



CCFLA Central Asia Hub

Scaling up project preparation and finance for net zero carbon buildings in Kazakhstan and Uzbekistan

May 2024



Supported by:



Federal Ministry
for Economic Affairs
and Climate Action



INTERNATIONAL
CLIMATE
INITIATIVE

on the basis of a decision
by the German Bundestag

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ACKNOWLEDGMENTS

The authors of this report would like to thank the following Cities Climate Finance Leadership Alliance (CCFLA) colleagues for their guidance and feedback: Priscilla Negreiros, Jessie Press-Williams, John Michael La Salle, Eyerusalem Masale, Alastair Mayes, and Hamzah Abdullah. Thanks also go to CPI communications team members Angel Jacob and Kirsty Taylor for their guidance in structuring and editing, as well as Elana Fortin for layout and graphics design.

The authors also appreciate and acknowledge the inputs and review by the following experts outside CPI and CCFLA (in alphabetical order):

AIFC Green Finance Centre: Aigul Kussaliyeva; **EBRD:** Hiro Ito; **FELICITY II – GIZ/EIB:** Marie-Anne Serve; **GCoM:** Carolina Mesa, Helena Monteiro, Alexandra Papadopoulou; **Independent expert:** Kairat Shalabay; **KazGBC:** Alexandr Belyi.

We also thank interviewees from: AIFC Green Finance Centre, Astana Centre of Urbanism, BI Development, CDIA, DENA, DKU (Kazakh-German University), EBRD, EEDI, FELICITY II – GIZ/EIB, G4 City Project, Gap Fund – WB/EIB, GCoM, GIB, Juru Energy, KazCenter, KazGBC, KfW, Q-Lab Almaty, SKB Energy, UNDP, UNECE, UNESCAP, Urban Forum Kazakhstan, UzGBC, UzNature, UzStandard; and the city administrations of Aktobe, Bukhara, Kokshetau, Namangan, Petropavlosk and Satpayev.

ABOUT THE CITIES CLIMATE FINANCE LEADERSHIP ALLIANCE

CCFLA is a coalition of leaders committed to deploying finance for city-level climate action at scale by 2030. Trillions of dollars will be required to help cities build the low-emissions, resilient infrastructure necessary to combat and react to climate change. CCFLA is the main multi-level and multi-stakeholder coalition aimed at closing the investment gap for urban subnational climate projects and infrastructure worldwide. Climate Policy Initiative serves as the Secretariat



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ABOUT FELICITY II

“Financing Energy for Low-carbon Investment- Cities Advisory Facility” (FELICITY II) - Eastern Partnership and Central Asia Program is an initiative of GIZ and the European Investment Bank (EIB) to support low-carbon infrastructure projects in cities that significantly contribute to sustainable development and climate change mitigation. As a project preparation facility, FELICITY offers technical assistance to cities in designing and structuring their infrastructure investment projects. FELICITY II is supported by the International Climate Initiative (IKI) of the Federal Ministry for Economic Affairs and Climate Action of Germany.

DESCRIPTORS

SECTOR

Buildings, Cities

REGION

Central Asia

KEYWORDS

Central Asia, Net Zero Carbon Buildings, Project Preparation

RELATED CPI WORKS

[Financing Net Zero Carbon Buildings \(2022\)](#)

[Net Zero Carbon Buildings in Cities: Interdependencies between Policy and Finance \(2023\)](#)

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RECOMMENDED CITATION

CCFLA, 2024. Macedo F, Bassetti T, and Zikrina Z. Financing Net Zero Carbon Buildings in Central Asia. Cities Climate Finance Leadership Alliance.

EXECUTIVE SUMMARY

Scaling up net zero carbon buildings (NZCBs) is critical to meeting Central Asia's climate mitigation goals.¹ Buildings account for up to 70-80% of total emissions from Central Asian cities' buildings, transport, and waste sectors combined, making their decarbonization crucial to expediting the region's path to climate neutrality (GCoM, upcoming). However, scaling climate investment in the buildings sector remains challenging.

NZCBs are buildings that have achieved decarbonization in all aspects of their energy use, operations, and embodied carbon from materials over their lifespan. While there are challenges in achieving NZCBs at scale in Central Asia and elsewhere, the measures outlined in this report can also assist in achieving green and low-carbon buildings, which have reduced carbon footprints without reaching the decarbonization levels of NZCBs.

This report builds on learnings from the Cities Climate Finance Leadership Alliance (CCFLA) Central Asia Hub, whose members have prioritized buildings' decarbonization as a focal area for the region, particularly for Kazakhstan and Uzbekistan. The Hub is convening CCFLA members and key regional stakeholders to develop action-oriented knowledge products and foster collaboration. Most regionally active CCFLA members engage in project preparation activities.² This paper presents an overview of the landscape of project preparation support for the sector in Central Asia, identifies challenges, and provides recommendations to accelerate action.

The report also builds on CCFLA's global work on NZCBs, including its [Financing Net Zero Carbon Buildings \(2022\)](#) and [Net Zero Carbon Buildings in Cities report \(2023\)](#), which, respectively, analyze the challenges and priorities relevant to cities in decarbonizing the buildings sector and the interdependencies between barriers and policy and finance instruments available to cities to achieve systemic transformation in the sector.

¹ The Central Asia region comprises Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan.

² CCFLA members active in Central Asia include: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), World Bank (WB), European Investment Bank (EIB), European Bank for Reconstruction and Development (EBRD), Global Covenant of Mayors (GCoM), United Nations Development Programme (UNDP), KfW Bankengruppe (KfW), Agence Française de Développement (AFD), and Cities Development Initiative for Asia (CDIA).

KEY FINDINGS

Buildings' decarbonization is fundamental to achieving the Nationally Determined Contributions of Central Asian countries. This paper focuses on Kazakhstan and Uzbekistan, where about 50% of the final energy use is attributable to the buildings sector (Belyi, 2023; JICA, 2023). Residential buildings are particularly relevant, as they account for 34% of final energy use in Kazakhstan and 39% in Uzbekistan (Belyi, 2023; JICA, 2023).

Recently, both Kazakhstan and Uzbekistan have intensified their government policy focus on decarbonizing buildings. Uzbekistan's government aims to improve the overall economy's energy efficiency by 50% by 2030 (LexUz, 2020). It concurrently aims to outfit a substantial portion of the country's building rooftops with both solar PV and solar water heaters (IEA, 2022). In Kazakhstan, the national government targets a 15% reduction in the economy's energy intensity by 2029 through prioritizing energy efficiency in buildings (EEDI, 2023). However, there has been little progress on investment and project implementation to date.

To realize their ambitions to decarbonize buildings, these countries need to step up their preparation of investable projects. Project preparation stakeholders in Central Asia focus on four key stages: concept design, pre-feasibility, feasibility, and structuring and transactions. They also conduct enabling activities such as awareness raising and capacity building for institutions, data, policies, and financial frameworks. The viability of NZCB projects in Kazakhstan and Uzbekistan is impaired by large energy subsidies, which cover up to 50% of the energy costs of residential buildings.

We mapped 12 international entities implementing project preparation activities for NZCBs in Kazakhstan and Uzbekistan. These include city networks, project preparation facilities (PPFs), and international organizations, including bilateral and multilateral development banks (MDBs). Broadly, project preparation stakeholders focus their support on either the early stages of the project development, working until the pre-feasibility stage, or full service, developing projects throughout the entire project cycle. Given that some of these organizations have only just begun working in Central Asia, there is great potential for them to collaborate on fostering NZCB project pipelines.

