

An aerial photograph of a coastal city, likely Karachi, Pakistan. The city is densely packed with buildings and extends along the coast. In the foreground, the water is a deep blue-green, with numerous small boats and larger ships. The background shows a range of mountains under a clear sky. A solid red rectangle is located in the top right corner of the image.

CHINA-PAKISTAN ECONOMIC CORRIDOR BEYOND 2030

A Green Alliance for Sustainable Development

Editor: Rabia Akhtar

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China-Pakistan
Economic Corridor Beyond 2030:
A Green Alliance for Sustainable Development

Editor: Rabia Akhtar

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Rabia Akhtar

Editor, China-Pakistan Economic Corridor Beyond 2030: A Green Alliance for Sustainable Development

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Foreword

As the Country Director of the Friedrich-Ebert-Stiftung (FES) in Pakistan, it is a privilege to be associated with the publication of “China-Pakistan Economic Corridor Beyond 2030: A Green Alliance for Sustainable Development.” This book is a testament to the collaborative spirit and intellectual rigor that defines FES’ mission. Dr. Rabia Akhtar’s editorial prowess and the scholarly contributions within these pages underscore the importance of integrating sustainability into large-scale development projects. The insights provided by the esteemed authors will not only advance the conversation on CPEC in Pakistan but also serve as a vital input for such discourses worldwide. This publication exemplifies our commitment to fostering dialogue and understanding on critical global issues, and I am confident it will leave a lasting impact on policymakers, researchers, and practitioners in Pakistan and beyond.

Felix Kolbitz

Country Director
Friedrich-Ebert-Stiftung (FES), Pakistan

Preface

The China-Pakistan Economic Corridor (CPEC) symbolizes a new chapter in the longstanding friendship between China and Pakistan. As the cornerstone of China's Belt and Road Initiative (BRI), CPEC has brought about profound economic and infrastructural transformations, enhancing regional connectivity and creating unprecedented opportunities for growth and development. Yet, as we move beyond 2030, the need to align this monumental project with global sustainability goals becomes more pressing.

"China-Pakistan Economic Corridor Beyond 2030: A Green Alliance for Sustainable Development," edited by Dr. Rabia Akhtar, emerges at a crucial juncture. This volume represents a visionary effort to reframe the narrative of CPEC, focusing on its potential to drive green development and sustainable growth. Dr. Akhtar, with her deep expertise and commitment to environmental sustainability, has curated a collection of insightful contributions from leading scholars and practitioners.

The chapters in this book delve into the historical, current, and future dimensions of CPEC, examining its economic, environmental, and social impacts. The contributors explore a wide range of topics, from the development of environmentally sustainable Special Economic Zones (SEZs) to the integration of CPEC with the United Nations' Sustainable Development Goals (SDGs). Their analyses offer a comprehensive understanding of how CPEC can be transformed into a model of sustainable development.

Ambassador Naghmana A. Hashmi provides a detailed analysis of CPEC's evolution and future prospects, highlighting its transformative impact on Pakistan's socio-economic landscape. Dr. Hassan Daud Butt examines policy lessons for developing green SEZs, proposing models that align with global sustainability goals. Dr. Asif Amin and Yan Zhen critically assess the environmental considerations of CPEC, while Dr. Marriyam Siddique discusses the challenges and opportunities in transforming CPEC into a Green Alliance. Professor Xiaoyu Zhang encapsulates the essence of CPEC as a model for global sustainable development, offering a forward-looking perspective on international cooperation.

This volume stands out for its holistic approach, addressing not only the economic and strategic dimensions of CPEC but also its potential to lead in environmental sustainability. By advocating for the integration of green technologies and sustainable practices, this book sets a new benchmark for large-scale infrastructure projects.

As we face unprecedented global challenges such as climate change and environmental degradation, the insights and strategies presented in this volume are both timely and essential. “China-Pakistan Economic Corridor Beyond 2030: A Green Alliance for Sustainable Development” calls for a concerted effort to harmonize economic growth with environmental stewardship, ensuring a sustainable future for the region and the world.

I extend my heartfelt gratitude to Dr. Rabia Akhtar for her exceptional leadership in bringing this important work to life. Her dedication, along with the invaluable contributions of all the authors and researchers involved, has resulted in a volume that will undoubtedly influence the discourse on CPEC and sustainable development for years to come.

May this book inspire policymakers, scholars, and practitioners to embrace the principles of sustainability and work collaboratively towards a greener and more prosperous future.

Mushahid Hussain Sayed

Chairman

Pakistan-China Institute

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Introduction

Rabia Akhtar

In the contemporary global landscape, the China-Pakistan Economic Corridor (CPEC) emerges as a cornerstone of the Belt and Road Initiative (BRI), illustrating a profound fusion of infrastructural might and economic foresight. This monumental project, over \$60 billion, aims to connect China's western provinces through Pakistan to the Arabian Sea, enhancing regional connectivity and creating significant economic opportunities for both nations involved. However, the complexity of CPEC extends beyond mere economic and infrastructural dimensions; it encompasses significant geopolitical, environmental, and socio-economic challenges and opportunities.

This edited volume titled ***“China-Pakistan Economic Corridor Beyond 2030: A Green Alliance for Sustainable Development”*** seeks to provide a comprehensive and critical assessment of CPEC, focusing on its sustainability and green potential. Against the backdrop of global sustainability challenges exacerbated by crises such as the COVID-19 pandemic, this book explores the avenues through which CPEC could transform into a green development initiative. It delves into the project's environmental, social, and economic impacts and proposes a roadmap for integrating sustainable practices into its framework.

This project is a timely contribution to the ongoing discourse on CPEC, particularly as the world navigates uncharted territories marked by unprecedented challenges. It aims to fill a critical gap in the existing literature, which predominantly focuses on the economic and strategic dimensions of CPEC, by emphasizing its potential environmental and social impacts. By proposing a more holistic and balanced approach to the Corridor's development, the book advocates for a transformation that aligns with the Sustainable Development Goals (SDGs) and supports a sustainable future for the region and beyond.

Structure and Content

The book is structured to facilitate a deep dive into various dimensions of CPEC. The introductory chapter sets the stage by providing an overview of CPEC's role in regional development and the overarching objectives of the volume, particularly its emphasis on the concept of a Green Alliance. Subsequent chapters are designed to build on this foundation by exploring CPEC's past developments, present circumstances, and future prospects in relation to its environmental footprint and sustainability.

A. Economic Aspirations and Ground Realities

The strategic intent behind CPEC is to catalyze region-wide economic integration, enhance trade routes, create jobs, and promote economic stability. As chapters from Ambassador Naghmana A. Hashmi and Dr. Hassan Daud Butt elaborate, the Corridor promises to rejuvenate Pakistan's economy by addressing its energy crisis, leveraging geographic advantages, and enhancing its role as a central gateway to Asia, the Middle East, and beyond.

Chapter One by Ambassador Naghmana A. Hashmi, "The China-Pakistan Economic Corridor: Past, Present, and Future", provides an in-depth analysis of the China-Pakistan Economic Corridor (CPEC), emphasizing its evolution, current status, and future prospects. It underscores the historical and strategic importance of CPEC within the context of the Belt and Road Initiative (BRI) initiated by China. The narrative weaves through the project's transformative impact on Pakistan's socio-economic landscape, touching upon infrastructural development, investment flows, and regional integration.

The chapter begins with a historical overview of trade routes and connectivity, setting the stage for understanding CPEC's significance as a modern incarnation of the ancient Silk Road. It highlights the strategic vision of Chinese and Pakistani leadership in revitalizing connectivity between Asia and the Arabian Sea through infrastructural projects. There is extensive discussion on how CPEC has propelled economic growth in Pakistan through substantial investments in energy and infrastructure. The chapter points out the creation of jobs, enhancement in trade capacity, and improvements in energy availability.

Ambassador Naghmana Hashmi underlines the significance of CPEC as a cornerstone for fostering regional integration, linking South Asia with economies in Central and Middle Eastern regions. This includes the potential of Gwadar port as a pivotal maritime hub. The chapter forecasts the future trajectory of CPEC, discussing ongoing projects and their implications for economic zones, agriculture, and technological advancement. It also addresses challenges such as geopolitical tensions and the need for sustainable development. Her chapter provides an analysis of the broader political and strategic implications of CPEC, including its role in global trade and politics and the positioning of Pakistan and China in a shifting global order.

This chapter aligns with the book's overarching theme of sustainable and inclusive development by discussing how CPEC could potentially transform into a green development initiative. It contributes critical insights to the economic, political, and strategic dimensions of the Corridor, providing a comprehensive background that supports the subsequent thematic explorations in other chapters.

Chapter Two, under this theme, is by Dr. Hassan Daud Butt and is titled "CPEC Beyond 2030: Policy Lessons for Developing Environmentally Sustainable Special Economic Zones (SEZs)." Hassan Daud Butt's chapter critically examines the development of environmentally sustainable Special Economic Zones (SEZs) under the framework of the China-Pakistan Economic Corridor (CPEC) beyond 2030. The chapter delves into the interplay between industrial development and environmental sustainability, drawing on case studies and lessons from China's approach to SEZs.

The chapter opens by highlighting the critical role that SEZs play in economic development and points out their significant environmental impacts, such as increased CO₂ emissions. It argues for the necessity of integrating environmental considerations into the planning and operation of SEZs to mitigate their ecological footprint. Dr. Butt proposes a model for Green SEZs development that includes stringent environmental regulations, energy-efficient transportation systems, and policies that align with global sustainability goals. This model aims to reduce greenhouse gas emissions and promote a sustainable industrial base.

The chapter identifies common challenges in the development of SEZs, such as legislative instability, inadequate federal engagement, bureaucratic complexities, and management inefficiencies. It suggests that overcoming these obstacles is crucial for the successful implementation of Green SEZs. The chapter offers detailed strategies for developing Green SEZs,

emphasizing the importance of comprehensive planning, stakeholder engagement, and alignment with international environmental standards. It also suggests that SEZs should serve as platforms for innovation in green technology and sustainable practices. The potential economic benefits of Green SEZs are discussed in this chapter, including innovation, export growth, and job creation, while also considering the social impacts, such as community sensitivity and resource efficiency.

This chapter contributes to the overarching theme of the book by examining the intersection of economic development and environmental sustainability within the CPEC initiative. It provides a thoughtful critique and forward-looking perspective on how SEZs can be transformed into catalysts for sustainable development, aligning with the broader goals of the book to explore sustainable pathways in the context of CPEC.

B. Environmental Stewardship and Sustainable Development

While CPEC offers substantial economic benefits, its environmental and sustainability implications are profound and complex. Dr. Asif Amin's and Dr. Yan Zhen's contributions critically assess how CPEC aligns with ecological considerations and the global sustainability agenda. Their analyses underscore the necessity of integrating green technologies and sustainable practices into the heart of CPEC's operations to mitigate potential environmental impacts and foster a sustainable development paradigm.

Chapter Three by Dr. Asif Amin, titled "The Green Dimension: Environmental Considerations of the China-Pakistan Economic Corridor (CPEC)," examines the environmental implications of the China-Pakistan Economic Corridor (CPEC), a large-scale infrastructure project designed to enhance connectivity between Gwadar port in Pakistan and Xinjiang, China. This chapter discusses both the potential environmental benefits and the significant risks associated with CPEC, proposing green growth strategies to minimize its ecological footprint.

The chapter highlights several environmental advantages that could arise from CPEC, such as increased reliance on renewable energy sources like wind and solar, improvements in water management through new dams, and enhanced irrigation systems, which could alleviate water scarcity issues in Pakistan. Dr. Amin raises concerns about the environmental degradation

that could result from CPEC, including deforestation, loss of habitats for endangered species, increased air and water pollution, and further strain on Pakistan's limited water resources. The chapter emphasizes the concept of "green growth," which involves integrating sustainable practices into economic development. Dr. Amin suggests that CPEC could incorporate renewable energy for its operations, use eco-friendly construction methods, and invest in technologies that reduce environmental impact. The chapter identifies challenges in implementing green practices, including political, bureaucratic, and financial hurdles. It argues that despite the presence of policies aimed at environmental conservation, actual practice often falls short due to these obstacles.

Dr. Amin provides recommendations for ensuring that CPEC's development considers environmental impacts. These include enforcing stricter environmental regulations, fostering public awareness of environmental issues, and investing in sustainable technologies and infrastructure. This chapter contributes significantly to the overarching theme of the book by providing a detailed analysis of how CPEC, as a part of the Belt and Road Initiative, intersects with environmental sustainability. It offers a critical perspective on the potential for CPEC to promote sustainable development in Pakistan if green growth principles are effectively integrated into its execution.

Chapter Four, titled "The Road to a Green Alliance: Synergizing CPEC and SDGs," by Yan Zhen, explores the intersection of the China-Pakistan Economic Corridor (CPEC) with the Sustainable Development Goals (SDGs) set by the United Nations. This chapter delves into how CPEC, as part of China's Belt and Road Initiative (BRI), is being aligned with global sustainability goals to ensure it contributes positively to both economic development and environmental protection.

The chapter discusses how CPEC aligns with the UN's 2030 Agenda for Sustainable Development. This alignment is illustrated through CPEC's focus on incorporating sustainable practices like renewable energy projects and green technologies, which resonate with several SDGs, including affordable and clean energy, sustainable cities, and climate action. Yan Zhen highlights initiatives within CPEC that focus on building a 'Green Silk Road.' These initiatives include investments in clean energy, promotion of sustainable infrastructure, and enhancement of ecological conservation aimed at reducing the environmental footprint of development activities.

The chapter emphasizes the synergy between economic growth and environmental sustainability under CPEC. It suggests that sustainable

practices within CPEC not only contribute to economic advancement but also help manage and mitigate environmental risks. The chapter acknowledges challenges in fully realizing green development goals due to various economic, political, and social factors. It proposes solutions such as increased international cooperation, technological transfer, and adherence to international environmental standards to overcome these challenges. The final section provides a future outlook on how CPEC could serve as a model for integrating economic development with sustainable practices. It advocates for continued collaboration between China, Pakistan, and other stakeholders to ensure that the benefits of CPEC are maximized and shared widely, particularly in achieving the SDGs.

This chapter significantly contributes to the overarching theme of the book by providing a detailed examination of how a major infrastructure project like CPEC can be aligned with international sustainability goals. It provides a comprehensive view of how sustainable practices can be integrated into large-scale development projects to ensure that they contribute to global environmental and economic stability.

C. Challenges and the Road Ahead

Chapter Five by Dr. Marriyam Siddique, titled “Transforming CPEC into a Green Alliance: Challenges and Opportunities,” highlights that transforming CPEC into a Green Alliance poses significant challenges, including environmental concerns, the need for technological adaptation, and the alignment of development goals with sustainable practices. Yet, these challenges also present unique opportunities to set a global standard for integrating development with sustainability. This chapter discusses the transformation of the China-Pakistan Economic Corridor (CPEC) into a Green Alliance, focusing on the integration of sustainable practices within the framework of this major infrastructure project. It highlights the environmental challenges and potential benefits of making CPEC a conduit for green development.

As part of one of the key themes of the book, the chapter outlines significant environmental concerns associated with CPEC, including the high carbon footprint of infrastructure projects, deforestation, and pollution. It emphasizes Pakistan’s vulnerability to climate change impacts, which exacerbates these challenges. Introduced as a response to these environmental challenges, the Green CPEC Alliance aims to shift the focus of CPEC projects towards sustainability. This includes reducing reliance on

fossil fuels, promoting renewable energy sources, and integrating green technologies and practices within the CPEC framework. The chapter discusses that the shift towards a greener CPEC is portrayed not just as a necessity but also as an opportunity to foster economic growth through sustainable means. The chapter argues that green investments can generate employment, improve food security, and enhance living standards while addressing climate change.

Siddique discusses various strategic initiatives and policy recommendations to promote green growth within CPEC. These include enhancing green financing, implementing strict environmental regulations, and investing in renewable energy projects. The chapter concludes with a discussion of the obstacles in transforming CPEC into a Green Alliance, such as the need for substantial investment, the alignment of policies and practices, and the integration of green technology. It calls for concerted efforts by both China and Pakistan to overcome these challenges and realize the potential of a sustainable development path.

This chapter contributes to the overarching theme of the book by examining how CPEC can evolve into a sustainable development initiative that aligns with both economic goals and environmental imperatives. It provides a critical assessment of the current state and offers a visionary outlook for integrating sustainability into one of the most significant economic corridors of the 21st century.

D. CPEC: A Model for Global Sustainable Development

Chapter Six by Dr. Xiaoyu Zhang's titled, "CPEC and Sustainability: A Model for the World" encapsulates the essence of CPEC as a model for global sustainable development. CPEC exemplifies how infrastructural mega-projects can be harmonized with sustainable development goals, serving as a blueprint for future international cooperation projects that aim to balance economic growth with environmental and social stewardship.

This chapter provides a comprehensive analysis of the China-Pakistan Economic Corridor (CPEC) as a model of sustainable development that could influence global practices. The chapter assesses CPEC's impact over the last decade, emphasizing its alignment with sustainable development goals (SDGs) and its role in promoting regional and international cooperation.

Xiaoyu outlines the evolution of the Belt and Road Initiative (BRI) and its transformation into a significant international collaboration platform,

highlighting CPEC's role in this transformation. The discussion includes the economic, infrastructural, and socio-political impacts of CPEC, reflecting on the jobs created, poverty reduction, and enhanced regional connectivity. The chapter links CPEC's objectives with the United Nations' SDGs, particularly focusing on infrastructure, economic growth, and poverty alleviation. Xiaoyu illustrates how CPEC's infrastructure projects contribute to these goals, enhancing access to essential services and promoting sustainable economic growth.

A significant portion of the discussion is dedicated to the "Green Belt and Road" concept. The chapter details efforts to integrate green and sustainable practices within CPEC projects, such as the incorporation of renewable energy sources and sustainable construction practices. While highlighting the successes, Xiaoyu does not shy away from addressing the challenges faced in implementing such a large-scale project sustainably. These include environmental concerns, the need for continued investment in green technologies, and the balancing of rapid development with sustainable practices.

The chapter concludes with a forward-looking perspective on how CPEC could serve as a blueprint for future international cooperation projects that aim to balance development with sustainability. Xiaoyu calls for increased international collaboration to further these goals, emphasizing China's role in leading such initiatives.

This chapter deepens the book's exploration of sustainable development within the context of CPEC, providing a critical evaluation of how infrastructure projects can be aligned with global sustainability goals. It showcases CPEC as not only a catalyst for economic growth and regional connectivity but also as a potential leader in sustainable development practices.

Significance of the Book

This book, "China-Pakistan Economic Corridor Beyond 2030: A Green Alliance for Sustainable Development," stands as a pivotal contribution to the ongoing discourse on sustainable infrastructure development. By shifting the focus from traditional economic and strategic analyses to an inclusive examination of environmental and social impacts, this volume challenges the conventional narrative surrounding the China-Pakistan Economic Corridor (CPEC).

The significance of this work lies in its holistic approach to CPEC's potential as a green development initiative. It brings together diverse perspectives from leading experts and scholars, offering a multifaceted analysis that encompasses economic, environmental, and social dimensions. By advocating for the integration of sustainable practices, this book sets a new benchmark for how large-scale infrastructure projects can be designed and implemented to achieve long-term sustainability.

One of the core challenges addressed in this volume is the transformation of CPEC into a Green Alliance. This entails not only mitigating the environmental impacts of infrastructure projects but also leveraging CPEC as a platform for promoting renewable energy, green technologies, and sustainable economic practices. The book critically examines the existing policies and practices, providing actionable recommendations for aligning CPEC's development with the Sustainable Development Goals (SDGs).

Moreover, this book underscores CPEC's potential to serve as a model for global sustainable development. By highlighting best practices and identifying potential pitfalls, it offers valuable lessons for other countries embarking on similar initiatives. The comparative analyses and policy frameworks presented here aim to guide sustainable infrastructure development worldwide, ensuring that economic progress does not come at the expense of environmental and social well-being.

This book challenges readers to rethink traditional development paradigms and envision a future where economic growth is harmonized with sustainability. It calls for a concerted effort to transform CPEC into a beacon of sustainable development, demonstrating that infrastructure projects can be both economically beneficial and environmentally responsible. As the world faces unprecedented sustainability challenges, the insights and strategies provided in this volume are timely and essential for shaping a more equitable and sustainable global landscape.

Chapter 1

The China-Pakistan Economic Corridor: Past, Present and Future

Ambassador Naghmana A. Hashmi

Introduction

The world today, with all its technological and social development, cultural diversity, languages, and heritage, is the result of millennia of intermingling of different peoples. The ideas that emerge from shared experiences have built our societies and led to our most ambitious inventions and deepest insights about the world around us. Geographical isolation, on the other hand, has always been the main hindrance to human progress and advancement. Whether it was the ancient Silk Route, Grand Trunk Road, Regional Cooperation for Development (RCD) rail connection, Karakoram Highway, Eurasian land bridge, or Trans-Siberian Rail, all have proved the efficacy of connectivity in the socio-economic development of civilizations. However, the visionary Belt and Road Initiative (BRI) of President Xi Jinping, of which the China-Pakistan Economic Corridor (CPEC) is the flagship project with Gwadar port as the Jewel in the crown of CPEC, stands apart from all other previous initiatives for its scale and positive socio-economic developmental impact which has reached far and wide.

The Significance of Connectivity in the 21st Century

Connectivity in the 21st century is a defining feature of the modern economy and comprehensive development. It is considered a cornerstone of economic cooperation and integration and has become a key priority, particularly for the countries of Asia and the Pacific. In order to unlock the potential of closely interlinked production networks and value chains, a more comprehensive perspective on connectivity has emerged, as led by President Xi Jinping of China. This connectivity is not sector-specific but is envisaged as part of an integrated whole, encompassing the development of corridors of prosperity through networks of trade, transport, energy, the flow of people, goods, services, communication, and technology that allow for greater efficiency in the distribution of resources. The concept comprises both hard and soft connectivity and is seen as an important pillar of economic development and regional integration.

Improving access to larger markets increases trade and production, encouraging the growth of local economies. Ease of movement lowers transport costs and increases supply reliability, strengthening the region's

comparative advantages. Reduced costs also encourage the creation of stronger production networks, which, in turn, drive trade and investment. Improving connectivity is thus essential for the region's prosperity, continued growth, and, most importantly, poverty reduction.

As a result of the development of BRI and CPEC, it is being quickly realized that in addition to the short-term impact of investments in connectivity infrastructure, there are also medium and long-term effects in strengthening the foundation for future economic growth, including making labor markets more efficient and productive. The growth of Global Value Chains (GVC) has been in tandem with improvements in transportation and communications technologies, which have allowed the fragmentation of production in different locations.

CPEC is, therefore, high on the policy agenda of both China and Pakistan as it contributes to the realization of Pakistan's national developmental goals and is a practical manifestation of Pakistan's pivot to geo-economics. It is a people-centric development project and represents a win-win proposition of international cooperation, providing new opportunities for economic rejuvenation and prosperity for both countries and other regions. CPEC also aims to promote peace and security through compressive socio-economic development.

The strategic concept of connectivity between Pakistan and China has been in the works for decades. In the early fifties, when China-Pakistan relations were in their early stages of development, Chairman Mao Zedong described Pakistan as "a Southwest window for China"¹ and urged the development of strong and friendly relations with Pakistan. The historic decision by the leadership of Pakistan and China to build the Karakoram Highway linking Pakistan and China through Khunjrab Pass in 1978 was the result of Chairman Mao's vision and desire. Pakistan and China were, therefore, the pioneers of rejuvenating the ancient Silk Road in modern times.

The two sides moved towards translating the concept into reality with the decision in 2001² to construct a deep sea port at Gwadar when the then

1 Masood Khalid, "Pakistan-China Relations in a Changing Geopolitical Environment," *Institute of South Asian Studies (ISAS), National University of Singapore*, 2022, <https://www.isas.nus.edu.sg/papers/pakistan-china-relations-in-a-changing-geopolitical-environment/>.

2 Dilip Hiro, "China and Saudi Arabia Converge on Pakistan." *Yale Global Online*, <https://archive-yaleglobal.yale.edu/content/china-and-saudi-arabia-converge/pakistan#:~:text=China's%20interest%20in%20Gwadar%20dates,the%20port%20commissioned%20in%202007>

Premier of China, Zhou Rongji, visited Pakistan. In 2004, the Karakoram Highway was upgraded to make it a dual carriage highway capable of carrying heavy truck cargo through the Khunjerab pass. The financial package for the concept of CPEC is linking KKH to Gwadar port with a network of roads and bridges, reviving Pakistan's energy sector and establishing Special Economic Zones (SEZs). The project layout of CPEC was signed in April 2013³ taking a big stride forward in accomplishing President Xi Jinping's vision of connectivity and development through BRI, of which CPEC is the flagship project. Through CPEC, China and Pakistan have jointly provided the sub-regions of South Asia, Central Asia, and West Asia with a connectivity network⁴ and have laid a strong and stable foundation for lasting broad-based regional as well as trans-regional cooperation.

CPEC's Economic and Strategic Benefits

Nurtured by generations of leadership on both sides for over seven decades, Pakistan and China have enjoyed an all-weather strategic cooperative partnership with Iron Brothers. CPEC is the distinctive symbol of this enduring friendship and a clear manifestation of the desire of leadership on both sides to take the economic and trade relations to new heights commensurate with the political and strategic relationship. CPEC covers a vast array of short, medium and long-term projects. This model of development fully resonates with Pakistan's own vision and firm belief that CPEC is a "game-changer" not only for Pakistan but the entire region and presents enormous opportunities to people from Gwadar to Kashgar and beyond.

Over the past decade, this transformational project has become a tangible reality and has already helped improve the economic landscape of Pakistan.⁵ It has propelled Pakistan's infrastructure development by laying a strong energy and road infrastructure for the subsequent development of industry, agriculture and human resources. When fully operational, Gwadar port will become one of the largest deep-sea ports in the region, located

3 Seema Khan, "The China-Pakistan Economic Corridor: A Flashpoint of Regional Competition," *London School of Economics and Political Science*, 2018, <https://www.lse.ac.uk/ideas/Assets/Documents/The-China-Pakistan-Economic-Corridor.pdf>.

4 China-Pakistan Economic Corridor (CPEC) Secretariat <https://cpec.gov.pk/introduction/1>.

5 Fida Hussain, "Economic Benefits of CPEC Project," Consulate General of the People's Republic of China in Lahore, December 12, 2023, http://lahore.china-consulate.gov.cn/eng/PIXJP/202312/t20231212_11200911.htm.

just before the entrance to the Strait of Hormuz, the busiest region for the flow of energy from the Gulf states to the rest of the world. By utilizing Gwadar Port, China will be able to access energy resources directly from the Gulf States, avoiding the long, busy, and politically charged Malacca Straits and also saving time. As CPEC connects China to the Indian Ocean by road and rail, it provides fast and easy access for Chinese exports to South Asia, the Middle East, Africa and Europe.⁶

Robert D. Kaplan said that “the word Pakistan sums up the Indian Subcontinent.”⁷ Pakistan is blessed with a profound blend of landscapes, ranging from the coastal areas of the Arabian Sea in the South to the mountains of the Karakoram Range in the North. Additionally, Pakistan is situated at the nexus of the four most dynamic regions of the world: China, South and South-East Asia, the Middle East, and Central Asia making it a crucial link in the peace, prosperity, and economic integration of the entire region. The development of transit routes, customs harmonization, and streamlining of trade regulations will create a conducive environment for regional economic cooperation and boost Pakistan’s trade volume.

CPEC through Gwadar port will not only provide better access to the Middle East, which is an important market for Pakistani exports but will also provide the Middle East with a route to Central Asia and beyond. Similarly, Africa’s economic potential is huge, with huge untapped natural resources and a high youth percentage. Africa has rightly earned the title of the Continent of the future. Pakistan, with its Look Africa policy, is keenly interested in enhancing trade and investment relations with Africa. CPEC thus provides a massive and critical platform for achieving this objective, which will be mutually beneficial for both Pakistan and Africa. Therefore, once completed, CPEC is expected to bring prosperity to around 3 billion people in the region, including China, South Asia, Central Asia, Africa and the Middle East.

CPEC and Global Geopolitical Dynamics

The world is currently experiencing a profound transformation, marked by significant shifts in political, strategic, and economic domains. Since the

6 Hilali, A. Z, “China-Pakistan Economic Corridor and Regional Connectivity,” *Institute of Strategic Studies Islamabad (ISSI)*, February 2020, https://issi.org.pk/wp-content/uploads/2020/02/6-SS_A_Z_Hilali_No-4_2019.pdf.

7 Amjad Hussain, “CPEC: Prospects for Pakistan’s Blue Economy,” *Sustainable Development Policy Institute (SDPI)*, https://sdpi.org/cpec-prospects-for-pakistans-blue-economy/news_detail.

end of the Cold War, numerous economies across Asia, South America, and Africa have rapidly developed, altering the traditional geopolitical landscape. Among these changes, China's ascendancy is notably transformative, heralding the advent of a multipolar world anticipated to take shape by the mid-21st century.

China's dramatic rise from an agrarian-based society to becoming the world's second-largest economy is nothing short of remarkable. This growth has been fueled by vast improvements in industrial capacity, technological innovation, and expansive infrastructure projects. At the heart of China's outward-looking strategy is the Belt and Road Initiative (BRI), with the China-Pakistan Economic Corridor (CPEC) as its flagship project, aiming to bolster global connectivity and economic integration.

This strategic pivot reflects a broader transition of global power from the Atlantic to the Pacific, with East Asia, in particular, emerging as a new center of global economic activity. This shift is driven by dynamic economic growth, expanding consumer markets, and the strategic significance of major trade routes. China's proactive engagement in reshaping global governance and increasing its influence within international frameworks underlines its intent to lead in this evolving multipolar environment. Initiatives such as the Asian Infrastructure Investment Bank (AIIB) and the New Development Bank (NDB) are indicative of China's commitment to creating alternatives to Western-centric financial institutions, thus expanding its geopolitical influence.

Within this broad context, CPEC stands as a critical component. Serving as a direct link for China's strategic westward expansion, it provides pivotal access to the Arabian Sea via Pakistan's Gwadar Port. This not only assists China in securing energy supplies from the Middle East but also reinforces its strategic presence in the Indian Ocean—a crucial artery for global trade.

For Pakistan, CPEC presents an unprecedented opportunity to fundamentally enhance its economic framework through improved connectivity, infrastructure upgrades, and deeper regional integration. The project promises substantial economic uplift, potentially catalyzing job creation, poverty reduction, and expanded market access. However, the realization of these benefits is contingent upon navigating a complex array of challenges, including geopolitical tensions, environmental concerns and socio-economic disparities.

As the global center of power gravitates towards the Pacific, the rise of China and the strategic deployment of initiatives like CPEC are reshaping

the international order. CPEC is emblematic of the new dynamics of economic ambition and strategic foresight, fostering a closer partnership between China and Pakistan. This project not only fortifies their bilateral ties but also plays a crucial role in the broader narrative of a multipolar world where influence and power are more evenly distributed among nations.

CPEC has to be understood in the context of Pakistan's and China's strategic interests in South and East Asia, particularly the way the US and the West have challenged them in general. Faced with such difficulties, China hopes to expand its strategic space by heading west, and for Pakistan, strategic relationships and connectivity are seen as essential for socio-economic development. In this regard, President Xi Jinping's statement is of great strategic importance. He said, "Given that the world is seeing more sources of instability and risk, the two countries should stand together more firmly, promote their all-weather strategic cooperative partnership, and build a closer China-Pakistan community of shared future in the new year."⁸

Therefore, viewed from a medium-term perspective, several potential threats can be identified, including emerging-market uncertainties, commercial and political frictions between countries, the proliferation of low-level conflict, and slow progress on global challenges. While China is set to overtake the USA as the largest economy in the coming years, the BRIC nations, which were expected to show notable growth, have suffered due to COVID-19, particularly India, but emerging markets, in general, are by no means a unified group, and in the coming years the economic performance of some of these nations is likely to diverge. U.S.-China containment currently forms the most important instance of great-power competition in the existing interstate system. As a result, it holds within itself the key to the all-important question of global stability, peace and socio-economic development and connectivity through BRI and CPEC. Therefore, looking at it from all perspectives, CPEC is an important and essential element of BRI and has, in the last ten years, rightly received the attention and focus that it deserves from both Pakistan and China

CPEC - The Present

The first phase of CPEC, which is almost complete, has had a positive impact on the lives of millions of Pakistanis by providing better access to

⁸ Naghmana A Hashmi, "A Look at CPEC on the Eve of 13th JCC." *Pakistan Observer*, May 7, 2024 <https://pakobserver.net/a-look-at-cpec-on-the-eve-of-13th-jcc/>

resources and modern infrastructure, addressing the critical energy deficit, creating employment opportunities and enhancing the country's capacity for transit and industrialization. This collaboration has not only bolstered economic and financial cooperation, but has also facilitated people-to-people exchanges and cultural ties, promoting mutual understanding and friendship between the two nations. Today there are over 30,000 Pakistanis getting higher education in prestigious Chinese universities;⁹ hundreds of Chinese traditional medicine hospitals are opening across Pakistan; and tens of thousands of people are traveling to and from China for tourism, business, investment and other purposes. Thousands of Chinese state-owned and private-sector enterprises have their country offices in Pakistan, helping to improve economic and trade relations between the countries.

So far, China has invested almost \$25.4 billion, primarily in energy and infrastructure projects.¹⁰ Another 36 projects worth USD 28.4 billion are in the pipeline. Thus far, CPEC projects have directly or indirectly generated approximately 200,000 jobs in Pakistan, added over 8,000 MW of electricity to the national grid,¹¹ built about 1656 km of road infrastructure¹² and installed 886 km of power transmission lines.¹³ Thus, CPEC has made substantial progress as numerous projects have been completed across Pakistan, including the first metro line in Lahore, Pakistan's second most populous city. China's investment in Pakistan has been instrumental in boosting the country's foreign direct investment and attracting other international investors to the region.¹⁴ CPEC's success has positioned Pakistan as an attractive destination for businesses seeking to capitalize on the opportunities offered by this strategic corridor.

9 China Admissions, "Pakistani Students in China." <https://www.china-admissions.com/pakistani-students-in-china/>

10 Syed Fazl-e-Haider, "China's Big Gamble in Pakistan: A 10 Year Scorecard for CPEC," *The Lowy Institute*, 2023, <https://www.loyyinstitute.org/the-interpreter/china-s-big-gamble-pakistan-10-year-scorecard-cpec>.

