



北京工商大学
BEIJING TECHNOLOGY AND BUSINESS UNIVERSITY

Bridging the Green Gap: Green Finance as a Catalyst for the Green Transition



Institution: Beijing Technology and Business University



Reporter: Yue Dou

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一、Introduction

>>> Background

- Over the past few decades, the world has witnessed unprecedented economic growth, with global GDP almost tripled since 1990 ([World Bank, 2023](#)). However, this rapid economic development is at a cost of environmental degradation and resources exhaustion.
- For example, ever since the 1990s, carbon dioxide (CO₂) emissions around the world due to fossil fuel combustion have increased from 21,328 million tons in 1990 to 37,400 million tons in 2024 ([IEA, 2025](#)).
- This trend has led to severe consequences such as global warming, frequent extreme weather events, and ecological imbalance.

一、Introduction

>>> Background



- Currently, the global economic development model remains highly reliant on a **high-carbon energy structure**, with a significant positive correlation between economic growth and carbon emissions.
- Although some developed countries have achieved a phased decoupling through **technological upgrading** and **industrial transformation**, developing countries, constrained by their industrialization process and growing energy demand, continue to see a sustained rise in their total carbon emissions.
- The international community has reached a consensus on the basic path of **"balancing economic growth and emission reduction goals"**, but there are still significant differences in specific implementation.
- Developed countries advocate promoting global emission reduction through **technology transfer** and **financial support**, while developing countries emphasize the principle of **"common but differentiated responsibilities"** and call for the establishment of a fairer mechanism for **allocating carbon emission rights**.

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>>> Background

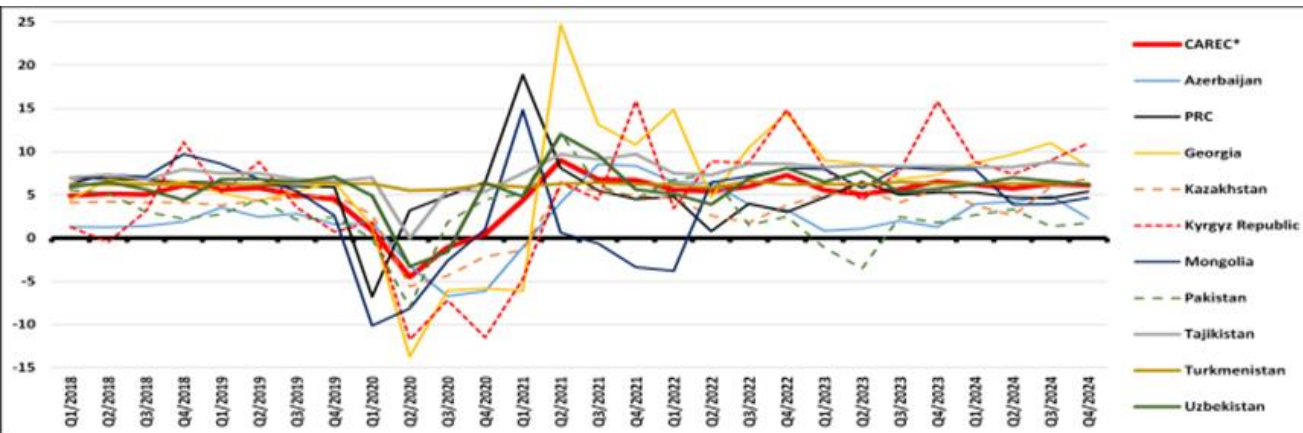


Fig. 1. GDP Growth % of CAREC Countries.

- As emerging economies, the countries participating in the Central Asia Regional Economic Cooperation (CAREC) program have achieved **relatively stable GDP growth** over the past few decades.
- However, due to issues such as their **high dependence on fossil fuels**, **low efficiency of energy systems**, and **aging industrial infrastructure**, these countries generally show high carbon emission intensity, with CO₂ emissions per GDP ranking among the highest in the world.
- While maintaining economic growth, CAREC member states are in urgent need to promote **low-carbon transformation** to address global climate challenges. By **optimizing energy structures**, **upgrading industrial technologies**, and **improving policy systems**, these countries can achieve sustainable development while reducing carbon emissions.

