United Nations ECE/ ECE/HBP/2023/Inf. 2

Economic and Social Council

Distr.: General
6 September 2023

Original: English

Economic Commission for Europe

Committee on Urban Development, Housing and Land Management

Eighty-fourth session
Geneva, 4-6 October 2022
Item 6 (b) of the provisional agenda
Review of the implementation of the programmes of work 2022 and 2023: Implementation of the United for Smart Sustainable Cities initiative

Smart Sustainable Cities Profile: Almaty

Note by the Secretariat

Summary

This document includes the Smart Sustainable City Profile of Almaty developed at the request of the city government of Almaty and supported with funds from the United Nations Development Account (UNDA) 12th tranche project "Smart Sustainable Cities for the 2030 Agenda for Sustainable Development and the New Urban Agenda in the UNECE Region".

The Committee is invited to welcome the draft of the Smart Sustainable City Profile of Almaty and approve it as an official publication in digital and print formats.

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

SMART SUSTAINABLE CITY PROFILE

ALMATY, KAZAKHSTAN

Draft

September 2023

Geneva, Switzerland

Preface

This Smart Sustainable City Profile of Almaty was developed upon the request of the Almaty City Government with funds from the United Nations Development Account (UNDA) 12th tranche regional project "Smart Sustainable Cities for the 2030 Agenda for Sustainable Development and the New Urban Agenda in the UNECE Region". The project is aimed at supporting selected beneficiary cities transition towards smart and sustainable development to accelerate the implementation of Sustainable Development Goal (SDG) 11 ((sustainable cities and communities) and other urban-related SDGs.

The Housing and Land Management Unit of the UNECE Division of Forests, Land and Housing led development of the City Profile in collaboration with the city government of the Municipality of Almaty (Almaty City Government) and the Government of Kazakhstan. The Profile provides the outcomes of the city evaluation against the Key Performance Indicators (KPIs) for Smart Sustainable Cities (SSC) and provides action-oriented recommendations for the consideration of the City Government (Akimat in Kazakh) of Almaty and the Government of Kazakhstan.

The KPIs for SSC is a public and freely available standard developed by the United Nations Economic Commission for Europe (UNECE) and the International Telecommunication Union (ITU) under the United for Smart Sustainable Cities (U4SSC) initiative. U4SSC is co-ordinated by UNECE, ITU and the United Nations Human Settlements Programme (UN-Habitat) and supported by 14 other United Nations agencies.[1]

[1] For up-to-date information on cities under KPI evaluation by UNECE, see at: https://unece.org/housing/sustainable-smart-cities#:~:text=A%20smart%20sustainable%20city%20is,as%20well%20as%20cultural%20aspects.

Acknowledgements

The United Nations Economic Commission for Europe (UNECE) wishes to acknowledge the following people for their contributions to the completion of this study:

UNECE secretariat

Paola Deda, Director, Forests, Land and Housing Division, UNECE

Gulnara Roll, Secretary to the Committee on Urban Development Housing and Land Management, UNECE (Project Manager)

Talaibek Makeev, Regional Adviser, Forests, Land and Housing Division, UNECE (Reviewer)

Mia Alibegovic – Associate Expert in Economic Affairs, UNECE (Contribution to chapters)

Cecilia Batac – Statistics Assistant, UNECE (Editor).

UNECE consultants

Anthony Salazar – Consultant, UNECE (Analysis of KPI indicators, Contribution to chapters)

Felix Schöneich – Consultant, UNECE (Contribution to chapters)

The UNECE secretariat would like to express its gratitude to the following persons for providing data and information used in this city profile:

Ms. Zulfira Zukrina	Local expert consultant	Expert for Central Asia, Centre for Sustainable Consumption and Production, SWITCH-Asia Programme, Almaty, Kazakhstan
Ms. Faima Urazayeva	Associate local expert	Associate Expert, Centre for Sustainable Consumption and Production, SWITCH-Asia Programme, Almaty, Kazakhstan
Mr. Matteo Tarantino	Key performance indicators visualization	Assistant Professor, Catholic University of the Sacred Heart, Milano, Italy Senior Expert, Centre of Excellence on Smart Sustainable Cities and Sustainable Urban Development, University of Geneva, Switzerland