We identified 6 key challenges related to NZCB project preparation and have proposed 12 recommendations that could help to overcome them.

Table ES1. Challenges and recommendations to scale NZCB project preparation in Central Asia

Challenges	Recommendations
<p>1. Limited awareness of NZCBs and their benefits undermines interest in such projects.</p>	<p>A. Raise awareness of NZCBs’ potential to help tackle the climate and other crises in the region (e.g., air quality and energy security) by enhancing existing awareness campaigns and in-person trainings, combining efforts of different organizations, and using multiple communications channels.</p> <p><i>Key stakeholders: City networks, PPFs, international organizations, NGOs, and universities.</i></p>
<p>2. Lack of data on buildings’ energy consumption, masking their investment needs.</p>	<p>B. Provide technical assistance (TA) to cities to support data collection and analysis in the buildings sector by training ministries and national agencies with building mandates, local governments, and other city-related actors in data collection and analysis.</p> <p><i>Key stakeholders: City networks, PPFs, international organizations, NGOs, and universities.</i></p>
<p>3. Financial disincentives and underdeveloped institutional coordination frameworks for NZCB project preparation.</p>	<p>Mainstream NZCB approaches in legal frameworks and key national and local processes by:</p> <p>C. Presenting opportunities to enhance national policies and regulations to government decision-makers.</p> <p>D. Providing TA to help governments incorporate realistic NZCB targets in their framework documents budget tagging mechanisms.</p> <p><i>Key stakeholders: International organizations, NGOs, and city networks.</i></p> <p>E. Improving coordination between national and local governments by developing frameworks for coordination between different levels of government (vertical) and across cities or departments (horizontal) to drive regulatory change for NZCBs. This could take the form of a steering committee or task force.</p> <p><i>Key stakeholders: PPFs, international organizations, NGOs.</i></p> <p>F. Facilitating knowledge exchange between countries by developing an international framework to support knowledge exchange and dissemination between governments and institutions pursuing NZCBs in Central Asia. This could take the form of an international task force.</p> <p><i>Key stakeholders: PPFs, international organizations, NGOs.</i></p>
<p>4. Limited capacities of local governments to prepare investable projects.</p>	<p>G. Increase project preparation support to local and national governments and national agencies with building mandates to help them identify priorities and develop their projects from ideas to financial closure.</p> <p><i>Key stakeholders: City networks, PPFs, international organizations, NGOs.</i></p>
	<p>H. Enhance dissemination of project preparation support available to cities by increasing outreach on available project preparation support and case studies targeted at local governments and ministries, as well as national agencies with building mandates.</p> <p><i>Key stakeholders: City networks, PPFs, international organizations, NGOs, and universities.</i></p>

Challenges	Recommendations
<p>5. Institutions providing project preparation support have untapped collaboration potential.</p>	<p>Enhance collaboration between stakeholders providing project preparation support services in the same countries and cities by:</p> <ul style="list-style-type: none"> I. Developing partnerships aiming to explore joint project pipeline synergies between stakeholders. Examples include donor coordination platforms through national ministries. J. Combining common efforts of institutions providing project preparation support in the same geographies. For instance, institutions can join forces to raise awareness, as well as for in-person and virtual capacity-building trainings and events. <p><i>Key stakeholders: City networks, PPFs, international organizations.</i></p>
<p>6. Underdeveloped public and private financing instruments dedicated to NZCBs, with limited uptake.</p>	<p>K. Support the scaling up of financing mechanisms offered by public and private institutions by helping to develop innovative financial instruments for NZCBs. Examples include sovereign and municipal bonds, fiscal instruments, blended financing, and energy service company operating models.</p> <p><i>Key stakeholders: PPFs, international organizations, MDBs, and local financing institutions</i></p> <ul style="list-style-type: none"> L. Train local governments and ministries/national agencies with buildings mandates to better leverage public procurement powers to finance NZCB projects. <p><i>Key stakeholders: City networks, PPFs, international organizations, MDBs, local financing institutions.</i></p>

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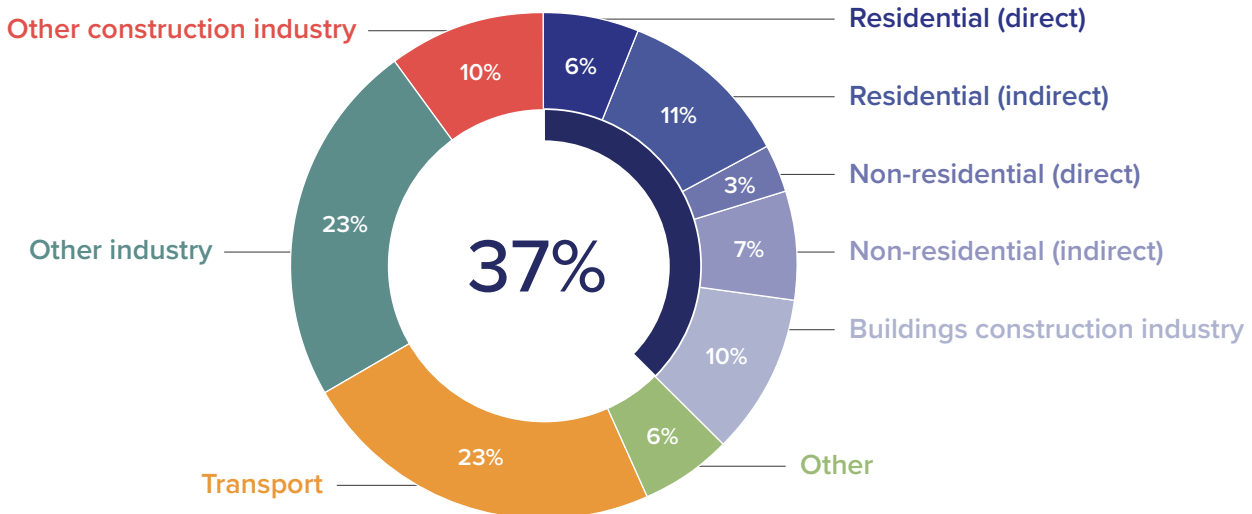
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1. INTRODUCTION

1.1 GLOBAL STATUS OF NET ZERO CARBON BUILDINGS

The buildings sector is a key contributor to greenhouse gas (GHG) emissions and is also critical to enhancing resilience against climate change. As shown in Figure 1, the buildings sector is responsible for 37% of global energy-related CO₂ emissions, making this the highest emitting sector (UNEP 2021). These emissions can be categorized as Scope 1 (e.g., direct use of fossil fuels in buildings such as for on-site oil and gas boilers for heating) and Scope 2 partly from generated electricity and heat for building use (e.g., electricity used in water heaters, lighting, electrical devices, cooling systems, etc.)(EEA, 2023). Buildings also offer critical protection against climate change impacts such as extreme weather (C40 and McKinsey, 2021).

Figure 1: Share of buildings sector GHG emissions over global energy and energy-related emissions



Source: UNEP, 2021

Transitioning to net zero carbon buildings (NZCBs) offers key economic, social, and environmental benefits. NZCBs are buildings that have achieved decarbonization in all aspects of their energy use, operations, and embodied carbon from materials over their lifespan (see Box 1).

Box 1: Defining net zero carbon buildings

Net zero carbon buildings are buildings that have achieved decarbonization in all aspects of their energy use, operations, and embodied carbon from materials over their lifespan (LETI, 2021; WorldGBC, 2019). Large-scale implementation of carbon-neutral buildings is presently an ambitious yet crucial objective in achieving complete decarbonization within the buildings sector.