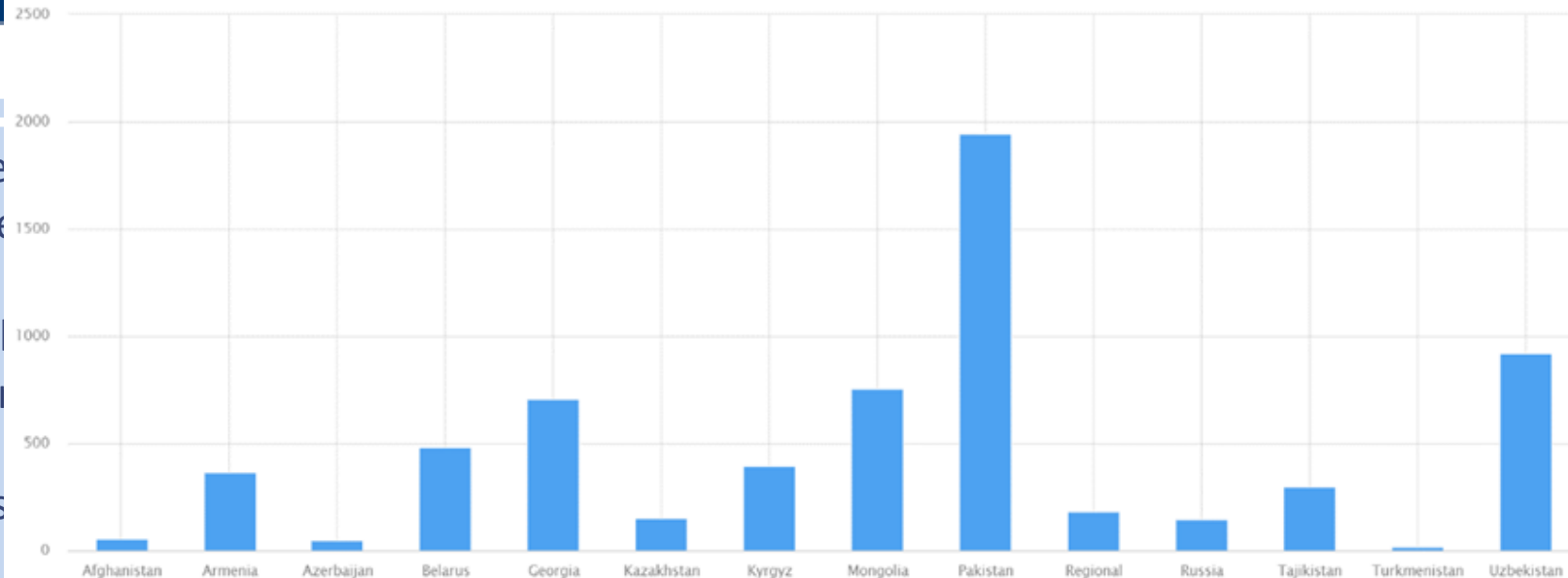
一、Introduction

>>> Motivation

🎯 How to promote the transition to a low-carbon and environmentally sustainable economy?

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➤ CAREC member countries are constrained by tight fiscal budgets and underdeveloped green capital markets, making it difficult to effectively mobilize such funds. Without the support of **targeted green financial tools**, the green transition in the CAREC region may fail to meet national commitments and international climate goals.

