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DISCOURSE

CHINA PAKISTAN ECONOMIC CORRIDOR

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Discourse is a quarterly magazine from Pakistan Institute of Development Economics. This issue of Discourse focuses on China- Pakistan Economic Corridor (CPEC) – a flagship initiative with potential to shape the nation's development trajectory. The Discourse Magazine brings together incisive analysis from the leading policymakers, scholars and practitioners, offering a comprehensive analysis of CPEC's role in Pakistan's industrialization, regional connectivity, energy, and sustainable growth.

This quarter's issue of the magazine provides a critical examination of CPEC's potential to revitalize industrialization, leveraging Special Economic Zones (SEZs) and exploring emerging sectors. Underscoring the importance of aligning domestic CPEC with domestic industrial priorities while addressing structural bottlenecks that hinder investment and export competitiveness. The Markets and regional connectivity section provides strategies for optimizing bilateral transit agreements, enhancing cross-border trade along with providing estimates for policymakers, and fostering collaboration. These discussions are timely, given Pakistan's urgent need to position itself as a regional trade hub and integrate more effectively into global value chains. The challenges and opportunities presented by the energy sector of Pakistan clubbed with the role of CPEC are also presented – a debate central to Pakistan's economy. Along with presenting detailed analysis on poverty and tax policy – moving beyond infrastructure centric to prioritize reforms for inclusive growth. Finally, the section on agriculture and environment highlights the CPEC's untapped potential in revolutionizing Pakistan's agrarian economy and its role in enhancing agrarian exports. Stressing the role of corridors in exploring innovations and reforms in crop productivity, livestock development, and carbon markets.

As always, we remain dedicated to fostering rigorous, accessible dialogues that bridge academia, policy, and public interest. Alongside submissions by students, academicians, researchers and professionals that enrich the Discourse with diverse viewpoints, this issue also features prominent voices in their respective fields. Together, the contributors of this Discourse map out a clear roadmap for policymakers, while also keeping the wider audience informed and stimulating discourse around pressing issues that warrant attention.

We hope you enjoy reading this issue of Discourse as well!

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TRANSITIONING TO CPEC 2.0

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A DECADE OF CPEC - LESSONS, CHALLENGES, AND THE ROAD AHEAD

An Interview with Mr. Ahsan Iqbal, Federal Minister for Planning, Development & Special Initiatives

1. Reflecting on the first decade of CPEC, what do you see as its most significant achievements, and how have these aligned with Pakistan's long-term development goals?

Ahsan Iqbal: When we launched CPEC in 2013, Pakistan was facing 14-16 hours daily power outages, broken infrastructure, and sluggish economy. Today, the transformation is visible. Over $25 billion in foreign investment has revitalized our energy, transport, port infrastructure and economy.

We've added more than 8,000 MW of electricity through projects like Port Qasim, Sahiwal, Karot Hydropower, Thar Coal, Solar and Wind energy projects, helping resolve our chronic power crisis. Meanwhile, strategic road projects—like the Multan-Sukkur Motorway, Hazara Expressway and KKH Phase I —are dramatically improving connectivity and reducing travel times.

The development of Gwadar Port is opening up access to global trade routes, while CPEC has already created over 200,000 direct jobs, with millions more expected as industrial zones come online.

Now, as we enter CPEC Phase II, the focus is shifting to inclusive growth, SEZ development, and local value creation—ensuring the foundation we've built benefits all Pakistanis.

2. Development often brings trade-offs. How is the government balancing infrastructure growth with environmental protection and community welfare, especially in sensitive areas like Gwadar?

Ahsan Iqbal: Growth without responsibility is short-sighted. We're fully committed to ensuring that CPEC projects are socially inclusive and environmentally sustainable.

Communities affected by infrastructure expansion—particularly in Gwadar—have been supported through compensation packages, relocation support, and local hiring mandates. We're also setting up vocational training centers to empower locals with the skills needed to participate in CPEC's growth.

Every major project is subjected to Environmental Impact Assessments (EIAs). We're integrating green

infrastructure, energy-efficient technologies, and renewables—not just as add-ons, but as central pillars of CPEC's second phase.

The objective is to ensure that CPEC doesn't just build roads and ports, but also builds lives and preserves ecosystems—especially in regions that have historically been left behind.

3. Debt concerns around CPEC often dominate headlines. Are these fears grounded? What's the real financial picture behind CPEC?

Ahsan Iqbal: There's a lot of misinformation around this. The truth is, CPEC is not a debt trap—it's a growth engine.

First, the financing mix includes equity investments, grants, and concessional loans—not just traditional debt. In fact, the **weighted average interest rate on all Chinese loans under CPEC is 2% approximately—the lowest Pakistan has ever secured from any bilateral or multilateral source. That's a major win in terms of financial prudence.

Secondly, these loans are tied to productive, revenue-generating projects—especially in energy and transportation. The revenue streams from these assets will contribute to debt servicing and economic circulation.

CPEC is about building national assets. If managed transparently and effectively, the returns will far exceed the cost, and the improved infrastructure will attract more trade and investment, reducing our reliance on external borrowing in the future.

We're focused on sound governance, project viability, and fiscal discipline, to ensure CPEC remains a source of economic strength, not strain.

4. What tangible impact has CPEC had on Pakistan's industrial and employment landscape so far?

Ahsan Iqbal: CPEC is driving a reindustrialization wave in Pakistan. At the heart of this are the Special Economic Zones (SEZs), being developed in places like Rashakai, Dhabeji, Shiekhupura, and Bostan. These are designed to host industries in textiles, electronics, agriculture, and manufacturing.

Rashakai SEZ alone is projected to create 200,000 jobs. So far, over 70,000 jobs have already been created across CPEC projects, with projections of up to 2 million direct and indirect jobs in the long term.

Equally important is technology transfer. Chinese firms are introducing advanced systems in sectors like energy, telecom, and heavy industry. We're complementing this with vocational and technical training—including over 50,000 Pakistanis trained in China—to equip our workforce with industry-ready skills.

CPEC isn't just building industries—it's building a skilled workforce and a competitive economy.

5. SEZs are central to CPEC's industrial promise, but progress has been uneven. What's holding them back, and how is the government accelerating their development?

Ahsan Iqbal: You're right—SEZs are a critical element, but they've faced regulatory, logistical, and financing hurdles.

In 2017, we agreed to set up 9 SEZs, which were to be readied by 2020. Unfortunately, after 2018 the new government didn't prioritise CPEC as a result till 2022, not a single SEZ was ready. We have now speeded up work. To fast-track progress, we've implemented single-window operations, introduced tax incentives, and improved federal-provincial coordination. We're also enhancing infrastructure and connectivity around priority SEZs, especially Gwadar and Rashakai.

On financing, we're bringing in Public-Private Partnerships (PPPs) and have allocated $3 billion for SEZ development. We're also working with Chinese financial institutions to ensure favorable loan terms and risk-sharing models.

The goal is to create globally competitive, investor-friendly zones that attract high-tech industries and create sustainable jobs across Pakistan.

6. Beyond economics, how is CPEC influencing Pakistan's strategic and diplomatic positioning in the region and beyond?

Ahsan Iqbal: CPEC is not just an economic corridor - it's a strategic bridge to connect the region in a shared vision of prosperity.

By connecting Gwadar to Xinjiang, it places Pakistan at the heart of regional trade, linking China, Central Asia, South Asia, the Middle East, and Africa. It offers Central Asian Republics and Afghanistan a much-needed route to global markets and positions Pakistan as a linchpin in regional connectivity.

While India has voiced objections, we continue

to frame CPEC as a developmental project, not a geopolitical provocation. Simultaneously, even in the context of US-China tensions, Pakistan remains focused on maintaining strategic balance - deepening cooperation with China, while sustaining constructive ties with the U.S.

CPEC is enhancing Pakistan's global stature - not through confrontation, but by becoming a platform for cooperation and economic diplomacy.

7. What key lessons has Pakistan drawn from the first phase of CPEC, and how are these shaping CPEC 2.0?

Ahsan Iqbal: The first phase taught us a lot: we need political ownership, focused governance, stronger local participation, improved coordination, and a sharper focus on sustainability.

CPEC 2.0 reflects these lessons. We're ensuring SMEs have access to SEZs, cutting red tape through regulatory reforms, and integrating vocational training and tech transfer at the grassroots.

We're also prioritizing environmental and social safeguards—not just to comply, but to ensure long-term viability. More importantly, we're shifting focus from brick-and-mortar infrastructure to economic integration, skills, and community uplift.

It's about deepening the roots of what we've built—so the benefits are wider, deeper, and more inclusive. CPEC is enhancing Pakistan's global stature - not through confrontation, but by becoming a platform for cooperation and economic diplomacy.

8. The URAAN Framework lays out Pakistan's vision for inclusive growth. How does CPEC support and align with URAAN's goals?

Ahsan Iqbal: CPEC 2.0 is a natural partner to the URAAN Pakistan Framework, which focuses on the Five Es: Exports, Employment, Empowerment, Environment, and Energy.

Interestingly, President Xi Jinping's Five Corridors under the Belt and Road Initiative also emphasize connectivity, industrial development, trade facilitation, energy cooperation, and people-to-people exchange. This synergy between China's Five Corridors and our Five Es is powerful and intentional.

CPEC is boosting exports by improving logistics and powering SEZs. It's driving employment through large-scale projects and localized job creation. Empowerment comes through vocational training and SME support. Environmental goals are being addressed via EIAs, green energy integration, and coastal protections. And, of course, we're enhancing energy security through diverse power generation.

Together, URAAN and CPEC are shaping a future-ready, resilient Pakistan—where development is inclusive, sustainable, and regionally integrated.

CPEC 2.0: The Road to Pakistan's Tomorrow

Dr. Nadeem Javaid

A SHARED DREAM OF PROGRESS

Islamabad and Beijing are finally manifesting CPEC 2.0. The inception of idea can be traced back a couple of years ago, when Vice Premier He Lifeng visited Pakistan, carrying a special message from Chinese President Xi Jinping, marking not just a diplomatic exchange but the reaffirmation of a transformative vision. CPEC 2.0 - the next chapter of the China-Pakistan Economic Corridor - is not merely about infrastructure; it's about ambition, innovation, and a shared future.

As President Xi Jinping once said, "The Belt and Road Initiative is not an empty slogan but a real practice that brings tangible benefits", and for Pakistan, CPEC has indeed delivered tangible results — from highways to power plants, from ports to industrial zones. Yet, the story doesn't end here. In fact, it was the groundwork for what has to come. Thus, CPEC 2.0 is a leap towards a future driven by knowledge, technology, sustainability, and inclusive growth.

Likewise, Prime Minister Shahbaz Sharif, complementing the vision of Chinese Premier, on an occasion precisely expressed, "CPEC 2.0 will not only reshape Pakistan's economy but redefine our role in the global economic landscape." Now, Pakistan has the opportunity to lead, innovate, and uplift its people - just as China did when it transformed its own landscape with visionary reforms and relentless determination.

But this future is not being built on roads alone. It is guided by two powerful frameworks: First is the Five Es (5Es) — Export, E-Pakistan, Environment, Energy, and Equity — which sets Pakistan's national policy agenda. Second is related to Five Corridors (5Cs) - Growth, Innovation, Green, Livelihood, and Openness Corridors — which operationalize this vision. These frameworks represent Pakistan's commitment to aligning growth with sustainability,

inclusion, and innovation — the very principles that propelled China's meteoric rise.

A TALE OF TWO NATIONS: LESSONS FROM CHINA'S RISE

Let's not forget, Pakistan and China share more than geography – they share a history. From the ancient Silk Road to the modern Belt and Road Initiative, both nations have long been linked by trade, culture, and a shared pursuit of progress.

China's own development journey offers invaluable lessons. Over the past four decades, China has lifted over 800 million people out of poverty - an achievement unparalleled in modern history. Central to this success was the strategic development of Special Economic Zones (SEZs), which attracted foreign investment, nurtured industries, and spurred regional growth.

Additionally, China's emphasis on innovation and digital transformation has placed it at the forefront of global technological advancements. Today, cities like Shenzhen and Hangzhou are not only industrial powerhouses but also hubs for fintech, AI, and green technology.

As Minister Ahsan Iqbal aptly observed, "Pakistan has a unique opportunity to apply the lessons of China's economic miracle, adapting them to our own realities and strengths" – a vision embodied in CPEC 2.0.

Building on this momentum, Pakistan now charts its own path toward sustainable development by prioritizing technological innovation, fostering inclusive growth, and capitalizing on its strategic geography as a regional connectivity hub. This evolution positions CPEC 2.0 not merely as infrastructure development, but as a transformative blueprint for equitable progress aligned with Pakistan's distinct economic potential.

GROWTH CORRIDOR: BEYOND ROADS AND PORTS

Needless to say that infrastructure remains a backbone of development, but Pakistan's true economic sovereignty will come from producing, innovating, and exporting. In parallel, the Growth Corridor will be connecting SEZs to global markets, fostering industrial sophistication and value-added production.

Thus than relying on low-value exports as always, Pakistan can now expand its footprint in pharmaceuticals, engineering goods, precision agriculture, and IT services. Enhanced logistics, modern transport systems, and streamlined trade processes will ensure that Pakistani products reach international markets swiftly and competitively.

Just as China turned Shenzhen from a fishing village into a global tech hub, Pakistan has the potential to transform its own industrial landscape — creating jobs, boosting exports, and achieving economic resilience.

INNOVATION CORRIDOR: POWERING A DIGITAL PAKISTAN

As we all know, it is a well-established fact, that the future belongs to nations that lead in innovation. This is why Pakistan's Innovation Corridor under CPEC 2.0 envisions technology parks, incubators, and R&D hubs where ideas turn into solutions.

From AI and blockchain to biotechnology and space technology, the goal is to harness the power of emerging technologies. By investing in 5G infrastructure, fiber-optic networks, and fintech platforms, Pakistan will empower its youth to lead in the global digital economy.

Moreover, Pakistan can collaborate with Chinese tech giants for knowledge exchange and joint ventures, creating a robust ecosystem of digital entrepreneurship. Imagine a Pakistan where Lahore and Karachi mirror the success of China's Beijing Zhongguancun — a hub of tech unicorns and digital innovation.

GREEN CORRIDOR: SUSTAINABILITY AT THE CORE

In the times we live and looking into the future, it is becoming increasingly crucial that economic growth should pave the way for a sustainable future, not at the expense of it. Thus, Green Corridor ensures that Pakistan's development is not just rapid but also resilient, aligning economic progress with climate responsibility.

In this context, China's success in renewable energy is a guiding example. It leads the world in solar and wind power capacity, with cities like Shanghai becoming models of sustainable urban planning. Pakistan is already making strides in clean energy, but CPEC 2.0 will accelerate this transition through: solar and wind farms to reduce reliance on fossil fuels, electric vehicle infrastructure for cleaner transportation, and smart energy management systems to ensure efficient power use.

These initiatives will not only reduce emissions but also create green jobs and ensure energy security for generations to come.

REGIONAL CONNECTIVITY AND OPENING UP CORRIDOR

Economic growth cannot be actualized in silos. It needs communication, collaboration and connectivity. Based on these principles, the connectivity corridor will materialize regional collaboration through trade openness, inclusiveness, active communication and exchange of not only tangible goods and services but also ideas, academic debates, and most importantly, knowledge.

This corridor will also help expand the range and scope of cooperation for opportunities among people across regions and seek common growth and prosperity.

CORRIDOR OF LIVELIHOOD

The livelihood of a populace is as motivated by economic well-being as it is by social well-being. The corridor of livelihood, by focusing on the social and economic well-being of the Pakistani populace, aims to build a society based on the normative principles of equality, inclusion, diversity and empowerment.

To achieve these ends, 10 different projects under this corridor have been outlined to meet target-oriented ends of expanding opportunities for all in Pakistan including: digital medical and healthcare, education and training, skills attainment, mechanization of agricultural practices, employment creation, Research and Development, and revival of creative industries in Pakistan.

THE ROAD AHEAD: A CALL TO ACTION

In a crux, CPEC 2.0 is not merely a project; it is a promise of a future where Pakistani industries thrive, its youth lead in innovation, and its natural resources are preserved.

Nonetheless, this transformation will not happen in isolation. It requires the collective will of every Pakistani — from policymakers to entrepreneurs, from academics to laborers and so on. It is time to move beyond skepticism and seize the opportunity before us.

To those who doubt or hesitate, remember that every great journey begins with a bold step. The roads, ports, and industrial zones we have built are not the end goal — they are the foundations for a brighter tomorrow. It is our ingenuity, resilience, and resolve that will determine how far we go.

Prime Minister Shahbaz Sharif articulated it perfectly when he expressed: "CPEC 2.0 is not just about GDP growth; it's about transforming lives, uplifting communities, and ensuring no one is left behind."

China, with its unprecedented progress based on technology-driven growth, fiscal incentives, and a rapidly evolving and knowledge-seeking populace, has maintained acceleration in modernization without compromising the normative development. The economic growth with socioeconomic equality is the desired model for social change and development. This route, as envisaged in China and articulated by the Prime Minister in his aforesaid speech, is depictive of the future development trajectory in Pakistan.

Now is the time to rally behind this vision. Support the innovators, empower the youth, and champion the entrepreneurs who will shape our digital future. The corridors of CPEC 2.0 are open, and the road to Pakistan's tomorrow lies before us. Let us walk it together - with hope, with determination, and with the conviction that our best days are yet to come.

Conclusion

With CPEC 2.0, Pakistan has the opportunity to take control of its economic destiny, reclaim its position in the global economic landscape and unleash the immense potential of it's people. No longer is CPEC only confined to the realm of infrastructure, having now broadened to transforming Pakistan into an innovative and export-led economic powerhouse. Pakistan, through aligning the 5 Es—Export, E-Pakistan, Environment, Energy, and Equity—with the 5Cs—Growth, Innovation, Green, Livelihood, and Opening-Up Corridors, is guaranteeing that every project, every policy, and every investment is geared toward an overarching vision of national prosperity.

Although the road ahead is daunting, Pakistan has never been a nation that shies away from challenges. Through the combination of consistent and durable policies, strong leadership as well as an unwavering national resolve, the country will realize the full potential of CPEC, making it a corridor of transformation, innovation, and limitless opportunity rather than merely a trade corridor.
The future is not something we wait for—it is something we build. And with CPEC 2.0, Pakistan is building a future that is nothing short of extraordinary.

Dr. Nadeem Javaid (SI) is a renowned academician and policy expert currently serving as the Vice Chancellor, Pakistan Institute of Development Economics.

Gwadar International Airport

CPEC: Unfulfilled Promise

Dr. Niaz Murtaza

The China-Pakistan Economic Corridor (CPEC), launched in 2015 under China's Belt and Road Initiative (BRI), stands as a cornerstone of the enduring Pakistan-China partnership. More than just an infrastructure project, CPEC symbolizes deep economic, cultural, and strategic cooperation between the two nations. As we mark a decade of CPEC, there is much to celebrate in terms of progress and development. However, the journey ahead remains crucial in realizing its full potential. To discuss the achievements of the past ten years and the government's vision for the next phase—CPEC 2.0—we are honored to have with us Federal Minister for Planning, Development & Special Initiatives, Mr. Ahsan Iqbal, who will share his insights on maximizing the corridor's long-term benefits for Pakistan.

CPEC OVERVIEW

The CPEC framework launched in 2014 and subsequent additions to it make it the biggest economic opportunity to come Pakistan's way in decades. CPEC includes infrastructure loans to link Pakistan and China, including a sea port and airport in the south in Gwadar, Balochistan; freeways all the way up to Khunjerab Pass in the north in Gilgit-Baltistan (GB) at the Chinese border; and the upgrading of Pakistan's main railway line from Karachi, Sindh to Peshawar, Khyber-Pakhtunkhwa (KP). A second component covers investment in power plans to help it overcome its long-standing electricity shortage. The third major component includes the establishment of nine Special Economic Zones nationally through Chinese investment. There are other miscellaneous components such as a railway line in Lahore, Punjab, tourism infrastructure etc. (GOP, 2017). Finally, there has also been much talk about the involvement of other countries in CPEC, such as Iran, Turkey, Afghanistan, Central Asia and Gulf states (Sakeena, 2022). CPEC was initially projected to cost US$46 billion from 2015 to 2030, of which 71 percent was to be invested in energy, 4 percent in the Gwadar port, 8 percent in rail, 13 percent in road links and 4% in other miscellaneous projects (McCartney, 2018). The amount was later increased to $62 billion in 2017[1].

This scope and size of CPEC gave it the potential to lead an infrastructure-led transformational economic change in Pakistan like that produced in many countries earlier such as UK, USA, Germany, India and Mexico (McCartney, 2018). The close proximity to, major investment by and deepening of economic linkages with a global

[1] Salman Siddiqui, "CPEC Investment Pushed from $55b to $62b," Express Tribune, April 4, 2017, <https://tribune.com.pk/story/1381733/cpec-investment-pushed-55b-62b/

economic superpower enhanced CPEC' potential in the same way as close ties with USA provided the opportunity for economic development in East Asian countries. The potential included financial, managerial and technical inputs from China into Pakistan's governance, infrastructure and industry; sub-contractual, imitation, skills acquisition and spin-off linkages with China's industries; and becoming part of and contributing to China's huge trade with countries to its west (Khan, 2022). Given Pakistan's development challenges, the key end expectations from these CPEC inputs were as follows: i) Rapid industrial and exports growth, ii) Creation of employment[2], and iii) Equitable growth to overcome regional disparities, and iv) Environmental sustainability given climate change challenges. However, the fact that such faraway countries were able to develop much more rapidly through their ties with USA than countries like Mexico, Turkey and East Europe that were neighbors to USA and European Union also highlighted the importance of the economic, political and managerial capacities of the recipient country in transforming the opportunity into reality.

EMERGING PROBLEMS

Ten years later today, this lack of capacity has clearly undermined the transformational potential of CPEC. A number of factors have contributed to this outcome. The most important factors have been the failure of successive Pakistani governments to develop a strategic and dynamic vision, mobilize adequate capacities to implement it and undertake deep-seated reforms to remove bottlenecks. From its inception, the project has lacked a clear vision and sequencing. Thus, there was not one integrated CPEC but actually two unconnected ones. The actual China Pakistan Economic Corridor, consisting of mainly loans and smaller grants for port, road and railway linkages between Pakistan and China, was only 25% of the total. The China Pakistan Electricity Cooperation consisting of investment in power plants was 75% of the total which could only contribute to the economic corridor if they fed old and new SEZ industries whose outputs traveled on the corridor to China or Gwadar port along with Chinese exports to the west. However, neither of that has happened much. The Gwadar port and SEZs, which carried the most potential in terms of upgrading Pakistan's industry and exports, are still largely inactive. This means that there is little export earnings from CPEC to compensate for the heavy machinery and other imports, profit repatriation and loan repayments, thus aggravating Pakistan's balance of payment situation. The power plants have created jobs and reduce power shortages but are expensive for consumers in comparison to regional South Asian electricity rates; are environmentally damaging due to the heavy use of coal in many plants; and have provided little compensating export earnings. The freeways have made travel easier but not added economic value or exports earnings to pay off the foreign loans.

China's shifting plans and calculations and inadequate investment have aggravated the situation. While it is widely reported that China sees CPEC as the crown jewel and role model of its larger One Road, One Belt (OBOR) strategy, its actual plans and investments have lagged far behind. In hindsight, it is unclear whether it really saw the Gwadar-Khunjerab corridor as an immediate alternative route for any significant proportion of its westwards trade or more as a Plan B in case its main sea trading routes through the Malacca Strait got blocked by the US or tensions with its neighbors. Clearly, sea transportation is often cheaper and even faster than land and rail routes. In the case of Gwadar—Khunjerab route, these costs and time issues are further exacerbated by the mountainous nature of Khunjerab pass which remains closed for several weeks during winter. China's plans to shift part of its industry to Pakistan as its labor costs increase have been hampered by Pakistan's failure to overcome its security issues and bureaucratic inertia and fast-track Chinese investments in SEZ and the presence of other better destination countries such as Vietnam which provide better security, infrastructure and speed. China and Pakistan are each other's only all-weather friends and both countries have varying conflicts from almost all their other neighbors. However, against this background, Chinese aid to Pakistan is far smaller than USA's aid to its most strategic allies in Europe, East Asia and Middle-east whom the USA provided huge amounts of aid, investment, technology and open access to its large markets, running large trade deficits with them for long. In contrast, Pakistan faces much disadvantage in accessing Chinese markets for its export under the China-Pakistan trade agreements and runs consistent large trade deficits (Chaudhry, et. Al., 2017).

Internal complaints from smaller provinces about their inadequate share in CPEC have further compounded its smooth implementation. The federal government of Nawaz Sharif billed the CPEC as benefitting the whole of Pakistan. However, this was questioned by the leaders of the socio-economically backward Balochistan and KP Provinces and GB region. There are also tensions between the decentralizing provisions in the 2010 18th Amendment to the Pakistan Constitution and the centralized nature of the CPEC, driven partially by the demands of the Chinese government for one central authority to deal with and rapid

[2] CPEC was seen to have a potential to create a total of 1.2 million direct jobs through its initially agreed projects (Rashid, et. al, CPEC Working Papers #21.

implementation. The Council of Common Interests (CCI) is the key Pakistani state institution for settling disputes between the provinces and the federal government, including on electricity, railways, ports, national planning, and national economic coordination. However, the absence of discussion on the CPEC there is revealed by repeated provincial calls to give the CCI a more central role in CPEC issues The initial plan for the CPEC roads network prioritized the less developed provinces, Balochistan and KP, since travel through these regions would also significantly shorten the route from Gwadar to the Karakoram Highway. However, priority was later given to road networks that were already well developed and lay in Sindh and Punjab, partly due to Chinese insistence to use existing ones and partly since Pakistan's larger two parties had roots in these provinces (Adeney and Boni, 2020). Similarly, of the initial total $35 billion investment in power projects, more than 60% was in Punjab and Sindh, none in GB, which ironically provides Pakistan actual access to China on the economic corridor, and Balochistan being the only backward region with a high share. Balochistan, KP, and GB have repeatedly raised concerns about the employment opportunities for the people in the area given the lower proportion of CPEC projects being in these areas and the fact that employment in the projects even in these areas may go to outsiders, e.g., in Gwadar (Ahmed, et. Al, 2018).

The security situation in Pakistan has also affected CPEC progress, with militants bent on disrupting CPEC. Multiple attacks on the CPEC-related projects have not only slowed down the pace of the project but have killed several Chinese workers and led to China suspending work on several occasions. The Balochistan Liberation Army (BLA) has conducted a series of attacks, including on the Chinese Consulate located in Karachi in 2018, Pearl Continental Hotel in Gwadar in 2019, Pakistan Stock Exchange in 2020 and Besham, KP attack[3] in 2024 that killed five Chinese workers (Khan, 2022). Twenty Chinese citizens have been killed in terrorist attacks in Pakistan since 2021[4].

Key CPEC components have also faced opposition from USA, India and IMF. Indian policymakers see the CPEC as China's strategy to encircle India. Indian concern over the CPEC route also relate to the location of some CPEC projects in Pakistani administered parts of Kashmir (Khan, 2022). USA sees the CPEC as China's strategy to achieve domination in South Asia and dismantle US global leadership there. The IMF has objected to the establishment of SEZs and has made Pakistan agree to not establishing new SEZs[5].

CONCLUSIONS

In 10 years, China has pumped in more $32 billion in CPEC but Pakistan is much worse off economically now than in 2015. This is not mainly because of CPEC but due to the series of economic crises that Pakistan has faced in this period: in 2018 due to current account deficit, 2020 due to Covid-19 and 2022-23 due to current account deficit. Of these, the 2018 one was mainly caused by large CPEC-related imports. These multiple crises have also slowed progress on CPEC and make it difficult to gauge CPEC's true contribution to Pakistan's economy in ten years. While CPEC has certainly created jobs and reduce electricity shortages, it has clearly not had the transformational major impact that Pakistan expected. Meanwhile, it has increased pressures on the current account deficit, increased tensions between the center and provinces and heightened terrorist attacks. The most critical reason for CPEC's failure to create transformational impact was the lack of a clear vision and proper sequencing, with insufficient progress in ten years on the two most critical components that could have created such impact: Gwadar port and SEZs. There has also been no major investment by other countries in CPEC activities so far.

This analysis highlights a number of key steps for Pakistan for the future. Firstly, it may be advisable for it to scale back expectations and marketing about what CPEC can achieve for Pakistan. Given China's current outlook, it seems unlikely that it would agree to a major expansion of CPEC. This was confirmed by the lack of any significant new investment plans unveiled during the 5-days Presidential visit to China by the Pakistani President. Both sides must come to the same page on the future of CPEC. The critical area where Pakistan must focus is on SEZs where China has strong experience. Pakistan must overcome bureaucratic hurdles in the way of the expansion of SEZs planned and provide a credible plan to China to rekindle its interest in investing in them, while also overcoming IMF objections to SEZs. Secondly, it must adopt a more strategic framework for future CPEC planning which simultaneously looks at employment, exports and industrial growth; regional inequity issues; environmental sustainability; and current account impact of future activities. Finally, it must focus on undertaking deep economic reforms to attract not only lumpy foreign investment from rich states like China and Gulf states but also local and foreign private investment in key industries that can help it upgrade its industry and exports.

[3] https://www.aljazeera.com/news/2024/3/26/five-chinese-nationals-killed-in-suicide-bomb-attack-in-pakistan-police

[4] https://www.pakistantoday.com.pk/2024/12/10/20-chinese-citizens-killed-34-injured-in-14-terrorist-attacks-since-year-2021-official/

[5] https://tribune.com.pk/story/2495112/govt-accepts-imf-bar-on-new-sezs

REFERENCES

Boni, F., and Adeney, K., 2020, The Impact of the China-Pakistan Economic Corridor on Pakistan's Federal System: The Politics of the CPEC, Asian Survey, Vol. 60, Number 3, pp. 441–465. 2020.

Chaudhry, T., Jamil, N., and Chaudhry, A., 2017, Pakistan's Experience with the Pakistan–China FTA: Lessons for CPEC, The Lahore Journal of Economics 22 : SE (September 2017): pp. 1–24

Government of Pakistan, 2017. Long Term Plan for China-Pakistan Economic Corridor (2017-2030).

Khan, S. 2022, The China-Pakistan Economic Corridor: A Flashpoint of Regional Competition, London School of Economics.

McCartney, M., 2018, The China-Pakistan Economic Corridor (CPEC): Considering Contemporary Pakistan through Old-Fashioned Economics and Historical Case Studies, Lahore Journal of Economics 23 : 2 (Winter 2018): pp. 19–48

Rashid, S., Zia, M.M., Waqar, S., Employment Outlook of China Pakistan Economic Corridor: A Meta-Analysis, Working Papers 21, Centre Of Excellence, China-Pakistan Economic Corridor

Salikuddin A.,., Amjad A.,, Dileep K., Malik, M., Memon, A.H., China Pakistan Economic Corridor and Pakistan's energy security: A meta-analytic review, Energy Policy, 2018.

Sakeena, S., 2022, An Analysis of the Political Economy Of China Pakistan Economic Corridor, Journal of Pakistan-China Studies, Vol. 3, Issue 1, 2022(December).

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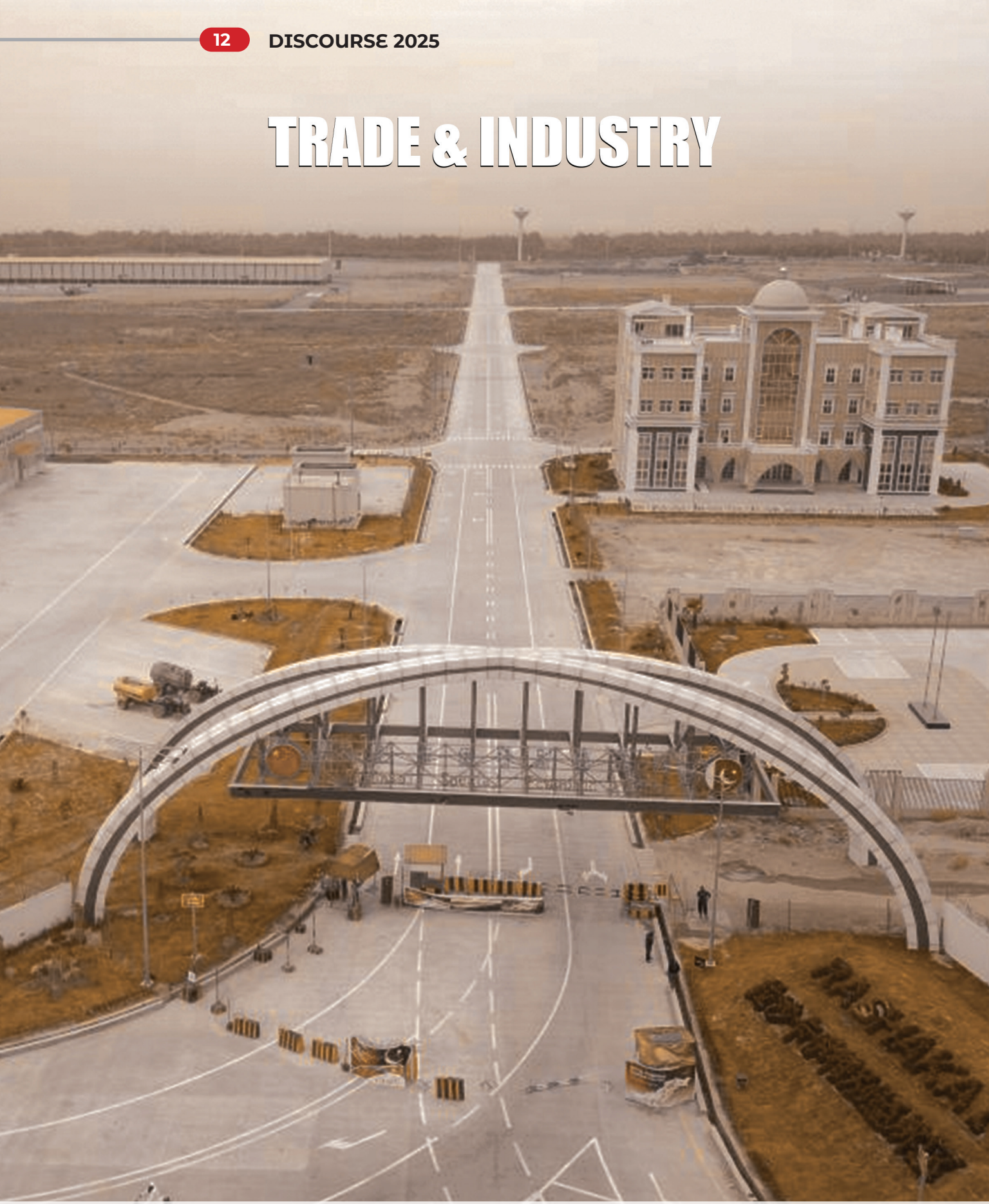
TRADE & INDUSTRY



Rashakai Special Economic Zone

Can Pakistan Pick up its Industrialization with CPEC?