Conversely, green buildings are buildings that demonstrate notable improvement compared to similar buildings in curbing energy consumption and emissions but that fall short of the net zero carbon standard (LaSalle et al., 2022). Hence, the references and recommendations in this report regarding NZCB are also relevant to green and low-carbon buildings.

Renewable energy generation and energy efficiency measures to achieve NZCBs also deliver various co-benefits, such as reduced energy bills, property price uplifts, and improved thermal comfort. On-site renewable energy generation, if implemented, may also serve to alleviate pressures on energy infrastructure and mitigate energy security risks. Using materials with net zero lifecycle emissions and/or engaging in carbon removals to offset residual lifecycle emissions can improve air quality and reduce other environmental externalities. Climate adaptation benefits can be unlocked through resilient design features such as passive heating and/or cooling technologies, as well as reinforced structures and elevated foundations to adapt to extreme weather.

Implementing NZCBs at scale faces several challenges, identified by CCFLA as including low awareness of their benefits, limited expertise for their construction and operation, and a lack of government policy and financial instruments to implement them (LaSalle et al. 2022; Micale and LaSalle, 2023; Beavor et al., 2023).

1.2 THE CENTRAL ASIA CONTEXT

Central Asia is disproportionately affected by the impacts of climate change.³ Annual temperatures in the region have increased by about 2°C on pre-industrial levels, which is twice the increase of the global average (IMF, 2023). This warming has strongly affected the major Central Asian Mountain ranges of Tian Shan and Pamir, deteriorating the region's 25,000+ glaciers (Barandun et al., 2020). This warming, coupled with excessive water use for irrigation of cotton crops, has led to drinking water scarcity and decreasing surface water runoff (Wang et al., 2022). This has resulted in the loss of biodiversity and the degradation of ecosystems, including the drying of the Aral Sea. Heatwaves, avalanches, fires, extreme cold snaps, floods, mudflows, landslides, and sand and dust storms have become more frequent. Regionally, natural disasters result in about USD 10 billion in damage and affect almost three million people per year (Kazinform, 2023). Average temperatures are forecast to reach 5.7°C on pre-industrial levels by 2085, devastatingly affecting human life, environment, and economies (UNDP, 2022).

³ The Central Asia region comprises the countries of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan.

Decarbonizing buildings offers a unique opportunity to accelerate Central Asian cities' climate mitigation efforts. While figures vary by country, the region's buildings sector accounts for up to 50% of total final energy consumption (World Bank, 2022a). This is significantly higher in Central Asia than the EU average of 40% (JRC, 2023) and substantially higher than the global average of 30% (IEA, 2023). In Kazakhstan and Uzbekistan, the highest proportion of energy is used by residential buildings, which account for about 34% (Kazakhstan) and 39% (Uzbekistan) of the countries' total energy use (See Section 2.2 for more detail).

In cities, buildings contribute to an even higher share of emissions (C40, 2016). Data from the Global Covenant of Mayors to be released in 2025 shows that, in secondary cities in Kazakhstan and Uzbekistan, buildings account for up to 70-80% of city-wide collective emissions from the buildings, transport, and waste sectors.

Central Asian countries have never placed a greater emphasis on decarbonizing buildings. In November 2023, all Central Asian countries signed a memorandum on building decarbonization, committing to conducting joint research, educational programs, and specialized training, advancing resource-efficient technologies, and aligning rules for voluntary green certifications of buildings (Jibek Joly, 2023). Yet, a major challenge in turning ambitions into action is the major energy subsidies of up to 50% in some of the region's countries (Belyi, 2023).

Kazakhstan and Uzbekistan have stressed the need for action on energy efficiency and renewable energy in their Nationally Determined Contributions (NDCs), published in 2023 and 2022, respectively. However, these documents lack targets for the buildings sector. Uzbekistan's government aims to install 150,000 rooftop solar PV systems, each with a capacity of 2-3 kilowatts, and to ensure that up to 2.5% of households have installed solar water heaters, each with a capacity of about 200 liters (IEA, 2022). In parallel, the government aims to improve the overall economy's energy efficiency by 50% by 2030 (LexUz, 2020). In Kazakhstan, the national government aims to use energy efficiency in buildings as a key avenue to reducing the economy's energy intensity by 15% by 2029 (EEDI, 2023).

Decarbonization requires massive investment in new and existing buildings. The Glasgow Financial Alliance for Net Zero (GFANZ) estimates global investment needs of USD 700 billion per year until 2050 to achieve net zero for existing buildings. Most of this must go to retrofitting and heating (80%)(GFANZ, 2021a and 2021b).

Central Asia's transition to NZCBs also requires huge investment. In Kazakhstan, the annual investment needed to reach carbon neutrality in the buildings sector by 2060 is estimated at USD 400 million per year between 2025-2030, and up to USD 1.35 billion annually between 2035 and 2040. Between 2040-2060, the investment need is forecasted to fluctuate, averaging USD 400 million to USD 800 million per year (World Bank, 2022). In Uzbekistan, this target requires an average of USD 1.1 billion per year from 2023-2031, and USD 1.6 billion from 2031-2060 (World Bank, 2023). Crucially, both countries must leverage between 80-95% of this finance from private sources (World Bank, 2022 and 2023).

1.3 PROJECT PREPARATION TO SCALE NZCBS

Financing the decarbonization of buildings in Central Asia is key to enhancing the pipeline of investable projects. This vision has been manifested by both local and international stakeholders in Central Asia during interviews and convenings organized by the CCFLA Central Asia Hub.

Project preparation entails four stages: concept design, pre-feasibility, feasibility, and structure and transaction, as outlined in Table 1. Each stage builds on the preceding one, with specific tasks varying depending on each project’s characteristics and enabling environment. Supporting cities’ project preparation facilitates project delivery and contributes to developing innovative financing models for subnational low-carbon infrastructure. This support can also consolidate efforts and commitments from a diverse range of stakeholders, particularly public and private investors and financing institutions (CCFLA, 2022).

Table 1: The four stages of project preparation

Concept design	Pre-feasibility	Feasibility	Structure and transaction
At this preliminary stage, the project document should clearly define the problem/need, the envisaged solution, the existing strategic/policy framework, key stakeholders, and existing initiatives.	Includes early technical considerations of project interventions to justify selecting specific actions over and give an overview of associated benefits and co-benefits. This aims to provide confidence that the project warrants a more detailed assessment by presenting a robust business case and potential for replication.	A feasibility study is developed on the project’s technical details, demonstrating feasibility from both technical and economic perspectives. The level of detail may differ depending on the funder and the project’s nature and size.	This final preparation phase includes legal procedures to secure financing and initiation of procurement of operation and construction services. It also entails a detailed delineation of risk management processes and responsibilities, as well as the project’s commercial and financial close.

Source: CCFLA, 2022

Cities’ ability to prepare investable projects heavily depends on the creation of enabling environments and robust technical capacities. While these are typically not regarded as integral components of project preparation, an enabling environment and the availability of specialized technical capacities can facilitate the preparation of investable projects. As such, the challenges and recommendations for project preparation outlined in this report cover some enabling environments and capacities (see Section 3). That said, even projects facing an unfavorable enabling environment

and a lack of capacities may benefit from project preparation to help them achieve investability. While project preparation, enabling environments, and capacity development are all interconnected and mutually beneficial, they address distinct obstacles to project investability and implementation (CCFLA, 2022).

