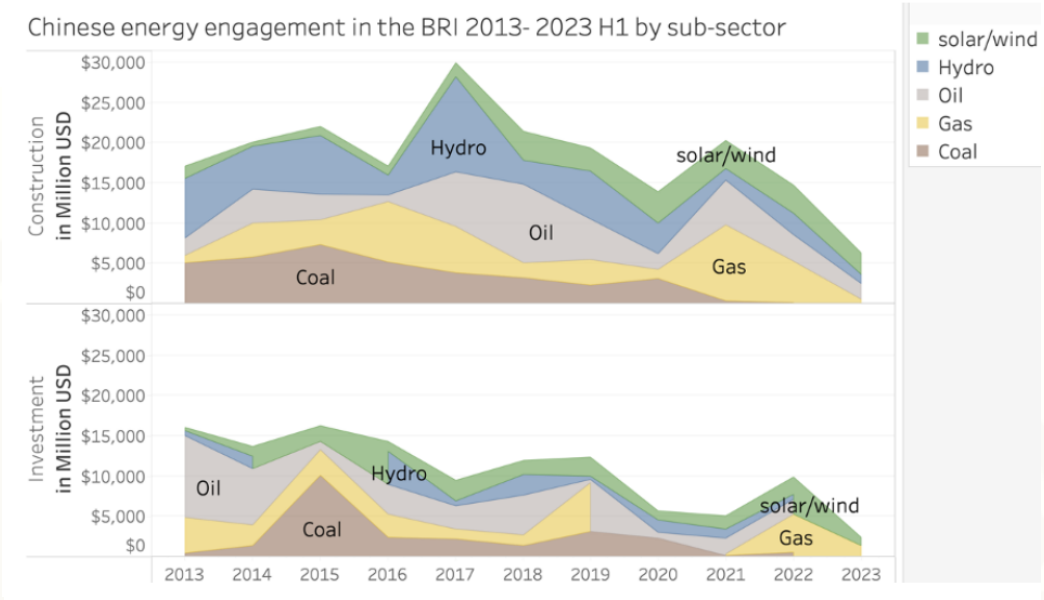

Figure 2: *Chinese energy engagement through investment and construction in the Belt and Road Initiative (BRI) 2013-2023 H1*. Source: Christoph Nedopil Wang (2023)

Further growth areas that deserve to be mentioned because of their strategic importance and significance for the green transition and batteries for EVs is metals and mining. Engagement in this sector, particularly in African and Latin American countries, has increased by 131% compared to the first half of 2022.

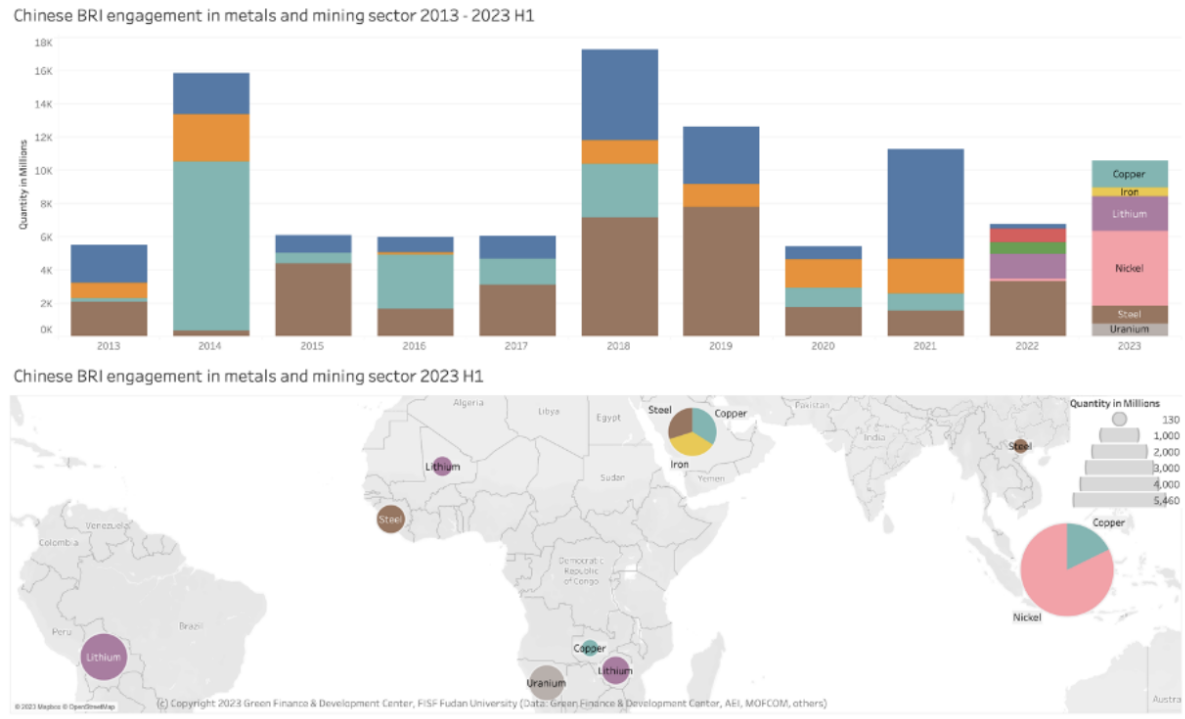

Figure 3: *Chinese BRI engagement in metals and mining in the Belt and Road Initiative (BRI) 2013-2023 H1*. Source: Christoph Nedopil Wang (2023)

It is also important to note that deal sizes related to the BRI are gradually getting smaller. This trend is likely to be explained with larger deals' more significant social, environmental and governance (ESG) requirements and issues. The average deal size for investments has decreased from about USD 617 million in 2022 to USD 392 million in the first half of 2023. Compared to the peak in 2018, the investment deal size is 48% smaller.

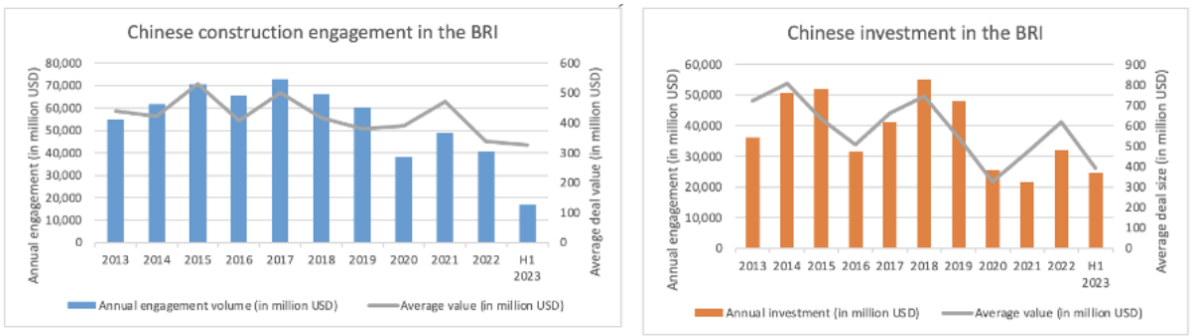

Figure 4: *Deal size of Chinese engagement in the Belt and Road Initiative (BRI) 2013-2023 H1*. Source: Christoph Nedopil Wang (2023)

Outlook for BRI Finance and Investments

As 2023 progresses, with the lifting of China's COVID lockdowns, a promising outlook emerges for the recovery of investments and construction contracts in BRI countries. On the one hand, the world needs investments supported by global financial institutions, including developing finance institutions to spur growth, thereby offering Chinese contractors a beneficial platform. Concurrently, the easing of travel restrictions empowers Chinese developers with enhanced mobility, enabling them to freely negotiate, plan, and implement new projects. Within this context, in tandem with the increasing global trend towards greener solutions and the growing energy needs of developing nations, China is poised to seize a notable momentum. There are some challenges ahead, however. The global renewable investment landscape remains intricate for potential investors to navigate. This is due to the diverse range of regulatory frameworks and policy conditions in place across countries. The global economic downturn may increase shipping costs, and soaring commodity prices and declining electricity demand might change the investment prospects. The mounting geopolitical tensions on the international stage may also have implications for China's capacity to dominate renewable energy markets. Nevertheless, the overall conditions are conducive for China to prioritise renewable energy over fossil fuels in its imminent phase of foreign investment.

Pakistan

Author: *Gabrielė Eidėjūtė-Strong*

The China-Pakistan Economic Corridor (CPEC) is one of six economic corridors within China's Belt and Road Initiative (BRI). Launched in 2015, the mammoth $62 billion project is considered to be China's boldest venture within a single recipient country.[38] It encompasses a spectrum of infrastructure, transportation, energy, industrial development, and socio-economic upliftment investments. The corridor connects China's Xinjiang province with the port of Gwadar in Southern Pakistan, giving Beijing access to the Indian Ocean.

CPEC – a chance to empower Pakistan?

Among the multifaceted partnership that extends across various domains, energy investments play a pivotal role in shaping CPEC strategic cooperation.[39] Pakistan has been dealing with a persistent energy crisis, severely impeding its economic progress, social development, and stability. Until 2017, energy demand significantly exceeded generation capacity, leading to regular load shedding, leaving many areas of the country disconnected from the national grid.[40] During the summer season, the energy deficit would reach 7,000MW.[41]

CPEC presented an opportunity for Pakistan to get out of the constant energy deficit.[42] Energy generation makes up the majority of already completed CPEC projects, which now provide around one-third of the power for Pakistan's electrical grid,[43] with most of the energy coming from coal-fired power plants.[44] While the expansion of power generation capacity under CPEC

[38] Mardell, Jacob. 2020. "The BRI in Pakistan: China's Flagship Economic Corridor." Merics.org. Mercator Institute for China Studies. May 20, 2020. https://merics.org/en/analysis/bri-pakistan-chinas-flagship-economic-corridor.