11 Planning Commission, "Mega projects of CPEC completed in record time one year," *Ministry of Planning Development & Special Initiatives*, 2023, https://www.pc.gov.pk/web/press/get_press/1031

12 The CPEC Portal, "China Pakistan Economic Corridor. Transportation Infrastructure," <https://cpecinfo.com/transportation-infrastructure/>

13 Murad Ali, "A Decade of China-Pakistan Development Partnership: Achievements and Expectations," *German Institute of Development and Sustainability*, 2023, <https://www.idos-research.de/en/the-current-column/article/a-decade-of-china-pakistan-development-partnership-achievements-and-expectations/>

14 Faisal Malik, "China-Pakistan Economic Corridor: A Decade of Common Development," *China Daily*, 2023, <https://www.chinadailyhk.com/hk/article/343713>

In Gwadar, China has completed several major projects under CPEC that, in addition to Gwadar Port, include the Gwadar Power Plant, the distribution of 2,000 boat engines to the fishermen of Gwadar, the Khuzdar-Panjgur transmission line that connects Makran with the national grid, the new Gwadar International Airport, the Pak-China Friendship Hospital, the Pak-China Technical and Vocational Institute in Gwadar, the Gwadar East Bay Expressway project and the Gwadar Free Zone.¹⁵

Completed Projects under CPEC ¹⁶				
Project Name	Type	Capacity/ Details	Location	Completion Date
Sahiwal Coal-fired Power Plant	Energy	1320MW	Sahiwal, Punjab	October 2017
Port Qasim Coal-fired Power Plant	Energy	1320MW	Karachi, Sindh	2018
China Hub Coal Power Project	Energy	1320MW	Hub, Balochistan	2019
Engro Thar Coal Power Project	Energy	660MW	Thar, Sindh	2019
Quaid-e-Azam Solar Park	Energy	1000MW	Bahawalpur, Punjab	2016
UEP Wind Farm	Energy	100MW	Jhimpir, Thatta	2019
Sachal Wind Farm	Energy	50MW	Jhimpir, Thatta	2017
Three Gorges Second Wind Power Project	Energy	100MW	Jhimpir, Thatta	2019
Karot Hydropower Project	Energy	720MW	AJK/Punjab border	June 2022
HUBCO Thar Coal Power Project	Energy	330MW	Thar, Sindh	September 2022
Matari to Lahore Transmission Line	Infrastructure/ Energy	4000MW transmission capacity	Matari to Lahore	2021

¹⁵ Staff Writer, "Minister Wants Work on CPEC Projects Expedited." *The News International*, <https://www.thenews.com.pk/print/1118007-minister-wants-work-on-cpec-projects-expedited>.

¹⁶ This data has been compiled from the official CPEC website. For details of the completed projects under CPEC see <https://cpec.gov.pk/long-term-plan-cpec#>

Project Name	Type	Capacity/ Details	Location	Completion Date
KKH Phase II (Havelian - Thakot Section)	Infrastructure	120KM	Khyber Pakhtunkhwa	2020
Peshawar-Karachi Motorway (Multan- Sukkur Section)	Infrastructure	392KM	Multan to Sukkur	2019
Lahore Orange Line Metro Train	Infrastructure	27KM	Lahore, Punjab	October 2020
Cross Border Optical Fiber Cable	Infrastructure	820KM	From Khunjerab to Rawalpindi	2018

Chinese Vice Prime Minister He Lifeng visited Pakistan for the 10th anniversary commemorative ceremony in July 2023. On this occasion, both China and Pakistan strongly reaffirmed their commitment to CPEC as “high quality development”, which envisages the building of growth corridor, livelihood-enhancing corridor, a green corridor, a health corridor, knowledge corridor and an open corridor.¹⁷ They also emphasized the speedy completion of the remaining projects, particularly the industrialization of Pakistan through SEZs and revolutionizing the agriculture sector.

In a message on the 10th anniversary of CPEC President Xi Jinping expressing strong support for CPEC, stated that, “China and Pakistan have been advancing CPEC under the principle of extensive consultation, joint contribution and shared benefits and have achieved a number of early harvests....China and Pakistan will continue to improve overall planning and expand and deepen cooperation. No matter how the international landscape may change. China will always stand firmly with Pakistan.”¹⁸ This clear and unambiguous declaration of support by China should not only silence the critics of CPEC but also encourage both governments to work with greater zeal and fervor to complete the remaining projects and expedite the construction and operationalization of the prioritized SEZs.

The real fruits of CPEC will only accrue with the speedy development of SEZs, which will enhance the production of diversified products and value-

17 Abdullah Momand, “Chinese Vice Premier He Lifeng Arrives in Islamabad to Celebrate Decade of CPEC.” *Dawn*, May 8, 2024, <https://www.dawn.com/news/1767479>.

18 “CPEC is 10: Chinese VP in Islamabad to celebrate,” *The Pakistan Military Monitor*, 2023, <https://thepakmilitarymonitor.com/cpec-is-10-chinese-vp-in-islamabad-to-celebrate/>

added merchandise to China, Africa, the Middle East, and Central Asia and even to other South Asian countries, making Pakistan the economic hub of the region. The nine SEZs under CPEC¹⁹ would be a lifetime opportunity for Pakistani companies to collaborate with Chinese companies for the development of export-oriented manufacturing sectors. It will also enable firms to cluster and tap the benefits of external economies and will thus provide an opportunity to put domestic industries on a higher learning curve.

In China, for example, SEZs have become a spectacular success and have emerged as a major driver of growth and exports.²⁰ In order to be successful in Pakistan, SEZs need to be supported with the right policies, including an effective design, ease of conducting business and effective implementation and management of SEZs. To maximize the benefits, it is also important to ensure that there are sufficient linkages between the SEZs and the rest of the economy.

Compared to other emerging markets in the Asia-Pacific, the contribution of the manufacturing sector to Pakistan's GDP is low. As a result, Pakistan faces competition from other countries in Asia that have similar comparative advantages and have successfully developed the manufacturing sector. Pakistan has not been able to attract investment in the manufacturing sector in its SEZs in the same massive way. Much of the growth of manufacturing in countries such as China can be attributed to their SEZ policy, and Pakistan can learn from their experiences that can provide valuable inputs to Pakistan. It is, therefore, important for Pakistan to examine China's SEZ policy for the new SEZs being developed along the CPEC route. Since wage costs in China are now rising, companies are looking for alternative destinations for labor-intensive work.²¹ Pakistan could become an alternative manufacturing hub, and SEZs can be an important cluster development model to replicate China's experience.

Proper establishment and successful running of SEZs are of critical importance for the second phase of CPEC to take off. SEZs under CPEC have the potential to enhance productivity, integrate Pakistan with global

19 "SEZs provide scope for developing export-oriented sector: SEZA chief," *Business Recorder*, 2022, <https://www.brecorder.com/news/40213863>

20 Ejaz Hussain, Muhammad Furqan Rao, "China-Pakistan Economic Cooperation: The Case of Special Economic Zones (SEZs)," *Fudan Journal of Humanities and Social Sciences*, 13(4): 453-72, 2020, 10.1007/s40647-020-00292-5

21 Álvaro Sánchez, "The Waning Charm of China: Multinationals Seek Alternatives to Produce Goods in Asia," *El País*, 2023, <https://english.elpais.com/economy-and-business/2023-08-28/the-waning-charm-of-china-multinationals-look-for-alternatives-to-produce-goods-in-asia.html>

value chains and revive its manufacturing industry in the long run. The development of SEZs must be aimed at improving the country's overall business climate. This can be done through improved infrastructure and trade facilitation to attract investment from foreign and domestic firms in the zones. It is therefore important to remember that in order to make SEZs a success story, Pakistan must take some necessary and urgent steps:

- a. Strengthening the Regulatory and Administrative Framework
- b. Addressing Land-Related Issues
- c. Providing the Right Incentives to SEZs
- d. Encourage Backward and Forward Linkages.

A "CPEC Business Council" has also been established by Pakistan's Board of Investment.²² Foreign investors are encouraged to explore rich dividends offered by Pakistan. SEZ Act of 2012²³ offers lucrative business incentives for investments in CPEC SEZs that include 100 percent repatriation of profits, tax holidays and customs exception on the import of capital goods.

China is now experimenting with different types of service SEZs to diversify their services export basket. This will offer tremendous competition to Pakistan in its services exports. Most countries in the region are also actively engaging in trade agreements, leading to the free movement of goods, services and capital across the region and greater integration with global production networks. Pakistan needs to develop its manufacturing sector and diversify its services sector through SEZs. Pakistan could become an alternative manufacturing hub, and SEZs can be an important cluster development model to replicate China's experience.

It is heartening to see that some of the SEZs already inaugurated are rapidly beginning to establish themselves and, with the passage of time, will emerge as powerful drivers of industrial growth and modernization in Pakistan. It is therefore important to urgently focus on the issues facing SEZs in Pakistan and, with targeted policy interventions, resolve them. Fourth industrial revolution and high-tech manufacturing should form a key component of the industrial cooperation in SEZs under CPEC. The development of technologies and high-end innovation capabilities should be the major goals of China-Pakistan industrial cooperation.

22 Prime Minister Office, Board of Investment, "CPEC Business Council." *Invest Pakistan*, <https://invest.gov.pk/about-us/cpec-business-council>.

23 Finance Division, "Pakistan Economic Survey 2020-21: Annex III - SEZs," 2021, https://www.finance.gov.pk/survey/chapters_21/Annex%20III%20SEZones.pdf

CPEC and Pakistan's Blue Economy

The maritime industry is more than a single industry; it is a parallel economy that connects all other industries. CPEC can serve as a womb for the birth of Pakistan's blue economy. CPEC offers an immense opportunity to explore and exploit Pakistan's untapped blue economy. With CPEC and the robust Gwadar port, the dream to capitalize on the country's blue economy for sustainable growth can be realized. Presently, Pakistan's fish export is around \$ 250-300 million per annum. The industry has the potential to grow to \$2 billion annually due to the positive impact of CPEC and Gwadar port.²⁴ An enhanced maritime partnership between China and Pakistan under CPEC can ensure sustained economic growth for Pakistan in particular and the region in general.

Gwadar is a deep sea port, which has great potential in terms of trade, marine transportation, off-shore exploration, tourism, aqua resort and deep-sea fisheries. According to the Director General of Gwadar Development Authority (GDA), after the execution of the master plan of Gwadar city under CPEC, the city would become the Singapore of Pakistan with a GDP of \$30 billion by 2050 with the production of 1.2 million jobs for the locals.²⁵ So, the success of CPEC and the development of Gwadar will give a great impetus to Pakistan's blue economy. Gwadar's development will pave the way for many subsidiary industries like ship-making, ship-breaking, shipyards construction, tourism and hoteling

Pakistan's blue economy also offers great potential in the marine transportation sector. Presently, Pakistan has only 12 ships and one shipbreaking yard at Gadani. Pakistan's freight bill is \$5 billion per annum.²⁶ The construction of a new shipyard at Gwadar and the regular shipping service by the China Ocean Shipping Company (COSCO) from Gwadar port and the development of Kati Bandar port in Sindh under CPEC will usher a new beginning for our marine transportation sector.²⁷ It will also make a feasible ground for the development of other related industries like

24 "Pakistan's seafood exports have massive growth potential," *The Nation*, 2023, <https://www.nation.com.pk/31-Aug-2023/pakistan-s-seafood-exports-have-massive-growth-potential>

25 Behram Baloch, "Gwadar port to Become Economic Hub, Like Singapore," *Dawn*, 2020, <https://www.dawn.com/news/1535937>

26 Kalbe Ali, "Shipping Lines May Stop Pakistan Operations, Warns PSAA," *Dawn*, 2023, <https://www.dawn.com/news/1732815>.

27 "Pakistan to commence Gwadar shipyard project," *Ship Technology*, 2021, <https://www.ship-technology.com/news/pakistan-gwadar-shipyard-project/?cf-view>

ship-making, ship-breaking, seafaring, aquaculture, minerals and offshore basins which will not only value-add to our ports and marine transportation but will also generate millions of employment opportunities.

China's strengths will help develop Pakistan and eradicate absolute poverty. As part of the philosophy of a "community of shared future for mankind", China makes strong links to the UN SDGs and uses the 2030 Agenda to frame its development efforts. China is now exploring and focusing on sectors and expanding investments in areas strongly linked to the Sustainable Development Goals (SDGs). The recently announced Global Development Initiative of China²⁸ squarely focuses on socio-economic development and mitigating the effects of climate change in venerable countries like Pakistan. Pakistan has already chosen the route of blue development by adopting Agenda 2030²⁹ and is following different targets of Sustainable Development Goals (SDG-14) to attain the desired objectives. China has also dedicated a large amount to supporting the developing countries to meet their climate-related requirements and also to meet the SDGs. Pakistan, under CPEC, can request funds under the GDI of China for the development of its poorest regions.

CPEC provides Pakistan with an opportunity to focus on benefiting from the extraordinary Chinese experience of poverty alleviation by formalizing the China-Pakistan poverty alleviation partnership for eradicating poverty in Pakistan. In this regard, major poverty alleviation demonstration zones should be created across Pakistan. Agricultural modernization and proposed integrated city clusters and functional zone development under CPEC should create positive externalities for poverty alleviation in Pakistan.

Climate change is one of the fundamental challenges to life as we know it. CPEC is considered a role model for China's overseas engagement. To ensure CPEC's green and sustainable development, committing to adaptation, monitoring, and evaluation of environmental strategies is imperative during the project's execution. Under the aegis of CPEC, the two states cooperate in green and sustainable energy projects. The Karot Hydropower Project³⁰ exemplifies such a vision. During the Project's

28 Rebecca Ivey, "How China's Global Development Initiative Is Addressing Global Challenges," *World Economic Forum*, 2022, <https://www.weforum.org/agenda/2022/05/china-global-development-initiative/>

29 "Blue Economy Development Framework," *World Bank Group*, 2016, <https://thedocs.worldbank.org/en/doc/446441473349079068-0010022016/original/AMCOECCBlueEconomyDevelopmentFramework.pdf>

30 "Karot Hydropower Station in Pakistan," Ministry of Water Resources of the People's Republic of China, 2021, http://www.mwr.gov.cn/english/overseaprojects/202112/t20211213_1554866.html

execution, a biodiversity management plan was developed to protect the aquatic and wildlife while taking strict measures to protect river water quality around the project site.

CPEC will promote green development. In this regard, Pakistan's membership of the Belt and Road International Green Development Coalition (BRIGC)³¹ should be appropriately leveraged. Diverse public and private institutions and organizations should utilize the benefits to be derived from participation in the ten thematic partnerships of BRIGC to utilize financing, investment, technological, legal, regulatory, research and communication, and capacity-building opportunities of such participation.

Multilateral cooperation for CPEC development is a key priority. The integration of CPEC with the Economic Cooperation Organization (ECO) should be promoted and new development realities, such as the recent China-Iran 25-year partnership deal³² should be utilized for the regionalization of CPEC. CPEC has now been connected to Afghanistan. Under a trilateral agreement³³ China, Pakistan and Afghanistan will identify feasible projects to help Afghanistan meet its infrastructure and development deficit. CPEC has the potential to transform Pakistan into a geo-economic hub³⁴ and its regional extension to Afghanistan and Central Asia will help expedite regional integration and development, leading to peace and prosperity.

CPEC and Bilateral Trade between China and Pakistan

With the improvements in connectivity infrastructure, bilateral trade between China and Pakistan is growing and stood at \$17.49 billion in 2020. Pakistan recorded a nearly 70% increase in exports to China in the first quarter of 2021, with \$888 million as compared to \$526 million

31 BRIGC International Green Development Coalition (BRIGC), "BRI Green Development Case Study Report," 2020, http://en.brigc.net/Reports/research_subject/202011/P020201129780236943177.pdf

32 Ali Shah, "Inclusive and Cooperative Development of CPEC," NUST *Institute of Policy Studies*, 2021, <https://nips.nust.edu.pk/storage/2020/07/NIPS-Report-Inclusive-and-Cooperative-Development-of-CPEC-25.05.2021.pdf>

33 Roshan Noorzai, Nazrana Yousufzai, "Extension of China-Pakistan Corridor to Afghanistan Presents Challenges," *Voice of America*, 2023, <https://www.voanews.com/a/extension-of-china-pakistan-corridor-to-afghanistan-presents-challenges-/7178387.html>

34 Khalid Masood, "From Vision to Reality: Celebrating a Decade of CPEC," Pivot, *Institute of Strategic Studies Islamabad*, 2023, https://issi.org.pk/wp-content/uploads/2023/12/Pivot_Magazine_Oct_2023.pdf

in the same period. In 2023, the total trade volume between China and Pakistan reached approximately \$23.79 billion. China's exports to Pakistan amounted to \$21 billion, while Pakistan's exports to China were \$2.79 billion.³⁵

Pakistan's exports to China have seen a significant increase. In the first five months of 2022, exports reached \$1.605 billion, marking a 5.42% year-on-year increase.³⁶ The bilateral trade potential between the two countries is projected to reach \$50 billion within the next five years. The China-Pakistan Free Trade Agreement (CPFTA-II) has provided zero-tariff market access for 313 major export commodities from Pakistan, which is expected to further boost trade volumes.³⁷

The rapidly growing bilateral trade between China and Pakistan, as highlighted by the latest figures, has significant implications for both countries and the broader region. The increase in trade volumes from \$17.49 billion in 2020 to approximately \$23.79 billion in 2023 underscores the positive impact of strategic economic initiatives such as the China-Pakistan Economic Corridor (CPEC) and the China-Pakistan Free Trade Agreement (CPFTA-II). These initiatives have not only facilitated trade but have also led to substantial economic growth and development in both countries.

Rewriting the CPEC Narrative

Being a pilot project of China's Belt and Road Initiative (BRI), the China-Pakistan Economic Corridor (CPEC) has been subject to intense scrutiny and criticism, particularly from Western media and governments. This scrutiny often manifests as propaganda aimed at portraying CPEC negatively, raising concerns about debt traps, sovereignty, and environmental impacts. There is an urgent need to disabuse public opinion of these notions and provide a balanced view of CPEC's contributions.

35 "China Remains Pakistan's Largest Trading Partner in 2022-23," *Pakistan Today*, March 6, 2023, <https://www.pakistantoday.com.pk/2023/03/06/china-remains-pakistans-largest-trading-partner-in-2022-23/>.

36 "Pakistan's Exports to China Up Nearly 6%," *The Express Tribune*, June 22, 2022, <https://tribune.com.pk/story/2362766/pakistans-exports-to-china-up-nearly-6>.

37 Pakistan Business Council, "Preliminary Analysis of Pak-China FTA Phase II," *Pakistan Business Council*, accessed May 20, 2024, <https://www.pbc.org.pk/research/preliminary-analysis-of-pak-china-fta-phase-ii/>.

Countering the Vilification Campaign

To ensure the continued vitality and progress of CPEC, it is crucial to proactively counter the negative narratives. This can be achieved through a multi-faceted strategic communications campaign that emphasizes the tangible benefits CPEC has brought to Pakistan. These benefits include significant improvements in infrastructure, energy production, and economic opportunities, which are often overshadowed by the negative discourse.

One of the most impactful ways to reshape the narrative is by showcasing the direct economic benefits of CPEC. This includes visible increases in agricultural and industrial production, leading to job creation and enhanced exports. By emphasizing how CPEC projects have led to the development of new industries and the revitalization of existing ones, the campaign can demonstrate the project's positive impact on the Pakistani economy.

CPEC has led to the construction of crucial infrastructure, including roads, highways, and energy projects, which have improved connectivity and reduced energy shortages in Pakistan. Highlighting these achievements can help counter the narrative that CPEC is merely a tool for Chinese expansion. Instead, it can be portrayed as a mutually beneficial initiative that addresses Pakistan's critical infrastructure needs.

Sharing success stories of individuals and communities that have benefited from CPEC projects can humanize the initiative and make its benefits more relatable. These stories can include farmers who have gained access to better markets, entrepreneurs who have seen their businesses grow, and workers who have found stable employment due to new industries.

Strategic Communications

Strategic communication plays a pivotal role in managing the transition and winning the hearts and minds of various stakeholders, including the local population, international observers, and potential investors. A well-coordinated communication strategy should include:

Tailoring messages to different audiences is essential. For local audiences, the focus should be on immediate benefits such as job creation, improved infrastructure, and economic opportunities. For international audiences, emphasizing the long-term strategic and economic benefits of CPEC can help counteract the negative propaganda.

Ensuring transparency in CPEC projects can help build trust and counter claims of corruption and exploitation. Regular updates on project progress, financial details, and environmental impact assessments can provide a clearer picture of CPEC's operations and intentions.

Utilizing local and international media to disseminate positive stories about CPEC can help shift the narrative. Collaborating with influencers, journalists, and analysts who understand the region's dynamics can amplify these messages and reach a broader audience.

In today's digital age, social media and online platforms are powerful tools for communication. Creating engaging content, such as videos, infographics, and articles, that highlight the benefits of CPEC can reach a wide audience and counter negative narratives effectively.

To effectively broaden local ownership of CPEC investments and counter the criticism from Western-aligned media amid rising tensions between China and the United States, a nuanced and strategic communication campaign is essential. It is important to recognize that the United States remains one of Pakistan's largest trading partners and holds substantial influence due to Pakistan's reliance on multilateral financing to address its chronic financial gaps. Over the years, multilateral and bilateral funding institutions have deepened their engagement with mainstream media and think tanks in Pakistan.

Rewriting the narrative around CPEC involves more than just countering negative propaganda; it requires a comprehensive and proactive approach to communication. By highlighting the tangible benefits of CPEC, promoting success stories, ensuring transparency, and engaging with various stakeholders through targeted messaging, Pakistan can effectively demonstrate the transformational impact of CPEC on the lives of its people. This strategic communication effort is essential for sustaining the momentum of CPEC and ensuring its long-term success as a cornerstone of Pakistan's economic development.

CPEC and Pakistan's Security Challenges

The implementation of the China-Pakistan Economic Corridor (CPEC) in Pakistan has faced significant challenges, particularly due to internal security concerns. Various militant groups, including the Tehreek-e-Taliban Pakistan (TTP) and the Balochistan Liberation Army (BLA), have targeted

CPEC projects, posing serious threats to both the infrastructure and personnel involved.³⁸

These groups have targeted various projects, including the Gwadar port and the Dasu hydropower project, resulting in casualties and disruptions. For instance, in March 2024, a suicide bomber attacked a convoy of Chinese engineers in Khyber Pakhtunkhwa, killing five Chinese nationals and their local driver.³⁹ This attack followed an earlier incident where BLA militants attempted to infiltrate the Gwadar port Authority complex, leading to a prolonged gunfight with security forces.⁴⁰

The Pakistani government has taken various measures to address these security issues, including conducting military operations and establishing a special security unit dedicated to protecting CPEC projects. Despite these efforts, the ongoing attacks underscore the need for a multifaceted approach to achieve long-term security. This approach involves not only military and policing efforts but also addressing the root causes of militancy through socio-economic development, improving education and employment opportunities in underdeveloped regions, and ending foreign interventions that fuel local insurgencies.⁴¹

On the diplomatic front, both China and Pakistan have reiterated their commitment to CPEC. China's foreign ministry has emphasized the importance of the corridor and has called for stronger security measures to protect its nationals working in Pakistan. This bilateral cooperation underscores the strategic importance of CPEC to both countries and their determination to overcome security challenges to achieve their mutual economic goals.⁴²

38 Qazi, M. N., Ahmad, M. A., Saleem, M., Khan, R. S. M., Qadri, M. A., "Internal and External Security Challenges to CPEC," *Journal of the Research Society of Pakistan*, 57(1), 2020, https://pu.edu.pk/images/journal/history/PDF-FILES/65_57_1_20.pdf

39 "Suicide Attack in Pakistan Kills 5 Chinese Nationals and Their Local Driver," *The Diplomat*, March 26, 2024, <https://thediplomat.com/2024/03/suicide-attack-in-pakistan-kills-5-chinese-nationals-and-their-local-driver>.

40 Abid Hussain, "Pakistan's Gwadar port Attacked, Eight Armed Fighters Killed," *Al Jazeera*, March 20, 2024, <https://www.aljazeera.com/news/2024/3/20/pakistans-gwadar-port-attacked-eight-armed-fighters-killed>.

41 Abdul Basit, "Surge in Attacks on Chinese Nationals, Projects Amid Pakistan's Dire Security Situation," *The Diplomat*, March 26, 2024, <https://thediplomat.com/2024/03/surge-in-attacks-on-chinese-nationals-projects-amid-pakistans-dire-security-situation/>.

42 Ayaz Gul, "China Says 'Deeply Rooted' Ties with Pakistan Unaffected by Terror Attack," *Voice of America*, March 27, 2024, <https://www.voanews.com/a/china-says-deeply-rooted-ties-with-pakistan-unaffected-by-terror-attack/7545833.html>.

Additionally, the success of the CPEC project is conditional to the economic and political stability of the country. If there is continuity in Pakistan's economic policies, along with political stability, then investment in CPEC and other projects will continue to grow. CPEC is a geo-strategically significant project for both China and Pakistan. It will enable China to get out of the Malacca dilemma and provide an alternative trade route to China. For Pakistan, CPEC is a ray of hope in the prevailing tough economic and geopolitical environment, where it has limited foreign policy options.

Conclusion

Since the inception of the project, CPEC has been one of the most popular and well-supported projects in the history of Pakistan. The stakeholders of the project tried to utilize all available resources to ensure the timely completion of this mega project. For China and Pakistan, these development initiatives under CPEC are a potential source of stability and prosperity for both countries. From a Chinese perspective, cooperation in the areas of security and economics is closely intertwined, and improvements on one side can improve the other. It is almost as though security and economics are two separate wheels on the same vehicle, and both need to be spinning to move things forward.

China is keenly now focused on solidifying concentric spheres of geo-economic influence. In West Asia, BRI projects will advance especially fast in Iran, as part of the 25-year deal signed between Beijing and Tehran⁴³ and the definitive demise of the Joint Comprehensive Plan of Action (JCPOA) – or Iran nuclear deal which will translate into no European investment in the Iranian economy. Iran is not only a BRI partner but also a full-fledged member of the Shanghai Cooperation Organization (SCO). It has clinched a free trade agreement with the Eurasian Economic Union (EAEU),⁴⁴ which consists of post-Soviet states Russia, Armenia, Belarus, Kazakhstan and Kyrgyzstan. Iran is, today, arguably the key interconnector of the International North-South Transport Corridor (INSTC), opening up the Indian Ocean and beyond, interconnecting not only with Russia and India

43 "Iran, China reach new agreements under 25-year partnership," *Tehran Times*, 2022, <https://www.tehrantimes.com/news/491058/Iran-China-reach-new-agreements-under-25-year-partnership>

44 'Azimzhan Khitakhunov, Can the EAEU and Iran FTA Boost Eurasian Trade?' *Eurasian Research Institute*, 2023, <https://www.eurasian-research.org/publication/can-the-eaeu-and-iran-fta-boost-eurasian-trade/>

but also China, Southeast Asia, and even, potentially, Europe – assuming the EU leadership will one day see which way the wind is blowing.

In the Arab world, China is already increasing its influence both politically and economically. President Xi's December 2022 visit to Saudi Arabia⁴⁵ is the diplomatic blueprint on how to rapidly establish a post-modern quid pro quo between two ancient, proud civilizations to facilitate a New Silk Road revival. Although the Arab leaders may be feeling pressure from the West, in view of the apparent shifting of the political and economic power towards China, they have realized that it is time to strike a balance and have therefore adopted a more multipolar agenda.

Similarly, China is keen to work with the GCC⁴⁶ to set up a new paradigm of all-dimensional energy cooperation within a timeline of three to five years. China will continue to import a lot of crude, long-term, from GCC nations, and way more Liquefied Natural Gas (LNG).⁴⁷ Beijing will strengthen its cooperation in the upstream sector, engineering services, as well as downstream storage, transportation, and refinery. The Shanghai Petroleum and Natural Gas Exchange platform will be fully utilized for RMB settlement in oil and gas trade, and they could soon start currency swap cooperation.⁴⁸ In parallel, the BRI will get a boost as President Xi's initiative of a Green BRI complements Saudi Arabia's desire for sustainable development, construction of factories, new job opportunities and Mohammad bin Salman's Vision 2030.⁴⁹

The containment of China policy pursued by the USA makes the Indian Ocean Region (IOR) the future of world politics. With India becoming the

45 Arab Center for Research and Policy Studies, "Xi Jinping's Visit to Saudi Arabia and Prospects for China-GCC Relations," 2022, <https://www.dohainstitute.org/en/Lists/ACRPS-PDFDocumentLibrary/xi-jinping-visit-to-saudi-arabia-and-prospects-for-china-relations.pdf>

46 Jan Yumul, Yang Han, "Xi Jinping Attends China-Arab States Summit, Delivers Speech," *China Daily*, 2022, <https://www.chinadaily.com.cn/a/202212/10/WS639461d1a31057c47eba3c22.html>.

47 Joseph Webster, Joze Pelayo, "China is getting comfortable with the Gulf Cooperation Council. The West must pragmatically adapt to its growing regional influence," *Atlantic Council*, 2023, <https://www.atlanticcouncil.org/blogs/menasource/china-is-getting-comfortable-with-the-gulf-cooperation-council-the-west-must-pragmatically-adapt-to-its-growing-regional-influence/>

48 Xinhua, "China's central bank signs 40 currency swap agreements with foreign counterparts," The State Council Office of PRC, 2024, http://english.scio.gov.cn/pressroom/2024-02/17/content_117003378.htm.

49 Mahesh Pathak, "The Belt and Road Initiative and Saudi Vision 2030 Will Bring New Prosperity," *China Focus*, 2023, http://www.chinatoday.com.cn/ctenglish/2018/commentaries/202309/t20230906_800341424.html

sixth largest economy⁵⁰ of the world bypassing France's, it naturally has started to assert itself in the region. The Indian hegemonic ambition in the IOR is a matter of deep concern for China as it is heavily dependent on the Ocean for its trade activities. Pakistan would also not like to see a strong Indian presence in the IOR as it would undermine its security and economic interests. In addition to this, the Quad,⁵¹ consisting of Australia, India, Japan and the US, is not in favor of allowing China to make inroads into the IOR.

With the successful convening of the Third Belt and Road Forum in 2023⁵² after a two-year hiatus due to the COVID-19 pandemic, a definitive tone has been established for the future across the entire geopolitical and geo-economic landscape. In parallel to its geo-economic breadth and reach, BRI was conceived as China's overarching foreign policy concept in the middle of this century. It is expected that along the BRI's several connectivity corridors, BRI is bound to be re-dimensioned to adapt to the post-COVID environment, the reverberations of the war in Ukraine, and a deeply debt-distressed world.

Despite the strong opposition of the West to BRI, an increasing number of countries around the world, including European states are joining the BRI⁵³ as they realize that this trend of comprehensive connectivity in the 21st century is irreversible. Although the West criticizes BRI and particularly CPEC by targeting China's peaceful intentions, it realizes that connectivity is the way forward to global peace and development, and the US has, therefore, announced its own connectivity initiative and has allocated USD six billion for the project.⁵⁴

50 "Top 15 Countries by GDP in 2022," *Global PEO Services*, 2022, <https://globalpeoservices.com/top-15-countries-by-gdp-in-2022/>

51 Kevin Rudd, "Why the Quad Alarms China. Asia Society," *Asia Society*, 2021, <https://asiasociety.org/policy-institute/why-quad-alarms-china>

52 Lili Pike, "The Belt and Road Ahead," *Foreign Policy*, 2023, <https://foreignpolicy.com/2023/10/19/china-xi-jinping-putin-bri-debt/>

53 Elaine Dezenski, "China's Belt and Road Initiative is bringing new risks to Europe," *Euronews*, 2024. <https://www.euronews.com/my-europe/2024/02/28/chinas-belt-and-road-initiative-is-bringing-new-risks-to-europe>

54 "India Middle East Europe Economic Corridor," *Blackridge Research and Consulting*, 2024, <https://www.blackridgeresearch.com/project-profiles/india-middle-east-europe-economic-corridor-imec-imeec-project>

About the author

Ambassador Naghmana A. Hashmi retired from the Foreign Service of Pakistan after 37 years of distinguished career. She was Pakistan's Ambassador to important countries like China, European Union, Belgium, Luxembourg, and Ireland. She was also Deputy Head of Mission in China, Denmark, Indonesia and France. Ambassador Hashmi also held important posts at the Foreign Office including Additional Foreign Secretary for Americas, Policy Planning and Public Diplomacy, Director General OIC and Policy Planning, Director UN, International conferences & Commonwealth, personnel, Africa, South East Asia and Foreign Secretary's Office. She has several publications to her credit like Magnificent Pakistan, Pakistan-China All Weather Friendship, ISHQ- Our Sufi Tradition among others. She is a prolific writer and contributes articles to national and international newspapers and magazines. Ambassador Hashmi is currently the Advisor to China Study Centre ISSI, Vice Chair Council on Global Policy, Sanobar Institute, Senior Fellow BRI Investment Forum and Kestral. Ambassador Hashmi also teaches at several prestigious universities and professional institutions.

Chapter 2

CPEC Beyond-2030: Policy Lessons For Developing Environmentally Sustainable Special Economic Zones (SEZs)

Dr. Hassan Daud Butt

Introduction

Green development refers to the style of development that gives significance to the environmental and social impacts of development.⁵⁵ The construction of the Green Belt and Road is an important aspect for the achievement of a green transition in line with the United Nations 2030 Agenda for Sustainable Development.⁵⁶ The experts have defined this concept by using three sub-categories, which include resource efficiency, environmental responsiveness and community sensitivity. Resource efficiency refers to gaining optimum results by utilizing minimum resources to conserve energy and natural resources. Environmental responsiveness refers to carefully analyzing the impact of the development on the environment and then developing innovative ways to reduce the deterioration of the environment due to that development. In community sensitivity, one recognizes the cultural and traditional values that each community has and how those values would be affected by the development in that region.⁵⁷

China is at the forefront of driving the shift towards green and sustainable development, as demonstrated by its Global Development Initiative (GDI), aiming to fulfill the United Nations' 2030 Sustainable Development Goals (SDGs),⁵⁸ through a well-rounded and inclusive development approach. China's Belt and Road Initiative (BRI) is considered one of the most ambitious geo-economic projects of human history. When the idea of BRI was conceived and put forth in 2013, the Asian economies yearned for infrastructural development and trade connectivity. That's how 56 countries joined this project in the first phase and the project evolved into an unprecedented linkage of land routes and the maritime Silk Road.⁵⁹

55 Muhammad Mohiuddin, Marie Helene Regnière, Albert Su, Zhan Su, "The Special Economic Zone as a Locomotive for Green Development in China," *Asian Social Science*, 10(18), p. 109, 2014, <https://doi.org/10.5539/ass.v10n18p109>.