1.4 REPORT OBJECTIVES AND METHODOLOGY

This report aims to consolidate the knowledge generated through the CCFLA Central Asia Hub on the role of project preparation to increase investment in NZCBs in Kazakhstan and Uzbekistan. Given that CCFLA members have identified NZCBs as a priority area for the region, particularly in Kazakhstan and Uzbekistan, the Hub actively engages and connects CCFLA members and other local stakeholders through events and workshops and develops action-oriented research products. CCFLA members have prioritized NZCBs due to their high climate mitigation potential and growing need to upgrade and renovate local building stocks. In this context, project preparation is seen as a key to enabling financing for their implementation.

The report analyzes challenges for project preparation for NZCBs in Central Asia and makes concrete recommendations to step it up.

- **Section 2** examines the regional landscape for NZCB project preparation in Kazakhstan and Uzbekistan, diving deeper into the enabling environment contexts in both countries.
- **Section 3** identifies key challenges for scaling up project preparation for NZCBs in the two countries.
- **Section 4** provides recommendations targeted to different stakeholders.

To develop the report, we devised a mixed-methods approach. We combined desktop research and the analysis of findings from 32 online and in-person interviews, bilateral meetings, project preparation stakeholder coordination meetings, and two hybrid stakeholder events held in Astana, Kazakhstan.

2. CENTRAL ASIA’S LANDSCAPE FOR NZCB PROJECT PREPARATION

2.1 REGIONAL PROJECT PREPARATION LANDSCAPE

Cities and national agencies in the region have an untapped opportunity to obtain project preparation support for buildings’ decarbonization. We identified 12 international institutions among city networks, international organizations, project preparation facilities, and development finance institutions delivering assistance across all four stages of project preparation for NZCB (see Figure 2 and Annex for further detail). Additionally, the following three have recently begun implementing project preparation programs with a focus on buildings’ decarbonization in Central Asia: The Global Covenant of Mayors for Climate & Energy (GCoM), the City Climate Finance Gap Fund (Gap Fund), and Financing Energy for Low Carbon Investment – Cities Advisory Facility Central Asia Program (FELICITY II). Additionally, the following five organizations are also active in supporting project preparation for NZCB: the Asian Development Bank (ADB), Agence Française du Développement (AFD), Kreditanstalt für Wiederaufbau (KfW), Japan International Cooperation Agency (JICA), and the World Bank (WB). Figure 3 shows project preparation support across different cities in the region.

Figure 2. Institutions providing project preparation support for NZCBs in Central Asia

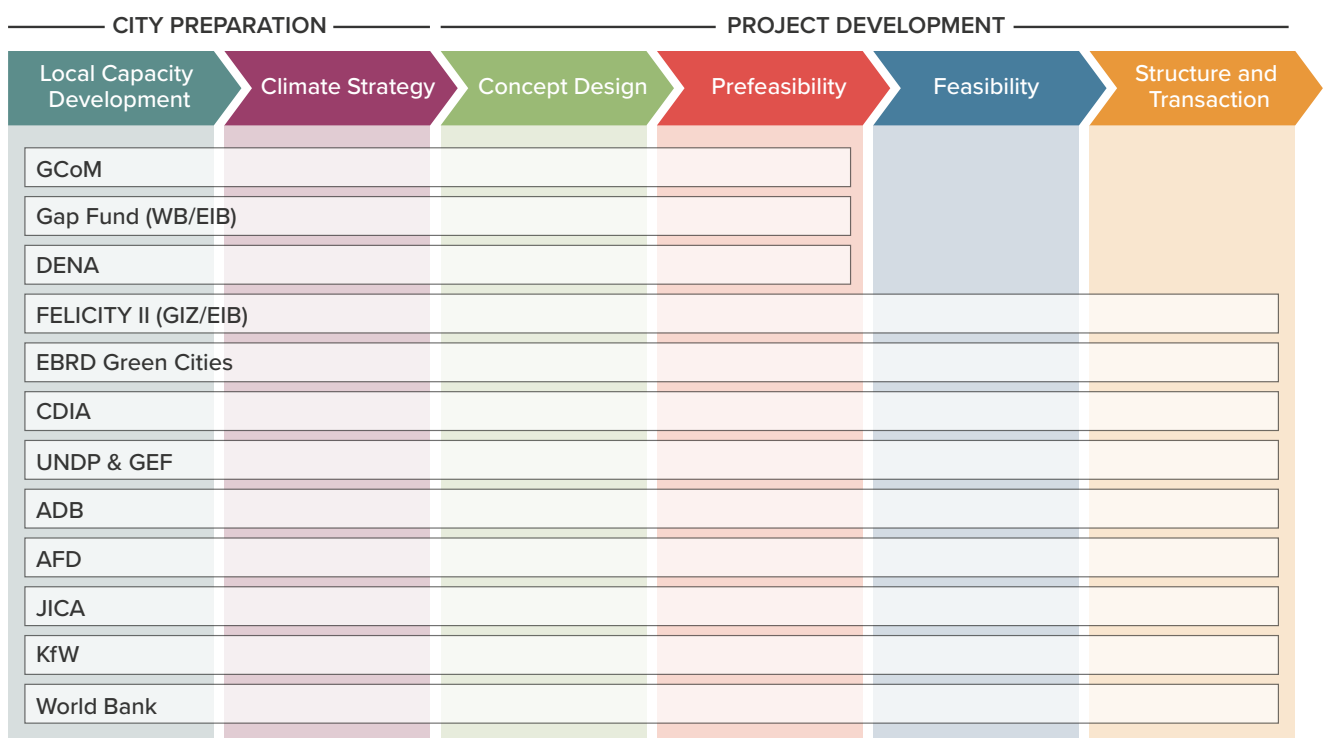
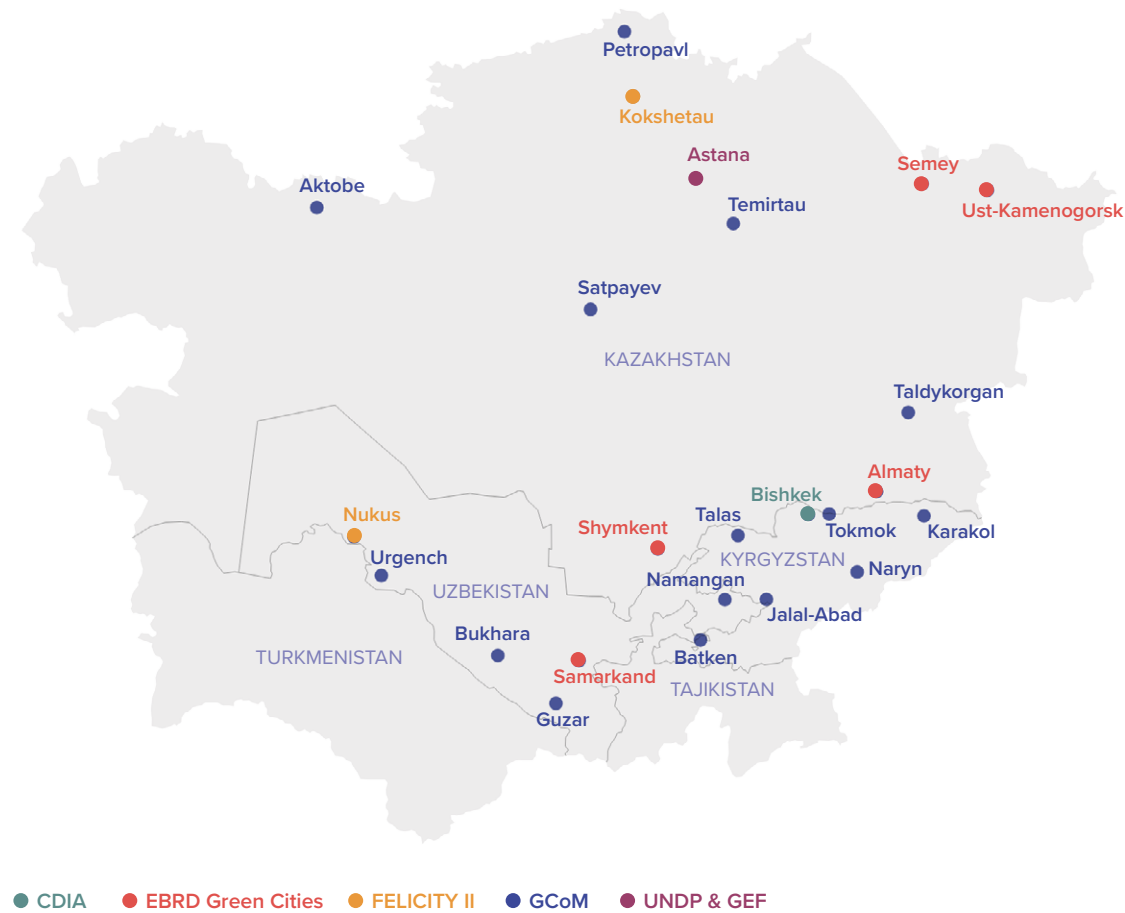