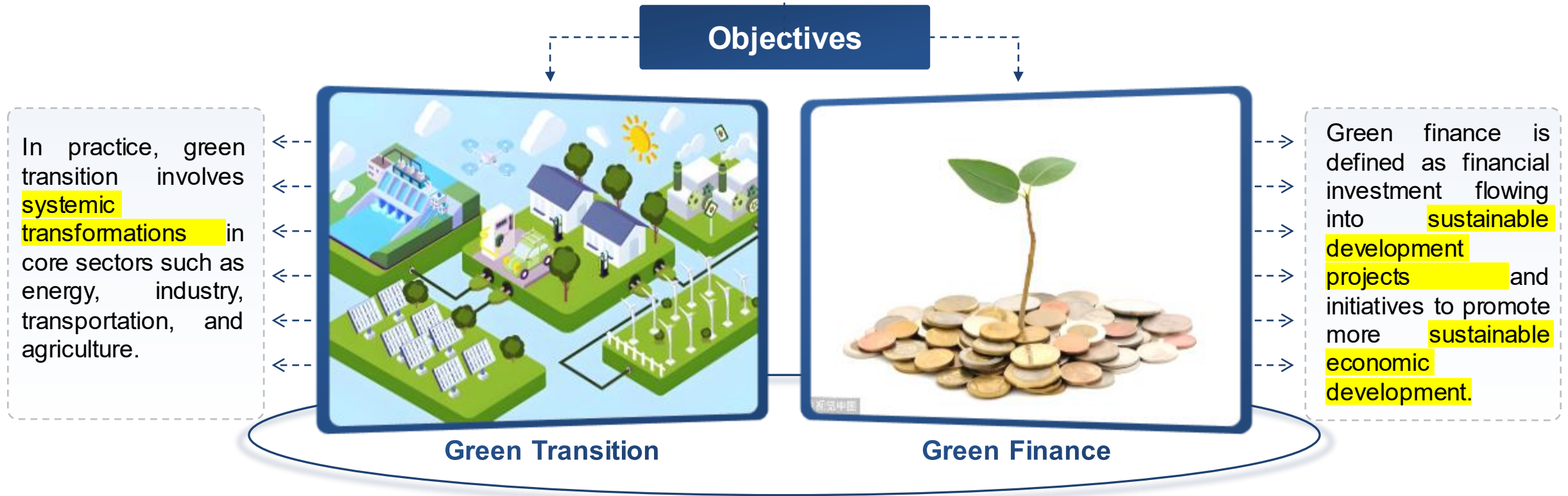
一、Introduction

>>> Background



Question 1: What is green transition?

Question 2: What is green finance?



一、Introduction

》》》 Objectives

Objective 1

- We explore the role of green finance in promoting green transition in CAREC countries.

Objective 2

- This report aims to support CAREC policymakers, development institutions, and financial actors in designing more effective strategies to reconcile economic development with environmental sustainability.

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二、 Green Transition Strategies in CAREC countries



Progress of green transition strategies in CAREC countries

Strategies	Progresses
Energy consumption structure of CAREC countries	From 2020-2030, total primary energy supply among CAREC countries is projected to grow significantly. The transport sector is the fastest-growing energy consumer within CAREC countries (excluding the PRC), with energy demand expected to rise at a compound annual growth rate (CAGR) of 3%–4% by 2030. In contrast, the residential and industrial sectors are anticipated to grow more moderately at 2%–3% annually, benefiting from targeted energy efficiency measures.
Green transition trends of CAREC countries	Energy policies and development plans of CAREC countries are closely related to the green transition process. In reality, most of these countries are still highly dependent on fossil fuels to meet their energy needs; but at the same time, the pressure brought by climate change is accelerating their transition to renewable energy adoption.
Challenges of green transition in CAREC countries	Heavy reliance on fossil fuels and carbon-intensive economies. Many CAREC countries, particularly Kazakhstan, Turkmenistan, Uzbekistan, and Azerbaijan, rely heavily on fossil fuel extraction and exports.
	Limited institutional and regulatory capacity. Several CAREC countries lack well-established institutional frameworks to support green development: (1) absence of national green finance strategies or taxonomies (e.g., in Kyrgyzstan, Tajikistan, Turkmenistan); (2) weak enforcement of environmental regulations; (3) incomplete MRV (Monitoring, Reporting, Verification) systems for tracking emissions and green investments.
	Inadequate access to green finance and investment. Most CAREC countries struggle to attract climate-aligned capital due to limited local capital markets and few green financial instruments, making it difficult to generate bankable renewable energy or climate adaptation projects.

二、 Green Transition Strategies in CAREC countries



Table 1. An overview of energy transition status across the CAREC countries.