Table of Contents

Acronyms and abbreviations

AA	Association Agreement
ADB	Asian Development Bank
CAREC	Central Regional Economic Cooperation Program
CDIA	Cities Development Initiative for Asia
CHP	combined heat and power
CNG	compressed natural gas
DCFTA	Deep and Comprehensive Free Trade Area
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EU	European Union
EUR	euro
FDI	foreign direct investment
GCAP	Green City Action Plan
GDP	gross domestic product
GFDRR	Global Framework for Disaster Risk Reduction
GIZ	German Corporation for International Cooperation
ICT	Information and communications technology
IPCC	Intergovernmental Panel on Climate Change
IMF	International Monetary Fund
ITDP	Institute for Transportation and Development Policy
ITU	International Telecommunications Union
KPIs	Key Performance Indicators
KZT	Kazakhstani tenge
LEPL	Legal Entity of Public Law
LUMP	Land Use Master Plan
MSW	municipal solid waste
MSMEs	micro and small and medium-sized enterprises
NAPR	National Agency of Public Registry
PPP	purchasing power parity
SDR	Special Drawing Rights

SDGs	Sustainable Development Goals
SMEs	Small and medium-sized enterprises
SSC	Smart Sustainable Cities
SUDA	Spatial and Urban Development Agency
tCO2eq	tons of CO2 equivalent
TUDA	Transport and Urban Development Agency
USD	United States Dollars
USSR	Union of Soviet Socialistic Republic
VAT	value-added tax

Executive summary

Almaty is a vibrant metropolitan city. It serves as a significant hub for business, economy, culture and education both in Kazakhstan and Central Asia. It has set its sights on a vision of becoming one of the leading smart and sustainable cities in the UNECE region and beyond. Since gaining independence, Almaty, alongside the nation's capital, Astana, has experienced tremendous growth, paving the way for significant progress in realizing the Sustainable Development Goals of the 2030 Agenda for Sustainable Development.

The Smart Sustainable City Profile of Almaty, which was developed between 2021 and 2023 at the request of the Almaty City Government, is an essential tool to achieving the SDGs. It is based on an evaluation that uses the Key Performance Indicators (KPIs) for Smart Sustainable Cities (SSC), which is a public and freely available standard developed by the United Nations Economic Commission for Europe (UNECE) and the International Telecommunication Union (ITU) under the United for Smart Sustainable Cities (U4SSC) initiative.

The results of the evaluation indicate the following:

- Strong performance in the ICT Infrastructure, Health, Environmental Quality, Public Space and Nature and Public Sector Governance areas
- Moderate to high performance in Education, Housing, Water and Sanitation
- Moderate performance in Social Inclusion, Safety, Culture, Waste, Transport and Employment
- Low performance in Innovation, Electricity Supply, Buildings (excessive heat consumption and no energy efficiency certification), Air Quality and Energy.

The analysis of the national and city-specific policy and institutional setup that support urban development in Almaty suggests that upscaling progress across the social, economic and environmental pillars of sustainable development requires targeted interventions in the following areas:

- Urban mobility
- Housing and buildings refurbishment
- Utilities sector
- Waste management
- Air quality management.

Successful implementation of these targeted interventions will require improvement in the:

- Overall urban policy and governance framework
- National quality system underpinning construction and urban infrastructure
- National and local monitoring and evaluation framework.

The Smart Sustainable City Profile offers practical recommendations for upscaling efforts to make the city smart and sustainable. The recommendations were developed in consultation with local and national authorities and will inform the work of UNECE in supporting Almaty's ambitious vision. The Almaty City Profile recommendations suggest short-term measures and mid to long-term solutions to help achieve sustainable development in the city.

1. Introduction

Almaty was the capital of Kazakhstan for almost seven decades, from 1929 to 1997. It is the largest city in Kazakhstan and remains the major commercial and cultural centre. Over one-third of all higher education institutions are located in Almaty. The city has ambitious plans to strengthen its position as a major socio-economic hub in Kazakhstan by transitioning into a smart and sustainable city.

Despite the positive economic and demographic conditions, the city still faces several challenges. Air quality and pollutant emissions remain a significant concern, with official government sources differing from independent assessments. Additionally, renewable energy sources and electricity consumption pose serious challenges for the city.