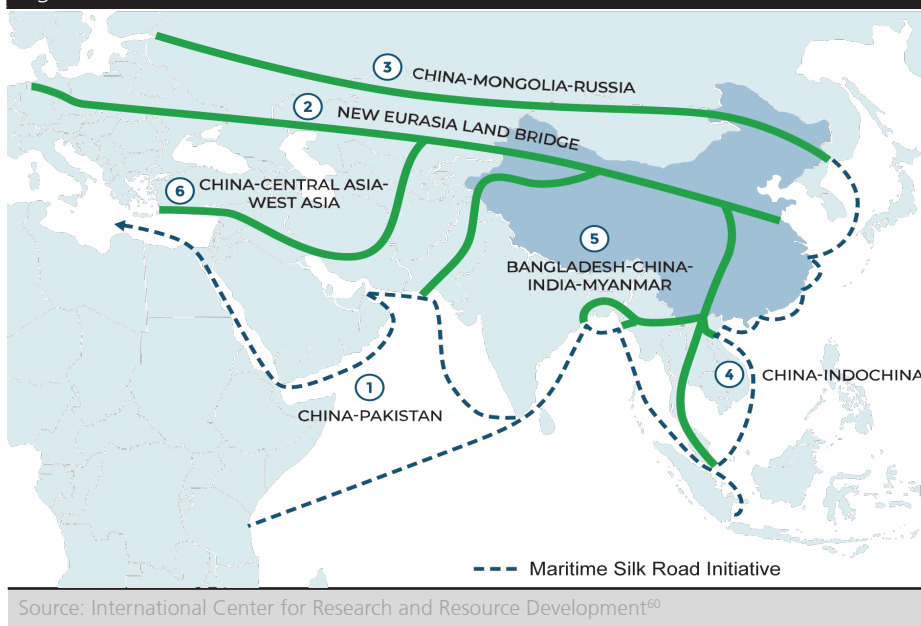
56 Cheng Cuiyun, Ge Chazhong, "Green development assessment for countries along the belt and road," *National Library of Medicine*, 2020, <https://pubmed.ncbi.nlm.nih.gov/32174542/>.

57 OECD, "Towards Green Growth," OECD Green Growth Studies, *OECD Publishing*, 2011, <https://doi.org/10.1787/9789264111318-en>.

58 Simming Yu, Muhammad Safdar Sial, Dang Khoa Tran, Alina Badulescu, Phung Anh Thu, Mariana Sehleanu, "Adoption and implementation of sustainable development goals (SDGs) in China—Agenda 2030," *Sustainability*, 12(15), 6288, <https://doi.org/10.3390/su12156288>.

59 Man Hung Thomas Chan, "The Belt and Road Initiative - The New Silk Road: a research agenda," *Journal of contemporary East Asia Studies*, 2019, <https://www.tandfonline.com/doi/full/10.1080/124761028.2019.1580407>

Figure 1: Maritime Silk Road Initiative



The initiative includes the development of six economic corridors:

1. The New Eurasia Land Bridge Economic Corridor.
2. The China-Mongolia-Russia Economic Corridor.
3. China-Central Asia-West Asia Economic Corridor.
4. China-Indochina Peninsula Economic Corridor.
5. China-Pakistan Economic Corridor.
6. Bangladesh-China-India-Myanmar Economic Corridor.

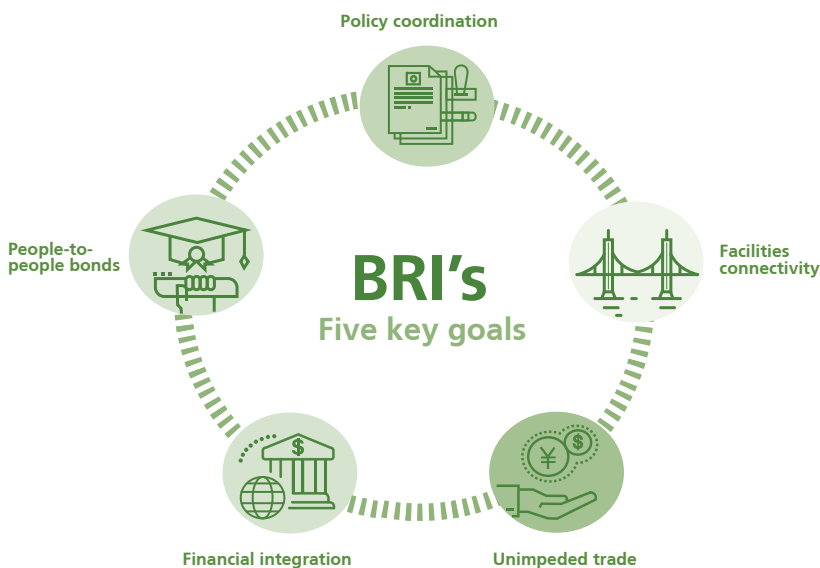
The significance of this initiative becomes apparent when considering that even the United Nations recognizes it as an opportunity to achieve Sustainable Development Goals, addressing issues such as poverty reduction, provision of clean water, and conservation of terrestrial and maritime life.⁶¹ While many perceive it primarily as an infrastructure initiative, focusing

⁶⁰ Gurbuz, Eren, "Latent Comparative Advantages of Turkish Economy in China under the Belt and Road Initiative," *Icrrd*, 2023. <https://icrrd.com/public/media/20-09-2023-025654Belt-and-road-Initiative.pdf>.

⁶¹ Simming Yu, Muhammad Safdar Sial, Dang Khoa Tran, Alina Badulescu, Phung Anh Thu, Mariana Sehleanu, "Adoption and implementation of sustainable development goals (SDGs) in China—Agenda 2030," *Sustainability*, 12(15), 6288, 2020, <https://doi.org/10.3390/su12156288>.

on energy projects and creating transport links for seamless trade across various countries, such a narrow perspective fails to encapsulate the true magnitude of this colossal undertaking.⁶² The Belt and Road Initiative (BRI) encompasses a multitude of projects that aim to connect China with the rest of the world, providing the nation with uninterrupted and stable access to crucial natural resources.⁶³ Furthermore, the development of infrastructure projects is expected to significantly enhance the exports of China's services sector. While the concept of global market outreach is not novel for China, the inauguration of BRI has undoubtedly accelerated its pace.

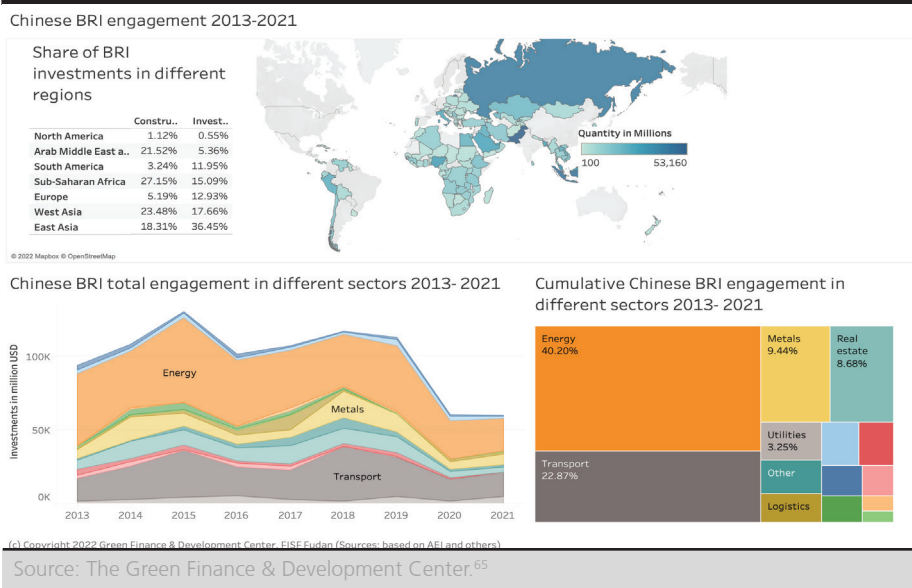
Figure 2: BRI's five key goals



Source: Sourcing and Supply Chain.⁶⁴

- 62 Nilofar Fallah Shayan, Nasrin Mohabbati Kalejahi, Sepideh Alavi, Muhammad Ali Zahid, "Sustainable development goals (SDGs) as a framework for corporate social responsibility (CSR)," *Sustainability*, 14(3), 1222, 2022, <https://www.mdpi.com/2071-1050/14/3/1222>.
- 63 Haiyang Zhu, Shiyu Chen, Muhammad Irfan, Mingjun Hu, Jin Hu, "Exploring the role of the Belt and Road Initiative in promoting sustainable and inclusive development," *Sustainable Development*, 32(1), p. 712-723, 2024, <https://doi.org/10.1002/sd.2705>.
- 64 Kalaria, Chirag, "Belt and Road Initiative (BRI)– China's Supply Chain Game Plan," *Sourcing And Supply Chain*, 2019, <https://sourcingandsupplychain.com/belt-road-initiative-bri-chinas-supply-chain-game-plan/>

Figure 3: China's BRI Engagement 2013-2021



In tandem with this, China is actively engaged in another vital initiative known as the Global Development Initiative (GDI). As a committed member of the Group of Friends of GDI, Pakistan aligns itself with the pursuit of Sustainable Development Goals and recognizes the China-Pakistan Economic Corridor (CPEC) as a noteworthy manifestation of the Belt and Road Initiative, playing a pivotal role in advancing these goals.⁶⁶ To ensure the green and sustainable development of CPEC, a crucial step involves committing to environmental strategies such as adaptation, monitoring, and evaluation throughout the project's implementation. Additionally, fostering consensus among all stakeholders and both federal and provincial governments is imperative for the successful execution of these projects. Despite the presence of adversarial forces opposing CPEC, the emphasis should be on maximizing the project's benefits for the economy and overall prosperity of the country, rather than indulging

⁶⁵ Chen, Lefei. "PODCAST: The China in Africa Podcast Invited the IIGF Green BRI Center to Discuss Whether the BRI Indeed Becomes More Green – Green Finance & Development Center," February 12, 2021. <https://greenfdc.org/podcast-the-china-in-africa-podcast-invited-the-iigf-green-bri-center-to-discuss-whether-the-bri-indeed-becomes-more-green/>.

⁶⁶ Murad Ali, "The China-Pakistan Economic Corridor: Tapping potential to achieve the 2030 agenda in Pakistan." *China Quarterly of International Strategic Studies*, 04 (02) : 301–25, 2018, <https://doi.org/10.1142/s2377740018500094>.

in doubt or scrutinizing potential faults in the initiative.⁶⁷ Looking ahead, China's evolving development model is likely to play a significant role in shaping the future landscape of international cooperation and sustainable development, adding another layer of importance to initiatives such as BRI and GDI.⁶⁸ China, in collaboration with global partners, is actively working towards the effective realization of these initiatives, aiming to translate conceptual ideas into tangible reality. Their focus is on fostering development through diverse cooperation platforms across multiple sectors, including education, addressing the challenges for tackling climate issues, promoting industrialization, advancing agriculture, and alleviating poverty.

Special Economic Zones

The term 'Special Economic Zone' refers to a specifically designated geographical area intended for commercial and industrial activities, featuring more favorable fiscal conditions than the country's general economic policies. Economic progress in developing nations often faces obstacles such as limited capital, a shortage of skilled labor, and restricted market access. Collaborative efforts between the public and private sectors play a pivotal role in fortifying and expediting growth and development, leveraging their combined investment capabilities, deployment of skilled human resources, and expanding market reach. As a leader in championing sustainable growth and environmental protection, the experiences of Chinese Special Economic Zones (SEZs), while varying in speed and performance, are generally considered successful despite facing several challenges and criticisms.⁶⁹ The current trend observed in numerous countries, including Greece, India, Mauritius, and Nigeria, opting to emulate the Chinese SEZ model, underscores the significant benefits SEZs can offer.⁷⁰ However, even with over 30 years of existence, SEZs continue to play a crucial role in China's development. The nation is currently grappling with increasingly complex challenges in terms of innovation, governance, social justice, and,

67 Hassan Daud Butt, Urooj Aijaz, Osman Bin Saif, Abdullah Athar, "Following the Chinese path in Post-Covid era," 2023, <https://www.journalppw.com/index.php/jpsp/article/view/16395>.

68 Douglas Z Zeng, "The Past, Present, and Future of Special Economic Zones and Their Impact," *Journal of International Economic Law*, 2021, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8083530/>.

69 Bhaskar Goswami, "SEZs: Lessons from China," *India Together*, 2007, <https://indiatogether.org/sezschina-opinions>

70 "Greece plans "special economic zones" to boost growth," *Reuters*, 2012, <https://www.reuters.com/article/idUSBRE87R099/>

notably, sustainable economic development. An SEZ is a designated area within a country crafted to stimulate positive economic growth, typically operating under distinct and more advantageous economic regulations than other regions within the same country.⁷¹

SEZs differ greatly in their type and incentives for investors. Overall, SEZs offer several advantages:

- a. Foreign Exchange Earnings
- b. FDI
- c. Industrial Growth
- d. Export Diversification
- e. SME sector development
- f. Capacity building
- g. Center of excellence for industrial development (this again should be in initial part)

Special Economic Zones (SEZs) play a pivotal role as accelerators of economic growth and development, particularly in developing nations. These zones incentivize investors, fostering quicker business activities under more favorable terms. Furthermore, SEZs generate employment opportunities, contributing to swift development in targeted areas and proving to be effective instruments for attracting both local and foreign investments.⁷² This framework supports large-scale production and businesses, encourages export-led growth, and boosts competitiveness. The resulting economic upswing creates conditions conducive to technological advancement, completing the entire production cycle from manufacturing to distribution and consumption.⁷³ Profits are subsequently reinvested in various ways, benefiting investors and societies alike. This underscores the interconnectedness of technology, economic expansion, and the overall prosperity of stakeholders. Notably, SEZs are viewed as experimental grounds for reshaping a country's economic development and

71 Giovanni Valentini, "Special Economic Zones in Latecomer Countries: Time to Bring Environmental Sustainability to the Fore," *The Oxford Handbook of Industrial Hubs and Economic Development*, Oxford Handbooks, 2020, <https://doi.org/10.1093/oxfordhb/9780198850434.013.23>

72 Hassan Daud Butt, Urooj Aijaz, Dr. Riaz Ahmed, "Development and Management of Integrated SEZs as Stimulus to Economic Growth," *Pakistan Journal of International Affairs*, 4(2), 2021, <https://pjia.com.pk/index.php/pjia/article/view/178>.

73 Saira Naeem, Abdul Waheed, Muhammad Naeem Khan, "Drivers and barriers for successful special economic zones (SEZs): Case of SEZs under China Pakistan economic corridor," *Sustainability*, 12(11), 4675, 2020, <https://doi.org/10.3390/su12114675>.

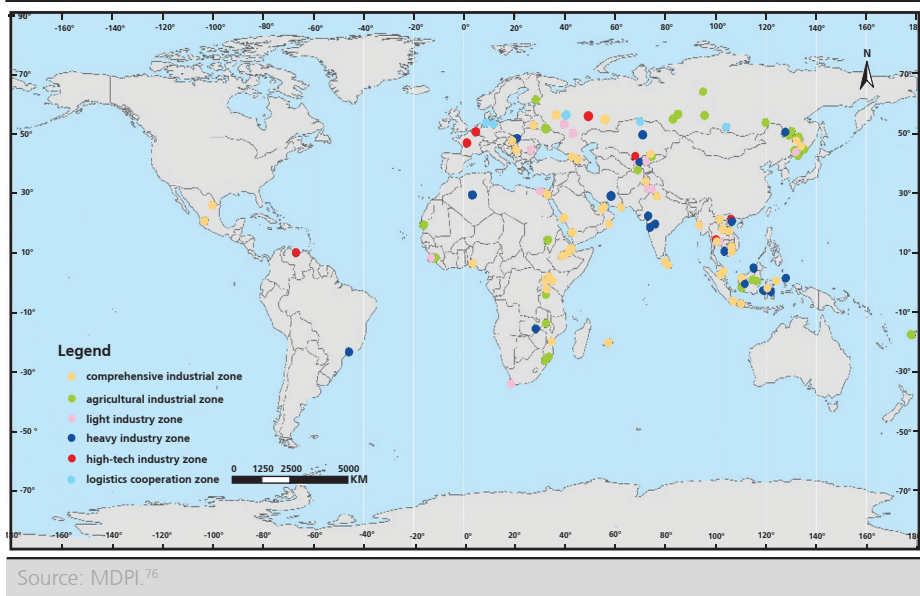
governance systems.⁷⁴ In today's world, the political and economic pursuits of nations are intertwined. While the governance system provides direction and strategy for development, economic well-being contributes to growth and sustainability. Despite abundant natural resources and favorable geography, an imbalance between human resources and investment capital often exists in many developing countries, particularly in the South Asian Region. The abundance of human resources, particularly unskilled labor, in this region faces challenges of low productivity and limited employability. This emphasizes the necessity for private sector involvement in developing human resources to enhance employment opportunities and strengthen the purchasing power of the population, ultimately supporting continuous development. This requires a significant investment that cannot be solely borne by the government; active private-sector participation is crucial to fostering competitive businesses.

Throughout history, economic growth in less developed countries with a surplus of predominantly unskilled labor has been slow. The primary obstacle is that unskilled human resources hinder progress, resulting in lower wages, reduced purchasing power, and limited savings capacity. Consequently, there is a lower contribution to domestic investment under conditions of low capital accumulation. Traditionally, developing economies have two main sectors contributing to their economic output: traditional agricultural yields/products and industrialized manufacturing. The agriculture sector faces challenges such as low productivity, inadequate earnings, and higher unemployment rates, while the industrial sector is technologically superior with a higher level of investment. The higher productivity in the industrial sector generates excess for sale, attracting labor to shift towards this more productivity-oriented sector.⁷⁵

74 Sajid Mehmood Shahzad, "Impact of CPEC on Pakistan's Economic Outlook," *South Asian Studies*, Vol. 37, No. 1, pp. 127 – 140, https://pu.edu.pk/images/journal/csas/PDF/9_37_1_22.pdf.

75 Bottini, Novella, Christoph Ernst, and Malte Luebker, "Offshoring and the labour market : what are the issues?" *International Labour Organization*, 2007, <http://www.gbv.de/dms/zbw/567858197.pdf>.

Figure 4: Overseas Economic and Trade Cooperation Zones (OETCZs)



In this context, SEZs can consistently play a vital leadership role, showcasing how China can adopt economic and societal values for sustainable economic growth. This approach stands in contrast to potentially impractical development models that could lead to ecological disasters for both businesses and the country.

The creation of Special Economic Zones (SEZs) in environmentally challenging conditions necessitates careful consideration, especially regarding the suitability of industries that rely on large quantities of groundwater, high energy consumption, high emissions, and the possibility of land loss. This prioritization also takes into account the prevailing environmental conditions related to the establishment of SEZs. Over the past four decades, China's Special Economic Zones (SEZs) have significantly influenced the nation's industrialization, urbanization, and reform efforts, playing a crucial role in its emergence as a global manufacturing powerhouse. These zones have been instrumental in establishing China as a prominent player on the

⁷⁶ Sun, Man, Tao Song, Weidong Liu, and Zhe Cheng. "Rejuvenating SEZs through Internationalization: A Case Study of Chinese Domestic and International SEZs." *MDPI*, April 19, 2022. <https://doi.org/10.3390/land11050596>

world stage.⁷⁷ So now, after a decade of BRI, it is important to focus on the development of Special Economic Zones (SEZs) under the Chinese Belt and Road Initiative (BRI) with an environmental lens. As the global community grapples with the challenges of climate change, it is crucial to ensure that development projects, including those within SEZs, adhere to environmentally friendly practices. By incorporating renewable energy sources, energy-efficient technologies, and sustainable infrastructure in SEZ development, China can contribute to global efforts to mitigate climate change, and thus, this study for CPEC phase II is important.

Green SEZs Development

In August 2010, China's National Development and Reform Commission (NDRC) initiated a nationwide experimental project focused on creating low-carbon provinces and low-carbon cities. This undertaking is set to be executed in five provinces, Guangdong, Liaoning, Hubei, Shaanxi, and Yunnan, and eight cities, Tianjin, Chongqing, Shenzhen, Xiamen, Hangzhou, Nanchang, Guiyang, and Baoding, all of which host numerous Special Economic Zones (SEZs). Green development policies within SEZs primarily encompass measures such as pollution supervision and incentives for green development, including sewage treatment policies, stringent pollution discharge monitoring for the chemical industry, and initiatives encouraging enterprises to save energy and reduce environmental impact and the concept of green development needs to be adopted to the entire process of pilot SEZs construction, promoting green manufacturing, green supply chain, and green trade in the future.⁷⁸

The historical roots of facilitating trade with minimal interventions can be traced back to ancient concepts of free ports. However, the modern incarnation of Special Economic Zones (SEZs), particularly since the 1960s, primarily centers on seaports, airports, or national borders. The surge in SEZ adoption during the 1980s aligned with the embrace of Industrial Revolution principles by countries aiming to enhance exports by minimizing costs, particularly in transportation. This not only stimulated sea trade but

77 Zoonia Naseeb, "CPEC and Globalization: An Appraisal of socio-economic impact on Pakistan," *Journal Of Climate and Community Development*, 2(2), 1-8, 2023, <https://joccd.com/index.php/joccd/article/view/16/16>

78 Liu, Xiao, Jun Zhang, Tinghua Liu, and Xiangjian Zhang, "Can The Special Economic Zones Promote the Green Technology Innovation of Enterprises? An Evidence From China," *Frontiers in Environmental Science*, 2022, <https://doi.org/10.3389/fenvs.2022.870019>.

also fortified trade with border nations, establishing Asian nations as global manufacturing hubs with a significantly least-cost advantage.

The period between the 1990s and 2000s witnessed the global expansion of production and substantial disruptions in supply/value chains, giving rise to a new wave of Small and Medium-sized Enterprises (SMEs) and Micro, Small, and Medium-sized Enterprises (MSMEs). Developing nations, aspiring to emulate the success stories of developed nations in the realm of SEZs, found a strategic avenue to overcome limitations negatively impacting imports. Globally, there are approximately 5,400 SEZs and MSMEs, with over 1,000 emerging in the last 5-6 years. The development of these zones not only provides increased investment options, employment opportunities, and export promotion but also generates associated profits by linking local suppliers to international markets. Policymakers in developing nations often opt for SEZ development due to governance system challenges and the difficulty of reforming existing systems.⁷⁹ In addition, environmental conditions and resource availability need to be considered in the planning and policy-making processes to maintain symmetry in the natural environment and ecosystem of the areas considered for SEZs.⁸⁰ Certain studies highlight that within Special Economic Zones (SEZs), there is a notable consumption of energy resources, accompanied by a substantial emission of CO₂.⁸¹ These initiatives include reducing CO₂ emissions⁸² and serving as COEs for a green economy.

79 Łukaniszyn-Domaszewska, Katarzyna and Mazur-Włodarczyk, Katarzyna and Karaś, Elżbieta and Łukaniszyn-Domaszewska, K and Mazur-Włodarczyk, K and Karaś, Elżbieta, "Special Economic Zones (SEZs) as an Element of Sustainable Development in Emerging Countries: A Case of Poland," *Scientific Papers of Silesian University of Technology Organization and Management Series*, 179, 2023, <https://doi.org/10.29119/1641-3466.2023.179.13>.

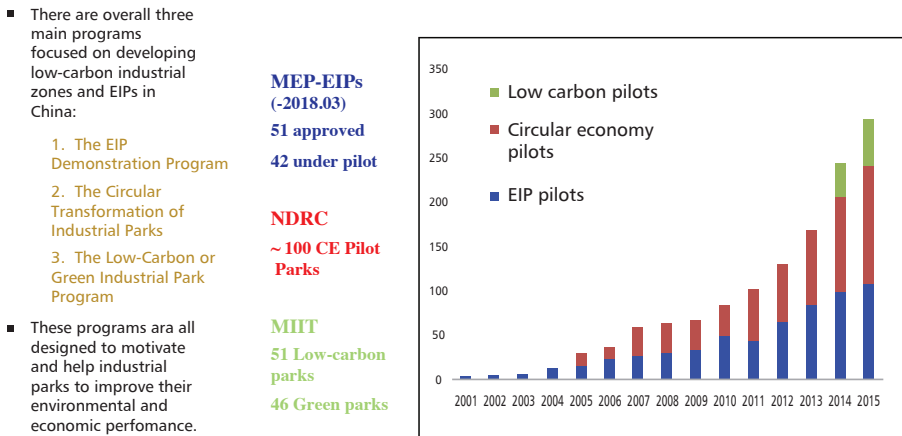
80 Tomasz Dorozynski et al, "Governance of special economic zones and their performance: Evidence from Poland," 2021, <https://eher.uek.krakow.pl/index.php/eher/article/view/1180>.

81 Simming Yu, Muhammad Safdar Sial, Dang Khoa Tran, Alina Badulescu, Phung Anh Thu, Mariana Seheanu, "Adoption and implementation of sustainable development goals (SDGs) in China—Agenda 2030," *Sustainability*, 12(15), 6288, 2020, <https://doi.org/10.3390/su12156288>.

82 Chen, Jieping, Xianpeng Long, Shanlang Lin, "Special Economic Zone, Carbon Emissions and the Mechanism Role of Green Technology Vertical Spillover: Evidence from Chinese Cities." *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health*, 2022, <https://doi.org/10.3390/ijerph191811535>.

Figure 5: Eco-Industrial Parks

China's Experiment with the Eco-Industrial Parks or Green Zones



Source: Institute of South-South Cooperation and Development.⁸³

The preference for SEZs is driven by two primary factors. Firstly, the adoption and development of SEZs offer a relatively easier option to bring about change in countries with poor governance systems. Secondly, the perceived lower cost of SEZ development, compared to alternative industrialization methods, makes it an attractive path toward industrial growth. The additional costs are typically outsourced, minimizing pressure on the local economy.⁸⁴ SEZs function as test beds for liberal economic systems, subject to the acceptability of economic tools and the credibility of transformation policies. By fostering innovation, value addition, and competitiveness, these zones significantly contribute to export orientation, import substitution, balance of payments correction, and various economic domains.

According to UNCTAD's (The United Nations Conference on Trade and Development) World Investment Report 2019, the reported number of SEZs increased from 4000 in 2015 to 5400 in 2019, indicating a 35% growth. Different nations employ diverse incentive packages to attract

83 Zhuhua, ZENG. "Industrial Zones and Africa's Industrialization - China's Experience in SEZs and Industrial Parks." *Institute of South-South Cooperation and Development*, May 13, 2022. <https://www.isscad.pku.edu.cn/viewpoints1/523089.htm>.

84 Douglas Z Zeng, "The Past, Present, and Future of Special Economic Zones and Their Impact," *Journal of International Economic Law*, 2021, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8083530/>.

investors, with historically struggling nations showing heightened interest in SEZ development to compete in the region.⁸⁵

These zones incentivize investors, fostering quicker business activities under more favorable terms. Furthermore, SEZs generate employment opportunities, contributing to swift development in targeted areas and proving to be effective instruments for attracting both local and foreign investments.⁸⁶ This framework supports large-scale production and businesses, encourages export-led growth, and boosts competitiveness. The resulting economic upswing creates conditions conducive to technological advancement, completing the entire production cycle from manufacturing to distribution and consumption. Profits are subsequently reinvested in various ways, benefiting investors and societies alike. This underscores the interconnectedness of technology, economic expansion, and the overall prosperity of stakeholders. Notably, SEZs are viewed as experimental grounds for reshaping a country's governance systems. In today's world, the political and economic pursuits of nations are intertwined. While the governance system provides direction and strategy for development, economic well-being contributes to growth and sustainability.⁸⁷

Despite abundant natural resources and favorable geographies, an imbalance between human resources and investment capital often exists in many developing countries, particularly in the South Asian region. Despite an abundance of human resources, particularly unskilled labor, this region faces challenges of low productivity and limited employability. This emphasizes the necessity for private sector involvement in developing human resources to enhance employment opportunities and strengthen the purchasing power of the population, ultimately supporting continuous development. This requires a significant investment that cannot be solely borne by the government; active private-sector participation is crucial to fostering competitive businesses.⁸⁸ China has invested a huge amount

85 Urooj Aijaz, Dr.Hassan Daud Butt , Dr.Sofia Bano , Anum Hayat , Muhammad Bilal Raees , Marium Mazhar, "Dynamics Of Sezs A Comparative Analysis Of Incentive Packages For Special Economic Zones Of Pakistan, Bangladesh & Vietnam," *Journal of Positive School Psychology*, 2022, <https://journalppw.com/index.php/jpsp/article/view/14147>

86 Dr. Ayesha Khan,Farkhanda Ilmas , Muhammad Zubair , Akash Khan , Prof. Dr. Liu Hong Zhong, "The impact of CPEC on the Economy of Pakistan," *Journal of Positive School Psychology*, 2022, <https://journalppw.com/index.php/jpsp/article/view/14260>.

87 Tomasz Dorozynki,Janusz Sweirkocki, Bogustawa Dobrowolska, "Governance of special economic zones and their performance: Evidence from Poland," 2021, <https://eber.uek.krakow.pl/index.php/eber/article/view/1180>.

88 Otaviano Canuto, Christos Daoulas, "Natural Wealth and Economic Growth: The Case of Sub-Saharan Africa." *Policy Center for the New South*, 2019, https://www.policycenter.ma/sites/default/files/PP_19-12%20%28Canuto%20and%20Christos%29.pdf.

into industrial pollution control over the past few years and resultantly succeeded in tackling smog, particularly in cities like Beijing. The steps taken by the Chinese Government, like the implementation of stringent emission standards, the promotion of cleaner technologies, and the establishment of green zones in urban areas, have significantly improved air quality. Xu Haihong from the Chinese Environment Engineering Assessment Centre, China said that although China has made significant improvements in environmental standards in the past decade, air preventive control is still very important. She said that they have implemented strict environment enforcement laws with strong policies towards industrial enterprises (Business Recorder, Jan 2024). Understanding the relationships between the environment, Foreign Direct Investment (FDI), industrialization, government policy-making, the role of private businesses, economic progress facilitated by Special Economic Zones (SEZs), and energy consumption requires a comprehensive and multidimensional approach.

Green Special Economic Zones (SEZs) refer to designated areas that prioritize environmental sustainability and ecological considerations in their development and operations.⁸⁹ These zones aim to balance economic growth with environmental protection, incorporating green technologies, renewable energy sources, and eco-friendly practices. In the context of the Belt and Road Initiative (BRI) and the Chinese development model, green SEZs under the Green BRI would align with these characteristics but with a focus on integrating sustainable practices into projects associated with the BRI.⁹⁰ Pushing for the construction of a green Belt and Road Initiative (BRI) aligns with the real needs of both China and the countries along the BRI by fostering the creation of green and low-carbon cycles. A green BRI prioritizes sustainable infrastructure development, renewable energy projects, and environmentally friendly practices, contributing to global efforts to combat climate change.⁹¹ For China, this initiative can enhance its international image as a responsible global player, showcasing its commitment to environmental stewardship.⁹² Simultaneously, countries along the BRI stand

89 SunWeizeng, JianfengWu and HongchangYang, "Increasing Entrepreneurs Through Green Industrial Parks: Evidence From Special Economic Zones in China," *The Annals of Regional Science*, 2024, <https://doi.org/10.1007/s00168-022-01200-3>.

90 Alexander Demissie, "Special Economic Zones: Integrating African Countries in China's Belt and Road Initiative," *Rethinking the Silk Road* (pp.69-84), 2017, https://link.springer.com/chapter/10.1007/978-981-10-5915-5_4#cities.

91 Yu Hongyan, Wang Wanfa, "Green Belt and Road Initiative: Progress, Challenges and Pathways," *China Int'l Stud.*, 87, 132, <https://heinonline.org/HOL/LandingPage?handle=hein.journals/chintersd87&div=10&id=&page=>.

92 Kiran Hassan, "CPEC: A win-win for China and Pakistan," *Human Affairs* 30(2):212-223, 2020, <https://www.degruyter.com/document/doi/10.1515/humaff-2020-0020/html>.

to benefit from improved infrastructure, reduced environmental impact, and enhanced economic productivity. By integrating green technologies and sustainable practices into the BRI projects, the aim is to increase the Green Total Factor Productivity (GTFP) of each participating country. This strategic approach not only supports economic development but also addresses environmental concerns, creating a win-win scenario for both China and the countries involved.⁹³ According to a World Bank report, BRI countries account for 72.7% of global coal consumption, 41.1% of global oil consumption, and 47.1% of global natural gas consumption. Most of the members of BRI are developing and industrialized states, so the average CO₂ emission in the BRI region is twice more than the global average of CO₂ emission. Thus, while China has provided a good, basic guideline related to Green Development in the BRI initiative, in the next phase, more formidable actions will be required for green industrial collaboration.⁹⁴

Moreover, a green BRI can pave the way for the development of a Green Special Economic Zone (SEZ) initiative in developing countries. SEZs, when designed with a green focus, can become hubs for sustainable industrialization, innovation, and economic growth. The integration of clean technologies, energy-efficient infrastructure, and eco-friendly practices within these zones can serve as a model for responsible development.⁹⁵ This initiative can be supported by bilateral agreements and international partnerships, fostering collaboration between governments, private enterprises, and environmental organizations. By incorporating green SEZs into the broader BRI framework, developing countries like Pakistan can attract foreign investment, promote technological transfer, and create jobs while minimizing the ecological impact of industrialization. The Green SEZ development initiative becomes a pathway for achieving inclusive, sustainable, and environmentally conscious economic progress in alignment with the broader goals of a green BRI.⁹⁶ Overall, the development of green Special Economic Zones (SEZs) involves various key factors that contribute

93 Li Jianxuan et al, "Does China's 'Belt and Road' Initiative Promote Green Total Factor Productivity Growth in Countries Along the Route?" *Journal of Cleaner Production*, 2022, <https://doi.org/10.1016/j.jclepro.2022.133004>.

94 Hira Akram, "Critical appraisal of BRI Green Development Initiative." *Social Science Research Network*, 2020, <https://doi.org/10.2139/ssrn.3766990>.

95 Ali Cheshmehzangi, Linjun Xie, May Tan-Mullins, "Pioneering a Green Belt and Road Initiative (BRI) alignment between China and other members: mapping BRI's sustainability plan," *Blue-Green Systems*, 3(1), 49-61, 2021, <https://research.nottingham.edu.cn/en/publications/pioneering-a-green-belt-and-road-initiative-bri-alignment-between>

96 Dr. Christoph Nedopil, "China's Investments in the Belt and Road Initiative (BRI) in 2020," *International Institute of Green Finance at the Central University of Finance and Economics*, 2021, <https://greenfdc.org/wp-content/uploads/2021/01/China-BRI-Investment-Report-2020.pdf>.

to environmentally sustainable practices and economic growth. Here are some crucial factors:

A. Environmental Policies and Development

- a. Implementation of clear and stringent environmental policies and regulations that guide and monitor activities within the SEZs.
- b. Establishment of frameworks for waste management, emissions control, and sustainable resource use.
- c. Development of eco-friendly infrastructure within SEZs, including energy-efficient buildings, green energy sources, and sustainable transportation options.
- d. Integration of green design principles to reduce environmental impact

B. Incentives for Green Practices

- a. Provision of financial and non-financial incentives to encourage businesses within SEZs to adopt environmentally friendly practices.
- b. Tax breaks, subsidies, and other incentives can promote green investments and technologies.
- c. Encouragement of research and development activities focused on green technologies and innovations.
- d. Support for the adoption of clean and sustainable technologies by businesses operating within the SEZ.
- e. Facilitation of collaboration among businesses, government agencies, and environmental organizations to share best practices and promote green initiatives.
- f. Creation of a supportive ecosystem that fosters partnerships for sustainable development.
- g. Recognition of green certifications as a competitive advantage for businesses.
- h. Integration of local communities into the planning and decision-making processes for SEZ development to ensure their needs and concerns are considered.