Dr. Karim Khan

China Pakistan Economic Corridor (CPEC), a flagship program of China's Belt and Road Imitative (BRI), has been on the move for almost a decade now. Since signing of the Memorandum of Understanding (MoU) in 2013, CPEC has been one of the widely discussed subjects in print, electronic, and social media. A variety of arguments has been made over its possible implications for the domestic economy of Pakistan. The proponents consider CPEC as a game changer as it is expected to result in market access, regional connectivity, and increased trade. Specifically, the market access to Middle East, Central Asia, and Africa through CPEC is projected to produce larger trade potentials. Likewise, state of the art infrastructure in terms of energy projects, transportation networks, and Special Economic Zones (SEZs) is likely to provide the essentials for industrial development. Alternatively, CPEC is anticipated to create higher investment and employment opportunities, on one hand, and result in heightened industrial development, larger trade, and overall growth of the economy, on the other. However, on the opposing arguments, the Pakistani economy is trapped into a scenario where the country is faced with low growth prospects amid recent stagflation, persistent macroeconomic imbalances, and enlarged vulnerabilities of a sizable fraction of the populace. In particular, the persistent twin deficits have caused the debt burden to reach an unprecedented level, with current debt-to-GDP ratio standing at more than 70 percent, leaving little fiscal space for the provision of social services. To put it differently, there is much uncertainty that revolves around the possible consequences of CPEC on Pakistan's debt trap. Despite these opposing perspectives, CPEC offers both opportunities and challenges that need to be addressed in order to reap the potential benefits associated with regional connectivity, enlarged market access, enormous infrastructure, and industrial development. Here, in this article, I am making an argument on how investments under CPEC can affect Pakistan's industrial progress.

Before going to the main argument, let me describe what does CPEC offer to Pakistan and what is the current status of projects under CPEC. As is planned initially, an investment worth of $62 billion is expected to be disbursed under CPEC by 2030. The sector-wise allocation comprises $34 billion for energy projects, $14 billion for the development of Gwadar, and the remaining $14 billion are for hard infrastructure and related activities like industrial cooperation/Special Economic Zones (SEZs) and other projects of social and economic development. Accordingly, during the last decade, China has been the largest source of investment for Pakistan, with around $25.4 billion has been invested in direct projects. Around 21 energy projects (equivalent to 16,635 MW) are planned under CPEC out of which 14 projects (equivalent to 8,220 MW) are completed, 2 projects (equivalent to 1,170 MW) are under progress, and 5 projects (equivalent to 3,245 MW) are under consideration. As of now, completed power projects under CPEC contribute about one-fourth to the Pakistan's power generation, with the compound growth rate of power generation has jumped from 2.7% in pre-CPEC period to 7%

during post-CPEC period. Likewise, with regard to the transportation infrastructure, CPEC includes 24 projects (covering 6,000 KM) out of which 6 projects (covering 1,656 KM) are completed, 5 projects (covering 813 KM) are under construction, 8 projects (covering 2,989 KM) are in pipeline, and 5 projects (covering more than 500 KM) are in long-term plan. As of now approximately 40 percent of the total mileage of Pakistan's motorways is completed under CPEC which is contributing significantly to Pakistan's passenger traffic and freight movement. Specifically, the motorway network in Pakistan links different parts of the country to the main ports, i.e. Karachi Port, Port Bin Qasim, and Gwadar Port, improving Pakistan's cross-border trade efficiency. Moreover, 14 projects have been planned for the development of Gwadar out of which 4 projects (including the Development of Gwadar Port and Free zone) are completed, 6 projects (including New Gwadar International Airport) are under construction, and the remaining 4 projects are in pipeline. Finally, 27 projects of Social and Economic development are planned under CPEC out of which 17 projects are completed, and 10 projects are in pipeline. In summary, it is stated that CPEC would make a significant contribution to the Pakistan's hard and soft infrastructure which is one of the necessary conditions for industrialization.

With regard to industrialization, Pakistan's performance has been truncated over its history. Policies of export promotion and import substitutions were in place in 1960s which were based on instruments like imports rationing, credits at subsidized rates, over-value exchange rates, discriminated tariffs and other non-tariff restrictions. These policies had two effects on the industrial sector of Pakistan. First, in static sense, it resulted in higher growth rates of the manufacturing sector in the country, exhibiting an industrial growth rate of around 10% per annum and raising the share of industrial sector to GDP to 11.9% in 1965 from 6.9% in 1950. However, as a by-product, these policies resulted in the creation of an organized interest group in the form of industrial class. Subsequently, the nationalization of 34 industrial units in 1970s not only retarded the continuity of higher manufacturing growth but also resulted in inefficiency and declining incentives on part of the private sector. To put it differently, the lack of continuity in policies combined with the short-sightedness or rent-seeking of the industrial class shaped a dichotomous performance of the industrial sector in Pakistan. Consequently, Pakistan has not been able to diversify its industrial production structure as is done by comparable countries like South Korea, China or Malaysia. Likewise, amid institutional decay, the structure of private sector in Pakistan has been restricted in size and scope, with limited penetration both in local markets as well as in global markets. In domestic markets, competition has been muted which has adversely affected the dynamism of businesses, inhibiting investments in innovations and technology, thereby, restricting creative destruction. In addition to ineffective implementation of competitive practices, state has a sizable footprint in key economic sectors which has been a deterrent to entry into markets. Given these constraints, 70% of the firms in Pakistan are classified as small, with only 8% of Pakistani firms are large compared to 54% in Sri Lanka, 52% in Indonesia, and 47% in Thailand. This has also been manifested by around 30% share of Small and Medium Enterprises (SMEs) in the manufacturing sector during the last decades. Furthermore, a sizable number of businesses in Pakistan operate in the informal sector, with the size of undocumented economic activities ranges from 25% to 35%. Informality in businesses has been further creating market hurdles like unfair competition, credit constraints, and losses in revenues. For instance, according to World Enterprise Survey of the World Bank, 13% of the companies in Pakistan has been complaining about unfair competition from the informal competitors. Likewise, unregistered firms are unable to access to the formal credit market, causing them to remain small forever.

Likewise, in international markets, Pakistan's export performance has been stagnant, with its share in global trade dropped from 0.15 percent in 2005 to 0.12 percent in 2022 while China has doubled and Vietnam has tripled their shares during the same period. Specifically, Pakistan has been losing its export competitiveness, with the share of Pakistan's competitors' have been increasing substantially in the global markets. For instance, from 2005 to 2022, Bangladesh's share in world exports increased from 0.06 percent to 0.19 percent, India's from 0.61 percent to 1.65 percent, and Vietnam's from 0.14 percent to 1.17 percent. Currently, Pakistan is among the top ten countries with lowest export orientation in the World, with an export to GDP ratio averaging to 12.3% for the period 2000-2020. Second, Pakistan's exports lack diversification, including both product diversification as well as market diversification. For instance, Pakistan's exports are mainly comprising resource-based items such as cotton, rice, and hides and skins over the past many decades, dominated largely by textiles products and rice. Similarly, Pakistan's exports market is concentrated as its main trading partners are only three, the United States, Europe, and China, though it also sells much of its rice to the Middle East. The only economy for which it is a major market is Afghanistan. Third, Pakistan has never been efficient with respect to value-addition. Unlike Pakistan, most of its regional neighbors and competitors were able to transform their export base from primary commodities to high value added items. For example, over the past two decades, compared to an increase of 16 percentage point in the share of manufactured exports in Pakistan's total exports, the share of regional competitors has on average increased by 43 percentage points. Further, exporters in Pakistan are relatively small – affecting their bargaining power when negotiating

with international buyers – and they operate under substantial supply constraints.

As stated earlier, CPEC entails a bunch of hard and soft infrastructure in terms of cost effective energy, motorways networks, Gwadar Port among others which all are the essential pre-requisites for successful industrialization. In addition, 9 Special Economic Zones (SEZs) are under progress under the umbrella of CPEC which offers a bunch of incentives to entrant firms. The incentives to investors fall into five categories: fiscal incentives; general incentives; facilities in export processing zones; facilities in industrial estates; and exemptions in Gwadar port. Fiscal incentives in SEZs includes one-time exemption for capital goods from all taxes and custom duties which are imported into Pakistan for the operation, maintenance and development of SEZs; a five-years exemption from all taxes on incomes which are accrued from the operation and development of SEZs; one-time exemption on capital goods to enterprises in zones from all taxes and customs duties which are imported for installation within the SEZs; and exemption of incomes of zone enterprises from all taxes for 10 years. These facilities are expected to incentivize investors to invest within the SEZs. Similar fiscal incentives are offered in Gwadar port. In terms of general incentives, all the SEZs, industrial estates and export processing zones would be offered utilities like electricity, gas, and others at the zero-point of the zones. Likewise, one window facility and dry port facility would be provided by the Board of Investment (BOI), government of Pakistan. In addition, the development of SEZs and the enterprises with in the zones would be regulated by transparent procedures and efficient regulatory mechanism. Furthermore, security arrangements, efficient dispute settlement mechanism, along with continuity of incentives would be ensured.

All these facilities imply that the stage is set for an industrial take-off in Pakistan. However, to reap the potential benefits of CPEC and SEZs we have to do some additional structural reforms in order to persuade investors to invest in Pakistan. In other words, these structural reforms constitute as threshold conditions for successful industrialization under CPEC. First, we need an organizational structure which could resolve the problems of knowledge and incentives. The decision making with regard to businesses, especially within the SEZs, must be handed over to the private sector as businesses have sufficient knowledge of the market compared to a central bureaucrat. Likewise, the incentives problem arises when the incentives of the policy makers are not aligned to the incentives of CPEC projects and successful SEZs. The incentives of all stakeholders must be aligned with the successful industrialization. Second, an efficiency or productivity based incentives mechanism should be introduced to investors in order to avoid the rent-seeking of the incumbent industrial class. Third, effective labor policy would not only generate employment; but it would also result in skill upgradation of the domestic labor. Fourth, we should prioritize our potential exports and markets for those exports in order to have beneficial effects on our overall exports and growth within SEZs. Fifth, the cost of doing business needs serious attention as exporters from Pakistan are facing tough competition from Bangladesh, India, and Vietnam. Internal security, rationalizing energy prices, performance-based incentives mechanism, and enabling regulatory environment are the key elements in this regard. Sixth, to encourage technological upgradation and enhance the size of businesses, we have to open our market to global firms, especially for joint-ventures. In other words, limited competition has halted the development of a competitive private sector in Pakistan in addition to inversely impacting the welfare of consumers. Finally, rationalizing the tariff structure from the perspective of anti-exports bias is essential as applied tariff rates are relatively high in Pakistan when compared to its peers/competitors. While higher tariff rates could be helpful in curbing unnecessary imports, tariff on imported raw materials could impact the country's export performance. With increasing importance of global value chains at different stages of production, share of exports made up of imported inputs have also increased across the globe, including Pakistan. Estimates suggest that around 20 percent to 30 percent of imported inputs have been used at different stages of production in Pakistan. So, we have to rationalize our tariff structure.

The main objective of this article is to see the prospects of industrial development in Pakistan under the umbrella of CPEC which is a flagship program of China's broader Belt and Road Imitative (BRI). We argue that CPEC entails enormous infrastructure development in Pakistan, including but not limited to energy projects, transportation network, SEZs, Gwadar port etc., which set up a stage for successful industrialization in Pakistan. However, to realize this objective, Pakistan needs structural reforms which can ensure enabling business environment to businesses by providing them with facilities and level-playing field. These reforms constitute as threshold conditions which can make CPEC as a game changer for successful industrialization in Pakistan.

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MG Automobile Assembly Line, Pakistan

Can CPEC Boost Pakistan's Manufacturing and Trade?

Dr. Vaqar Ahmed

The China-Pakistan Economic Corridor (CPEC) is often viewed as a collection of infrastructure projects, but its real potential lies in transforming Pakistan's industrial landscape. This article explores how productivity improvements drive economic growth, how CPEC can serve as a catalyst for such improvements, and how Pakistan can integrate itself more effectively into global trade networks.

1. PRODUCTIVITY AND ECONOMIC GROWTH: A THEORETICAL PERSPECTIVE

Productivity—the efficiency with which inputs like labor and capital are converted into outputs—is a fundamental driver of economic growth. Recent economic theories emphasize innovation, technology diffusion, and human capital as key determinants of productivity enhancement in developing countries. Endogenous Growth Theory, for instance, highlights how investment in knowledge, research and development (R&D), and human capital accumulation fuels long-term growth. Similarly, Solow model underscores the role of technological progress in driving productivity beyond mere capital accumulation.

For Pakistan, low productivity has been a major impediment to industrial expansion. The country's manufacturing sector is characterized by inefficiencies, outdated technology, and skill gaps in the labor force. To compete in global markets, Pakistani industries must adopt productivity-enhancing measures such as automation, digitalization, and supply chain optimization. Here, CPEC presents a unique opportunity to integrate modern industrial practices, reduce operational inefficiencies, and boost competitiveness.

2. PRODUCTIVITY, OUTPUT, AND TRADE: THE LINKAGES

There exists a strong theoretical linkage between productivity, output, and trade. Higher productivity leads to increased output at lower costs, making industries more competitive in both domestic and international markets. Countries that enhance their industrial productivity typically experience a rise in exports due to cost efficiencies and quality improvements.

Take the case of China, which leveraged its productivity improvements to become the world's manufacturing hub. Through industrial policies, investment in infrastructure, and supply chain integration, China significantly reduced production costs and enhanced global trade participation. Pakistan can follow a similar trajectory by focusing on:

Technology Adoption: Integrating automation and artificial intelligence (AI) in manufacturing can improve efficiency and reduce waste.

Labor Productivity: Upskilling the workforce through vocational training programs tailored to industrial needs can enhance output quality.

Supply Chain Efficiency: Strengthening logistics infrastructure and reducing transportation bottlenecks can facilitate smoother trade flows.

With CPEC's transport networks and energy projects already underway, Pakistan has a foundation to capitalize on these linkages. The challenge now is to align policy reforms with these infrastructure developments to maximize economic dividends.

3. CPEC'S ROLE IN ENHANCING PRODUCTIVITY AND TRADE

A. Special Economic Zones (SEZs) and Industrial Clusters

One of CPEC's key features is the development of Special Economic Zones (SEZs) across Pakistan. SEZs have historically played a crucial role in boosting industrial productivity in countries like China, Vietnam, and Malaysia. These zones attract foreign direct investment (FDI), facilitate technology transfer, and provide a conducive environment for high-value manufacturing.

Pakistan's government has identified priority SEZs, including Rashakai (Khyber Pakhtunkhwa), Dhabeji (Sindh), M3 Allama Iqbal (Punjab), and Bostan (Balochistan). These zones aim to create industrial clusters that drive economies of scale and encourage backward and forward linkages in manufacturing supply chains. To make SEZs successful, Pakistan must ensure:

- Business-friendly regulatory frameworks to attract multinational corporations.
- Infrastructure readiness with reliable electricity, transportation, and digital connectivity.
- Sector-specific incentives tailored to industries having backward and forward linkages in Chinese and Pakistani supply chains.

B. Infrastructure Upgrades and Supply Chain Efficiency

CPEC's investments in roads, railways, and ports directly contribute to improving Pakistan's trade competitiveness. The expansion of Gwadar Port, for instance, offers an alternative trade route that reduces dependency on traditional transport channels. The reduction in logistics costs can enhance the price competitiveness of Pakistani exports, making them more attractive in regional and global markets.

Efficient infrastructure also reduces lead times in supply chains. For example, improved road networks between industrial hubs and ports ensure faster delivery of goods, thereby reducing inventory holding costs for manufacturers. If complemented by digital trade facilitation measures such as e-customs and automated clearance systems, Pakistan can significantly improve its ease of doing business ranking.

C. Technology Transfer and Human Capital Development

CPEC is not just about physical infrastructure; it is also about knowledge exchange. Chinese firms investing in Pakistan bring technological know-how and expertise that can be leveraged to modernize industries. Joint ventures, technology licensing agreements, and training programs can facilitate this transfer.

A prime example is China's success in upgrading its workforce through vocational training centers linked to industrial zones. Pakistan must adopt a similar model by establishing:

- Technical training institutes within SEZs to equip workers with relevant skills.
- Public-private partnerships (PPPs) to encourage knowledge-sharing between academia and industry.
- Innovation hubs to foster R&D collaboration between Pakistani and Chinese firms.

4. A WIN-WIN FOR PAKISTAN, CHINA, AND BEYOND

CPEC's impact extends beyond Pakistan and China. As part of the Belt and Road Initiative (BRI), CPEC is positioned to serve as a trade corridor connecting South Asia, Central Asia, and the Middle East. This opens opportunities for regional economic integration and global value chain participation.

For China, Pakistan's industrial growth means a more reliable trading partner and a stable market for Chinese exports. For Pakistan, integration into China's manufacturing ecosystem can provide sustained demand for its industrial products, particularly in sectors like textiles, agro-processing, and engineering goods.

Furthermore, CPEC enhances Pakistan's attractiveness as an investment destination. The introduction of financial instruments such as CPEC bonds and Islamic financing mechanisms like Sukuk can deepen capital markets and attract diversified funding sources.

5. POLICY RECOMMENDATIONS FOR MAXIMIZING CPEC'S BENEFITS

To ensure that CPEC delivers maximum productivity dividends, the following policy measures should be prioritized:

Industrial Policy Reforms: Streamlining regulatory procedures and reducing bureaucratic hurdles to attract investment in SEZs.

Export Diversification Strategies: Encouraging high-value-added industries such as information technology, pharmaceuticals, and precision engineering.

Public-Private Collaboration: Facilitating joint ventures between Pakistani firms and Chinese counterparts to accelerate technology transfer.

Infrastructure Sustainability: Ensuring that CPEC infrastructure projects are maintained effectively to prevent bottlenecks in trade and production.

China-Pakistan Free Trade Agreement (FTA): Leveraging CPEC to enhance dividends from FTA.

6. CONCLUSION

CPEC has the potential to be a game-changer for Pakistan's manufacturing sector and trade competitiveness. However, infrastructure alone will not automatically lead to industrial growth. Productivity-enhancing strategies—ranging from technology adoption and workforce upskilling to supply chain optimization—are critical to realizing the full benefits of CPEC.

Alongside infrastructure and productivity improvements, governance reforms are essential for Pakistan to fully capitalize on CPEC's potential. Transparent regulatory frameworks, efficient policymaking, and institutional accountability can enhance investor confidence, reduce bureaucratic inefficiencies, and facilitate smoother trade and industrial operations. Strong governance fosters economic stability, ensuring that CPEC-driven growth translates into long-term industrial competitiveness, higher exports, and sustainable economic progress.

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Picture courtesy of Tetra Pak

Picture courtesy of CPEC Secretariat
Under construction Allama Iqbal Industrial City, Faisalabad

Rethinking SEZs as Instrument of FDI

Haroon Sharif

Ever since its independence, the Government of Pakistan has tried various approaches to attract investment for industrial development. However, the share of industry in GDP has remained on the lower side (around 20%) when compared with the emerging Asian economies. Initially, industrial estates were developed by the provincial governments in almost all major district headquarters to lure industrial projects through infrastructure and special incentives. In 1980, the policy focus turned towards export led growth and the Government of Pakistan announced Export Processing Zone (EPZ) framework. The experience did not yield desired results and out of the ten EPZs established only five remain somewhat operational. Then came China Pakistan Economic Corridor (CPEC), under which, the Government of Pakistan enacted the Special Economic Zones (SEZ) Act in 2012, establishing both federal and provincial SEZ authorities. At the federal level, the Act established the Board of Approvals (BOA) headed by the Prime Minister. At the provincial level, the SEZ Act set up provincial SEZ Authorities (SEZAs), headed by the Chief Ministers. Due to a variety of reasons, the Government of Pakistan has not managed to develop world class functional SEZs that could attract Chinese, regional and domestic investors. As a result, the planned nine SEZs under the CPEC Framework could not be made functional and the Government is now focusing to get five priority SEZs operational.

The above experience calls for a serious evidence-based rethinking of the SEZ framework as a tool for attracting investment. By definition, the Specialized Economic Zones are long-term initiatives that require cutting edge and predictable government policies, strong economic diplomacy, and proper infrastructure development. Other important considerations are strategic location, integration of zone strategy with the overall development strategy, understanding of the market and leveraging country's comparative advantage. Strong and resilient laws and regulations are integral to achieving these. Clearly, the fundamental question that Pakistan's policy makers need to ask themselves is the potential effectiveness of SEZs as a stand-alone intervention that can create adequate incentives for investors.

Before analyzing the potential policy responses, one must take a look at the country's economic fault-lines that should be the top most filter for any policy intervention. Evidence is clear that the investors have chosen short-term trading options rather than taking positions on log-term expansion of the production base and productivity enhancement that has led to perpetual economic crises, be it the job creation or the perpetual pressure on external account. The structure of economy has not changed for years and it is time to have a cutting-edge industrial revival policy framework that can set the direction for a competitive and sustainable expansion of the industrial base. A serious rethinking on changing the structure of economy is critical as the current investment climate has failed to revive investor confidence. Pakistan's current investment to GDP ratio is less than 13%, one of the lowest among its competitors in the region. As a matter of fact, both public and private sector investment have plunged with the later declining by 25%. It is pertinent to highlight that targeted public sector investment attracts private capital. For that, major issues will have to be addressed relating to the policy consistency, political fragmentation, declining security, lack of commercial dispute resolution and bureaucratic capability.

First and the foremost barrier to economic policy development including the SEZs is the old school mindset of the policy makers and their influencers. There is a high level of dependence on international organizations, bi-lateral partners and a desire to prioritize foreign investors only through government-to-government deals. As a result, a vast number of ill planned infrastructure projects have popped up with a massive increase in the debt burden. The survival of political parties and overall stability is now largely linked to the Pakistani elites' ability to strike a new bargain that will lead to a more stable and equitable model of managing the economy.

Having developed connectivity and power sector related projects over thirty billion dollars under CPEC, it is pertinent to note that regional connectivity and economic zones can only bring desired results if this infrastructure manages to attract private capital targeted towards country's comparative advantage. The policy vacuum remains a huge challenge in Pakistan as projects are perceived as policies without the use of evidence or adaptation to modern financial structuring and project management tools. SEZs in various Asian economies like Cambodia and Vietnam have attracted huge amount of investment due to clear policy incentives and a market-based governance model.

Multiple layers of bureaucracy have not only increased the transaction cost of investors but it has also created confusion about the overall objectives and role of SEZs. Contrasting incentives and broken coordination between the provincial and federal institutions are clearly creating barriers to the functioning of SEZs. There are multiple investment promotion agencies including the recently established Special Investment Facilitation Council (SIFC). Progressive economies in the region have shifted to a delegated model of dealing with key issues of investors like visas, permissions, registration, financing and dispute resolution. The Government needs to close down multiple layers and delegate these functions to a corporate entity led by private sector to facilitate smooth functioning of the SEZs. UAE, Qatar and Kazakhstan are working on this model through their independent financial sectors that facilitate foreign companies. Most of the SEZs in China are managed as independent corporate entities led by professional CEOs.

It is critical for Pakistan's economic managers to give lead to the private sector for reaching out to the interested investors in China, Saudi Arabia, UAE and Qatar. The government-to-government transactions are complicated due to a variety of reasons including lack of capability in ministries, weak audit practices and legal issues pertaining to public asset transfer. In order to facilitate private sector, the Government may pick up winners in the sectors of comparative advantage. These could include value added agriculture and IT services. Insofar as the SEZs are concerned, a package of financial and regulatory incentives will have to be negotiated with the IMF and other key stakeholders to provide level playing field in terms of financing, taxation, utilities and logistics to the attract private capital in these sectors. It will be critical to align these incentives alongside the regional connectivity infrastructure developed under the China Pakistan economic corridor.

Communication between the government and private sector remains weak and business leaders blame Pakistan for lack of policy consistency, repressive taxation, high utility costs, cumbersome procedures, weak contract enforcement and dispute resolution capacity. According to the United Nations Conference on Trade and Development, liberalization of investment policies and investment incentives account for more than 50 per cent of reforms that attract investment. The key lesson for Pakistan is to properly sequence investment climate

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Pakistan's EV Potential and How We Can Leverage It Under CPEC

Dr. Usman Qadir

THE GLOBAL EV SHIFT AND PAKISTAN'S POSITION

The global automotive industry is undergoing a seismic shift, transitioning from internal combustion engine (ICE) vehicles to New Energy Vehicles (NEVs), with electric vehicles (EVs) leading the way. This shift is driven by multiple factors: stringent environmental regulations, concerns over energy security, and technological advancements that have significantly reduced battery costs.

China, the European Union (EU), and the United States have emerged as dominant players in the EV landscape. China alone accounted for over 60% of global EV production and nearly 50% of global EV sales in 2023 (IEA, 2024). Countries such as Thailand, Indonesia, and Vietnam are also positioning themselves as key players in the global EV supply chain, leveraging foreign direct investment (FDI) and industrial policy to develop domestic capabilities.

Pakistan, however, remains largely absent from this transformation. The country's Electric Vehicle Policy 2020-2025 aimed to electrify 30% of passenger vehicles and 90% of two- and three-wheelers by 2030, yet progress has been slow due to a lack of coordinated industrial policy, financial constraints, and a weak innovation ecosystem (PIDE, 2023). While the automotive sector continues to rely heavily on imports and assembly-based production, the China-Pakistan Economic Corridor (CPEC) presents a unique opportunity to integrate into global EV value chains.

CPEC, originally focused on infrastructure and energy projects, has evolved into a broader platform for industrial collaboration between Pakistan and China. Given China's dominance in EV technology, battery manufacturing, and supply chain networks, Pakistan can leverage this partnership to accelerate its EV transition—not just for domestic adoption but also as a potential manufacturing and export hub for the broader region.

This article explores Pakistan's current auto sector challenges, opportunities under CPEC, comparative lessons from regional competitors, and key policy recommendations for developing a sustainable and competitive EV industry.

PAKISTAN'S AUTO INDUSTRY: STAGNATION AND THE NEED FOR REFORM

Pakistan's automotive sector has long been characterized by a lack of technological advancement, protectionist policies, and a limited

focus on genuine localization. PIDE's research highlights that the industry remains dominated by a few major players that operate within a tariff-driven protectionist structure rather than through market-driven competition (Qadir, 2023).

Key challenges faced by the industry include **High Dependence on Imports, Supply Chain Weaknesses, Inefficient Policy Interventions, and Limited R&D Investment.**

IMPORT DEPENDENCE AND LACK OF LOCALIZATION

Pakistan's auto industry is characterized by a heavy reliance on Completely Knocked Down (CKD) kits and imported components, limiting local value addition. Despite various localization policies, domestic production capabilities remain weak, with localization levels at 30-40% for passenger vehicles—far below India and Thailand, where localization exceeds 60-80% (PIDE, 2023).
Pakistan also has no fully localized EV manufacturer; even existing players like MG Motors and Sazgar rely on imported parts. Moreover, key inputs such as lithium, cobalt, and nickel—critical for battery manufacturing—are not produced locally, increasing dependence on imports.

INEFFECTIVE INDUSTRIAL POLICY AND PROTECTIONISM

Pakistan's auto industry operates under a highly protectionist regime, where high tariff barriers protect inefficient incumbents while discouraging competition and innovation. The Automotive Development Policy (ADP) 2016-2021 failed to attract high-tech investments, as new entrants focused on assembly operations rather than full-scale manufacturing.

Similarly, the NEV Policy 2020-2025 primarily incentivizes duty-free imports of EVs and offers tax exemptions on CKD kits, but lacks a structured road-map for developing a domestic EV ecosystem. Key shortcomings include: no clear technology transfer requirements for foreign investors, absence of R&D incentives for universities and industry collaborations, and limited focus on building EV component supply chains, such as batteries and power electronics.

ABSENCE OF AN R&D AND INNOVATION ECOSYSTEM

PIDE's research (Qadir, 2023) highlights that Pakistan's low investment in R&D has hindered the development of indigenous capabilities in EV batteries, software, and powertrain technologies. Unlike China, which has developed specialized EV research parks and state-led innovation clusters, Pakistan lacks an ecosystem that integrates academia, industry, and government support.

LACK OF EXPORT VISION

Pakistan's EV policy is overwhelmingly domestically focused, lacking a regional export strategy. In contrast, Thailand and Indonesia have successfully positioned themselves as EV manufacturing and export hubs, leveraging: strategic trade agreements with key markets, alignment with global regulatory standards, and incentives for global automakers to set up export-oriented production.

Without an export-oriented vision, Pakistan risks being confined to a limited domestic market, which will hamper economies of scale and long-term industrial growth.

The recently announced NEV policy aims to shift 30% of Pakistan's vehicle fleet to electric by 2030. However, the policy has been criticized for focusing primarily on import facilitation rather than fostering local manufacturing. This risks increasing Pakistan's dependence on imported EVs rather than building a sustainable domestic industry.

CPEC AS A CATALYST FOR PAKISTAN'S EV SECTOR

CPEC is not merely an infrastructure initiative; it represents an opportunity for industrial collaboration between Pakistan and China. Given China's dominance in the NEV sector, Pakistan can leverage this partnership to build its own EV ecosystem and integrate into China's supply chain network in the following ways:

ATTRACTING CHINESE INVESTMENT IN EV MANUFACTURING

China's EV industry is led by companies such as BYD, NIO, and CATL, which are expanding globally. Pakistan can leverage CPEC to attract Chinese EV manufacturers into local joint ventures (JVs), ensuring:

- Technology transfer agreements that facilitate local capability building.
- Investment in localized component manufacturing to reduce import dependence.

- Training and workforce development programs to equip engineers with EV expertise.
- Establish EV Technology Parks to attract Chinese investment and facilitate R&D collaboration.

DEVELOPING A LOCALIZED BATTERY SUPPLY CHAIN

Battery production is central to cost competitiveness in EVs, as batteries account for 40% of total EV costs. Pakistan can develop a localized battery industry by:

- Partnering with Chinese battery giants like CATL to set up battery production plants.
- Incentivizing local battery cell assembly using imported lithium-ion components.
- Expanding renewable energy integration into EV charging networks to ensure sustainability.
- Develop battery manufacturing by giving incentives through tax breaks and research grants.

POSITIONING PAKISTAN AS A REGIONAL EV EXPORT HUB

One of the key shortcomings of Pakistan's NEV policy is the absence of an export vision. Countries such as Thailand and Indonesia have positioned themselves as regional EV manufacturing hubs by aligning their policies with global demand trends. Given Pakistan's geographic position, it can target regional export markets such as South Asia, Central Asia, and the Middle East, taking advantage of:

- Lower labor costs than China, making Pakistan a competitive assembly hub.
- Strategic location along CPEC trade routes for efficient regional exports.
- Market potential in Afghanistan, Uzbekistan, and the GCC, where EV penetration is still low.
- Develop an EV Export Strategy under CPEC, aligning Pakistan's EV production with global safety and regulatory norms. And align Pakistani production standards with global safety and regulatory norms.

COMPARATIVE LESSONS FROM REGIONAL COMPETITORS

China's success in the EV industry is a direct result of long-term state-led industrial policy and strategic investment. Over the past two decades, the Chinese government has provided more than USD 60 billion in subsidies to support research and development (R&D), incentivize local manufacturing, and promote consumer adoption of EVs. Foreign automakers entering China were required to form joint ventures with local companies, ensuring technology transfer and the development of domestic capabilities. Additionally, China aggressively invested in battery production and charging infrastructure, establishing itself as the global leader in battery supply chains. For Pakistan, the key takeaway from China's approach is that policy consistency, strategic investment in R&D, and technology transfer mechanisms are essential for developing a competitive EV industry. Without a clear, long-term vision backed by state support, Pakistan's EV ambitions will struggle to gain momentum.

Thailand, often referred to as the "Detroit of Asia," has successfully positioned itself as an EV manufacturing and export hub through a strategically designed investment-friendly policy framework. The Thai government has actively courted foreign automakers by offering tax holidays, investment incentives, and regulatory support, making it an attractive destination for companies looking to establish regional production bases. Crucially, Thailand has mandated export quotas for global automakers setting up plants, ensuring that local production is not limited to domestic consumption but is integrated into global supply chains. Furthermore, Thailand has aligned its vehicle safety and emissions standards with international markets, facilitating smooth export operations to Europe and ASEAN countries. Pakistan can learn from Thailand's success by shifting from a domestically focused EV policy to an export-driven strategy, integrating with regional trade networks and ensuring that its production meets international quality and safety standards.

KEY POLICY INTERVENTIONS FOR A SUSTAINABLE EV INDUSTRY

For Pakistan to maximize its EV potential under CPEC, it must adopt a comprehensive industrial strategy that prioritizes domestic capability-building, technology transfer, and long-term economic sustainability. The following are critical policy recommendations:

RETHINKING PROTECTIONIST TARIFFS

Pakistan's current tariff structure discourages investment in local manufacturing. While high tariffs on imports protect existing players, they also stifle competition and technological innovation. Instead of blanket protection, Pakistan should introduce

smart tariff policies that encourage investment in EV production and gradually phase out high tariffs on EV components while linking tariff reductions to localization targets.

STRENGTHENING INDUSTRIAL AND RESEARCH LINKAGES

Pakistan's industrial policies have historically overlooked the importance of R&D and collaboration between academia and industry. A successful EV strategy must include investments in research to develop indigenous capabilities. Pakistan must focus on establishing EV research and testing centers in collaboration with Chinese partners, and encourage Pakistani universities to partner with leading Chinese EV research institutes.

INFRASTRUCTURE DEVELOPMENT FOR EVS

A major bottleneck in EV adoption is the lack of charging infrastructure. Without widespread charging stations, EV adoption will remain slow. Given the energy sector's existing issues, a focus on renewable energy-based charging solutions is necessary. Pakistan needs to develop a national EV charging infrastructure plan under CPEC, and encourage private sector participation in charging station deployment through public-private partnerships.

CREATING A FAVORABLE BUSINESS ENVIRONMENT

Attracting investment in the EV sector requires policy consistency and a business-friendly regulatory environment. Investors are wary of unpredictable shifts in policy, particularly in sectors where long-term planning is required. It is high time Pakistan ensures regulatory consistency by locking in EV incentives for a fixed period and provides clear investment roadmaps for both domestic and foreign investors.