[39] ibid.

[40] Ali, Murad. 2022. "CPEC in Pakistan's Quest for Energy Security: Clarifying Some Misperceptions." *China Quarterly of International Strategic Studies* 07 (02): 179–98. https://doi.org/10.1142/s237774002150007x.

[41] Ibid.

[42] Duan, Wenqi, Adnan Khurshid, Naila Nazir, Khalid Khan, and Adrian Cantemir Calin. 2022. "From Gray to Green: Energy Crises and the Role of CPEC." *Renewable Energy* 190 (May): 188–207. https://doi.org/10.1016/j.renene.2022.03.066.

[43] Jaleel, Muhammad. 2023. "Economists Tally Results of Decade of Chinese Investment in Pakistan." VOA. July 27, 2023. https://www.voanews.com/a/economists-tally-results-of-decade-of-chinese-investment-in-pakistan/7201145.html.

[44] China-Pakistan Economic Corridor (CPEC) Secretariat. n.d. "Energy Projects under CPEC | China-Pakistan Economic Corridor (CPEC) Authority Official Website." Cpec.gov.pk. Accessed August 10, 2023. https://cpec.gov.pk/energy.

helped the country meet its energy demands, it presented a new challenge – energy surplus.[45] The surplus capacity reveals a multitude of issues, with one of the most prominent being the inadequacy of Pakistan's energy grid infrastructure, which fails to reach nearly 50 million people, even amidst the abundance of energy.[46] For example, the 2,400MW coal power plant in Thar "is unable to dispatch more than 75 percent of the aggregate capacity".

Moreover, the outdated transmission network struggles to handle the increased load, which leads to transmission losses, grid instability, and frequent power outages. Pakistan experienced one of its longest blackouts this year, affecting roughly 90 percent of its population.[47] Major cities, including its capital, Islamabad, stayed in the dark for around 8 hours[48], with complete grid restoration taking nearly 24 hours.[49] Despite the urgency of bolstering energy grid infrastructure, the Matiari-Lahore Transmission Line, completed in 2021, stands as the sole grid infrastructure project listed among CPEC initiatives. [50]

Moreover, the excess capacity causes financial burdens. Even if the power is not fully utilised, either the consumers or the government are obligated to pay for excess power, contributing to rising electricity prices.[51] This puts financial strain on households and businesses and fuels inflation. In turn, the government's attempt to remedy the situation by introducing subsidies on power tariffs causes a significant drain on the government's resources. It creates circular debt, which by 2020, has reached around 12 billion USD.[52] Achieving and surpassing energy requirements is a commendable feat. However, it raises an essential question: What purpose do these coal power plants serve if they often remain idle and inaccessible to a significant portion of the population? This question is especially pertinent if we also look at the negative

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[45] Ebrahim, Zofeen T. 2021. "Pakistan Faces an Unexpected Dilemma: Too Much Electricity." *Reuters*, February 24, 2021, sec. APAC. https://www.reuters.com/article/us-pakistan-energy-climate-change-featur-idUSKBN2AO27C.

[46] ibid.

[47] Saifi, Sophia, Azaz Syed, and Rhea Mogul. 2023. "Nearly 220 Million People in Pakistan without Power after Countrywide Outage." CNN. January 23, 2023. https://edition.cnn.com/2023/01/22/asia/pakistan-power-outage-intl-hnk/index.html.

[48] Masood, Salman, and Zia ur-Rehman. 2023. "Power Outage Sweeps Pakistan, Dropping Millions into Darkness." *The New York Times*, January 23, 2023, sec. World. https://www.nytimes.com/2023/01/23/world/asia/pakistan-power-outage-blackouts.html.

[49] Hussain, Abid. 2023. "Power Fully Restored in Pakistan Day after Outage, Says Minister." Aljazeera. January 24, 2023. https://www.aljazeera.com/news/2023/1/24/power-fully-restored-in-pakistan-day-after-outage-says-minister.

[50] China-Pakistan Economic Corridor (CPEC) Secretariat. n.d. "Matiari to Lahore ±660 KV HVDC Transmission Line Project." China-Pakistan Economic Corridor (CPEC) Secretariat Official Website. Accessed September 7, 2023. https://cpec.gov.pk/project-details/17.

[51] Ebrahim, Zofeen T. 2021. "Pakistan Faces an Unexpected Dilemma: Too Much Electricity." *Reuters*, February 24, 2021, sec. APAC. https://www.reuters.com/article/us-pakistan-energy-climate-change-featur-idUSKBN2AO27C.

[52] Nicholas, Simon. 2020. "IEEFA Report: New Coal Power Plants Locking Pakistan into Too Much Supply and Unsustainable Capacity Payments." Institute for Energy Economics and Financial Analysis. June 26, 2020. https://ieefa.org/articles/ieefa-report-new-coal-power-plants-locking-pakistan-too-much-supply-and-unsustainable.

environmental impact connected to both the construction and operation of coal-fired power plants.

According to a report by the Institute for Energy Economics and Financial Analysis (IEEFA), "smaller, modular renewable energy additions, grid improvements, and energy efficiency" would reduce the overcapacity, energy distribution, and, in turn, financial issues.[53] However, coal-fired and hydroelectric power plans have been the main focus of CPEC investments. In the energy sector, Chinese state-owned enterprises (SOEs), like the China Machinery Engineering Corporation (MEC), PowerChina, and the China Three Gorges Corporation, are most prominent in the coal-fired and hydropower plants. Meanwhile, China's private renewable energy companies have been reported to face "difficulties getting their "green" investments into CPEC"[54] – resulting in a relatively small percentage of renewable energy projects within CPEC.

Green Promises and Realities

However, over the last few years, there has been a shift in policy and investments in renewable energy sources like wind and solar power.[55] The shift signifies China's attempt to rebrand the BRI as an eco-friendly initiative. Policy declarations and official statements from both China and Pakistan, highlighting their commitment to sustainable development and environmental conservation, played a pivotal role in signalling the greening of CPEC. In 2020, at the Climate Ambition Summit, Pakistan's Prime Minister Imran Khan stated that his country "will not have any more power based on coal," pledging that two major ongoing carbon plants will be scrapped.[56] He also set goals for his country to produce 60% of its energy from renewable sources by 2030.[57] The following year, at the UN General Assembly, China pledged "not to build any new coal power plants overseas.[58] To facilitate the transition, the Sustainable Development Policy Institute (SDPI) and Pakistan-China Institute (PCI) launched a Green

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[53] ibid.

[54] Wilson Center. 2020. "WEBCAST: It's Not Easy Being Green: Obstacles for Clean Energy in the China-Pakistan Economic Corridor." Wilson Center. December 3, 2020. https://www.wilsoncenter.org/event/webcast-its-not-easy-being-green-obstacles-clean-energy-china-pakistan-economic-corridor.

[55] Jillani, Shahzeb. 2022. "Analysis: China's Energy Investment in Pakistan, from Coal to Renewables." The Third Pole. November 18, 2022. https://www.thethirdpole.net/en/energy/analysis-chinas-shifting-energy-investments-in-pakistan-from-coal-to-renewables/.

[56] Pakistan Tehreek-e-Insaf. 2020. "Prime Minister Imran Khan's Address to the Climate Ambition Summit 2020." Pakistan Tehreek-e-Insaf. December 12, 2020. https://insaf.pk/news/prime-minister-imran-khans-address-climate-ambition-summit-2020.

[57] Sheikh, Ali Tauqeer. 2021. "Pakistan NDC Commits to Halving Emissions, Finance Key." The Third Pole. October 30, 2021. https://www.thethirdpole.net/en/climate/pakistan-ndc-commits-to-halving-emissions-finance-key/.

[58] Volcovici, Valerie, David Brunnstrom, and Michelle Nichols. 2021. "In Climate Pledge, Xi Says China Will Not Build New Coal-Fired Power Projects Abroad." *Reuters*, September 22, 2021, sec. China. https://www.reuters.com/world/china/xi-says-china-aims-provide-2-bln-vaccine-doses-by-year-end-2021-09-21/.

CPEC initiative, "uniting stakeholders to make the CPEC greener and decarbonized."[59] By redirecting Chinese infrastructure investments in Pakistan, SDPI hopes for Pakistan to act as a "leading role in shaping the development of the overall BRI."[60] Undermining the rhetoric, in 2023, Pakistan's government announced plans to proceed with the construction of a 300MW coal-powered plant in Gwadar, highlighting a disconnect between stated intentions and practical actions by both governments.[61] The Gwadar coal power plant, envisioned in 2016 with a projected cost of USD 542.32 million, is set to be financed by China's largest commercial bank and constructed by CIHC Pak Power, a subsidiary of China Communications and Construction Group – a state-owned enterprise. Addressing the criticism, government officials argued that the project is not new and was approved in 2017; therefore, it does not fall under the pledge.[62] According to Azhar Lashari from the Policy Research Institute for Equitable Development, it not only violates the commitments made – as no civil works on the plant had started, but it also undermines "the battle against global warming and climate change."[63]

Case study: Quaid-e-Azam Solar Park in Bahawalpur

The combination of unfulfilled commitments and past instances of underperforming green projects raises concerns about the attainability of Pakistan's target to get 60% of its energy from sustainable and renewable sources by 2030.

Despite Pakistan being an ideal candidate for harvesting solar power, out of 21 energy projects completed or in development under CPEC, only one is solar: the 1,000 MW Quaid-e-Azam Solar Park (QASP) in Bahawalpur. The Solar Park, listed as one of CPEC's "early harvest"[64] projects, was approved by the Government of Punjab in 2013. Employing PV solar technology, the project was divided into three construction phases: the first two involved installing 400 MW capacity, which was completed in 2016. The third phase, aiming to add another 600MW

[59] Javid, Siham. 2023. "CPEC Promoting Green and Sustainable Development." Centre for Strategic and Contemporary Research. June 28, 2023. https://cscr.pk/explore/themes/energy-environment/cpec-promoting-green-and-sustainable-development/.