This City Profile aims to help the local and national government bodies of Almaty realize its vision of becoming a smart sustainable city. It was prepared at the request of the city government and based its analysis on the results of an evaluation using the United Nations Economic Commission for Europe (UNECE) Key Performance Indicators (KPIs) for Smart Sustainable Cities (SSC)[2] and a desk review of local and national urban development plans and initiatives. This was followed by face-to-face and online interviews with local and national government officials, as well as experts, to gain insights into the city's immediate and strategic, long-term development challenges and priority needs. This City Profile was developed from mid-2021 to late 2022, in close consultation with the city government of Almaty (Akimat) and the Government of Kazakhstan.

The KPIs for SSC consist of 112 quantifiable performance measurements for evaluating cities against a common set of benchmarks of excellence that can be used to track progress towards the achievement of the Sustainable Development Goals (SDGs). The indicators cover the economic, social and environmental dimensions of the 2030 Agenda for Sustainable Development (2030 Agenda), with information and communications technology (ICT) integrated as a cross-cutting "means of implementation". [3]

The emphasis therefore is on supporting city leaders to use ICT for improving the quality of life of all inhabitants and bolstering their cities' overall competitiveness in a manner that is consistent with the 2030 Agenda principle of policy coherence. Thus, KPIs provide city leaders with a consistent and standardised method for collecting data and measuring performance, as well as a practical reference framework for an integrated, indivisible and balanced treatment of the SDGs.

---

[2] The KPIs were developed jointly by UNECE and the International Telecommunication Union (ITU) and have been used in over 150 cities across the globe. The indicators were endorsed by the UNECE Committee on Urban Development, Housing and Land Management in 2016 (ECE/HBP/2016/4) to form the basis for the United for Smart Sustainable Cities (U4SSC) initiative. The U4SSC initiative brings together sixteen United Nations agencies and supports the evaluation of the performance of cities using the KPIs for SSC and the implementation of SSC solutions through the development of guidelines, studies, city action plans and capacity-building events (https://u4ssc.itu.int/). The KPIs are detailed in the Collection Methodology for Key Performance Indicators for Smart Sustainable Cities (https://unece.org/housing-and-land-management/publications/collection-methodology-key-performance-indicators-smart).

[3] Established under SDG 17 "Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development", "means of implementation" is to be understood as "the interdependent mix of financial resources, technology development and transfer, capacity-building, inclusive and equitable globalization and trade, regional integration, as well as the creation of a national enabling environment required to implement the new sustainable development agenda, particularly in developing countries". For further details, see UN DESA, Technical Support Team brief (https://sustainabledevelopment.un.org/content/documents/2079Issues%20Brief%20Means%20of%20Implementation%20Final_TST_141013.pdf).

This City Profile is organized into six chapters. The introduction gives an insight on the preparation of this Profile, chapter II provides an overview of the salient features of Almaty, including its topology, urbanization patterns and climate change challenges, and chapter III presents the socio-economic impact of the COVID-19 pandemic at the national and local levels. The institutional and financial framework underpinning the city's urban development along with its development priorities set the context for the analysis in chapter IV. Chapter V analyses the results of the evaluation of performance of Almaty against the KPIs for SSC backed up by evidence highlighting remaining challenges and efforts toward smart, sustainable urbanism. Based on the information gathered from each chapter, action-oriented recommendations were developed, and these are contained in chapter VI.

2. General overview

Location, topography and hydrography

Almaty is the largest and most populous city of Kazakhstan. It has a favourable geographic location and a highly developed economy and is well-connected to major transport arteries.

One of the city's notable features is its location in a valley in the south-eastern part of the country, nestled in the foothills of Zailisky Alatau mountain range. The city's southern and eastern suburbs climb up these hills and mountains slopes, offering breath-taking views of the surroundings. Pik Talgar (4,979 meters), a northern peak in the Tian-Shian mountain range, is only 30 km away.

Almaty is home to a wealth of freshwater resources, woods, natural areas and recreational facilities. In the surrounding area, there are four man-made reservoirs and 22 rivers. The Almaty region also has large resources of groundwater suitable for drinking, agricultural and industrial use, making it an important resource for the region. Almaty City has two main rivers, the Large and Small Almatinka, which are fed by glacier water. During the summer months, the glacier water provides a natural source of cooling and drinking water, as well as an irrigation source that is much needed when temperatures soar beyond 30°C for several days. In winter months, average temperatures reach a low of - 8°C, characteristic of a typical continental climate. [4]