Figure 3: Cities that are receiving or have received NZCB project preparation support in Central Asia⁴



Project preparation stakeholders focus on different stages of the project cycle, some addressing the early stages and others supporting across all stages. Early-stage project preparation stakeholders such as GCoM, Gap Fund, and DENA tend to focus on cities’ preparation for pre-feasibility project development, such as local engagement and dialogue, capacity development for local staff, and other key experts, such as energy auditors and local NZCB developers. They may also support the development of buildings’ decarbonization strategies, buildings’ technical inspections, energy audits, the definition of priority sub-sectoral areas and projects, concept design and pre-feasibility, and matchmaking with financial institutions. Each of these organizations can develop projects up to the feasibility stage, and if the right conditions arise, it can connect them to their respective reference financial institutions or departments for appraisal and co-financing.

Full-service project preparation follows a multi-level approach, simultaneously seeking to address technical and financial gaps to scale up NZCBs. While full-service PPFs can work throughout the project cycle, some may decide to focus on specific stages in certain countries based on national priorities and context, as is often the case in Central Asia.

⁴ Certain stakeholders involved in project preparation, as indicated in Figure 2, may not feature in Figure 3 due to the fact that these stakeholders either have not initiated their program or have not yet concluded their city selection process.

The diversity of technical assistance (TA) providers, many of who have only recently started their programs, suggests untapped collaboration potential. Case studies have shown that enhancing collaboration across the project cycle is a key success factor in advancing NZCB projects. In Kazakhstan, for example, the UNDP and the GEF have implemented a mechanism to subsidize and provide guarantees for NZCB projects. This was tested in more than 40 pilot projects, including in the city of Astana (detailed in Section 2.2.1). In the Kyrgyzstan city of Bishkek, the UN Economic Commission for Europe (UNECE) and the Cities Development Initiative for Asia (CDIA) pooled resources to move from an early-stage needs prioritization survey to the feasibility stage (see Box 2).

Box 2: Elevating project preparation in Bishkek via stakeholder engagement

Between 2020 and 2021, the UNECE engaged with the Kyrgyz State University of Architecture in Bishkek, funding a survey examining key infrastructure challenges on the city's outskirts, including for buildings. While insightful, the survey provided insufficient detail to leverage financing. UNECE, through CCFLA connections, established an association with CDIA's PPF in the region. In the early stages, UNECE supported the Bishkek city government in navigating CDIA's project preparation and application process, which was new to the city. Bishkek received a USD 500,000 project preparation grant from CDIA in 2022, and the project reached the feasibility stage in late 2023 (CDIA, 2023).

2.2 COUNTRY DEEP DIVES

Countries' unique context, policy, and financing mechanisms influence the project cycle and are vital to implementing and scaling projects. In Kazakhstan and Uzbekistan, NZCB projects hold major mitigation potential, though obtaining investment remains challenging due to these countries' relatively immature enabling environments.

Transitioning to NZCBs presents a major opportunity to accelerate Kazakhstan and Uzbekistan's climate goals. Most of the buildings in these countries were constructed during the Soviet Union era when energy efficiency was not a priority. As such, they face challenges including major energy losses due to poor thermal insulation of building envelopes, insufficient management of heating units, and losses from the energy infrastructure network. Buildings also lack meters and thermostatic valves, while the countries lack sufficient energy consumption regulations.

2.2.1 KAZAKHSTAN

Greening Kazakhstan's buildings is essential to achieving the country's goal of climate neutrality by 2060. The country's strategy for achieving carbon neutrality by 2060 includes a clear goal of decarbonizing the building sector (Government of Kazakhstan, 2023). The country's buildings, 80% of which were built during the Soviet era, are responsible for about 47% of total final energy use, well ahead of the industry and transport sectors (Belyi, 2023). Scaling up action on buildings is particularly

urgent as their energy use has risen by 10% since 2014 (Belyi, 2023). About 34% of today's final energy demand is taken up by residential buildings alone (Government of Kazakhstan, 2023a; Belyi, 2023).

There are many opportunities to resolve inefficiencies in the energy supply system for buildings in Kazakhstan. Buildings experience up to 36% of heat losses, and there are 200 technical failures every year per 100km of heating network (World Bank, 2022). Over 49% of Kazakhstan's heating network, which is more than 6,200km, needs to be replaced (Government of Kazakhstan, 2023a). The average thermal energy consumed for heating in buildings is around 270 kWh/m², which is considerably higher than the European average of 100-120 kWh/m² (UNDP and GEF, 2015).

In this context, energy efficiency in buildings has become a key government objective. In Kazakhstan, NZCB policy is the responsibility of the Ministry of Industry and Construction (MoIC), namely through the JSC Electric Power and Energy Saving Development Institute (EEDI) and the Kazakhstan Centre for Housing for Modernization and Development and Housing of Communal Services (KazCenter). Energy efficiency considerations were first introduced for the industrial sector in 2012, achieving an 11% reduction in energy intensity (energy per unit of GDP) between 2014 and 2021 (EEDI, 2023). Currently, Kazakhstan is reducing its energy intensity at a rate of 2% per year, which is half the target set for the country by the International Energy Agency (EEDI, 2023). As new approaches are required, the government has indicated intent to step up energy efficiency in buildings in its most recent NDC and its 2023-2029 Energy Efficiency and Energy Saving Concept (Kazakhstan Ministry of Ecology and National Resources, 2023; Government of Kazakhstan, 2022). The country is also raising public awareness of energy consumption, including through a national holiday and an annual forum dedicated to energy efficiency held each November since 2018.