C. Government Support

- a. Active support and commitment from the government are needed to promote and enforce green initiatives.
- b. Promotion of sustainable and inclusive community development initiatives.
- c. Alignment of national policies and strategies with the objectives of sustainable development within SEZs.
- d. Promoting flexibility in adapting to changing environmental conditions and advancements in green technologies.
- e. Developing continuous improvement and refinement of green policies based on evolving environmental challenges and opportunities.

CPEC and Special Economic Zones

China, emerging as a formidable economic force, stands as a significant contributor to Foreign Direct Investment (FDI). Presently, Chinese FDI in Pakistan has surged to USD 1.4377 billion in 2023.⁹⁷ A future scenario may witness collaborative endeavors between Pakistani and Chinese investors, fostering mutual state benefits. The China-Pakistan Economic Corridor (CPEC) serves as a conduit for fostering such partnerships and joint progress among nations in the Asian region.⁹⁸ Since its initiation in 2013, the landscape of commercial and trade cooperation between China and Pakistan has witnessed considerable expansion. Notably, China has consistently maintained its status as Pakistan's foremost trading partner for a decade, concurrently holding the position of the principal source of foreign direct investment in Pakistan for nine consecutive years. The collaborative domains between these two nations have experienced steady evolution, surpassing the conventional emphasis on energy, connectivity, and infrastructures and venturing into new frontiers. SEZs, characterized by their relatively small geographic areas with well-organized infrastructure, administrative services, and innovative environmentally friendly production methods, have the potential to serve as prototypes. They can address the mentioned challenges

97 Dr. Hassan Daud Butt, Zainab Ahmed, Osman Bin Saif, "Harnessing Regional Connectivity Potential Through Bri: A Case Study on China, Pakistan and Turkiye Connectivity, *Competitive Social Science Research Journal*, Vol. 3 No.1 2022, <https://cssrjournal.com/index.php/cssrjournal/article/view/376>.

98 Javed, Hafez Muhammad, Muhammad Ismail, "CPEC and Pakistan: Its Economic Benefits, Energy Security and Regional Trade and Economic Integration," *Chinese Political Science Review*, 6(2), 2021, <https://link.springer.com/article/10.1007/s41111-020-00172-z>.

on a small scale and subsequently expand their experiences to the entire country, much like how the foreign investment capitalistic product model was initially introduced in SEZs and later extended to the entire nation.⁹⁹ Thus, SEZs can play a prominent role in the development of a green economy in China. Given their substantial role in national industrial production and economic reforms, SEZs should take the lead in steering the country towards green development. As China is Pakistan's strategic partner and aids Pakistan in preserving the balance of power in the area, having a solid and positive relationship with China has been a key component of Pakistan's foreign policy goals.¹⁰⁰ CPEC provides a platform for both domestic and foreign investors to participate in lucrative ventures. Pakistan's allure lies in its cost-effective labor and abundant natural resources, including significant reserves of coal (185 billion tons), bauxite (74 million tons), and iron ore (430 million tons), making it an appealing investment destination. The southern and western regions of Balochistan, focal points of CPEC initiatives, harbor substantial reserves of metallic and non-metallic minerals. Given these situations and the prevailing chances, the establishment of SEZs, as envisioned by Pakistan, signifies a positive stride and establishes a precedent for other developing nations, provided effective implementation is prioritized for the collective benefit of the populace.¹⁰¹ The introduction of Special Economic Zones (SEZs) under the China-Pakistan Economic Corridor (CPEC) has marked the commencement of a rapid phase of industrial development. In this context, Pakistan envisions the establishment of resilient and highly productive industries, forging collaborative partnerships with Chinese companies within the SEZs to usher in a new era of industrialization.¹⁰² As Pakistan ventures into this industrialization phase, it is presented with numerous opportunities to capitalize on, along with the imperative task of effectively managing challenges for the success of the SEZs.

99 Urooj Aijaz , Dr.Hassan Daud Butt , Dr.Sofia Bano , Anum Hayat , Muhammad Bilal Raees, Mariam Mazhar, "Dynamics Of Sezs A Comparative Analysis Of Incentive Packages For Special Economic Zones Of Pakistan, Bangladesh & Vietnam," *Journal of Positive School Psychology*, 2022, <https://journalppw.com/index.php/jpsp/article/view/14147>

100 Abid, Massarrat, Ayesha Ashfaq, "CPEC: Challenges and Opportunities for Pakistan." *Journal of Pakistan Vision*, 17 (2). 2015, http://pu.edu.pk/images/journal/studies/PDF-FILES/Artical-7_v16_2_2015.pdf.

101 Dost Muhammad Barrech, Dr Siraj Bashir, "Balochistan's Potential under CPEC: Opportunities and Challenges," *Qualitative Research*, 2023. https://www.researchgate.net/publication/374116411_Balochistan's_Potential_under_CPEC_Opportunities_and_Challenges.

102 Naeem Shahzad (Corresponding Author) , Hafiza Rukhsana Khuram , Dr. Hamid Khan , Muhammad Jamshaid Bajwa , Shahbaz Nawaz, "Opportunities And Challenges Of The China-Pakistan Economic Corridor (Cpec): A Game Changer In South Asian Countries And Impact Of Cpec On Pakistani Economy," *Journal of Positive School Psychology*, 2023, <https://journalppw.com/index.php/jpsp/article/view/16891>.

CPEC provides a platform for both domestic and foreign investors to participate in lucrative ventures. SEZs create a business-friendly environment that shields foreign investors from the structural weaknesses of the host economy, such as weak market-oriented institutions, a lack of horizontal and vertical mechanisms for coordination and conflict resolution, the financial system's backwardness, distorted industrial structures, and political upheavals.¹⁰³

Highlighting the importance of the next phase, the development of Smart and Green SEZs is crucial, aligning with the Chinese model of SEZ modernization. The evolving landscape of CPEC brings about a myriad of benefits, particularly in the realm of specialized economic zones. These zones not only stimulate entrepreneurial activities but also catalyze the establishment of new enterprises within strategically chosen geographical areas. Moreover, the Special Economic Zones are poised to feature cutting-edge facilities, with a primary focus on industries such as food, pharmaceuticals, engineering, automotive, and food packaging.¹⁰⁴ To maximize the utilization of Special Economic Zones (SEZs) and Export Processing Zones (EPZs), it is imperative to implement appropriate investment strategies, ensure an optimal mix of industries and zones, improve management practices, and promote incentivizing structures. The initiation of SEZs under the China-Pakistan Economic Corridor (CPEC) signifies the commencement of a new era of swift industrial development. In this pursuit, Pakistan aims to establish resilient and potentially productive industries, either through collaboration with Chinese enterprises or alongside them within SEZs.¹⁰⁵ While venturing into this industrialization phase, Pakistan will encounter a spectrum of opportunities to seize and challenges that must be effectively managed for the success of SEZs.

Originating in 1970, the majority of industrial estates faced setbacks primarily due to the non-provision of utilities, substandard infrastructure, and limited connections. Developing countries lack the resources to provide a productive business environment and a nationwide industrial infrastructure but we all are aware of the fact that a Special Economic

103 Abbad Farooq, "Revisiting CPEC: A corridor of opportunities," *Journal of Social and Political Sciences*, 3(1), 2020, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3553085.

104 Urooj Aijaz , Dr.Hassan Daud Butt , Dr.Sofia Bano , Anum Hayat , Muhammad Bilal Raees , Mariam Mazhar, "Dynamics Of Sezs A Comparative Analysis Of Incentive Packages For Special Economic Zones Of Pakistan, Bangladesh & Vietnam," *Journal of Positive School Psychology*, 2022, <https://journalppw.com/index.php/jpsp/article/view/14147>.

105 Zaigham Ali, "The CPEC Projects and the Entrepreneurial Opportunities in Pakistan," *Essays and Perspectives on the China-Pakistan Economic Corridor and Beyond*, 2023, <https://csc.kiu.edu.pk/wp-content/uploads/2023/07/Chapter-6.pdf>

Zone (SEZ) offers the government an opportunity to test new policies but the kind of operations in SEZs are different in every country depending on the economic standing of a country and its region. Technology parks and innovation districts are found in high-income economies, technology-based zones such as high-tech and biotech are found in upper-middle-income economies, specialized zones such as automotive and electronics are found in middle-income economies, and multi-activity zones aimed at luring the manufacturing sector are found in low-income economies where Half of the world's SEZs are located in China and the success of its zones lie under the maintenance of its pace of technological innovation and inclusion that add value to its economy which generally lacks in developing countries like Pakistan.¹⁰⁶

SEZs create a business-friendly environment that shields foreign investors from the structural weaknesses of the host economy, such as weak market-oriented institutions, a lack of horizontal and vertical mechanisms for coordination and conflict resolution, the financial system's backwardness, distorted industrial structures, and political upheavals. The evolving landscape of CPEC brings about a myriad of benefits, particularly in the realm of specialized economic zones. These zones not only stimulate entrepreneurial activities but also catalyze the establishment of new enterprises within strategically chosen geographical areas. Moreover, the Specialized Economic Zones are poised to feature cutting-edge facilities, with a primary focus on industries such as food, pharmaceuticals, engineering, automotive, and food packaging.¹⁰⁷ Currently, SEZs in Pakistan are following a one-size-fits-all policy with core objectives of populating them, whereas they need to have their vision and mission, and all the policies and regulatory framework shall be based on them.¹⁰⁸

106 Waqas Ahmed, Qingmei Tan, Yasir Ahmed Solangi, Sharafat Ali, "Sustainable and Special Economic Zone Selection under Fuzzy Environment: A Case of Pakistan," *Symmetry* 12, 2020,. <https://doi.org/10.3390/sym12020242>.

107 Urooj Aijaz , Dr.Hassan Daud Butt , Dr.Sofia Bano , Anum Hayat , Muhammad Bilal Raees , Marium Mazhar, "Dynamics Of Sezs A Comparative Analysis Of Incentive Packages For Special Economic Zones Of Pakistan, Bangladesh & Vietnam," *Journal of Positive School Psychology*, 2022, <https://journalppw.com/index.php/jpsp/article/view/14147>

108 Saira Naeem, Abdul Waheed, Muhammad Naeem Khan, "Drivers and Barriers for Successful Special Economic Zones (SEZs): Case of SEZs under China Pakistan Economic Corridor," *Sustainability*, 2020, <https://www.mdpi.com/2071-1050/12/11/4675>.

The following are the nine proposed CPEC SEZs:

#	SEZ	Province/ Region	Status / Green development
1	Rashakai Economic Zone, M-1, Nowshera	Khyber Pakhtunkhwa	Phase 1 completed/ Moderate
2	China Special Economic Zone Dhabeji	Sindh	Under development stage/ Cannot be determined at this stage
3	Bostan Industrial Zone	Balochistan	Under development stage/ Cannot determine at this stage
4	Allama Iqbal Industrial City (M3), Faisalabad	Punjab	Under development stage / Limited
5	ICT Model Industrial Zone, Islamabad	Federal	Nil Progress
6	Development of Industrial Park on Pakistan Steel Mills Land at Port Qasim near Karachi	Federal	Nil Progress
7	Special Economic Zone at Mirpur	AJK	Very limited development
8	Mohmand Marble City	FATA (KP)	waste to treatment being implemented
9	Moqpondass SEZ	Gilgit-Baltistan	Very limited development

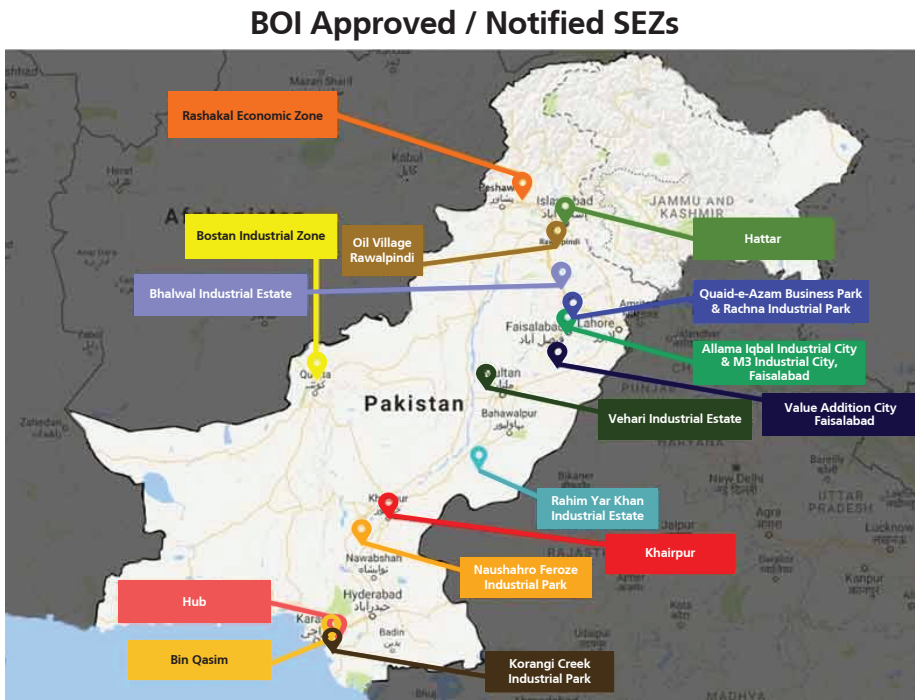
Source: Centre of Excellence for CPEC.¹⁰⁹

The role of the Board of Approval (BOA), headed by the Prime Minister, will be critical to finalizing arrangements for infrastructure development of the areas identified for zones and to ensuring developers must undertake to comply with all environmental, labor and other applicable legislation in force in Pakistan.¹¹⁰

¹⁰⁹ Saira Ali, and Ahsan Abbas. "Nine Proposed Priority SEZs under CPEC and SEZ Act; An Approach to Industrial Development." *Centre of Excellence for CPEC.*, no. 1 (2018). <https://cpec-centre.pk/wp-content/uploads/2018/06/WP16-Nine-Proposed-Priority-SEZs-under-CPEC.pdf>

¹¹⁰ Javed, Hafez Muhammad, Muhammad Ismail, "CPEC and Pakistan: Its Economic Benefits, Energy Security and Regional Trade and Economic Integration," *Chinese Political Science Review*, 6(2), 2021, <https://link.springer.com/article/10.1007/s41111-020-00172-z>.

Figure 7: Pakistan - Special Economic Zones¹¹¹



Industrial Cooperation under CPEC

CPEC aims to enhance collaboration in trade and industry, broaden the scope of bilateral economic and trade relations, and raise the bar for mutual trade liberalization. The objective is to foster key areas of cooperation, improve the efficiency of collaboration, and align economic development endeavors through synchronization, coordination, and reciprocity.¹¹² Moreover, CPEC is positioned to empower Pakistan in expanding its commercial and transportation linkages, thereby enhancing its economic influence across Central Asia, South Asia, the Middle East, Africa, and Europe. This strategic initiative holds significant potential to strengthen the longstanding friendship between Pakistan and China. In recent years, a notable portion of Pakistan's trade deficit has been associated with its trade with China.

¹¹¹ "SEZs and why Pakistan needs them," *Global Village Space*, Nov 2020 <https://www.globalvillagespace.com/sezs-and-why-pakistan-needs-them/>

¹¹² Fida Hussain, "The Benefits of CPEC," *Pakistan Observer*, 2023, http://lahore.china-consulate.gov.cn/eng/PIXJP/202312/t20231212_11200911.htm.

Hence, the strategic development of Special Economic Zones (SEZs) under the CPEC framework necessitates meticulous planning to align with the objectives of achieving rapid industrial growth and promoting exports through a diversified range of products. Additionally, in the development of these zones, thoughtful consideration should be given to the potential for enhancing exports through value addition facilitated by advanced manufacturing processes.¹¹³ China, as the world's second-largest economy and foremost global exporter with \$2.2 trillion in exports and the second-largest importer with \$1.8 trillion in imports, presents substantial opportunities for Pakistan.

The shift into a new phase will involve a broader range of activities, with a primary emphasis on fostering robust industrial collaboration to improve the local business environment and create significant growth opportunities for Pakistan. Under the CPEC long-term plan, both sides will promote industrial capacity cooperation by using efficient, energy-saving and environmentally friendly processes and equipment to meet the demands of Pakistan's local markets and at the same time to further expand it to the international market.¹¹⁴ This requires effective collaboration between Chinese and Pakistani industries, technology transfer, and the implementation of sustainable and environmentally friendly practices. Additionally, it necessitates the development of a skilled workforce, investment in research and development, and the establishment of quality standards to enhance the competitiveness of the products in both local and international markets. Close coordination between the governments of China and Pakistan, as well as active engagement with relevant stakeholders, will play a crucial role in realizing the long-term goals outlined in the CPEC plan.

Challenges in SEZ Development in Pakistan

The concept of Special Economic Zones (SEZs) is not a recent development in Pakistan. Originating in 1970, the majority of industrial estates faced setbacks primarily due to the non-provision of utilities, substandard infrastructure, and limited connections. However, with a poor history of SEZ development, Green Special Economic Zones (SEZs) will pose challenges

113 Saptaningtyas, R. S., Utomo, P. K., Hilyana, S., & Anwar, "Planning of fishing residential in Kuta Village (supporting the Mandalika special economic zone) based on green concept," *Earth and Environmental Science*; Bristol Vol. 847, 2021, <https://www.proquest.com/docview/2569674536?sourcetype=Scholarly%20Journals>

114 China-Pakistan Economic Corridor (CPEC), "CPEC Long Term," 2017, <https://cpec.gov.pk/long-term-plan-cpec>

and demand effective governance and a well-operating market system. Three fundamental principles are essential for the advancement of SEZs: they should not operate in isolation from the broader macroeconomic framework, they must be integrated into comprehensive national industrial development plans, and their success hinges on viable infrastructure, strategic geographical positioning, and robust connections to markets. Across the globe, SEZs have been established with distinct models, varying according to countries' economic growth levels, trade specialization, and sectoral considerations.¹¹⁵

Before delving into an analysis of the efficiency of Special Economic Zones (SEZs) in Pakistan, it is crucial to provide a comprehensive understanding of the historical backdrop surrounding SEZ creation in the country.¹¹⁶ Initial endeavors to establish free economic zones were undertaken; however, the majority of these zones encountered significant operational challenges, particularly in developing nations like Pakistan. The reasons for their limited success are multifaceted:

1. One significant impediment to the success of free economic zones in Pakistan was the lack of financial resources allocated to invest in the necessary infrastructure and utilities.
2. Cumbersome tax exemption approvals to investors.
3. Constructing SEZs as real estate activities.
4. Complex NOC/approvals regime.

To shift Pakistan's economy away from import substitution industrialization and towards an export-oriented strategy, seven Special Economic Zones (SEZs) were created between 1983 and 2005. Unfortunately, though, the effects of these zones on the overall economy had been minimal because of the absence of workable systems, government policies that lack coherence, and infrastructure facilities¹¹⁷ but as a part of the China-Pakistan Economic Corridor (CPEC), nine new Special Economic Zones (SEZs) are being planned to be established in Pakistan. If we consider the SEZs of Pakistan, then we realize that ineffective state agencies play duplicate roles in the

115 Dr. Hassan Daud Butt, Urooj Aijaz, Dr. Riaz Ahmed, "Development and Management of Integrated SEZs as Stimulus to Economic Growth," *Pakistan Journal of International Affairs*, 4(2), 2021, <https://pjia.com.pk/index.php/pjia/article/view/178>.

116 Dr. Hassan Daud Butt, Urooj Aijaz, Osman Bin Saif, Abdullah Athar, "Following the Chinese path in Post-Covid era," 2023, <https://www.journalppw.com/index.php/jpsp/article/view/16395>.

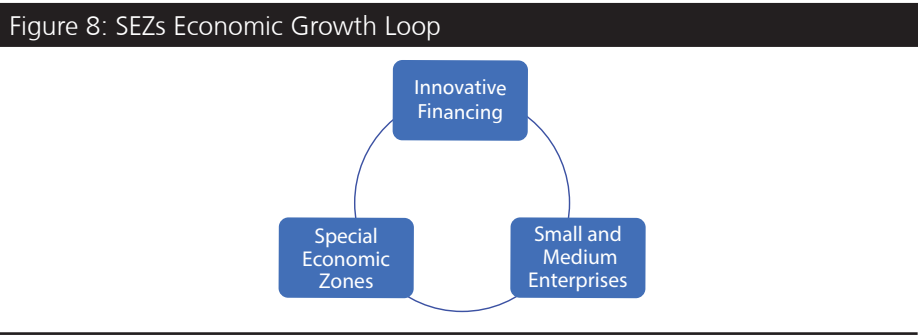
117 Tahir Mukhtar, Zainab Jehan and Faiz Bilquees, "Is trade openness Inflationary in developing economies," *Pakistan Economic and Social Review*, Vol. 57 No. 1 pp. 47-68, 2019, <https://www.jstor.org/stable/26842693>.

administration of SEZs, which causes long procedures. Under the SEZ Act, the investor must undergo a drawn-out procedure to obtain approval for a SEZ unit. This process includes passing via the SEZ committee, province SEZ authority, Federal Board of Revenue (FBR), Board of Investment (BOI), district administration, and so on.

Similarly, ease of doing business in Special Economic Zones was vital for attracting investments, promoting economic growth, enhancing competitiveness, creating jobs, facilitating technology transfer, promoting trade, and ensuring administrative efficiency. However, despite several initiatives, a whole-of-government approach could not be undertaken, which resulted in a below-par development. Bureaucratic delays delayed trade and investment transactions. These factors collectively contribute to the success and attractiveness of SEZs as business hubs. In the past, undue engagement from various regulatory bodies has not produced the intended outcomes; if this pattern continues, Pakistan’s ambition to become an export-based may not be achieved.

Next Phase of Industrial Cooperation under CPEC

The development of green Special Economic Zones (SEZs) under the China-Pakistan Economic Corridor (CPEC) initiative beyond 2024 makes it essential to adopt a comprehensive government approach. This entails providing subsidized loans or grants to developers and entrepreneurs, incentivizing the emergence of environmentally friendly entities, such as green SEZs, and promoting green entrepreneurship. This will require provincial government and local authorities to actively encourage green SEZs to establish additional education or training programs aimed at transferring green technology to industries. This strategy can significantly enhance local economic competitiveness.



When formulating regulations for Special Economic Zones (SEZs), it is crucial to recognize that the country's conditions can undergo significant changes within a short span through pragmatic planning and the strategic utilization of technologies to promote sustainable, green growth. Consequently, the goals initially set for the establishment of SEZs may evolve. The legislation should allow flexibility not only in terms of technology selection and investment decisions for SEZs but also in decision-making processes overall. The emergence and influence of intelligent technologies may further impact the development of infrastructure and play a role in shaping the establishment and expansion of special economic zones.¹¹⁸

Conclusion and Policy Recommendations

Looking ahead, ensuring the benefits of the Belt and Road Initiative (BRI) involves recognizing the significance of fostering people-to-people contact and connecting regions and countries. This undertaking will be both challenging and gradual, given the dynamic changes in the global scenario. Successfully addressing this formidable task requires charting a distinctive path toward achieving economic development at both regional and global levels. The incorporation of green development practices within Special Economic Zones (SEZs) stands as a strategic imperative for advancing economic development in China.¹¹⁹ Therefore, the principles of “green development” and “low-carbon operation” hold significant importance in this context. Examining the influence of SEZs on enterprise green technology innovation emerges as a critical consideration.

Additionally, the dispersed establishment timelines of each zone present a favorable condition for isolating the impact of policies and unobservable annual fixed effects. This temporal distribution provides a suitable quasi-natural experiment for quantitatively evaluating the influence of the SEZ program on enterprise green technology innovation. As a policy recommendation for Pakistan, adopting a similar strategic approach by prioritizing green development in its SEZs could yield substantial economic and environmental benefits. By emphasizing “green development” and “low-carbon operation,” Pakistan can create an environment conducive to

118 Saira Naeem, Abdul Waheed, Muhammad Naeem Khan, “Drivers and barriers for successful special economic zones (SEZs): Case of SEZs under China Pakistan economic corridor,” *Sustainability*, 12(11), 4675, 2020, <https://doi.org/10.3390/su12114675>.

119 Zeng, Douglas Zhihua, Cheng, Lei, Shi, Lei, Luetkenhorst Wilfried, “China’s green transformation through eco-industrial parks,” *World Development*, Elsevier, vol. 140(C), 2021, <https://ideas.repec.org/a/eee/wdevel/v140y2021ics0305750x20303764.html>.

fostering innovation in green technologies within its SEZs.¹²⁰ Furthermore, careful consideration of the establishment timelines of these zones, ensuring a deliberate and well-planned rollout, would enhance the effectiveness of policies aimed at promoting sustainable practices and technological advancements. This approach aligns with global trends towards environmentally conscious economic development and positions Pakistan to benefit from the positive outcomes observed in China.

Therefore, adopting a well-balanced and inclusive approach that takes these factors into account is essential for maximizing the positive impact of BRI and CPEC investments on economic development. In the subsequent phases of BRI and CPEC, there should be a focus on enabling businesses to expand their markets beyond national borders.¹²¹ By accessing international markets, companies can enhance their sales and revenue, thereby contributing to overall economic growth. Furthermore, local enterprises have the opportunity to prepare themselves for exposure to global competition, fostering increased efficiency and innovation. As a recommendation for the development of Special Economic Zones (SEZs) under the China-Pakistan Economic Corridor (CPEC), a critical review of China's SEZ development model is essential.¹²² By the end of 2022, there are over 5000 zones in 147 countries, and Asia has the largest number and the biggest share of the global industrial zones, and China alone has more than 2500 and we need to develop our SEZs by following global best practices.

The following recommendations are proposed to outline a comprehensive development strategy emphasizing green and environmentally friendly Special Economic Zones (SEZs) for Pakistan, fostering shared prosperity and achieving a mutually beneficial outcome:

- a. Governments need to formulate and enforce environmental policies that balance industrial growth with sustainability. Regulations can be put in place to control emissions, waste disposal, and resource usage

120 Dr. Hassan Daud Butt, Urooj Aijaz, Dr. Riaz Ahmed, "Development and Management of Integrated SEZs as Stimulus to Economic Growth," *Pakistan Journal of International Affairs*, 4(2), 2021, <https://pjia.com.pk/index.php/pjia/article/view/178>.

121 M Jahanzeb Butt, "A Comparative Analysis of the Environmental Policies in China and Pakistan: Developing a Legal Regime for Sustainable China-Pakistan Economic Corridor (CPEC) under the Belt and Road Initiative (BRI)" *IPRI Journal*, 2021, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3928027.

122 Saira Naeem, Abdul Waheed, Muhammad Naeem Khan, "Drivers and barriers for successful special economic zones (SEZs): Case of SEZs under China Pakistan economic corridor," *Sustainability*, 12(11), 4675, 2020, <https://doi.org/10.3390/su12114675>.

in all CPEC SEZs. However, the same may not increase the cost and speed of development.

- b. It is crucial for Pakistan to enhance the coordination of macro-level industrial policies and collaboratively establish supportive international institutions and policy environments conducive to green and sustainable industrialization in developing countries.
- c. Although there are certain restrictions in the SEZ Act on the age of the industrial plants being placed in the SEZs, we need to improve the SEZ Act to attract FDI while ensuring it aligns with national development goals. This includes regulations on environmental standards.
- d. Policies related to SEZs should include provisions for sustainable energy use, encouraging businesses to adopt renewable energy sources and energy-efficient technologies.
- e. Pakistan should prioritize the identification of key drivers of the country's comparative advantage and focus on a sectoral approach that aligns with its specialization, emphasizing environmentally friendly practices.
- f. Explore China's support in building Pakistan's capacity to independently formulate green industrial policies. Align these policies with national conditions and market economy laws, emphasizing comparative advantages rooted in resource endowments and existing green industrial foundations.
- g. While working on SEZ business development, environmentally friendly construction models and minimizing CO₂ emissions need to be carried out as a priority in Phase II of CPEC.
- h. Simplify procedures for profit and capital repatriation for foreign investors, eliminate regulatory barriers, and support the local integration of SEZs. Provide Provincial SEZ authorities and developers with suitable financial and administrative independence to ensure effective green development.
- i. We may continue to use technology to showcase our strengths and by using institutions like the Special Investment Facilitation Council (SIFC), we need to craft regulations, properly tailored, to ensure that competition and challenge of timely development of smart and Green SEZs is addressed
- j. SEZ developers need to engage with businesses, local communities, environmental groups, and international organizations to gather diverse perspectives and ensure inclusivity in policy development

- k. Streamline procedures for land acquisition and transfers within SEZs, ensuring efficiency and sustainability in the process.
- l. Consider the careful selection of investors and prioritize the development of integrated Special Economic Zones (SEZs) and Coastal Economic Zones with a focus on green practices, contributing to the nation's overall industrialization goals while ensuring environmental sustainability.
- m. The biggest hindrance in this development is the financial issues. State-owned banks and enterprises aren't ready to take up the risk related to this Green SEZs development. There is a need to recommit to the international standards again.
- n. It is imperative to reaffirm commitment to international standards. To make decisions that are both environmentally sustainable and economically viable, there is a crucial need for unwavering determination from the leaders, investors, and developers of Belt and Road Initiative (BRI) countries.

Lastly, in considering the implementation of green practices in the development of Special Economic Zones (SEZs) under the China-Pakistan Economic Corridor (CPEC), it's crucial to recognize that these SEZs present a high-reward opportunity for Pakistan.¹²³ Viewing them as a policy instrument, there is no inherently good or bad; the outcome depends on careful planning, design, and implementation. Globally, the results of SEZs have been mixed, emphasizing that there is no universal approach that fits all circumstances. It is imperative to construct SEZs tailored to their specific purposes, ensuring they are well-suited to unleash their true potential and contribute significantly to national development with an environmentally friendly approach.¹²⁴

123 Umar Farooq, Asma Shakir Khawaja, "China-Pakistan economic corridor: geo-political implications, regional constraints and benefits of CPEC," *South Asian Studies*, Vol. 34, No. 2, pp. 591 – 601, 2019, https://pu.edu.pk/images/journal/csas/PDF/16_v34_2_19.pdf.

124 Iram Khalid, Tooba Ahmad, Sami Ullah, "Environmental impact assessment of CPEC: a way forward for sustainable development," *International Journal of Development Issues*, 21(1), 159-171, 2021, <https://ideas.repec.org/a/eme/ijdiip/ijdi-08-2021-0154.html>.

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Chapter 3

The Green Dimension: Environmental Considerations of the China-Pakistan Economic Corridor (CPEC)

Dr. Asif Amin

Introduction

The China-Pakistan Economic Corridor (CPEC), a multibillion-dollar project, aims to link Gwadar port in southwest Pakistan with Xinjiang in China. This ambitious initiative involves a comprehensive infrastructure network comprising pipelines, power plants, railways, and highways, set to bolster investment and trade between the two nations. Pakistan stands to gain various environmental benefits from CPEC. For instance, by incorporating additional wind and solar power facilities, the reliance on fossil fuels could be reduced. Moreover, CPEC could enhance Pakistan's water management systems through the construction of new dams and modernization of irrigation techniques, potentially alleviating the persistent water scarcity issues faced by the nation.

CPEC has been lauded for its impact on regional development, yet concerns about its potential environmental consequences abound. Despite its perceived benefits, the project poses significant ecological risks. Extensive land clearance for construction has led to the felling of millions of trees, threatening the habitats of endangered species. The surge in traffic and industrial operations could elevate levels of air and water pollution. Moreover, the initiative may exacerbate Pakistan's water scarcity issues.

Green growth involves coupling economic development with sustainable practices to enhance both economic prosperity and environmental conservation. The fundamental idea is to decouple environmental degradation from economic progress. Achieving green growth encompasses various strategies, such as promoting sustainable agriculture, boosting energy efficiency, and investing in renewable energy sources.

This concept of green growth can be effectively applied to the CPEC project. For instance, the project could power its infrastructure using renewable sources like wind turbines, solar panels, and power stations. Moreover, incorporating eco-friendly construction methods such as material recycling and waste reduction can further bolster sustainability. Supporting the adoption of eco-friendly technologies like water-efficient irrigation systems and electric vehicles could also play a pivotal role in the project's green evolution.

This chapter delves into the efforts made by China and Pakistan to tackle environmental issues and explores how CPEC could pave the way for sustainable development in Pakistan. It will analyze the environmental challenges associated with the CPEC project and weigh its potential pros and cons, with a focus on its positive impact on economic growth and potential environmental drawbacks. Additionally, it will explore the concept of “green growth” and how the CPEC initiative can leverage it to mitigate its environmental footprint. Finally, it will assess the hurdles hindering Pakistan’s adoption of eco-friendly practices and propose strategies to ensure that environmental considerations are at the forefront of CPEC implementation.

Overview of the Decade of CPEC

The year 2023 marked the 10th anniversary of the China-Pakistan Economic Corridor (CPEC) project, which is the flag bearer of the China’s Belt and Road Initiative. CPEC has become the centerpiece of China-Pakistan’s all-weather friendship. The project has transformed Pakistan’s economic landscape and promoted connectivity not just in Pakistan but in the region. Over the last decade, infrastructural developments such as road networks, railways, ports, and energy projects in Pakistan have accelerated. The CPEC is the flagship project of China’s Belt and Road Initiative, which is aimed at regional connectivity, access to new markets, economic integration, geostrategic and geo-economic cooperation, and infrastructure development in the global south.¹²⁵ CPEC is considered the crown jewel of China’s grand strategy of BRI, which comprises an overland belt stretched across China, Central Asia, and Europe. CPEC and its associated megaprojects are anticipated to enhance cross-border connectivity, infrastructure, and economic vitality, potentially raising the quality of life. To date, CPEC and its related initiatives have generated 800,000 job opportunities in Pakistan, with the potential to create 1.2 million jobs in the future.¹²⁶

CPEC project has been instrumental in easing Pakistan’s energy crisis, leading to a notable boost in the nation’s energy capacity. This surge

125 Egorycheva, Elena Aleksandrovna, Nataliya Valerievna Dyuzheva, Andrey Vladimirovich Girinskiy, and Ekaterina Petrovna Makarova Korobeinikova, “China-Pakistan Economic Corridor (CPEC) as a flagship of Chinese Belt and Road initiative,” *International Journal of Economics and Business Administration*, Volume VIII, Special Issue 1, 353-363, 2020, <https://ijeba.com/journal/585>.