However, the city still faces certain challenges. Some of the largest contaminated areas and territories can be found in the Almaty Oblast, characterized by high water salinity, hardness of water and concentrations of sulphates and chlorides.[5]

Moreover, the mountains that provide the city with its beautiful panorama can also cause temperature inversions in the city, keeping air masses idle. This, combined with high emissions of air pollutants from traffic and industry, results in poor ambient air quality, especially over the wintertime, with its negative health effects. The situation has been worsened by the construction of high-rise structures, which is an ongoing urbanization trend in the city. [6]

Furthermore, the city is located on the mountainous active tectonic plate of Zailisky Alatau, making it prone to seismic activity.[7] Over the last century and a half, Almaty has experienced numerous earthquakes, some of which have caused significant damage, such as the 1887 earthquake. The high seismicity, with earthquakes of up to a magnitude of 7.3, poses a significant risk of violent ground movements within the city limits. Mudflows and landslides, along with their cascade impacts, are additional concerns due to the rough topography and the substantial loess deposits under the expanding city's perimeter. In the 1887 earthquake, steep loess hills saw severe landslides.[8] And due to ongoing urban expansion, those hills now pose a serious concern to urban structures built on or by

[4] Almaty City Akimat. Shifting Paradigms, *Circular Economy Opportunities in Almaty, a metabolic approach to define a resource efficient and low-carbon future for the city*, May 2019. Available at https://shiftingparadigms.nl/wp-content/uploads/2019/02/Circular-Economy-opportunities-in-Almaty-Web-spread-20190627-1.pdf.

[5] United Nations Economic Commission for Europe. *Kazakhstan, Environmental Performance Reviews*, Third Review. (2019). Available at https://unece.org/sites/default/files/2021-08/ECE_CEP_185_Eng_0.pdf.

[6] Lars Carlsen and others. *Assessment of the Air Quality of Almaty. Focusing on the Traffic Component*, 2013. In: International Journal of Biology and Chemistry, 5, №1, 49, 2013.

[7] Christofer Grützner and others. *Active Tectonics Around Almaty and along the Zailisky Alatau Rangefront*, 2017. In: Tectonics 36 (10), P. 2192-2226. Available at http://dx.doi.org/10.17863/CAM.15800.

[8] Ivan Mushketov. Le tremblement de terre de Verny, 28 Mai (9 Juin) 1887. Memoires du Comite Geologique, X(1), 65; Tatevossian, R. E. (2007). The Verny, 1887, earthquake in Central Asia: Application of the INQUA scale, based on coseismic environmental effects. Quaternary International (1890). 173, 23–29.

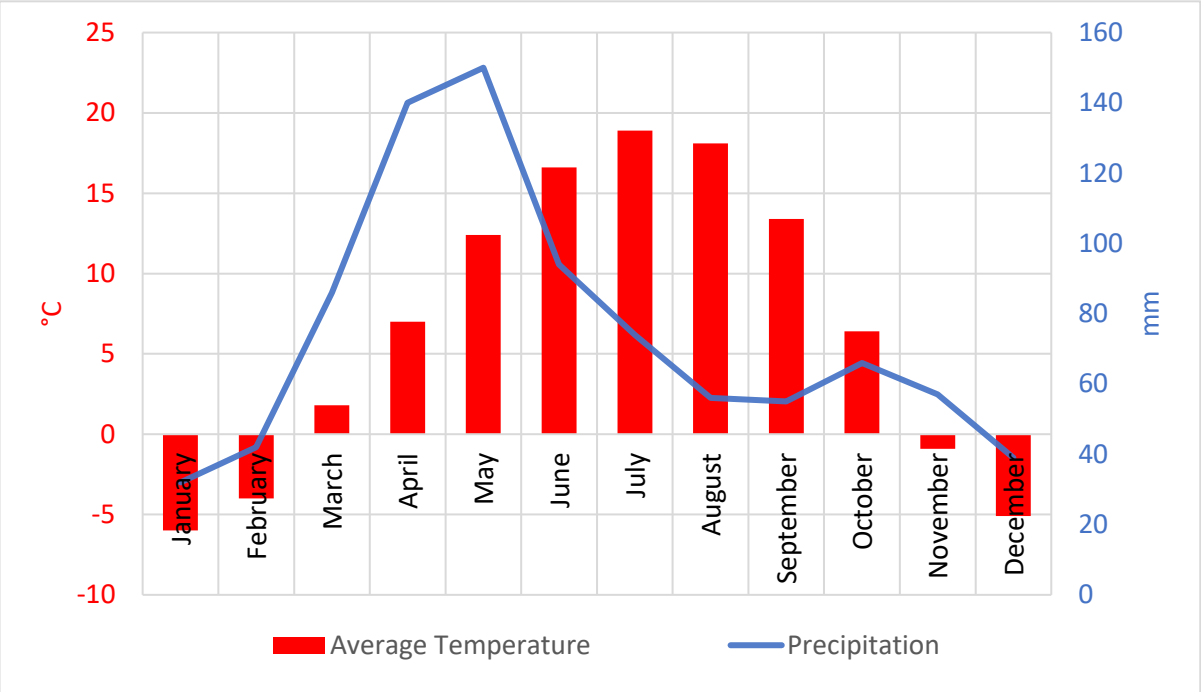
them. A powerful earthquake beneath Almaty will potentially cause numerous slope failures and impact densely populated areas. Damage could interrupt utilities and vital lifelines, obstruct roadways, and harm vital built infrastructure.[9]