[60] Nedopil, Christoph, and Hina Aslam. 2023. "Green Financing Guidelines and Framework for China Pakistan Economic Corridor (CPEC) -Baseline Research." Shanghai and Islamabad: GFDC FISF Fudan University, SDPI and PCI. https://greenfdc.org/wp-content/uploads/2023/03/Green-CPEC-Financing-Guidelines.pdf.

[61] Ebrahim, Zofeen. 2023. "Coal Returns to the China-Pakistan Economic Corridor." The Third Pole. March 16, 2023. https://www.thethirdpole.net/en/energy/gwadar-coal-returns-to-china-pakistan-economic-corridor/.

[62] ibid.

[63] ibid.

[64] Kai, Liu. 2018. "Zonergy Solar Power Project." Embassy of the People's Republic of China in the Islamic Republic of Pakistan Official Website. October 1, 2018. http://pk.china-embassy.gov.cn/eng/zbgx/CPEC/201901/t20190104_1270073.htm.

capacity,[65] has been stalled due to disagreements regarding the reduction of tariffs.[66] The Contractor for the first phase was TBEA Xinjiang SunOasis Co. Ltd., while the remaining two were awarded to Zoenergy Company. According to official reports, the estimated cost is 1.3 billion USD.[67]

It is the very first utility-scale solar power plant in the country, and, according to Quaid-e-Azam Solar's official website, it is meant to "achieve socio-economic prosperity and sustainability for the nation, for the planet, for a better tomorrow."[68] QASP was supposed to become the largest solar farm in the world, making Pakistan a world leader in green energy.[69] However, in parallel with the earlier discussed commitments, the Quaid-e-Azam Solar Park has become entangled in controversy due to its lacklustre performance. Envisioned as a pioneer in utility-scale solar power generation, it produces ten times less than promised and at a much higher cost[70], contributing to Pakistan's growing circular debt. There are many theories explaining the failure of the project.

One of the factors hindering power generation seems to border on the ironic. Located in the Cholistan Desert, the park's solar panels grapple with a seemingly mundane adversary – sand. The accumulation of sand particles leads to a substantial decline in power output and module efficiency.[71] The solar company uses one litre of water to clean each solar panel. There are 400,000 panels, which should grow to 5.2 million once the project is completed. The cleaning is manual and takes up to 15 days to complete, after which the process must be repeated. This can cost up to 124 million litres of water every wash cycle.[72] The juxtaposition of an eco-friendly project consuming exorbitant water resources exposes a harsh reality behind the CPEC's seemingly noble intentions.

Some argue that the overly ambitious goals and overestimation of the park's potential might have impeded the success of meaningfully contributing to Pakistan's energy sector. When the project was announced, Ali Hassan Habib, a former director general of WWF-Pakistan,

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[65] China-Pakistan Economic Corridor (CPEC) Secretariat. n.d. "1000MW Quaid-e-Azam Solar Park (Bahawalpur)." China-Pakistan Economic Corridor (CPEC) Authority Official Website. Accessed August 7, 2023. https://cpec.gov.pk/project-details/10.

[66] Saeed, Aamir. 2016. "Solar Scale-up in Pakistan Hits Roadblock after Payments Slashed." *Reuters*, September 19, 2016, sec. Economic News. https://www.reuters.com/article/pakistan-solar-energy-idINKCN11P1SX.

[67] ibid.

[68] Quaid-e-Azam Solar Power (Pvt.) Ltd. n.d. "100 MW Solar Power Plant at Bahalwalpur." Quaid-e-Azam Solar Power (Pvt.) Ltd. Accessed August 7, 2023. https://www.qasolar.com/.

[69] Eco-Business. 2015. "China Helps Pakistan Build World's Largest Solar Farm." Eco-Business. September 9, 2015. https://www.eco-business.com/news/china-helps-pakistan-build-worlds-largest-solar-farm/.

[70] Khawaja, Nudrrat. 2015. "Why Is the Govt Privatising the Quaid-e-Azam Solar Park?" Dawn.com. December 6, 2015. https://www.dawn.com/news/1224548.

[71] Khaliq, Asad, Ali Ikram, and Muhammad Salman. 2015. "Quaid-e-Azam Solar Power Park: Prospects and Challenges," 1–6. https://doi.org/10.1109/PGSRET.2015.7312186.

[72] Atif Azad, Raja Muhammad. 2015. "The Solar Project." Dawn.com. September 30, 2015. https://epaper.dawn.com/DetailImage.php?StoryImage=30_09_2015_009_004.

questioned the choice of "jumping into untested scale. Pakistan is inexperienced in solar power; however, the project is nearly double the world's largest Solar power generating facilities. He suggested that it would have been wiser to distribute the panels closer to the electricity consumption point, potentially large parking lot rooftops, rather than remote locations.[73] On top of the costly investment in grid infrastructure to bring the produced energy from a remote location and expensive maintenance, large projects are prone to corruption due to their complexity and financial magnitude, offering opportunities for unethical practices.

As expected, the QASP is ridden with controversies regarding embezzlement, corruption, and lack of transparency in bidding and recruitment processes[74] , which also shed light on potential reasons for QASP's underperformance. The initial contract for the project's second phase was awarded to a Chinese company, Zoenergy, a subsidiary of a telecommunication company, without competitive bidding, which raised suspicions about the selection process. In 2014, PPP member of the Punjab Assembly, Khurram Jehangir Wattoo, filed a petition to cancel the letter of interest issued to Zoenergy, demanding that Punjab Chief Minister Shahbaz face accountability for the lack of transparency.[75] The petitioner highlighted that Zoenergy's parent company, ZTE, was rejected for the construction of the first phase because the telecommunications company had nothing to do with solar energy. Nevertheless, a subsidiary of the same company is now selected for a much larger task.[76] Similar allegations, claiming that the company had "given contracts to "favourite" contractors, who used substandard material in the construction of the project," have been investigated by the Punjab Anti-Corruption Establishment (ACE) as recently as 2022.[77] Additionally, there have been reports of the Punjab government trying to sell the QASP out of fear of an investigation by the National Accountability Bureau (NAB) and the Auditor General of Pakistan (AGP) regarding the alleged embezzlement of billions of rupees.[78][79]

Quaid-e-Azam Solar Park's underperformance, not-so-green maintenance, and the financial issues connected to Pakistan's circular debt problem highlight the complexities of transitioning

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[73] Eco-Business. 2015. "China Helps Pakistan Build World's Largest Solar Farm." Eco-Business. September 9, 2015. https://www.eco-business.com/news/china-helps-pakistan-build-worlds-largest-solar-farm/.

[74] The Express Tribune. 2022. "Irregularities Detected in QASPL Contract Award." The Express Tribune. July 3, 2022. https://tribune.com.pk/story/2364469/irregularities-detected-in-qaspl-contract-award.

[75] Dawn News. 2014. "Award of Solar Park Contract to Chinese Firm Challenged." DAWN.COM. November 15, 2014. https://www.dawn.com/news/1144652.

[76] ibid.

[77] Dawn News. 2022. "ACE to Probe 'Irregularities' in QASP." DAWN.COM. July 3, 2022. https://www.dawn.com/news/1697876/ace-to-probe-irregularities-in-qasp.

[78] Bashir, Kainat. 2018. "Punjab Govt to Sell Quaid-e-Azam Solar Park out of NAB's Fear." Pakistan Point. March 31, 2018. https://www.pakistanpoint.com/en/story/299647/punjab-govt-to-sell-quaid-e-azam-solar-park-out-of-nab.html.

[79] The Express Tribune. 2018. "Despite Ongoing Probe, Quaid-e-Azam Solar Power Being Privatised." The Express Tribune. March 30, 2018. https://tribune.com.pk/story/1673621/despite-ongoing-probe-quaid-e-azam-solar-power-privatised.

to sustainable energy sources while managing economic constraints. Addressing these issues is crucial for the broader energy sector and economic stability.

CPEC's Impact on Local and Regional Dynamics

Undoubtedly, CPEC has the potential to drastically change the geopolitical environment in the region. Whether for the better or for the worse depends on who is asking. According to a paper by Shanghai International Studies University professors, CPEC can transform the economically vulnerable and conflict-prone zone into "economic well-being, peace and stable region." [80] Based on the article, Pakistan's relations within the region are characterised by its lack of trust with Afghanistan, disagreements with Iran, conflicts with India, and frictions with the US. Conversely, China is seen as a stabilising actor in this scenario.

However, other powers involved do not see China or its engagement with Pakistan in the same light. India, for instance, sees it as a strategic threat. China has been urging Pakistan to strengthen its authority over disputed regions in Kashmir, potentially using its economic influence to push Pakistan to take a more assertive stance against India. Moreover, it's worried that "with control of the Gwadar port in Pakistan and the Hambantota port in Sri Lanka, as well as the construction of the Payra port in Bangladesh, China's navy has the potential to gain access on all sides of India." [81] Western democracies are apprehensive about potential democratic regression and curtailed civil liberties in Pakistan under China's influence. Criticisms extend to China's muted stance on its Uyghur situation, support for Pakistan-based terrorist groups, and the United States' waning counterterrorism leverage.[82]

Even CPEC's impact on Pakistan's energy landscape has been a double-edged sword. The pursuit of coal-fired and hydroelectric power plants, coupled with neglected energy grid infrastructure, caused long-term financial strains and had adverse environmental effects. The commitments to greening CPEC, evidenced by policy shifts and investments in renewable energy sources, cast doubts. The Quaid-e-Azam Solar Park (QASP) case study is emblematic of how projects presented as a green solution can become mired in challenges, undermining the environmental benefits and straining financial resources. The lack of a transparent bidding process is a recipe for disaster, especially for large-scale projects such as the QASP. Non-competitive processes usually lead to higher costs, delays, and inefficiencies in project execution due to limited accountability. If mismanaged, projects accumulate debt and drain

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[80] Hussain, Iqtidar, Israr Hussain, Guo Ke, and Muhammadi Muhammadi. 2021. “The Effects of China-Pakistan Economic Corridor (CPEC) on Regional Geopolitics.” *Geopolitics Quarterly* 17 (64): 206–30. https://journal.iag.ir/article_129600.html?lang=en.