126 Muhammad Ali Baig, Shaheer Ahmed, “The Decade of CPEC,” *Pivot Magazine*, 5(3), 46-47, 2023, https://issi.org.pk/wp-content/uploads/2023/12/Pivot_Magazine_Oct_2023.pdf.

can be attributed to the successful execution of various energy initiatives encompassing wind, solar, hydro, and coal power plants, alongside fostering industrial cooperation. Additionally, in a bid to meet its energy demands, Pakistan has established coal-fired power plants (CFPPs) under the CPEC umbrella.¹²⁷ The significant concern lies in the potential impact on climate change and environmental sustainability due to the substantial investments in energy projects. There could be a fresh set of challenges as coal-fired power plants, major contributors to greenhouse gas emissions causing global warming and air pollution, are prioritized. Allegedly, the Environmental Impact Assessment (EIA) aspect of these projects is being overlooked.

It cannot be denied that mega projects in developing countries, which encompass large-scale infrastructure and mass developmental transformation, are the engines of economic growth for the Global South. However, these projects and their environmental footprint create major challenges for the states. Research stresses that industrial cooperation, economic growth, increased trade between the partner states, and the influx of tourists cause an increase in carbon emissions. Rapid growth in globalization and industrialization, infrastructure, and transportation developments have a deteriorating impact on the environment, causing a significant rise in carbon emissions.¹²⁸ Global Socioeconomic development has been significantly impacted by global warming and environmental deterioration.

Pakistan's Environmental Challenge

Pakistan is one of the most vulnerable nations to the effects of climate change, although it contributes less than 1% of global emissions. Pakistan ranks eighth on the Germanwatch Global Climate Risk Index 2019 report, with 502 annual deaths and almost \$3.8 billion in economic losses.¹²⁹ Pakistan's per capita emissions are only 2.4 Mt CO₂ eq, which ranks 19th in terms of world emissions. According to the emission trend, a big chunk of Pakistan's total greenhouse gas emissions comes from the energy and

127 Qurat Hashmi, "CPEC Project: Is CPEC an Environment Friendly Project?" *The EurAsian Times*, 2018, <https://www.eurasiantimes.com/cpec-environment-renewable-energy/>.

128 Arshian Sharif et al, "Revisiting the role of tourism and globalization in environmental degradation in China: Fresh insights from the quantile ARDL approach," *Journal of Cleaner Production*, 2020, <https://www.sciencedirect.com/science/article/abs/pii/S0959652620329516?via%3Dihub>.

129 David Eckstein, Vera Künzel, Laura Schäfer, "Global Climate Risk Index 2021," *GermanWatch*, 2021, <https://www.germanwatch.org/en/19777>.

agricultural sectors. The Intended Nationally Determined Contribution (INDC) states that in the past 21 years, Pakistan's total greenhouse gas emissions have increased by 123%.¹³⁰ However, total emissions are predicted to rise by almost 300% over the forecast period (2015–2030) due to the country's GDP growth ambitions stated in Vision 2025, infrastructure expansion, investments made in CPEC, and increased energy utilization.¹³¹

According to reports, the updated GreenHouse Gas Emission (GHG) inventory of 2017-2018 from different sectors is shown in Table 1. Compared to the 2015 GHG inventory, the emissions of the energy and agriculture sectors have increased by 19 percent and 14 percent due to growing energy needs and food security concerns.

Table 1: Greenhouse gas Emission (GHG) inventory of 2017-2018

Sectors	Sub-Sectors	Emission (Mt CO ₂ e)	Total Emissions (Mt CO ₂ e)
Energy	Energy Industries	43.40	218.94
	Manufacturing Industries and Construction	66.20	
	Transport	51.34	
	Others (commercial, residential & agricultural)	44.06	
	Fugitive Fuel emissions	3.94	
Industrial Processes and Product Use (IPPU)	Mineral industry	22.75	25.6
	Chemical Industry	2.71	
	Non-Energy Fuel and Solvent use product	0.10	
	Others (paper & pulp, Food & beverages)	0.2	
Agriculture, Forestry and Other Land use (AFOLU)	Livestock	109.12	223.45
	Land	31.52	
	Managed Soils	74.98	
	Rice Cultivation	7.83	

¹³⁰ UNFCCC, "Updated Nationally Determined Contributions 2021," United Nation Framework Convention on Climate Change, 2021, <https://unfccc.int/sites/default/files/NDC/2022-06/Pakistan%20Updated%20NDC%202021.pdf>.

¹³¹ UNFCCC, "Updated Nationally Determined Contributions 2021," United Nation Framework Convention on Climate Change, 2021, <https://unfccc.int/sites/default/files/NDC/2022-06/Pakistan%20Updated%20NDC%202021.pdf>.

Waste	Solid Waste Disposal	10.23	21.72
	Waste Incineration and Open Burning	0.9	
	Wastewater treatment and discharge	11.90	
	Total Emissions	489.87	
Source: United Nations Framework Convention on Climate Change ¹³²			

According to the Inventory, Pakistan's overall emissions for the year 2018 were estimated at 489.87 MtCO₂eq. The contributions from the Energy sector (218.94 MtCO₂eq), Industrial operations (25.76 MtCO₂eq), Agriculture, Forestry and Land Use (223.45), and Waste (21.72) Mt CO₂ eq. were the highest, respectively. Nitrous oxide (N₂O), methane (CH₄), and carbon dioxide (CO₂) are the primary greenhouse gases that need to be addressed.¹³³

The CPEC and Environmental Challenges

Environmentalists have opposed the CPEC project because of its environmental implications despite its significant economic contributions. The first complaint stems from its adverse impacts on wildlife and the environment. Road building and other development-related activities would cause the loss of wildlife corridors and natural habitats, which are essential to the survival of many species. Some of Pakistan's most environmentally delicate locations are located along the corridor.¹³⁴ CPEC overlaps with the Indus River System, which flows through the Punjab province and the Gilgit-Baltistan region. It also travels through the province of Khyber Pakhtunkhwa (KP) and into Indian Territory before emptying into the Arabian Sea at Karachi Port, close to Gwadar city in Balochistan. Cities with large populations, such as Ganweriwala, Lahore, Mohenjo-Daro, and Harappa, are found in the Indus River Basin. Concerns have also been raised

¹³² UNFCCC, "Updated Nationally Determined Contributions 2021," United Nation Framework Convention on Climate Change, 2021, <https://unfccc.int/sites/default/files/NDC/2022-06/Pakistan%20Updated%20NDC%202021.pdf>.

¹³³ UNFCCC, "Updated Nationally Determined Contributions 2021," United Nation Framework Convention on Climate Change, 2021, <https://unfccc.int/sites/default/files/NDC/2022-06/Pakistan%20Updated%20NDC%202021.pdf>.

¹³⁴ Shakir Ullah, Sergey Barykin, Ma Jianfu, Tahir Saifudin, Muhammad Arshad Khan, Ruban Kazaryn, "Green Practices in Mega Development Projects of China-Pakistan Economic Corridor," Sustainability, 2023, <https://www.mdpi.com/2071-1050/15/7/5870>.

on the extent of harm that development will cause to nearby ecosystems and wildlife. Not only that, it will seriously harm Pakistan's already delicate ecosystems.¹³⁵

However, the project has implemented several measures to guarantee eco-friendly infrastructure development strategies. First, CPEC will use existing infrastructure to transport its goods rather than constructing new infrastructure. This implies that less fuel and building materials will be utilized. This aims to generate electricity from renewable energy sources to lower carbon emissions.¹³⁶ Hence, the government has also laid out several policies for the mitigation action. The NEP 2021, the Energy Efficiency & Conservation Strategic Plan by NEECA, ARE 2019, NEVP 2019, and IGCEP 2021–2030 are the policies that are the foundations for Pakistan's activities.¹³⁷ It can be argued that several factors cause delays in policy implementation in Pakistan. Even though the government has established policies due to political rifts, bureaucratic hurdles, red tape culture, and not reaching a consensus, all the policy-making process rounds up on paper rather than implementation. The majority of CPEC-related policy implementation has been hindered by domestic challenges that have arisen during planning and execution.

There has not been any reflection on why the CPEC's success has faltered from the word "go" in Pakistan's broken democracy. In Pakistan, the CPEC was also intended to improve relations between the provinces. However, Balochistan, the region hosting CPEC's primary projects, Gwadar, feels excluded.¹³⁸ Provincial governments have raised concerns regarding the equitable distribution of CPEC project benefits since the implementation of the 18th Amendment, which conferred autonomy to the provinces.¹³⁹

135 Abrar Hashmi, Aamer Iqbal Bhatti, Saira Ahmed, Muhammad Atiq ur Rehman Tariq, Andre Savitsky, "Revisiting the Indus Basin Model for an Energy Sustainable Pakistan," *Water*, 2023, <https://www.mdpi.com/2073-4441/14/5/702>.

136 Shakir Ullah, Sergey Barykin, Ma Jianfu, Tahir Saifudin, Muhammad Arshad Khan, Ruban Kazaryn, "Green Practices in Mega Development Projects of China–Pakistan Economic Corridor," *Sustainability*, 2023, <https://www.mdpi.com/2071-1050/15/7/5870>.

137 UNFCCC, "Updated Nationally Determined Contributions 2021," United Nation Framework Convention on Climate Change, 2021, <https://unfccc.int/sites/default/files/NDC/2022-06/Pakistan%20Updated%20NDC%202021.pdf>.

138 Sajjad Ashraf, "Why CPEC faces challenges in Pakistan," *China US Focus*, 2022, <https://www.chinausfocus.com/finance-economy/why-cpec-faces-challenges-in-pakistan>.

139 Kashaf Ali, "CPEC and Provincial Autonomy," *Business Recorder*, 2020, <https://www.brecorder.com/news/40023923>.

The completion rate of CPEC projects in Sindh and Punjab provinces is higher than the projects in Khyber Pakhtunkhwa, Balochistan, and Gilgit-Baltistan.¹⁴⁰ However, the 18th Amendment also provides a chance to strengthen Pakistan's provincial environmental safeguards by granting provincial governments the sole authority to enact laws about "environmental pollution and ecology."¹⁴¹ According to recent studies, a nation can only attain sustained growth if fair socioeconomic opportunities and environmentally favorable conditions are provided.¹⁴² It can be argued that prioritizing the environment could inspire people and to adopt a new, sustainable approach to life. Only switching the energy industry from fossil fuels to renewable resources may lessen the effects of climate change and end the nation's ongoing pattern of growing electricity costs and instability that follows.

Habitat Loss and Biodiversity

Pakistan enjoys rich biodiversity, especially in the northern part of the country. However, over the past decade, biodiversity has been reduced in the Northern part of the country. Due to its geopolitical and socio-economic significance, Northern Pakistan has become a gateway for CPEC. Infrastructure development projects under CPEC have imposed threats to biodiversity due to its rapid expansion.¹⁴³ It will damage habitats and ultimately lead to biodiversity loss if it is not quickly managed. Notable mammal habitats, along with the Himalayas, are already listed on the red list of the International Union for the Conservation of Nature and Natural Resources (IUCN). Mammals in this region that are threatened or endangered include the Markhor, Kashmir red deer, White-bellied musk

140 Filippo Boni, Kathareine Adeney, "The Impact of the China-Pakistan Economic Corridor on Pakistan's Federal System," *Asian Survey*, 441-465, https://www.researchgate.net/publication/341941373_The_Impact_of_the_China-Pakistan_Economic_Corridor_on_Pakistan's_Federal_System_The_Politics_of_the_CPEC.

141 Yanying Huang, Thomas B. Fischer, Xe Hu, "The stakeholder analysis for SEA of Chinese foreign direct investment: the case of 'One Belt, One Road' initiative in Pakistan," *Impact Assessment and Project Appraisal*, 2017, <https://www.tandfonline.com/doi/full/10.1080/14615517.2016.1251698>.

142 Maryam Farooq, Zia Ur Rehman Rao, Muhammad Shoaib, "Analyzing the determinants of sustainability of China Pakistan Economic Corridor (CPEC) projects: an interpretive structural modelling (ISM) approach," *Environmental Science and Pollution Research*, 2022, <https://link.springer.com/article/10.1007/s11356-022-22813-3>

143 Akhtar Hussain Lashari, Wei Li, Mabroor Hassan, Ghulam Nabi, Prince T Mabey, Muhammad Morshedul Islam, Khalid, Safdar, "Biodiversity conservation in China-Pakistan Economic Corridor region with strategic environmental assessment," *Environmental and Pollution Research*, 2020, <https://pubmed.ncbi.nlm.nih.gov/32642885/>.

deer, Rhesus macaque, Himalayan brown bear, Kashmir gray langur, Indian wolf, Indian leopard, and Snow leopard.¹⁴⁴

The conservation of these species has yet to receive enough attention despite the dire circumstances. Furthermore, because the CPEC project is anticipated to result in significant air pollution, degradation, fragmentation, and habitat loss, it needs to be adequately assessed for any potential harmful effects on the local biodiversity.¹⁴⁵ The livelihood of the surrounding communities depends heavily on the biodiversity found in the northern mountains. In this regard, China and Pakistan are working to discover various strategies to prioritize addressing, minimizing, and mitigating harm to biodiversity while maximizing the social acceptability and environmental benefits of the CPEC.¹⁴⁶

Under the Pakistan Environmental Protection Act of 1997 and provincial environmental protection statutes, the Initial Environmental Examination (IEE), EIA, or Strategic Environmental Assessment (SEA) is required before the start of new projects.¹⁴⁷ The Pakistani government has chosen to undertake SEA because it believes that the EIA is insufficient for the China-Pakistan Economic Corridor (CPEC) because of the diverse interests of stakeholders. Experts contend that when it comes to protecting the environment and maximizing benefits, EIA is insufficient for the CPEC's massive projects. Therefore, SEA, which includes Social Impact Assessment (SIA), could benefit both nations. Along the CPEC route, SEA can protect the ecosystem and stop habitat degradation.¹⁴⁸

Water Scarcity and Water Resource Management

Pakistan is one of the lowest-ranked nations in terms of water resources and water management. With a population of over 231 million, Pakistan's water security has become a significant security concern. Statistics show that 3.5 to 7 million acre-feet (MAF) of water is needed to meet its

144 Ghulam Nabi, Suliman Khan, Shahid Ahmed, Ahsan Khan, "China-Pakistan Economic Corridor (CPEC): an alarming threat to the biodiversity of Northern Pakistan," *Biodiversity and Conservation*, 2017, <https://link.springer.com/article/10.1007/s10531-017-1402-0>.

145 Ibid

146 Akhtar Hussain et al <https://pubmed.ncbi.nlm.nih.gov/32642885/>.

147 Mehreen Khan, Muhammad Nawaz, Sajid Rashid, Saima Saif, Asim Mehmood, "Performance of EIA authority and effectiveness of EIA system in Pakistan," *Environmental Impact Assessment Review*, 2020, <https://www.sciencedirect.com/science/article/abs/pii/S0195925518303652?via%3Dihub>.

148 Akhtar Hussain et al <https://pubmed.ncbi.nlm.nih.gov/32642885/>.

collective domestic demand yearly, with each person needing 50 to 100 liters daily.¹⁴⁹ Since 1947, there has been a 400% decrease in per capita water availability, showing levels falling from 5600 m³ to 1038 m³.¹⁵⁰ It is projected that the per capita availability of water will drop to 860 m³ by 2050.

Experts argue that most of the CPEC's territory is in arid and semi-arid regions with dense populations and delicate biological environments. As a result, these regions' food, energy, and water supplies are severely challenged.¹⁵¹

The region's continued population and agricultural growth are driving up the demand for water supplies. The water supply for agricultural irrigation is threatened by a lack of water resources, which affects crop productivity and food security. Studies suggest that even in the absence of climate change, Pakistan's per capita water shortage is expected to rise in the following decades due to projected increases in water consumption. Vigorous activity is required to enhance water management techniques, especially in the agricultural sector, and to gain a deeper understanding of current and forecast water demand patterns.¹⁵²

Pakistan has proposed areas of cooperation under CPEC's long-term strategy, including water resource management and climate change mitigation. Pakistan is one of the top ten nations most susceptible to climate change. The scarcity of water is one effect of climate change. Through technological tools and under the umbrella of the CPEC China-Pakistan water cooperation, Pakistan can assist in managing its water sources to mitigate the impact of climate change and the ensuing calamities.¹⁵³

149 Uzair Sattar, "Pakistan's political economy perpetuates its water crisis," *Stimson Center*, 2023, <https://www.stimson.org/2023/pakistans-political-economy-perpetuates-its-water-crisis/>

150 Kalbe Ali, 'Per capita water availability in Pakistan has decreased by 400pc,' *Dawn*, 2021, <https://www.dawn.com/news/1634786#:~:text=ISLAMABAD%3A%20Parliamentary%20Secretary%20National%20Health,of%20around%201%2C038%20cubic%20metres.>

151 Mengzhu Cao, Yaning Chen, Weili Duan, Yaqi Li, Jingxui Qin, "Comprehensive Evaluation of Water-Energy-Food System Security in the China-Pakistan Economic Corridor," *Water*, 2022, <https://www.mdpi.com/2073-4441/14/12/1900>.

152 Jo-Ellen Parry, Dr. Hisham Osman and Anika Terton, "The Vulnerability of Pakistan's Water Sector to the Impacts of Climate Change: Identification of gaps and recommendations for action," UNDP Pakistan, 2017, <https://www.undp.org/sites/g/files/zskgke326/files/migration/pk/Report.pdf>.

153 Staff Reporter, "Water resource management to get special focus under CPEC," *Gwadar Pro*, 2023, <https://gwadarpro.pk/1614530715210055682/water-resource-management-to-get-special-focus-under-cpec>.

Worsening Air Quality in Pakistan

Due to the rapid expansion of the world population and the overexploitation of natural resources, air pollution has become a severe global environmental concern. According to the World Health Organization (WHO), air pollution levels are rapidly increasing worldwide; more than 90% of people breathe filthy air, and roughly 7 million deaths yearly are caused by outdoor and indoor aerosol pollutants. Airborne particulate matter (PM), ozone (O₃), nitrogen oxide (NO), nitrogen dioxide (NO₂), volatile organic compounds (VOC), carbon monoxide (CO), sulfur dioxide (SO₂), and high quantities of other species all contribute to outdoor (ambient) air pollution, which has detrimental health impacts. The adverse effects of air pollution and greenhouse gas (GHG) emissions brought about by human activity on the environment and human health have received much attention.¹⁵⁴

Recent studies have shown that a high percentage of affected cities are in low and middle-income countries. It is believed that ambient (outdoor) air pollution contributed to 4.2 million preventable deaths in 2019 globally. Approximately 89% of those premature fatalities happened in low- and middle-income nations, with the WHO's Western Pacific and Southeast Asia regions accounting for the majority of those deaths.¹⁵⁵ Numerous severe health problems, including respiratory ones like coughing, burning in the chest and throat, asthma flare-ups, and chronic bronchitis, are brought on by smog. In addition to these respiratory issues, smog also manifests as skin, heart, and eye disorders.¹⁵⁶ Smog contains particulate matter 2.5 (PM 2.5), which is considered a primary health risk. It can travel through the airways and land in the lungs, where it can lead to a variety of pulmonary conditions. The same element makes smog appear "hazy" and decreases visibility.¹⁵⁷

In the past several years, air pollution has become one of Pakistan's most serious problems. Pakistan was ranked as the second most polluted

154 Peng Wang, Waqar Hussain, Lyudmila, Ajaz Ali, Suhaib Farhan, "Air Quality Assessment along China-Pakistan Economic Corridor at the Confluence of Himalaya-Karakoram-Hindukush," *Atmosphere*, 2022, <https://www.mdpi.com/2073-4433/13/12/1994>.

155 "Ambient (outdoor) air pollution," *World Health Organization*, 2022, [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health).

156 Muhammad Ashraf, Rana Ahmad, and Haseeb Tareen, "Worsening Situation of Smog in Pakistan: A Tale of Three Cities," *Annals of Medicine and Surgery*, 79, 2022, <https://www.sciencedirect.com/science/article/pii/S2049080122007075>

157 Ernesto Triana, Santiago Enriquez, Javaid Afzal, Akiko Nakawaga, Asif Shuja, "Air Pollution in Pakistan," *World Bank Group*, https://elibrary.worldbank.org/doi/10.1596/978-1-4648-0235-5_ch2.

country in the world in 2023.¹⁵⁸ With the city's Air Quality Index (AQI) reaching a hazardous 512 in 2023, Lahore remained the most polluted city in Pakistan,¹⁵⁹ the fifth most polluted city in the world and the most polluted megacity, globally.¹⁶⁰ Fine particulate air pollution in Pakistan was found to be at a concentration of 73.7 µg/m³. Calculations conducted by the Pakistan Air Quality Initiative (PAQI), based on this data, show that residents lose "4.4 years" of their lives due to such hazardous levels.¹⁶¹

Some parts of Pakistan perform significantly worse than average; in the most polluted districts of the nation, such as Lahore, Sheikhupura, Kasur, and Peshawar, life expectancy is shortened by about seven years due to air pollution.¹⁶² Each winter season, Pakistan witnesses a rise in smog and Anthropogenic aerosols, of which 65% are produced within Pakistan. The primary reason for smog buildup is nitrogen oxides (NO_x), which are emitted mainly from Pakistan's 23.6 million transport vehicles (58%), followed by the industry and power sector, which account for 34% of emissions.¹⁶³ Since CPEC's primary focus is on connectivity through road networks, it is predicted that following the completion of the CPEC's road networks, up to 7000 trucks a day are anticipated to travel the Karakoram highway, emitting up to 36.5 million tons of CO₂ en route to Gwadar.¹⁶⁴ Experts have indicated that Pakistan's water, air quality, and biodiversity will suffer directly due to the CPEC investments. The potential environmental risks could significantly diminish the possible benefits of the CPEC.¹⁶⁵

158 Imran Gabol, "Pakistan 'second most polluted country' in 2023," *Dawn*, 2024, <https://www.dawn.com/news/1822667>

159 Staff Reporter, "Lahore again assumes most polluted city slot," *Dawn*, 2023, <https://www.dawn.com/news/1801183>.

160 Imran Gabol, "Pakistan 'second most polluted country' in 2023," *Dawn*, 2024, <https://www.dawn.com/news/1822667>.

161 Staff Reporter, "Lahore again assumes most polluted city slot," *Dawn*, 2023, <https://www.dawn.com/news/1801183>.

162 University of Chicago, "Country Spotlight: Pakistan," *Air Quality Life Index*, 2021, <https://aqli.epic.uchicago.edu/country-spotlight/pakistan/>.

163 Maqbool Ahmad, Khadim Hussain, Jawad Nasir, Zhongwei Huang, Khan Alam, Samreen Liaquat, Peng Wang, et al., "Air Quality Assessment Along China-Pakistan Economic Corridor at the Confluence of Himalaya-Karakoram-Hindukush." *Atmosphere* 13 (12), 2022, <https://doi.org/10.3390/atmos13121994>.

164 Shahzad Kouser, Abdul Subhan, Abedillah, "Uncovering Pakistan's Environmental Risks and Remedies under the China-Pakistan Economic Corridor," *Environmental Science and Pollution Research*, 27, 4661–4663, 2019, <https://doi.org/10.1007/s11356-019-07428-5>

165 Maqbool Ahmad, Khadim Hussain, Jawad Nasir, Zhongwei Huang, Khan Alam, Samreen Liaquat, Peng Wang, et al., "Air Quality Assessment Along China-Pakistan Economic Corridor at the Confluence of Himalaya-Karakoram-Hindukush." *Atmosphere* 13 (12), 2022, <https://doi.org/10.3390/atmos13121994>.

The Green Dimensions of CPEC for Sustainable Development

Technological innovations in green practices, technology, and procedures have ushered in a global transition toward sustainable development. This is particularly important to consider in light of the climate change incidents connected to Pakistan. As the demand for environmentally friendly products and services rises partially due to government mandates, more and more firms are anticipated to get on the green revolution bandwagon, creating a positive feedback loop of continuously upgrading green products and services. The construction industry has become one of the most critical industries requiring the contribution of sustainable development, not only to deliver sustainable projects but also to cut costs.¹⁶⁶ Conventional development initiatives within the infrastructure development industry have been linked to several issues. These concerns include time management difficulty, over budget, construction flaws, and environmental hazards.

Experts point out that the primary cause is that construction sites are usually found close to busy roads or railroads, which contributes to air pollution and noise pollution.¹⁶⁷ The green growth concept talks about environmental responsibility, formulation, and modification of industries' existing strategies.¹⁶⁸ The concept of green dimensions covers the various aspects of strategies formulated by institutions to regulate firms in the marketing environment.

The Paris Agreement for Climate Change called for a faster shift to a more environmentally friendly and sustainable growth model.¹⁶⁹ According to the World Bank, Green growth is defined as growth that uses natural resources efficiently, is clean in the sense that it reduces pollution and its effects on the environment, and is resilient in the sense that it takes into consideration natural dangers, the role that environmental management

166 Shakir Ullah, Sergey Barykin, Ma Jianfu, Tahir Saifudin, Muhammad Arshad Khan, Ruban Kazaryn, "Green Practices in Mega Development Projects of China–Pakistan Economic Corridor," *Sustainability*, 2023, <https://www.mdpi.com/2071-1050/15/7/5870>.

167 Li-yin Shen, Vivian Tam, Leona Tam, Ying-bo Ji, "Project feasibility study: the key to successful implementation of sustainable and socially responsible construction management practice," *Journal of Cleaner Production*, 18 (3), 254-259, 2010, <http://dx.doi.org/10.1016/j.jclepro.2009.10.014>.

168 Timothy O. Olawumi, Daniel W.M. Chan, "Identifying and prioritizing the benefits of integrating BIM and sustainability practices in construction projects: A Delphi survey of international experts," *Sustainable Cities and Society*, 40, 2018, <https://doi.org/10.1016/j.scs.2018.03.033>.

169 UNFCCC, "The Paris Agreement," United Nations, <https://unfccc.int/process-and-meetings/the-paris-agreement>

and natural capital play in averting actual disasters.¹⁷⁰ The World Bank identifies that social and environmental sustainability and economic and social sustainability are compatible and generally complementary. Green development tries to ensure that financial and environmental sustainability are compatible because growth has historically come at the expense of the environment.¹⁷¹ The concept of “green growth” has deeper roots, and existing research aims to interlink the pressing environmental issues with the advancement of industry and the economy.¹⁷²

The CPEC project is a vital initiative for the socioeconomic development of China and Pakistan. Dynamic development will be possible economically thanks to CPEC, but environmental effects will result from its construction. By implementing green practices in the various construction phases, this study aims to comprehend the many measures used to reduce the project’s negative environmental impact and related attitudes. This study aims to look into how the massive CPEC projects take environmental factors into account. The goal is to assess the green practices used in CPEC infrastructure projects to determine the degree of conformity with sustainable practices and green initiatives. As discussed in this chapter, there have been serious concerns regarding the impact of infrastructural developments on Pakistan’s ecosystems.

The China-Pakistan Economic Corridor (CPEC) is hailed as an environmentally friendly initiative, aiming to diminish its carbon impact through the adoption of renewable energy sources such as hydroelectric, wind, and solar power.¹⁷³ The second phase of CPEC (CPEC 2.0) has been focused on sustainable development, and it covers projects that are high quality and eco-friendly.¹⁷⁴

170 “What is green growth and how can it help deliver sustainable development?” OECD, *Green Growth and Sustainable Development*, <https://www.oecd.org/greengrowth/whatisgreengrowthandhowcanithelpdeliversustainabledevelopment.htm>

171 Ibid

172 Guendalina Anzolin, Amir Lebdioui, “Three Dimensions of Green Industrial Policy in the Context of Climate Change and Sustainable Development,” *European Journal of Development Research*, 33(2), 1-35, 2021, <http://dx.doi.org/10.1057/s41287-021-00365-5>

173 Shakir Ullah, Sergey Barykin, Ma Jianfu, Tahir Saifudin, Muhammad Arshad Khan, Ruban Kazaryn, “Green Practices in Mega Development Projects of China–Pakistan Economic Corridor,” *Sustainability*, 2023, <https://www.mdpi.com/2071-1050/15/7/5870>.

174 Government of Pakistan, “CPEC 2.0 Achievements and Updates,” CPEC Secretariat, 2020, https://cpec.gov.pk/brain/public/uploads/documents/CPEC_2.0_Eng.pdf

Conclusion and Policy Recommendations

CPEC presents a clear picture through the prism of environmental concerns and green dimensions: ambition and ecology can coexist, but only with deliberate effort and persistent dedication. Pakistan and China could reap socioeconomic and strategic benefits from the CPEC. Nevertheless, this development may result in serious environmental harm, such as habitat loss, water scarcity, and air pollution. Adopting the concept of green growth can be a way forward that mitigates environmental effects while fostering economic development. Essential elements of this strategy include investments in green technologies, sustainable building practices, and renewable energy.

Pakistan faces several hurdles in implementing green practices, such as low public awareness of environmental issues, waning political will, and budgetary constraints. Investments in environment-friendly practices and adopting technology, such as sustainable infrastructure development and renewable energy sources, must be given top priority by the governments of China and Pakistan.

Both countries can mitigate the potential risks that are a cause of concern for this large-scale infrastructure project. Building and funding renewable energy projects could help Pakistan lessen its dependency on fossil fuels, which it now imports and which puts a heavy strain on the country's already precarious economy. It can also help Pakistan lower its environmental worries. It is imperative to build new infrastructure with as little adverse effect on the environment as possible. It can be done by employing recycled materials and energy-efficient construction techniques. It is crucial to create and implement strict environmental standards. The focus must be on developing and implementing environmental legislation that adheres to international standards; governments should collaborate.

It is critical to set up efficient oversight and enforcement systems. Establishing unambiguous protocols for overseeing adherence to ecological statutes and implementing sanctions for noncompliance is imperative. Promoting public awareness of environmental challenges and the effects of the China-Pakistan Economic Corridor (CPEC) is essential to building community support for sustainable development strategies. Empowering the Indigenous people could be beneficial in reaping the long-term benefit of CPEC.

The communities that reside on the paths of CPEC ought to have the authority to take proactive measures to safeguard the environment, like keeping an eye on local environmental conditions and reporting infractions of environmental laws. Encouraging accountability and transparency is critical to the China-Pakistan Economic Corridor's (CPEC) success. Governments must take responsibility for their actions and be open about the project's impact on the environment.

CPEC is at a turning point. It could represent unrestrained environmental devastation or serve as a symbol of sustainable development. Both countries can steer the project toward a future where environmental well-being and economic prosperity are two sides of the coin rather than mutually exclusive by prioritizing green investments, enforcing stricter environmental regulations, increasing public awareness, and promoting international collaboration. Their decision will significantly impact the region's ecological and economic destiny.

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Chapter 4

The Road to a Green Alliance: Synergizing CPEC and SDGs

Dr. Yan Zhen

Introduction

The year 2015 was an extremely important year. China's Belt and Road construction entered a new phase marked by unprecedented expansion and comprehensive development of the China-Pakistan Economic Corridor (hereinafter referred to as CPEC). In the exact same year, the 193 member states of the United Nations formally adopted the 17 Sustainable Development Goals (hereinafter referred to as SDGs), outlining the Agenda on Sustainable Development (AoSD) for 2030.¹⁷⁵ The emergence of these two important projects was no coincidence. Both events serve as an important milestone in China's updated integration with the world and prompt an urgent task for China, Pakistan, and even the whole Global South to face the unavoidable developmental transformation.

Since the 20th National Congress of the Communist Party of China (CPC) in 2022, China has developed an even clearer vision for CPEC and the Belt and Road Initiative (hereinafter referred to as BRI), i.e., to promote high-quality development for BRI, to build a more solid connection with the BRI family, and to share China's experience with the rest of the world.¹⁷⁶ As China enters an even more extraordinary year of 2023, president Xi Jinping has put forward further Global Development Initiative and re-emphasized the importance of high-quality development at the Third Belt and Road Forum for International Cooperation (BRF III) in October.¹⁷⁷ History has clearly mapped out the path of BRI towards a future driven by the self-awareness in pursuing a high-quality, sustainable and inclusive agenda. A green alliance with an abundance of sustainable means and ends is taking shape between China and the world.

175 United Nations, "The 17 Goals," Sustainable Development, Department of Economic and Social Affairs <https://sdgs.un.org/goals>.

176 Yang Sheng and Fan Anqi, "China-Pakistan ironclad ties consolidated; key CPEC projects to advance as 'BRI, Chinese modernization benefit all,'" *Global Times*, 2022, <https://www.globaltimes.cn/page/202211/1278594.shtml>.

177 Robert Kuhn, "China's Global Development Initiative," *CGTN*, 2023, <https://news.cgtn.com/news/2023-10-18/China-s-Global-Development-Initiative-1nZSSYGyKA0/index.html>.

BRI, Global Development Initiative and the Green Vision of CPEC

BRI and the Global Development Initiative are certainly not redundant proposals. They are coherent in both forming logic and practice, and are designed as platforms of cooperative mechanism. Openness is their essential characteristic. Firstly, they reflect the openness of the participating partners. Although BRI mainly concerns the countries along the route, it is also a platform for global cooperation; as long as one agrees with the “Silk Road Spirit” and has the intention to cooperate, BRI can naturally be extended to all regions of the world.¹⁷⁸ The signing of the Memorandum of Understanding on Belt and Road Cooperation between Argentina and China¹⁷⁹ is the best proof of this, in spite of geographical distance and the supposed routes of BRI: which mainly center on the Eurasian continent. Similarly, the Global Development Initiative is a cooperative platform with a high degree of openness to partnership, and in order to forge a global consensus on development, the Initiative welcomes all kinds of actors, including sovereign states, international organizations and enterprises, to jointly build a global partnership for development.¹⁸⁰ Secondly, they reflect the openness of the content of cooperation. The Belt and Road Initiative has established priority areas of cooperation such as poverty reduction and eradication, food security, economic recovery and ecological environment,¹⁸¹ but it has set a higher blueprint for cooperation by promoting the implementation of the 17 SDGs.

The concept of green and ecological development has already taken root in China’s economic and social development practices,¹⁸² and will certainly be expanded to China’s international cooperation platforms such as BRI. Most of the developing countries along the Belt and Road are at the

178 “Silk Road spirit still pioneering path to an inclusive and interconnected world,” *China Daily*, 2023, <https://global.chinadaily.com.cn/a/202310/18/WS652fdabba31090682a5e9548.html>.

179 Xinhua, “China, Argentina sign MoU on Belt and Road Initiative: Joint Statement,” The State Council Information Office of PRC, 2022, http://english.scio.gov.cn/beltandroad/2022-02/07/content_78032658.htm.

180 Robert Kuhn, “China’s Global Development Initiative,” *CGTN*, 2023, <https://news.cgtn.com/news/2023-10-18/China-s-Global-Development-Initiative-1nZSSYGyKA0/index.html>.

181 “The Belt and Road Initiative: A Key Pillar of the Global Community of Shared Future,” The State Council Information Office of PRC, *TBRF*, 2023, <http://www.beltandroadforum.org/english/n101/2023/1010/c124-895.html>.