Climate change impacts

The landscape of Kazakhstan is mostly comprised of lowlands and low mountains, which account for one third and one fifth of the country's area, respectively. With the exception of the Caspian Sea, there are no other large bodies of water or oceans in close proximity to the country. This leads to a continental climate, with long, hot summers and cold winters. The national average temperatures range from -12°C in the winter months up to 23°C in June, July and August. The average annual precipitation is low and ranges from 14mm to 30mm.[10] In Almaty, the average temperatures vary from -6°C in winter to 18.9°C in summer, with an average annual temperature of 6.5°C. Precipitation in Almaty reaches its peak in May (150mm) and its low in January (32mm) (see figure 1).

Climate data for Kazakhstan indicates that average temperatures have increased over the 20th century, particularly since the 1980s. From 1997-2010, temperatures were about 0.3-1.4°C higher compared to the baseline period from 1971-2000. On average, temperatures increased by 0.28°C per decade between 1941 and 2011. Although precipitation trends are not as clear as temperature changes, climate changes can be observed across the entire country.[11] Due to its location in the southern region of the country, Almaty experiences less extreme temperatures, with less cold winters and slightly warmer summer months.

Figure 1 **Average temperature and precipitation in Almaty, 1991-2021**



Source: Climate-data, 2023.

[9] Grützner et al.

[10] World Bank Climate Risk Country Profile: Kazakhstan (2021). Available at: https://climateknowledgeportal.worldbank.org/sites/default/files/2021-06/15834-WB_Kazakhstan%20Country%20Profile-WEB.pdf.

[11] World Bank Climate Risk Country Profile: Kazakhstan (2021).

According to temperature projections for the periods 2040-2059 and 2080-2099 using RCP emissions pathways RCP2.6 and RCP8.5 against the reference period of 1986-2005, Kazakhstan can expect a rise in average daily temperatures ranging from 1.7°C (RCP2.6) to 2.8°C (RCP8.5) and from 1.6°C (RCP2.6)to 5.8°C (RCP8.5), respectively. The latter scenario (under RCP8.5) suggests that temperatures in Kazakhstan could rise faster than the projected global average increase of 3.7°C and averages in most other Asian countries. General Circulation Models (GCM) projections show future increases in average annual precipitation. However, estimations show considerable difference between models in the direction and magnitude of change.[12]

It is clear that Almaty Oblast is already vulnerable to a range of natural hazards that are expected to be made worse by climate change. This includes riverine flooding, ice jams, and extreme weather events that can negatively impact agriculture and power systems. Due to its geographical location, Almaty Oblast is already vulnerable to a range of natural hazards that are expected to be made worse by climate change. This include riverine flooding which rose by 35 per cent between 1991 and 2015, ice jams which grew three times in the same period, droughts, floods, avalanches, landslides and extreme weather events that can negatively impact agriculture and power systems. Almaty Oblast has the highest frequency of extreme weather events, such as heavy rains, strong winds, heavy snow and blizzard, in Kazakhstan.[13]

In Almaty Oblast, riverine flooding rose by 35 per cent between 1991 and 2015. The number of ice jams nationwide grew three times between 1991 and 2015, while their frequency increased by 33 per cent in the Almaty region.[14]