Country	Green Transition Status	Renewable Energy Targets	Main Renewable Sources	Key Progress	Major Challenges
Kazakhstan	Leading in Central Asia	15% by 2030, 50% by 2050	Wind, Solar	Policy frameworks, auctions	Heavy coal reliance, aging infrastructure
Uzbekistan	Rapid progress	25% by 2030	Solar, Wind	Successful auctions, foreign investment	Low energy efficiency, fossil dominance
Turkmenistan	Minimal progress	None officially stated	Negligible	Gas export focus	No climate policy, lack of transparency
Kyrgyzstan	Hydropower leader	Maintain high share	Hydropower	90% electricity from hydro	Water variability, limited diversification
Tajikistan	Clean power system	Maintain ~95% hydro	Hydropower	Among cleanest energy mixes	Winter shortages, climate risk
Azerbaijan	Starting to diversify	30% by 2030	Solar, Wind	Large-scale foreign partnerships	Oil/gas dependency
Georgia	Moderate progress	Increase share	Hydropower, Wind	Over 60% from hydro	Financing gaps, energy security
Mongolia	Strong potential	30% by 2030	Wind, Solar	Grid-connected projects with ADB support	Coal dependence, harsh climate
Pakistan	Scaling up RE investments	60% renewable electricity by 2030	Solar, Wind, Hydro	Large hydro plants, policy shift	Grid instability, fossil fuel subsidies
Afghanistan	Very limited but vital	No unified target	Solar, Small Hydro	Donor-funded off-grid projects	Conflict, lack of infrastructure
China (West)	Global leader, regional gaps	Carbon neutral by 2060	All types, esp. solar/wind	Massive RE deployment	Xinjiang still coal-reliant

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三、 Green Finance Development in CAREC countries



➤ Green finance general policies in CAREC countries.

An overview of green finance status across the CAREC countries

Country/Institution		Green Finance Activity	Funding/Capital
Kazakhstan		AIFC Green Centre, green bonds, KazREFF	US \$0.48 M + €70 M
China		National green bond market, BRI green funds	US \$489 bn by 2022
Eurasian Development Bank		Renewable energy financing & green bonds	USD 540 M (2017–20); pipeline USD 1 bn
CAREC (regional)		CSPPF, ReCATH, CACIP, training	Multi-donor trust; 26 workshops in 2023
Other members	CAREC	Limited domestic instruments; rely on multilateral funds	World Bank, GIZ, USAID, EU

The regional leader—Kazakhstan

Kazakhstan has emerged as a regional leader with initiatives such as the AIFC Green Finance Centre and the KazREFF facility, backed by funding of US \$0.48 million and €70 million.

One of the largest players globally—China

China, with its sophisticated national green bond market and Belt and Road Initiative (BRI) green funds, has mobilized an impressive US \$489 billion by 2022, making it one of the largest green finance players globally.

Other CAREC members

Other CAREC members—including Uzbekistan, Kyrgyzstan, Tajikistan, and Turkmenistan—still lack domestic green financial instruments and rely heavily on multilateral donors like the World Bank, GIZ, USAID, and the EU for project financing and capacity building.

三、 Green Finance Development in CAREC countries



➤ Green finance products in CAREC countries

Green finance in CAREC countries is gaining momentum. Uzbekistan has pioneered sovereign green finance in Central Asia, issuing US \$660 million in green Eurobonds on the London Stock Exchange in 2023, followed by its first domestic green bond (US \$4 million) in 2024 through UzMRC.

The most popular green finance product that has been introduced in the CAREC region, particularly in nations like China and Kazakhstan, is green bonds. China has become one of the world's largest green bond markets with issuance exceeding \$489 billion in 2022.

Country	Instrument Type	Volume / Amount	Year(s)	Notes
Kazakhstan	Green bonds & loans	~US \$1.2 billion (end-2023)	up to 2023	via AIFC-certified instruments
Kazakhstan	Green loans	US \$183M → ~US \$437.6M	2021 → ~2024	growth tracked by AIFC & financial market
Kazakhstan	ESG bond issuance (2023 alone)	~US \$431.3 million	2023	KASE/AIX listed bonds
Kazakhstan	Flagship sustainable projects	> US \$650 million total	Since 2020	18 cases across four CAREC countries
Azerbaijan	First green bond (UNIBANK)	AZN 20M (~US \$11.8M)	~2023-2025	via AIFC-supported issuance
Uzbekistan	Green corporate bonds (UzMRC)	UZS 50B (~US \$4M)	Sept 2024	First domestic green bond issuance
Uzbekistan	Sovereign green Eurobonds	UZS 4.25T (~US \$660M)	Oct 2023	First CIS sovereign green bonds

三、 Green Finance Development in CAREC countries

➤ Green finance products in CAREC countries

Green finance products in CAREC countries vs. global practices

- While CAREC countries are at varying stages of developing green finance products, progress is underway.
- Green bonds, concessional loans, and green investment funds are starting to shape the sustainable finance landscape, especially in leading economies like China and Kazakhstan.
- For other members, capacity building and regulatory reform remain critical to unlock the full potential of green finance tools and mobilize capital for a greener future.