182 Xiaoxue Weng, Zhanfeng Dong, Qiong Wu, Ying Qin, “China’s path to a green economy: Decoding China’s green economy concepts and policies,” International Institute for Environment and Development, <https://www.iied.org/sites/default/files/pdfs/migrate/16582IIED.pdf>.

critical juncture of green development and clean energy transformation, and China's experience in building ecological civilization and the green development concepts embedded in the Belt and Road Initiative provide important references for these countries to learn from, especially as the Green Belt and Road construction provides a practical platform for China and the respective countries to carry out meaningful cooperation. In particular, the construction of the Green Belt and Road, in reality, provides opportunities for China and the countries along the route to carry out international cooperation in clean energy and green technology transfer and creates favorable conditions for mutual benefits and win-win situations.

In March 2015, the National Development and Reform Commission, the Ministry of Foreign Affairs and the Ministry of Commerce of China jointly issued the "Vision and Action for Promoting the Construction of the Silk Road Economic Belt and the 21st Century Maritime Silk Road,"¹⁸³ which clearly puts forward the need to highlight the concept of ecological civilization in investment and trade, strengthen cooperation in ecological environment, biodiversity and response to climate change, so as to jointly build a Green Silk Road.

On July 25, 2016 President Xi Jinping said in a congratulatory letter to the Belt and Road Media Cooperation Forum that "China is willing to join hands with countries along the route to build a Green Silk Road."¹⁸⁴ In 2017, the former Ministry of Environmental Protection issued the Belt and Road Ecological Environmental Protection Cooperation Plan,¹⁸⁵ and jointly issued the "Guiding Opinions on Promoting the Construction of Green Belt and Road"¹⁸⁶ with the Ministry of Foreign Affairs, the National Development and Reform Commission, and the Ministry of Commerce, making clear the road map for the Green Belt and Road. On April 22, 2021, when President Xi Jinping attended the online Leaders Summit on Climate with world leaders, he pointed out that "China has also promoted

183 "Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road," *Ministry of Foreign Affairs PRC*, 2015, https://www.fmprc.gov.cn/eng/topics_665678/2015zt/xjpcxbayzlt2015nnh/201503/t20150328_705553.html.

184 Wenwen Han, "President Xi sends congratulatory message to 2016 Media Cooperation Forum on Belt and Road," *BRICS Information Sharing and Exchanging Platform*, 2016, <http://en.people.cn/n3/2016/0726/c98649-9091126.html>.

185 "The Belt and Road Ecological and Environmental Cooperation Plan," *Ministry of Ecology and Development PRC*, 2017, https://english.mee.gov.cn/Resources/Policies/policies/Frameworkp1/201706/t20170628_416869.shtml.

186 "Guidance on Promoting Green Belt and Road," *Ministry of Ecology and Development PRC*, 2017, https://english.mee.gov.cn/Resources/Policies/policies/Frameworkp1/201706/t20170628_416864.shtml.

cooperation in the field of ecological civilization as a key element in the construction of the Belt and Road, launched a series of green action initiatives, and taken a series of initiatives in green infrastructure, green energy, green transportation, green finance, etc., which will continue to benefit the people of all countries participating in the joint construction of the Belt and Road.”¹⁸⁷

On October 18th, 2023, as an important part of the third Belt and Road Summit Forum on International Cooperation, the High-level Forum on Green Development was held in Beijing, with the theme of “Building a Green Silk Road and Promoting Harmonious Coexistence between Humanity and Nature.” In his speech, Vice President Han Zheng said that promoting the construction of the Green Silk Road is an important initiative to promote the green and low-carbon development of developing countries and to build a clean and beautiful world together. He lauded the co-constructing countries, led by the concept of green development, having learned from each other and cooperated with each other, with extensive and in-depth exchanges and effective practical cooperation to have achieved great results in promoting the construction of the Green Silk Road.¹⁸⁸ At the forum, the concept of Green Silk Road positively resonated among and praised by the attendees, including the Secretary-General of the United Nations, the Prime Minister of Thailand and the President of Uzbekistan.¹⁸⁹

CPEC, as an important part of BRI, has great potential and opportunities to provide new paths and support for the realization of green development. CPEC is, in every sense, a concrete implementation of the United Nations 2030 SDGs and deployment of China’s global development initiatives, and will surely become an important platform to test China’s ability to work with its partners to promote the United Nations Sustainable Development Agenda.

With the rapid development of the global economy and the acceleration of urbanization, China and Pakistan, as well as other countries around the world, are facing global warming, energy shortages, excessive consumption of natural resources, and various environmental problems, etc. How to achieve coordinated development of economic development

187 “China reiterates climate change commitments, says efforts underway,” *CGTN*, 2021, <https://news.cgtn.com/news/2021-04-22/President-Xi-attends-Leaders-Summit-on-Climate-via-video-link-ZFKPiQ9yCc/index.html>.

188 “Belt and Road Forum: Green Development Centered at Beijing Gathering as Partner Countries Call for Green Future,” *Chinese Academy of Sciences*, 2023, https://english.cas.cn/newsroom/multimedia_news/202310/t20231020_384172.shtml.

189 Ibid

and environmental protection has become a common challenge for all countries. Under such a background, green development has become a new way of thinking and development direction. Therefore, it is of great practical significance and research value to integrate the China-Pakistan Economic Corridor with the United Nations Sustainable Development Program to explore a new road of sustainable development.¹⁹⁰

The Intersection of UN SDGs 2030 Agenda and China's Belt and Road Initiative

The United Nations SDGs Agenda 2030 is global in nature and requires joint global coordination, cooperation and efforts for its eventual realization. China, as a responsible major country, has played an active role in realizing these goals. In fact, China's BRI is practicing the spirit of UN sustainable development in its own way. From all perspectives, the SDGs 2030 and BRI have a high level of synchronization in terms of both principles and specific objectives.¹⁹¹ In terms of basic principles, the 2030 Agenda for Sustainable Development is guided by the goals and principles of the United Nations Charter, while BRI also explicitly mentions that it is proposed under the framework of the United Nations Charter. The 2030 Agenda for Sustainable Development emphasizes that every country has the right to exercise sovereignty over its wealth, natural resources and economic activities in perpetuity, and considers that the implementation of the Agenda should not contravene the rights and obligations of States under international law.¹⁹²

In contrast, BRI also adheres to the Five Principles of Peaceful Coexistence: mutual respect for sovereignty and territorial integrity, non-aggression, non-interference in each other's internal affairs, equality and mutual benefit, and peaceful coexistence - an important covenant and commitment China

190 Zhang Chun, "G20 and Implementation of UN 2030 Agenda for Sustainable Development," *Global Review*, No. 4., 2016, <https://www.worldscientific.com/doi/full/10.1142/S2377740016500238>.

191 Balazs Horvath, "Identifying Development Dividends along the Belt and Road Initiative: Complementarities and Synergies between the Belt and Road Initiative and the Sustainable Development Goals," *China Center for International Economic Exchanges*, 2016, <https://www.undp.org/sites/g/files/zskgke326/files/migrationcn/139e87df8c74c6731e5da60079ce6c88d59e7fe6e5282c3a8f4c472955315493.pdf>.

192 United Nations. "Transforming our World: The 2030 Agenda for Sustainable Development." <https://sdgs.un.org/2030agenda>.

has vowed to the international community from as early as the 1950s.¹⁹³ The 2030 Agenda for Sustainable Development is committed to creating conditions and an environment for sustainable, inclusive and mutually prosperous economic development for countries with different levels of development and potential. BRI likewise emphasizes the importance of harmony and inclusiveness, advocating mutual respect among different countries for the paths and modes of development independently chosen by their peoples, while at the same time supporting dialogue and cooperation among different civilizations on the basis of seeking common ground while reserving differences, so as to achieve common development.¹⁹⁴

In terms of green development, the 2030 Agenda for Sustainable Development has a high degree of compatibility with the Belt and Road Initiative. The 2030 Agenda includes a goal to address the impacts of climate change, a process that will require significant infrastructure investments in transportation, energy, and other sectors,¹⁹⁵ so the connectivity of facilities can also play a role in addressing climate change. While the “Five Links” of the BRI do not specifically target consumer production and bioprotection, trade connectivity plays a crucial role in the Belt and Road initiative. The core idea of encouraging investment and collaboration in energy-efficient, low-carbon, and eco-friendly sectors to facilitate trade aligns to some extent with the environmental goals of the 2030 Agenda.

China has been recognized by the United Nations for actively promoting environmental sustainability in its own way. The United Nations Environment Programme (UNEP) believes that the construction of the Green Belt and Road will play an important role in promoting the realization of the 17 SDGs contained in the UN’s 2030 Agenda for Sustainable Development.¹⁹⁶ The last forty years of China’s reform and opening-up definitively demonstrate a profound reality: when a major country undergoes true transformation, it has the power to reshape the world. China’s industrial modernization, scientific advancements, and cultural shifts have not only transformed the nation but also significantly influenced the fate of a fifth of humanity,

193 “Celebrating 5 Principles of Peaceful Coexistence.” *China Daily*, May 10, 2024. <https://epaper.chinadaily.com.cn/a/202405/10/WS663d7535a310df4030f51685.html>.

194 Yang Bo, “A comparative study of the United Nations 2030 Sustainable Development Goals and the Belt and Road initiative,” *Future and Development*, No. 2., 2021, https://caod.oriprobe.com/articles/60834913/A_comparative_study_of_the_united_nations_2030_sus.htm.

195 Rajendra Pachauri (ed), Leo Meyer (ed), *Climate Change 2014 Synthesis Report*, WIPCC, 2014, https://www.ipcc.ch/site/assets/uploads/2018/05/SYR_AR5_FINAL_full_wcover.pdf.

196 “UNEP Official Says Partnerships Key to Ensure Green Belt and Road Projects,” *Xinhua*, 2019, http://www.xinhuanet.com/english/africa/2019-04/20/c_137991724.htm.

leaving a profound impact on the global landscape. Similarly, in the context of the sustainable development agenda advocated by the United Nations, China is still actively promoting technological and theoretical innovation and international connectivity to build a greener future.

In the field of technology and policy, China promotes the development of clean energy and industry. China is one of the world's largest clean energy investors, promoting the development of solar energy, wind energy and other clean energy, and has become one of the world's largest clean energy markets.¹⁹⁷ China has already become a leader in terms of technological progress in the respective clean energy sectors. According to China's National Energy Administration (NEA), by the end of 2021, China's photovoltaic power generation grid-connected installed capacity reached 306 million kilowatts, as the world's largest installed capacity of new photovoltaic power generation for seven consecutive years.¹⁹⁸ At the same time, China's installed capacity of wind power generation also ranked first in the world.¹⁹⁹ The facts show that China has a leading position in clean energy technology, and China has also become one of the world's largest producers and exporters of clean energy equipment. According to China's General Administration of Customs, China's exports of clean energy equipment, such as solar panels and wind turbines, reached \$25.9 billion in 2021, a year-on-year increase of 54.3 percent.²⁰⁰ In addition, Chinese companies have built a number of clean energy projects overseas and provided a large number of clean energy products and services to other countries.

In terms of applied technology, China has vigorously promoted the use of clean energy and the popularization of new energy vehicles and other environmentally friendly products. China experienced a dramatic annual increase of 93.4 percent in electric and hybrid vehicle sales, reaching 6.887

197 Sara Schonhardt, "China Invests \$546 Billion in Clean Energy, Far Surpassing the U.S.," *Scientific American*, 2023, <https://www.scientificamerican.com/article/china-invests-546-billion-in-clean-energy-far-surpassing-the-u-s/>.

198 "China's installed capacity of photovoltaic power tops 300 mln kw," Xinhua, 2022, <https://english.news.cn/20220122/be328684d8e744d7a71f0e7d73e03385/c.html>.

199 "China's installed wind power capacity exceeds 300 mln kW, 1.4 times EU levels and 2.6 times that of US," *Global Times*, 2021, <https://www.globaltimes.cn/page/202111/1240202.shtml>.

200 General Administration of Customs of the People's Republic of China. "Belt and Road Initiative Adheres to Five Principles of Peaceful Coexistence." <http://english.customs.gov.cn/Statics/9cdd359c-b6c4-4732-ba42-bbe337fa04ff.html>.

million units in 2022.²⁰¹ Moreover, China has accelerated the adoption of clean energy in both urban and rural regions. This effort involves the promotion of solar street lights, wind power generation, and other facilities to diminish reliance on fossil fuels, thereby making a commendable impact on environmental conservation.

China's swift progress in the green building sector has not only fueled energy but also advanced the eco-friendly evolution and enhancement of the construction industry. In 2020, seven departments, including the Ministry of Housing and Urban-Rural Development of the People's Republic of China, jointly issued the "Action Plan for the creation of Green Buildings", proposing that "by 2022, the proportion of green building area in new urban buildings in the year will reach 70%" ²⁰² making a positive contribution to the sustainable development of the construction industry in China.

In 2019, China implemented the pilot construction of "Zero-Waste City" in 11 cities, including Shenzhen and Xiong'an New Area, and expanded the scope of construction to 113 cities and Eight special areas by 2021, making significant steps forward in municipal solid waste emission and treatment, and providing a new direction for the 21st century cities.²⁰³ This is an important step forward in municipal solid waste discharge and disposal and an important endeavor for the sustainable development of cities in the twenty-first century.

The important experience of China's reform and opening-up lies in the parallel development of practice and philosophy. While China advances the green economy and transformation, the Communist Party of China (CPC) is also formulating and advancing the theory of ecological civilization construction. It declares its commitment to leveraging ecological civilization construction as a foundation to holistically drive the evolution of China's economic development mindset and approach. Since the 18th National Congress of the CPC, the Central Committee has made unprecedented efforts to grasp the construction of ecological civilization,

201 "China Auto Industry Leverages Modular Production to Become EV Powerhouse," *Nomura*, 2023, <https://www.nomuraconnects.com/focused-thinking-posts/china-auto-industry-leverages-modular-production-to-become-ev-powerhouse/>

202 Dehai Zhu, Chengri Zhang, Qian Cao, and Yuqi Gao. "Research on the Development Trend of Green Building in China from the Perspective of Patent." *E3S Web of Conferences* 512 (2024): 01014. <https://doi.org/10.1051/e3sconf/202451201014>.

203 Shiyue Qi, Ying Chen, Xuexue Wang, Yang Yang, Jingjie Teng, Yongming Wang, "Exploration and practice of 'zero-waste city' in China," *Circular Economy*, 3(1), 2024, <https://doi.org/10.1016/j.cec.2024.100079>.

and the whole Party and the whole country have significantly increased their conscientiousness and initiative to promote green development,²⁰⁴ and have carried out a series of fundamental and pioneering long-term work, with unprecedented determination, intensity and effectiveness. A major step has been taken in the construction of a beautiful China, and the construction of an ecological civilization has made new and historic achievements.

Xi Jinping's thought on ecological civilization is an important part of his thoughts on socialism with Chinese characteristics in the new era. Xi Jinping's thought on ecological civilization ascended as early as his governorship years in Zhejiang province, where he tested his thoughts over the combat of environmental degradation in the peak time of extensive individualization of the late 1990s and early 2000s. Over the past decade, China's experience in socialist modernization has been encapsulated in the ecological civilization theory. This theory not only explains the necessity for China to develop an ecological civilization but also delves into the specifics of what kind of ecological civilization should be established. China has integrated the construction of ecological civilization into the overall layout of national development, strengthened environmental governance and ecological protection, and promoted the complementarity of economic development and environmental protection.²⁰⁵

China's ecological civilization construction focuses on promoting public awareness over the concept, strengthening public education, and raising the environmental protection awareness and eco-literacy of the whole society. The Chinese government popularizes the knowledge by carrying out ecological civilization publicity activities and promoting eco-culture, guides the public to experiment and pursue green life, and pushes for the formation of a moderately frugal, green, low-carbon, civilized and healthy lifestyle and consumption pattern. At the same time, it has strengthened education and training on ecological civilization for leading cadres and raised their level of ecological awareness and decision-making. The very aim of the massive public campaign is to foster a national consensus over environmental and ecological conservation so a sustainable pattern of development will be assured.

204 Wang Yiming, "China's Transition to Green Development: Process, Challenges and Responsive Measures," *Development Research Center of the State Council*, 2020, <https://dx.doi.org/10.1142/S2345748120750056>.

205 Arthur Hanson, "Ecological Civilization in the People's Republic of China: Values, Action, and Future Needs," *ABD East Asia Working Paper Series*, 2019, <https://www.adb.org/sites/default/files/publication/545291/eawp-021-ecological-civilization-prc.pdf>

Promoting Cooperation on Global Environmental and Ecological Governance

China's ecological civilization construction focuses on cooperation with the international community and participation in global ecological governance. The Chinese government supports and promotes the international community's collective response to global environmental problems, strengthens exchanges and cooperation with the countries concerned, and jointly researches and solves global environmental problems such as climate change, wildlife protection, etc. At the same time, China actively participates in the activities of international environmental protection organizations and contributes to the promotion of global ecological environmental protection. China continues to strengthen the construction of multilateral cooperation platforms in the green field under the BRI framework.

The BRI International Green Development Coalition has attracted more than 150 partners from more than 40 countries, including the environmental authorities of 26 countries, and has established 10 thematic partnerships, including those on climate change, biodiversity conservation and green finance.²⁰⁶ The membership of the Belt and Road Green Investment Principles has continued to expand, with 44 signatory organizations and 14 supporting organizations from 17 countries and regions. China has launched the BRI Green Development Partnership Initiative with 31 countries and signed memorandums of understanding on green development and investment cooperation with Hungary, Singapore and other countries, thus expanding the circle of friends of the Belt and Road Green Development Initiative. Beijing Initiative for Belt and Road Green Development, the Green Development Investment and Financing Partnership, and the Action Plan for Green Technology Development in Central Asia have expanded the breadth and depth of China's green development cooperation with co-constructing countries.²⁰⁷ In September, 2021, President Xi Jinping made a solemn pledge at the 76th United Nations General Assembly that "China will strongly support the green and low-carbon development of energy in developing countries, and will not build any new offshore coal power projects."²⁰⁸

206 BRI International Green Development Coalition, BRI International Green Development Institute, http://en.brigc.net/About_us/Member/202306/t20230629_132436.html.

207 Belt and Road Official Portal, <https://eng.yidaiyilu.gov.cn/>.

208 Han Chen, Shen Wei, "China's no new coal power overseas pledge, one year on," 2022, <https://dialogue.earth/en/energy/chinas-no-new-coal-power-overseas-pledge-one-year-on/#:~:text=On%2021%20September%202021%2C%20China's,coal%2Dfired%20power%20projects%20overseas.>

In 2021, China's investment in foreign coal projects was cut to zero for the first time, and green energy currently accounts for more than 40% of investment in the energy sector.²⁰⁹ China continues to deepen international cooperation in the field of renewable energy, contributing green solutions to the high-quality construction of BRI.²¹⁰ Clean energy projects such as the Nam Ou River Basin Hydroelectric Power Project in Laos, the Sachal Wind Farm Project in Pakistan, and the Dhafra Solar Power Station in the United Arab Emirates have played an important role in the sustainable development of the energy economy in respective countries. The China-Laos Railway bypasses the core areas of various nature reserves and ecologically sensitive spots, and fully protects natural resources such as Asian elephants and tropical rainforests along the route. Projects such as the Central Sewage Treatment Plant in Ulaanbaatar, Mongolia, and the Dasherbandi Sewage Treatment Plant in Bangladesh have effectively improved the local living environment by perfecting environmental infrastructure. Among many, the Saisetha Comprehensive Development Zone in Vientiane, Laos, has become a model of green, low-carbon and environmental protection projects.²¹¹

Countries along the BRI generally benefit from international cooperation dedicated to environmental and ecological protection. It also enables China to gain valuable experience in environmental and ecological governance in the process of further connection with the world, and promotes the construction of China's local ecological civilization.

The Green Path of CPEC

The China-Pakistan Economic Corridor is a 3,000-kilometer-long mega infrastructural project stretching from Kashgar in Xinjiang in the north to Gwadar, Pakistan's mouth of the sea in the south. It was initiated by Chinese Premier Li Keqiang during his visit to Pakistan in May 2013, with the aim of strengthening exchanges and cooperation in the fields of transportation, energy, and maritime affairs between China and Pakistan and enhancing the connectivity between the two countries for their mutual development. CPEC was formally launched on April 20, 2015, and is a model and flagship

209 Ibid

210 "Chair's Statement of the Third Belt and Road Forum for International Cooperation," The Third Belt and Road Forum for International Cooperation, 2023, <http://www.beltandroadforum.org/english/n101/2023/1020/c127-1271.html>.

211 Ni Hao, "Chinese clean energy firms continue overseas expansion amid challenges, opportunities," 2024, <https://www.globaltimes.cn/page/202403/1309308.shtml>.

project of China's BRI.²¹² CPEC, from paper to practice, carries the vision to further strengthen the China-Pakistan all-weather strategic cooperative partnership by providing important opportunities for the development of Pakistan. Currently, the implementation of CPEC has yielded results, yet encounters numerous risks and challenges. Its development significantly advances economic collaboration between China and Pakistan, propels global energy transition, and tackles climate change. For the corridor construction to truly benefit Pakistan's people in the long run, both nations must thoroughly grasp, assess, and actively address environmental and developmental risks. This approach is crucial to achieving tangible outcomes and answering the pivotal question of the project's potential for lasting welfare impact.

Pakistan's construction of the China-Pakistan Economic Corridor stands as a catalyst not only for the development of both China and Pakistan but also for optimizing Pakistan's regional advantages in South Asia. This initiative will enhance connectivity throughout South Asia and foster collaboration in economic and energy spheres, uniting South Asia, Central Asia, North Africa, and the Gulf countries. Such cooperation will create an economic resonance benefiting nearly 3 billion people.²¹³ The construction of CPEC will provide a wide range of markets and investment opportunities for both countries, and promote the development of the regional economy and job growth, which will not only help to improve the standard of living of the local population, but also reduce social problems such as poverty and inequality.

Secondly, the construction of CPEC promotes the global energy transition and the development of low-carbon technologies. Through the introduction of clean energy and renewable energy technologies, greenhouse gas emissions can be reduced and the ecological environment can be protected. Moreover, CPEC provides a broad space for cooperation and an innovative platform for both countries.²¹⁴ The two sides can carry out in-depth cooperation in the fields of infrastructure construction, agriculture, science and technology, and so on, in order to jointly promote the cause of green development in the world. A report in 2020 highlighted the strategic link

212 CPEC Secretariat, Ministry of Planning, Development, and Special Initiatives Pakistan, <https://cpec.gov.pk/>.

213 Minhas Majeed Khan, Ahmad Rashid Malik, Saira Ijaz, Ume Farwa eds., *China-Pakistan Economic Corridor: A Game Changer*, Institute of Strategic Studies (ISSI), 2016, https://issi.org.pk/wp-content/uploads/2017/04/CPEC_Book_2016.pdf.

214 Siham Javid, "CPEC Promoting Green and Sustainable Development," 2023, <https://cscr.pk/explore/themes/energy-environment/cpec-promoting-green-and-sustainable-development/>.

between the Clean Green Pakistan Movement (CGPM) and the Green Belt and Road Initiative (BRI). The article suggests that China's Belt and Road Initiative, with its valuable experience, has been instrumental in conserving the ecological balance in regions connected to CPEC. It emphasizes the significance of using China's Belt and Road Initiative as a blueprint for the region's future. The report argues that because of the exemplary role of China's BRI and its rich experience in preserving the ecological environment in the areas related to CPEC, the strategic interaction between China and Pakistan has become a model for international cooperation and green development practices.²¹⁵

CPEC focuses on projects that are closely related to the long-term development of the country, including energy, transportation and other infrastructures, and it is adding a development engine for the well-being of Pakistan's next generation. The construction of the new Gwadar International Airport, Gwadar Port, the East Bay Expressway, the Sahiwal Power Station, and many other projects in the fields of energy, transportation and electricity is laying a solid foundation for Pakistan's economic development.

CPEC significantly boosts Pakistan's economic performance by creating numerous job opportunities, enhancing infrastructure, upgrading the power supply, and facilitating the export of fisheries, agricultural produce, textiles, and other goods. This initiative presents a pivotal chance for Pakistan to overcome its economic challenges.

Most of the projects of CPEC are also livelihood projects, including electricity, clean water, education and short distance modern transportation, etc., focusing on enabling ordinary Pakistanis to enjoy modern conveniences and building bridges of friendship between the two countries. The Mehra DC transmission project, the Technical and Vocational Training Institute (TVTI) in Gwadar,²¹⁶ the seawater desalination projects, and the Lahore Orange Line Metro Rail project are some of the projects that will bring development dividends to the Pakistani people and build bridges of friendship between the two countries.²¹⁷

215 Noor Aftab, "CPEC to Be Turned into Model Green Belt Initiative," *The News International*, 2020, <https://www.thenews.com.pk/print/758878-cpec-to-be-turned-into-model-green-belt-initiative>.

216 "Pak-China vocational institute opens in Gwadar," *Dawn*, April 20, 2021, <https://www.dawn.com/news/1649616> ;for other CPEC Gwadar projects see <https://cpec.gov.pk/gwadar>

217 "Introduction on CPEC Projects," Pakistan-China Embassy, <http://pk.china-embassy.gov.cn/eng/zbgx/CPEC/201812/P020210603123729272088.pdf>

The energy development of CPEC also puts the country on track for sustainable and scientific development, combining China's experience with local strengths to draw a green picture. The Suki Kinari (SK) Hydropower Station, Bahawalpur Photovoltaic Power Station, and Dawood Wind Power Project are key renewable energy initiatives under the China-Pakistan Economic Corridor (CPEC), aimed at enhancing Pakistan's energy infrastructure through hydropower, solar, and wind resources. The Green Corridor has become one of the keywords used to build an upgraded version of CPEC. For example, Sahiwal Power Station uses advanced desulphurization technology, a low-NO_x combustion process and high-efficiency electric dedusting equipment in flue gas purification, so that the content of three pollutants in the flue gas is far lower than that of the standards of Pakistan; the World Bank and developed countries in Europe and the U.S. The mercury density in the flue gas is less than one-thousandth of that of Pakistan's environmental protection standards. In addition, more than 60,000 trees and 80 kinds of flowers are planted in the whole plant.²¹⁸

The core contribution of CPEC is to lay the foundation for Pakistan's energy development, while traditional fossil energy is often a major cause of resource depletion and environmental damage. With Pakistan's abundant hydropower, wind and solar energy resources, Chinese enterprises have put environmental sustainability as their primary consideration in the validation and implementation of those projects. For example, in the construction of the Karot Hydropower Plant, Chinese constructors have integrated advanced technology and green concepts into the project, set up a special health, safety and environment team, formulated 159 management systems and 88 technical standards for local operational characteristics, and put in place environmental protection and biodiversity conservation measures. By June 2023, the hydropower station have generated a cumulative power output of 3.64 billion kilowatt-hours (kWh), which is able to satisfy the power consumption needs of more than 5 million people in the local area, and will be equivalent to saving 1.59 million tons of standard coal and reducing carbon dioxide emission by 3.98 million tons. In addition to the development of hydropower projects by utilizing the advantages of water resources and mountainous terrain, a series of new energy projects, such as the Bahawalpur photovoltaic power station and Dawood wind power project, make use of the country's abundant solar energy and wind energy resources, opening up a new space for energy development in the future.²¹⁹

218 For a detailed list of these projects under CPEC see <http://pk.china-embassy.gov.cn/eng/zb/gx/CPEC/201812/P020210603123729272088.pdf>

219 "Karot Hydropower Project, Pakistan," *Power Technology*, 2023, <https://www.power-technology.com/projects/karot-hydropower-project-jhelum-river/?cf-view>

Conclusion and Future Outlook

Over the past decade, China's politics, economy, society, and the ideology advocated by the ruling party have undergone tremendous changes. With the rise of China's comprehensive national power and the perplexing turn of the global disorder, the positioning of China's relationship with the world has also been put to the test. How to effectively combine the consensus that has been forged by China's domestic development with the pressing needs of humanity has been an important external strategic issue for China's leadership to consider. On the basis of thinking about and pursuing common values, the 2030 Agenda for Sustainable Development advocated by the United Nations, China's ecological civilization, and Xi Jinping's concept of a "community of shared future for mankind" have found a good point of convergence, i.e., a "community of life between human beings and nature." China has not only put forward the concept of, but also used it as a guideline for concrete policy-making and national development practices. There is no doubt that CPEC has become an important venue for the internationalization of China's practices.

China and Pakistan are members of the community of developing countries and share a lot of common grounds and expectations for the development of their national economies and modernization, which serve an important material and ideological basis for mutual understanding, consensus and cooperation. China, while actively promoting its own development concepts, should also be inclusive, appreciate and learn from Pakistan's needs and ideals of its own development, and find the intersection of sustainable cooperation in the future, so as to turn CPEC into a corridor of the people's hearts and minds between China and Pakistan, a role-model corridor of regional integration and development, and a high-speed corridor for realizing the 2030 SDGs. Undoubtedly, the integration and alliance of CPEC with the United Nations 2030 SDGs is one of the most important ways to realize the green economic and social development of mankind, and China and Pakistan need to further strengthen the coordination of policies, promote the cooperation in green finance, and strengthen the cooperation in scientific and technological innovation in the future, and at the same time need to pay attention to the experiences and practices of other countries and regions in green development, and explore and innovate on different platforms to continuously expand the space and improve the quality of cooperation.

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Chapter 5

Transforming CPEC into a Green Alliance: Challenges and Opportunities

Dr. Marriyam Siddique

Introduction

“We need to seize opportunities presented by the new round of change in energy mix and the revolution in energy technologies to develop global energy interconnection and achieve green and low-carbon development. We should improve the transregional logistics network and promote connectivity of policies, rules and standards so as to provide institutional safeguards for enhancing connectivity.”

(President Xi Jinping’s speech at the Belt and Road Forum, May 14, 2017)

The China-Pakistan Economic Corridor (CPEC) serves as a pivotal framework for regional connectivity. It aligns with the Belt and Road Initiative (BRI), combining the Maritime Silk Road and Silk Road Economic Belt to foster economic integration across Eurasia. With investments totaling US\$62 billion, CPEC projects are primarily directed towards enhancing Pakistan’s energy, infrastructure, and developmental endeavors.²²⁰ The project is expected to significantly boost Pakistan’s economy by increasing the country’s economic growth to 7.5% from 2015 to 2030.²²¹ CPEC is expected to generate approximately 700,000 new employment opportunities in Pakistan by accelerating resource discovery, agricultural growth, IT advancement, communication networks, trade, and investment by 2030.²²² The China-Pakistan Economic Corridor (CPEC) holds immense importance for China’s economy as it facilitates the trade of Chinese goods through a direct route to Middle Eastern, African, and European markets. Additionally, this initiative enables the development of China’s north-western region, Xinjiang.

CPEC offers substantial environmental and climate risk mitigation benefits alongside economic advantages. The Global Climate Risk Index (GCRI) of 2023 indicates Pakistan is ranked 7th out of the ten most vulnerable

220 Dr. Robert F. Ichord, “Transforming the Power Sector in Developing Countries: Geopolitics, Poverty, and Climate Change in Pakistan,” *Atlantic Council*, 2020, <https://www.atlanticcouncil.org/wp-content/uploads/2020/01/Power-Transformation-Pakistan-final-web-version.pdf>.

221 Faisal Mehmood Mirza, Nishat Fatima, Kafait Ullah, “Impact of China-Pakistan Economic Corridor on Pakistan’s Future Energy Consumption and Energy Saving Potential: Evidence from Sectoral Time Series Analysis,” *Energy Strategy Reviews*, 34-36, 2019, <https://www.sciencedirect.com/science/article/pii/S2211467X19300422>.

222 “CPEC to boost Pakistan GDP growth to 7.5%,” *The Nation*, 2016, <https://www.nation.com.pk/08-Oct-2016/cpec-to-boost-pakistan-gdp-growth-to-7-5>.

nations to climate change.²²³ In addition, the nation is dealing with various climate-related problems, including heat waves, droughts, floods, illnesses, and a rise in hunger and poverty.²²⁴ However, despite the need for stricter environmental regulations, the Environmental Impact Assessment (EIA) has been neglected in the planning of CPEC projects.²²⁵ Recent studies have cautioned that the investments in CPEC may directly harm Pakistan's water, air, and wildlife.²²⁶ The potential environmental risks could significantly diminish the potential benefits of the CPEC. To make the CPEC greener and less carbon-intensive, China and Pakistan in 2022 launched the Green China-Pakistan Economic Corridor Alliance.²²⁷

The Green CPEC Alliance aims to decrease dependence on fossil fuels, reduce carbon emissions, address electricity shortages, generate jobs, reduce poverty, improve food security, and elevate living standards. Furthermore, advocating for green and sustainable development is a practical approach to tackling Pakistan's significant climate issues and increasing inflation. Pakistan and China are significantly impacted by climate change, increasing their susceptibility to natural calamities. It highlights the importance of implementing mitigation and adaptation strategies. China has promised to reduce its carbon dioxide (CO₂) emissions per unit of GDP by more than 65% by 2030 compared to 2005 levels and 'achieve carbon neutrality before 2060'.²²⁸ Pakistan also has committed to reducing its CO₂ emissions by 50% by 2030 relative to its business-as-usual scenario as per its Nationally Determined Contributions (NDCs).²²⁹ By emphasizing environmental risk management and green investments for energy projects

223 Hassam Bin Waseem, Irfan Ahmed Rana, "Floods in Pakistan: A State-of-the-Art Review," *Natural Hazards Research*, 2023, <https://www.sciencedirect.com/science/article/pii/S2666592123000641?via%3Dihub>.

224 "Climate Change Impacts On Health And Livelihoods: Pakistan Assessment," *Climate Centre*, 2021, https://www.climatecentre.org/wp-content/uploads/RCRC_IFRC-Country-assessments-PAKISTAN-3.pdf.

225 Waqas Ahmed, Sharafat Ali, Alisher Ismailov, "Assessment and Analysis of the Complexities in Sustainability of the Transport Projects Under CPEC: A Grounded Theory Approach," *Sage Journals*, 2023, <https://journals.sagepub.com/doi/10.1177/21582440231203477>.

226 Shahzad Kouser, Abdul Subhan, Abedullah, "Uncovering Pakistan's Environmental Risks and Remedies under the China-Pakistan Economic Corridor," *Environmental Science and Pollution Research*, 4661-4663, 2020, <https://pubmed.ncbi.nlm.nih.gov/31879869/>.

227 "Green China Pakistan Economic Corridor (CPEC) Alliance," *Sustainable Development Policy Institute*, 2022, https://sdpi.org/green-china-pakistan-economic-corridor-cpec-alliance/event_detail.

228 Hongqiao Liu, Simon Evans, Zizhou Zhang, Wanyuan Song, Xiaoying You, "The Carbon Brief Profile: China," *Carbon Brief*, 2023, <https://interactive.carbonbrief.org/the-carbon-brief-profile-china/>.

229 "Pakistan Asia and the Pacific," UNDP, 2023, <https://climatepromise.undp.org/what-we-do/where-we-work/pakistan>.

under CPEC and BRI, both nations can meet their sustainability goals by promoting green financing.