[81] Sacks, David. 2021. “The China-Pakistan Economic Corridor—Hard Reality Greets BRI’s Signature Initiative.” Council on Foreign Relations. March 30, 2021. https://www.cfr.org/blog/china-pakistan-economic-corridor-hard-reality-greets-bris-signature-initiative.

[82] United States Institute for Peace. 2020. “China’s Influence on Conflict Dynamics in South Asia.” Washington, DC: United States Institute for Peace. https://www.usip.org/sites/default/files/2020-12/20201216-chinas_influence_on_conflict_dynamics_in_south_asia-report.pdf.

resources, weakening Pakistan's financial foundation and undermining its capacity to contribute positively to regional stability. This instability in a region marked by geopolitical complexities can potentially disrupt the broader regional equilibrium, affecting neighbouring countries and the overall regional outlook. The strategic ambitions of CPEC, designed to enhance connectivity and economic progress, risk being overshadowed by the financial burdens and inefficiencies caused by untested large-scale initiatives like the QASP.

Kenya

Author: Campbell Clarke

Kenya's Energy Evolution

Like many states located in Sub-Saharan Africa, Kenya has historically contended with technical, regulatory, institutional, and financial challenges that impeded its ability to fully develop and deploy reliable sources of energy. During the last two decades, however, the state's energy sector has experienced remarkable growth. Between 2013 and 2022, for example, Kenya's electricity generation capacity grew by an annual average rate of 4.9%, outpacing the state's average annual real gross domestic product growth of 4.5% over the same period.[83] Kenya also aggressively attempted to increase access to the power grid during this time frame by employing a combination of grid-connected and off-grid systems, successfully expanding access from just 40.1% of the population in 2013 to 76.5% of the population in 2021.[84] Today, the access rate stands at approximately 100% in urban areas and 68% in rural areas, and the country is capable of producing 2,990 MW of electricity each year. While this represents a significant improvement from 2014, in which year the state's installed electricity capacity totalled just 1,800 MW, its current capacity remains low for a country with more than 54 million people.[85]

Crucially, however, Kenya has made significant progress towards its clean energy goals by exploiting its unparalleled potential for renewable energy production. Kenya's strong solar output, stable coastal winds, and rich geothermal resources – especially those located in the Rift Valley Region – allow it to generate approximately 80% of its electricity from renewable resources, meaning the state is poised to meet its goal of transitioning to 100% clean energy by 2030.[86] Geothermal energy production is especially important as it accounts for approximately 45% of Kenya's electricity production, although wind and solar sources are also crucial.[87] While solar sources accounted for just 5% of Kenya's total electricity production in 2022, nearly two-thirds of the country's total solar power capacity were added to its grid systems in 2021 alone, which reflects the untapped potential for developing solar energy sources in Kenya. In fact, the estimated solar potential in Kenya is almost 15,000 MW, which is significantly

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[83] 'Investor Interest in Kenya's Renewable Energy Sector Rises', Economist Intelligence Unit, 27 March 2023, https://www.eiu.com/n/investor-interest-in-kenyas-renewable-energy-sector-rises/.

[84] IEA, IRENA, UNSD, World Bank, WHO, 'Tracking SDG 7: The Energy Progress Report' (World Bank, 2023), https://data.worldbank.org/indicator/EG.ELC.ACCS.RU.ZS?locations=KE.

[85] 'Kenya - Energy-Electrical Power Systems', International Trade Administration, 19 August 2022, https://www.trade.gov/country-commercial-guides/kenya-energy-electrical-power-systems#:~:text=Kenya%20has%20also%20aggressively%20tried,rural%20Kenya%20stands%20at%2065%25.

[86] International Trade Administration, 'Kenya - Country Commercial Guide', International Trade Administration, 19 August 2022, https://www.trade.gov/country-commercial-guides/kenya-energy-electrical-power-systems.

[87] International Energy Agency, 'Clean Energy Transitions in the Greater Horn of Africa' (International Energy Agency, October 2022), https://iea.blob.core.windows.net/assets/656b8a1f-5aff-4da9-908f-c669dda28914/CleanEnergyTransitionsintheGreaterHornofAfrica.pdf.

greater than the 170 MW of solar generation capacity currently installed in the state.[88] Having established the largest wind farm in Africa – the Lake Turkana Wind Plant – in 2019, wind power is also important for Kenya as it accounts for approximately 16% of the state's total electricity generation.

Although domestic reforms have played a prominent role in Kenya's clean energy transition, foreign direct investment and financing from external states have also been pivotal. In this regard, China has assumed an increasingly important role in Kenya's energy transition by providing loans and immense investments for various energy infrastructure projects.

Bilateral Relations Between China and Kenya

China and Kenya formally established diplomatic ties immediately after Kenya gained independence from Britain in 1963. The radical left wing of the ruling political party in Kenya, the Kenya African National Union (KANU), which was led by Jaramogi Oginga Odinga, then KANU vice president and Minister of Home Affairs, had played a pivotal role in this process. By 1964, however, the KANU left met stiff resistance from the right wing of their own political party and from entrenched Kenyan capitalist interests. They also suffered machinations from Western intelligence operatives in Nairobi – who supported the right wing of the KANU even as China closely identified itself with the left wing of the ruling party – which limited their ability to play a prominent role in mainstream politics by the late 1960s. As a result of internal acrimony and the decline of the KANU left, diplomatic relations between China and Kenya deteriorated, leading to a diplomatic break in 1967 as both states recalled their respective embassies.[89]

By 1978, however, President Toroitich arap Moi endeavoured to repair relations with China as he sought to diversify the sources of Kenya's external development funds and secure partnerships for new development projects, ostensibly to generate support among the domestic electorate. As such, he dispatched an ambassador to China at the end of 1978 and held talks with China's de facto leader, Vice Chairman Deng Xiaoping, and Prime Minister Zhao Ziyang, after which China appointed an ambassador to Kenya. In August 1980, Ji Pengfei, then Vice Premier of China's State Council, visited Kenya. President Moi visited China just one month later in 1980, during which Kenya and China concluded an agreement on economic and technological cooperation – covering a wide variety of projects, including the construction of a new sports stadium and sports center, technical support for universities, scholarships, and

[88] International Trade Administration, 'Kenya - Country Commercial Guide'.

[89] Michael Chege, 'Economic Relations between Kenya and China, 1963-2007' (Center for Strategic and International Studies, 4 June 2008), https://csis-website-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/media/csis/pubs/080603_chege_kenyachina.pdf.

military and cultural exchanges – as well as a new trade deal, signalling a renewal in bilateral relations between both states.[90]

Since then, both countries have established a strong relationship that is rooted in their mutual desire to enhance economic cooperation, particularly in the energy sector.[91] China has served as a source of critical financing for renewable energy projects and has positioned itself as an attractive provider of foreign direct investment by refraining from attaching the types of loan covenants and conditions – that obligate recipient states to reform their governance structures and systems, for example – that have historically been associated with loans from traditional Western donors.[92] Moreover, China is Kenya's largest construction project contractor and largest trade partner.[93]

As a result, Chinese financers signed 1,188 loan commitments worth approximately USD$160 billion with African governments and their state-owned enterprises between 2000 and 2021, of which 11 – valued at USD$6.0 billion – were signed with Kenyan entities.[94] Over this period, the China Development Bank (CDB) and the Export-Import Bank of China committed $49 billion worth of loans to African governments for 128 energy projects, of which $18 billion was allotted for oil production projects, $13 billion for hydropower, $6 billion for coal, $3 billion for gas and liquified natural gas (LNG), $480 million for geothermal, and $367 for solar sectors.[95] Kenya received approximately $1.5 billion of these loans, of which $1.3 billion targeted energy sub sectors – or projects intended to bolster Kenya's transmission and distribution infrastructure ($876 million) – while $480 million was invested in geothermal energy exploration and extraction projects. The remaining $136 million was allocated to the development of solar energy sources.[96] These commitments are intended to help China diversify its energy sources and reduce its reliance on fossil fuel imports, although they have also played a pivotal role in Kenya's energy evolution.

Energy Investments, Partnerships and Projects

[90] Ibid.

[91] Alex Vines and Jon Wallace, 'China-Africa Relations', Chatham House, 18 January 2023, https://www.chathamhouse.org/2023/01/china-africa-relationsCh.

[92] Apurva Sanghi and Dylan Conte Johnson, 'Deal or No Deal: Strictly Business for China in Kenya?', World Bank Policy Research Working Paper No.7614, 23 March 2016, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2757452.

[93] World Integrated Trade Solution, 'Kenya Trade Balance, Exports and Imports', n.d., https://wits.worldbank.org/CountryProfile/en/Country/KEN/Year/2019/TradeFlow/EXPIMP/Partner/all.

[94] Global Development Policy Center, 'Chinese Loans to Africa Database', Global Development Policy Center, n.d., https://www.bu.edu/gdp/chinese-loans-to-africa-database/.

[95] Global Development Policy Center, 'China's Global Energy Finance', Global Development Policy Center, n.d., https://www.bu.edu/gdp/chinese-loans-to-africa-database/.

[96] Global Development Policy Center, 'China's Global Energy Finance - Kenya', Global Development Policy Center, n.d., https://www.bu.edu/gdp/chinese-loans-to-africa-database/.