FROM POLICY TO ACTION

Pakistan's journey towards becoming an EV player will require a shift from ad-hoc policy-making to a structured, long-term industrial vision. Learning from China's experience, Pakistan must move beyond mere incentives and create an enabling environment for domestic firms to scale up production and compete in global markets.

The key takeaways for policymakers include:

1. Leverage CPEC for joint ventures and technology transfer in NEV manufacturing.
2. Prioritize local battery production and research into alternative energy storage.
3. Develop a regional export strategy to ensure long-term industry viability.
4. Invest in EV infrastructure, particularly in renewable energy-based charging networks.
5. Ensure policy consistency to attract long-term investment.

With a clear strategy and effective execution, Pakistan can position itself as an emerging player in the global NEV market, leveraging its CPEC partnership to drive economic growth, industrial development, and environmental sustainability.

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Seres, Pakistan's First Locally Assembled EV

MARKETS & REGIONAL CONNECTIVITY

Image obtained from NLC Website

Picture courtesy of Pamir TImes
Sost Dry Port, Hunza

CPEC Extensions: How Pakistan can get more from bilateral transit agreements?

Dr. Hamid Haroon

1. INTRODUCTION:

Pakistan's geostrategic position as a connection between South Asia, Central Asia, and the Middle East has long been recognized as a strong element of its economic potential. However, the rapid evolution of regional transit trade initiatives, such as the India-led International North-South Transport Corridor (INSTC), emphasizes the resolve for Pakistan to leverage its geographical advantages through proactive engagement in transit trade frameworks. The China-Pakistan Economic Corridor (CPEC), a flagship project of China's Belt and Road Initiative (BRI), offers an excellent opportunity to redefine Pakistan's role as a regional trade and logistics hub. By integrating CPEC into its transit trade strategy, Pakistan can not only counterbalance regional corridors but also unlock unprecedented economic growth, infrastructure modernization, and geopolitical relevance.

CPEC's infrastructure backbone—spanning the Gwadar Port, cross-border highways, railways, and energy projects—positions Pakistan to serve as a critical artery for transcontinental trade. The synergy between CPEC and regional transit trade agreements could amplify Pakistan's capacity to facilitate trade flows between South Asia, the Middle East, and Eurasia. However, realizing this vision requires strategic alignment of CPEC's infrastructure with Pakistan's bilateral and multilateral transit agreements, addressing challenges such as security risks, customs inefficiencies, and geopolitical competition.

This article examines how CPEC reshapes Pakistan's transit trade dynamics, focusing on two strategic pathways for extending the benefits of this initiative: A Comprehensive Regional Connectivity Arrangement including Pakistan, India, Iran, Afghanistan, CARs, and Russia.

Focused Bilateral and Regional Agreements including Pakistan, Iran, Afghanistan, CARs, and Russia.
By evaluating CPEC's role in reducing trade costs, expanding export markets, and mitigating risks posed by rival corridors like INSTC, this analysis

aims to provide actionable insights for policymakers. The following sections delve into empirical assessments of transit trade scenarios, infrastructure demands, and the geopolitical balancing act required to secure Pakistan's position as a linchpin of regional connectivity in the CPEC era.

This article is organized to first present a bilateral analysis of Pakistan's trade and transit relations with individual countries. Following this foundation, both proposed scenarios are explored in detail based on the insights from these analyses.

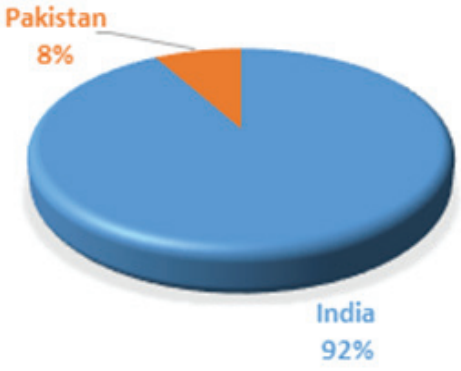
2. BILATERAL TRANSIT TRADE ANALYSIS

This section presents an analysis of Pakistan's bilateral transit trade scenarios with key regional partners, including India, Iran, Afghanistan, and the CARs. Each bilateral relationship is explored to assess the economic, logistical, and strategic implications of potential transit agreements.

2.1. Pakistan India Transit Trade

Pakistan and India have many things in common and both can help each other for regional stability and economic growth. Pakistan can provide shortest transit route to India for reaching Afghanistan and CARs. In response India can offer reciprocal access to Bangladesh, Nepal and Bhutan. The following table provides a comparative analysis of the costs and benefits of transit trade for Pakistan and India. This comparison highlights the strategic and economic trade-offs involved in facilitating regional connectivity.

Share of India and Pakistan in total gains if transit trade is permitted



Key Insights:

- Shortest possible route for India to reach Afghanistan and CARs.
- Business As Usual: Based on current data, India can get everything it wants through the Transit Trade Agreement.
- Hypothetical Best Case Scenario: Though short run benefit is ignorable, Pakistan can increasingly participate in Global Value Chains due to industrial integration with India and better market openings, leading to extra exports of more than $10 billion in 5 years. Share of

Parameter/ Country	Pakistan	India	Who Benefits More?
Access to:	Bangladesh, Bhutan, Nepal	Afghanistan, CARs, Russia	**India:** Access to a bigger region
Total Trade	$ 823 million.	$ 31.69 billion	**India:** Higher trade volume
Feasible Transit Volume	$ 416 million	$ 4.86 billion	**India:** Higher volume that India can transit
Trade Cost Savings	$ 11.66 million	$ 287 million	**India:** Saving 24 times more than Pakistan
Revenue Generation from Transit Fee	$ 48 million	$ 8.33 million	
Infrastructure Cost	$ 21.5 million	$ 5.45 million	
Other Costs	$ 12.6 million	$ 1.5 million	
Net Revenue	$ 13.9 million	$ 1.38 million	**Pakistan:** Due to bigger share of India in trade
Potential to increase exports	$ 3 billion	$ 15 billion	**India:** Due to Proximity
Benefitting sectors (Current/Potential)	Pharma, Surgical, Fruits, Sports, Textile	Agriculture, Processed Food, Pharma, Machinery, Textiles	India: Due to diversity, and better Economic Complexity Index

Source: calculations are based on data from Pakistan Bureau of Statistics and International Trade Centre, while some estimates are made using customized GTAP model with latest 2024 data of Pakistan.

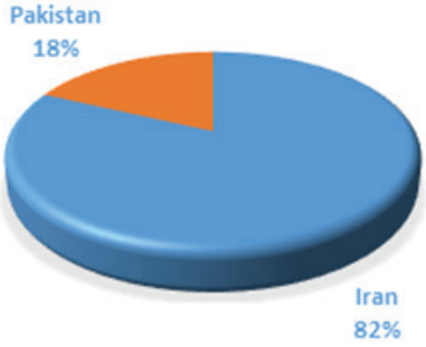
India and Pakistan in total gains if transit trade is permitted

- India don't need Pakistani route for trade with Russia due to opening of International North South Transport Corridor (INSTC)
- In return for greater access to CARs and Russia, Afghanistan can demand direct access to India from Pakistan.
- Pakistan's most important partner in South Asia is Bangladesh, which is securely accessible through Sea Route.
- Bhutan and Nepal have greater reliance on India due to proximity, so very little scope for Pakistani exports.

2.2. Pakistan Iran Transit Trade

Pakistan and Iran's strategic positions make them natural partners in regional transit trade. In this report, we assume Pakistan grants Iran access to China via CPEC, while Iran leverages the International North-South Transport Corridor (INSTC) to provide Pakistan access to Azerbaijan, Turkey, and Russia. However, Iran opts to use maritime routes for trade with India, bypassing Pakistan.

Share of Iran and Pakistan in total gains if transit trade is permitted



Key Insights:

- Shortest possible route between western China and Iran. Pakistan's access to Russia in least possible logistic time.
- By providing transit facility to Iran and China, Pakistan can tackle international obstacles stemming out of economic partnerships with Iran.
- Normalized economic ties with Iran can give more access to Iranian energy market.
- Integration with INSTC can balance out enhanced Indian access to Central Asia and Russia through Iran. Share of Iran and Pakistan in total gains if transit trade is permitted

Parameter/Country	Pakistan	Iran	Who Benefits More?
Access to:	Azerbaijan, Turkey, Russia	China	Iran:
Total Trade	$ 1.5 billion	$ 30.3 billion	Iran
Feasible Transit Volume	$ 1.4 billion	$ 9.1 billion	Iran
Trade Cost Savings	$ 80 million	$ 500 million	Iran
Revenue Generation from Transit Fee	$ 181 million	$ 29 million	Pakistan
Infrastructure Cost	$ 119 million	$ 18 million	
Other Costs	$ 30 million	$ 4.6 million	
Net Revenue	$ 32 million	$ 6.4 million	Pakistan
Potential to increase exports	$ 5.5 billion	Negligible	Pakistan
Benefitting sectors (Current/Potential)	Pharma, surgical instruments, Fruits, Processed food		

Source: calculations are based on data from Pakistan Bureau of Statistics and International Trade Centre, while some estimates are made using customized GTAP model with latest 2024 data of Pakistan.

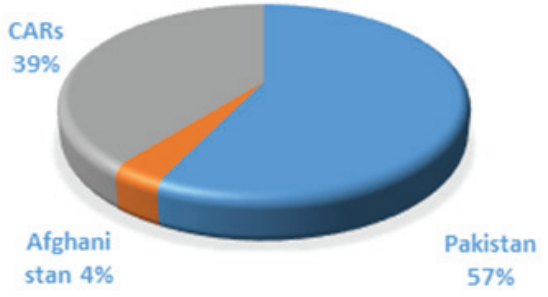
2.3 – Reaching CARs through Afghanistan

While limited trade through this route already occurs, a comprehensive transit trade agreement with Afghanistan could transform Pakistan into a pivotal gateway for CARs, enabling a significant increase in exports of textiles, pharmaceuticals, agricultural products, and industrial goods. In return, Pakistan can provide reciprocal sea access to Afghanistan and CARs through its ports, such as Gwadar and Karachi, fostering mutual economic growth. This arrangement has the potential to unlock vast trade opportunities, reduce logistics costs, and enhance regional connectivity for all involved nations.

3. COMPARISON OF REGIONAL TRANSIT TRADE ALTERNATIVES

As outlined in the introduction, this section presents a comparison of the "comprehensive re-gional transit trade" and "bilateral transit trade" alternatives, based on the analysis provided in Section 2. The comparison is thematic, addressing each aspect separately for a clearer under-standing of the differences. Further, Pakistan – Iran transit trade option is not included in this analysis as it can be separately negotiated among Pakistan, Iran and China without involving any other regional country.

Share of Pakistan, Afghanistan and CARs in total gains if transit trade is permitted



Key Insights:

- There is no trade cost savings for Afghanistan as it has an alternate Chahbahar route.
- CARs are at the end of logistics route so they are not earning any transit fee
- Pakistan's largest share in gains pie is mainly coming from transit fee.
- This is the best scenario for Pakistan as the export potential is maximum.
- Pakistan can become the hub of regional trade securing regional peace and stability.

Parameter/Country	Pakistan	Afghanistan	CARs
Access to:	CARs	The world through Pakistani Sea Ports	Pakistan, Middle East, East Asia
Total Trade	$ 234 million	$ 8.54 billion	$ 1.5 billion
Feasible Transit Volume	$ 234 million	$ 5 billion	$ 1.1 billion
Trade Cost Savings	$ 23 million	N/A	$ 50 million
Revenue Generation from Transit Fee	$ 250 million	$ 11.7 million	
Infrastructure Cost	$ 150 million	$ 6 million	
Other Costs	$ 50 million	$ 1.2 million	
Net Revenue	$ 50 million	$ 4.5 million	
Potential to increase exports	$ 5 billion	$ 1 billion	$ 2 billion
Benefitting sectors (Current/ Potential)	Textile, Citrus Fruits, mangos, rice surgical instruments, Processed food	Dry fruits, minerals, handicrafts, wool, carpets	Minerals, metals, cotton, energy

Note: Due to small share of CARs in Pakistan's trade pie, these states are aggregated into a single region.
Source: calculations are based on data from Pakistan Bureau of Statistics and International Trade Centre, while some estimates are made using customized GTAP model with latest 2024 data of Pakistan.

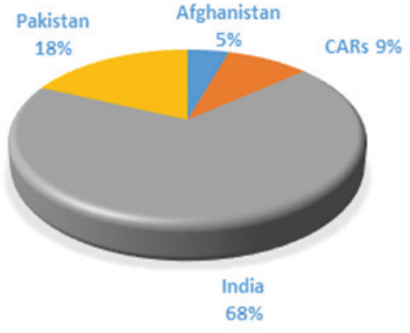
3.1 – Short-Term benefits based on current trade

Cost savings predominantly favor India, given its substantial trade with Afghanistan and the Central Asian Republics (CARs). While Pakistan benefits from transit trade revenue, it does not receive reciprocal transit advantages. Pakistan's primary trade partner, Bangladesh, is more securely accessible through maritime routes, and Nepal and Bhutan, which are at the end of the transit route, have limited trade with Pakistan. In both scenarios, most countries, aside from Afghanistan, would see similar outcomes. However, if India is not granted transit rights through Pakistan, Afghanistan would face an additional $28 million in transit trade costs. Therefore Pakistan stands to benefit from pursuing bilateral transit agreements with Afghani-stan and Iran, which could provide access to Azerbaijan, CARs, Russia, and Turkey.

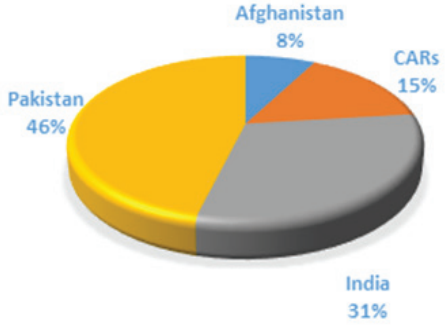
3.2 – Long-term benefits based on export potential

Long run trade benefits are estimated through the potential impact on future exports. In the fol-lowing two charts provide a clear picture of both scenarios.

Share in export potential (with India)



Share in export potential (without India)



The big difference in export potential for India and Pakistan can be explained with the help of Economic Complexity Index (ECI), which tells how much a country's physical and human re-sources are able to enhance and diversify the exports. Latest data tells that Pakistan (score -0.57) is much below India (score 0.48) as far as resource concentration in exporting ability is concerned. Direct access to Afghanistan and CARs through the shortest possible route will un-dermine export potential in future.

Based on both short run and long rung analysis, it is suggested to strike bilateral transit trade deals with Afghanistan and Iran for access to CARs, Azerbaijan, Russia and Turkey with recip-rocal routes provided to access Arabian Sea and China.

4. CHALLENGES

Afghanistan Can Demand Access to India

Afghanistan may leverage its position by demanding transit access to India in exchange for of-fering Pakistan routes to CARs. If denied, Afghanistan could shift its trade operations to Chabahar Port in Iran, reducing Pakistan's role as a primary transit corridor. This shift would compel Pakistan to use longer and costlier Iranian routes to access CARs, undermining its competitiveness. Diplomatic engagement is essential to prevent such retaliatory actions.

Security on Trade Routes

Ensuring secure transit routes, particularly in conflict-prone regions like Balochistan and areas near the Afghan border, remains a critical challenge. These regions are vulnerable to insurgen-cies and instability, threatening trade flows and increasing operational costs. Investments in enhanced security infrastructure, surveillance, and convoy protection are necessary to maintain trade continuity and partner confidence.

Smuggling and TIR System

Smuggling along the Afghan-Pakistan border, and Pakistan-Iran border undermines formal trade, causing significant revenue losses and distorting local markets. Common smuggled goods include fuel, textiles, and electronics. Effective implementation of the TIR System can help address this issue by streamlining customs processes and providing transparency. Modern border management systems, surveillance technology, and joint anti-smuggling initiatives with Afghanistan and Iran are critical to reducing smuggling and ensuring efficient trade flows.

Infrastructure and Customs Modernization

Pakistan's transit trade infrastructure, including Gwadar Port and Pakistan Railways, requires

modernization to handle increased trade volumes. Upgrading road networks, railways, and port facilities is essential to prevent delays and bottlenecks. Additionally, customs procedures must be automated to reduce inefficiencies, expedite clearance, and enhance border management.

CPEC can be leveraged to unlock the opportunities that regional bilateral trade presents for Pa-kistan. If possible, through amending the CPEC agreements with China or coming to terms with China and regional countries through extension of CPEC i.e., separate agreements but connect-ed to overall CPEC infrastructure. Through relying on CPEC infrastructure and unlocking Paki-stan's strategic position, Pakistan can gain economically and geo politically.

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Afghan transit trade through Pakistan

Border Trade Woes & Way Forward

Ajmal Kakar

Balochistan, Pakistan's largest province, wields an immense economic potential. It plays para-mount role in the country's bilateral, transit and border trade, by sharing 1,464 km and 909 km long borders with Afghanistan and Iran, respectively. Out of its 36 districts, 13 are located along these international borders, with nine districts having a physical border with Afghanistan and five bordering Iran. There are nearly 25 trade hotspots along the border. In fact, the border communities on both sides, sharing common language, culture, and history. These deep-rooted commonalities underscore the bordering town's dependency on cross-border trade as a primary source of livelihood.

Our recent comprehensive PIDE-RASTA study (not published yet) reveals that various type of trade take place at prominent trade hotspots along the borders including (1) formal and docu-mented, (2) formal but undocumented (3) informal but documented, and (4) informal and undocumented trade. During our field survey, the majority of the residents in bordering towns define border and border trade as a primary source of income, backbone of local economy, business hub, a family legacy, a tradition, and even as valuable as gold or a natural resource. Additionally, the study reports the estimated size of labour force participation in border trade and related activities, focusing on the import of petroleum/diesel exclusively. In fact, 31% of the population in district Washuk, 21% in Gwadar, 16% in Punjgor, 13% in Chaghi and around 8% in Kech district are directly involved in petroleum import from Iran exclusively. Similarly, a survey conducted in Chaman and Spin Boldak reports that, 81% of the respondents reported that business activity in their community depends entirely or mainly on cross-border trade. And, 65% revealed that household well-being is mainly dependent on trade. Dependency on border trade extends beyond bordering towns. Balochistan's overall economy is highly depend-ent on cross-border trade with neighboring countries.

However, the border trade in Balochistan is not free of impediments. During our field visit to bordering towns in Balochistan, the respondents including but not limited to traders, member chamber of commerce, members trade unions, transporters and local residents reported various issues in border trade. The reported issues include, token policy regime, loss of economic au-tonomy, public exploitation, rigorous inspections, inadequate infrastructure, impediments in barter trade, interprovincial restrictions and market accessibility, and passport and visa regime. Additionally, since cross-border trade is mainly informal, it leads to significant revenue loss. Furthermore, the existing model is causing human capital loss in bordering districts in particu-lar and Balochistan in general.

In fact, token policy regime (Zamyad vehicle Tokens) has emerged as a prominent concern for the traders engaged in border trade with Iran, a matter that originated in 2020. The respondents reported that, this policy has reduced the access to border, exacerbated regional disparity, en-couraged corruption and government official's involvement, augmented rent-seeking, cost of doing business and which is being used as a political tool by the politicians. The loss of local resident's economic autonomy is also the byproduct of token policy and border fencing and subsequent government officials and political elite's intervention in border trade either direct or indirect. Additionally, respondents also reported trader's exploitation as issue in border trade (with Iran). They believe that border trade is only for the few elites and majority of the masses are earning for them. One respondent expressed in these words: "In the past, people used to earn for themselves, securing their livelihoods. However, now the work here is done for the benefit of DCs, MPAs/ MNAs, powerful individuals, politicians, and other government officials. Their profit is guaranteed, but the public's benefit is uncertain and may even result in losses for them."

Additionally, the traders reported large number of checkpoints and rigorous inspections as one of the stumbling block in border trade. They believed that checkpoints are unnecessary, and in some routes, multiple checkpoints exist, and each increase the cost for businessmen. Moreover, as in Balochistan most of the cross-border points are not formally notified, therefore lack proper infrastructure. Ultimately, inadequate infrastructure increases transportation cost, time-consuming, interrupts the supply chain, increasing risk of accidents, and causes products damage, therefore reducing efficiency and profit. For instance, in district Kech, the Abdu bor-der is approximately 130 kilometers from Trurbat city but due to the lack of infrastructure, it takes around 7-8 hours to reach the border. In the same way, District Zhob Qamerdin Karaz is 208 kilometres, Mazakai Kundar is 178 kilometers, and Gul Koch is 185 kilometers from Zhob City but due to the pitiable condition of the road, this takes approximately more than five hours.

increasing the risk of accidents

Traders engaged in border trade also reported impediments in barter trade with Iran. The Markran Division Chamber of Commerce Members expressed the issue as: "There is huge po-tential of barter trade with Iran, we are not serious in this regard." They identified a list of 40 potential exportable items in which Pakistan has comparative advantage. Similarly, there are many products in which Iran has comparative advantage, for instance steel, oil, gas, marble and other food commodities. However, these are restricted to informal ways, to please selected individuals."

One of the major issues reported in all bordering towns including traders from Quetta is the dif-ficulties in interprovincial movement/transportation and access to big markets in Pakistan. This further increases the cost of doing business and encourages corruption. Additionally, in Chamn district, most of the respondents reported the negative repercussions of implementation of passport and visa regime which resulted in historic large protest "Parlat" (for details see: https://eastwestnewswire.com/pakistan-prolonged-sit-in-at-chaman-border-highlights-devastating-impact-of-revoked-easement-rights/).

The above mentioned are the issues reported by the respondents during our field visit to border-ing towns. However, our study reports additional issues of border trade for Pakistan's economy. As I mentioned the nature trade which is mainly informal but documented, this informal nature of the trade leads to revenue loss and privatization of tax. According to our study, on daily ba-sis Pakistan is losing around USD 2.6 million in petroleum import exclusively. The overall rev-enue loss is many times higher than this. In addition to this, In the bordering region, the pro-spects of education are so bleak that university students abandon education to pursue career in border trade. Thus, such a model of trade is unsustainable. On one hand, it results in revenue loss for the government; on the other, it diverts local residents from formal trade and educa-tion, pulling them into an unstable livelihood that could be discontinued at any time. Indeed, the closure will have either more devastating impacts for both the government and local com-munity, its therefor, indispensable to streamline the border trade gradually with alternative business model.

Thus, based on the challenges we observed and those reported by the respondents during our field visit to bordering towns. We suggest the following policy proposal and confidence build-ing measures for a greater interest of state and local community.

Formulization and Regulation of Border Trade: As a policy proposal we suggest to establish officially designated border-crossing points or border economic corridors in each bordering district of Balochistan. Additionally, the establishment of Border Economic Zones or Joint Border Markets along each border gateways.

Revisit the Token Policy: The Balochistan government should revisit the existing Zamyad Vehicle Token policy to enhance transparency in token allocation across designated districts and union councils. Additionally, a rational petroleum tax levy should be imposed. This will not only generate revenue for the government but also reduce the cost of doing business, curbing rent-seeking practices and bureaucratic hurdles.

Infrastructure Development and Trade Facilities: There is dire need upgrade the existing road network and building of new roads along the border economic zones and getaways in each potential bordering districts. Furthermore, trade facilities such as custom clearance stations, border terminal, banking, internet accessibility and other logistic support are indispensable.

Unified National Border Trade Policy: Interprovincial trade barriers can be eliminated by adopting a unified national border trade policy and elimination of unnecessary and overlapping checkpoints.

Livelihood Diversification in Bordering Towns: in order to reduce reliance on unsustainable informal border trade initiatives should be taken to diversify the livelihood of local communi-ties in the bordering settings. For instance, skills training programs can be incited to integrate the labor force in formal sectors, different bordering cities can be developed as hubs for specif-ic services, such as Taftan as a tourist city and Chaman as a healthcare hub. Similar steps can be taken in other region based on their potential and feasibility

Preferential Trade Agreement (PTA) with Iran and Afghanistan: As a confidence building measure we suggest to sign preferential trade agreement with the government of Iran and Af-ghanistan to improve the market access and bilateral trade. As a part of the agreement, the gov-ernments should agree on the utilization of potential products and tariff rationalization.

As in our field visit, the Chman and Makran members chamber of commerce has emphasized on the identification of the local economy potential and recommended the development of Spe-cial Economic Zones under CPEC, in the bordering town. In Balochistan, currently there are two ongoing SEZs, established in district Peshin and Hub, similar SEZs will be established at Chaman and Khuzdar. Therefore, one the recommendation is to:

Research for Region Specific Potential and Development of SEZs under CPEC: Finally, we suggest conducting extensive research on the subject to identify region specific potential. Addi-tionally, the development of Special Economic Zones (SEZs) in bordering town under China Pakistan Economic Corridor (CPEC)

These policy proposals and proposed confidence building measures will have the following implications; decline the informality in border trade, will encourage transit trade with Afghani-stan and Pakistan's access to Central Asia. Additionally, this will enhance the volume of bilat-eral trade with neighboring countries (Iran and Afghanistan). Imposing tax will generate reve-nue and subsequently will enhance foreign reserves. The unified national border policy will fa-cilitate movement of goods within Pakistan and will assist in developing well-coordinated trade policies at provincial and federal level. In addition to this, these policy proposals will generate alternative and sustainable livelihood opportunities for the local residents in bordering towns in general and for the youth of Balochistan in general.

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Strengthening Pakistan's Connectivity with Regional Countries Through CPEC

Zartasha Inayat

CPEC is the single largest infrastructure investment for Pakistan and the broader region, par-ticularly in energy and infrastructure development. Recognized for its potential importance in connecting South Asia, Central Asia, and the Middle East, CPEC positions Pakistan as a central hub for regional trade and economic connectivity. As a trade gateway to these regions, Pakistan can play a crucial role in facilitating cross-border commerce and investment. As the flagship project of China's Belt and Road Initiative (BRI), CPEC holds the promise of transforming re-gional connectivity landscape, pivoting Pakistan's economic direction.

With 800 km of highways completed and 813 km under construction, along with 17 completed energy projects adding 8,000 megawatts to the national grid (Khalid, 2023) CPEC has signifi-cantly improved transportation networks and energy security. While the total valuation stands at $64 billion, CPEC has brought around $25 billion in direct investment to Pakistan as per De-cember 2024 (Tribune, 2024). These developments have not only addressed Pakistan's infra-structure gaps but also created employment opportunities and expanded access to regional mar-kets, fostering economic growth.

CPEC Phase II signifies a strategic shift towards broader economic diversification, prioritizing maritime trade, connectivity, and the blue economy, as highlighted in the Economic Survey 2023-24. This phase emphasizes both government-to-government (G2G) and business-to-business (B2B) cooperation, creating employment opportunities and boosting Pakistan's agri-cultural exports. In collaboration with Chinese research institutions

and enterprises, Pakistan is making strides in animal husbandry, crop cultivation, and agricultural product processing, strengthening its agribusiness sector and trade potential under CPEC.

CPEC primarily connects Pakistan with Xinjiang province of China, however, its broader sig-nificance lies in fostering integration with neighboring countries such as Iran, Afghanistan, and Central Asian states to enhance regional trade and connectivity. This article presents a brief overview of these possibilities.

REGIONAL CONNECTIVITY WITH NEIGHBORING COUNTRIES

Pakistan and Kazakhstan share growing trade ties, with Pakistan exporting goods worth $95 million to Kazakhstan and importing $45.9 million from the country (OEC, 2022). However, connectivity challenges have historically hindered trade expansion. CPEC's infrastructure pro-jects—including highways, railways, and Gwadar Port—offer Kazakhstan an alternative route to access South Asian and global markets. By utilizing these transit routes, Kazakhstan can ef-ficiently export commodities such as oil, coal, and metals, while Pakistan can increase its ex-ports of textiles, agricultural products, and pharmaceuticals. Additionally, the Quadrilateral Traffic in Transit Agreement (QTTA) provides an important avenue to expand trade routes and boost trade volume between both nations. Chinese investment in Kazakhstan's infrastructure, especially in logistics and energy, further strengthens collaboration opportunities. Many Chi-nese companies operate in both Kazakhstan and Pakistan, creating a platform for tripartite ven-tures. Joint investments in trade hubs, special economic zones, and digital trade platforms could streamline commerce and boost trade volumes.

Kazakhstan's vast energy resources, including oil and natural gas, position it as a strategic sup-plier for Pakistan's increasing energy demands. Expanding energy corridors under CPEC could enable Kazakhstan to export hydrocarbons to Pakistan via existing pipelines to China or through new transit routes via Afghanistan and Iran. Furthermore, Pakistan's growing focus on renewable energy aligns with Kazakhstan's expertise in solar and wind power, opening avenues for joint ventures in green energy projects. Strengthening energy trade would not only enhance Pakistan's energy security but also provide Kazakhstan with an alternative market beyond its northern trade partners. Infrastructure investments, such as power grids and energy transmis-sion networks, could support energy trade, ensuring stable supply chains and reducing reliance on external factors. Kazakhstan's participation in CPEC aligns with broader regional trade ini-tiatives, including the Trans-Caspian International Transport Route (TITR). By integrating Ka-zakhstan's existing transport infrastructure with CPEC's road and rail networks, goods can move more efficiently between the two countries. Establishing logistics hubs in both nations, coupled with streamlined customs procedures, could significantly lower transit costs and deliv-ery times.

Although there is significant trade potential between countries, certain challenges remain un-addressed. Geopolitical uncertainties, including regional instability in Afghanistan, pose secu-rity risks to trade routes. Additionally, environmental concerns associated with large-scale in-frastructure projects must be addressed to ensure sustainable development. Kazakhstan's eco-nomic diversification strategy should also address potential risks of over reliance on China, en-suring balanced trade engagements which makes trade beneficial for all the countries involved in trade, to maintain economic autonomy. Nevertheless, proactive policy coordination and in-vestment in resilient trade infrastructure can help mitigate these risks and unlock the full po-tential of Kazakhstan-Pakistan trade through CPEC. Strengthened diplomatic ties and regional cooperation will be essential in navigating political complexities and ensuring long-term eco-nomic benefits.

Turkmenistan also offers trade opportunities for Pakistan, particularly in the energy and infra-structure sectors. With Pakistan's energy demand rapidly increasing, strategic regional collabo-rations are essential to secure a stable energy supply. Projects like the TAPI (Turkmenistan-Afghanistan-Pakistan-India) gas pipeline and the TAP (Turkmenistan-Afghanistan-Pakistan) power transmission lines could play a crucial role in meeting Pakistan's energy needs, provid-ing a reliable source of natural gas and electricity. Additionally, infrastructure projects such as fiber optic networks and railway connectivity could further enhance trade between the two countries.

Iran is another key player connected to Pakistan via CPEC. Due to US sanctions, Iran heavily depends on China to replace Western goods and services. In 2024, Iran's oil exports to China accounted for 90% of its total exports (Fadlon & Zimmt, 2024) highlighting this reliance. Giv-en its strategic location, Pakistan can act as a bridge between China and Iran. As CPEC extends beyond Gwadar Port, linking China with Iran, Pakistan has the opportunity to position itself as a crucial trade and transit hub. By facilitating trade routes, Pakistan stands to benefit from transit fees, infrastructure development, and increased economic activity in its port cities. Strengthening economic ties with both China and Iran could also improve Pakistan's energy security through potential gas imports and oil trade, reducing dependence on expensive alterna-tives. Despite security concerns

linked to terrorist activities, the leadership of Iran and Pakistan remains optimistic about increasing bilateral trade through CPEC, targeting $10 billion in the coming years (Business Recorder, 2025). Additionally, there is significant trade potential in agriculture and industry, which both countries can further explore. Streamlining trade routes under CPEC could also help curb oil smuggling from Iran to Pakistan. According to a report submitted to the Prime Minister, approximately 2.8 billion liters of oil are smuggled into Paki-stan annually, resulting in a revenue loss of Rs. 60 billion (Butt, 2023).

Azerbaijan also presents untapped trade potential, with mutual trade between the two countries currently below $100 million. Despite being 2,200 km apart, Pakistan and Azerbaijan share his-torical connections through the Silk Road and CPEC, strengthening bilateral relations in trade, defense, energy, and information technology.

Recent developments highlight a growing commitment to economic cooperation, with bilateral trade nearly tripling since 2017, reaching $40.88 million in 2022. Furthermore, discussions on $2 billion worth of joint projects indicate a shift towards deeper economic collaboration. De-fense cooperation remains a key aspect of their relationship, with Pakistan providing strategic support to Azerbaijan during the Nagorno-Karabakh conflict and signing multiple defense agreements over the years.

Beyond defense and trade, energy cooperation has emerged as a key focus. Azerbaijan's vast oil and gas reserves offer a valuable opportunity for Pakistan, which faces a severe energy crisis and dwindling domestic gas supplies. Azerbaijan's Shah Deniz gas field—one of the world's largest—could significantly benefit Pakistan's energy sector. Recently, agreements have been signed for LNG imports, strengthening Pakistan's energy security while expanding Azerbaijan's export market.

Additionally, cooperation in the information technology sector has been gaining traction, with both countries emphasizing digital transformation. Azerbaijan's rapidly growing ICT sector and Pakistan's expanding IT industry, reflected in its $2.1 billion ICT exports, have led to new agreements on digital collaboration (Raza, 2024). This multi-sectoral engagement reflects a strategic shift in Pakistan-Azerbaijan ties, evolving into a comprehensive partnership focused on regional economic stability and mutual growth.

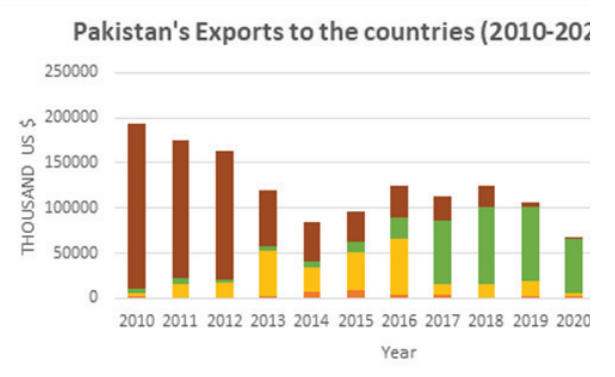
IMPORT AND EXPORT TRENDS

Data suggests quite surprising trends of Pakistan's trade with these countries. As shown in fig-ures 1 and 2 below, Pakistan's trade with Iran and Kazakhstan have had contrasting patterns with the passage of time. Export patterns indicate that Pakistan's trade with Kazakhstan in-creased constantly while with Iran reduced possibly due to the effect of the sanctions, trade re-strictions, and a change of trade policies.