Deep-seated challenges, such as large energy subsidies, hinder investment in NZCBs. Kazakhstan has subsidized up to 50% of the cost of heat energy in residential buildings for decades (Belyi, 2023). As of 2020, the country's overall fossil fuel subsidies stood at USD 4.3 billion, equal to 2.8% of the country's GDP (World Bank, 2022). Such subsidies impact public behavior on energy consumption and undermine NZCB investments by increasing the payback periods of energy-efficient retrofits. For residential buildings, payback periods range between 6 and 10 years for engineering upgrades and up to 20 years for thermal insulation (GIZ, 2023). Public buildings (e.g., schools, hospitals, and kindergartens) do not receive the same subsidies, resulting in heating costs of about two to five times higher, depending on the city (GIZ, 2024). Yet, operators of public buildings are disincentivized from saving energy or carrying out energy-efficiency renovations because their budgets are calculated based on floor space (by square meter) rather than on a consumption basis. As a result, the less energy they use, the lower their budgets will be the following year. To address this, the FELICITY II program is providing TA to EEDI to propose amendments to the budget code (GIZ, 2024), which will also need to be voted on by the Kazakhstan parliament to take effect. Furthermore, data on buildings' energy consumption (e.g., readings from installed heat, electricity, hot water, and gas meters) is not systematically collected or analyzed over the long term. This crucial information is held by the enterprises supplying these services and tends to be overlooked in local administrations' decision-making processes.

At the project level, some stakeholders are implementing innovative approaches to energy efficiency in buildings and cities and have begun innovative NZCB project pilots, as shown in Box 3. Since 2012, Kazakhstan has initiated a decentralization process, shifting powers from the national government to regions and cities. Cities now oversee land regulation, public housing, and local social infrastructure development. Further decentralization is anticipated starting in 2024, when citizens will be called to vote to directly elect Mayors in major cities for the first time (SNG WOFI, 2024). Currently, cities are responsible for managing municipal buildings, offering an opportunity to align procurement practices with net zero goals. The major cities of Astana, Almaty, and Shymkent hold municipal borrowing powers, though they have not yet used them for building projects.

Box 3: Piloting residential buildings' energy efficiency in Kazakhstan

1: UNDP & GEF in Astana (2018-2022)

The UNDP, the GEF, and Kazakhstan's MoIC, as well as the city halls (*Akimats*) of Astana and the city's Baikonir district, piloted an effective model to finance energy-efficiency retrofits in five residential buildings in Astana, covering a total of 400 apartments.

The UNDP and the GEF devised a blended financing mechanism to which they contributed a 65% grant component (KZT 285 million or USD 637,000), with a further 22% from the *Akimat* of Astana (KZT 100 million or USD 223,000), and 16% from residents (KZT 76 million or USD 170,000). The pilot project achieved an average reduction in thermal energy use of 31%, as well as a 71% reduction in electricity use.

Retrofitting entailed the sealing of inter-panel joints, the restoration of gutters and ebbs, and the replacement of building entrance doors. Lighting was also upgraded to LEDs in the entrances of individual apartments. Additionally, the heating system and hot and cold water supply were modernized by introducing automated heating points and replacing pipes. Awareness raising on the benefits of this retrofitting work was also key to the project's success.

2: FELICITY II in Kokshetau (Began in 2024)

Collaboration between FELICITY II and the *Akimat* of Kokshetau is seeking to deliver energy-efficiency improvements in a residential building of 80 apartments. FELICITY II will develop the project up to the feasibility stage, after which the Kokshetau *Akimat* will finance the retrofitting works through low-interest loans offered to residents. The modernized building is expected to be certified according to the OMIR National Standard of Green Buildings, with cooperation already underway between the project executor and the Kazakhstan Green Building Council (KazGBC) to include the green standard requirements in the design.

Kokshetau aims to replicate this project in 48 surrounding condominiums, which would see a total of 4,800 apartments benefiting from substantial energy-efficiency improvements and providing an example of good practice for Kazakhstan and Central Asia as a whole.

Box 4: Green Mortgages in Kazakhstan

The state-owned Otbasay Bank launched Kazakhstan's first green mortgage in 2023 to accelerate the development of a NZCB market. In this first stage, the bank allocated KZT 10 billion (USD 22.5 million) for this product, targeting individuals seeking to purchase primary housing. With a minimum 20% down payment, the maximum loan amount is KZT 100 million (USD 222,000) with the provision of collateral.

These loans can only be used to purchase properties that meet the OMIR or other widely accepted green standards, such as BREEAM and LEED. The OMIR green standard is a Kazakhstani system for environmental assessment of buildings, developed with the support of construction industry professionals, the World Green Buildings Council, and the UNDP. The OMIR Standard is implemented by the KazGBC, which represents the global green building movement in Kazakhstan. Certification ranges from bronze (minimum 40 points) to platinum (110 points), and projects are assessed against 56 net-zero-aligned criteria, including in relation to energy use to materials, water, and waste.

While renovating Kazakhstan's building stock requires massive public and private investment, this also offers sustainable economic growth opportunities. Currently, government funding for NZCBs falls short at only KZT 10 billion (USD 22.5 million), channeled through the State Thermal Modernization Program (Serikov, 2023). According to the World Bank (2022), to align with net zero, the Government of Kazakhstan needs to make available 0.7% of annual GDP, or USD 1.35 billion per year, accounting for half of the country's predicted transition costs. In this direction, the government approved its first green taxonomy in 2021 (Green Finance Platform, 2021), and by 2023, the country's green finance had reached KZT 150.2 billion (USD 334.4 million) (AIFC, 2023). While NZCBs are part of the green taxonomy, key challenges remain, such as the underdevelopment of a green bonds market specific to the buildings sector. Additionally, the lack of targeted financial products for the private sector, such as sustainability-linked bonds for developers and construction companies, limits the preparation of private projects. The only NZCB financial instrument found at the time of writing was Otbasay's bank green mortgage, as outlined in Box 4.

2.2.2 UZBEKISTAN

The buildings sector will be fundamental to lowering Uzbekistan's emissions intensity by 35% compared to 2010, as outlined in the country's latest NDC. The country's energy intensity continues to be the highest in Central Asia, partly due to low societal awareness about energy-efficiency actions and benefits (World Bank, 2023). The average heat consumption of Uzbekistan's buildings is as high as in Kazakhstan, ranging from 253 kWh/m² in public buildings to 290 kWh/m² in residential buildings. In this context, buildings account for over half the total final energy consumption in the country, with the industry and transport sectors trailing at 22% and 20%, respectively (World Bank, 2022a; JICA, 2023). IEA data shows that residential buildings consume the largest share (39%), while public and commercial buildings account for about 12% (JICA, 2023).

Major disruptions to the energy infrastructure raised the government's prioritization of NZCBs, yet policy responsibilities have not been clearly assigned. Uzbekistan's energy system has proven particularly vulnerable, creating major disruptions to people and the economy. Due to structural lack of maintenance of the energy and buildings' infrastructure, heat and electricity supply disruptions in buildings are common. These were most disruptive in the winter of 2022-2023, when unusually cold weather in Central Asia spurred consumption and brought the utility system to a standstill, leaving tens of thousands of households without heat, electricity, and sometimes water. Following this, renewable energy generation has risen on the government's agenda.

Currently, several ministries and government agencies claim policy responsibility for NZCBs, including the Ministry of Construction and Housing and Communal Services (MoC), the Ministry of Energy (MoE), and the Agency for Strategic Reforms under the President of Uzbekistan. Furthermore, the transition to a net zero economy, for which NZCBs will be key, falls under the Ministry of Economy and Finance (MEF) (World Bank, 2023a). As of August 2023, energy efficiency in residential buildings was the responsibility of the MoC, leaving the mandate for public buildings with the MoE (LexUz, 2023).

Uzbekistan's NZCB policy has so far prioritized renewable energy generation over energy efficiency. In response to the disruption caused by the failure of the country's energy system in 2022-2023, Uzbekistan set ambitious renewable energy generation goals. Buildings legislation put forth in 2023 targeted the installation of renewable energy generation infrastructure on 20,000 public buildings and 765 residential buildings in the country by the end of the year (LexUz, 2023a). It also mandated that all new residential buildings have solar panels on at least 50% of their available roof surface (LexUz, 2023a). Despite the ambitious goal to enhance the country's energy efficiency by 50% by 2030, there has been a significant lag in implementation (LexUz, 2020).