Since 2005, President Mwai Kibaki and his successor, President Uhuru Kenyatta, have attempted to attract energy investments from, and develop energy infrastructure with, China, which initially sought imported oil and gas from Kenya – and other African states – to fuel its growing economy. In 2006, for example, former President Mwai Kibaki and Hu Jintao, former President of the People's Republic of China, signed an oil exploration deal that allowed China National Offshore Oil Corporation (CNOOC), the largest state-owned offshore oil and gas producer in China, to explore potential oil reserves in six blocks covering more than 115,340 sq km in the north and south of the country, near the borders of Sudan and Somalia.[97] Although CNOOC drilled more than 5,000 meters below the surface in 2009, producing the deepest well in Kenya, it did not find oil.[98]

Then, in 2008, President Mwai Kibaki launched Kenya Vision 2030 as a long-term development plan intended to transform the country into a rapidly industrialising, middle-income nation by 2030, which served to further reinforce economic ties between China and Kenya by creating additional opportunities for Chinese entities to invest in Kenya's energy sector. Crucially, Xi Jinping also launched China's Belt and Road Initiative (BRI) in 2013, which featured an ambition to reinvigorate historical trading routes along the coast of East Africa.[99] Although Kenya did not officially join the BRI until 2017, the vast majority of Chinese energy-related investments that have occurred in Kenya since then have targeted the renewable energy sector.[100] Such a shift in strategic direction came in response to criticism Beijing faced from environmentalists and policy pundits, who accused China of polluting the environment and adversely affecting wildlife habitats through its mining operations and infrastructure projects, particularly those in non-renewable energy sectors.[101] In 2013, for instance, the Government of Kenya proposed a 1,050 MW coal production project in Lamu – a cowas declared a United Nations Scientific and Cultural Organization (UNESCO) World Heritage Site in 2001. UNESCO World Heritage Site. Two years later, the Industrial and Commercial Bank of China (ICBC) committed USD 900 million to the project and two state-owned enterprises – Power Construction Corporation of China and China Huadian Corporation – agreed to construct and operate the plant.[102] The project roused suspicion local environmental activists and community members launched a petition and filed a lawsuit (COAL).

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97 'China Gets Kenyan Oil Exploration Deal', *Al Jazeera*, 28 April 2006, https://www.aljazeera.com/news/2006/4/28/china-gets-kenyan-oil-exploration-deal.

98 'Kenya's Oil Sector and Regional Infrastructure Cooperation', *Oxford Institute for Energy Studies*, 2014, https://www.jstor.org/stable/pdf/resrep32374.8.pdf.

99 Yu Jie and Jon Wallace, 'What Is China's Belt and Road Initiative (BRI)?', Chatham House, 13 September 2021, https://www.chathamhouse.org/2021/09/what-chinas-belt-and-road-initiative-bri.

100 'Kenya Signs Infrastructure, Energy Deals Worth $5 Bln with China', *Reuters*, 19 August 2013, https://www.reuters.com/article/kenya-china-idUSL6N0GK2MT20130819.

101 Kate Bartlett, 'Why China Is Investing in Africa's Green Energy Future', *VOA News*, 3 May 2023, https://www.voanews.com/a/why-china-is-investing-in-africa-s-green-energy-future/7077274.html.

102 Shi Yi, 'Kenyan Coal Project Shows Why Chinese Investors Need to Take Environmental Risks Seriously', China Dialogue, 9 March 2021, https://chinadialogue.net/en/energy/lamu-kenyan-coal-project-chinese-investors-take-environmental-risks-

Moreover, Chinese firms have become increasingly interested in expanding their footprint in Kenya's renewable energy sector because of the favourable regulatory environment, and unparalleled potential for clean energy development.[103] On 13 June 2015, for example, the Government of Kenya and the Export-Import Bank of China signed an export credit agreement worth US$135.7 million to construct the Garissa Solar Power Plant approximately 20km north of Garissa, in Barki Village. Although the terms of the loan are unknown, China Jiangxi Corporation for International Economic and Technical Cooperation (CJIC), a state-owned international conglomerate corporation, was the main contractor, and began project implementation – in collaboration with Kenya's Rural Electrification Authority (REA) and China's JinkoSolar – in September 2016. Launched by Kenyan President Uhuru Kenyatta in December 2019, the Garissa Solar Power currently consists of more than 2100,000 photovoltaic (PV) panels and is the largest solar plant in East Africa with a capacity of approximately 55MW.[104] Crucially, the plant also provides power for 70,000 homes, offsetting approximately 43,000 tonnes of carbon dioxide (CO2) emissions every year.[105]

This is not to say that all of such energy-sector initiatives have been successful. In fact, China has been accused of engaging in 'debt-trap-diplomacy,' a policy through which Beijing intentionally persuades developing countries to accept unsustainable loans for infrastructure projects so that it can seize assets and extend its strategic or military reach after the recipient encounters financial challenges, both in Kenya and across the continent. At the same time, former President Uhuru Kenyatta has faced criticism for corruption, environmental and financial negligence, and insensitivity to local concerns.[106]These accusations primary arose in response to three loans - worth USD 3.6 billion - Kenyatta approved in 2013 from the Export-Import Bank of China for the construction of the Standard Gauge Railway, a 480km railway project that connects the city of Mombasa – located approximately 490km southeast of Nairobi, along the Indian Ocean – with Kenya's capital city, Nairobi.[107] Although the project planners assumed that the railway would generate enough revenue to cover its operating costs and loan repayments, the system continues to be unprofitable – accruing nearly USD 200 million in operating losses after three years – and the Kenyan government has struggled to persuade local

seriously/#:~:text=Concerns%20extended%20beyond%20Kenya.,commitments%20under%20the%20Paris%20Agreement.

[103] 'Chinese Firms Eye Kenya's Renewable Energy Sector amid Potential for Growth', *New China*, 27 July 2019, http://www.xinhuanet.com/english/2019-07/27/c_138262916.htm.

[104] 'Project ID: 47008', AidData, n.d., https://china.aiddata.org/projects/47008/.

[105] 'Chinese-Built Solar Plant Boosting Kenya's Clean Energy Aspirations', Xinhua, 26 August 2023, https://english.news.cn/20230826/771ccbc8c85b427195fdd23230c10592/c.html.

[106] 'Belt and Road in Kenya: COVID-19 Sparks a Reckoning with Debt and Dissatisfaction', *Council on Foreign Relations*, 25 March 2021, https://www.cfr.org/blog/belt-and-road-kenya-covid-19-sparks-reckoning-debt-and-dissatisfaction..

[107] Ian Gorecki, 'Kenya's Standard Gauge Railway: The Promise and Risks of Rail Megaprojects', Wilson Center, 24 September 2020, https://www.wilsoncenter.org/blog-post/kenyas-standard-gauge-railway-the-promise-and-risks-of-rail-megaprojects.

companies to utilise the infrastructure because the cost of transporting freight on the Standard Gauge Railway is higher than the equivalent journey by truck.[108] The project also became linked to numerous criminal investigations pertaining to corruption, displaced workers, labour practices, and environmental concerns.[109] Documents disclosed in 2022 by President William Ruto – who served as deputy during the years of the Uhuru administration – revealed that the railway's primary financer, the Export-Import Bank of China, had a significant advantage during the initial project negotiations, and judges have since declared that the project was illegal because it contravened the country's procurement laws.[110] Moreover, the lack of transparency associated with the initial contract has led some observers – both in Kenya and the West – to believe that the Mombasa Port was posted as collateral for the aforementioned loans, even though such claims reflect a misinterpretation of the loan structure and terms, which do not sign away a right to seize the Mombasa Port in the event of a default.[111]

While the railway project is not explicitly linked to the energy sector in Kenya, such challenges have contributed to broader accusations that China is engaging in debt-trap diplomacy – in other Kenyan industries, including the energy industry. Crucially, they have also raised concerns regarding the efficacy of BRI projects in Kenya and whether they are capable of creating value for all affected stakeholders, not just those who rule Kenya's political parties. Given these controversies, it is important to critically examine existing renewable energy projects in Kenya to accurately determine how they have affected Kenya's economy, renewable energy transition, and, crucially, the local communities and people who are often most affected by such projects. As such, the following case study will investigate the Garissa Solar Power Plant to better understand China's involvement and how the project has influenced local communities. While it is true that the project was commissioned in 2019, and it is not particularly recent, it is important to investigate this solar energy project considering the

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[108] Duncan Miriri, 'Kenya Forcing Importers to Use Costly New Chinese Railway, Businessmen Say', *Reuters*, 3 December 2019, https://www.reuters.com/article/us-kenya-railways/kenya-forcing-importers-to-use-costly-new-chinese-railway-businessmen-say-idUSKBN1Y70LT; John Mutua, 'SGR Reveals Sh21bn Loss as China Firm Debt Rises', *Business Daily*, 9 September 2020, https://www.businessdailyafrica.com/economy/SGR-reveals-Sh21bn-loss-as-China-firm-debt-rises/3946234-5621684-147ah8k/index.html.

[109] Elaine Dezenski, 'Below the Belt and Road', Foundation for Defense of Democracies, 6 May 2020, https://www.fdd.org/analysis/2020/05/04/below-the-belt-and-road/; Max Yoeli, 'Belt and Road in Kenya: COVID-19 Sparks a Reckoning with Debt and Dissatisfaction', Council on Foreign Relations, 25 March 2021, https://www.cfr.org/blog/belt-and-road-kenya-covid-19-sparks-reckoning-debt-and-dissatisfaction; Uwe Wissenbach, Yuan Wang, 'African Politics Meets Chinese Engineers: The Chinese-Built Standard Gauge Railway Project in Kenya and East Africa', *China Africa Research Initiative*, 2017, https://static1.squarespace.com/static/5652847de4b033f56d2bdc29/t/594d739f3e00bed37482d4fe/1498248096443/SGR+v4.pdf.