On the export side also, Pakistan has posted its highest export to Iran year by year with the ma-jor export being trade of energy like petroleum products and gas. Iran is a major supplier to Pa-kistan's growing energy needs despite regional threats to security and political issues.

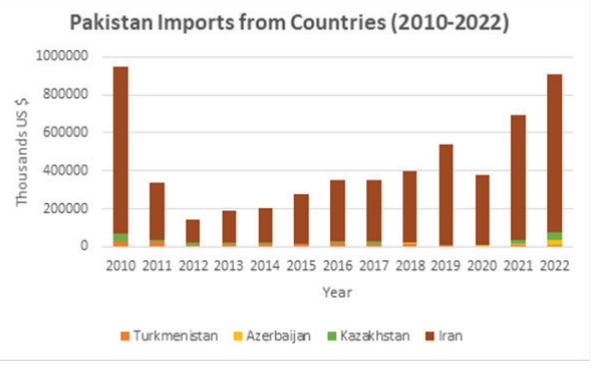
In contrast, trade with Azerbaijan and Turkmenistan is still untapped to a significant degree. Although present agreements with Azerbaijan are a reflection of growing economic relations, the trade is still below its potential. Energy-rich Turkmenistan is rich with opportunities to col-laborate together, notably with respect to gas supply and electricity supply by way of the TAPI and the TAP ventures.

Figure 1



Source: WITS

Figure 2



Source: WITS

In conclusion the China-Pakistan Economic Corridor (CPEC) can play a pivotal role in expand-ing Pakistan's trade with Kazakhstan, Iran, Azerbaijan, and Turkmenistan by enhancing region-al connectivity and infrastructure. Furthermore, trade facilitation measures, such as relaxed vi-sa policies and trade agreements, would encourage business engagement. Given Kazakhstan's membership in regional organizations like the Shanghai Cooperation Organization (SCO), dip-lomatic collaboration could enhance trade cooperation and regulatory alignment. By develop-ing modern transportation networks, energy projects, and trade hubs, CPEC can further facili-tate smoother trade flows and reduce logistical barriers.

It is important to note that there are alternate routes being developed to connect the regional countries, including India Middle East Europe Corridor(IMEEC), North South Transport Corri-dor (NSTC), Trans-Caspian International Transport Route(TITR) or Middle Corridor. These corridors are independent of CPEC and could even push investors towards alternative routes if Pakistan fails to work on security concerns of investors. Furthermore, bureaucratic delays and presence of red tape can further risk the investment in Pakistan and change investors preference to alternate routes, thus bypassing Pakistan.

Pakistan needs to work on the given challenges and provide a secure investment climate, so that CPEC further strengthens Pakistan's position as a key trade gateway between South Asia and Central Asia, fostering economic integration and opening new opportunities for exports and imports. Leveraging CPEC's infrastructure, Pakistan can deepen its trade ties with these coun-tries, diversify its markets, and promote sustainable economic growth through increased re-gional cooperation.

REFERENCES

Business Recorder. (2025). Retrieved from Business Recorder: https://www.brecorder.com/news/40346021/pakistan-iran-business-chambers-ink-mou-to-boost-bilateral-trade-to-10bn

Butt, N. (2023). Business Recorder. Retrieved from Business Recorder: https://www.brecorder.com/news/40262513

Fadlon, T., & Zimmt, R. (2024, August 27). Growing but Limited: Iranian Economic Re-lations with China . Retrieved from The Institute for National Security Studies : https://www.inss.org.il/publication/china-iran-economy/

Khalid, M. (2023). 10 Years of CPEC SpecIal Edition: Unlocking Pakistan's Potential and Future Prospect. Institute of Strategic Studies.

OEC. (2022). Retrieved from https://oec.world/en/profile/bilateral-country/pak/partner/kaz

Raza, S. B. (2024). Enhancing Cooperation: Pakistan-Azerbaijan Multi-Sectoral Part-nership . China-Pakistan Study Centre (CPSC), ISSI .

Tribune, E. (2024). CPEC brings $25.4b investment, 236k jobs. Retrieved from The Ex-press Tribune: https://tribune.com.pk/story/2515902/cpec-brings-254b-investment-236k-jobs

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Enabling Business-to-Business (B2B) Prospects in CPEC 2.0

Moeez Manzoor and Moaaz Manzoor

1. INTRODUCTION:

Pakistan stands on the brink of an economic renaissance with the inception of a new era in the China-Pakistan Economic Corridor (CPEC). The first phase of CPEC transformed an infrastructure and energy deficit nation into an infrastructure and energy surplus nation. The second phase of CPEC offers prospects envisioning a business-to-business (B2B) framework in strate-gic sectors like agriculture, green energy, mining, and information technology that could boost Pakistan's exports and rejuvenate its stagnating economy. The onus lies in Pakistan's creation of an environment that is enabled by removing bureaucratic sludge, insecurity, and political uncertainty. Steps like these are linchpin as it will pave the way for economic dynamism rooted in innovation and sustainable growth for both nations. However, the path ahead is rocky. A massive government over-regulatory footprint impedes the prospect of a B2B framework. Similarly, rising insecurity, economic stagnation, incapacity, and unproductivity are severe challenges to the B2B environment. However, the solution lies in strategic collaborative plan-ning and the implementation of a home-grown reform agenda. In essence, CPEC 2.0 represent a pivotal opportunity to galvanize Pakistan's modernization and industrialization base, trending the nation toward a prosperous future.

OVERVIEW OF PAKISTAN'S B2B ENVIRONMENT

The deteriorating economic situation of Pakistan paints a bleak picture of the B2B environ-ment. The country has been in a continuous cycle of stagflation since 2022, where inflation and low growth are evident. As per the Economic Survey of 2023-24, the country witnessed a low growth rate of 2.38 per cent (Ministry of Finance, Government of Pakistan, 2024). Similarly, the economy is projected to slow to an average of 2% over the next five years (Siddiqui, 2024). The situation is going to deteriorate further as Pakistan is home to 240 million people, which is highly unsustainable for a country that is growing at a snail's speed of 2.38 per cent. To absorb this burgeoning overpopulation in the economy, Pakistan must achieve and sustain a 5 to 6 per cent growth for a decade. Enabling the B2B environment Under CPEC 2.0, Pakistan can reform its strategic sectors like manufacturing, textile, small and medium

enterprises (SMEs), agricul-ture, and IT which can absorb this population. Hence, the B2B framework will lead to economic cooperation, technology, and knowledge transfer.

It also offers a sustainable alternative model centering around SME development, preparing the ground for industrialization, and driving significant innovation and productivity to rejuvenate growth. This approach will attract foreign investors to upscale operations, stabilizing and boosting the stagnating economy. China's opening-up strategy of the 1980s is an inspiration that transformed Shenzhen into a global innovation hub that is contributing $500 billion to the economy (Ramay, 2024). Under one roof, the "24-hour approval" model provided legislative and economic cover to foreign investors and has been the main ingredient to attract FDI. Paki-stan must adopt Shenzhen reforms to attract foreign direct investment and foster collaboration between SMEs and large enterprises under CPEC 2.0. However, institutional incapacity, bu-reaucratic inefficiencies, and the absence of cohesive planning prevent CPEC from reaching its full transformative impact. By removing the bottlenecks, as mentioned above, these SEZ can play a pivotal role in overcoming current economic challenges and can pave the way for sustainable growth.

POTENTIAL SECTORS UNDER CPEC 2.0 FOR B2B GROWTH

I. B2B framework under the agriculture sector

China offers Pakistan a diverse, vibrant, unexploited, growing agricultural market of $1,701.00 billion (Statista, n.d.). As a pioneer in agricultural innovation via advanced technology, China can help revolutionize Pakistan's agriculture sector. Agreements like China's Litong Foods and Pakistan's Guard Agricultural Research & Services in 2023 under the B2B framework offer collaboration potential investment opportunities in chili export (Baig, 2023). Thus, China can boost agricultural growth by modernizing this sector in Pakistan with advanced technology, capacity building, and knowledge transfer. Moreover, possible transactions under the Yuan bridge the trade deficit gap. Hence, under CPEC 2.0 the agriculture sector posits potential expansion investment opportunities for both nations to exploit, potentially leading to increased exports and food security.

II. B2B framework under the information technology (IT) sector

China is advancing to become a global AI leader. Chinese tech giant Huawei is interested in establishing its international service center for the Middle East, Central Asia, and Africa in Pakistan, which shows emerging opportunities to unfold (Press Release, 2024). By streamlining the process under the B2B framework, Chinese companies can invest and strengthen partnerships with Pakistani IT firms. Pakistan's IT sector is witnessing unprecedented growth, with IT exports reaching $310 million in April 2024, a 62.3% increase from the previous year (Web Desk, 2024). By harnessing the potential of the B2B framework in the IT industry, both businesses and consumers can reap substantial rewards. Moreover, embracing tax digitalization, e-invoicing, and revenue automation could transform Pakistan's digital landscape, paving the way for innovation and efficiency like never before. President Xi Jinping's vision of upgrading CPEC to the China-Pakistan Digital Corridor (CPDC) marks a strategic shift in CPEC (IANS, 2022). Hence, both nations can become digital hubs of innovation, entrepreneurship and connectivity by uncapping Pakistan's booming IT industry.

III. B2B framework under the mining sector

Pakistan is blessed with immense minerals like salt, coal, copper, gold, iron, gemstones, etc., making it an ideal destination for mineral exploration. China has expertise and technology, while Pakistan has immense mineral reserves under the B2B framework, so Chinese companies can accelerate the development of Pakistan's mining sector. Proposed future zones like Khewra salt mines in Punjab and Mineral Economic Processing Zones in Sindh (Thar and Lakra for coal) and KPK (Dargai for chromite; North Waziristan for chromite; Kurram for antimony; Waziristan for copper; Chitral for antimony; Besham for iron ore and lead; Nizampur for iron ore; and Mohmand for marble) and the Saindak Copper-Gold Project in Balochistan exemplifies that the sector's hold hidden remarkable potential (Awan, 2018). Thus, establishing mineral industrial parks under the B2B framework will increase investment feasibility in sub-sectors like metal refineries and processing plants. Additionally, the interest of MCC Tongsin Resources, one of the world's leading metallurgical construction companies, in investing in Pakistan's mining sector can lead to deepening cooperation and collaboration. Hence, by creating one window operations and ending the bureaucratic bottlenecks, this sector can become a viable player in the development of the mining sector in Pakistan.

IV. B2B framework under the industrial and services sector

The B2B framework can do wonders in the services and industrial sectors. In the fiscal year 2023-24, the services and industrial sectors posted growth of 1.21 per cent, which was low compared to their contribution to GDP. The SEZ under CPEC 2.0 can

expedite the relocation of the Chinese services sector to Pakistan. As China is charting its path toward high-quality, productive growth, incentives like tax breaks and sovereign guarantees and equipping 63 percent of the youth bulge with skills can uncover hidden potential that can mutually benefit the two Iron brothers. Lastly, targeted investment and access to finance in strategic sectors like manufacturing textiles and reducing the time lag can manifold productivity and growth for both nations.

NAVIGATING THE CHALLENGES OF THE B2B LANDSCAPE IN CPEC 2.0

The resurgence of terrorism in Khyber Pakhtunkhwa and Balochistan is posing a direct threat to CPEC 2.0 viability, as it is eroding investors' confidence in the future investment climate. Chinese officials have repeatedly raised concerns that "Security threats are the main hazards to CPEC cooperation. As people often say, confidence is more precious than gold. In the case of Pakistan, the primary factor shaking the confidence of Chinese investors is the security situation" (Syed, 2024). The return of Taliban 2.0 in Kabul, whose complacent support and their reluctance of not cracking down on TTP hideouts inside Afghanistan, has heightened insecurity for Pakistan. Likewise, renewed targeted attacks on Chinese personnel showcase that traditional counter-terrorism frameworks have become inept in addressing the threat posed to CPEC. A possible solution can be establishing a joint intelligence-sharing framework and implementing holistic, comprehensive strategies that can counter the traditional and non-traditional threats to CPEC 2.0. Secondly, political instability is the most serious challenge to CPEC as it creates an environment of uncertainty. In its report, the State Bank of Pakistan cautioned that political uncertainty exacerbates the situation through inconsistency in economic policies and weak governance, hindering the investment climate (SBP, 2024). The economy seems to have recovered, but growth prospects remain elusive as structural reforms like taxation, ease of doing business, and privatization of SOE remain distant, which can potentially dent the viability of a B2B environment in CPEC 2.0.

CONCLUSION

The future of CPEC 2.0 is fundamentally tied to Islamabad's ability to enable a thriving B2B environment. One can concur that establishing a B2B environment is not merely an option but necessary step to pull the country out of the economic morass. Moreover, a framework of policy consistency and predictability will be instrumental in transforming CPEC initiatives from bilateral to a multilateral initiative. In a nutshell, Pakistan is yet again at a critical juncture where it must walk the talk to make CPEC 2.0 successful by enabling an environment for the B2B framework. Failure to do so will make the CPEC 2.0 redundant, and don't be surprised when the chickens come home to roost in the form of low growth and economic stagnation.

REFERENCES

Ministry of Finance, Government of Pakistan. (2024). Pakistan Economic Survey 2023-24 Highlights. https://finance.gov.pk/survey/chapter_24/Highlights.pdf

Siddiqui, S. (2024, April 13). Pakistan on silent economic decline. The Express Tribune. https://tribune.com.pk/story/2462399/pakistan-on-silent-economic-decline

Ramay, S. A. (2024, June 24). CPEC 2.0: Can Pakistan learn from Shenzhen? The Express Tribune. https://tribune.com.pk/story/2473366/cpec-20-can-pakistan-learn-from-shenzhen

Statista. (n.d.). Agriculture in China - statistics & facts. Statista. Retrieved February 21, 2025, from https://www.statista.com/topics/7439/agriculture-in-china/

Baig, Z. (2023, August 7). Chinese firm to import 5,000 tons of chillies from Pakistan. Business Recorder. https://www.brecorder.com/news/40256575

Press Release. (2024, May 24). Huawei team meets Aurangzeb. Business Recorder. https://www.brecorder.com/news/40305005

Web Desk. (2024, May 20). Pakistan's IT exports jump 62% to $310 million in April. The News International. https://www.thenews.com.pk/latest/1191181-pakistans-it-exports-jump-62-to-310-million-in-april

IANS. (2022, October 22). Pakistan, China jointly agree to launch 3 new corridors besides CPEC. Business Standard. https://www.business-standard.com/article/international/pakistan-china-jointly-agree-to-launch-3-new-corridors-besides-cpec-122102200486_1.html

Awan, Z. A. (2018, July 10). CPEC: Opportunities for Chinese entrepreneurs in mining industry of Pakistan. China Daily. http://global.chinadaily.com.cn/a/201807/10/WS5b446ef2a3103349141e1e69.html

Syed, B. S. (2024, June 22). Security threats endanger future of CPEC, warns Chinese official. Dawn. https://www.dawn.com/news/1841194

State Bank of Pakistan. (2024, May 14). SBP releases half year report on the state of Pakistan's economy. https://www.sbp.org.pk/press/2024/Pr-14-May-2024.pdf

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ENERGY

Picture courtesy of Developing Pakistan
100MW UEP Wind Farm Jhimpir Thatta, Sindh Pakistan

Energy Projects under CPEC: A Game Changer?

Afia Malik

The China-Pakistan Economic Corridor (CPEC) became fully operational a decade ago, generating significant anticipation regarding its potential to transform Pakistan's economic landscape. The primary emphasis of CPEC during its initial phase was on energy and infrastructure projects. These energy initiatives were considered crucial for alleviating the chronic power generation deficiencies that plagued the country then; regular load shedding of several hours hindered Pakistan from reaching its full economic potential.

From 2015 to 2019, nine new power plants were established under CPEC, culminating in a total capacity of 5,320 MW. This expansion was pivotal in addressing the nationwide energy shortfall. Subsequently, additional capacity has been added to the power system. Currently, there are fourteen completed generation projects under CPEC, with a combined capacity of 9,504 MW and one transmission project capable of transmitting 4,000 MW. Furthermore, six additional electricity generation projects, with an anticipated capacity of 3,545 MW , are in the pipeline.

Of 9504 MW , 6600MW are coal power plants; 3960MW depend on imported coal. 1320 MW Thar coal and 600MW imported coal-based capacity are in the pipeline. Despite offering high returns on equity for Thar coal, low global coal prices and slow progress in Thar coal mining deterred significant investment in Thar coal-based generation plants in

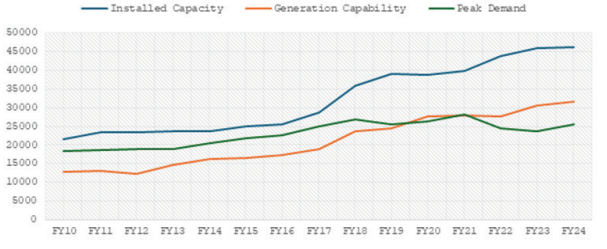
early harvest projects. Furthermore, the government encouraged coal imports to mitigate the distance between coal reserves and load centers. At that time, coal-based generation was regarded as the most cost-effective means to enhance power generation, even if it is imported. However, the situation changed in just a few years.

The cost of imported coal started rising, and so was the electricity generation cost.

Another contributing factor to the increasing electricity generation costs is the dollar-denominated capacity payments to power plants, even for power plants that use local coal. The devaluation of the rupee has worsened this situation.

Undoubtedly, CPEC power projects delivered in terms of generation expansion (see Figure 1 below). Generation capability, which was in deficit, turned into a surplus. The gap between installed capacity and generation capability widened. Besides, the electricity generation cost has increased, decreasing the peak demand.

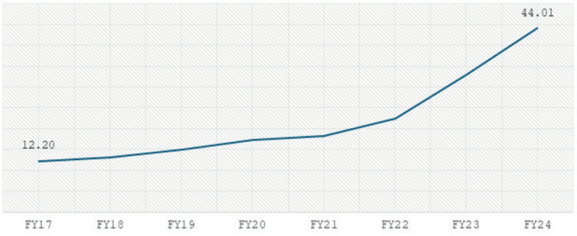
Figure 1. Electricity Supply and Demand MW



Source: NEPRA State of Industry Reports (Various Years).

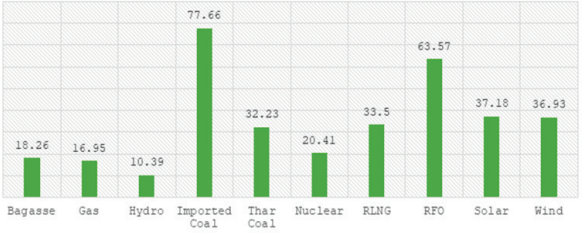
The average sale rate of electricity since 2017 has increased by more than 260% (Figure 2). The per unit cost of imported coal-based power plants is among the highest - PKR 77.66/kWh for FY2025 (Figure 3) and often fails to qualify for EMO, resulting in capacity payments without producing any electricity. Capacity payments to power producers have increased from PKR 418 billion in FY18 to PKR 2090 billion in FY25. In FY25, the contribution of imported and local coal power plants in total capacity payments is about 31% (PKR 394 billion-imported coal power plants and PKR 256 billion-local coal power plants) respectively.

Figure 2. Average Sale Rate (PKR/kWh)-NTDC System



Source: NEPRA State of Industry Reports (Various Years).

Figure 3. Power Purchase Price (PKR/kWh) - FY25



Source: NEPRA Tariff Determination for FY25.

The incentives offered to power plants under CPEC were even more than the incentives offered to earlier independent power plants (IPPs). Long-term take-or-pay contracts made with CPEC projects offered capacity charges for 85% of total capacity compared to 65% of the capacity charges offered earlier on take-or-pay IPPs. The coal-based power plants have exacerbated the existing circular debt situation (many times); for instance, outstanding liabilities to Chinese IPPs reached a record PKR 493 billion in February 2024.

The CPEC projects did address the issue of load-shedding, albeit only for a limited duration. The capacity glut created due to the addition of this much capacity has led to high electricity costs and rising circular debt. There is excess installed capacity, but consumers still face load-shedding due to insufficient generation. Reliance on imported fuels and financial challenges often result in power shortages. Coal plants, like other thermal generating units, struggle to maintain fuel inventory because of non-payments from the Central Power Purchasing Agency. The paradox within the power sector arises from substantial system losses and inefficiencies, often intensified by elevated electricity costs.

Under CPEC, the power plant's proximity to the mine was overlooked as the focus shifted to imported

coal, straining foreign exchange reserves. On the other hand, Thar coal-based power plants, despite being cheaper, often remain unused due to a lack of Thar coal. For instance, during FY2024, 35% of plants were not utilized because coal was unavailable.

Under CPEC, the system added a significant generation capacity without upgrading transmission and distribution infrastructure. Persistent underinvestment in local grid infrastructure has impeded the equitable distribution of this new power supply across the country. The disparities in energy access have been exacerbated, particularly between rural and urban areas and central and remote areas.

The Pak-Matiari Lahore Transmission Company Limited (PMLTC) constructed a High Voltage Direct Current (HVDC) transmission line under CPEC, with a 4,000 MW capacity to transport electricity from the southern region to central and northern load centers. Completed in September 2021, yet its full utilization remains pending. The line has been utilized only 38% in FY24 due to operational challenges. Under a take-or-pay contract, PMLTC receives payments based on total capacity, regardless of actual usage, resulting in a financial burden for consumers. Total capacity payments reached about PKR 97.8 billion for FY24, leading to an average PKR7.4/kWh cost.

Under CPEC, the focus was not just on coal but green energy. A key project under early harvest is the Quaid-e-Azam Solar Power Park (QASPP) in Bahawalpur; 400MW capacity was completed in 2016, according to CPEC Secretariat data. NEPRA estimated the tariff for solar power plants, including QASPP, at PKR37.18/kWh for FY25, higher than the Thar coal tariff of PKR32.23/kWh.

Establishing a solar power park has prerequisites, including transmission lines to evacuate electricity and an ideal location. QASPP is located in the Lal Sohanra desert, where summer temperatures can reach 48°C, impacting efficiency and lifespan. Although the transmission infrastructure is now in place, generation was limited to 155.11 GWh in FY24 due to heat and management issues. The bidding process also strayed from international standards, leading to higher tariffs that burden consumers.

The projects under CPEC, which are designed to enhance energy security by prioritizing the availability of electricity resources, have inadvertently compromised the aspects of affordability and sustainability.

Coal is the most environmentally harmful energy source, contributing significantly to climate change. While the world is moving away from coal, Pakistan has turned to it for electricity generation, after facing over three decades of delays due to inadequate infrastructure, financing, and expertise. Pakistan has not just been slow to enter the coal industry; the technology used in CPEC projects is outdated. For instance, Thar coal-based power plants utilize sub-critical technology, which many countries are phasing out to lower carbon emissions and opting for more advanced methods instead.

Despite the inherent challenges, local coal will continue to serve as Pakistan's most dependable and cost-effective fossil fuel option for diversifying the energy generation portfolio. However, upgrading the associated technology to optimize efficiency and sustainability is essential.

Following the completion of Phase-I of the energy projects, the CPEC was poised to move into Phase II, which involves establishing nine Special Economic Zones (SEZs) to boost industry, trade, and employment in Pakistan. A dependable energy supply was critical for these SEZs, thus rendering the timely completion of energy projects of utmost importance. Efforts to establish Special Economic Zones (SEZs) encountered considerable challenges, resulting in significant delays, if not cancellations.

As a result, the excess and costly energy capacity installed for these zones under CPEC became a burden, not a game changer for the power sector and the broader economy.

By the end of FY24, Pakistan's installed electricity generation capacity was 45,888 MW , but the average utilization was only about 34%. Consequently, consumers paid higher costs - for about 66% of the unutilized capacity, which included costs from renewable energy intermittency. Electricity tariffs for businesses in Pakistan are 30% to 40% higher than those of regional competitors. This underutilization of generation capacity is a significant challenge for the electric power sector, leading to high consumer costs and, in turn, an increase in grid defection.

Due to economic constraints and excess capacity, initiating any new project under CPEC is infeasible for Pakistan. Pakistan needs to reevaluate its energy strategy, focusing on optimizing existing capacity and addressing transmission and distribution challenges. Furthermore, any new capacity developed under CPEC should be contingent upon competitive tariffs and market-based approaches; a review of pipeline projects is necessary.

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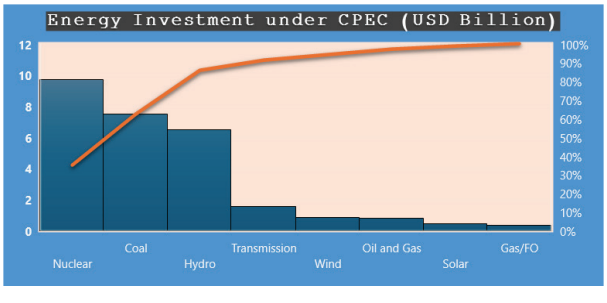
CPEC's Power Dilemmas and the Case for a Just Transition

Picture courtesy of CPEC Secretariat
884MW Suki Kinari Hydropower Project, Khyber Pakhtunkhwa

Dr. Khalid Waleed

The China-Pakistan Economic Corridor (CPEC) has long been hailed as a transformative engine for Pakistan's economic development. As a flagship project under China's Belt and Road Initiative, CPEC was designed to tackle long-standing challenges in energy supply and infrastructure, with a view to catalyzing growth across the country. Central to CPEC's portfolio is a diverse mix of power generation and transport projects intended to boost capacity, modernize the grid, and stimulate industrial development.

Among the many projects initiated under CPEC, energy infrastructure has received considerable attention. Rapid construction of coal-fired power plants, along with investments in renewables and transmission networks, provided an immediate remedy to chronic power shortages. However, these efforts have also introduced new economic and operational challenges. In particular, imported coal power plants—financed through capacity payment arrangements—have become a double-edged sword. While they helped end years of debilitating power outages, they also locked Pakistan into significant fixed costs, even as many of these plants operate far below their full capacity. This article examines the economic implications of these challenges and outlines policy recommendations to steer Pakistan toward a just energy transition that is both sustainable and equitable.



Source: Ministry of Planning. Development and Special Initiatives

CPEC has mobilized billions of dollars into Pakistan's energy sector, focusing on rapid capacity expansion to meet an urgent demand for electricity. Among the projects initiated, coal-fired power plants have been prominent. These plants, built with the expertise and financing of Chinese companies, were designed to deliver large amounts of base-load power quickly. Projects like the Sahiwal and Port Qasim coal plants, with capacities exceeding 1,320 MW each, exemplify the drive to eliminate long-standing power deficits.

Alongside coal projects, CPEC has also financed nuclear, hydro and renewable energy initiatives, such as solar parks and wind farms, and improved the transmission network. The strategy was straightforward: solve the immediate crisis by ensuring a steady power supply while laying the foundation for long-term economic development. In the short run, these projects did achieve their goal—load shedding was significantly reduced, industrial productivity improved, and overall confidence in Pakistan's economic prospects grew.

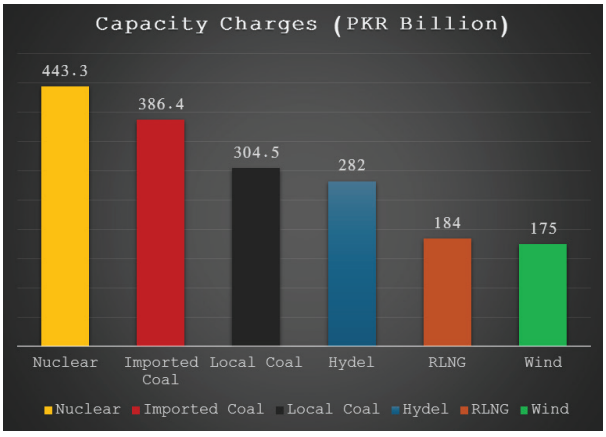
Yet, the rapid expansion of capacity was not without drawbacks. Many of the coal plants were built with a view toward future demand, but economic slowdowns and miscalculations in demand growth have left these plants underutilized. This overcapacity, coupled with rigid financial arrangements, has strained Pakistan's energy finances and raised important questions about the long-term sustainability of the country's energy mix.

CHALLENGES WITH IMPORTED COAL POWER PLANTS

Capacity Payments and Financial Burdens

A central challenge facing Pakistan's energy sector today is the system of capacity payments tied to many of the imported coal power plants. These payments are fixed charges that the government must pay to power plant operators irrespective of how much electricity the plants actually generate. The purpose is to cover the plants' capital costs and ensure a reliable supply; however, this arrangement has a significant downside. When power plants are underutilized, Pakistan ends up paying for generation capacity that it does not use, leading to a heavy financial burden on the national budget.

These fixed payments have become a source of fiscal strain, as they contribute to rising debts and force the government to subsidize electricity tariffs. The cost of maintaining these capacity payments can exceed the entire defense budget, and they are not easily reduced even if the plants are rarely in operation. In effect, the country is locked into paying for idle capacity, which diverts resources away from other critical areas and contributes to a growing circular debt in the power sector.



Source: State of Industry Report 2024, NEPRA

Underutilization: Causes and Consequences

The underutilization of coal power plants stems from several factors. First, the demand for electricity did not grow as quickly as projected when these plants were being contracted. Economic slowdowns and unforeseen recessions meant that the anticipated load never materialized, resulting in excess capacity once the plants came online. Second, grid constraints and transmission bottlenecks have prevented some plants from operating at full capacity, limiting their output despite being available for dispatch. Finally, existing contracts often favor keeping these plants online at minimal loads, simply to avoid penalties and maintain contractual commitments, even when cheaper or cleaner alternatives exist.

This combination of overcapacity and fixed capacity payments creates a scenario where Pakistan is effectively paying for assets that are not being fully utilized. The economic implications are significant: higher electricity tariffs for consumers, increased subsidies from the government, and mounting national debt. The excess capacity, rather than being a buffer against shortages, has become an economic liability that constrains the nation's fiscal space and hampers long-term investment in more efficient and sustainable energy sources.

Policy Recommendations for a Just Energy Transition in the CPEC Context

Given the structural inefficiencies and financial burdens in Pakistan's power sector, a well-managed transition toward clean energy is imperative. A just energy transition should focus on early retirement of costly and inefficient fossil fuel-based plants, leveraging sector coupling to optimize renewable energy integration, and aligning China-Pakistan Economic Corridor (CPEC) investments with sustainable energy solutions. The following policy measures can guide Pakistan's transition toward a financially and environmentally viable energy future.

Firstly, Pakistan must facilitate the early retirement of fossil fuel plants through Just Energy Transition Partnerships (JETPs) and the Energy Transition Mechanism (ETM) to secure financing for the phased decommissioning and repurposing of high-cost imported coal plants. These financing mechanisms, supported by international climate funds and multilateral institutions, can be leveraged to retire inefficient plants while repurposing their infrastructure for renewable energy generation or industrial applications. Imported coal plants, in particular, should be evaluated for conversion into solar or wind-powered hybrid stations, flexible peaking plants, or industrial steam production facilities. To ensure financial sustainability, the government should negotiate with Chinese investors to restructure CPEC power sector investments, aligning future projects with renewable energy goals.

Secondly, Pakistan should expand sector coupling approaches to maximize renewable energy utilization and reduce curtailment losses. A major challenge in renewable energy integration is the wastage of surplus generation due to grid constraints. To overcome this, wind and solar projects must be directly linked to Special Economic Zones (SEZs) under CPEC, ensuring a stable demand for variable energy supply. Industrial clusters can be powered through dedicated renewable energy microgrids, reducing their reliance on grid-based fossil-fuel generation. Additionally, Power-to-Gas (PtG) projects, particularly green hydrogen production from excess wind power, should be explored as a means of storing renewable energy and creating an exportable commodity. Investments in grid-scale energy storage solutions, such as pumped hydro and advanced battery storage, will also help balance fluctuations in renewable energy generation and stabilize the power sector.

Thirdly, Pakistan must reform Power Purchase Agreements (PPAs) to reduce capacity payments and improve financial sustainability while ensuring a win-win situation for all stakeholders. The rigid structure of take-or-pay contracts has led to significant financial liabilities in the form of fixed capacity payments for underutilized power plants. To address this, Pakistan should transition to take-and-pay models, where payments are linked to actual consumption rather than guaranteed capacity. Performance-based tariff structures should also be introduced, incentivizing industries to increase electricity usage by offering declining tariffs for higher consumption. While renegotiating PPAs, the sanctity of contracts must be preserved to maintain investor confidence, ensuring that modifications do not lead to legal disputes or a negative investment climate. A collaborative approach should be adopted, where concessions from power producers are matched by policy incentives, such as extended debt repayment terms or refinancing options, creating a mutually beneficial framework for the government, investors, and consumers.

Fourthly, Pakistan must modernize its transmission and distribution infrastructure to integrate renewable energy efficiently. The existing grid is inflexible and outdated, limiting the ability to accommodate intermittent renewable energy sources. To overcome these constraints, high-voltage direct current (HVDC) transmission corridors should be developed, connecting Sindh's wind and solar zones with Punjab's industrial hubs. Smart grid technologies, such as real-time demand response systems, smart metering, and AI-based load forecasting, should also be deployed to improve grid flexibility and reduce technical losses. Expanding the grid interconnection between Pakistan and regional energy markets, such as China, Iran, and Central Asia, could further enhance energy security and facilitate cross-border electricity trade.

Fifthly, Pakistan must ensure that workers and communities affected by the transition away from fossil fuels are adequately supported. A Just Energy Transition Task Force should be established to oversee reskilling programs for coal-sector workers and create employment pathways in the renewable energy industry. Financial transition packages should be introduced for regions dependent on fossil fuel revenues, and targeted economic diversification strategies should be implemented in coal-producing areas. This could include investments in alternative industries such as critical minerals mining (lithium, rare earth elements) for renewable energy technologies, as well as renewable-powered manufacturing clusters in former coal-dependent regions.

Sixthly, Pakistan should institutionalize a Just Energy Transition Framework to ensure a long-term, stable policy environment. A national roadmap should be developed for coal phase-out and renewable integration, aligned with Pakistan's Nationally Determined Contributions (NDCs) under the Paris Agreement. Additionally, CPEC energy investments should be reoriented towards sustainable energy projects, ensuring that future Chinese-funded infrastructure aligns with Pakistan's renewable energy ambitions. A dedicated regulatory authority should be established to monitor the progress of the energy transition, ensure policy coherence across government agencies, and create a transparent mechanism for stakeholder engagement, including industry, labor unions, and civil society.
By implementing these policy measures, Pakistan can achieve a just, sustainable, and economically viable energy transition, reducing its reliance on costly fossil fuel imports while leveraging CPEC for a green industrial transformation.