The country's current policy framework and technical capacities fall short of NZCB project preparation needs. Despite introducing the above policies supporting NZCBs in 2023, several issues remain. For instance, on-site renewable energy generation, storage of below 100 kilowatts (kW), and energy-efficiency retrofitting measures receive little incentivization or support (LexUz, 2023a). Most importantly, project implementation is hindered by a structural shortage of key technical capacities, with a lack of urban planners, housing managers, project engineers, architects, designers, energy auditors, and technical supervisors of building projects.

Uzbekistan's NZCB market is underdeveloped, which poses challenges in the preparation of investable projects. To move towards climate neutrality by 2060, the buildings sector needs almost USD 9 billion of investment between 2023-2030 and close to USD 50 billion between 2031 and 2060 (World Bank, 2023). Crucially, 80-95% of this investment needs to be leveraged from private sources (World Bank, 2023). In October 2023, Uzbekistan's government approved its first green taxonomy (UzReport, 2023). Similar to Kazakhstan, the lack of targeted NZCB financing instruments at scale is a key barrier to matching projects with finance. In response to this, in 2020, the MoE created the Intersectoral Energy Saving Fund (IESF). After a slow start attributed to limited operational capacity, the program has gained momentum and is expanding its project portfolio. Several MDBs, including the World Bank, EBRD, and EIB, aim to channel NZCB-aligned loans through the IESF.

3. CHALLENGES TO SCALE NZCBS

We identified six key project preparation challenges impacting the transition to NZCBs in Central Asia. As shown in Table 2.

Table 2: Project preparation challenges to scale NZCBs in Central Asia

Challenge	Description
1. Low awareness of NZCBs and their benefits among public officials and citizens, undermining general interest in projects in this sector.	Low awareness of NZCBs impacts energy consumption practices , as well as attitudes (e.g., resistance) when NZCBs are being considered for development. Citizen involvement and buy-in are key, as residential buildings use the most energy in the building sector. Furthermore, while energy efficiency and renewable energy generation are beginning to be reflected in government policy in Uzbekistan and Kazakhstan (see Section 2), other elements, such as embodied emissions from the entire construction cycle, are not mainstreamed in policy discourse or within civil society. In 2024, a UNECE-led project addressing this will kick off in Kyrgyzstan, Tajikistan, and Uzbekistan.
2. A lack of data on buildings' energy consumption masks their investment needs, as well as potential energy savings.	Data on energy consumption in buildings, including readings from heat, electricity, hot water, and gas meters, is not systematically collected or analyzed over the long term. This crucial information is held by the respective resource-supplying enterprises and tends to be overlooked by local administrations in their decision-making processes. Therefore, Energy consumption data depends on energy audits, a key starting point without which NZCB projects cannot go forward. There is also a lack of capacity in local governments to analyze buildings' energy consumption and to estimate potential savings from energy efficiency and renewable energy measures.
3. Financial disincentives and underdeveloped institutional coordination frameworks for NZCB project preparation.	There are financial disincentives for energy efficiency in buildings in Kazakhstan and Uzbekistan. Residential buildings receive large energy subsidies, while public buildings' energy costs are billed based on floorspace (by square meter) rather than consumption. This means that with a reduction in energy use, public building budgets are automatically cut, removing incentives to shift to NZCBs. There is a lack of institutional coordination on project preparation among national ministries, among cities, and between cities and national governments. In Kazakhstan and Uzbekistan, responsibilities for NZCBs sometimes overlap or are unclear among national ministries, making it challenging for project preparation stakeholders to conduct targeted and coordinated engagement. The centralized nature of national ministries creates silos, making coordination among ministries and between cities and national governments challenging. Additionally, local governments' lack of skilled personnel makes city-level coordination and exchange extremely rare.
4. Limited capacities of local governments to prepare investable projects.	There is little awareness of the project preparation support available among cities and relevant government stakeholders or of how to access it. Cities lack the technical capacities to support the preparation of NZCB projects in both Kazakhstan and Uzbekistan.

<p>5. Institutions providing project preparation support have untapped collaboration potential.</p>	<p>Project preparation processes are long and complex, yet pipeline collaboration between institutions remains limited. For instance, early-stage actors tend to have difficulties in ensuring that project concepts can be developed further and linked to financing, while later-stage actors can struggle to identify project pipelines. The fact that many of these institutions have only recently begun their project preparation support activities in the region presents a significant opportunity for realizing the collaboration potential.</p>
<p>6. Underdeveloped public and private financing instruments dedicated to NZCBs, with limited uptake.</p>	<p>There is a lack of dedicated and operational NZCB financing instruments. While Kazakhstan’s green finance market is more developed than Uzbekistan’s, both countries lack targeted financing instruments for NZCBs. Instruments such as sovereign and municipal bonds, fiscal instruments, and innovative business models such as energy service companies are needed to support NZCB projects. Adding workable financing options would also increase confidence in “full service” project preparation stakeholders who commit significant funding to project preparation.</p>

4. RECOMMENDATIONS

We identified 12 recommendations to address the above challenges and improve the landscape for project preparation for NZCBs in Central Asia, as shown in Table 3. We also identify these recommendations' relevant stakeholder groups, including city networks, PPFs, international and bilateral organizations, MDBs, local NGOs, financing institutions, and universities.

The Central Asia Hub has begun implementing recommendations outlined in this report, starting with a virtual course on NZCB and project preparation. Key partners engaged in the Central Asia Hub began developing a joint virtual self-paced course on NZCB envisioned to help address challenges 1 and 4 identified through this report. Furthermore, it aims to increase the audience of CCFLA members and key regional stakeholders' capacity-building initiatives, connecting to their in-person activities and amplifying their work. The collaborative virtual course model is also poised to strengthen collaboration and partnerships across Central Asia Hub partners, ultimately boosting project preparation and investment in NZCB.

Table 3: Challenges and recommendations to support project preparation for NZCBs in Central Asia

Challenges	Recommendations
<p>1. Limited awareness of NZCBs and their benefits undermines interest in such projects.</p>	<p>A. Raise awareness of NZCBs' potential to tackle the climate and other crises in the region (e.g., air quality and energy security) by enhancing existing awareness campaigns and in-person trainings by combining efforts of different organizations and using multiple communications channels.</p> <p><i>Key stakeholders: City networks, PPFs, international organizations, NGOs, and universities.</i></p>
<p>2. Lack of data on buildings' energy consumption, masking their investment needs.</p>	<p>B. Provide technical assistance (TA) to cities to support data collection and analysis in the buildings sector by training ministries/national agencies with building mandates, local governments, and other city-related actors (e.g., local public agencies and NGOs) in data collection and analysis.</p> <p><i>Key stakeholders: City networks, PPFs, international organizations, NGOs, and universities.</i></p>