[110] Abdi Latif Dahir, 'Kenya Discloses Part of Secret Railway Contract With China', *New York Times*, 8 November 2022, https://www.nytimes.com/2022/11/08/world/africa/kenya-china-railway-contract.html; Abdi Latif Dahir, '"Jewel in the Crown of Corruption": The Troubles of Kenya's China-Funded Train', *New York Times*, 7 August 2022, https://www.nytimes.com/2022/08/07/world/africa/kenya-election-train.html.

[111] Alex Vines, Creon Butler, and Yu Jie, 'The Response to Debt Distress in Africa and the Role of China', Chatham House, 15 December 2022, https://www.chathamhouse.org/2022/12/response-debt-distress-africa-and-role-china/02-case-studies-chinese-lending-africa.

unparalleled potential for future solar power generation in Kenya. Seeing the state has only installed approximately 170 MW of an estimated 15,000 MW of solar power potential, lessons learned from the Garissa Solar Power Plant might be useful for planning future solar power projects.[112]

Case Study: Garissa Solar Power Plant

The Garissa Solar Power Plant Project was the first Chinese-backed solar energy project in East Africa and is currently the largest grid-connected solar power plant in East and Central Africa.[113] The power plant is located four kilometers from Raya Village in the Sankuri division of Garissa County, where it occupies approximately 85 acres. The plant comprises more than 210,000 photovoltaic panels and is capable of producing 54.65 MW, meaning it accounts for approximately 2% of the national energy mix and promotes the development of clean, sustainable, and reliable sources of electricity.

Chinese project developers, financers, and contractors played a pivotal role in the construction and implementation of the power plant. The project was initiated in 2012 during discussions between members of Kenya's Ministry of Energy and Petroleum, and government representatives from China's Jiangxi Province.[114] During these discussions, representatives from both parties agreed that the Import-Export Bank of China would provide a concessional loan for the project, while China Jiangxi International Economic and Technical Cooperation Co., an international conglomerate corporation that specialises in international contracting and domestic and foreign investment, would support the project's construction. The Import-Export Bank of China conditioned such loans on the completion of an environmental and social impact assessment as well as a feasibility study, which were both completed by private consulting firms in 2013.[115] For the next two years, prolonged negotiations – between Kenya's Rural Electrification and Renewable Energy Authority (REREC) and Kenya's national utility company, the Kenya Power and Lighting Company – pertaining to the power purchase agreement and associated tariffs delayed the development of the project. After these discussions, however, the Import-Export Bank of China and the Government of Kenya signed an export credit agreement on 13 June 2015, worth USD 135.7 million to finance the

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[112] [1] Cece Coffey, 'Kenya's Clean Energy Transition Gets a Boost from Solar Power', *Kleinman Center for Energy Policy* (blog), 19 January 2023, https://kleinmanenergy.upenn.edu/news-insights/kenyas-clean-energy-transition-gets-a-boost-from-solar-power/; 'Doing Development Differently: How Kenya Is Rapidly Emerging as Africa's Renewable Energy Superpower', Rapid Transition Alliance, 17 November 2022, https://rapidtransition.org/stories/doing-development-differently-how-kenya-is-rapidly-emerging-as-africas-renewable-energy-superpower/#:~:text=As%20well%20as%20harnessing%20the,for%20wind%20capacity%20by%202035.

[113] REREC, 'The 50 MW Garissa Solar Power Plant', REREC, 2020, https://www.rerec.co.ke/garissa-solar-power-plant.php.

[114] Padmasai Lakshmi Bhamidipati and Ulrich Elmer Hansen, 'Unpacking Local Agency in China–Africa Relations: Frictional Encounters and Development Outcomes of Solar Power in Kenya', *Geoforum* 119 (February 2021): 206–17, https://doi.org/10.1016/j.geoforum.2020.12.010.

[115] Ibid.

construction of the solar power plant.[116] REREC also signed a 25-year power purchase agreement with the Kenya Power and Lighting Company to sell electricity generated from the solar plant at USD 0.12/kWh, which reflected the feed-in-tariff rate, although these rates were renegotiated and reduced to USD 0.054/kWh in 2019 after solar panel prices decreased.[117]

Prior to project inception, the REREC informed local county and community leaders about the project and its main purposes. This aroused a sense of optimism among many in local communities – such as Mandera, Garissa, Turkana, Wajir, Lamu and Tana, which previously depended on diesel generators for consistent electricity – who believed the benefits associated with the project would accrue directly to their localities. During subsequent meetings between representatives from the REREC, Chinese officials, and local community members, however, the REREC informed those from these communities that the electricity generated from the plant would be transmitted directly into the national grid, and would therefore indirectly benefit the broader community, but would not directly resolve the power problems encountered by the villages in the vicinity of the project's grid lines.[118] Specifically, the project planners chose to construct a 6km, 132 KV power transmission line to connect the solar plant to the Kenya Electricity Transmission Company sub-station in Garissa.[119]

Project implementation began on 29 September 2016, approximately four kilometers from Raya Village in the Sanjuri division of Garissa County, and finished without significant delays on December 13, 2019, when former President Uhuru Kenyatta officially launched the powerplant.[120] Chinese firms played a pivotal role in the construction of the Garissa Solar Power Plant, which reflects China's position as the world's leading manufacturer of solar panels and its dominance along the entire solar panel supply chain. The Jiangxi Corporation for International Economic and Technical Cooperation, for example, was the main construction contractor, although it signed a memorandum of understanding with Jinko Solar – a solar panel manufacturer based in Shanghai – to acquire equipment for the project and to receive technical support. Although it is commonly assumed that China employs migrant labour directly from China when constructing such energy and infrastructure projects in foreign regions, the CECC recruited most of its employees from Africa itself, preferring to engage people who had gained experience working on other infrastructure projects, especially those in North and West Africa. As the project owner, the REREC also played a prominent role in the construction of the Garissa Solar Power Plant; however, because the institution lacked internal capacity, it subcontracted the tasks of technical supervision during the feasibility and construction stage to a consortium of engineers led by Maknes Consulting Engineers, Ltd., a private firm in Kenya, who were responsible for monitoring the progress and technical aspects of the project on behalf

116 'Project ID: 47008'.
117 Ibid.
118 Bhamidipati and Hansen, 'Unpacking Local Agency in China–Africa Relations'.
119 REREC, 'The 50 MW Garissa Solar Power Plant'.
120 Ibid.

of the REREC. Moreover, the Kenya Electricity Generating Company assumed the responsibility of managing the plant in 2021 because it possesses greater expertise in running such facilities than the REREC.

Crucially, however, the construction of the power plant failed to generate significant employment opportunities for those residing in local communities. Local community representatives verbally discussed the importance of local employment creation during initial meetings before the project began, which was a top priority considering limited employment opportunities exist outside of traditional pastoral and agricultural sectors for many people in the region. While the REREC repeatedly assured these representatives that the project would provide substantial employment opportunities, and numerous media reports stated that "at least 1000 jobs" would be created, these statements exaggerate the project's true contribution to local labour opportunities.[121] Recent research indicates that just 50-70 Kenyan-Somali workers from Garissa were hired as carpenters, masons, drivers, manual lifters, and security guards – depending on the volume of work available – during the project's initial construction phase in 2017, and they were paid lower salaries and wages than Chinese employees engaged in similar tasks.[122] Those Kenyans who did work on the solar power plant were hired on a casual basis during the construction phase of the project, meaning they did not receive formal contracts, wage guarantees or medical benefits. By the peak construction phase in 2018, however, approximately 200 Kenyan workers – some semi-skilled – managed to find work on the project, often as steel workers, electricians (solar panels), or manual labourers. After the project was officially completed in 2019, five Kenyan and four Chinese employees were reportedly hired on a contractual basis to manage operations and project maintenance.[123] Overall, however, the total number of jobs generated for local labour by the Garissa Solar Power Plant was significantly lower than the quantity the local community was promised, and those that were able to find associated employment opportunities generally did so in unskilled occupations.

Despite such adverse employment outcomes, numerous corporate social responsibility initiatives were implemented to benefit the communities living near the solar power project. Seeing those residing in adjacent local communities depended primarily on agricultural farms and animals for income and sustenance, the land diversion associated with the project directly affected their livelihoods, and the county and community representatives thus expected to be directly compensated. As such, both the REREC and Jiangxi International Economic and Technical Cooperation Co., allocated a fixed – and unknown – proportion of their budget to improve the social and physical infrastructure in the region. Numerous community improvement initiatives were implemented, including the refurbishment of a local police post

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[121] Bhamidipati and Hansen, 'Unpacking Local Agency in China–Africa Relations'.

[122] Ibid.