CONCLUSION

The China-Pakistan Economic Corridor (CPEC) has undeniably played a pivotal role in addressing Pakistan's energy crisis, expanding power generation capacity, and modernizing infrastructure. However, the economic and operational challenges associated with imported coal power plants—particularly the burden of capacity payments and underutilization—have highlighted the urgent need for a strategic shift. The current trajectory, if left unaddressed, risks exacerbating Pakistan's financial vulnerabilities, increasing electricity costs, and stifling investment in cleaner, more sustainable energy solutions.

A just energy transition offers a viable pathway to rectify these inefficiencies while ensuring economic stability and environmental sustainability. By prioritizing early retirement initiatives for high-cost fossil fuel plants, embracing sector coupling to maximize renewable energy integration, and reforming power purchase agreements without compromising contractual sanctity, Pakistan can realign its energy sector with long-term national interests. Additionally, modernizing the transmission network, supporting affected workers, and embedding a structured energy transition framework into policy decisions will enable Pakistan to harness CPEC investments for green growth.

The success of this transition depends on political will, institutional coordination, and international collaboration. Engaging with China and multilateral development partners to restructure energy investments under CPEC is crucial for ensuring that Pakistan's energy future is both affordable and sustainable. A well-managed transition will not only reduce fiscal pressure and electricity tariffs but also create new economic opportunities in renewable energy industries, positioning Pakistan as a key player in the global clean energy economy. With deliberate action and forward-looking policies, Pakistan can transform its energy landscape, making CPEC a true engine of sustainable development rather than a financial burden.

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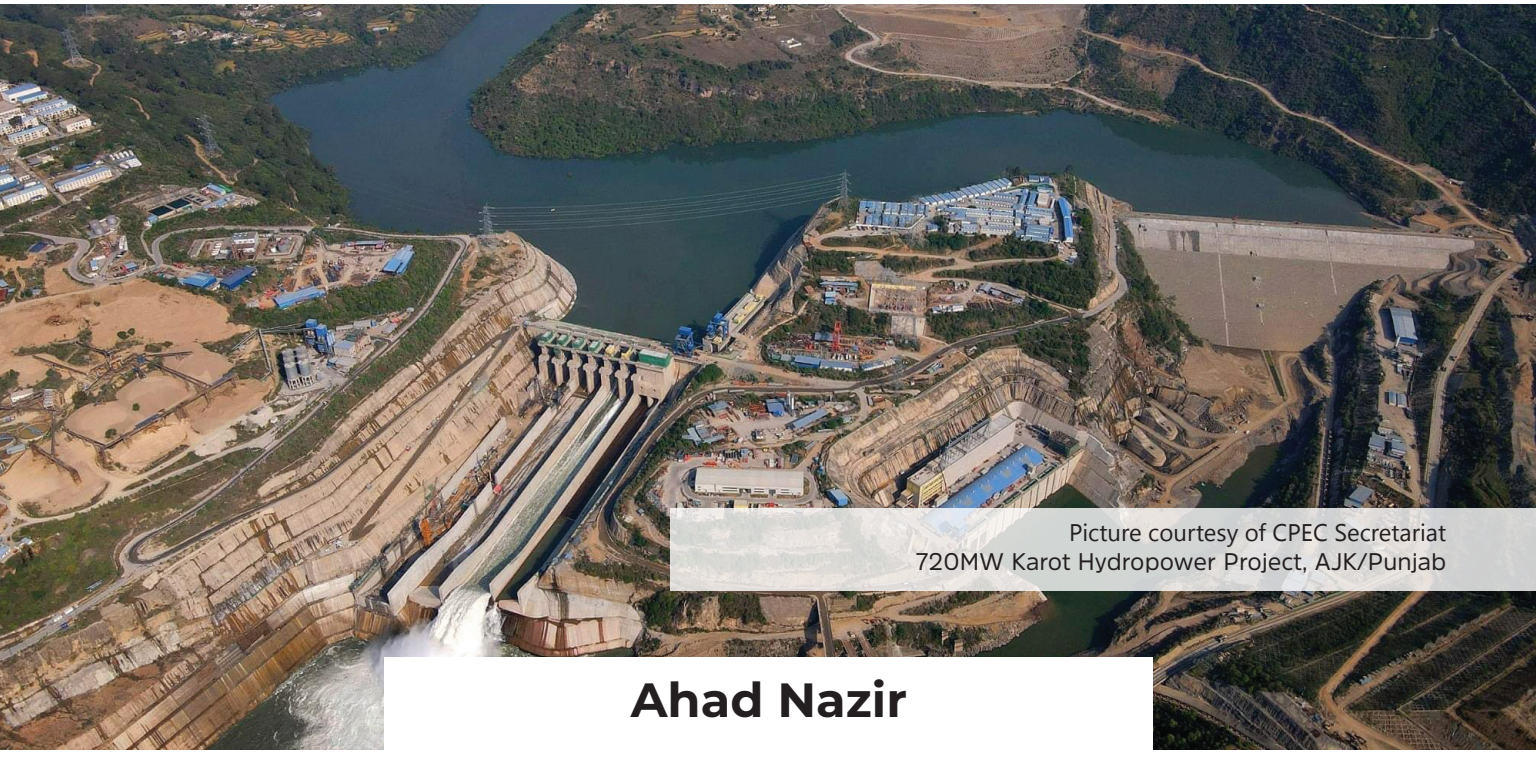
Picture courtesy of CPEC Secretariat
1320MW Sahiwal Coal-Þred Power Plant 1320MW Sahiwal Coal-Þred Power Plant

Sustainable Energy Infrastructure within the China-Pakistan Economic Corridor Framework



Picture courtesy of CPEC Secretariat
720MW Karot Hydropower Project, AJK/Punjab

Ahad Nazir

Pakistan's energy sector has faced profound structural issues over the years, primarily due to its reliance on a single-source, state-owned energy system that later transitioned into a privately invested, fossil fuel-based framework. This shift led to serious challenges in energy availability, affordability, and sustainability. Compounded by a devalued currency, a weak balance of payments, high import dependence, subsidy-driven policies, and dollar-indexed agreements with power producers, these factors contributed to an unsustainable energy ecosystem (Arzhaev et al., 2024; Abdul Rehman & Deyuan, 2018; Shahzad, 2022).

From 2008 to 2013, Pakistan's energy system started to feel the intensity of the impacts of inconsistent policies, lack of indigenous resources-based infrastructure investment, and huge economic losses in terms of circular debt. This was primarily caused due to investment in huge hydro projects that were primarily focused on water and were producing electricity as a biproduct. These were hard to operate and maintain structures and with an unbundled electricity governance system made the availability, affordability and sustainability of energy a big question mark. In the 1990s efforts towards de-bundling of Water and Power Development Authority (WAPDA) and creation of several entities that will result in this de-bundling including but not limited to National Electric Power Regulatory Authority (NEPRA), National Transmission and Despatch Company (NTDC), Central Power Purchaser Authority (CPPA-G), and Private Power Infrastructure Board (PPIB) came into the picture (Amir-ud-Din, 2014; Narejo, Azeem, & Zardari, 2017; Sajid & Javaid, 2018; Zulfiqar, Nazir, & Khalid, 2022).

This started off with a policy for development of independent power producers (IPPs) in the 1990s focusing on the development of imported fossil

fuel-based power plants which were focused on dollar indexed payments. These steps were taken to make the environment conducive for the investors but in reality, it created issues with regards to affordability, availability and sustainability of the energy and also created issue in a decentralized grid planning in long term. The confidence of the government to perform in the energy sector was further reduced by non-response of the policy that came out in 1998 which had tried to create IPPs that were based on PKR based payments (Maka & Alabid, 2022; Mengal, Harijan, Uqaili, Mirjat, & Shah, 2017; Turi et al., 2022).

Similarly, dollar indexed, and high-capacity payments-based plants were further developed in the 2000s and the 2010s as well. Similar issues and external pressures, global recession created an impactful issue in 2008 where Pakistan became unable to import fuel for the powerplants and suffered through a huge energy crisis with impacts amounting to around USD 3 billion based in the next 5 years. This was the worst time in terms of power outages and the increase in tariff. This formed basis for a cooperation agreement between Pakistan and China which was supposed to support Pakistan get out of the crisis (Anwar, 2010; Asad, Mahmood, Baffo, Mauro, & Petrillo, 2022; Hussain & Hassan, 2019; Sajid & Javaid, 2018).

The China-Pakistan Economic Corridor (CPEC) represents a broader strategic initiative under the Belt and Road Initiative (BRI), designed to enhance regional connectivity, trade facilitation, and economic integration between China and the global economy. Launched in 2015 with an initial USD 46 billion investment, later expanding to USD 62 billion, CPEC has played a transformative role in Pakistan's infrastructure development, with a core focus on energy and transportation networks. At its heart, CPEC aims to strengthen energy connectivity, ensuring both the supply-side stability and demand-side expansion necessary for long-term economic growth (Ashfaqur Rehman, Hakim, Khan, & Khan, 2018).

ENERGY CRISIS AND CPEC'S ROLE IN RECOVERY

CPEC was initiated at a time when Pakistan was facing severe energy shortages, leading to economic disruptions. The country struggled with load shedding, unreliable power supply, unaffordable electricity, and unsustainable fuel dependency. The high reliance on imported fossil fuels, capacity payment obligations, and dollar-indexed agreements exacerbated the problem, leading to an alarming circular debt exceeding PKR 2.5 trillion, which contributed to an annual GDP loss of 2–3%. The CPEC energy projects, particularly during 2015–2017, played a crucial role in stabilizing power supply, promoting economic growth, job creation, and export expansion, while also reducing Pakistan's import bills through an increased renewable energy share in the national grid (Pasha, 2018).

CPEC'S ENERGY PORTFOLIO AND PROJECT IMPLEMENTATION

CPEC's energy projects have significantly transformed Pakistan's power generation landscape by adding a cumulative 12 GW[1] of installed capacity across coal, hydropower, solar, wind, and transmission infrastructure. This ambitious investment has reshaped the country's energy mix, reducing the dependency on expensive imported fuels and improving supply reliability. The breakdown of these projects highlights the strategic approach taken under CPEC, aligning with Pakistan's long-term energy security objectives.

Coal-based power plants remain the dominant contributor, accounting for 8.2 GW of total installed capacity. Among these, 6.6 GW is fully operational, while an additional 1.6 GW is under development. Key projects such as the 1320 MW Sahiwal Coal-Fired Power Plant, 1320 MW Port Qasim Coal Power Plant, and 1320 MW China Hub Coal Power Project have been instrumental in mitigating Pakistan's severe power shortages. These plants operate on supercritical technology, which enhances efficiency and reduces emissions compared to traditional coal plants. Additionally, the Engro Thar Coal Power Plant (660 MW) is significant as it utilizes indigenous lignite coal reserves, reducing reliance on imported fuels and strengthening local energy autonomy.

Hydropower projects, a crucial component of CPEC's sustainability-driven approach, contribute 3.4 GW to the national grid, with 1.6 GW already commissioned and 1.8 GW under development. Notable projects include the 720 MW Karot Hydropower Project and the 870 MW Suki Kinari Hydropower Plant, both of which employ run-of-the-river technology, minimizing environmental disruption while providing clean, renewable energy. These projects align with Pakistan's goal of increasing renewable energy's share to 60% by 2030, ensuring a gradual transition from fossil fuel reliance.

Renewable energy initiatives under CPEC have expanded Pakistan's portfolio in solar and wind power. The 600 MW Quaid-e-Azam Solar Park, Pakistan's first major solar project, has set the foundation for future expansion, with an additional 100 MW in the pipeline. Similarly, wind energy projects totaling 300 MW , concentrated in the Jhimpir Wind Corridor, provide sustainable alternatives to conventional energy sources. The integration of renewable energy into the national grid has been a pivotal step towards reducing Pakistan's carbon footprint and promoting climate resilience.

[1] The data is available at CPEC Authority website https://cpec.gov.pk/energy

A critical milestone in transmission infrastructure has been the Matiari-Lahore High Voltage Direct Current (HVDC) Transmission Line, the first of its kind in Pakistan. This 660 kV transmission line has a transfer capacity of 4,000 MW, significantly reducing transmission losses and improving power flow stability. The state-of-the-art technology employed in this project ensures efficient electricity transfer from generation hubs in Sindh and Balochistan to major demand centers in Punjab, addressing Pakistan's long-standing transmission bottlenecks.

From a financial perspective, these projects have been executed under various investment models, including Chinese concessional loans, independent power producer (IPP) arrangements, and public-private partnerships (PPP). The financing terms, particularly for coal and hydropower projects, include long-term repayment structures with sovereign guarantees, ensuring bankability and sustained investor confidence. However, challenges such as capacity payments to power producers, tariff adjustments, and circular debt accumulation remain critical issues requiring policy reforms.

As Pakistan transitions from CPEC Phase 1.0, which prioritized base-load power generation, to CPEC Phase 2.0, the emphasis has shifted towards grid modernization, distribution efficiency, and renewable integration. Future investments are expected to focus on smart grid technologies, decentralized energy systems, and increased private sector participation, ensuring that energy security objectives are met while fostering economic and industrial growth. The ongoing evolution of CPEC's energy sector remains a testament to its long-term strategic vision, balancing economic development with sustainability imperatives.

THE NEED FOR DEMAND-SIDE DEVELOPMENT AND POLICY COHERENCE

While these supply-side projects were implemented effectively through bilateral cooperation, a significant gap in demand-side initiatives has hindered Pakistan's energy sector from realizing its full potential. The inconsistent policy environment post-2018, particularly in the relocation of Chinese industries and the operationalization of Special Economic Zones (SEZs), has created an imbalance between supply and demand. The failure to fully capitalize on industrial relocation opportunities resulted in surplus electricity generation, leading to higher capacity payments to power producers without adequate industrial consumption. This structural mismatch has intensified circular debt accumulation, further straining foreign exchange reserves and energy affordability (Abrar & Farzaneh, 2021).

The post-COVID economic slowdown exacerbated this crisis, leaving the excess power supply unutilized, while rising import dependence, a weakening currency, and declining foreign exchange reserves continued to undermine affordability and sustainability. The recent solar energy boom, marked by over 10 GW of imported solar equipment, poses another challenge, as unregulated expansion may destabilize grid balance without adequate transmission and storage infrastructure[2].

STRENGTHENING TRANSMISSION, DISTRIBUTION, AND MARKET COMPETITIVENESS

For Pakistan to build a sustainable and resilient energy framework, a holistic energy value chain approach is imperative. While significant progress has been made in expanding generation capacity, the real challenge lies in modernizing transmission and distribution infrastructure. The national grid continues to suffer from chronic inefficiencies, leading to high transmission and distribution losses. According to reports from the National Transmission and Despatch Company (NTDC) and the National Electric Power Regulatory Authority (NEPRA), transmission and distribution losses in Pakistan range between 17 and 19 percent, far exceeding international benchmarks. In some inefficiently managed distribution companies, these losses even surpassed 30 percent, straining the financial viability of the power sector and exacerbating circular debt (Falcone, 2023; Nazir, Mahmood, & Hameed, 2022).

Addressing these inefficiencies requires a strategic focus on grid modernization, investment in advanced monitoring technologies, and regulatory reforms to enhance accountability. Many countries have successfully reduced losses through targeted transmission upgrades. For instance, India implemented high-voltage transmission networks and smart grid systems in key industrial regions, resulting in a measurable reduction in technical losses and improved system reliability. Similarly, Brazil modernized its power grid by adopting automated substations and digital monitoring, which significantly improved energy efficiency and reduced theft. These examples highlight the potential benefits of adopting a comprehensive modernization strategy tailored to Pakistan's needs (Archana, 2022; Bhattarai et al., 2023).

China, through its extensive experience in energy infrastructure development, can play a critical role in upgrading Pakistan's transmission and distribution networks under the CPEC framework. China has been at the forefront of smart grid deployment, integrating artificial intelligence, data analytics,

[2] This was adapted from several discussions during seminars on energy sector including World Economic Forum https://www.weforum.org/stories/2024/11/pakistan-solar-power-energy-transition

and real-time monitoring to enhance grid reliability. The adoption of such technologies in Pakistan can lead to more efficient demand-side management, minimize voltage fluctuations, and optimize electricity distribution. Moreover, high-voltage direct current (HVDC) transmission, which China has implemented successfully in its own power sector, could significantly reduce transmission losses in Pakistan and improve power supply stability (Haque, Hussain, Ali, Khan, & Halim, 2023).

A key policy initiative to support this modernization is the privatization of state-owned Distribution Companies (DISCOs), a reform that aims to introduce competition, improve financial discipline, and enhance service delivery. Currently, the inefficiencies within government-controlled DISCOs contribute to revenue shortfalls and unsustainable tariff structures. By allowing private sector participation, Pakistan can attract foreign investment, improve regulatory compliance, and benefit from technology transfer in the distribution sector. China, having successfully privatized and modernized portions of its own power grid, could facilitate this transition by providing technical expertise, infrastructure investment, and capacity-building programs for local stakeholders (Solat, Aminifar, & Shayanfar, 2023).

In addition to large-scale grid modernization, the integration of micro and mini-grids presents a viable solution for rural electrification and decentralized power distribution. These localized grids can enhance energy access, particularly in remote areas, while also reducing dependency on the national grid. China's extensive experience in rural electrification through distributed energy networks offers a model that Pakistan can adopt, ensuring cost-effective and sustainable energy solutions (Hartvigsson, Ahlgren, & Molander, 2020; Zhou et al., 2021).

A long-term approach to Pakistan's energy challenges must incorporate lessons from global best practices, targeted policy interventions, and strategic foreign collaborations. By prioritizing grid modernization, embracing smart technology, and leveraging China's expertise under CPEC, Pakistan can establish a more efficient, reliable, and financially sustainable power sector, ultimately fostering economic stability and industrial growth.

THE FUTURE OF CPEC 2.0: ENHANCING THE ENERGY VALUE CHAIN

CPEC 2.0 represents a transformative phase in Pakistan's energy sector, expanding beyond power generation to prioritize solar and wind energy development. Future investments will focus on off-grid solar solutions for rural electrification, providing low-cost, sustainable electricity and reducing dependence on diesel generators. Several planned solar and wind projects will diversify the renewable energy mix, supporting Pakistan's Nationally Determined Contributions (NDCs) and the 2030 Agenda, which aim for 60 percent renewable energy-based power generation (Aized, Shahid, Bhatti, Saleem, & Anandarajah, 2018; Ashfaq & Ianakiev, 2018; Turi et al., 2022).

Beyond generation, energy storage solutions are critical for managing the intermittency of solar and wind power. Incorporating battery storage systems, particularly lithium-ion and flow batteries, and pumped hydro storage will enhance grid stability by balancing peak demand fluctuations and storing excess electricity. These technologies will help stabilize the national grid and improve the reliability of renewable energy sources (Kamal, 2024).

CPEC 2.0 also provides an opportunity to modernize Pakistan's transmission and distribution infrastructure. High-voltage transmission projects, such as the Matiari-Lahore HVDC Transmission Line, have improved power evacuation. Further investment in long-distance corridors will ensure surplus renewable energy from Sindh and Balochistan reaches demand centers. Leveraging China's expertise in smart grid technology, Pakistan can implement real-time monitoring, automated fault detection, and AI-driven load management to minimize technical losses and outages (Almasoudi, 2023; Laninga, Nasr Esfahani, Ediriweera, Jacob, & Kordi, 2023).

China's advancements in energy digitalization present another avenue for transformation. Integrating artificial intelligence, the Internet of Things (IoT), and predictive analytics can optimize electricity distribution, improve demand forecasting, and enhance grid efficiency. AI-driven platforms will promote dynamic pricing, encouraging efficient electricity use, while predictive analytics can prevent grid failures through proactive maintenance. On the distribution side, Pakistan can adopt China's expertise in loss reduction, revenue collection, and grid modernization. Smart meters, automated billing, and AI-assisted theft detection will strengthen financial sustainability for distribution companies (DISCOs). Digitized payment systems and prepaid metering will improve revenue transparency and mitigate circular debt accumulation (Jiang, Niu, Ru, Tong, & Wang, 2023; Zhao, Xia, Zhang, Hu, & Wu, 2021).

POLICY DIRECTION AND ENERGY MARKET REFORMS

A strategic shift in Pakistan's energy policy is necessary to ensure long-term stability and efficiency. Policymakers should prioritize a diversified energy mix, placing greater emphasis on renewables and hybrid energy solutions. This transition must be

complemented by a proactive investment strategy, promoting private sector participation and regulatory transparency to enhance ease of doing business.

A crucial policy consideration is the de-bundling of the National Transmission and Despatch Company (NTDC), enabling multiple stakeholders to share grid infrastructure costs. This could reduce power wheeling charges, improve grid efficiency, and accelerate the transition toward a competitive multi-buyer, multi-seller electricity market. Coupled with DISCO privatization, these reforms can foster a dynamic, competitive, and technology-driven power sector, ultimately ensuring greater affordability and reliability for consumers.

The role of technology transfers and investment in emerging digital infrastructure cannot be overstated. AI-powered forecasting tools, drone-based grid monitoring, and data-driven energy management systems can revolutionize Pakistan's electricity sector, reducing losses, curbing electricity theft, and enhancing grid resilience.

CONCLUSION

CPEC has been instrumental in reshaping Pakistan's energy landscape, playing a critical role in resolving the 2014 and 2022 energy crises. With continued technological collaboration, strategic planning, and sustainable policy implementation, CPEC's second phase has the potential to not only secure Pakistan's energy future but also strengthen regional integration, paving the way for a reliable, affordable, and sustainable power sector.

REFERENCES

Abrar, S., & Farzaneh, H. (2021). Scenario analysis of the low emission energy system in Pakistan using integrated energy demand-supply modeling approach. Energies, 14(11), 3303.

Aized, T., Shahid, M., Bhatti, A. A., Saleem, M., & Anandarajah, G. (2018). Energy security and renewable energy policy analysis of Pakistan. Renewable and Sustainable Energy Reviews, 84, 155-169.

Almasoudi, F. M. (2023). Enhancing power grid resilience through real-time fault detection and remediation using advanced hybrid machine learning models. Sustainability, 15(10), 8348.

Amir-ud-Din, R. (2014). From energy blues to green energy: options before Pakistan. The Pakistan Development Review, 309-325.

Anwar, J. (2010). An analysis of energy security using the partial equilibrium model: the case of Pakistan. The Pakistan Development Review, 925-940.

Archana. (2022). Modelling Barriers for Smart Grid Technology Acceptance in India. Process Integration and Optimization for Sustainability, 6(4), 989-1010.

Arzhaev, F., Abramov, V., Shchukina, T., Mamedov, T., Sadriddinov, M., Morkovkin, D., . . . Zvereva, A. (2024, 2024). Defining of the energy poverty of the state through the analysis of Belt and Road influence on its alleviation in the context of sustainable development.

Asad, M., Mahmood, F. I., Baffo, I., Mauro, A., & Petrillo, A. (2022). The Cost Benefit Analysis of Commercial 100 MW Solar PV: The Plant Quaid-e-Azam Solar Power Pvt Ltd. Sustainability, 14(5), 2895.

Ashfaq, A., & Ianakiev, A. (2018). Features of fully integrated renewable energy atlas for Pakistan; wind, solar and cooling. Renewable and Sustainable Energy Reviews, 97, 14-27.

Bhattarai, T. N., Ghimire, S., Mainali, B., Gorjian, S., Treichel, H., & Paudel, S. R. (2023). Applications of smart grid technology in Nepal: status, challenges, and opportunities. Environmental Science and Pollution Research, 30(10), 25452-25476.

Falcone, P. M. (2023). Sustainable energy policies in developing countries: a review of challenges and opportunities. Energies, 16(18), 6682.

Haque, A., Hussain, M. N., Ali, M. S., Khan, M. Y. A., & Halim, M. A. (2023). Technical and Economic Challenges and Future Prospects of a Smart Grid-A Case Study. Control Systems and Optimization Letters, 1(3), 186-193.

Hartvigsson, E., Ahlgren, E. O., & Molander, S. (2020). Tackling complexity and problem formulation in rural electrification through conceptual modelling in system dynamics. Systems Research and Behavioral Science, 37(1), 141-153.

Hussain, J., & Hassan, S. (2019). Global energy transition and the role of energy mix in creating energy crisis in Pakistan. Pakistan Journal of Humanities and Social Sciences, 7(2), 219-232.

Jiang, L., Niu, H., Ru, Y., Tong, A., & Wang, Y. (2023). Can the digital economy promote the development of the energy economy? Evidence from China. Frontiers in Energy Research, 11, 1257794.

Kamal, M. (2024). Optimal Planning of Standalone Rural Microgrid With Effective Dispatch Strategies and Battery Technology. Energy Storage, 6(8), e70092.

Laninga, J., Nasr Esfahani, A., Ediriweera, G., Jacob, N., & Kordi, B. (2023). Monitoring technologies for HVDC transmission lines. Energies, 16(13), 5085.

Maka, A. O. M., & Alabid, J. M. (2022). Solar energy technology and its roles in sustainable development. Clean Energy, 6(3), 476-483.

Mengal, A., Harijan, K., Uqaili, M. A., Mirjat, N. H., & Shah, S. M. A. (2017). Cost estimation and comparison of carbon capture and storage technology with wind energy. Mehran University Research Journal of Engineering & Technology, 36(2), 373-384.

Narejo, G. B., Azeem, F., & Zardari, S. (2017). An Energy Policy Analysis and Proposed Remedial Actions to Reduce Energy Crises in Pakistan. Mehran University Research Journal of Engineering and Technology, 36(2), 401-406.

Nazir, S., Mahmood, N., & Hameed, G. (2022). Energy Substitution Effect in Major Energy Consumption Sectors of Pakistan: Translog Cost Function. Review of Economics and Development Studies, 8(2), 167-181.

Pasha, H. A. (2018). Growth and inequality in Pakistan: Friedrich-Naumann-Stiftung für die Freiheit Pakistan.

Rehman, A., & Deyuan, Z. (2018). Pakistan's energy scenario: a forecast of commercial energy consumption and supply from different sources through 2030. Energy, sustainability and society, 8, 1-5.

Rehman, A., Hakim, A., Khan, K., & Khan, I. (2018). Role of CPEC in development of trade, transport and economy of Pakistan. Romanian Journal of Transport Infrastructure, 7(1), 77-92.

Sajid, Z., & Javaid, A. (2018). A stochastic approach to energy policy and management: A case study of the Pakistan energy crisis. Energies, 11(9), 2424.

Shahzad, S. M. (2022). RENEWABLE ENERGY RESOURCES IN PAKISTAN: PAVING A WAY FORWARD. Pakistan Journal of Science, 74(4).

Solat, S., Aminifar, F., & Shayanfar, H. (2023). Changing the regulations for regulating the changes: From distribution system operator (DSO) to electricity distribution stakeholders' organization (EDSO). Energy & Environment, 34(4), 830-854.

Turi, J. A., Rosak-Szyrocka, J., Mansoor, M., Asif, H., Nazir, A., & Balsalobre-Lorente, D. (2022). Assessing wind energy projects potential in Pakistan: challenges and way forward. Energies, 15(23), 9014.

Zhao, Y., Xia, S., Zhang, J., Hu, Y., & Wu, M. (2021). Effect of the digital transformation of power system on renewable energy utilization in China. Ieee Access, 9, 96201-96209.

Zhou, B., Zou, J., Chung, C. Y., Wang, H., Liu, N., Voropai, N., & Xu, D. (2021). Multi-microgrid energy management systems: Architecture, communication, and scheduling strategies. Journal of Modern Power Systems and Clean Energy, 9(3), 463-476.

Zulfiqar, A., Nazir, A., & Khalid, A. (2022). Examining the Future Direction of Electricity Market in Pakistan: The Case of Competitive Trading Bilateral Contracts Market (CTBCM): Sustainable Development Policy Institute.

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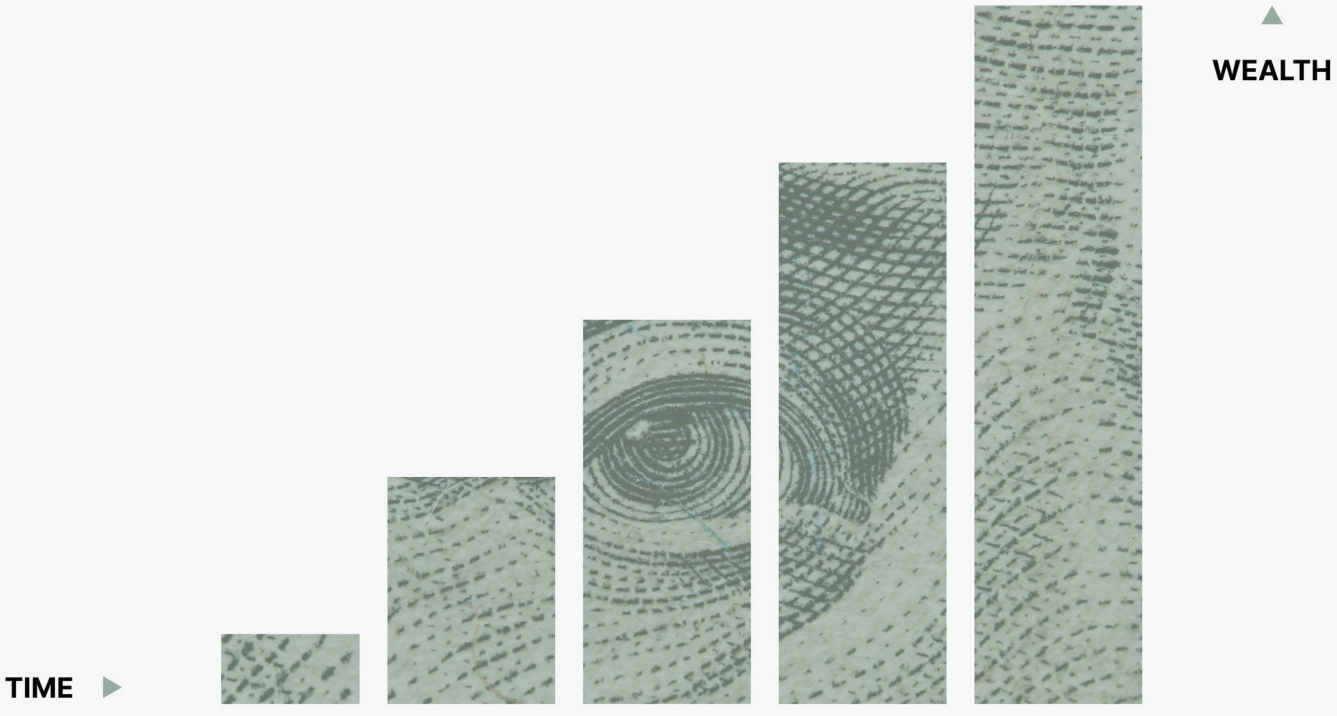
Picture courtesy of CPEC Secretariat
Matiari to Lahore 660KV HVDC Transmission Line Project

ECONOMIC GROWTH & DEVELOPMENT



Is CPEC Phase 2.0 a Game Changer for Poverty Reduction in Pakistan?

Dr. Nasir Iqbal

Pakistan has now entered the next phase of the China-Pakistan Economic Corridor (CPEC) Phase 2 to deepen bilateral relations through strategic collaborations, transformative socio-economic projects, and advanced technological transfer.

Industrial cooperation, agricultural development, and trade promotion are key components of this phase. To accelerate industrialization, the government has planned the establishment of special economic zones (SEZs) in each province. Nine SEZs have already been identified across the country, offering competitive incentives such as income tax exemptions and customs duty exemptions on imports. Additionally, the tourism sector is expected to expand under Phase 2. These initiatives hold promise for job creation and poverty reduction by generating employment, supporting local businesses, and enhancing income generation, particularly in underdeveloped regions.

However, a crucial question remains: Is Pakistan equipped to maximize CPEC's potential for inclusive economic growth and poverty alleviation?

While CPEC brings substantial investment opportunities and promises of job creation, several concerns persist:

- Will these opportunities be accessible to underprivileged communities, or will the benefits remain concentrated among industrial elites?
- Do both foreign and domestic investors have confidence in Pakistan's economic stability, security, and policy consistency?
- Does Pakistan have a stable regulatory framework and a skilled workforce to attract and retain industrial investments in SEZs?

These structural challenges could hinder Pakistan's ability to translate CPEC investments into sustained economic growth and poverty reduction.

KEY PREREQUISITES FOR ECONOMIC GROWTH AND POVERTY ALLEVIATION

To fully harness the potential benefits of industrialization, tourism, and poverty reduction, Pakistan must focus on three critical prerequisites: human capital (HC), rural connectivity (RC), and a safe business environment (SBE). These factors are essential for attracting foreign direct investment (FDI), promoting tourism, and driving economic growth. However, Pakistan's current status in these areas remains weak.

1. Human Capital Development

Pakistan lags behind its regional counterparts in human capital development. According to the 2021

Human Development Report, Pakistan's Human Capital Index (HCI) ranks 144th out of 189 countries, significantly behind India (116), Bangladesh (123), and Sri Lanka (71). Additionally, Pakistan has one of the lowest female workforce participation rates in the region. A shortage of skilled labor could impede the success of SEZs and industrial expansion under CPEC.

To bridge this gap, Pakistan must invest in vocational and technical training programs aligned with CPEC-related industries, improve education infrastructure in underdeveloped regions, and implement targeted policies and incentives to encourage female workforce participation. With the right policies and investments, Pakistan's growing working-age population can become more skilled, productive, and capable of earning higher incomes, provided the economy generates sufficient quality jobs under CPEC.

2. Rural Connectivity and Infrastructure

Pakistan's underdeveloped road and transportation networks limit economic opportunities for underprivileged communities. Well-developed rural roads are crucial for linking growth-generating sectors across different regions and ensuring the equitable distribution of economic benefits. They are also essential for the development of remote and environmentally challenging areas. Investments in rural infrastructure can boost both farm and non-farm productivity, generate employment, and raise incomes—key factors for poverty alleviation.

However, rural connectivity with SEZs remains weak, raising concerns about whether CPEC-led industrialization will truly benefit the poor. Nationally, 60% of Mouzas (a regional unit similar to a town) are located within one kilometer of a paved road, and 67% have good transport links within the same radius. However, the situation is far worse in CPEC districts. For instance, only 4% of Mouzas in Kohistan have road connectivity, and just 23% have transport links. Similar gaps exist in other districts, making it unlikely that SEZ-led industrialization will create employment opportunities for rural populations without targeted infrastructure investments.