Green finance products	CAREC countries	Global context
Green Bonds	- China : Largest issuer in CAREC; over USD 489 billion issued by 2022.- Kazakhstan : AIFC-supported issuance since 2020.- Other countries: Limited or pilot stage only.	- Widely adopted globally.- Major issuers: US, EU, China. - Valued at over USD 2.5 trillion by 2023.
Green Loans	- Kazakhstan & Uzbekistan : Concessional loans via KazREFF, World Bank, EBRD.- Mongolia : Green lending guided by MSFP.- Limited adoption elsewhere.	- Common in EU, US, and Japan. - Linked to sustainability performance metrics and targets.
Sustainable Investment Funds	- China : Green funds under BRI.- Kazakhstan : Emerging ESG-aligned funds.- Rest of CAREC: Minimal activity.	- Rapid growth worldwide. - ESG funds surpassed USD 2 trillion AUM globally in 2023.
Carbon Markets / Trading	- China : National Emissions Trading System (ETS) launched in 2021.- Other CAREC: No formal carbon markets.	- EU ETS is most advanced. - Over 30 global carbon pricing schemes in operation.
Sukuk (Green Islamic Bonds)	- Not yet implemented in CAREC, though potential exists in Muslim-majority countries (e.g., Uzbekistan, Kazakhstan).	- Issued in Malaysia, UAE, Saudi Arabia. - Growing demand in Islamic finance markets.
Sustainability-Linked Loans	- Not yet formalized in CAREC; under study in some countries (e.g., via ADB consultations).	- Used by global corporations. - Tied to borrower's sustainability KPIs.
Guarantees & Risk-sharing Mechanisms	- Donor-led guarantees in Tajikistan, Kyrgyzstan for green infrastructure.- Largely pilot or project-based.	- Common in blended finance deals. - Used to de-risk green investments in developing economies.
Green Taxonomies & Standards	- China : Well-developed taxonomy and disclosure rules.- Other CAREC: Draft or absent; working toward alignment.	- EU, China, ASEAN have taxonomies. - International convergence underway (e.g., via IPSF).

三、 Green Finance Development in CAREC countries



➤ Green finance risk management in CAREC countries

China has adopted a comprehensive green risk management system

- ◆ **China has the most developed green finance market among the CAREC member countries.** China promotes the incorporation of environmental, social, and governance (ESG) considerations into lending decisions and has required financial institutions to disclose environmental risks. In addition, China's national emissions trading system (ETS) helps institutions assess and price carbon-related risks, which in turn influences investment and credit choices.

Other CAREC countries also actively promote green finance risk management

- ◆ **Kazakhstan has begun incorporating ESG risk analysis** through the Astana International Financial Centre (AIFC) Green Finance Centre, which provides resources and training to help banks and investors assess environmental and climate risks. However, there are currently no unified scenario analysis or green risk disclosure regulatory requirements. In Uzbekistan, Kyrgyzstan, Tajikistan and Mongolia, green risk management is mainly driven by donors or as part of specific multilateral project frameworks, and is not rooted in national financial regulations.

Multilateral organizations are supporting risk management capacity building

- ◆ **European Bank for Reconstruction and Development (EBRD) and the Asian Development Bank (ADB)** have organized training workshops for financial regulators and central banks, creating ESG toolkits, and developing climate risk models. In addition, the recently launched Central Asia Regional Economic Cooperation (CAREC) Green Finance Framework aims to promote standardized approaches to risk assessment, disclosure, and sustainable financial integration.