[123] Rebecca Hardin, Josephat Okemwa, and Cecilia Gregersen, 'Building Competences and Capabilities through Projects: Examples from Kenya's Renewable Energy Sector' (IREK, 2019), https://www.irekproject.net/wp-content/uploads/IREKPaper8.pdf.

and a chief's camp to improve regional security, and the establishment of a new primary school, a new dispensary, a new borehole with a storage tank and piping, a 3km access road to a community farm.[124]

As mentioned, the Garissa Solar Power Plant comprises more than 210,000 photovoltaic panels and is capable of producing 54.65 MW of solar power, which allows it to significantly strengthen the supply of power provided to the local substation and national grid.[125] In fact, the project generates enough power to supply approximately 70,000 households, offsetting approximately 43,000 tonnes of CO2 emissions each year or approximately 0.02% of Kenya's total CO2 emissions, based on 2021 figures.[126] While it is important to recognize that the local towns to which this power is intended to flow lack the distribution infrastructure that is required to ensure consistent electricity, the Garissa Solar Power Plant significantly contributes to Kenya's renewable energy generation capabilities, especially considering the largest solar power project implemented in East and Central Africa before Garissa was a 10 MW solar energy project in Soroti, Uganda.[127]

In conclusion, the Garissa Solar Power Plant represents an important grid-connected, renewable energy project for Kenya that bolsters the state's renewable energy production capabilities and advances the goals explicated in the government's Kenya Vision 2030 strategy. While future renewable energy projects undertaken between Kenyan and Chinese entities might benefit from the creation of additional employment options for local Kenyans, opportunities also exist to develop off-grid solar technologies, which are especially important for ensuring rural residents receive access to electricity.[128] Projects like the Garissa Solar Power Plant play a pivotal role in ensuring a consistent supply of power to the national grid system in Kenya, and have significantly contributed to the state's installed generation potential from solar sources, which surpassed 170 MW in 2022.[129] Additional off-grid systems, however, are needed to further enhance power connectivity throughout the state. Government-led initiatives such as the Kenya Off-Grid Solar Access Project, and innovative, private-sector led solutions such as M-Kopa have already proven successful and should therefore be emphasised by Kenya's policy practitioners to further enhance the state's renewable energy performance.

[124] REREC, 'The 50 MW Garissa Solar Power Plant'.
[125] Bhamidipati and Hansen, 'Unpacking Local Agency in China–Africa Relations'.
[126] 'Kenya - CO2 Emissions', Knoema, n.d., https://knoema.com/atlas/Kenya/CO2-emissions.
[127] Bhamidipati and Hansen, 'Unpacking Local Agency in China–Africa Relations'.
[128] Ibid.
[129] International Trade Administration, 'Kenya - Country Commercial Guide'.

Vietnam

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Since 2019, Vietnam has emerged as the leader in solar and wind electricity adoption in the ASEAN area. The country overtook Thailand to have the largest installed solar and wind capacity in 2019. Vietnam's total capacity of solar photovoltaic (PV) reached about 16,500 megawatts (MW) by the end of 2020.[130] More than 100,000 rooftop solar PV systems were installed in Vietnam in 2019 and 2020, an extraordinary achievement.[131]

China-Vietnam relations

China and Vietnam have had a complex relationship since the two countries first established diplomatic ties in 1950. The relationship was strained during the Vietnam War, when China supported North Vietnam against the United States. However, relations have improved significantly since the war ended, and the two countries are now close economic partners. Proposed in 2004, the "Two Corridors and One Ring" (TCOR) initiative was introduced.[132] The collaborative initiative[133] between China and Vietnam intends to cover five Chinese regions (such as Yunnan, Guangdong, Hainan among others) along with four Vietnamese locations including Lang Son, Quang Ninh, Hanoi, and Haiphong. The two countries have agreed on several areas of collaboration: infrastructure such as railways routes or highways or ports, transport of goods services and passengers, resource deployment and processing, among other factors. Subsequently, China and the ten ASEAN nations' Ministers of Economy and Trade jointly signed the China-ASEAN Free Trade Area Investment Agreement in August 2009.

Considering bilateral ties specifically, in October 2011, the two countries signed the Five-Year Development Plan for China-Vietnam Economic and Trade Cooperation. This was followed by the Memorandum of Understanding (MOU) on the Construction and Development of Cross-border Economic Cooperation Zones signed by the two countries in October 2013. The two countries agreed to a Memorandum of Understanding on Promoting the Connection of the TCOR Framework and the "Belt and Road" Initiative, as well as cooperation documents in the fields of capacity, energy, cross-border economic cooperation zones, and other fields, which were signed in November 2017. Projects under the "Two Corridors and One Ring" and "Belt and Road" are liable to expand opportunities for both countries' firms to actively engage in

[130]Thang Nam Do et al., "Vietnam's Solar and Wind Power Success: Policy Implications for the Other ASEAN Countries," Energy for Sustainable Development, September 27, 2021, https://www.sciencedirect.com/science/article/pii/S097308262100096X#bb0190.

[131] Ibid.

[132] "Vietnam Becomes China's Largest Trade Partner in ASEAN," Xinhua Silk Road - Belt and Road Portal, China's silk road economic belt and 21st Century Maritime Silk Road Website, accessed November 16, 2023, https://en.imsilkroad.com/p/58302.html.

[133]https://leap.unep.org/en/countries/cn/national-legislation/memorandum-understanding-between-government-people-s-republic-0

regional markets as well as strengthen cooperation in environmental protection, response to climate change, and the use of natural resources.[134] The economic and trade ties between China and Vietnam expanded rapidly, and for 12 consecutive years, China has been Vietnam's largest trading partner.[135] The evolving investment patterns may also be informed by the fact that Vietnam's vast coastline and ample sunshine offer substantial resources and immense scope for the growth of renewable energy domestically, notably wind and solar power.[136] That said, since the onset of closer US-China competition, following the US lifting its long-standing arms embargo on Vietnam in 2016,[137]Vietnam-China relations have evolved in a complex and nuanced way. On the one hand, it has led to increased tensions between the two countries. For example, in 2014,[138]China deployed an oil rig in disputed waters in the South China Sea, which led to a tense standoff between China and Vietnam. On the other hand, increased competition between the US and China has culminated in a greater level of pragmatism in Vietnam's disposition to China. Vietnam recognises that it mustn't entirely alienate China, and it has attempted to strike a careful balance between its ties with China and its relationship with the US.

As of 2022, approximately 73% of Vietnam's energy comes from fossil fuels.[139] Vietnam went from having barely any solar generation in 2018 to a quarter of its total installed capacity being solar – a 100-fold increase in two years. This rapid growth is primarily due to the Vietnamese government's feed-in tariff, which guarantees renewable energy producers a price above the market, additional incentives signed off in 2017 in an effort to steer away from lagging fossil fuel projects, and the more affordable solar panels, some of which are assembled domestically.[140] Additionally, Vietnam is finalising its national Power Development Plan 8 (PDP 8), which will lay the foundation for the country's energy development until 2030 and the vision to 2045,[141] representing Vietnam's clearest commitment towards decarbonisation since it announced its net zero ambitions at the COP26 Summit in October 2021.[142] The final edition of Power Development Plan 8, released in May 2023, will likely influence China's

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[134] Opportunities and challenges for China's renewable energy overseas ..., accessed November 16, 2023, https://www.ghub.org/en/wp-content/uploads/sites/2/2020/08/bri-re-vn-report-en-aug-2020.pdf., 27.

[135] Ibid.

[136] Ibid, 30.

[137]US Lifts Decades-Long Embargo on Arms Sales to Vietnam," The Guardian, May 23, 2016, https://www.theguardian.com/world/2016/may/23/us-lifts-decades-long-embargo-on-arms-sales-to-vietnam.

[138] Paul J. Leaf, "Learning from China's Oil Rig Standoff with Vietnam," – The Diplomat, August 30, 2014, https://thediplomat.com/2014/08/learning-from-chinas-oil-rig-standoff-with-vietnam/.

[139] Hannah Ritchie, Max Roser, and Pablo Rosado, "Vietnam: Energy Country Profile," Our World in Data, October 27, 2022, https://ourworldindata.org/energy/country/vietnam.

[140] Linh Pham, "China Key to Vietnam's Solar Success," China Dialogue, July 20, 2021, https://chinadialogue.net/en/energy/china-key-to-vietnams-solar-success/.

[141] Richard Strockl, "Vietnam's Draft Master Plan Viii – What It Means for Renewable Energy," WFW, July 22, 2022, https://www.wfw.com/articles/vietnams-draft-master-plan-viii-what-it-means-for-renewable-energy/.

[142]"Vietnam's PDP8 Released: Perspectives & Events: Mayer Brown," Perspectives & Events | Mayer Brown, accessed November 16, 2023, https://www.mayerbrown.com/en/perspectives-events/publications/2023/05/vietnams-pdp8-released.

future strategy in Vietnam's power sector. The plan envisions renewable energy as a significant priority, with renewables accounting for nearly 50% of the energy mix by 2030, with 19.5% coming from hydropower (down from 30% in 2020), 18.5% coming from wind (the majority of which will come from onshore wind generation), and 8.5% coming from solar. [143]

With the expansion of cooperation under the BRI and the steady liberalisation and development of the Vietnamese power market, China's investment in Vietnam's renewable energy sector has expanded.[144] Increasing Chinese investment in the Vietnamese power industry's sustainability metrics and national energy security are both supported by the advancement of green energy sources. As such, by 2030, when the electricity market will have further opened up and the privatisation process will have been finished, the Vietnamese government anticipates that the installed capacity of wind and solar power will have increased to 18GW.[145]

Chinese companies primarily invest through equity investments, asset mergers and acquisitions, equipment export and assembly. However, through the BRI, and planning in the areas of energy and environmental protection, more Chinese businesses have started to engage in renewable energy investment in Vietnam. For example, they have partnered with local renewable energy companies to invest in power generation projects, sell equipment, and provide local grid solutions.[146] Vietnam was the second biggest export market for Chinese solar panel makers in 2020, with a volume of 10 gigawatts (GW) and accounting for 12 per cent of the nation's exports.[147]

JA Solar's investment in Vietnam

Since 2016, JA Solar - a solar panel firm from China - has been pouring sizable investments into Vietnam. JA Solar has previously received financial support from the Chinese government. For example, in 2010 it was awarded credit worth $4.4 billion by the China Development Bank (CDB).[148] Aside from the CDB loan, JA Solar has received other forms of governmental assistance from the Chinese government, consisting of tax exemptions and subsidies. The corporation, however, is a private one that is not directly controlled by the government.[149]

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[143] Ibid.

[144] Opportunities and challenges for China's renewable energy overseas ..., accessed November 16, 2023, https://www.ghub.org/en/wp-content/uploads/sites/2/2020/08/bri-re-vn-report-en-aug-2020.pdf., 26.