These connectivity challenges reinforce the risk that CPEC's benefits will remain concentrated in industrial hubs and urban centers rather than reaching underprivileged communities. Without an integrated rural transport strategy, industrial investments in SEZs may struggle to attract a local workforce, and rural populations may remain excluded from the economic gains of CPEC Phase 2.0.

3. A Safe and Business-Friendly Environment

Foreign direct investment (FDI) inflows remain constrained by an unfavorable business environment. According to the World Bank's Business Ready (B-READY) 2024 report, Pakistan falls into the fourth quintile, indicating persistent challenges in fostering a conducive investment climate. The report assesses economies across three key pillars: Regulatory Framework, Public Services, and Operational Efficiency, covering ten critical topics for investment and business operations. Pakistan's ranking highlights its struggle to create a stable and predictable business environment compared to regional peers.

This unfavorable business climate is particularly concerning for CPEC Phase 2.0, which relies on FDI, industrial expansion, and trade growth. Poor business conditions deter both foreign and domestic investors, limiting the potential for job creation within SEZs and other CPEC-related projects.
Additionally, weak institutional frameworks exacerbate these challenges. Essential governance structures—such as political stability, an independent legal system, and regulatory efficiency—are critical for attracting investment and ensuring long-term industrial growth. However, according to the World Governance Indicators (WGI) 2024, Pakistan ranks alarmingly low in these areas:

- Political stability and absence of violence/ terrorism: 6th percentile
- Government effectiveness: 26th percentile (compared to 36 for South Asia and 69 for Eastern Europe & Central Asia)
- Control of corruption: 23rd percentile (compared to 34 for South Asia and 63 for
- Eastern Europe & Central Asia)

Pakistan also scores poorly in rule of law and regulatory quality, further eroding investor confidence. Without institutional reforms, the country risks failing to leverage CPEC investments for sustainable economic growth and poverty reduction. Strengthening governance is critical to ensuring that SEZs attract long-term industrial investments, create jobs, and promote inclusive development.

To ensure that CPEC Phase 2.0 leads to meaningful poverty alleviation, Pakistan must strengthen its institutions, enhance rural connectivity, and invest in vocational training, particularly for low-income and rural populations. A well-functioning business environment—complemented by inclusive economic policies, will be essential in transforming CPEC from merely an investment corridor into a true engine of sustainable economic growth and poverty reduction.

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CPEC: Moving Beyond Infrastructure to Economic Reforms

Dr. Manzoor Ahmad

The first phase of the China-Pakistan Economic Corridor (CPEC) primarily focused on infrastructure development, with investments of over $25 billion in road networks, port development, and power generation. Nearly 1,500 kilometers of highways were built, and power generation units adding 8,000 MW to the national grid were established.

Despite these infrastructure developments, a critical question arises: Why have they failed to deliver the expected economic benefits? Instead of reducing poverty and raising living standards, Pakistan's poverty rates have increased, and its per capita income has remained stagnant at around $1,400 since the launch of CPEC in 2015. In contrast, competing countries have made significant gains. For instance, between 2015 and 2023, Bangladesh's per capita income doubled from $1,236 to approximately $2,400, while India's rose from $1,590 to $2,485 during the same period (Macrotrends).

A key reason for Pakistan's lagging macroeconomic performance lies in its failure to modernize policies alongside infrastructure. While the country invested in physical infrastructure (hardware), it neglected critical structural reforms (software). Pakistan halted its reform process in 2004 and began reversing earlier reforms from 2008 onwards. This trend intensified after 2014, leading to a decline in exports as a percentage of GDP. Exports peaked at 15% of GDP in 2003 but have since fallen to just 10.48%—far below levels seen in comparable economies.

International institutions like the World Bank and IMF have repeatedly warned of the consequences of Pakistan's failure to reform its trade policies. A 2022 IMF report[1] described Pakistan as "a very closed economy compared to other emerging and developing economies, with net exports often acting as a drag on growth." Similarly, a 2020 World Bank study[2] highlighted Pakistan's high trade barriers, noting that its tariffs are almost twice the global average and three times higher than those in East Asia and the Pacific. Pakistan ranks as the world's seventh-most protected economy, as measured by the Overall Trade Restrictiveness Index (OTRI).

The Pakistan Tariff Policy 2019-24[3] acknowledged that while the world's fastest-growing export economies reduced import tariffs over the past decade, Pakistan increased them by 11%. Regulatory duties further raised effective tariff levels, making Pakistan's average weighted tariff the highest among 70 countries with over $20 billion in annual exports. Despite this recognition, no remedial action was taken due to fears that lowering tariffs would reduce revenue collection.

Pakistan's failure to integrate with the global economy stands in stark contrast to the experiences of its neighbors and even its close ally, China. During the 1980s, China's trade grew at an annual rate of 12%, and its share of global exports rose from less than 1% in 1980 to 1.9% in 1990. This transformation was driven not just by infrastructure development but by structural reforms focused on global integration. Pakistan, however, has not adopted similar strategies, leaving its economy stagnant despite significant infrastructure investments.

[1] https://www.elibrary.imf.org/view/journals/002/2022/027/article-A006-en.xml
[2] World Bank. 2020. Modernizing Trade in Pakistan: A Policy Roadmap. © World Bank
[3] https://www.commerce.gov.pk/wp-content/uploads/2019/11/National-Tariff-Policy-2019-24.pdf

The second phase of CPEC must take a fundamentally different approach, prioritizing policy reforms over infrastructure expansion. Pakistan must learn from China's dismantling of trade protectionism and focus on reducing both tariff and non-tariff barriers. High import duties inflate production costs, making exports less competitive globally. Lowering tariffs would grant local industries access to cheaper inputs and advanced technology, enabling them to integrate into global supply chains and drive economic growth.

Non-tariff barriers, such as complex regulations, inefficient customs clearance, and excessive documentation, further hinder trade. Streamlining these processes through automation, transparent policies, and harmonization with international standards would enhance trade efficiency and attract foreign direct investment (FDI).

Pakistan should actively integrate its economy into Chinese supply chains, leveraging its existing free trade agreement (FTA) with China. However, the current FTA is shallow, covering only 8.4% of Pakistan's exports and 27.28% of its imports. As a result, less than 5% of the bilateral trade increase can be attributed to the FTA. Whereas Pakistan's bilateral trade since the signing of FTA increased from $3.5 billion to $19 billion, India's trade with China surged from $13 billion to $116 billion in 2023.

Pakistan should also look at some other developing countries which underwent deep integration with their much larger neighbouring economies. For example, Turkey has integrated its economy with the European Union through a Customs Union, eliminating tariffs on manufactured goods. This has significantly enhanced Turkey's integration into European supply chains, with EU-Turkey trade reaching a record high of nearly $215 billion in 2023. Similarly, Mexico's elimination of tariffs on manufactured goods has embedded its industries within U.S. supply chains, leading to bilateral trade exceeding $800 billion.

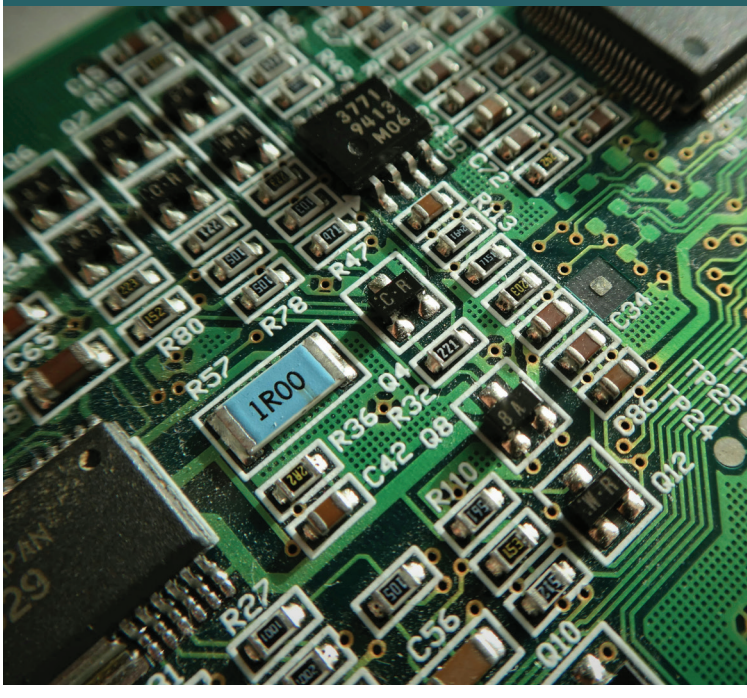
Pakistan's limited trade integration has constrained its ability to produce and export more complex goods. Ranked 93rd out of 145 on the Economic Complexity Index (ECI), Pakistan's export basket remains dominated by low-value textiles and agricultural commodities like rice. Greater integration with China could enable a transition to high-value, knowledge-intensive products such as electronics, pharmaceuticals, and machinery. This shift would enhance export revenues, strengthen global competitiveness, and reduce reliance on volatile commodity markets.

To achieve this, Pakistan should focus on acquiring advanced technologies and getting its work force better skilled. Deeper integration with China can accelerate this transformation. Additionally, Pakistan should focus on emerging industries like electric vehicles, advanced battery technologies, and solar energy—sectors where China leads globally. Collaboration in these areas would facilitate technology transfer and help Pakistan build a competitive edge in the green economy.

A strategic shift toward investment-driven growth is also crucial. Excessive borrowing has increased financial burdens and diverted resources from productive investments. By attracting FDI, promoting exports, and encouraging industrialization, Pakistan can create a self-sustaining cycle of economic growth, reducing dependence on international financial institutions.

In conclusion, the second phase of CPEC must prioritize policy reforms, global integration, and investment in high-growth sectors. While China can support Pakistan's industrialization by relocating some industries, long-term progress depends on Pakistan's ability to implement reforms that enhance productivity, investment, and economic resilience. By learning from China's experience and adopting similar strategies, Pakistan can unlock the full potential of CPEC and achieve sustainable economic growth.

Dr. Manzoor Ahmed is a renowned trade and industry expert with experience working for leading national and global organizations including the Federal Board of Revenue and the World Trade Organization.



CPEC Sustainable Development: Opportunities and Challenges

Dr. Mujtaba Ellahi

INTRODUCTION

A flagship project of China's Belt and Road Initiative (BRI), the China-Pakistan Economic Corridor (CPEC) aims to promote economic cooperation between China and Pakistan while also improving regional connectivity. CPEC is a multi-billion-dollar infrastructure and development project that was started in 2015. It connects Pakistan's Gwadar Port on the Arabian Sea with China's northwest Xinjiang region across a distance of more than 3,000 kilometres. Energy, transportation, infrastructure, and industrial cooperation are just a few of the many industries that are included in the project. Although CPEC has the potential to greatly accelerate Pakistan's economic development and prosperity, it also poses serious sustainability concerns. Examining the economic, environmental, and social aspects of CPEC, this essay examines its implications for sustainable development and talks about the chances and challenges of making sure CPEC promotes sustainability over the long run.

One of the biggest infrastructure projects of the contemporary era is the China-Pakistan Economic Corridor (CPEC). The project links China's Xinjiang province with Pakistan's Gwadar Port on the Arabian

Sea and entails building highways, railroads, energy pipelines, and industrial zones. CPEC, a flagship project under China's Belt and Road Initiative (BRI), is anticipated to transform Pakistan's economy by establishing new trade channels, boosting regional connectivity, and improving infrastructure. The long-term viability of the CPEC projects is still a concern, especially about economic, social, and environmental sustainability, despite the promise of quick progress. These CPEC features are examined critically in this essay, which also looks at the prospects and difficulties related to its sustained growth.

CPEC'S ECONOMIC SUSTAINABILITY

Pakistan's economy is anticipated to undergo a radical change as a result of CPEC. With the creation of special economic zones (SEZs), the project seeks to alleviate Pakistan's ongoing energy problems, enhance transportation infrastructure, and generate new economic opportunities. The Planning Commission of Pakistan estimates that by 2030, CPEC will increase the nation's GDP growth rate by 2 to 2.5 percentage points and generate over 700,000 direct jobs (Planning Commission of Pakistan, 2017). To solve Pakistan's energy crisis, one of the main aims of the China-Pakistan Economic Corridor (CPEC) is the construction of energy projects. Through the development of coal-fired, hydro, wind, and solar power plants, CPEC has contributed more than 5,000 megawatts (MW) of electricity to Pakistan's national grid as of 2021 (China-Pakistan Economic Corridor, 2021).

In addition to lowering power outages, this has made the energy supply for home and business use more dependable. However, given international efforts to cut carbon emissions and fight climate change, CPEC's reliance on coal-fired power facilities has sparked questions about its environmental viability. Along with energy projects, CPEC also includes building ports, railroads, and other transportation facilities, which should improve regional connectivity and ease trade. Among the major infrastructure projects under CPEC are the development of the Karachi-Lahore Motorway, the construction of the Gwadar Port, and the improvement of the Karakoram Highway.

The creation of Special Economic Zones (SEZs) under the China-Pakistan Economic Corridor (CPEC) is another significant component of the project. These zones are meant to draw in foreign investment, encourage industrialization, and generate employment opportunities; they are expected to concentrate on industries like information technology, textiles, and automobiles, which have the potential to boost Pakistan's export revenue and economic diversification. However, the success of these zones will depend on the availability of skilled labour, access to financing, and the capacity to establish a business-friendly environment.

Even though CPEC has the potential to spur economic growth and development in Pakistan, it is crucial to make sure that this growth is sustainable and inclusive, which means tackling issues like income inequality, regional disparities, and the potential for environmental degradation. Additionally, since CPEC is primarily financed by Chinese loans, its long-term viability will depend on Pakistan's ability to manage its debt obligations; the State Bank of Pakistan reports that in 2020, the country's external debt and liabilities totalled $115.7 billion, with a large amount of that debt being attributable to CPEC-related projects (State Bank of Pakistan, 2020). They are:

1. Trade Integration and Economic Growth

The potential of CPEC to promote sustained economic growth in Pakistan is a key factor in determining its long-term viability. It is anticipated that the construction of Gwadar Port and the road and rail system linking Pakistan to China and other areas will greatly lower trade costs, improve export capacities, and strengthen Pakistan's standing in global commerce (Ali et al, 2020). Furthermore, CPEC is a vital hub for regional economic integration since it gives Pakistan direct access to China's sizable consumer markets as well as trade routes that link Central Asia, the Middle East, and Africa. By drawing in foreign direct investment (FDI), generating employment, and encouraging technology transfer, the establishment of Special Economic Zones (SEZs) along CPEC routes has the potential to accelerate industrialization.

In an economy like Pakistan, which has struggled with industrial growth because of inadequate infrastructure and restricted access to global markets, this is especially crucial. CPEC can ease the flow of products, lessen traffic jams, and cut down on transaction costs for companies as it improves Pakistan's energy and transportation infrastructure. But for the economic gains from CPEC to last, Pakistan needs to make sure that foreign investment leads to the growth of domestic industry, especially in less developed areas like Khyber Pakhtunkhwa and Balochistan. The ability of regional industries to profit from enhanced infrastructure and worldwide connectivity will determine how well this integration goes.

2. Creating Jobs and Reducing Poverty

The potential for CPEC to generate thousands of employment is one of the main advantages it offers. There will be a high demand for workers as infrastructure projects are created to build highways, electricity plants, and other services. Employment in the manufacturing and service sectors may increase as a result of the creation of SEZs (Shah et al, 2019). Additionally, by giving local workers access to skill development programs, CPEC can increase their employability in a competitive market by giving them useful technical expertise.

Furthermore, by enhancing the economic climate in developing regions, CPEC may help reduce poverty. Balochistan and other historically economically marginalized regions may benefit from the increased economic prospects brought forth by the China-Pakistan Economic Corridor (CPEC). Improved access to markets, improved economic activity, and better infrastructure can help reduce poverty and enhance living standards (Hussain et al, 2018).

However, the equitable distribution of economic rewards is a fundamental concern. Rural areas might not witness the same amount of development as major hubs like Lahore, Karachi, and Islamabad, which are expected to grow rapidly. The long-term social and economic viability of CPEC depends on ensuring that its advantages are felt throughout Pakistan.

CPEC'S SOCIAL SUSTAINABILITY

1. Inclusivity and Social Equity

CPEC needs to address social justice concerns and encourage diversity to be socially sustainable. If steps are not taken to guarantee that local communities are involved in the development process, the fast expansion of infrastructure in areas that have long been disregarded, like Balochistan and portions of Khyber Pakhtunkhwa, might make already-existing disparities worse. Prioritizing health, education, and job creation will guarantee that every group of people benefits equally from the programs. Furthermore, by giving women equal employment opportunities and guaranteeing them access to the financial gains of development, CPEC should promote gender equality. Gender gaps can also be lessened via projects about healthcare, education, and rural development, especially in less developed and rural areas (Shah et al, 2019).

The potential for local populations to be uprooted by massive infrastructure projects is a major worry. Social discontent may result from community relocations that do not provide sufficient resources, support services, or compensation. To guarantee inclusive and equitable development, the government must place a high priority on community involvement and participatory decision-making procedures.

2. Reducing Regional Inequalities and Enhancing Governance

Enhancing governance structures is another important challenge in ensuring social sustainability. The success of CPEC depends not only on building physical infrastructure but also on the Pakistani government's institutional capacity to manage the projects, ensure transparency, and address the concerns of local communities. This calls for strong institutions that can effectively manage large-scale projects and effective coordination between the federal, provincial, and local governments. Regional disparities, especially in politically sensitive areas like Balochistan, could pose significant obstacles to CPEC's social sustainability, as local populations may feel left out of the economic benefits of the project if they are not consulted and their concerns are not sufficiently addressed.CPEC must be presented as an inclusive project that considers the interests and goals of all Pakistani residents, especially those from marginalized communities, to prevent such tensions (Ali et al, 2020).

CPEC'S ENVIRONMENTAL SUSTAINABILITY

1. Effects on the Environment and Their Mitigation

Although CPEC could accelerate Pakistan's economic growth, there are rising concerns about how sustainable it would be for the environment. Large-scale infrastructure initiatives, including building new roads and producing electricity, frequently have a high environmental cost. While energy plants, especially those that use coal, contribute to air pollution and greenhouse gas emissions, construction activities can result in deforestation, habitat damage, and soil erosion.

CPEC's growth of coal-fired power plants, in particular, may have long-term environmental effects, aggravating global climate change and adding to Pakistan's already high air pollution levels (Hussain, 2018). Pakistan must enforce laws meant to reduce environmental damage and conduct thorough environmental impact assessments (EIAs) for all significant CPEC projects to allay these worries. One of the most controversial aspects of CPEC is the development of coal-fired power plants, which

have helped to address Pakistan's energy shortages but have also raised concerns about air pollution and greenhouse gas emissions. The project's reliance on coal-fired power plants and the potential for ecological degradation make it extremely concerning. Pakistan is already vulnerable to the effects of climate change, including rising temperatures, melting glaciers, and extreme weather events; the construction of large-scale infrastructure projects under CPEC could exacerbate these challenges, especially if environmental considerations are not sufficiently addressed.

One of the main sources of carbon dioxide (CO2) emissions that contribute to global warming, according to the International Energy Agency (IEA), is coal-fired power stations (IEA, 2020). Environmental organizations have attacked CPEC's construction of coal-fired power facilities, claiming it jeopardizes international efforts to switch to cleaner energy sources.

The Pakistani government has responded to these worries by stressing the significance of expanding the proportion of renewable energy in CPEC projects and diversifying its energy mix. About 30% of the total energy capacity added by the CPEC as of 2021 comes from renewable energy projects, such as wind, solar, and hydroelectric power plants (China-Pakistan Economic Corridor, 2021). Nonetheless, Pakistan's entire energy mix still has a comparatively small amount of renewable energy, and more funding for clean energy technology is required.

The environment may be impacted by the CPEC's transportation infrastructure construction. Deforestation, habitat destruction, and increased pollution could result from the construction of roads, railroads, and ports. For instance, there are worries regarding the effects on regional ecosystems and biodiversity of the Karakoram Highway, which is being built through some of Pakistan's most environmentally delicate regions. Similarly, marine ecosystems may be impacted by the construction of the Gwadar Port, especially if appropriate environmental protections are not implemented.

Environmental factors must be incorporated into CPEC project planning and execution to overcome these obstacles. This entails carrying out environmental impact assessments (EIAs), embracing sustainable building best practices, and putting policies in place to lessen the negative effects of infrastructure development on the environment. Furthermore, the decision-making process needs to be more transparent and involve stakeholders, especially when it comes to the social and environmental effects of CPEC projects.

2. Encouraging Renewable Energy and Green Infrastructure

The creation of green infrastructure should be given top priority by the Pakistani government to lessen the negative environmental effects of CPEC. To lessen Pakistan's carbon footprint and dependency on fossil fuels, this includes the utilization of renewable energy sources including wind, solar, and hydropower. Sustainable substitutes for conventional coal-fired power plants may be offered by the construction of clean energy projects under CPEC, such as wind and solar farms (Ali et al, 2020). Furthermore, promoting eco-friendly transit options like buses and electric trains as well as sustainable urban design could lessen the environmental impact of CPEC projects. To reduce the environmental dangers connected to rapid infrastructure growth, it will be essential to make sure that development complies with international sustainability standards.

CHALLENGES AND POSSIBILITIES IN CPEC FOR SUSTAINABLE DEVELOPMENT

Several issues, such as social, environmental, and economic ones, must be resolved for CPEC to be implemented successfully and in a way that supports sustainable development. However, there are also plenty of chances for CPEC to support long-term sustainability, especially if the project is in line with international sustainability objectives like the Sustainable Development Goals (SDGs) of the UN. Making sure the project is financially viable is one of CPEC's main obstacles. As previously mentioned, a significant portion of CPEC's funding comes from Chinese loans, which has sparked questions about Pakistan's ability to repay its debt. In the upcoming years, Pakistan's external debt is anticipated to rise sharply, with CPEC-related projects contributing considerably to this burden, according to the International Monetary Fund (IMF) (IMF, 2020). It will take careful financial management, including the adoption of measures that encourage economic resilience and lower the risk of debt hardship, to guarantee that CPEC supports sustainable development. Making sure CPEC projects are environmentally sustainable is another difficulty. This necessitates incorporating environmental factors into CPEC project design and execution, including implementing strategies to lessen the environmental effect of infrastructure development and embracing best practices for sustainable building. Furthermore, more funding is required for renewable energy

technology, especially given international initiatives to lower carbon emissions and fight climate change. Another crucial factor to take into account is CPEC's social viability. The project's long-term viability depends on ensuring that everyone in society benefits from CPEC, especially in terms of job generation, social fairness, and community involvement. This necessitates tackling problems like geographical differences, income inequality, and the possibility of relocation and displacement. To guarantee that everyone in society benefits from CPEC, more money must be invested in social infrastructure, including community centres, hospitals, and schools. Notwithstanding these obstacles, CPEC has a lot of potential to support sustainable development. The project could spur economic expansion and advancement in Pakistan, especially in less developed areas.

Furthermore, especially in light of the BRI, CPEC may serve as a template for regional connectivity and collaboration. There is a chance to guarantee that CPEC promotes long-term sustainability in Pakistan and the surrounding area by coordinating the project with international sustainability objectives like the SDGs. The economic and environmental effects of CPEC are intimately related to its social elements. Particularly in Pakistan's less developed areas, the project may open up new doors for social development, education, and employment. But it also brings up significant issues regarding community involvement, social equality, and the possibility of relocation and displacement.

The potential for job creation is one of the main social benefits of CPEC. It is anticipated that the construction of infrastructure projects, the creation of Special Economic Zones (SEZs), and the growth of the energy sector will generate thousands of jobs for local communities; however, there are concerns regarding the quality of these jobs, specifically about wages, working conditions, and job security; additionally, it is necessary to guarantee that local communities have access to the necessary skills and training to capitalize on these opportunities; and finally, the development of CPEC projects may have an impact on social equity, particularly for regional disparities.

Although the project could boost economic growth in Pakistan's less developed areas, there is a chance that the advantages of CPEC will be concentrated in a few places, escalating already-existing disparities. For instance, the construction of the Gwadar Port and related infrastructure may boost Balochistan's economy, but there are questions about whether the local populace will gain anything from these advancements. In a similar vein, residents may be displaced as a result of the establishment of SEZs, especially if land acquisition procedures are not carried out fairly and transparently.

One of the main societal concerns with CPEC is the possibility of relocation and displacement. Large-scale infrastructure projects frequently necessitate the purchase of land, which may result in the eviction of nearby people. The land purchase procedures in Pakistan have come under fire for being opaque and not providing impacted communities with fair compensation. In the context of CPEC projects, there have been allegations of forceful evictions, insufficient compensation, and a failure to involve local populations (Amnesty International, 2019). For CPEC to be socially sustainable, the rights of impacted populations must be upheld.

Along with these difficulties, it is important to make sure that CPEC advances social progress, especially in the areas of gender equality, health, and education. Especially in light of SEZs and the growth of the energy industry, the project may open up new avenues for education and skill development. To guarantee that everyone in society benefits from CPEC, more money must be invested in social infrastructure, including community centres, hospitals, and schools. They are:

1. Problems with Governance and Political Instability

Political unrest and issues with governance in Pakistan pose a serious threat to the long-term viability of the China-Pakistan Economic Corridor (CPEC). The successful execution of CPEC projects may be hampered by the complicated political climate, which is marked by frequent changes in government and divergent regional interests. The success of the project may be harmed, namely, by poor governance systems, corruption, and delays in project approvals (Hussain et al, 2018). For CPEC projects to be managed openly and resources to be distributed fairly, effective governance is necessary. To preserve public confidence and avoid resource misallocation, transparent decision-making procedures and accountability systems are essential.

2. Security Issues

Security concerns may discourage foreign investors and affect the overall success of the initiative. Militancy, insurgency, and ethnic tensions pose risks to the completion of CPEC projects, with potential delays and cost overruns. The security situation in some parts of Pakistan, particularly Balochistan and Khyber Pakhtunkhwa, continues to be a major

challenge. The Pakistani government must ensure a secure environment for both local and international stakeholders involved in CPEC (Shah et al, 2019).

CONCLUSION

With the potential for substantial economic growth, regional integration, job creation, and infrastructure development, the China-Pakistan Economic Corridor (CPEC) offers Pakistan a game-changing opportunity. However, resolving the project's social, economic, and environmental issues is essential to its long-term viability. Pakistan should use CPEC as a platform for sustainable development by resolving environmental issues, enhancing governance, and making sure that the benefits are shared fairly. CPEC has the potential to be a model for other infrastructure projects in developing economies, fostering prosperity that benefits present and future generations, provided it is planned carefully and inclusively. The China-Pakistan Economic Corridor (CPEC) is a game-changing initiative that might greatly accelerate Pakistan's economic development and growth. But the initiative also brings up significant issues regarding sustainability, especially when it comes to its social, environmental, and economic facets. Several issues, such as social justice, environmental impact, and financial sustainability, must be resolved if CPEC is to support sustainable development. However, there are also plenty of chances for CPEC to support long-term sustainability, especially if the project is in line with international sustainability objectives like the SDGs. There is a chance to guarantee that CPEC will benefit Pakistan and the larger region in the long run by including sustainability concerns in the project's design and execution.

REFERENCES

Ali, M., & Ahmad, M. (2020). China-Pakistan Economic Corridor: Economic opportunities and sustainable development in Pakistan. Journal of South Asian Studies, 45(2), 123-139.

Amnesty International. (2019). Pakistan: Displaced and dispossessed: Forced evictions in Pakistan. Retrieved from https://www.amnesty.org

China-Pakistan Economic Corridor. (2021). CPEC energy projects. Retrieved from http://cpec.gov.pk

Hussain, A. (2018). CPEC and sustainable development: The environmental and social implications. International Journal of Development Studies, 36(4), 201-217.

International Energy Agency (IEA). (2020). Coal 2020: Analysis and forecast to 2025. Retrieved from https://www.iea.org

International Monetary Fund (IMF). (2020). Pakistan: 2020 Article IV consultation. Retrieved from https://www.imf.org

Planning Commission of Pakistan. (2017). Long-term plan for China-Pakistan Economic Corridor (2017-2030). Retrieved from http://pc.gov.pk

Shah, S. K., & Ali, Z. (2019). Social impacts of the China-Pakistan Economic Corridor in underdeveloped regions. South Asian Policy Review, 12(1), 45-63.

State Bank of Pakistan. (2020). External debt and liabilities. Retrieved from https://www.sbp.org.pk

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CPEC, Taxes & IMF

Dr. Ikramul Haq

"The authorities plan to undertake a holistic assessment of Special Economic Zones and Export Processing Zones to gradually phase out the existing incentives subject to contractual obligations. Phasing out of the incentives coupled with the decision to grant no such incentives in the future will help reduce the associated fiscal costs and create a level playing field and a more predictable business environment." - IMF Country Report 24/310[1]

The International Monetary Fund (IMF), in its Pakistan's Country Report [24/310] of October 2024, has made it abundantly clear that Pakistani authorities will not extend any new tax exemptions under Special Economic Zones (SEZs) and Export Processing Zones (EPZs) and gradually withdraw the existing ones, subject to contractual obligations. This condition, not yet adequately debated in official quarters and media, will certainly affect the existing and new projects under China-Pakistan Economic Corridor (CPEC[2]), a flagship project[3] of Belt & Road (B&I[4]) initiative covering 152 countries "mainly relying on Chinese investment to develop infrastructure in these countries"[5].

The above confirms beyond any doubt that bilateral economic agreements between China and Pakistan, in general, and those under CPEC in particular, are now under a strict scrutiny and review of the lender of last resort. This testifies to Pakistan's dilemma of further losing its economic sovereignty in the wake of availing the twenty-fifth IMF program[6] (US$7 billion 37-month extended fund facility).

No one in the Parliament as well as in academic circles noticed and/or debated that unconditional income tax exemption available to Thar Coal Project[7] established under CPEC since its inception was modified to tax credit through Finance Act, 2021. It was further curtailed vide Finance Act 2024 through an Explanation applicable retrospectively that reads as under:

[1] https://www.finance.gov.pk/mefp/extended_Fund_Facility_October_2024.pdf, accessed at 10:30 am on February 23, 2024.
[2] https://www.cpec.gov.pk/, accessed at 10:35 am on February 23, 2024.
[3] Established in 2013 and operational from 2016, CPEC promises to bring un-precedented levels of Chinese investment to Pakistan—the primary aim of this multidimensional, multifaceted and multibillion dollar (USD 61 billion) program is to provide land route connectivity between the China and Arabian Seas.
[4] An ambitious £900 billion initiative under which China aims to connect with Africa, the Middle East, Central Asia, and Europe via sea route and overland corridors
[5] https://www.jstor.org/stable/pdf/resrep24394.5.pdf, accessed at 10:40 am on February 23, 2024.
[6] The Executive Board of IMF on 27 September 2024 concluded the 2024 Article IV consultation with Pakistan and approved a 37-month Extended Arrangement under the Extended Fund Facility (EFF) in the amount of SDR 5,320 million (or around US$7 billion). The Fund's immediate disbursement was SDR 760 million (or about US$1 billion)
[7] https://cpec.gov.pk/project-details/9, accessed at 11:15 am on February 23, 2024

"For the removal of doubt it is clarified that tax credit under clause (a) shall only be available to the income derived from the operations of coal mining projects in Sindh supplying coal to power generation projects".

The specifically inserted exemption clause in the Income Tax Ordinance, 2001 for Thar Coal Project, when changed unilaterally and retrospectively through a controversial Presidential Ordinance, came as a shock and highlighted/criticized in the following words:

".....[Thar Coal] enjoying unconditional exemption that is now withdrawn retrospectively, is a matter of great concern as it is for "persons engaged in coal mining projects in Sindh supplying coal exclusively to power generation projects". On the other hand, unconditional income tax exemption available to the existing Independent Power Producers (IPPs) funded by International Finance Corporation (IFC) and other World Bank institutions would continue and not subjected to above conditions and tax will be levied only on new plants established after June 30, 2021.

The same should have been the case for successful China's projects under CPEC—as a matter of uniform policy for all. If emergent situation existed [for issuance of a Presidential Ordinance], was it only to damage local IT industry and Chinese projects under CPEC? This is a crucial question showing the real agenda of IMF of destroying our ability to earn billions of dollars through IT exports and hamper economic progress under CPEC to get rid of external loans"[8].

It is clear from above that even under the program availed by the coalition government of the Pakistan Tehreek-e-Insaf (PTI), IMF successfully forced the Federal Board of Revenue (FBR) to curtail an income tax exemption available to a coal mining project in Sindh and utilization of indigenous raw material for power generation. This was in contrast to blanket income tax exemption available to IFC funded IPPs running mainly on imported fossil fuel, forcing an already dollar-strapped country to incur monstrous foreign exchange out-flows.

FBR is now captive in the hands of IMF—most of the time its Chairman tell the elected Parliament of the day that no relief in taxes can be given to the poor and salaried class due to conditions imposed by IMF! Interestingly, exemptions available in income tax, sales tax and customs duties to the foreign-funded IPPs were zealously guarded by IMF and the World Bank but similar exemptions to the Chinese-funded IPPs were forced to be withdrawn or modified. The case in point of that of Thar Coal Project under CPEC. The following observations, remarks, comments and conclusions in this saga of subservience to IMF and other foreign lenders reported in a newspaper story [Income Tax Bill 2021: Several exemption under CPEC to withdraw] are worth reading:

".....tax expert.....has said that the proposed Income Tax Amendment Bill 2021 submitted to the National Assembly has proposed to withdraw some existing and many futuristic exemptions under the China-Pakistan Economic Corridor (CPEC).

Speaking as a guest in "Paisa Bolta Hai" with Anjum Ibrahim on Aaj News, here on Sunday, Dr Haq explains that the exemption of Thar Coal project is proposed to be deleted under the said Bill. The proposed withdrawal of First Year Allowance in the Bill would hit many capital intensive industries, and many Chinese companies committed to come for many corporate-related benefits may reconsider their plans as initial depreciation on plant and machinery used for the first year has already curtailed to 50 percent. These actions will harm new industrial investment in Pakistan.

He stated that the government has retained exemption granted to the Chinese company operating in Gwadar, but the companies support to it will get no concession and pass the burden of the port operator. There was no need to bring a Bill effective from July 1, 2021 in March instead as part of the regular Annual Finance Bill along with the Budget for fiscal year 2021. The need for urgency is not understandable when the Bill has not to take effect immediately. No public debate and consultations are held with stakeholders likely to be affected by the proposed changes in the Bill.