Changing Norms

Pakistan accounts for a mere 0.9% of global greenhouse gas (GHG) emissions, yet its vulnerability to climate change is extensively recognized and observed. Research shows that air pollution causes a minimum of 128,000 fatalities annually in Pakistan; however, the actual figure is probably greater.²³⁰ Pakistan incurred over \$30 billion in losses and damages as a result of the 2022 floods.²³¹ The mitigation and adaptation to climate-related disasters are greatly impacted by climate change, which also poses a substantial threat to vulnerable communities. As in Pakistan, China's water shortage is getting worse, and the country's rainfall patterns are becoming more erratic and unpredictable. Moreover, the Intergovernmental Panel on Climate Change projects that annual heat-related mortality in 27 major Chinese cities would rise by 50–100% under a 1.5-degree warmer scenario if adaptation is not implemented.²³² As a result, in an attempt to reduce emissions, China and Pakistan are concentrating more on creating renewable energy sources.

Pakistan's environmental situation requires immediate action, given the backdrop of a 170% increase in carbon emissions over the previous three decades and an elevated danger of climate-related flooding. Pakistan's economy suffers a significant 8.5% loss of GDP, equivalent to \$30 billion annually, due to environmental degradation, as reported by the United Nations.²³³ By 2035, more than 7,200 glaciers in northern Pakistan will disappear. By 2050, two million migrants may arrive in Pakistan due to climate change.²³⁴

230 Saroop Ijaz, "Pakistan's Air Pollution Shortens Lives," *Human Rights Watch*, 2023, <https://www.hrw.org/news/2023/12/06/pakistans-air-pollution-shortens-lives#:~:text=Fair%20Finance%20Pakistan%2C%20an%20organization,real%20number%20is%20likely%20higher>.

231 Ayaz Gul, "Study: Pakistan Flood Damages, Economic Losses Exceed \$30 Billion," *Voice of America*, 2022, <https://www.voanews.com/a/study-pakistan-flood-damages-economic-losses-exceed-30-billion-/6810207.html#:~:text=4%2C%202022.&text=An%20internationally%20supported%20study%20has,continuously%20evolves%20on%20the%20ground>.

232 Yuan Ye, "IPCC Warns China Will Be Hit Hard by Climate Change," *Sixth Tone*, 2022, <https://www.sixthtone.com/news/1009809#:~:text=In%20China%2C%20rising%20temperatures%20will,cited%20in%20the%20report%20shows>.

233 "Pakistan," *International Monetary Fund*, 2023, <https://www.elibrary.imf.org/downloadpdf/journals/002/2023/260/article-A001-en.xml>.

234 Betsy Joles, "Pakistan's Climate Migrants Face Tough Odds," *Foreign Policy*, 2022, https://foreignpolicy.com/2022/12/21/pakistan-climate-change-migration-flood/#cookie_message_anchor.

Given the critical state of the environment, let's shift our attention to the significant bilateral initiative - CPEC, intrinsically tied to Pakistan's future economic prosperity. CPEC intends to link the Gwadar port to China's Xinjiang region through an extensive network of highways, railways, and pipelines spanning 3000 km. This initiative has the potential to upgrade Pakistan's energy and transportation industries. Although Pakistan has not had the best environmental record in the past, its capacity for change could be its greatest asset in the fight against climate change. A new era for Pakistan's energy and transport infrastructure was promised when the CPEC was unveiled in 2015. However, rapid development overshadowed sustainability, and the price was high. CPEC's primary environmental concern is associated with energy projects in Pakistan. To address the energy crisis in the country, CPEC has allocated a significant investment of US\$33 billion to 19 energy projects. Most of the new energy will be generated by traditional coal-fired power plants situated in the provinces of Sindh (Thar-I and Thar-II coal power plants), Punjab (Sahiwal and Salt Range coal power plants), and Baluchistan (Hub and Gwadar coal power plants).²³⁵ In fact, traditional coal-fired power plants serve as the primary culprits behind smog and CO₂ emissions. Consequently, these emissions contribute to acid rain and global warming.²³⁶ Large portions of the provinces of Punjab and Sindh have already been blanketed by seasonal haze, which has led to numerous deadly traffic accidents owing to poor visibility and hospital admissions each year. Consider the impact on the local environments of these provinces as coal power stations escalate to maximum capacity. In Pakistan, three primary sources of pollution include coal fires, vehicle emissions, and burning agricultural waste. The detrimental air quality resulting from these activities can lead to an upsurge in health issues such as heart attacks, lung damage, asthma attacks, and bronchial infections.

CPEC's significant environmental issue involves the extensive deforestation for building road networks in Pakistan. The CPEC road networks consist of a northern segment and three alignments: western, eastern, and central. They originate in Kashgar in western China and terminate in Pakistan in Gwadar, Balochistan. In 2017, more than 54,000 trees, including fruit and non-fruit/forest trees, were felled in Abbottabad, Nowshera, Lower Dir, Swabi, Mardan, and Malakand districts. A tree may store 50 pounds of CO₂ each year and play a crucial role in mitigating the effects of climate change.

235 Shahzad Kouser, Abdul Subhan, Abedullah, " Uncovering Pakistan's Environmental Risks and Remedies under the China-Pakistan Economic Corridor," *Environmental Science and Pollution Research*, 4661-4663, 2020, <https://pubmed.ncbi.nlm.nih.gov/31879869/>.

236 "Coal and Air Pollution," *Union of Concerned Scientists*, 2017, <https://www.ucsusa.org/resources/coal-and-air-pollution>.

In 2017, trees did not absorb 7 million pounds of CO₂ in regions affected by significant deforestation, leading to its accumulation in the atmosphere. The districts are susceptible to climate change, which is evident through increasing temperatures, droughts, soil erosion, unpredictable rainfall, and glacier melting, which leads to significant flooding. Nowshera, Lower Dir, Swabi, Mardan, and Malakand were previously the most vulnerable regions to monsoon flooding.²³⁷ The tourism sector in these areas has also felt significant impacts. Restoring biodiversity and the declining natural surroundings necessitates reforestation efforts. It is obligatory to plant eight trees for every tree uprooted, along with ensuring that the landowner receives fair market value for each tree.

Vehicle trafficking presents a substantial environmental threat in northern Pakistan within the CPEC framework. Upon completion of the road infrastructure linked to CPEC, the Karakoram highway is expected to handle a daily influx of around 7000 trucks, releasing an estimated 36.5 million tonnes of CO₂ as they journey towards Gwadar. Pakistan's 2030 greenhouse gas emissions inventory is projected to reach 1,603 metric tonnes of CO₂ equivalent, influenced significantly by CPEC. This estimate, derived from the World Resources Institute's Climate Analysis Indicator Tool and the 2016 Pak-INDC report, accounts for approximately 23.12% of the total estimated greenhouse gas emissions for that year.²³⁸ The detrimental effects extend beyond emissions alone. The extensive repercussions of coal, spanning water and air pollution, environmental degradation, health implications, and significant socio-economic costs, cast a foreboding shadow over Pakistan's future. As natural habitats are depleted and matters concerning land and water rights are taken into account, the environmental equilibrium of CPEC grows increasingly precarious.

During its initial decade, the Belt and Road Initiative (BRI) primarily focused on investments in fossil fuels, allocating a significant \$52 billion solely to coal power projects.²³⁹ However, the upcoming decade could mark a shift. During the 2021 UN General Assembly, China is committed to halting

237 "Environmental Degradation in South Asia and China's Belt and Road Initiative," *European Foundation for South Asian Studies*, 2021, <https://www.efsas.org/EFSAS-Environmental%20Degradation%20in%20South%20Asia%20and%20China%E2%80%99s%20Belt%20and%20Road%20Initiative-August%202021.pdf>.

238 Muhammad Awais, Tanzila Samin, Muhammad Awais, Jinsoo Hwang, "The Sustainable Development of the China Pakistan Economic Corridor: Synergy among Economic, Social, and Environmental Sustainability," *Sustainability*, 2019, <https://mdpi.com/2071-1050/11/24/7044>.

239 Lihuan Zhou, Ziyi Ma, "After a Decade of Fossil Fuel Investing, Can China Fulfill Its Promise of a "Green" Belt and Road Initiative?" *World Resource Institute*, 2023, <https://www.wri.org/insights/greening-chinas-belt-and-road-initiative>.

the construction of new coal plants overseas and focusing on renewable energy investments. This pledge was reiterated by President Xi Jinping at the October 2023 BRI conference. China, notably, stands out among the BRI nations as a top recipient of coal and fossil investments. Pakistan emerges as a key player in attracting Chinese investments within the BRI framework. Transforming CPEC into an environmentally friendly initiative could establish a pivotal model for other BRI countries aspiring to embrace sustainable practices in their Chinese-backed ventures overseas. Pakistan has secured around US\$36 billion for energy projects and US\$10.6 billion for transport investments under CPEC. Notably, 28% of the energy funding was earmarked for coal, with 7% dedicated to gas. Pakistan's goal was to avoid building new coal-fired power plants in 2020, while China had pledged not to construct such plants abroad in 2021.²⁴⁰ Two main challenges are at play here: accelerating the transition to sustainable practices via eco-friendly investments and phasing out existing non-environmentally friendly ones. The China-Pakistan Economic Corridor (CPEC) serves as a pivotal case study, setting a standard for China's global engagement. Effectively integrating eco-friendly measures into CPEC could set a precedent for other Belt and Road Initiative (BRI) countries to follow suit, promoting greener initiatives in their Chinese-backed projects within the BRI framework.

The Green CPEC Alliance is to assist, expedite, and advocate for the green transformation within Pakistan and the BRI by involving members from both countries' governments, investors, developers, and civil society. The Alliance aims to make CPEC more environmentally friendly by encouraging a shift in Chinese infrastructure investments from GHG emission projects to green initiatives, like transitioning from coal to renewable energy sources and ultimately phasing out current coal-fired power plants. The Green CPEC Alliance will collaborate with partners in both nations throughout the next one to five years to increase demand and supply for green infrastructure investments.

The Belt and Road Initiative Green Coalition (BRIGC) aims to work closely with relevant stakeholders to extend the greening practices of the China-Pakistan Economic Corridor (CPEC) to the broader Belt and Road Initiative (BRI) framework.²⁴¹ Collaborating with Chinese authorities, investors,

240 "Green China Pakistan Economic Corridor (CPEC) Alliance," *Sustainable Development Policy Institute*, 2022, https://sdpi.org/green-china-pakistan-economic-corridor-cpec-alliance/event_detail.

241 "Green China Pakistan Economic Corridor (CPEC) Alliance," *Sustainable Development Policy Institute*, 2022, https://sdpi.org/green-china-pakistan-economic-corridor-cpec-alliance/event_detail.

developers, and financial institutions is crucial for crafting policies, implementing green finance standards and methods, and forging relevant connections to accelerate green investment opportunities. The Green CPEC alliance strives to engage with partners in Pakistan, fostering green investment prospects and providing the expertise needed for crafting and evaluating eco-friendly projects. It considers the risks linked to stranded assets resulting from investments in fossil fuels, all while ensuring a just transition. The alliance will partner with diverse stakeholders, including multilateral banks, financial institutions, civil society organizations, and academic establishments globally, to broaden the reach of its insights to a broader audience.

The Challenge of the Green CPEC

China's BRI commitment to green investments may affect global renewable energy adoption as changing the momentum of a large investment initiative is challenging. China's success depends on global economic conditions, BRI host nations' investment environments, and its own commitment and supportive policies. Renewable energy investment is required in BRI host nations, regardless of income. To meet global climate objectives, many developing nations would need \$1.4-\$1.9 trillion in renewable energy investment by the early 2030s, up from \$260 billion in 2022. These countries need revenue to generate renewable energy since investment goes where demand and returns are highest.²⁴² China's solar and wind power investments in the Middle East throughout the past decade focused on the UAE, Turkey, Saudi Arabia, and Oman. These countries invested more in renewable energy than other non-advanced economies including China. In many BRI countries, environmental design principles and low-carbon technology are neglected. The business case for green or natural infrastructure investment is often unclear. Technical standards and local laws are sometimes deficient or ambiguous. Given the multitude of sustainability standards and assessment methods, financial investors may lack confidence in their investments in sustainable infrastructure. The limited revenue streams or public incentives for sustainability expenses contribute to certain designs for sustainable infrastructure, offering low risk-adjusted returns.

242 "Financing Climate Resilience And A Just Energy Transition In Africa: New Strategies And Instruments," *African Development Bank Group*, 2022, https://www.afdb.org/sites/default/files/2022/05/25/aeo22_chapter3_eng.pdf.

Pakistan is committed to reducing its carbon emissions, however, this requires significant investment. The NDCs of Pakistan suggest that 35% of its targeted emissions reduction relies on foreign funding. The green energy revolution needs \$101 billion.²⁴³ Thus, expanding green financing access is crucial. Green financing guidelines should help these investments and promote sustainable development. CPEC energy projects can increase generation capacity and strengthen Pakistan's economy. Unfortunately, the banks do not have the money to expand the energy transition. Underestimating risks often leads to minimal outcomes. Investments made without foresight can fail to yield expected returns, resulting in stranded assets and potential legal consequences for investors. It is imperative for the China-Pakistan Economic Corridor (CPEC) to integrate an environmental framework, especially considering the significance of energy infrastructure investments for Pakistan's prosperity. Both China and Pakistan stand to benefit from green funding within the CPEC Green Alliance. Implementing green reporting standards, offering training, and enhancing capacity building are essential strategies to encourage businesses to engage in environmentally friendly investments.

Despite its growing importance, the financial sector has yet to recognize climate change as a systematic risk, thus green finance must be promoted. To facilitate the shift to a sustainable economy, a supportive regulatory framework encouraging investment in the green sector is essential. The State Bank of Pakistan (SBP) introduced a green banking framework in 2017, aimed at assisting banks and Development Finance Institutions (DFIs) in addressing environmental degradation.²⁴⁴

Infrastructure investments play a crucial role in the China-Pakistan Economic Corridor (CPEC). These ventures necessitate substantial funding and prolonged gestation periods to ensure financial sustainability due to the inherent risk-return imbalance. Investors may encounter initial challenges but can reap subsequent rewards. To mitigate risks and maximize returns, the Securities and Exchange Commission of Pakistan (SECP) may consider investing in stocks or financing such projects. The Green Climate Fund (GCF) and the Global Environment Facility (GEF) are key international bodies involved in these initiatives. GEF has allocated approximately \$100 million across 38 projects in Pakistan, while GCF oversees four projects

243 UNFCCC, "Updated Nationally Determined Contributions 2021," *United Nation Framework Convention on Climate Change*, 2021, <https://unfccc.int/sites/default/files/NDC/2022-06/Pakistan%20Updated%20NDC%202021.pdf>.

244 SBP, "Green Banking Guidelines," *State Bank of Pakistan*, 2017, <https://www.sbp.org.pk/smfed/circulars/2017/C8-Annex.pdf>

totaling \$131 million. Despite these efforts, addressing Pakistan's climate crisis remains a formidable challenge.²⁴⁵ As per the 2021 NDC plans, the government aims to allocate \$101 billion for energy transition by 2030. The estimated annual cost of adaptation ranges from \$7 billion to \$14 billion until 2050. Addressing the aftermath of the 2022 floods, requiring US\$16.2 billion, is crucial to mitigate humanitarian and socioeconomic repercussions.²⁴⁶

Pakistan's construction industry may offer a large opportunity concerning green infrastructure. Pakistan's housing and building backlog is projected to be at least 10 million dwellings, but the country needs to be more active in addressing this issue. There is a big opportunity when it comes to environmentally friendly architecture, materials, and energy sources. Renewable energy sources and electric vehicles are at the forefront of sustainable initiatives. They hold the promise of significantly cutting emissions and aiding Pakistan in meeting its environmental commitments. The agriculture, water resources, and solid waste management sectors are closely followed. With Pakistan's dwindling water resources, the agricultural sector stands out as a beacon of hope, requiring immediate attention due to its inefficient water usage practices. While strides have been made in the realm of smart agriculture, expanding these efforts is imperative. Pakistan's proposed interventions aim to achieve a maximum reduction of 20% in greenhouse gas emissions by 2030. This target is part of Pakistan's broader climate action plan, which includes enhancing renewable energy usage and improving water use efficiency in agriculture to reduce reliance on diesel-powered pumps. These efforts are aligned with the country's commitment to international environmental agreements and its goal of achieving sustainable development.²⁴⁷

While CPEC may bring about political, structural, and economic stability along with green growth that could impact agriculture, there are concerns regarding its agricultural potential. Critics argue that mechanization under CPEC could displace local farmers and lead to the overexploitation of natural resources. CPEC's extensive projects pose a risk to the nation's water resources and agricultural land availability. The scarcity of raw materials

245 GCF, Islamic Republic of Pakistan, *Green Climate Fund*, 2024, <https://www.greenclimate.fund/countries/pakistan>.

246 "Climate Change Impacts On Health And Livelihoods: Pakistan Assessment," *Climate Centre*, 2021, https://www.climatecentre.org/wp-content/uploads/RCRC_IFRC-Country-assessments-PAKISTAN-3.pdf.

247 Erum Abdul Razzak, "Greenhouse Gas Emission in Pakistan," *Daily Times*, April 10, 2019. <https://dailytimes.com.pk/377839/greenhouse-gas-emission-in-pakistan/>.

for primary and secondary industries could lead to shortages in food and industrial outputs, impacting the region within the global economy if not managed sustainably. Deforestation remains a pressing issue, especially with the history of extensive deforestation due to mechanized agriculture practices, as exemplified during Jair Bolsonaro's term in Brazil.²⁴⁸

CPEC's expansion of livestock farming in Pakistan may involve utilizing the country's limited forest area for cattle grazing and agricultural purposes. Trees and forests play a crucial role in reducing summer heat, preventing soil erosion, and stabilizing the soil to safeguard crops against monsoon flash floods, thereby aiding in climate change mitigation. However, the intended beneficiaries of deforestation, the farmers, now find themselves contending with flash floods, altered weather patterns, and barren soil. The emphasis of CPEC on enhancing production and efficiency through mechanized technologies such as threshers and harvesters raises concerns about potential excessive land use for farming practices.

Since the onset of the Industrial Revolution, the surge in technological advancements has sparked worries regarding the exploitation of land in industrial projects. The escalation of animal production to support the dairy industry for exports results in overgrazing and CO₂ emissions, while resorting to technology to farm the land beyond its natural limits risks depleting its fertility. The overarching critique persists: CPEC poses an irreversible threat to our land resources.

While skepticism will prevail, the China-Pakistan Economic Corridor (CPEC) has the potential to mitigate these challenges and foster a sustainable agricultural landscape in Pakistan.²⁴⁹ Nevertheless, the expansion of industries, construction ventures, and agricultural activities has triggered apprehensions about deforestation. China's emphasis on reafforestation aims to enhance Pakistan's agricultural industry. By 2025, Gwadar is projected to be adorned with one million trees as part of a robust reforestation initiative. Notably, Gwadar's afforestation program focuses on 'mangrove' trees, well-suited for thriving in saline coastal settings.²⁵⁰ Many cross-developmental approaches reduce over-exploitation. To meet

248 Diana Roy, "Deforestation of Brazil's Amazon Has Reached a Record High. What's Being Done?" *Council on Foreign Relations*, 2022 <https://www.cfr.org/in-brief/deforestation-brazils-amazon-has-reached-record-high-whats-being-done>.

249 "China, Pakistan to jointly promote agricultural technology under CPEC," *Radio Pakistan* <https://www.radio.gov.pk/08-03-2023/china-pakistan-to-jointly-promote-agricultural-technology-under-cpec>

250 PPF, "COPHC to Plant one Million Trees in Gwadar," *Pakistan Press Foundation*, 2019, <https://www.pakistanpressfoundation.org/cophc-to-plant-one-million-trees-in-gwadar/>.

global agricultural standards, China's sustainable agricultural model uses sustainable methods that can be applied to Green CPEC projects.

With the large-scale hydropower initiatives, significant challenges persist. These encompass risks such as stranded assets, precipitation variability induced by global warming, unpredictability, and impacts on biodiversity. While hydropower ventures in Pakistan boast significant Returns on Investment (ROIs), delays hinder their prompt payback. Such investments pose risks due to extended repayment periods, fluctuations in exchange rates, and inherent project hazards. Land conflicts and environmental damage can result from billion-dollar hydropower projects. Long gestation periods are another drawback of hydropower projects. Unlike solar and wind installations, which can be completed in months, construction requires years of investment. These variables reduce hydropower project efficiency. Solar panels have immense potential but are too expensive for states like Pakistan. The bank loan approvals for solar finance might take six months, hindering investment. The Government of Pakistan, in 2022, announced a plan to solarize 1.2 million agricultural tube wells as part of its efforts to support the farming sector and reduce energy costs. This initiative was confirmed by the Federal Minister for Food Security, Tariq Bashir Cheema, who emphasized that the solarization of tube wells would help farmers by making their operations electricity-free and enabling them to repay loans within a few years.²⁵¹

Weak regulations and lack of transparency leave investors bearing the brunt of costs. Ambiguous laws hinder the adoption of renewable energy in Pakistan, complicating the landscape. As Pakistan transitions to competitive pricing, investors prioritize cost-cutting. The delayed payments to Chinese IPPs prevent investors from reducing expenses through project investments. Investment decisions in the renewable energy sector are not solely driven by expenses. Issues like the lack of coordination between federal and provincial entities and renegotiation of tariffs have dampened investor confidence. Monthly tariff revisions could heighten investment risks, impacting decision-making. Emerging solar developers face funding limitations as investors view the financing phase as riskier. The substantial capital investment and the developer's lack of experience may restrict financing options.

251 Zakir Ahmed, "1.2 Million Agricultural Tube Wells to be Shifted on Solar Power." *ProPakistani*, July 5, 2022, https://propakistani.pk/2022/07/05/1-2-million-agricultural-tube-wells-to-be-shift-on-solar-powered-minister-for-food-security/#google_vignette

Renewable energy projects also face energy intensity issues and the need to replace lithium-ion batteries in solar photovoltaic systems every two to three years. Land-use issues eventually arise because 1 MW of solar power requires 5-10 acres of land. Longi Solar, a leading Chinese solar manufacturer, will allow local investors technology and brand name to produce solar PVs. Solar PV investors need local raw resources.²⁵² Establishing a solar photovoltaic (PV) assembly is viable in Pakistan, but due to imported raw materials like tempered glass, local production faces challenges. Collaboration with various companies is crucial for setting up a solar manufacturing plant. Furthermore, similar to solar PV systems, wind energy projects also encounter land-use concerns. Notably, an average US wind power facility occupies approximately 34.5 to 56.9 hectares per megawatt.²⁵³ To remain competitive, investors are urged to embrace a new approach known as reverse tariff bidding. Previously, wind and solar investors enjoyed a 17% Return on Equity (ROE) within the cost-plus tariff system.²⁵⁴ While investors can reduce production expenses to adhere to the tariff, the absence of a well-defined regulatory framework poses challenges for project progression, thereby raising concerns regarding revenue stability and long-term sustainability. Variable Renewable Energy (VRE) systems encounter issues related to base load and intermittency.

Transitioning entirely to renewable energy poses challenges and complexities within CPEC projects. Understanding the essence of 'sustainability' is paramount prior to investing in sustainable infrastructure. Various standards and methodologies are essential for the planning, design, construction, operation, and evaluation of sustainable infrastructure. The Green CPEC Alliance stands as a bold venture necessitating thoughtful reasoning in its execution. This could involve addressing external factors that call for governmental policy adjustments or a lack of comprehension regarding the innovative returns on investments.

252 "BRI drives Pakistan's green transformation," *The Express Tribune*, October 21, 2023 <https://tribune.com.pk/story/2442198/bri-drives-pakistans-green-transformation>

253 Dallaev, Rashid, Tatiana Pisarenko, Nikola Papež, and Vladimír Holcman. 2023. "Overview of the Current State of Flexible Solar Panels and Photovoltaic Materials" *Materials* 16, no. 17: 5839. <https://doi.org/10.3390/ma16175839>

254 Lionel Bloch, Jordan Holweger et al., "Impact of Advanced Electricity Tariff Structures on the Optimal Design, Operation and Profitability of a Grid-Connected PV System with Energy Storage." *Energy Informatics* 2, Suppl 1 (2019): 16. <https://doi.org/10.1186/s42162-019-0085-z>

Opportunities of Green CPEC

The Green CPEC is intricately connected to the concept of a ‘resilient green economy’, as articulated by Edward B. Barbier, which aims to elevate human well-being and social equity by mitigating environmental risks and ecological trade-offs. Through the promotion of innovative green technologies, the Green CPEC strives to advance these principles.²⁵⁵ As the world embraces renewable energy, CPEC projects incorporate green power sources to reduce carbon footprint and set a precedent for sustainable growth. CPEC optimizes local resources by combining advanced technologies with traditional wisdom. Sustainable waste management, water conservation, and land usage demonstrate a dedication to economic growth, environmental protection, and community improvement. Initiatives for reforestation associated with CPEC have the potential to drastically cut carbon emissions produced during the project’s construction. It helps the environment and greatly supports Pakistan’s dedication to global climate change mitigation goals. Reforestation – planting trees on desolate lands helps prevent potential environmental degradation caused by CPEC’s construction activity. These endeavors aid in sequestering CO₂ emissions and making substantial progress in addressing global climate change. Trees are crucial in avoiding soil erosion, sustaining the water table, and promoting biodiversity. As these recently established forests grow, they provide habitats for different species, guaranteeing the ongoing interconnectedness of ecosystems.

Restoration of complete ecosystems, including native plant species, fauna, water sources, and soil quality, is what ecosystem restoration means beyond simple tree planting. CPEC spans various regions with distinct ecosystems, each with its difficulties and needs. Efforts are focused on ensuring that after development, these areas’ natural balance is restored and often improved. It includes implementing water conservation methods in dry regions, restoring wetlands, and reintroducing native species impacted by environmental changes.²⁵⁶ The afforestation and ecosystem restoration initiatives showcase CPEC’s commitment to environmentally sustainable development. This declaration acknowledges the importance of nature’s

255 Ammar Junaid Asghar, Amna Mahnoor Cheema, Muhammad Ibrahim Hameed, Syed Qasim Abbas, & Uswah Fatima, “Agriculture and Climate Change,” LUMS Center for Chinese Legal Studies, 2021, https://ccls.lums.edu.pk/sites/default/files/2023-01/the_critical_junction_between_cpec_agriculture_and_climate_change.pdf.

256 Muhammad Awais, Tanzila Samin, Muhammad Awais, Jinsoo Hwang, “the Sustainable Development of the China Pakistan Economic Corridor: Synergy among Economic, Social, and Environmental Sustainability,” *Sustainability*, 2019, <https://mdpi.com/2071-1050/11/24/7044>.

well-being in the broader scope of progress and prosperity. By safeguarding the Earth's flora and promoting ecosystems, CPEC sets benchmarks for forthcoming global infrastructure endeavors, demonstrating the harmony between economic progress and environmental preservation.

In Balochistan, an arid province known for its water scarcity, community-managed rainwater collection systems have been established on account of Green CPEC initiatives. This innovative method has established a reliable water supply and enabled local communities to manage their resources independently. Water plays a crucial role in developing and sustaining large infrastructure projects like the CPEC. Water management and conservation play a crucial role in ensuring the sustainability of the corridor. Balancing industrial needs, human consumption, and environmental well-being is paramount as CPEC extends its footprint across diverse regions. The physical diversity of the CPEC route, ranging from dry terrains to lush valleys, leads to several water-related difficulties. In arid locations like Balochistan, the emphasis is on maximizing the use of every drop of water. Systems for collecting rainwater are implemented, and groundwater extraction is closely regulated to avoid depletion. Waste water treatment facilities are set up to prevent industrial and construction operations from contaminating nearby water sources. Processed water is reused for non-drinking purposes, decreasing the dependence on fresh water sources.²⁵⁷ The core of CPEC's water management approach revolves around involving the community. Integrating ancient wisdom with modern techniques promotes a complete water management approach.

Local communities are educated on water conservation to guarantee that sustainable practices are adopted from the bottom up. Furthermore, community members receive training to oversee and uphold water infrastructures, connecting community development with resource preservation. The significance of Green CPEC goes beyond its impressive infrastructure; it focuses on empowering the local population. Investing in human capital is crucial to ensuring that the advantages of the corridor are significant, well-established, and broadly distributed. Green CPEC adopts a comprehensive approach to development by implementing initiatives like skill development, training, knowledge exchange between Chinese and Pakistani professionals, support for local enterprises, and involvement of

257 Shahzad Kouser, Abdul Subhan, Abedullah, " Uncovering Pakistan's Environmental Risks and Remedies under the China-Pakistan Economic Corridor," *Environmental Science and Pollution Research*, 4661-4663, 2020, <https://pubmed.ncbi.nlm.nih.gov/31879869/>.

community leaders.²⁵⁸ These efforts generate immediate job opportunities and consistently prepare local communities to take advantage of the corridor's long-term benefits.

Furthermore, Green CPEC can help Pakistan attain sustainable and resilient energy security by using its local renewable resources in the long run. This decreases dependence on unpredictable fossil fuel markets and decreases energy expenses, resulting in more cheap electricity for businesses and individuals. Shifting to greener energy sources, the transportation networks will greatly decrease air pollution, leading to better public health and lower healthcare expenses. Embracing the Green CPEC will elevate Pakistan's global standing by showcasing a dedication to sustainable development, drawing foreign investments, and strengthening its international prestige.

Conclusion

By establishing the Green CPEC Alliance and altering norms regarding renewable energy, both nations hope to participate in clean energy cooperation that will guarantee Pakistan's energy security and sustainability. This is evident from the developments under CPEC. China is at the forefront of the shift towards environmentally friendly and sustainable development, as demonstrated by its Global Development Initiative (GDI), which aims to achieve the UN's 2030 Sustainable Development Goals (SDGs) through equitable and comprehensive development. As a Group of Friends of GDI participant, Pakistan is dedicated to attaining the SDGs. It views Green CPEC as an outstanding example of the BRI and a key component. However, there are still practical obstacles to accomplishing this vision.

China and Pakistan must create rules for a green investment project roadmap to mitigate the environmental and social risks associated with Green CPEC investments to align with goals for cleaner energy projects. Pakistan's policymakers need to prioritize coal extraction and the elimination of policy obstacles to accelerate the development of renewable energy, as stipulated in Pakistan's Alternative and Renewable Energy Policy. To achieve these goals, Pakistan must create a comprehensive regulatory framework that includes environmental and socio-economic safeguards, legislation, and pollution responsibilities for Green CPEC projects. Consensus from all stakeholders and government bodies at federal and provincial levels

258 "Green China Pakistan Economic Corridor (CPEC) Alliance," *Sustainable Development Policy Institute*, 2022, https://sdpi.org/green-china-pakistan-economic-corridor-cpec-alliance/event_detail.

is necessary to carry out the projects. This involves extensive discussions, social media campaigns, and interactions with various organizations, including the CPEC Authority, the Embassy of the People's Republic of China in Pakistan, the Ministry of Planning, Development and Special Initiatives, Chinese companies involved in CPEC projects, the Ministry of Climate Change, Ministry of Energy, and relevant ministries and institutions in China like BRIGC, MEE, and NDRC.

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Chapter 6

CPEC and Sustainability: A Model for the World

Dr. Xiaoyu Zhang

Introduction

In September and October 2013, during Chinese President Xi Jinping's visits to Central and Southeast Asian countries, he put forward the strategic concept of jointly building the Silk Road Economic Belt and the 21st Century Maritime Silk Road,²⁵⁹ which received great attention from the international community and received positive responses from many countries. Over the past decade, thanks to the concerted efforts of all parties,²⁶⁰ the Belt and Road Initiative has evolved from a Chinese initiative to international practice, from concept to action, and from vision to reality. It has made solid and significant progress and has become a well-received international public good and platform for international cooperation.

The Fruits of Belt and Road in the Past Decade

Over the past ten years, Belt and Road cooperation has aroused the enthusiasm of more than 150 countries to realize their dreams and brought profound changes to the world. Over the past decade, the Belt and Road Initiative has made remarkable progress. It has opened up new space for global economic growth, built a new platform for international trade and investment,²⁶¹ enhanced the development capacity and people's well-being of relevant countries, expanded new practices for improving the global governance system, and brought more certainty and stability to a volatile and intertwined world. The Belt and Road Initiative has not only developed China but also benefited the world.

From 2013 to 2022, the cumulative two-way investment between China and co-developing countries exceeded 380 billion US dollars, of which the direct investment in co-developing countries exceeded 240 billion US

259 Peizhu Xin, Min Zhao, Yang Bai, Does the Belt and Road Initiative Promote Green Innovation Quality? Evidence from Chinese Cities. *Sustainability*, 14(10), 6060., 2022, <https://www.mdpi.com/2071-1050/14/10/6060>.

260 RUC Held International Symposium about Belt and Road. <https://en.ruc.edu.cn/detail/2437.html>

261 The Belt and Road Initiative: A Key Pillar of the Global Community of Shared Future | english.scio.gov.cn. http://english.scio.gov.cn/node_9004454.html

dollars,²⁶² covering various fields of economic and social development. China has also built a series of economic and trade cooperation zones in cooperation with co-authors, with a cumulative investment of more than US \$60 billion by the end of 2022. At the same time, co-founding countries have actively invested in China and shared China's development opportunities. Over the past decade, they have invested more than 140 billion US dollars in China, and nearly 67,000 new enterprises have been set up in China.²⁶³

Since its inception ten years ago, the Belt and Road Initiative has created 420,000 jobs for partner countries and lifted nearly 40 million people out of poverty.²⁶⁴ According to a World Bank research report, by 2030, the Belt and Road Initiative will increase trade among participating countries by 2.8 to 9.7 percent, global trade by 1.7 to 6.2 percent, and global income by 0.7 to 2.9 percent.²⁶⁵ The Pakistan Observer said that the Belt and Road Initiative has become a symbol of economic stability, sustainable development, social prosperity, infrastructure development, economic diplomacy, service to humanity, poverty eradication and the hope of regional connectivity.

The Green Belt and Road: China's Sustainable Development Solution for the World

The 2030 Agenda for Sustainable Development, launched at the UN Sustainable Development Summit in 2015, has set the direction for sustainable development in the world in the next 15 years. The 17 SDGs and 169 targets cover the economic, social and environmental dimensions of sustainable development, reflecting the commitment of UN member States to a world free from poverty, free from hunger, secure, dynamic and sustainable.

262 Xinhua, "BRI Countries Continue to Facilitate Trade, Investment, Financial Integration: White Paper." Sasac. October 12, 2023. http://en.sasac.gov.cn/2023/10/12/c_16006.htm#:~:text=From%202013%20to%202022%2C%20the%20cumulative%20value%20of,reached%20%24380%20billion%2C%20including%20%24240%20billion%20from%20China.

263 Feingold, Spencer, "China's Belt and Road Initiative Turns 10. Here's What to Know." *Weforum*. November 20, 2023. <https://www.weforum.org/agenda/2023/11/china-belt-road-initiative-trade-bri-silk-road/>.