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四、The role of Green Finance on Green Transition

➤ Importance of Green Finance in CAREC Countries

- Green finance plays a key role in accelerating green transition in CAREC countries. As these countries strive to transition to low-carbon and climate-resilient economies, the availability and mobilization of sustainable financial resources becomes critical.
- Green finance is essential to finance renewable energy, climate-resilient infrastructure, energy efficiency, and sustainable agriculture.
- According to the Asian Development Bank (ADB), CAREC countries will need more than \$400 billion in green investments by 2030 to achieve their climate goals and comply with the Paris Agreement.

Countries	Circumstances	Endowment
Afghanistan	Highly vulnerable to drought and water scarcity, with support currently limited to small-scale initiatives by ADB and UNDP.	Conflict and institutional weakness hinder access to international finance
Azerbaijan	Launched a 230 MW solar PPP project in 2022 in partnership with Masdar, supported by international climate finance.	As a fossil fuel exporter, Azerbaijan faces the challenge of decarbonizing its economy.
Georgia	The Green Climate Fund (GCF) has provided USD 70 million to support energy-efficient housing and agriculture.	Needs green finance to diversify into solar and wind energy, especially given climate-related fluctuations in water availability.
Kazakhstan	Green finance supports major renewable projects like the Zhanatas 100 MW wind farm, backed by the EBRD and the GCF.	The region's largest emitter, Kazakhstan aims to increase renewables to 15% by 2030 and achieve carbon neutrality by 2060.
Xinjiang and Inner Mongolia	Green finance here also supports transboundary projects under the Belt and Road Initiative that benefit neighboring CAREC countries.	These western regions are key to China's broader green strategy, with massive investments in wind, solar, and green hydrogen.

四、 The role of Green Finance on Green Transition

➤ Growth of Green Finance Instruments

In the field of green bonds, Kazakhstan became the first CAREC country to issue green bonds in 2020, raising more than 20 million US dollars for renewable energy projects. Uzbekistan and Georgia have also followed suit; Uzbekistan's first sovereign green bond was issued in 2023, which attracted widespread attention from the international community.

In terms of climate funds, the Green Climate Fund (GCF) has approved projects in many CAREC countries, such as Mongolia's energy-saving housing project and Uzbekistan's solar photovoltaic infrastructure project.

➤ Role of Multilateral Development Banks (MDBs) and Public-Private Partnerships (PPPs)

Green finance in the CAREC region has received strong support from **multilateral development banks**, especially the World Bank, the Asian Development Bank and the European Bank for Reconstruction and Development. **Partnerships (PPPs)** are becoming a key mechanism for financing and implementing green infrastructure projects in CAREC countries.

四、 The role of Green Finance on Green Transition



➤ Role of Multilateral Development Banks (MDBs)

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五、Conclusions

➤ Conclusions

- As one of the important financial tools for environmental protection, green finance inevitably has an impact on green transition and sustainable development. The green finance mechanisms, such as green bonds, climate funds, and public-private partnerships (PPPs), are instrumental in supporting the green transition in CAREC countries.
- MDBs, such as the ADB, EBRD, and World Bank, have played a significant role in supporting green finance in CAREC countries. Building the required regulatory frameworks for green finance depends on their investments in energy and climate projects, as well as their technical assistance and policy recommendations.
- The PPP model is gaining increasing recognition as a successful way to finance green infrastructure projects. In the CAREC region, PPP has become a key tool for scaling up waste management facilities, energy-efficient transportation systems, and renewable energy projects, alleviating the financial pressure on the public sector while leveraging the creativity and experience of the private sector.

五、Conclusions

➤ Policy implications



CAREC member governments should prioritize the construction of a strong green finance regulatory framework. Specifically, transparent and unified regulations on green bonds, climate funds, and public-private partnerships (PPPs) can be formulated, and a green finance taxonomy can be introduced to clarify the standards for qualified green projects.



Given the funding gap in CAREC member countries, it is crucial to promote deeper private sector participation in green finance. Governments can formulate incentive policies, such as tax exemptions or financial support for environmental projects, to attract private investment.



CAREC member countries need to establish a strong cooperation mechanism to enhance the ability of government and private sector partners to develop and implement PPP projects. For example, training government representatives to master the establishment and operation methods of green PPP projects and provide technical support.

Thank you!

by YUE DOU