This is undemocratic as well as against the spirit of the Constitution.....He stated that it is a matter of concern to withdraw exemptions granted to the successful Chinese projects. On the other hand, the income tax exemption available to the existing Independent Power Producers (IPPs) would continue and only new plants established after June 30, 2021 will be taxed.

He said that the government is continuing exemptions where they have their own interest, but some CPEC-related projects [considered as game changers] and also those to be executed on the basis of joint ventures between Chinese and local companies have been targeted. The sunrise industries with innovation, especially SMEs, are discouraged to earn billions of dollars through IT and IT-enabled exports due to cumbersome procedures.

He said that the government instead of giving relief to all industries and businesses, making them unviable to survive. Huge tax expenditure in income

[8] https://www.linkedin.com/pulse/imf-imposed-ordinance-exports-dr-ikram-ul-haq/, accessed at 13:05 on February 23, 2025

tax is due to enormous tax-free benefits to the big segments and not because of industries that are providing jobs even in difficult times.

International tax expert stated that it is a prior condition of the International Monetary Fund for release of US$500 million to withdraw tax exemptions and concessionary rates. The same could have been made part of regular budget exercise to determine their overall impact on the economy and challenges faced due to Covid-19 pandemic.[9]

The episode narrated above proves that the State of Pakistan has not only lost economic sovereignty, but has also miserably failed to fulfill its commitment to honor tax exemptions, promised to China, when IMF was not in the picture in 2013 at the time of establishing CPEC, till today labelled as "game changer" by our economic managers.

It is high time that elected members in Parliament take economy seriously and force the government of the day to devise a pragmatic plan and workable strategy through research and debate engaging local experts, think-tanks and institutes like Pakistan Institute of Development Economics (PIDE) to make the country self-reliant and to release itself from the clutches of IMF and others—their prescriptions are anti-growth and anti-people.

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[9] https://www.brecorder.com/news/40073516/income-tax-amendment-bill-2021-several-exemptions-under-cpec-proposed-to-withdraw-expert, accessed at 13:30 on February 23, 2024.

CPEC and Sustainable Development

Jazib Mumtaz

Since the introduction of the Open Door Policy, China has been on a steady path of economic growth while maintaining a peaceful approach toward other countries to avoid conflicts and strengthen its economy. This shift in China's global engagement, particularly with regional states, was driven by domestic political changes following Deng Xiaoping's leadership in the late 1970s. It also coincided with the emergence of the Complex Interdependence Theory, which emphasizes cooperation and economic ties over traditional power struggles. In contrast, the Mao era was marked by confrontation and conflict, both globally and regionally. China's involvement in the Korean War, the Vietnam War, border clashes with India and the Soviet Union, and its rivalry with the Western world reflected the Realist perspective in international relations, which views power struggles as the primary force in global politics. The Cold War period saw shifting alliances based on military strength, including the China-Pakistan alignment, which can be better understood through the Neo-realist approach that focuses on power and security.

However, in the post-Cold War era and especially in the 21st century, the China-Pakistan partnership has evolved beyond just defense and security. Their relationship now includes trade, investment, regional cooperation, and infrastructure development, reflecting the realities of globalization and economic interdependence. While security remains an important factor, the partnership now extends to multiple areas, shaping regional politics and contributing to China's peaceful rise. Researchers and analysts have explored various aspects of this strategic partnership, often interpreting it through different theoretical lenses. Their studies have deepened our understanding of not just China-Pakistan relations, but also China's broader role

in regional and global affairs. One of China's key long-term economic goals is to increase regional connectivity. To achieve this, it launched the Belt and Road Initiative (BRI), which aims to develop a network of overland corridors and maritime trade routes. This massive project spans 71 countries across Southeast Asia, Eastern Europe, and Africa, covering half of the world's population and contributing to a quarter of global GDP.

In South Asia, China and Pakistan's bilateral relationship has grown into a mutually interdependent partnership. A major part of this collaboration is the China-Pakistan Economic Corridor (CPEC), one of the flagship projects under BRI. The idea for CPEC was first conceived in the 1990s, but it took shape in 2003 following a joint declaration between China's President and Pakistan's then-President Pervez Musharraf. The relationship further strengthened in 2006, when China and Pakistan signed a Free Trade Agreement (FTA) during the Chinese President's visit to Islamabad. As a result of this agreement, bilateral trade grew significantly, increasing from $1 billion in 1998 to $15 billion in 2015. This surge in trade laid the foundation for CPEC, which has since become a cornerstone of economic cooperation between the two nations.

Pakistan is strategically located in South East Asia having China the second largest economy in the world on the north, India on the east, Iran and Afghanistan on the west. In the south lies the Arabian Sea which has a unique proximity with the Persian Gulf. This geostrategic location has compelled China to build a corridor from Gwadar port in the south to Kashgar in the north. China planned US$46billion worth investment to develop China Pakistan economic corridor CPEC as part of strategic partnership between the two countries. It is a long term plan having a time frame of 2014 – 2030, with its two necessary conditions of the Corridor – development of the port at Gwadar and creating surface transport connectivity among the city of Gwadar in southwestern Pakistan to China's northwestern autonomous region of Xinjiang.

The China-Pakistan Economic Corridor (CPEC) is a transformative initiative that goes beyond road construction, aiming to drive economic growth, infrastructure development, and social welfare in Pakistan. With significant investments in energy, transportation, Gwadar Port, and public welfare projects, CPEC is designed to improve living standards, reduce poverty, and enhance access to education and healthcare. The project allocates $34 billion to the energy sector, planning to generate 21,000 megawatts of electricity, which will help overcome power shortages and support industrial growth. Additionally, $12 billion is dedicated to infrastructure, transportation, and social development, ensuring better connectivity and boosting economic activity. One of CPEC's most impactful features is the establishment of Special Economic Zones (SEZs), which will create millions of jobs, improve vocational skills, and enhance productivity.

China's development model in Pakistan prioritizes human security, focusing on infrastructure, job creation, and social welfare. Investments in road networks and energy infrastructure will provide long-term industrial security and generate employment for the growing population. The expansion of road and rail networks from Gwadar to Gilgit-Baltistan will benefit remote areas by reducing transportation costs and travel time, making economic opportunities more accessible. CPEC also emphasizes health and education, including freshwater supply projects, a 50-bed Friendship Hospital in Gwadar, and a technical and vocational institute to equip people with necessary skills. These initiatives are particularly significant for underdeveloped regions, reducing economic disparities and improving livelihoods. In the long run, CPEC has the potential to reshape Pakistan's economy and society, ensuring sustainable development and human security. By addressing critical challenges such as energy shortages, unemployment, and regional inequality, the project paves the way for a more stable, prosperous, and self-sufficient Pakistan. Its multidimensional impact extends beyond economic growth, fostering a better quality of life and promoting long-term stability.

The 2008-09 financial crisis forced countries to launch development projects aimed at improving infrastructure and boosting economic demand. While some nations focused on domestic investments, others pursued regional connectivity through cross-border projects. Enhancing infrastructure in underdeveloped areas plays a crucial role in raising living standards and reducing poverty by providing easier access to markets and economic centers. For Pakistan, this objective is being fulfilled through the China-Pakistan Economic Corridor (CPEC), while for China, CPEC strengthens its position as a global economic power by securing trade routes and energy supplies.

CPEC involves an investment of $46 billion across energy, infrastructure, special economic zones, and social welfare projects. It is not just a road-building initiative but a comprehensive strategy to improve living standards, reduce poverty, and enhance access to education and healthcare. Research by Haq & Farooq (2016) highlights the social welfare impact of CPEC in three key areas: education (school enrollment), health (maternal and child care), and housing & water supply systems. The study suggests that improved connectivity and job creation will boost household incomes, leading to a 5.21% increase in social well-being at the national level. Provincial improvements are estimated at Balochistan

(6.4%), Sindh (6.31%), Khyber Pakhtunkhwa (5.19%), and Punjab (3.5%). In terms of specific welfare dimensions, education is expected to improve by 3.85%, health by 4.74%, and housing by 8.6%, with housing conditions showing the highest growth. Underdeveloped districts, particularly those along CPEC's western and central routes, are likely to see the greatest social and economic transformation. The project has the potential to bring significant economic growth, reduce regional disparities, and uplift local communities, making it a key driver of development in Pakistan.

The China-Pakistan Economic Corridor (CPEC) holds significant potential to drive both economic and social sustainability in Pakistan. Economically, it promises to enhance long-term growth by improving infrastructure, energy, and trade connectivity. With projects like the Gwadar Port, new roads, and rail networks, Pakistan can better link its industries to global markets, reducing trade costs and increasing exports. Energy projects under CPEC aim to address chronic power shortages, making industries more efficient and lowering production costs. The development of Special Economic Zones (SEZs) is another key component, attracting both domestic and foreign investments that generate jobs and foster industrial growth. On the social front, CPEC can uplift marginalized regions through job creation and poverty reduction. Improved infrastructure will enhance access to markets, education, and healthcare, especially in rural areas. Additionally, vocational training programs linked to CPEC projects will help develop the skills necessary for sustainable employment. The expansion of reliable energy access is expected to improve living standards and promote small businesses. While challenges such as debt management and environmental impacts remain, transparent governance and equitable resource distribution can ensure that CPEC's benefits are shared broadly. With the right approach, CPEC has the potential to become a cornerstone for Pakistan's sustainable development.

The China-Pakistan Economic Corridor (CPEC) has played a crucial role in supporting Pakistan's journey toward economic and social sustainability by addressing some of its most pressing challenges. Economically, CPEC has contributed to infrastructure development by building modern highways, railways, and the Gwadar Port, which have improved connectivity within Pakistan and with global markets. This enhanced infrastructure has facilitated trade, boosted industrial activity, and attracted foreign investments, particularly through Special Economic Zones (SEZs) that provide job opportunities and promote exports. CPEC has also addressed Pakistan's chronic energy shortages through its energy projects, adding thousands of megawatts to the national grid and ensuring reliable electricity for industries and households, fostering economic stability. On the social front, CPEC has improved the quality of life for millions of Pakistanis by creating jobs, reducing poverty, and developing rural and underserved areas. Enhanced transportation networks have connected remote regions to markets, education, and healthcare, reducing regional inequalities. Furthermore, skill development programs tied to CPEC projects have empowered the local workforce, while increased energy access has enabled small businesses and improved household living standards. By tackling both economic and social challenges, CPEC has become a transformative initiative that has laid the foundation for sustainable growth and development in Pakistan.

The China-Pakistan Economic Corridor (CPEC) has delivered tangible benefits to the people of Pakistan over the past decade. According to CPEC Joint Cooperation Committee, one significant achievement is the creation of approximately 192,000 direct jobs across various sectors, providing livelihoods and reducing unemployment. Infrastructure developments, such as the construction of highways, ports, and energy facilities, have enhanced transportation and energy efficiency, facilitating trade and improving daily life for millions.A notable example is the Quaid-e-Azam Solar Power Park in Bahawalpur, which, as the largest solar power plant in Pakistan, has not only generated employment but also supplied clean and reliable energy to the national grid. These initiatives have collectively contributed to economic growth and improved living standards, underscoring CPEC's role in fostering sustainable development in Pakistan. CPEC has supported environmental sustainability in Pakistan through various initiatives focused on renewable energy and eco-friendly development. A key example is the development of renewable energy projects, such as the Quaid-e-Azam Solar Power Park in Bahawalpur, which is Pakistan's largest solar power plant. This project helps reduce the country's reliance on fossil fuels, contributing to lower carbon emissions and promoting clean energy usage. Similarly, several wind and hydropower projects under CPEC have been launched to diversify the country's energy mix and reduce environmental impacts. CPEC's infrastructure projects have also integrated environmentally conscious planning, with some initiatives incorporating green technologies and energy-efficient practices. Additionally, improved transportation networks have the potential to reduce fuel consumption and carbon emissions by streamlining travel and trade routes. As CPEC expands, there is a growing focus on environmental sustainability measures to mitigate the impact of development, ensuring that economic progress is aligned with long-term environmental goals for Pakistan.

Sustainable development has become major objectives of various countries in the current millennium. Infrastructure and transportation plays an important role in the development process. It contributes in the social uplift of the society which leads to stability and

REFERENCES

Ahmed, Z., & Mustafa, G. (2020). CPEC: A Catalyst for Pakistan's Economic and Social Transformation. South Asian Studies, 35(1), 1-20.

Ali, S., & Yousaf, I. (2019). China-Pakistan Economic Corridor and Its Environmental Implications. Pakistan Development Review, 58(3), 275-290.

Avery, Goldstein, "Rising to the Challenge: China's Grand Strategy and International Security", Stanford. CA: Stanford University, 2005

China's place in Global politics: International, Regional and Domestic Challenges, Editors Kjeld

China-Pakistan Economic Corridor (CPEC) Official Website: CPEC Official

China-South Asia: Issues, Equations, policies by Dr. Swaran Singh. Lancers Books: New Delhi. 2008

Chung Chien Peng, "The Shanghai Co-operation Organization: China's Changing Influence in Central Asia", The China Quarterly (2004): 991.

Hussain, M. (2018). China-Pakistan Economic Corridor: A Game Changer. Institute of Strategic Studies Islamabad (ISSI).

Institute of Strategic Studies Islamabad (ISSI) Reports:

Ramay, Shakeel (2023) 10 Years of CPEC: Success and Challenges: The NEWS

Shaikh, F. M., & Ji, Q. (2020). Energy and Economic Cooperation Under the CPEC: Opportunities and Challenges. Energy Policy, 142.

Wolf, S. O. (2019). The China-Pakistan Economic Corridor of the Belt and Road Initiative: Concept, Context and Assessment. Springer.

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AGRICULTURE & ENVIRONMENT

Punjab's Strategy for CPEC for Development of Agriculture Sector – The Urban Unit

Dr. Azeem Sardar, Ahmad Bilal, Iqra Akram, Sundas Hassan, Khurram Afzal Malik

OVERVIEW

The agriculture sector is a cornerstone of Pakistan's economy, contributing approximately 24% to the national GDP and employing about 37.4% of the total labor force during the 2023-24 fiscal year (Government of Pakistan, 2024). In the same period, the sector experienced significant growth, registering a 6.3% increase compared to 2.3% the previous year, driven by healthy growth in important crops (Government of Pakistan, 2024).

Punjab plays a pivotal role in this sector, accounting for about 54.2% of the national GDP and engaging approximately 25% of its labor force in agriculture and allied activities (Punjab Growth Strategy 2023, GoP). Notably, agriculture-based products constitute around three-fourths of the country's total exports, with Punjab contributing about 60% of this share (Punjab Growth Strategy 2023). The Punjab Growth Strategy 2023 emphasizes that a

1% growth in the agriculture sector leads directly and indirectly to over 0.4% growth in the overall economy of Punjab (Punjab Growth Strategy, 2023).

Enhancing agricultural productivity is essential for sustainable economic growth, poverty alleviation, and food security in Pakistan. Punjab holds significant potential for development and value addition in cropping systems, aiming to improve rural household incomes and livelihoods. Leveraging opportunities under the China-Pakistan Economic Corridor (CPEC), Punjab GDP can be increased from $33 billion to $100 billion making a significant development in this sector (Punjab Growth Strategy, 2023).

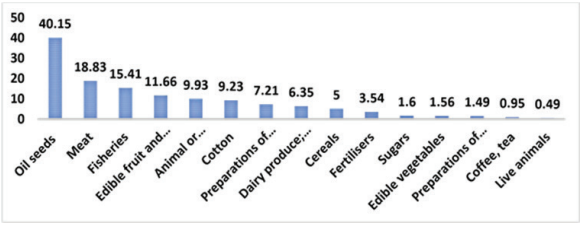
While China's agricultural import landscape is diverse, encompassing a wide range of products to meet its domestic demand. In 2023, China's total agricultural imports were valued at approximately $234.1 billion USD, with the highest chunk of imports consisting of soybeans and oilseeds, i.e., 52.93%, followed by 13.4% of agricultural and food imports such as cotton, wool and fibers, reflecting a slight decrease of 0.3% from the previous year (Ministry of Agriculture and Rural Affairs, 2024). The import composition includes:

- Soybeans and Oilseeds: These constitute the largest share, driven by the need for animal feed and edible oils.
- Cotton, Wool, and Fibers: Essential for the textile industry, these imports support China's significant manufacturing sector.
- **Fats and Oils:** Including palm oil and other vegetable oils, these are crucial for both industrial use and food processing.
- Meat and Dairy Products: To meet the rising consumer demand for protein, China imports substantial quantities of beef, pork, and dairy goods.

The proximity of trading partners plays a vital role in China's import strategy, especially for perishable goods. Shorter distances reduce shipping costs and minimize the risk of spoilage, making trade with neighboring countries more favorable. Longer distances not only increase transportation costs but also necessitate additional measures such as enhanced preservation techniques and the use of pesticides to extend shelf life, which can impact the quality and safety of food products.

Understanding these dynamics is crucial for countries aiming to engage with China in agricultural trade, as factors like product type, shelf life, and logistical considerations significantly influence trade feasibility and competitiveness.

Graph 1. China's Agricultural Imports



China's overall agricultural exports are worth USD 98.9 billion, the biggest chunk lies with cotton contributing 17%, followed by fishing, vegetables, meat preparations and vegetable preparations contributing 15%, 13%, 12% and 10% respectively. This shows that in these goods, China has the technologies that can be traded with China to grow these products and their supply chain to raise exports from Pakistan.

Graph 2. China's Agricultural Exports (USD 84 Billion)

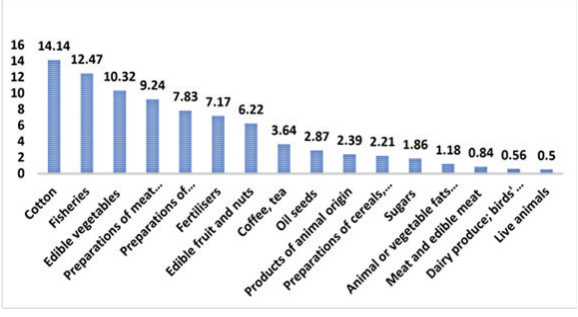
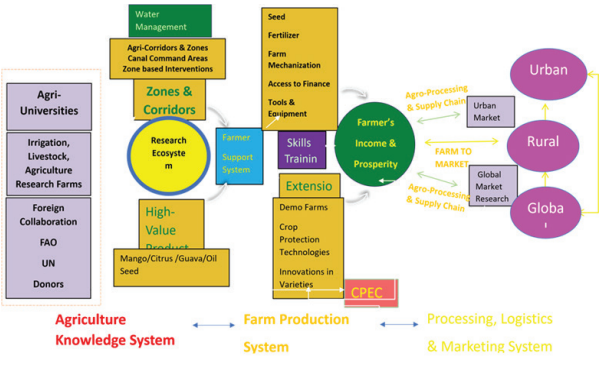


Figure 1. Knowledge Base Economy & CPEC



The figure 1 illustrates an integrated agricultural framework where research, farm production, and market linkages work together to enhance farm-

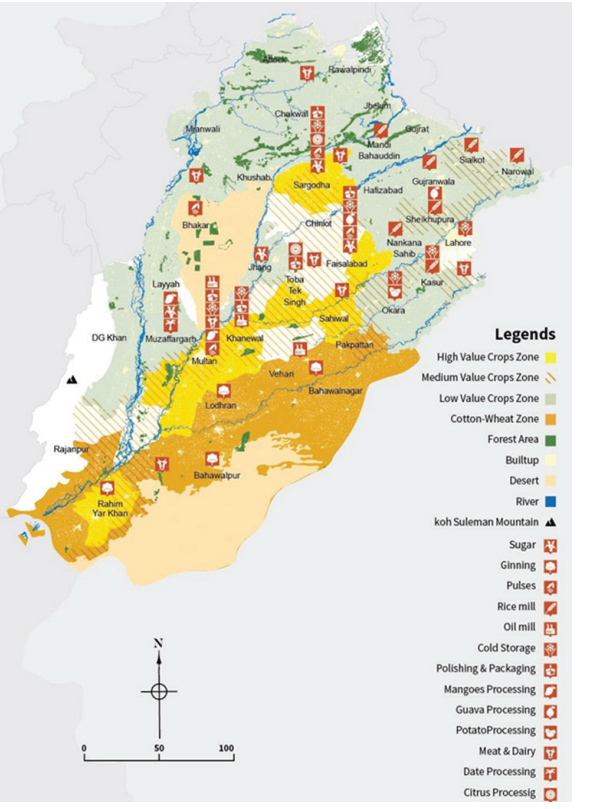
https://finance.gov.pk/survey/chapter_24/2_agriculture.pdf:

ers' income and prosperity. It highlights the role of agri-universities, research institutions, farmer support systems, and CPEC in strengthening agricultural value chains through modern techniques, financial access, and global market connections. The integration of these components is crucial for transforming Punjab's agriculture sector into a more efficient and globally competitive industry. Punjab, as Pakistan's agricultural backbone, can benefit immensely from agri-universities, research collaborations, and extension services, which introduce innovative farming techniques, high-yield crops, and sustainable irrigation methods. By utilizing agriculture zones, mechanization, and financial support, farmers can enhance productivity and resilience against climate change. CPEC's role in infrastructure development, agro-processing, and trade connectivity further strengthens Punjab's agriculture by linking rural farmers with national and international markets. This integration ensures higher farmer incomes, reduced post-harvest losses, improved food security, and a stronger export-oriented agricultural economy, making it essential for Punjab's long-term economic growth and sustainability.

KEY CHALLENGES

Agriculture sector of the province faces the following key challenges through Transfer of Technology, Equipment, Partnership, and R&D to increase productivity, competitiveness & export and reduce cost of production with financial supports in terms of grants, loan, PPP, and JVs.

Figure 2. Potential Agriculture Crops Zone



(B2B. G2G, B2G)

Inputs: Limited access to quality agriculture inputs	Diversification: Low diversification in the production and processing	Value Addition: Limited processing, storage and logistic capacity
Markets: Inefficient agriculture markets and operating framework	Natural Resources: Poor practices depleting natural resources (land and water)	Human Capital: Inadequate investment in human capital and archive farm methods/techniques
	Small Holding: Less focus on export & foreign markets due to scalability issues	

The map (Figure 2) illustrates the high-value crop zones in Punjab, highlighting distinct agricultural regions based on crop suitability. In Northern Punjab, the districts of Attock, Rawalpindi, and Chakwal are well-suited for a mix of olives, grapes, pulses, and groundnuts. The Western Zone, encompassing Gujrat, Narowal, and Gujranwala, is classified as a vegetable and rice zone due to its fertile land. Central Punjab, including Sargodha, Chiniot, and Mandi Bahauddin, is recognized as a citrus-producing region. In the South-Western Zone, districts such as Multan, Khanewal, and Muzaffargarh form a mango, date, and vegetable cluster. The Eastern Zone, comprising Bhakkar, Layyah, and Dera Ghazi Khan, is favorable for pulses, barley, and dates. Finally, the Southern region, including Bahawalpur, Rahim Yar Khan, Bahawalnagar, and Rajanpur, is identified as a cotton, oilseed, and sugarcane zone. These agricultural zones are classified based on comparative advantages in yield, production capacity, and agro-ecological conditions.

This strategic zoning is essential for aligning CPEC investments with Punjab's agricultural strengths, ensuring targeted infrastructure, value chain development, and export-oriented growth. By directing Chinese investment into these specialized zones, Pakistan can enhance productivity, modernize processing facilities, and strengthen trade linkages, maximizing the economic benefits of CPEC in the agricultural sector.

PLANNING FOR CPEC

- Collaboration in area where Chinese agriculture is advanced for technical assistance & technological transfer
- A comprehensive examination of the export basket of Pakistan and the import basket of China should be undertaken to identify promising agriculture and agro-processed products that offer opportunities to increase and diversify Pakistan's exports to China
- Planning the CPEC – an iterative approach

KEY AREAS OF INTERVENTION FOR CPEC

- Strengthening and upgrading of agricultural infrastructure adjoining the route of CPEC.
- Construction of water resources and water-saving modern agricultural demonstration zones
- Technical exchange and cooperation in fields such as crop seed reproduction, livestock and poultry breeding, breeding and production technology, agricultural products processing, animal & plant epidemic prevention & control, mechanization demonstration and ICT-enabled agriculture
- Collaboration in medicines and vaccines for horticulture, fisheries and livestock
- Reinforcement of R&D in view of latest agriculture practices, mechanization, hybrid varieties and value addition
- Improvement of post-harvest handling, storage and transportation of agricultural products and innovation of advanced marketing and sales models

STRATEGIC DIRECTION

The aim of cooperation in agriculture development and poverty alleviation is to reinforce and improve the agricultural infrastructure and knowledge exchange. The construction of water resources and modern agricultural areas will be encouraged and medium and low fertile lands will be restored for efficient use of resources. Technical exchange and cooperation in areas such as crop seed production, production technology, agricultural processing, prevention and control of animal and plant epidemics, mechanization demonstration and ICT-enabled agriculture will be enhanced under the CPEC.

They key strategies and policies set following strategic directions for agricultural development:

CPEC Long Term Plan 2030

CPEC LTP aims to strengthen agricultural infrastructure and play key role in agricultural personnel training, technical exchanges and cooperation. It promotes cooperation in areas such as biological breeding, production, processing, storage and transportation, infrastructure construction, disease prevention and control, water resources utilization, conservation and production, land development and remediation, ICT-enabled agriculture and marketing of agricultural products to promote the systematic, large-scale, standardized and intensified construction of the agricultural industry.

Punjab Growth Strategy 2023

Cornerstone of the growth strategy is to accelerate the growth of agriculture from about 2% in the last

five years to between 3.5% to 4 % in the next five years. The strategy contains specific initiatives like achieving greater efficiency in the utilization of water resources and other inputs, enhancing the quality and access of agriculture research and transforming, cropping pattern based on changed climatic profile and improving productivity yields in key agricultural zones.

Punjab Spatial Strategy 2047

PSS focuses on development of competitive crop areas for investment mobilization. It emphasizes to improve existing cropping patterns to draw maximum benefit from land. Efficient land use can be ensured by improving the value of produce per unit of land, as well as by making more land arable. Identifies high value cropping zones that can lead to maximizing yield per area of land utilized by providing integrated support system in agriculture cluster

Punjab Agriculture Policy 2018

Agriculture Department aims to enhance competitive position of agriculture sector in line with global and domestic market demands, utilizing benefits from increasing food production (improving food quantity, quality and nutrition diversity through higher yields and better crop mix). Increasing farmer profitability to raise living standards of the farming families, with increased participation of rural women and youth. Conserving agricultural resources with efficient use of land, water and labor deployed for agriculture. Enhancing sustainability and resilience in the wake of climate changes.

KEY OBJECTIVES OF STRATEGY

Government of the Punjab aims to develop vibrant and outward looking agriculture sector under CPEC through promoting sustainable development, advancement in technology and overall improving the quality of life. The objective is to induce growth in the cropping sector by enhancing productivity, improving farmer profitability, encouraging diversification, increasing market and trade competitiveness, fostering encouraging private investment, and by improving the supply-chain mechanism under CPEC.

The key objectives of the strategy are as follows:

1. Enhance the competitive position of agriculture sector to capture global demand and cater to domestic demand through the modernization of traditional agriculture practice.

2. Ensure food security by improving food quantity, quality and nutrition diversity through higher yields and better crop mix and also increasing farmer profitability.

3. Enhance sustainability and resilience in the wake of climate changes by conserving agricultural resources through efficient use of land & water.

4. Strengthen and promote private sector participation in agriculture value chains with increased investment, technology infusion and resource management

STRATEGY INTERVENTIONS

In the short-term, the focus of strategy would be on fruit & vegetable and selected major crops. In medium and long-term, other important crops (horticulture and other products like oilseed, fodder, pulses etc.) will also be explored. These systems are also in line with the FTA II signed between China & Pakistan.

The CPEC Strategy intervention is comprised of five important pillars for agriculture that aim to boost productivity, competitiveness, and exports while lowering production costs through short-, medium-, and long-term initiatives.

Pillar I

- Input Quality & Availability

Pillar II

- Production Infrastructure Development

Pillar III

- Farmer Mechanization

Pillar IV

- Technological Development

Pillar V

- Bilateral Investment & Trade

The five pillars of agricultural development are structured into short-term, medium-term, and long-term strategies to ensure a sustainable and progressive transformation of the sector.

Under Pillar I: Input Quality & Availability, the focus is on improving the quality of agricultural inputs such as seeds, fertilizers, pesticides, and weedicides

while ensuring efficient resource utilization. In the short term, this includes the production of certified seeds and the establishment of fertilizer and pesticide production facilities. Medium-term goals emphasize the acquisition and exchange of high-yielding varieties and the introduction of water-efficient technologies. In the long term, hybrid and certified new varieties will be developed based on agro-ecological conditions, along with the integration of bio-fertilizers and microbial pesticides for sustainable agriculture.

Pillar II: Production Infrastructure Development aims to enhance farmers' income by promoting highly profitable cropping patterns. Short-term strategies focus on strengthening and developing crop value chains by establishing clusters and initiating bilateral exchange programs to create model farms. In the medium term, the development of value chains for high-value crops will be prioritized through technology transfer and extension services, with incentives for cooperative farming. The long-term vision includes the development of modern agricultural infrastructure, state-of-the-art extension services, training centers in Punjab, and the promotion of corporate farming.

Pillar III: Farmer Mechanization seeks to reduce production costs by upgrading mechanization levels. In the short term, subsidies will be provided for the import of agricultural machinery, along with the establishment of mechanization service centers. Medium-term actions include the development of SMEs for agricultural machinery manufacturing and repair. In the long term, hi-tech agricultural machinery manufacturing facilities will be established along CPEC routes in collaboration with the private sector in Punjab.

Pillar IV: Technological Development emphasizes the advancement of technology in agriculture through R&D collaboration and technology transfer. Short-term initiatives include the establishment of oil technology laboratories, a joint Pak-China cotton laboratory, and cooperation with industry and institutions for research and training. In the medium term, research departments within the Punjab agricultural sector and universities will be strengthened, and an International Seed Testing Association (ISTA)-accredited seed certification facility will be set up. Financial support will be arranged through China EXIM Bank and SBP for clean technologies, while joint ventures in processing and mechanization technology will help reduce postharvest losses. Long-term strategies focus on modernizing agriculture through artificial intelligence, network-based systems, intelligent prediction models, and climate-smart agricultural R&D, along with improvements in soil structure through advanced scientific techniques.

Pillar V: Bilateral Investment & Trade focuses on developing product value chains under CPEC to enhance global trade opportunities. Short-term plans include attracting Chinese investment in processing and value addition industries along the CPEC route and establishing a business-to-business (B2B) collaboration platform for bilateral trade. In the medium term, efforts will be made to encourage more companies to engage in B2B collaborations for fruits and vegetables. The long-term goal is to enhance cooperation between industries and institutions for research, development, training, and technology transfer, ultimately improving agricultural processes and value addition.

These pillars collectively aim to modernize agriculture, improve productivity, and enhance farmers' livelihoods through strategic interventions across different time frames.

REFERENCES

Government of Pakistan. (2024). Economic Survey of Pakistan 2023-24. Ministry of Finance. Retrieved from https://www.finance.gov.pk/survey/chapter_24/Highlights.pdf

Gop. Punjab Growth Strategy 2023. Retrieved from https://punjab.gov.pk/system/files/PGS_2023.pdf

Ministry of Agriculture and Rural Affairs. (2024). China's foreign trade of agricultural products stable in 2023. Retrieved from https://english.www.gov.cn/archive/statistics/202401/29/content_WS65b7a274c6d0868f4e8e399c.html

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Punjab's Strategic Approach to CPEC for Livestock Sector Development – The Urban Unit

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OVERVIEW

The livestock sector in Pakistan has demonstrated consistent growth, significantly contributing to both the agricultural economy and the national GDP. In the fiscal year 2023-24, livestock accounted for 60.84% of the agricultural sector's value addition and 14.63% of the overall GDP, marking a growth rate of 3.89% from the previous year (Finance Division, 2024). The gross value addition of the livestock sector increased from Rs5,587 billion in 2022-23 to Rs5,804 billion in 2023-24 (Finance Division, 2024).

Punjab, the largest province, continues to house the majority of the livestock population. The sector not only supports agriculture but also underpins related industries such as meat and dairy processing, leather production, tanneries, and various wholesale and retail sub-sectors. Despite its substantial economic

contribution, the livestock sector has not reached its full potential. Challenges persist, including suboptimal productivity, inadequate preventive health measures, and quality standards that fall short of global benchmarks. These issues are attributed to genetic limitations of local breeds and broader market distortions.

The Economic Survey of 2022-23 highlighted discrepancies in livestock data, primarily due to reliance on outdated census figures from 2006. For instance, while Punjab's cattle population was reported at 14.9 million in 2018, estimates for 2022-23 surged to 27.3 million, indicating significant data inconsistencies. An accurate and up-to-date livestock census is essential for informed policymaking and sustainable sector growth.

To address these challenges, it is imperative for the government to focus on developing the animal by-product industry. This includes enhancing tanneries, improving the processing and packaging of offal, hooves, horns, and blood, and adding value to milk and meat products. Establishing robust business linkages among stakeholders across the supply chain can serve as a catalyst for improved productivity and increased exports. Given the livestock sector's significant share in both national and provincial GDP, along with its diverse export potential—particularly in halal meat—it is crucial to prioritize its development, a facet that has historically been overlooked.

TRADE INVESTMENT SCENARIO

China's agricultural trade experienced a 6.8% year-on-year decline in the first half of 2024, totaling $158.0 billion. However, exports saw a modest increase of 2.0% during the same period (Ministry of Agriculture and Rural Affairs of China, 2024). In contrast, Pakistan's food group exports surged by 44.77% in July 2024, reaching $475.767 million compared to $328.632 million in July 2023 (Pakistan Today, 2024). Notably, meat and meat preparation exports grew by 23.65%, amounting to $511.688 million in the fiscal year 2023-24, up from $425.605 million the previous year (Pakistan Business Council, 2024).

China remains a significant importer of agricultural products, with imports valued at approximately $234.1 billion in 2023 (Statista, 2024). This presents a substantial opportunity for Pakistan to enhance its meat and dairy exports. Collaborating with China to adopt advanced meat and dairy processing technologies could add value to Pakistan's livestock products, making them more competitive in the Chinese market. Furthermore, China's investments in agriculture, forestry, and fisheries have been substantial, with overseas investments valued at $26 billion in 2016. These investments span livestock farming, fishing, processing, farm machinery, inputs, seeds, and logistics (Ministry of Agriculture and Rural Affairs of China, 2016). Engaging with Chinese enterprises could provide Pakistan with access to capital, technology, and expertise, fostering growth in its livestock sector.