264 China's government single-minded push towards modernisation. <https://www.the-star.co.ke/opinion/2023-12-19-chinas-government-single-minded-push-towards-modernisation/>.

265 China: Statement by Consul General Dong Zhihua at the Asia Business Series: Increasing China Trade and Investment Roundtable. MENA Report, 2019, http://perth.china-consulate.gov.cn/eng/notc/201912/t20191203_165827.htm

The real implementation of the 2030 Agenda and the full realization of the Sustainable Development Goals must rely on strong policy measures and concrete actions by all countries in the world²⁶⁶, in particular by strengthening broad international cooperation, including global and regional cooperation, and mobilizing all available resources of governments, the private sector, civil society and the United Nations system. Otherwise, the 2030 Agenda will remain a dead letter.

Infrastructure connectivity includes strengthening the docking of infrastructure construction plans and technical standard systems of countries along the Belt and Road, gradually forming an infrastructure network connecting sub-regions in Asia and between Asia, Europe and Africa, and a series of measures such as green and low-carbon infrastructure. Economic theory and empirical analysis fully demonstrate that infrastructure development can effectively reduce poverty. Infrastructure construction can improve overall economic productivity, promote endogenous economic growth, and thus improve the per capita income and living standards of the whole society. Infrastructure development can also accelerate the process of poverty eradication by increasing poor people's access to education, health and employment, facilitating the transfer of labor from low-productivity sectors to high-productivity sectors, and increasing poor people's incomes.²⁶⁷ Infrastructure development is also a necessary condition for achieving Sustainable Development Goal 8 (SDG) to promote sustained, inclusive and sustainable economic growth. In fact, the 2030 Agenda fully recognizes the important role of infrastructure development, including 'Building disaster-resilient infrastructure' as one of the separate Sustainable Development Goals (Goal 9). This coincides with the focus of the Belt and Road Initiative.

SDGS 3 to 7 cover health, education, women's empowerment, water and sanitation, and energy. Infrastructure connectivity under the Belt and Road Initiative, including infrastructure development, can contribute to achieving these goals. Take the fifth Sustainable Development Goal, Achieving gender equality and empowering all women and girls. Some empirical studies have shown that increasing infrastructure construction can liberate women from some intensive and time-consuming labor and

266 "UN Chief Calls for Fundamental Shift to Put World Back on Track to Achieving the Sustainable Development Goals." 2023. Press release. April 26, 2023. <https://www.un.org/sustainabledevelopment/blog/2023/04/press-release-un-chief-calls-for-fundamental-shift-to-put-world-back-on-track-to-achieving-the-sustainable-development-goals/>.

267 Tian, Guangning, Juncheng Li, "Construction Affect Economic Development Along the 'Belt and Road': By Promoting Growth or Improving Distribution?" *Emerging Markets Finance and Trade*, 2019, <http://dx.doi.org/10.1080/1540496X.2019.1607725>

engage in other jobs with higher social and economic benefits, thereby improving women's social and economic status. At the same time, increased infrastructure development can also improve health care and educational opportunities for women and children. Infrastructure connectivity, including infrastructure development, especially green and low-carbon infrastructure, is also important for achieving Sustainable Development Goals such as Sustainable cities and human Settlements (Goal 11) and combating climate change (Goal 13). People-to-people connectivity, including extensive exchanges in culture, talent, science and technology, contributes to the Sustainable Development Goal of building peaceful and inclusive Societies (SDG 16).

The Belt and Road Initiative proposed by China in 2013, as a major regional and international cooperation platform, can precisely make important contributions to the realization of the Sustainable Development Goals.²⁶⁸ Although the Belt and Road Initiative and the 2030 Agenda differ in nature and scope, they share the same vision and basic principles. Both emphasize adherence to the purposes and principles of the UN Charter and are committed to promoting inclusive development and common prosperity. The basic concepts of common development, common prosperity, win-win cooperation, openness and inclusiveness upheld by the Belt and Road Initiative are, to a large extent, consistent with the basic concepts of the 2030 Agenda.

The five key areas of international cooperation identified by the Belt and Road Initiative, including policy communication, infrastructure connectivity, unimpeded trade, financial integration and people-to-people ties,²⁶⁹ are closely related to the 17 Sustainable Development Goals in the 2030 Agenda and the Addis Ababa Action Agenda (AAAA). The overarching goal of the Sustainable Development Goals is to end poverty in all its forms worldwide. Infrastructure connectivity, unimpeded trade and financial integration in the five key areas of international cooperation under the Belt and Road Initiative are crucial to achieving this goal.

In his speech at the Belt and Road Forum for International Cooperation in Beijing in 2023, UN Secretary-General Antonio Guterres pointed out that the Belt and Road Initiative can help close the huge funding gap to achieve

268 Liu, Yali, Yao Ning, Jianqing Du, Yu Chen, Liwen Shan, Yaqian Yang, Baoming Ji, Yanfen Wang, "Uneven Progress Toward Sustainable Development Goals Reveals Urgency and Potential for Green Belt and Road Initiative." *Ecosystem Health And Sustainability*, 2023, <https://doi.org/10.34133/ehs.0092>

269 Liao Li. "International Cooperation for the Belt and Road Initiative: Key Issues and Future Prospects." *Vietnamese Journal of Legal Sciences* 2(1), 2020, <https://10.2478/vjls-2020-0011>.

the Sustainable Development Goals,²⁷⁰ while noting that the initiative also provides space for green climate action. In his speech, Guterres said that based on current trends, the 2030 Agenda, the globally agreed plan for people, peace, planet and prosperity, will only achieve half of the Sustainable Development Goals by the target date of 2030. Today, the financial resources available to developing countries to achieve these goals are far from adequate. Second, climate change, which is moving faster than we can respond to it, is the defining issue of our time and poses an existential risk to all nations. China plays a central role in international cooperation and multilateralism, Guterres affirmed China's central role as a pillar of international cooperation and multilateralism. He said China's leadership on climate action was helping to show the way. New renewable energy jobs in China now exceed those created in the oil and gas industry.

The Green Belt and Road is the major part of the BRI, and the core concept of the Green Belt and Road is with rich connotations and dynamics. In 2017, in his keynote speech at the first Belt and Road Forum for International Cooperation, President Xi stressed the need to practice the new concept of green development, advocate green, low-carbon, circular and sustainable ways of production and life, strengthen ecological and environmental protection cooperation, build an ecological civilization, and jointly achieve the 2030 sustainable development goals.²⁷¹ In 2019, at the Second Belt and Road Forum for International Cooperation, the President stressed the need to adhere to the concept of openness, green and clean, take green as the background, promote green infrastructure construction, green investment and green finance, and protect the common home on which we rely for survival. In his speech at the 75th session of the United Nations General Assembly in September 2020, President Xi announced that China will increase its nationally determined contributions, adopt more powerful policies and measures, strive to peak its carbon dioxide emissions before 2030, and strive to achieve carbon neutrality before 2060.²⁷² The successful practice of the past few years has proved that the green Belt and Road Initiative is the Chinese wisdom and Chinese solution to improve the global governance system, the "Chinese key" to solving

270 United Nation. "António Guterres (UN Secretary-General) at the Opening Ceremony - Belt and Road Initiative Forum (Beijing, China)." Press release, October 17, 2023. <https://webtv.un.org/en/asset/k18/k189a2wsdk>.

271 Xinhua. "President Xi's Speech at Opening of Belt and Road Forum." Xinhuanet. Beijing, China, 2017, http://www.xinhuanet.com/english/2017-05/14/c_136282982.htm.

272 The State Council Information Office of China. "Xi's Statement at the General Debate of the 75th Session of the United Nations General Assembly," 2023, http://english.scio.gov.cn/topnews/2020-09/23/content_76731466.htm.

today's world problems and eliminating global chaos, and an important path for China to actually participate in global governance and reform the global governance system, as well as an institutionalized platform for promoting global development cooperation.

Over the past decade, China has worked with Belt and Road countries and international organizations to establish cooperation mechanisms for green and low-carbon development to promote green development and address climate change. Today, the concept of green development is gaining popularity, the international cooperation platform is constantly improving, the practical cooperation measures are constantly deepening, and the cooperation projects in green infrastructure, green energy, green transportation and green finance are constantly turning from vision to reality. Green has become a distinctive undertone of the Belt and Road Initiative.

CPEC and the Green Belt and Road

The China-Pakistan Economic Corridor is an important flagship project under the Belt and Road Initiative. The year 2023 marked the 10th anniversary of the launch of the China-Pakistan Economic Corridor. Over the past decade or so, the China-Pakistan Economic Corridor has made great contributions to Pakistan's economic and social development and regional connectivity, and has been called a "game changer" by the Pakistani side. After 10 years of development, the "1+4" cooperation layout, which centers on the construction of the corridor and focuses on the Gwadar port, energy, infrastructure and industrial cooperation has turned from a grand blueprint into a reality.

In the past ten years, the construction of the China-Pakistan Economic Corridor has gone through three development periods, namely, the start-up period, the promotion period and the quality improvement period, and each stage has its own distinct and sequential development characteristics.²⁷³ At the same time, China and Pakistan have also built a diversified cooperation system for the construction of CPEC, which covers different entities such as governments, political parties, parliaments, enterprises and social organizations. The construction and upgrading of the China-Pakistan Economic Corridor is an important object that can benefit from

²⁷³ The China Academy. "Ten Years of the China-Pakistan Economic Corridor: What Has Changed?" January 5, 2024. <https://thechinaacademy.org/ten-years-of-the-china-pakistan-economic-corridor-what-has-changed/>.

the high-quality development of the Belt and Road. In terms of practical experience, the construction of the China-Pakistan Economic Corridor has achieved remarkable fruits mainly due to the solid and powerful political guidance of the two sides, the dialectical and coordinated project planning and the all-round and progressive construction ideas.²⁷⁴

One of the core factors for the success of the China-Pakistan Economic Corridor is the leadership of the two countries. On July 31, 2023, President Xi Jinping sent a congratulatory letter to the Decade of China-Pakistan Economic Corridor celebration event held in Islamabad, Pakistan. Xi Jinping pointed out that the China-Pakistan Economic Corridor (CPEC) is an important flagship project of the Belt and Road Initiative. Since its launch in 2013,²⁷⁵ China and Pakistan have been advancing the development of CPEC under the principle of extensive consultation, joint contribution and shared benefits, and have achieved a number of early harvests. This has added new impetus to the economic and social development of Pakistan and also laid a sound foundation for regional connectivity and integration. CPEC has been a vivid testament to the all-weather friendship between China and Pakistan, and provided an important underpinning for building a closer China-Pakistan community with a shared future in the new era.

During his visit to China in April 2023, Ahsan Iqbal, Pakistan's Minister of Planning, Development and Special Initiatives, said that through the energy projects of the China-Pakistan Economic Corridor, China has helped Pakistan solve the problem of energy shortage.²⁷⁶ The Port Qasim coal-fired power Station project, the Dawo Wind Power Project and other energy and infrastructure construction projects undertaken by Chinese companies have contributed wisdom and strength to Pakistan's energy development.

Since the launch of the CPEC, the economic development has benefited the Pakistani people, promoted the further integrated development of China and Pakistan, and helped build an even closer China-Pakistan community of shared future in the new era. According to data provided by the Chinese Embassy in Pakistan, by the end of 2022, the China-Pakistan

274 Adnan, Mubeen, and Reema Murad. "China-Pakistan Economic Corridor: Socio-Cultural and Political Implications for Pakistan amid COVID19 and the Way Forward." *Journal of Political Studies* 30, no. 1 (2023). https://pu.edu.pk/images/journal/pols/pdf-files/10-v30_1_2023.pdf

275 Ministry of Foreign Affairs, The People's Republic of China. "Xi Jinping Sends Congratulatory Letter to the Decade of China-Pakistan Economic Corridor Celebration Event." Press release, July 31, 2023. https://www.mfa.gov.cn/eng/zxxx_662805/202308/t20230808_11123502.html.

276 Pakistan Today. "Pakistan, China Working to Define Parameters of CPEC Phase-II: Ahsan Iqbal." May 10, 2024. <https://www.pakistantoday.com.pk/2024/05/10/ahsan-iqbal-holds-media-interaction-in-beijing-highlighting-pakistans-commitment-with-cpec/>.

Economic Corridor has brought a cumulative direct investment of 25.4 billion US dollars to Pakistan, created 236,000 jobs in total, and helped Pakistan add 510 kilometers of highways, 8,000 megawatts of electricity and 886 kilometers of national core transmission grid.²⁷⁷ The China-Pakistan Economic Corridor has created more indirect job opportunities, with more than 100 local small and medium-sized enterprises benefiting from the China-Pakistan Economic Corridor project, which helps solve the poverty problem in Pakistan.

Pakistan and China have established an all-weather strategic cooperative partnership and carried out in-depth and comprehensive cooperation in the fields of power engineering, communications engineering and transportation.²⁷⁸ At present, problems such as the huge power gap in Pakistan's power industry and aging transmission and distribution equipment have become constraints on its economic development. But at the same time, it also provides an opportunity for Chinese enterprises to enter Pakistan's electricity market. Under the framework of the "Belt and Road" and the CPEC, China and Pakistan will carry out more in-depth cooperation in the field of energy and power.

Electricity shortage has been a persistent problem in Pakistan's economic development. Since the outbreak of power system triangle debt in 2007, Pakistan's power gap has increased year by year, and the total gap has remained at 400 to 6 million kilowatts.²⁷⁹ Power cuts can last up to 12 hours a day in some urban areas and up to 18 hours in rural areas. According to the World Bank's Global Competitiveness Report 2014-2015, Pakistan ranks only 133rd out of 148 countries in terms of electricity supply.²⁸⁰

In addition to power shortage, Pakistan's power generation energy structure is also unreasonable, and the power triangle debt cannot be effectively solved for a long time. Oil - and gas-fired power generation accounts for about 60% of Pakistan's electricity mix, but domestic oil and gas resources

277 LIN, Minwang. "China-Pakistan Economic Corridor:Retrospect and Prospects after 10 Years." *East Asian Policy* 16, no. 1 (2024). <https://doi.org/10.1142/S1793930524000060>.

278 The State Council of the People's Republic of China. "Joint Press Statement between the People's Republic of China and the Islamic Republic of Pakistan." Press release, October 21, 2023. https://english.www.gov.cn/news/202310/21/content_WS65331142c6d0868f4e8e07ff.html.

279 Naveed Arshad, Usman Ali, "An analysis of the effects of residential uninterpretable power supply systems on Pakistan's power sector," *Energy for Sustainable Development*, 2017, <https://web.lums.edu.pk/~eig/pdf/S0973082615300958.pdf>.

280 The Global Competitiveness Report, *World Economic Forum*, 2015, https://www3.weforum.org/docs/gcr/2015-2016/Global_Competitiveness_Report_2015-2016.pdf.

are extremely short, and can only rely on expensive imports of fuel and gas for a long time, adding to the financial burden of the government.²⁸¹

Beside, electricity transmission and distribution equipments are aging, which leads to a high power loss rate. The high power loss rate is one of the important factors leading to the power shortage in Pakistan. Due to serious aging of transmission and distribution equipment and other reasons, Pakistan's power loss rate has been maintained at about 20%.²⁸²

The competent departments of energy and power in Pakistan are the Ministry of Energy and the Ministry of Water Resources. According to the Vision 2030 Plan, the main goals are: (1) adopt PPP, BOT and other methods to accelerate the construction of large and medium-sized hydropower stations on rivers, mainly Indus River, and strive to increase the hydropower generation capacity from the current 6.46 million kilowatts to 32.66 million kilowatts by 2030; (2) Develop the Thar coal field with an estimated reserves of 180 billion tons, vigorously develop the construction of thermal power stations, and strive to reach 20 million kilowatts of installed capacity by 2030; (3) Strengthen the exploration and development of oil and gas resources, and the estimated exploitable reserves are increased from the current 840 million barrels and 51.5 billion cubic feet to 27 billion barrels and 282 billion cubic feet respectively; (4) By 2030, the installed capacity of nuclear power is 8.8 million kW, and the installed capacity of renewable energy is 9.7 million kW; (5) Improve the efficiency of hydropower and grid management departments through privatization and other measures, and upgrade the transmission network.²⁸³

The Pakistani side said through various channels that the energy shortage in Pakistan has become an important factor restricting its economic and social development. Energy projects are the top priority of the China-Pakistan Economic Corridor, and they are also the areas where progress is the fastest and results are the most significant.²⁸⁴

281 Pakistan's Implementation of the 2030 Agenda for Sustainable Development, 2019, https://sustainabledevelopment.un.org/content/documents/233812019_06_15_VNR_2019_Pakistan_latest_version.pdf.

282 Fatima Habib, "Power shortages in Pakistan: Causes and Solutions," Consortium for Development Policy Research, International Growth Centre, 2018, <https://cdpr.org.pk/wp-content/uploads/2018/07/Power-outages-final-brief.pdf>

283 Pakistan's Implementation of the 2030 Agenda for Sustainable Development, 2019, https://sustainabledevelopment.un.org/content/documents/233812019_06_15_VNR_2019_Pakistan_latest_version.pdf.

284 Wanning Qinngyun, "Joint energy projects help boost Pakistan's growth," *China Daily*, 2023, <http://epaper.chinadaily.com.cn/a/202312/18/WS657f824aa31036711cce4cf8.html>

A Case Study of Sustainable Development in CPEC

Being a driving force for Pakistan's socio-economic growth and industrial advancement and a key player in enhancing regional connectivity, CPEC has been instrumental in addressing Pakistan's energy challenges and enhancing infrastructure over the last decade, paving the way for numerous success stories.

In recent years, China and Pakistan have strengthened their collaboration in the realm of clean energy. Pakistan has enhanced the capacity and efficiency of clean energy, uplifting the living standards of local communities within the framework of CPEC.²⁸⁵

Pakistan is rich in clean energy resources and has great potential for development, but the development rate is low, and the contradiction between supply and demand in the electricity market is also prominent. The development of clean energy, such as hydropower and wind power, is an effective way to transform Pakistan's resource advantages into economic advantages, which will help ease the contradiction between supply and demand of electricity in Pakistan and promote the sustainable economic and social development of Pakistan.

The completion of Karot Hydropower Station is a role model of sustainable development cooperation between China and Pakistan in CPEC. The Karot Hydropower Station is located on the Jhelum River in Punjab Province, Pakistan, with a total installed capacity of 720,000 kilowatts and a total investment of 1.74 billion US dollars.²⁸⁶ It is a priority project for energy cooperation under the China-Pakistan Economic Corridor, the first large-scale hydropower investment and construction project under the Belt and Road Initiative, and the "first order" of investment after the establishment of the Silk Road Fund. The Karot Hydropower Station is also the first hydropower investment project to be included in the joint statement of the Chinese and Pakistani governments. In January 2016, the construction of the main project was fully started. Since 2015, a group of builders from China have incorporated Chinese technology and green concepts into the project, which has lasted more than seven years, and transformed the Karot Hydropower Station from an idea to a "green pearl" on the Jhelum River.²⁸⁷

285 "China and Pakistan have deepened cooperation in the field of clean energy," *Xinhua*, 2024, <https://eng.yidaiyilu.gov.cn/p/061HIDOA.html>

286 "Karot Hydropower Project, Pakistan," *Power Technology*, 2023, <https://www.power-technology.com/projects/karot-hydropower-project-jhelum-river/?cf-view>

287 "Karot Hydropower Station in Pakistan Creates a Green Pearl on the Jhelum River," *Valve Data Center PRC*, 2022, <https://www.prcvalve.com/ENPC/NewsDet-58429.html>

With a total investment of about 1.74 billion US dollars and a total installed capacity of 720,000 kilowatts, the Karot Hydropower Project will generate 3.2 billion kilowatt-hours of electricity annually after it is put into operation, providing Pakistan with market-competitive clean energy and meeting the electricity needs of 5 million local people, which will effectively alleviate the power shortage problem in Pakistan. The project is expected to save about 1.4 million tons of standard coal and reduce carbon dioxide emissions by about 3.5 million tons per year, helping to achieve the global goal of “carbon neutrality” while promoting Pakistan’s energy construction and economic and social development.²⁸⁸

In the early stage of the construction of the Karot Hydropower Station, the contractor did a detailed environmental and social assessment to ensure that the green concept was carried out throughout the project’s construction. The Karot Hydropower Station project adopted the IFC environmental and social responsibility framework and relevant standards.²⁸⁹ Before the start of construction, a social environmental assessment consultant company was hired to prepare a social environmental Impact Assessment Report based on IFC performance standards and local policies and regulations related to occupational health, environmental protection and labor management in Pakistan. Obtained the approval of the company, IFC, and the relevant local government of Pakistan. A social and environmental management system based on the project company, including the owner engineer and the general contractor of the project, has been established. Each participant has also formulated specific social and environmental sub-management plans, including biodiversity, water quality, air quality, noise and vibration management, waste management and other aspects. In the construction process, professional environmental engineers are hired to provide technical guidance and management, and environmental protection training for project personnel; hire a professional waste recycling company to recycle and dispose of domestic waste on site; cover all exposed surfaces with vegetation to reduce soil erosion and dust; restore the ecological environment and landscape of the affected area as soon as possible and maintain suitable aquatic habitat downstream of the dam.²⁹⁰

288 “Karot Hydropower Project, Pakistan,” *Power Technology*, 2023, <https://www.power-technology.com/projects/karot-hydropower-project-jhelum-river/?cf-view>

289 “Karot Hydro,” IFC Project Information and Data Portal, International Finance Corporation, <https://disclosures.ifc.org/project-detail/SII/36008/karot-hydro>

290 Moaaz Awan, “Biodiversity protection lies at core of Karot Hydropower Project,” *China Daily*, 2022, <https://www.chinadaily.com.cn/a/202202/16/WS620c6daca310cdd39bc86f7c.html>

In order to protect animal diversity and maintain ecological balance, Chinese enterprises invested about 150 million yuan to create a special environmental protection plan for the Karot Hydropower Station project. The first measure is to carry out publicity and education on ecological environmental protection in advance in the affected areas of the project to improve the environmental awareness of construction and management personnel; the second measure is to restore the ecological environment and landscape in the affected area of the project as soon as possible after the completion of the project, formulate explicit norms for the protection of fish resources, strictly require that the ecological flow downstream of the dam is not less than 15 cubic meters per second during the initial storage and operation period, so as to maintain the aquatic environment downstream of the dam, and carry out surveys from time to time during the construction period. Collect information on affected fish species to record fish migration patterns. The third initiative is to develop a Biodiversity Management Plan, endorsed by the IFC, based on an in-depth study of the biodiversity of the project site prior to construction. The plan mitigates the impact of the Karot Hydropower Project on biodiversity through six measures, including dam construction to ensure unimpeded migration of organisms; to protect the hatching grounds of high conservation value fish; the biological habitat under the dam is protected by progressive flood discharge; Improving habitats in waterways within the project area; Working with local governments to improve the protection of downstream fish habitats and protected areas; capacity building for local aquaculture and wildlife protection authorities, strengthening aquatic biodiversity management, etc. The fourth is to support the ecological protection of the Murree-Kotli Sattian-Kahuta National Park in conjunction with the World Wildlife Fund Pakistan.²⁹¹

The construction of the Karot Hydropower Station focuses on the development of the local community and has made many contributions to improving the living standards of the local residents, focusing on the well-being of the residents and improving the local infrastructure, which is in line with the goals of SDG 3, 4, 8 and 12.

The Karot Hydropower Station has promoted local employment and improved the local labor force. According to statistics, more than half of the Karot project construction team are local employees in Pakistan, and the project provides more than 4,500 local jobs directly or indirectly every year. In the first phase of the wind power project in Pakistan, non-

291 Moaaz Awan, "Biodiversity protection lies at core of Karot Hydropower Project," *China Daily*, 2022, <https://www.chinadaily.com.cn/a/202202/16/WS5620c6daca310cdd39bc86f7c.html>

Chinese employees account for 67% of the total number of employees of the project company, and their professional categories involve many fields such as electrical, mechanical, civil, commercial, and administrative management.²⁹² In addition, the Chinese enterprises have also conducted two years of special technical training and ability improvement for the Pakistani employees in the wind power project maintenance team, and now they can independently complete the wind turbine inspection twice a year, becoming the technical backbone of the local wind power operation and maintenance field.

In terms of improving local infrastructure, the Karot Hydropower Project has invested more than \$6 million in local public welfare projects, including improving local education and medical facilities, repairing public water supply systems and roads, building public libraries and lounges, etc., to improve the living standards of residents by effectively improving the infrastructure conditions of the affected areas.²⁹³

In terms of promoting equality in education, the Chinese enterprise responsible for the construction of Karot Hydropower Station, together with the University of Punjab, the Confucius Institute and Jiangxi University of Science and Technology in Pakistan, jointly implemented the Pakistani immigrant scholarship program. Through school-enterprise and school-school cooperation, with reference to China's "targeted poverty alleviation" model, full scholarships will be provided to eligible young people of the appropriate age from the Kohala Hydropower Station and Karot Hydropower Station immigrant families to finance them to complete a four-year undergraduate education in electrical engineering, obtain the corresponding academic degree, and provide long-term and stable job opportunities in the future. In the Karot Hydropower Station resettlement work, in addition to providing monetary compensation for reasonable relocation, Chinese companies provided free financial knowledge training to all affected local migrants over the age of 16, ensuring that they can better use the migrant compensation money to improve their lives.²⁹⁴

292 "Karot Hydropower is environment friendly, Chinese workers continued to work amid New Year celebrations in China," China-Pakistan Economic Corridor, 2020, <https://cpecinfo.com/karot-hydropower-is-environment-friendly-chinese-workers-continued-to-work-amid-new-year-celebrations-in-china/>

293 "Karot Hydropower Project, Pakistan," *Power Technology*, 2023, <https://www.power-technology.com/projects/karot-hydropower-project-jhelum-river/?cf-view>

294 "Karot Hydropower Project: Special Report on CPEC Projects," Embassy of PRC in Pakistan, 2018, http://pk.china-embassy.gov.cn/eng/zbqx/CPEC/201901/t20190104_1270086.htm

Conclusion

Jointly building the Belt and Road is not only for the development of China, but also for the development of the world. The historical trend of economic globalization is irreversible, and countries cannot return to an era of isolation and isolation. However, economic globalization is facing new adjustments in both form and content and should be made more open, inclusive, balanced and beneficial to all. China has both benefited from and contributed to economic globalization. China has actively participated in the process of economic globalization, achieved rapid economic development through benign interactions with the rest of the world, successfully pioneered and promoted Chinese-style modernization, and expanded the options for developing countries to pursue modernization. China's rapid economic growth and continued progress in reform and opening-up have provided an important driving force for global economic stability and growth and the development of an open world economy. China is a staunch supporter and defender of economic globalization. The vision, measures and goals of the Belt and Road Initiative are highly in line with the United Nations 2030 Agenda for Sustainable Development. It is a major initiative for China to open up to the outside world. It aims to promote a higher quality development through higher level of opening up and sharing China's development opportunities with the world. It is also China's plan to solve the difficulties of global development. It aims to promote the common modernization of all countries, promote a more dynamic, inclusive and sustainable economic globalization process, and ensure that the fruits of development benefit people of all countries in a more equitable manner.

Chinese scholar Liu Le argued that in the past ten years, the construction of the China-Pakistan Economic Corridor has made a series of outstanding progress and important achievements at the micro, medium and macro levels, but it has also been criticized. Specifically, the criticism of the CPEC construction and its reasons mainly focus on four aspects, including criticism based on narrow political interests; criticism arising from wrong cognitive orientation; criticism for domestic political reasons and criticism of the project construction and operation process. However, the construction of the CPEC has yielded tangible results, effectively answering the voices of skepticism.

Since 2013, China has been the country with the highest direct investment in Pakistan. So far, CPEC has invested more than \$30 billion in infrastructure. In the field of energy, according to Pakistani statistics,

as of November 2022, the 12 energy cooperation projects in commercial operation in the corridor have provided nearly one-third of Pakistan's electricity, easing the pressure on urban and industrial power. In the field of infrastructure construction, key projects include Gwadar Port, Lahore Rail Transit Orange Line project, and Karakoram Highway upgrading. In terms of stimulating local employment, data provided by the Chinese Embassy in Pakistan shows that the China-Pakistan Economic Corridor has created 236,000 jobs in total and has the potential to create 1.2 million jobs in the future. The China-Pakistan Economic Corridor has created more indirect job opportunities, with more than 100 local small and medium-sized enterprises benefiting from the China-Pakistan Economic Corridor project, which helps to solve the poverty problem in Pakistan.²⁹⁵

China has also promoted a series of livelihood projects, including the construction of a medical emergency center, the Gwadar Desalination Plant and the Gwadar Vocational and Technical School, which have brought real benefits to the local communities in water use, medical care, education and employment skills training. Environmental protection has always been a priority in the construction of the China-Pakistan Economic Corridor, and green power plants, including water, light, wind and nuclear projects, account for more than 60% of the total projects. After the second phase of the China-Pakistan Economic Corridor, the proportion of green energy projects has been rising, and green energy has become a new driving force for the construction of the China-Pakistan Economic Corridor. There is no doubt that the development model of the China-Pakistan Economic Corridor is a model of sustainable development. Although the construction of the China-Pakistan Economic Corridor faces multiple challenges such as competition in the global value chain and changes in the geographical pattern, the persistence of cooperation between China and Pakistan sends a signal that China firmly promotes international cooperation as the right path, and the multilateralism that China adheres to is still the mainstream, and it is also an example and model for responding to changes in the regional situation. China and Pakistan are further deepening bilateral cooperation through the construction of the China-Pakistan Economic Corridor and taking more concrete actions to implement the concept of China-Pakistan community of shared future.

295 Muhammad Jaleel, "Economists Tally Results of Decade of Chinese Investment in Pakistan," *Voice of America*, 2023, <https://www.voanews.com/a/economists-tally-results-of-decade-of-chinese-investment-in-pakistan/7201145.html>

About the author

Dr. Xiaoyu Zhang is a Research Fellow at the Centre for BRICS Studies, Communication University of China. Her research interest is in South Asian studies. She has been invited as political commentator by leading Chinese newspapers and TV channels, including the Global Times and CGTN. She has published more than 20 academic papers and has co-authored two books.

Conclusion:

CPEC - The Green Alliance Beyond 2030

The China-Pakistan Economic Corridor (CPEC) stands at the crossroads of economic ambition and environmental responsibility. This edited volume highlights the potential of CPEC to serve as a catalyst for sustainable development, advocating for a shift from traditional infrastructural projects to initiatives that prioritize green growth.

As explored in Naghmana A. Hashmi's chapter, the historical and strategic significance of CPEC has already propelled substantial economic growth in Pakistan. However, future developments must integrate sustainable practices to maintain this trajectory. Hassan Daud Butt's analysis of Special Economic Zones underscores the necessity of aligning industrial growth with environmental sustainability, a sentiment echoed by Asif Amin, who emphasizes the importance of renewable energy and eco-friendly methods to mitigate environmental risks.

Yan Zhen's chapter links CPEC with the global sustainability agenda, illustrating how the Corridor can contribute to the Sustainable Development Goals (SDGs). This alignment is crucial as it positions CPEC not only as an economic initiative but also as a platform for fostering sustainable practices. Marriyam Siddique delves into the challenges and opportunities of transforming CPEC into a Green Alliance, highlighting the strategic initiatives needed to promote green growth.

Finally, Xiaoyu Zhang's perspective situates CPEC as a potential model for global sustainable development, showcasing how large-scale infrastructure projects can balance economic growth with environmental stewardship.

Policy Recommendations

In concluding this comprehensive exploration of the China-Pakistan Economic Corridor (CPEC) and its potential as a green development initiative, it is crucial to synthesize the policy recommendations presented throughout the book. These recommendations form a cohesive roadmap for transforming CPEC into a model of sustainable infrastructure development.

1. Strengthening Frameworks and Incentives: A robust regulatory and administrative framework is essential for the success of Special Economic Zones (SEZs). Addressing land-related issues and providing the right incentives can enhance the operational efficiency and attractiveness of these zones to investors. Encouraging backward and forward linkages will ensure that SEZs integrate well with the broader economy, fostering comprehensive development.

2. Environmental Integration: Integrating environmental considerations into the planning and development of SEZs is crucial. Developing models for Green SEZs, which prioritize sustainability, and promoting innovation in green technologies are pivotal steps toward sustainable industrialization. This approach not only mitigates the ecological footprint but also aligns with global sustainability goals.

3. Regulations and Awareness: Enforcing stricter environmental regulations and fostering public awareness about environmental issues are necessary to mitigate the negative impacts of large-scale infrastructural projects. Investing in sustainable technologies and infrastructure will support these regulatory measures, ensuring that development is both responsible and forward-looking.

4. International Cooperation: Increasing international cooperation and promoting technological transfer are vital for enhancing the sustainability of CPEC. Adhering to global environmental standards and leveraging international best practices can significantly improve the project's outcomes. Collaborative efforts between countries can ensure that the benefits of CPEC are maximized and that sustainable practices are effectively implemented.

5. Green Financing and Renewable Energy: Enhancing green financing mechanisms and investing in renewable energy projects are crucial for achieving sustainable development within CPEC. Implementing strict environmental regulations will ensure that these projects adhere to high sustainability standards. Green investments not only support environmental goals but also drive economic growth through the development of sustainable industries.

6. Skilled Workforce and Research: Developing a skilled workforce is critical for the long-term success of CPEC. Training programs and educational initiatives should focus on sustainability and green technologies to prepare the workforce for future challenges. Promoting research and development in sustainable practices will drive innovation and help establish quality

standards that enhance the competitiveness of CPEC projects in both local and international markets.

By embracing these comprehensive policy recommendations, CPEC can evolve into a beacon of sustainable development, setting a precedent for large-scale infrastructure projects worldwide. The successful implementation of these strategies will not only benefit Pakistan and China but also serve as a model for international cooperation in sustainable development. The integration of robust regulatory frameworks, environmental considerations, green financing, international cooperation, and skilled workforce development will ensure that CPEC aligns with the Sustainable Development Goals (SDGs) and contributes to a sustainable future for the region.

The overarching narrative of this book emphasizes that the success of CPEC lies in its ability to adapt to the demands of sustainable development. By integrating green technologies, promoting renewable energy, and adhering to stringent environmental standards, CPEC can transcend its role as a mere infrastructural project to become a beacon of sustainable progress.

The China-Pakistan Economic Corridor Beyond 2030 can indeed become a Green Alliance for Sustainable Development, setting a precedent for future projects worldwide. The transformation of CPEC into a green development initiative requires concerted efforts across multiple dimensions. Strengthening frameworks, integrating environmental considerations, enforcing regulations, fostering international cooperation, enhancing green financing, and developing a skilled workforce are all critical components of this transformation. These strategies will ensure that CPEC not only drives economic growth but also promotes environmental sustainability and social well-being, making it a model for sustainable infrastructure development globally. This book not only provides a critical assessment of CPEC's current and future impact but also offers actionable recommendations to ensure that economic advancement and environmental responsibility go hand in hand.

About the editor

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