Challenges	Recommendations
<p>3. Financial disincentives and underdeveloped institutional coordination frameworks for NZCB project preparation.</p>	<p>Mainstream NZCB approaches in legal frameworks and key national and local processes by:</p> <p>C. Presenting opportunities to enhance national policies and regulations to government decision-makers. Action areas may include 1) energy-efficiency policy incentives such as reforms to budget codes for public buildings or energy subsidy structures for residential buildings; 2) building standards; 3) buildings energy classification/typology; 4) energy audit concepts; and 5) thermal heat meter policies and methodologies.</p> <p>D. Providing TA to help governments incorporate realistic NZCB targets in their framework documents (e.g., NDCs, national climate action plans, decarbonization strategies for national government; and local climate action plans and master plans for local government) and budget tagging mechanisms.</p> <p><i>Key stakeholders: International organizations, NGOs, and city networks.</i></p> <p>E. Improving coordination between national and local governments by developing frameworks for coordination between different levels of government (vertical) and across cities or departments (horizontal) to drive regulatory change for NZCBs. This could take the form of a steering committee or task force.</p> <p><i>Key stakeholders: PPFs, international organizations, NGOs.</i></p> <p>F. Facilitating knowledge exchange between countries by developing an international framework to support knowledge exchange and dissemination between governments and institutions pursuing NZCBs in Central Asian countries. This could take the form of an international task force.</p> <p><i>Key stakeholders: PPFs, international organizations, NGOs.</i></p>
<p>4. Limited capacities of local governments to prepare investable projects.</p>	<p>G. Increase project preparation support to local and national governments and national agencies with building mandates to help them identify priorities and develop their projects from ideas to financial closure. In this process, leverage national and local policies and, when possible, provide platforms for exchange between local government and civil society on project ideas.</p> <p><i>Key stakeholders: City networks, PPFs, international organizations, NGOs.</i></p> <p>H. Enhance dissemination of project preparation support available to cities by increasing outreach (e.g. events, workshops, and in-person and virtual training) on available project preparation support and case studies, targeted at local governments and ministries, as well as national agencies with buildings mandates.</p> <p><i>Key stakeholders: City networks, PPFs, international organizations, NGOs, universities.</i></p>

Challenges	Recommendations
<p>5. Institutions providing project preparation support have untapped collaboration potential.</p>	<p>Enhance collaboration between stakeholders providing project preparation support services in the same countries and cities by:</p> <ul style="list-style-type: none"> I. Developing partnerships aiming to explore joint project pipeline synergies between stakeholders. Trust and transparency are essential in this process, which may also benefit from regular meetings for coordination and collaboration. Examples include donor coordination platforms through national ministries. J. Combining common efforts made by institutions providing project preparation support in the same geographies. For instance, institutions can join forces to raise awareness, as well as for in-person and virtual capacity-building trainings and events. <p><i>Key stakeholders: City networks, PPFs, and international organizations.</i></p>
<p>6. Public and private financing instruments dedicated to NZCBs are underdeveloped and have limited uptake</p>	<p>K. Support the scaling up of financing mechanisms offered by public and private institutions by helping to develop innovative financial instruments for NZCBs. Examples include sovereign and municipal bonds, fiscal instruments, blended financing, and energy service company operating models. In this process, it may be necessary to train local financial institutions.</p> <p><i>Key stakeholders: PPFs, international organizations, MDBs, and local financing institutions</i></p> <ul style="list-style-type: none"> L. Train local governments and ministries/national agencies with buildings mandates to better leverage public procurement powers to finance NZCB projects. <p><i>Key stakeholders: City networks, PPFs, international organizations, MDBs, and local financing institutions.</i></p>

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ANNEX

Table I: Current net zero carbon buildings project preparation activities in Central Asia

Organization / initiative	Timeline	Country focus	Activities
Global Covenant of Mayors (GCoM)	2022-2025	Kazakhstan, Uzbekistan, Kyrgyzstan	Support for 16 cities to develop Climate Action Plans, with the buildings sector playing a central role in emissions reduction. Supporting the development of one pre-feasibility climate project per city, bundled at the country level. In 2023, energy efficiency and renewable energy generation in buildings were chosen as priority sectors for pre-feasibility studies in Uzbekistan and Kyrgyzstan.
City Climate Finance Gap Fund (Gap Fund): World Bank and EIB	Open-ended	Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan	Support for NZCB projects in cities through data collection, target and commitment setting, analysis, scenario building and reporting, development of action plans to integrate green construction into urban policies, capacity development, cost-benefit analysis of green and energy-efficient buildings construction, project definition, energy-efficiency certification development, and energy audits.
Deutsche Energie Agentur (DENA)	Open-ended	Kazakhstan, Uzbekistan	Development of a pre-feasibility study for energy-efficiency improvements in Nukus, Karakalpakstan, Uzbekistan.
Financing Energy for Low Carbon Investment – Cities Advisory Facility Central Asia (FELICITY II); GIZ and the EIB.	2022-2026	Kazakhstan, Uzbekistan	Support for national and local governments along the entire project development cycle, addressing institutional and financial barriers for energy-efficiency finance, working along three axes: <ul style="list-style-type: none"> 1) Improving country policy and capacity: Supporting national-level sectoral strategies and plans, updating building and budget codes, and municipal infrastructure planning documents. 2) Project pipelining & capacity building and project feasibility & preparation: Project selection criteria & identification, strengthening capacities of project promoters (e.g., planning, prioritizing), technical, economic, social, and legal feasibility studies. 3) Financing & investment: Defining viable financing schemes, strengthening financial intermediaries, and supporting loan and grant applications.

Organization / initiative	Timeline	Country focus	Activities
Cities Development Initiative for Asia (CDIA)	Open-ended	Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan	Support for urban development plans, financial schemes, and solutions for energy-efficiency projects through the entire project development value chain.
UN Development Program (UNDP) & Global Environment Facility (GEF)	Open-ended	Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan	Joint support for urban development plans, financing schemes, and solutions for energy-efficiency projects through the entire project development value chain. Successfully developed and tested a financial de-risking mechanism for subsidizing and guaranteeing energy-efficiency projects and installing renewable energy in buildings.
Japan International Cooperation Agency (JICA)	Open-ended	Uzbekistan, Kazakhstan	Delivery of a technical support grant for energy efficiency in buildings in Kazakhstan. ⁵
Clean Energy in Buildings in Uzbekistan (CEBU): World Bank	Open-ended	Uzbekistan	The program includes technical assistance (TA) and a USD 143 million loan for energy efficiency in public buildings in Uzbekistan, and has completed mapping and prioritization of 600 public buildings projects in the country. It is part of wider proposed funding envelope of up to USD 2 billion, which supports energy efficiency across four pillars (public sector, residential sector, industry, and district heating).
Kreditanstalt für Wiederaufbau (KfW)	Open-ended	Uzbekistan	TA for energy efficiency in public buildings in Uzbekistan.
Agence Française du Développement (AFD)	Open-ended	Uzbekistan	Supporting energy tariff reform, raising awareness on heating biomass and GHG emissions monitoring, and technical and financial assistance for energy efficiency in buildings.
Supporting Development of Green Housing Finance: Asian Development Bank (ADB)	2022-2024	Kazakhstan	TA to the Government of Kazakhstan through the Kazakhstan Housing Company. It aims to boost understanding and policy guidance for selecting appropriate green technologies in housing, improve capacity to assess their financial feasibility and share knowledge on integrating green features into urban housing projects. This capacity building will aid KHC in promoting green construction and sustainable mortgage finance. The TA aims to assist the country in climate mitigation and is part of a broader strategy to leverage emission reductions for supporting green technology adoption across sectors.
Green Cities: European Bank for Reconstruction and Development Green Cities (EBRD)	Open-ended	Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan	Support for cities to develop Green City Action Plans, which include a set of priority project investment fiches, including for the buildings sector; building capacity of city administrators and key stakeholders; facilitating and stimulating infrastructure investments; and supporting access to green finance.

⁵ JICA undertook an appraisal mission to Kazakhstan in January 2024 and will finalize the details of its technical support grant by the end of 2024.

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