By leveraging China's technological advancements and investment potential, Pakistan can enhance the value addition of its livestock products, thereby increasing exports and contributing to economic growth.

KEY OBJECTIVES

The strategy is drawn from the 3 key objectives of livestock sector to reap maximum benefits from CPEC:

- Contribute towards poverty alleviation and economic development of the province through provision of an enabling environment and support services in the livestock sector through collaboration with China.
- Exponential increase in yield of livestock products by introducing modern production mechanisms, disease prevention and providing high quality nutritional feed.
- Incorporating modern processing technologies to move towards high value-added meat and dairy products and increasing exports by better orientation of livestock products

KEY CHALLENGES

Sector major challenge are reluctant attitude towards adoption of innovations, out-dated mechanization practices, low productivity per animal, poor & expensive transportation system, less focus on commercialization & industrial approach, capacity building of farmers, veterinary institutes, missing of integrated approach between industry, field & research, absence of need base R&D, inadequate availability of credit to farmers particularly small farmers and salient issues/ challenges are deliberated in detail below:

- **Low productivity:** Although Punjab is a major producer of livestock products, the average productivity of livestock is much lower as compared to world average due to inadequate availability of feed and fodder, poor breeding practices, poor management, poor husbandry practices, animal diseases, etc.

- **Low quality feed, fodder and scarcity of minerals, nutrients and quality water:** The gap between the requirement and availability of quality feed and fodder for livestock is increasing day by day.
- **Poor disease control, diagnostics, surveillance infrastructure:** The preventable diseases of animals in Punjab are causing a huge economic loss in terms of is in billions of rupees. The FMD alone causes loss of Rs. 8 billion in a year.
- **Shortage of vaccines:** The shortage of vaccine is a major impediment to move towards eliminating the preventable diseases; to minimize the economic losses of diseases and to gain access to high-end export markets.
- **The poor breeding services and genetic upheaval:** The breeding services despite consuming major chunk of the budget did not produce desired result due to absence of a direction and linkage of breeding activities and goals with holistic development of the livestock sector.
- **Lack of demand driven applied research and underdeveloped extension services:** There is state of the art laboratories with equipment, chemicals, kits and trained HR form best institutions of the world but they could not contribute to the sector as per their capabilities, the reason behind that is the extension workers are mostly ill-motivated with little incentive to work and bring about the change.
- **Poor value chains and lack of value addition:** Currently, there is no value chain developed in the province. The contribution of the corporate sector is very restricted in the livestock sector, which is almost 1%. Whereas, the contribution of the commercial sector in the livestock sector is around 4%, due to this poor value chain linkages, there is no value addition and processing of the meat and dairy products as per the full potential
- **Market distortions and no farm gate pricing:** Currently, markets are not perfect and not playing their role. Middlemen (milkman and corporate milk collectors) exploit the livestock producers by charging lower and differentiated prices from different areas.
- **Lack of institutional coordination and overlapping mandates:** There is a lack of coherent livestock policy for the province and no coordination or collaboration mechanism for overlapping role of the institutions.
- **Lack of bank credit for livestock:** Bank loans to the agriculture sector have been on a rise for some years. However, only a fraction of the said lending i.e., just 7% was given to the livestock sector even though livestock contributes 58% of agriculture sector

KEY POLICY INTERVENTIONS

A multiple-approach strategy needs to be adopted for defining strategic interventions, focusing on collaboration in areas where Chinese livestock practices are more advanced to facilitate technological transfer. Additionally, a comprehensive examination of Pakistan's export basket and China's import basket needs to be undertaken to identify promising livestock and livestock-processed products that offer opportunities for increasing and diversifying Pakistan's exports to China and other global markets. Using these multiple approaches, the following strategic framework needs to be defined.

Pillar I: Enhancing Yield and Genetic Improvement

To meet the growing demand for high-quality livestock products, improving yield needs to be a priority. In the short term, modern breeding techniques need to be introduced to enhance productivity, including the expansion of artificial insemination facilities in collaboration with China. As part of the medium-term strategy, the production of high-quality semen needs to be increased, and indigenous breeds need to be improved using advanced reproductive technologies such as in vitro fertilization (IVF). In the long run, efforts need to be focused on developing exotic meat breeds that meet global standards and enhancing the productivity of local breeds through partnerships with international research institutes.

Pillar II: Advancing Nutrition and Disease Prevention

A well-nourished and disease-free livestock population is essential for sustainable growth. The short-term focus needs to be on improving animal nutrition through advanced fodder technologies like silage production, alongside the establishment of Disease-Free Zones and a Foot and Mouth Disease (FMD) vaccine production unit. Moving forward, medium-term strategies need to include upgrading animal diagnostic laboratories, identifying disease-free zones, and establishing modern fodder production units in collaboration with Chinese experts. The long-term vision needs to be the development of a specialized research institute for livestock nutrition and forage research, the creation of a centralized database for animal identification and health monitoring, and the full implementation of disease-free zones to facilitate safer livestock trade.

Pillar III: Strengthening Extension Services for Farmers

For a successful transformation of the livestock sector, extension services need to evolve to integrate modern technology and knowledge-sharing mechanisms. In the short term, innovative approaches need to be adopted to provide farmers with the necessary knowledge to improve production and disease management. Medium-term objectives need to focus on capacity-building programs for extension staff, training them as master trainers, and establishing bilateral knowledge exchange initiatives. In the long run, the approach needs to be further strengthened by upscaling technical expertise within the Livestock and Dairy Development (L&DD) department and implementing the "Whole Family Extension Approach," ensuring uniform awareness and adoption of best practices among livestock breeders.

Pillar IV: Driving Technological Development

The modernization of the livestock sector requires continuous technological advancements. In the short term, research and development (R&D) institutes need to be established to attract large-scale investments in vaccine production, fodder processing, semen production, and drug development. Medium-term efforts need to focus on setting up a quality examination and standardization center in collaboration with China and exchanging technology to enhance value addition for dairy and meat exports. Over the long term, dedicated R&D centers need to be developed to introduce new livestock breeds and improved forage varieties, ensuring that the sector remains innovative and globally competitive.

Pillar V: Boosting Bilateral Investment and Trade

Investment and trade are key drivers of economic growth in the livestock industry. In the short term, a business-friendly environment needs to be created to encourage business-to-business (B2B) collaborations between local and Chinese companies, particularly in livestock product value addition. In the medium term, incentives need to be introduced to promote the establishment of meat and dairy processing units within Special Economic Zones (SEZs), while streamlined one-window operations need to be implemented to facilitate smoother business transactions. The long-term strategy needs to be focused on ensuring that meat and dairy products meet international certification standards, enhancing collaboration between industries and institutions for research and technology transfer, and improving production efficiency to meet global trade demands.

REFERENCES

Ministry of Agriculture and Rural Affairs of China. (2024). China's agricultural trade statistics, 2024. Retrieved from https://www.mczx.agri.cn/mczx_en/Statistics/202407/t20240726_8656050.htm

Finance Division. (2024). Pakistan Economic Survey 2023-24. Islamabad: Government of Pakistan. Retrieved from https://www.finance.gov.pk/survey/chapter_24/Economic_Survey_2023_24.pdf

Pakistan Business Council. (2024). Pakistan's trade in goods data FY24 vs. FY23. Retrieved from https://www.pbc.org.pk/wp-content/uploads/Pakistans-Trade-in-Goods-Data-FY24-Vs.-FY23.pdf

Pakistan Today. (2024). Pakistan's food exports surge by 45% to $476 million in July 2024. Retrieved from https://profit.pakistantoday.com.pk/2024/08/16/pakistans-food-exports-surge-by-45-to-476-million-in-july-2024/

Statista. (2024). China agricultural products trade growth rates 2023. Retrieved from https://www.statista.com/statistics/1300634/china-agricultural-products-trade-growth-rates/

Ministry of Agriculture and Rural Affairs of China. (2016). China's overseas investments in agriculture, forestry, and fisheries. Retrieved from https://www.moa.gov.cn/

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CPEC 2.0 as a Corridor of Innovation: Revolutionizing Agriculture Through China's 5C Vision

Moaaz Manzoor

INTRODUCTION

The China-Pakistan Economic Corridor (CPEC) has been a cornerstone of Pakistan's economic strategy since its launch in 2015. What began as a beacon of infrastructure and energy project development has now entered the pivotal phase of CPEC 2.0. Pakistan again stands at the cusp of an opportunity to convert CPEC into a corridor of innovation, with sustainability, new collaboration, and economic diversification as its main tenants. Among the sectors poised to benefit the most via this corridor of innovation is the agriculture sector, which holds untapped potential. By aligning CPEC 2.0 vision of the 5Es framework that is exports, e-Pakistan, environment and climate change, energy and infrastructure, and equity and empowerment with China's "5C Corridor" for growth, better life, innovation, green development, and openness (The Express Tribune, 2024)—Pakistan can transform its agriculture and many other sectors, unlocking new growth opportunities.

Agriculture is the backbone of Pakistan's economy, and in the previous Fiscal year of 2024, it was the main contributor to growth as it grew by 6.25% and saw a 16.82% increase in key crops like wheat, rice, and cotton production (Government of Pakistan, Ministry of Finance, 2024). Nonetheless, the sector is under the malaise of low productivity, outdated practices, and inefficiencies. Now, as a new era in CPEC begins, Pakistan must innovatively untap its potential to modernize its stagnating agriculture sector, making it more productive, sustainable, and globally competitive. This article explores how CPEC 2.0, in tandem with China's 5C Corridor, can revolutionize and address many challenges to Pakistan's agriculture sector to make the vision of a prosperous and food secure Pakistan into reality.

AGRICULTURE IN CPEC 2.0: A SECTOR READY FOR TRANSFORMATION

Looking at Pakistan's agricultural sector, one can say that it is an enigma. Like, it has undoubtedly been an

important engine of economic growth, ensured food security, and helped garner important export earnings up to $8bn in FY24, which is 37pc higher than last year[1].

Similarly, it remains the backbone of Pakistan's economy, contributing 24% to GDP and employing 37.4% of the labor force (Urban Unit, 2024). Conversely, it is also true that this sector is ridden with the plague of inefficiencies, water scarcity, outdated farming techniques, and post-harvest losses of up to 40% annually (Amin, 2024). In its latest monetary policy Statement, the State Bank of Pakistan (SBP) has raised concerns about the weakening outlook for the agriculture sector in the FY-25 (State Bank of Pakistan, 2025). Farmers in Pakistan still rely on traditional indigenous methods in this gilded age of artificial general intelligence, satellite imaging, Internet of Things (IoT) sensors, and big data. Thus resulting in low yields and high post-harvest losses. In this context, CPEC 2.0 can be a beacon in addressing these challenges. With China being the world's largest agriculture consumer market and possessing cutting-edge expertise, technology, satellite imaging, drones, AI-based monitoring, high-yield seeds, and solar-powered irrigation—Pakistan can increase crop yields by 20-30%(McCabe, n.d). Pakistan's wheat productivity currently stands at 2.8 tons per hectare, compared to China's 5.3 tons (Rose, 2024). With China's expertise and linking its **Smart Agriculture Action Plan 2024-2028 with** CPEC 2.0, a strategic foundation can be established to modernize Pakistan's dilapidated agriculture sector. Similarly, the focus should not be only on increasing yield but also on optimizing storage systems and halting the conversion of agricultural land into housing schemes. The writing is on the wall for Pakistan as this strategic shift is crucial for Pakistan to move from being a raw commodity exporter to a value-added agricultural powerhouse in South Asia.

DRIVING AGRICULTURAL GROWTH THROUGH INNOVATION AND TRADE

The Growth and Openness pillars of China's 5C framework align with Pakistan's Export and Economy goals. Pakistan's agricultural exports, currently valued at $5 billion annually, have the potential to double to $20 billion through value addition and market expansion (Nazir & Shuhua, 2023). By developing cold storage chains, modern silos, and high-tech processing plants, Pakistan can move beyond exporting raw agricultural products to processed foods, frozen fruits, dairy products, and halal meat, capturing a larger share of the $3 trillion global food trade.

China presents a golden opportunity for Pakistan with its $250 billion food import market. By providing better logistics, reduced customs barriers, and improved certification processes under the China-Pakistan Agricultural Cooperation, Pakistan can establish agro-industrial parks, similar to China's successful Yangling Agricultural High-tech Zone. Initiatives like these will create food processing and agribusiness innovation hubs across Pakistan (AQin & Li, 2024). Likewise, digital agriculture, as evidenced by China's Rural Taobao initiative, which substantially increased rural incomes, can be replicated in Pakistan through e-commerce platforms connecting farmers directly to urban and international markets, reducing middlemen, increasing farm profitability, and improving consumer access to fresh produce. Agreements like China's Litong Foods and Pakistan's Guard Agricultural Research & Services in 2023 offer collaboration potential investment opportunities in chili export. Likewise, numerous protocols like Dairy Products, Hides of Donkey, and Heated beef protocols have been formulated under the B2B framework. Also, Pakistan must leverage from China's agriculture growth strategy (2015-2030) and strengthen its interest in gaining scientific and technological support for an agricultural revolution that primarily ensures food security for both nations.

INDUSTRIALIZATION AND ENERGY: A CATALYST FOR GROWTH

The agro-industrial growth can give impetus to various connected manufacturing, logistics, and energy sectors. Establishing food processing zones along the CPEC route could add $ billion annually to Pakistan's economy while creating millions of jobs. Pakistan's agri-based industries—such as textile (which contributes 60% of exports), dairy, and leather—can benefit from modernized supply chains and Chinese investment in automation and quality control.

Similarly, in a dilapidated state, the energy sector costs the nation around 5.1% of its GDP each year (Kiani, 2024). To address this challenge, renewable energy solutions must be incorporated into both the agricultural and industrial sectors, which will address energy needs and pave the way for sustainable economic advancement. By leveraging solar-powered irrigation, wind-driven irrigation systems, and biogas plants, Pakistan can cut massive energy costs while ensuring continuous power supply to agro-industrial zones (Hussain et al., 2023). Pakistan must utilize China's expertise and its leadership in solar panel manufacturing and hydroelectric projects and establish eco-industrial parks with incentives for green innovation supply chains, augmented with robust research and development initiatives and access to easy credit, hence paving the way for an imminent green transition.

[1] https://finance.gov.pk/survey/chapter_24/2_agriculture.pdf

BETTER LIFE AND EQUITY: EMPOWERING FARMERS AND RURAL COMMUNITIES

The Better Life and Equity pillars of China's 5C align perfectly with Pakistan's rural development needs. The majority of Pakistan's farmers—80% of whom are smallholders—struggle with limited access to credit, markets, and technology. China's rural development model, which lifted 800 million people out of poverty, offers valuable lessons for Pakistan. A focused investment in rural infrastructure, microfinance for farmers, women-led agribusinesses, and vocational training in modern farming techniques can uplift millions out of poverty. Initiatives like Uraan Pakistan, aimed at training youth in agritech, digital marketing, and food processing, can create new employment streams while reducing reliance on traditional low-paying jobs. Meanwhile, access to high-yielding certified and climate-resilient seeds can unlock immense potential in the short term.

Additionally, Pakistan must adopt Chinese cooperative farming models, where small farmers pool resources and share modern equipment. This would usher in a new era in which integrating tech-driven farming solutions and cooperative farming will reduce input costs, increase efficiency, and improve bargaining power for small farmers.

GREEN DEVELOPMENT: ENSURING SUSTAINABLE GROWTH

Agriculture and industry cannot grow without sustainability. Pakistan is among the top 10 countries most vulnerable to climate change, with rising temperatures, erratic monsoons, and water shortages threatening food security. The Green Development pillar of China's 5C aligns with Pakistan's environmental focus, advocating climate-smart agriculture, reforestation, and water conservation. President Xi Jinping outlined the water-saving policy, which "prioritizes water saving, spatial balance, systematic governance, and giving full play to the role of government and market." By adopting Chinese water-saving irrigation techniques, such as drip irrigation and rainwater harvesting, and designating national water-saving irrigation areas, Pakistan can reduce agricultural water usage by 50% (Ashraff & Yasin, 2012). Introducing biodegradable fertilizers and eco-friendly pest control methods will substantially lead to reduction in soil degradation and will boost organic farming. Moreover, under China's Green Investment and Finance Partnership (GIFP) and Green Development Guidelines for Overseas Investment and Cooperation 2020, Pakistan can accelerate the adoption of renewable energy technologies and untapped new green financing mechanisms in green industrial zones, focusing on low-carbon manufacturing and renewable energy projects under CPEC. This will transform Pakistan's power sector into a catalyst for sustainable economic growth. It offers and will help both Iron brothers fulfill their respective environmental pledges and drive economic growth, job creation, and reduction of greenhouse gas emissions by prioritizing renewable energy projects within the BRI framework.

THE ROAD AHEAD: FROM VISION TO REALITY

The integration of China's 5C framework and Pakistan's 5E priorities under CPEC 2.0 presents a cross sectional transformative roadmap for agriculture, industry, energy, and rural development. As it is not limited to trade and infrastructure but is about reshaping Pakistan's economic landscape, creating millions of jobs, boosting exports, and making Pakistan a transit hub for agribusiness and industry. With strategic investment, technology transfer, and policy alignment, Pakistan can emerge as a competitive player in the global economy. However, the proof of the pudding lies in Islamabad's ability to provide an enabling environment. The once stagnant agriculture sector, which is currently underutilized, can become a manufacturing hub of innovation and exports that provides millions of Pakistanis, particularly in rural areas, with a tangible improvement in their quality of life.

This is not just a vision—it is an achievable reality, provided that Pakistan capitalizes on the opportunities presented by CPEC 2.0 and its partnership with China. The next decade is crucial, and the choices made today will determine whether Pakistan merely survives or thrives in the new global economic order.

REFERENCES

News Desk. (2024, August 28). CPEC 2.0: Govt to start work on five new economic corridors. The Express Tribune. https://tribune.com.pk/story/2491785/cpec-20-govt-to-start-work-on-five-new-economic-corridors

Ministry of Finance, Government of Pakistan. (2024). Pakistan Economic Survey 2023-2024: Agriculture. https://finance.gov.pk/survey/chapter_24/2_agriculture.pdf

The Urban Unit. (2024). Agriculture Development Plan. https://urbanunit.gov.pk/Download/publications/Files/22/2024/FINAL%20Agriculture_DGK_Development_Plan%20V2.pdf

Amin, T. (2024, December 10). Post-harvest losses in country up to 40pc, says ADB. Business Recorder. https://www.brecorder.com/news/40336744/post-harvest-losses-in-country-up-to-40pc-says-adb

State Bank of Pakistan. (2025, January 27). Monetary Policy Statement. https://www.sbp.org.pk/m_policy/2025/MPS-Jan-2025-Eng.pdf

McCabe, S. (2022, Spring). Agriculture turns to AI. SWE Magazine. https://swe.org/magazine/agriculture-ai/

Rose, S. (2025, January). Reforming agricultural land markets in Pakistan: Overcoming structural inequities. Pakistan Institute of Development Economics. https://pide.org.pk/research/reforming-agricultural-land-markets-in-pakistan-overcoming-structural-inequities/

Nazir, R., & Shuhua, Z. (2023, December 21). Pakistan exports first shipment of red chilies to China in CPEC agriculture cooperation. Xinhua News Agency. https://english.news.cn/20231221/af51f01483684761b6e4b184199efd7e/c.html

Qin, F., & Li, L. (2024, November 2). Agri fair features range of domestic innovations. China Daily. https://www.chinadaily.com.cn/a/202411/02/WS6725615da310f1265a1cafca.html

Kiani, K. (2024, April 4). Energy sector circular debt surges to Rs5.5tr. Dawn. https://www.dawn.com/news/1825571

Hussain, F., Maeng, S.-J., Cheema, M. J. M., Anjum, M. N., Afzal, A., Azam, M., Wu, R.-S., Noor, R. S., Umair, M., & Iqbal, T. (2023). Solar irrigation potential, key issues and challenges in Pakistan. Water, 15(9), 1727. https://doi.org/10.3390/w15091727

Ashraff, C. M., & Yasin, H. Q. (2012). Drip irrigation for sustaining irrigated agriculture in Punjab, Pakistan: Issues and strategy. Irrigation Association. https://www.irrigation.org/IA/FileUploads/IA/Resources/TechnicalPapers/2012/

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CPEC's Paradox: Economic Aspirations in an Era of Climate Crisis

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Until the third industrial revolution, most economies overlooked environmental concerns in their quest for economic expansion. Industrial progress was pursued at the expense of ecological integrity, and climate change was rarely considered a critical challenge. However, as the repercussions of unchecked emissions became more apparent, global economies began acknowledging the dire need for sustainable policies. Today, the world is witnessing a shift towards a more regulated carbon economy, particularly in the European Union (EU), where the Carbon Border Adjustment Mechanism (CBAM) is being enforced. The CBAM policy seeks to curtail carbon emissions from imported goods and promote fair trade by placing environmental accountability on exporting nations. This shift, however, contrasts starkly with the trajectory of the China-Pakistan Economic Corridor (CPEC), which, despite its potential economic benefits, poses significant environmental risks for Pakistan.

CPEC, a flagship component of China's Belt and Road Initiative (BRI), has been instrumental in modernizing Pakistan's energy and transportation

sectors. While its economic promises are substantial, its environmental cost remains under-discussed. Over the past decade, Pakistan has witnessed devastating climate impacts, including severe flooding, escalating heat waves, rising temperatures, biodiversity loss, and accelerated glacier melting (Ali & Askari, 2023). Yet, environmental sustainability has not been a focal point of CPEC's agenda since its inception in 2015. A prime concern is Pakistan's continued reliance on coal-fired energy, even as the world transitions toward cleaner alternatives. Many countries are actively reducing their dependence on coal to mitigate greenhouse gas emissions. However, under CPEC, Pakistan has expanded its coal-based power generation by 75%, largely through Chinese financing (Downs, 2019). The Thar coal power plants alone are projected to emit an additional 51 million tons of greenhouse gases annually (Aslam, 2021), exacerbating climate risks and undermining global de-carbonization efforts.

Beyond energy, CPEC's impact on transportation emissions is another pressing issue. The project envisions major upgrades to Pakistan's freight infrastructure, with investments amounting to USD $10.63 billion. However, the majority of freight transport in Pakistan still relies on outdated, heavy-duty trucks, which could add up to 36.5 million tons of carbon dioxide emissions if this practice continues unchecked (Aslam, 2021). Without a shift toward greener transportation solutions, such developments could further degrade air quality and accelerate climate-related challenges.

Additionally, CPEC is expected to trigger both population growth and temperature increases in key corridor regions. The combination of rising human activity and climate change will likely heighten exposure to extreme heat waves, particularly nighttime heat waves in northern, southwestern, and southern CPEC zones (Ullah et al., 2023). The scale of human vulnerability to these climatic extremes remains uncertain, but the risks are undeniable. Without comprehensive climate adaptation strategies, these environmental shifts could lead to significant health and economic repercussions.

CPEC's implications for Pakistan's agrarian economy also demand attention. Improved infrastructure and connectivity offer opportunities for agricultural mechanization and resource optimization. However, these benefits will remain unrealized if critical agrarian challenges—such as inefficient irrigation, inadequate farmer training, suboptimal crop yields, limited technology adoption, and poor-quality seed inputs—are not addressed (Asghar et al., 2021). If mismanaged, CPEC's impact on agricultural land and rural communities could be more damaging than beneficial, exacerbating water scarcity and soil degradation in an already vulnerable sector.

NEED FOR STRUCTURED CARBON POLICY

Despite the environmental risks posed by CPEC, Pakistan's policy framework remains fragmented and reactive. The country's climate governance has largely relied on external donor support and the Clean Development Mechanism (CDM), introduced under the Kyoto Protocol in 2005. While Pakistan submitted its initial National Communication on Climate Change Report to the United Nations Framework Convention on Climate Change (UNFCCC) in 2003, subsequent updates have been irregular, limiting effective climate action.

In contrast, China has pursued a proactive, market-driven approach to carbon management. Since launching its pilot carbon trading initiatives in seven provinces, China has progressively integrated carbon pricing into its national economic strategy. The National Development and Reform Commission (NDRC) released interim regulations on carbon emissions trading in 2014, laying the foundation for a national carbon market. The system operates through Certified Emissions Reductions (CCER) and emission quotas, providing industries with structured incentives to reduce carbon footprints.

This stark policy divergence highlights Pakistan's need for a comprehensive, market-based carbon pricing mechanism. Rather than relying solely on donor-driven CDM initiatives, Pakistan must develop a structured emissions trading framework aligned with its industrial and economic policies. A shift toward a proactive, sustainability-oriented governance model will be crucial for achieving long-term climate resilience.

ECONOMIC GROWTH WITH ENVIRONMENTAL ACCOUNTABILITY

As Pakistan advances with CPEC-related developments, revising its environmental strategy is not just desirable—it is imperative. Shifting from coal-based energy projects to renewable alternatives and investing in climate-resilient infrastructure will be essential to mitigating environmental harm. Economic integration with China must be complemented by legal cooperation on environmental policies, ensuring that CPEC evolves into a sustainable and secure initiative.

Environmental degradation knows no borders, making it vital for China and Pakistan to align their strategies with broader ecological and economic security concerns. Rather than formulating environmental provisions on a case-by-case basis, China should

establish a high-standard, uniform framework for trade-related environmental policies. Integrating such measures into future Free Trade Agreements (FTAs) under the One Belt One Road (OBOR) initiative will enhance the credibility and long-term success of mega-infrastructure projects like CPEC.

By embedding sustainability within its economic ambitions, Pakistan can ensure that CPEC does not become an environmental liability but rather a model for responsible, forward-thinking development.

REFERENCES

Ali, T. Z., & Askari, M. U. (2023). Impacts of the China-Pakistan Economic Corridor on the Natural Environment of Pakistan. https://doi.org/10.35484/pssr.2023(7-IV)58

Asghar, A. J., Cheema, A. M., Hameed, M. I., Abbas, S. Q., & Fatima, U. (2021). The Critical Junction between CPEC, Agriculture and Climate Change. https://ccls.lums.edu.pk/sites/default/files/2023-01/the_critical_junction_between_cpec_agriculture_and_climate_change.pdf

Aslam, H. (2021, July 20). CPEC & Environmental Sustainability [Online post]. https://southasianvoices.org/cpec-environmental-sustainability/

Downs, E. (2019). China-Pakistan Economic Corridor Power Projects: Insights into Environmental and Debt Sustainability. https://www.energypolicy.columbia.edu/publications/china-pakistan-economic-corridor-power-projects-insights-environmental-and-debt-sustainability/

Ullah, S., You, Q., Ullah, W., Sachindra, D. A., Ali, A., Bhatti, A. S., & Ali, G. (2023). Climate change will exacerbate population exposure to future heat waves in the China-Pakistan economic corridor. Weather and Climate Extremes, 40, 100570. https://doi.org/10.1016/j.wace.2023.100570

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Picture courtesy of Northeastern Global News
Flood in Sohbat Pur city, a district of Pakistan's southwestern Baluchistan province.

Utilizing CPEC for benefitting from Carbon Markets

Alishba Khan

A major economic drive, the China-Pakistan Economic Corridor (CPEC) aims to increase economic cooperation between the two countries. Significant investments have been made throughout the span of three five-year phases of CPEC's development, with a particular emphasis on energy infrastructure, Gwadar port, transportation infrastructure, and industrial cooperation. Around USD 35.7 billion, or more than half of the USD 56 billion total CPEC investment, will be directed toward energy infrastructure by 2030, boosting 16,379.7 MW of installed generation capacity.

These major energy infrastructure projects are critical to Pakistan. Poor planning, supply shortages, and distribution issues cause expenses of up to 2% of GDP growth per year. Along with the challenge of power loss during transmission and distribution, Pakistan's electricity shortfall has risen to 6623 MW. Furthermore, 65.88% of Pakistan's electricity is generated from fossil fuels, costing USD 12.33 billion per year and accounting for 28.3% of the country's greenhouse gas emissions.

The environmental impact, specifically CO2 emissions, is a major concern for the long-term viability of CPEC investment, given the large-scale development of transportation infrastructure, industrial cooperation, and energy infrastructure across various sectors, from coal to nuclear energy power plants, transportation systems, and industrial development, all of which could potentially lead to significant changes in CO2 emissions. These concerns are similar to those raised by China's investment through the Belt and Road Initiative, which has the potential to greatly contribute to international growth while simultaneously reshaping the pattern of carbon emissions. There is a growing understanding that hydropower and nuclear cooperation will provide greener energy to host nations. However, significant concerns exist about fossil fuel electricity, particularly coal-fired plants.

"China and Pakistan must jointly develop a robust green investment roadmap that incorporates the Corridor's socio-environmental risks"

These plants, particularly coal-fired plants, contribute significantly to environmental degradation. We can analyze similar scenarios to look for solutions, for example, we can see how Indonesia prioritized economic growth over environmental and social sustainability, or how increased fossil fuel generation capacity resulted in higher carbon emissions, which varied across different scenarios.

If the potential environmental risk is managed effectively in timely manner, the China's Belt and Road Initiative has the potential to become the largest means of disseminating cleaner energy technologies throughout the developing world, subject to recipient countries enforcing more

stringent ecological standards and changes in Chinese overseas investment policies.

Carbon trading could play an important role in mitigating the environmental risks connected with China's Belt and Road Initiative.

Future of notwithstanding its drawbacks and restrictions, the UNFCCC's Clean Development Mechanism (CDM) under the Kyoto Protocol shown that carbon trading may significantly and economically help meet global carbon mitigation targets. In order to comply with the goals and pledges stated in the Nationally Determined Contributions, it also guarantees flexibility within the larger framework of regulatory requirements. Carbon markets have the potential to provide many co-benefits, especially for developing nations, if they are well conceived and implemented.

These elements clearly illustrate the significance of carbon markets within the framework of The Paris Climate Agreement. Article 6 of the Agreement presents the idea of Cooperative Mechanisms, which includes both Market Mechanisms (as outlined in Articles 6.2 and 6.4) and Non-Market Mechanisms (detailed in Article 6.8). The primary objective of Article 6 is to facilitate international collaboration and the application of market-oriented strategies aimed at the global reduction of greenhouse gas emissions. This approach is predicated on the recognition that developing nations have the capacity for economically viable reductions in GHG emissions, which can be realized through investments from the private sector. Pakistan, like many developing countries, possesses significant yet largely unexploited potential for carbon investments, along with several inherent advantages. The nation has pledged in its Nationally Determined Contributions (NDCs) to cut its projected emissions by 50% by 2030. While considerable initiatives are being implemented across various sectors, including energy, transportation, and agriculture, some areas, particularly industry, have seen limited engagement. Although there are isolated efforts within the industrial sector, its substantial potential indicates that further action is necessary.

Currently, the industrial sector contributes approximately 25.76 MtCO2e to the overall emissions inventory, with projections suggesting that energy, agriculture, and industry will be the primary contributors in the future.

"Pakistan is the fifth Fastest growing country In the world"

Pakistan ranks among the top ten countries most vulnerable to climate change, and it stands to gain considerably from international carbon markets. The potential for carbon reduction initiatives can lead to essential improvements in energy efficiency and processes within various industries, aid in the transition to sustainable energy sources, and bolster the ongoing evolution of the agricultural sector.

Furthermore, there are significant and largely unexplored opportunities for decarbonizing urban transportation, which could play a crucial role in helping Pakistan fulfill its Nationally Determined Contributions (NDCs) through a blend of concessional financing and investments focused on carbon reduction. However, the establishment of carbon markets is a complex endeavor, necessitating support for the industry and the broader private sector.

In 2010, the government of Pakistan designated financial resources for carbon trading within its yearly budget. Nevertheless, by 2012, Pakistan's participation in Clean Development Mechanism (CDM) projects was under one percent, in stark contrast to China and India, which represented 60% and 30% of the global CDM project share, respectively.

In the fiscal year 2015-16, the finance ministry of Pakistan designated PKR 34 million (around USD 340,000) for initiatives aimed at achieving carbon neutrality, facilitating the trading of carbon credits within the industrial sector in a local marketplace. The Pakistan Climate Change Act of 2017 established a comprehensive legal and institutional framework for addressing climate change, assigning the Ministry of Climate Change (MoCC) the task of creating a national registry and database to monitor greenhouse gas (GHG) emissions. In 2018, the National Committee on the Establishment of Carbon Markets (NCEC) was established to evaluate the country's capacity for engaging in both domestic and international carbon markets. The implementation of a domestic emissions trading scheme (ETS) targeting major emitters in the power and industrial sectors, responsible for 168 million tons of CO2 equivalent emissions.

"Pakistan needs to Shift business model"

Considering genuine funding payments have been slow and have addressed less than one-fourth of the harms evaluated, Pakistan is currently concentrating on the need to shift its business model and go to the carbon credits market.

After being certified by an administration or independent organization, carbon credits or balances are traded. By supporting initiatives that reduce emissions elsewhere, such as promoting renewable power and preserving forests, carbon balancing enables compounds to compensate for their ozone-damaging substance emissions.

Focusing the way forward, specific set of measures is proposed to empower Pakistan to engage effectively in carbon trading and access carbon markets. Firstly, the current policy, legal, and regulatory frameworks are insufficient for facilitating carbon trading in the country. It is essential to revise these frameworks in line with established best practices, such as the European Union's cap-and-trade system, while also implementing robust monitoring, reporting, and verification (MRV) protocols for greenhouse gas emissions. Secondly, Pakistan should create an independent regulatory authority in collaboration with the Ministry of Climate Change and relevant provincial departments to ensure the transparent and efficient functioning of carbon markets. The government might also consider delegating significant responsibilities from the Ministry of Climate Change, including climate finance and access to international funds like the Global Environment Facility and the Green Climate Fund, to enhance the development and operation of carbon markets. This approach would facilitate the integration of climate change initiatives into economically and socially vulnerable sectors, promoting low-carbon and climate-resilient development while optimizing the benefits from the global carbon market, particularly for communities impacted by climate change. Thirdly, participation in carbon markets can assist Pakistan in achieving its Nationally Determined Contributions (NDCs), with a target of reducing emissions by up to 20% below Business as Usual (BAU) levels by 2030. Lastly and most importantly, Pakistan has a considerable opportunity to join China's program by developing carbon offsets locally and selling them to China. In its 14th five-year plan, China emphasized carbon trading, including online trading.

It is reasonable to conclude that numerous sectors within Pakistan's economy could present an appealing carbon investment opportunity for both local and international investors, particularly under CPEC. In addition to assistance with technical and regulatory frameworks, fostering international connections and promoting collaboration is vital for success.

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Picture obtained from Thar Coal and Energy Board, Government of Sindh