[145] Ibid, 30.

[146] Ibid, 29.

[147] "Chinese Renewable Energy Firms to Benefit from Vietnam's Financing Pact," South China Morning Post, January 8, 2023, https://www.scmp.com/business/article/3205826/chinas-renewable-energy-firms-seen-benefiting-us155-billion-deal-help-vietnam-reach-climate-goals.

[148] "Update 2-China's JA Solar in $4.4 Bln Credit, Shares Rise," Reuters, September 10, 2010, https://jp.reuters.com/article/jasolar-idUKSGE68904920100910.

[149] https://www.globaldata.com/company-profile/ja-solar-technology-co-ltd/#:~:text=JA%20Solar%20Technology%20Co%20Ltd%3A%20Overview&text=JA%20Solar%20develops%2C%20constructs%20and,and%20residential%20distributed%20photovoltaic%20systems.

JA Solar entered Vietnam in 2016 with a $1 billion solar cell manufacturing factory. In February 2022, the firm announced plans to expand its existing integrated manufacturing capacity by 14GW to suit its strategic development needs for a total investment of $543 million. The investment by JA Solar has been and will be utilised to construct solar panel manufacturing factories around Vietnam, as well as to create solar power projects in the nation.[150] During a June 2023 visit to JA Solar's Vietnam Manufacturing Base, the Chinese Ambassador to Vietnam, Xiong Bo, emphasised the favourable trajectory of the China-Vietnam relationship and the opportunity therein for firms to harness both local and international markets, as well as tap into Vietnam's outward-oriented free trade system.[151]

Vietnam's solar energy sector has received a considerable boost from JA Solar's investment. Vietnam has a lot of solar energy potential, but the government hasn't been able to completely actualise it. The investment made by JA Solar is expected to contribute to the acceleration of solar energy consumption in Vietnam and provide employment opportunities nationwide. In addition, the investment will arguably help Vietnam reduce its dependence on nonrenewable energy sources and boost the country's solar panel manufacturing sector.

That said, there are some challenges that Vietnam will need to address in order to fully benefit from the investment by JA Solar. Due to the imperfect political environment, laws and regulations system, investment environment and development planning, long-term energy planning is hampered by fragmented and paralyzed decision-making.[152] Vietnam has planned and authorised several renewable energy projects, however the conversion rate is relatively low owing to a lack of finances. The policy paralysis in the domestic solar energy sector is a barrier to its success. Moreover, the sector further slowed "due to the lack of policy frameworks and route to market for projects after the expiry of Vietnam's solar feed-in tariff schemes," said Bloomberg NEF'sSoutheast Asia analvst Caroline Chua. "There were also delays in several discussed frameworks such as the direct power purchase agreement pilot and auctions, which limited opportunities for large-scale solar development in Vietnam."[153]

Moreover, currently, Vietnam's LCOE from solar is $0.046/kWh[154] and the cost of solar energy in Vietnam is still relatively high compared to the LCOE for residential PV which is indicated

[150]Vietnam Investment Review - VIR, "Ja Solar to Develop $189-Million Facility in Vietnam," VIR, February 19, 2022, https://vir.com.vn/ja-solar-to-develop-189-million-facility-in-vietnam-91379.html.

[151]S.R.C. Roy, "Chinese Ambassador to Vietnam Xiong Bo Visited the Vietnam Manufacturing Base of JA Solar," SolarQuarter, June 1, 2023, https://solarquarter.com/2023/06/01/chinese-ambassador-to-vietnam-xiong-bo-visited-the-vietnam-manufacturing-base-of-ja-solar/.

[152] Quynh Nguyen and Nguyen Dieu Tu Uyen, "Green Energy Investors Demand Vietnam Speed-up Policy Changes," Bloomberg.com, March 14, 2023, https://www.bloomberg.com/news/articles/2023-03-14/green-energy-investors-demand-vietnam-speed-up-policy-changes.

[153] https://www.pressreader.com/china/south-china-morning-post-6150/20220509/281831467319389

[154]Tuong Thuy, "Vietnam Solar Energy Costs 'lowest' in Southeast Asia," Theinvestor, September 26, 2022, https://theinvestor.vn/vietnam-solar-energy-costs-lowest-in-southeast-asia-d1917.html.

at $0.147-$0.221/kWh[155], and this is a barrier to the development of the wider sector. The majority of projects are funded by multinational banks, with local banks merely participating in project investments by providing guarantees, thereby minimising the role of the domestic financial sector in the overall development of the sector's infrastructure .[156] Another issue is the shortage of skilled workers in the solar energy sector. Vietnam lacks a big pool of competent personnel in the industry, which is a deterrent to attracting international investment. Other Chinese businesses, in addition to JA Solar, have invested in Vietnam's solar energy sector in 2022, including Longi Solar, Trina Solar, and Yingli Solar, demonstrating Vietnam's rising prominence as a location for solar energy investment.

Although China and Vietnam have a strong economic relationship, there are still some challenges that the two countries are seeking to resolve. Their historical antagonism and tensions as a result of the South China Sea dispute, in particular, have had a severe influence on their trade relations.[157] As a result, Vietnamese people's attitudes towards Chinese investment are largely unfavourable. There is a possibility that such efforts could potentially be viewed as a means of asserting local Chinese influence.[158]

Aside from broader political dynamics that lead to general suspicion of Chinese investment, there is also disaffection towards the additional prerequisites imposed on China through its loans. For instance, project design and administration by Chinese SOEs, the acquisition of Chinese technology, and the use of Chinese labourers. In this regard, Vietnam's poor experience with Chinese contractors and technology on numerous projects may limit its desire to accept Chinese financing under the BRI if such requirements are imposed.[159] This has also been cited as a reason for Vietnam to opt for US funding in other domestic power projects, given that "Chinese loans under the BRI are normally arranged through government-to-government agreements or provided by Chinese state-owned banks and require government guarantee. In contrast, America-backed projects use market-based financing arrangements

[155]Emiliano Bellini, "Utility Scale Solar Reaches LCOE of $0.028-$0.041/Kwh in the US, Lazard Finds," pv magazine International, November 5, 2021, https://www.pv-magazine.com/2021/11/05/utility-scale-solar-reaches-lcoe-of-0-028-0-041-kwh-in-the-us-lazard-finds/#:~:text=The%20LCOE%20for%20residential%20PV,at%20%240.067%2D%240.180%2FkWh.

[156] Zachary Abuza and Phuong Vu, "Vietnam's Hidden Debts to China Expose Its Political Risks," – The Diplomat, October 15, 2021, https://thediplomat.com/2021/10/vietnams-hidden-debts-to-china-expose-its-political-risks/.

[157] Nghia L. Nguyen, "Vietnam and China: Conflicting Neighbors Stuck in Nationalism and Memory," Harvard International Review, May 3, 2023, https://hir.harvard.edu/vietnam-and-china-conflicting-neighbors-stuck-in-nationalism-and-memory/.

[158] "As Trade-War-Weary China Sends Money, Old Foe Vietnam Is Unsure Whether to Cheer or Fear," Los Angeles Times, January 3, 2019, https://www.latimes.com/world/la-fg-vietnam-chinese-money-20190103-story.html.

[159]Le Hong Hiep, "Potholes Lie Ahead for China's Belt and Road Initiative in Vietnam - VnExpress International," VnExpress International – Latest news, business, travel and analysis from Vietnam, July 16, 2019, https://e.vnexpress.net/news/perspectives/potholes-lie-ahead-for-china-s-belt-and-road-initiative-in-vietnam-3735310.html.

negotiated between investors and international creditors."[160] The preference of Chinese over Vietnamese labour, technology, and ownership fuels local hostility, as evidenced by the fact that over 100 protesters were arrested and dozens of police injured at a protest in central Vietnam in June 2018, one of several demonstrations nationwide against the special economic zones opponents fear will be dominated by Chinese investors.[161] At an international conference held in Hanoi in October 2017 on the opportunities and challenges presented by the BRI, certain Vietnamese scholars stated that Vietnam's participation in the initiative may lead to its "excessive dependence" on China, and even harm its territorial and maritime claims in the South China Sea. They also highlighted sustained concerns about inadequate labour rights protection, Chinese enterprises' poor environmental records, a lack of transparency, and China's resistance to internationally accepted dispute settlement practises. [162]

This creates an interesting dynamic between the TCOR and the BRI. The Vietnamese public's distrust towards the BRI programme has led the Vietnamese government to be cautious of blending the profiles of the two programmes. While the TCOR is a government-to-government initiative, the BRI is, at least in Vietnam, a mainly private sector related initiative - the attempt to clearly demarcate the two China-related policies in Vietnam is arguably a means to ensure that Chinese investment in Vietnam is aligned with its own development goals and does not lead to undue Chinese influence. A conflagration of the aforementioned local and regional dynamics, as well as the underpinned political risks, are liable to continue as impediments to the Vietnamese solar energy sector's development under the BRI over the coming term.

[160] "Opinion: In Vietnam's Power Plants, US Finds a Counter to China's Belt and Road," South China Morning Post, February 4, 2021, https://www.scmp.com/week-asia/opinion/article/3120522/vietnams-power-plants-us-finds-counter-chinas-belt-and-road.

[161] ABC News, "China Warns Its Citizens in Vietnam after Protests," ABC News, June 12, 2018, https://www.abc.net.au/news/2018-06-12/china-warns-citizens-in-vietnam-after-protests/9857786.

[162] Le Hong Hiep, "Potholes Lie Ahead for China's Belt and Road Initiative in Vietnam - VnExpress International," VnExpress International – Latest news, business, travel and analysis from Vietnam, July 16, 2019, https://e.vnexpress.net/news/perspectives/potholes-lie-ahead-for-china-s-belt-and-road-initiative-in-vietnam-3735310.html.


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