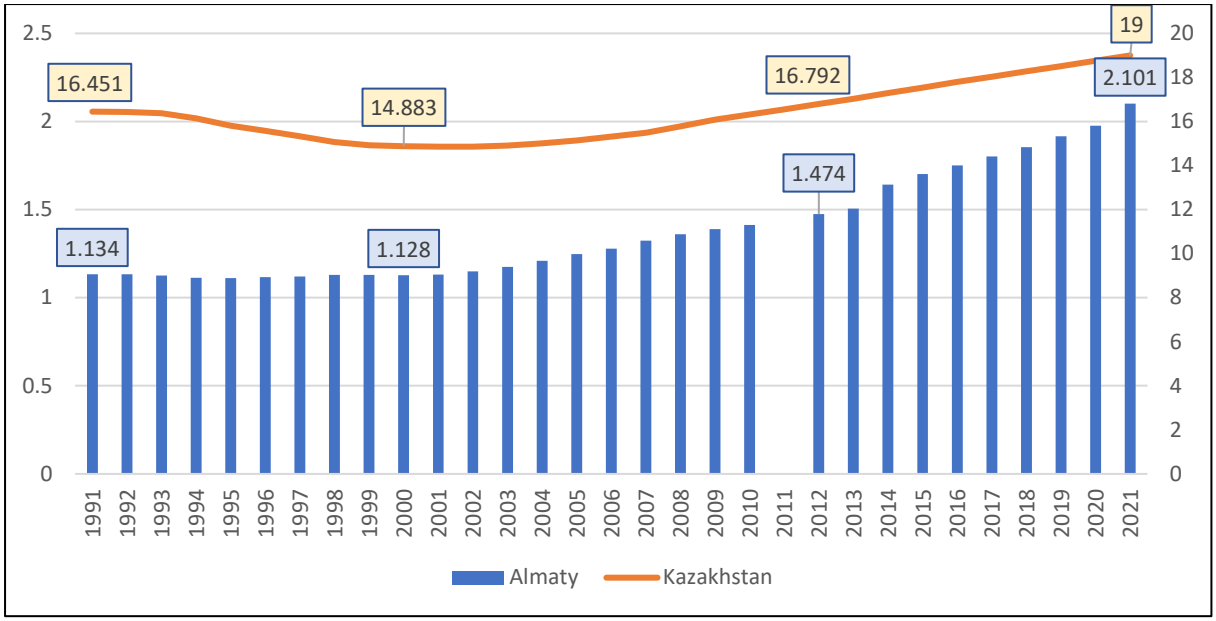
The incident in 2015 is a clear example of the increased risk of climate change-related natural disasters in the city. In July 2015, a glacial lake overflowed, causing the Kargalinka River to overflow and send flood water and mud flowing towards Almaty.[15]

Urbanization trends

In the past two decades, Almaty has experienced significant growth. The city almost doubled in size, from covering an area of 33,300 hectares in 2001 to 68,000 hectares in 2021.[16] The population of Almaty has also increased from 1.13 million in 2001 to 2.1 million in 2021, an 85% increase, which is remarkable compared to the country's 28 per cent population growth during the same period (see figure 2). Over the last six years (2016-2022), the population of Almaty has grown by an average of 68,416 people per year. [17]

Figure 2 **Population growth of Kazakhstan and Almaty, by year, 1991-2022**
(Millions)

[12] World Bank, Climate Risk Country Profile: Kazakhstan (2021)
[13] United Nations Economic Commission for Europe, Environmental Performance Reviews. Kazakhstan, Third Review (2019) . Available at https://unece.org/sites/default/files/2021-08/ECE_CEP_185_Eng_0.pdf.
[14] United Nations Framework Convention on Climate Change, Seventh National Communication and third Biennial report of Kazakhstan to the UN Framework Convention on Climate Change (2017).
[15] United Nations Environment Programme, Outlook on Climate Change Adaptation in the Central Asian Mountains (2017). Available at https://gridarendal-website-live.s3.amazonaws.com/production/documents/:s_document/339/original/CentralAsia_screen.pdf?1496827676.
[16] Almaty City Akimat. Almaty city development program until 2025 and the medium-term outlook until 2030.
[17]Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics "Dynamics of main socio-economic indicators" (2023). Available at: https://stat.gov.kz/region/268020/dynamic.



Source: Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics; World Bank.

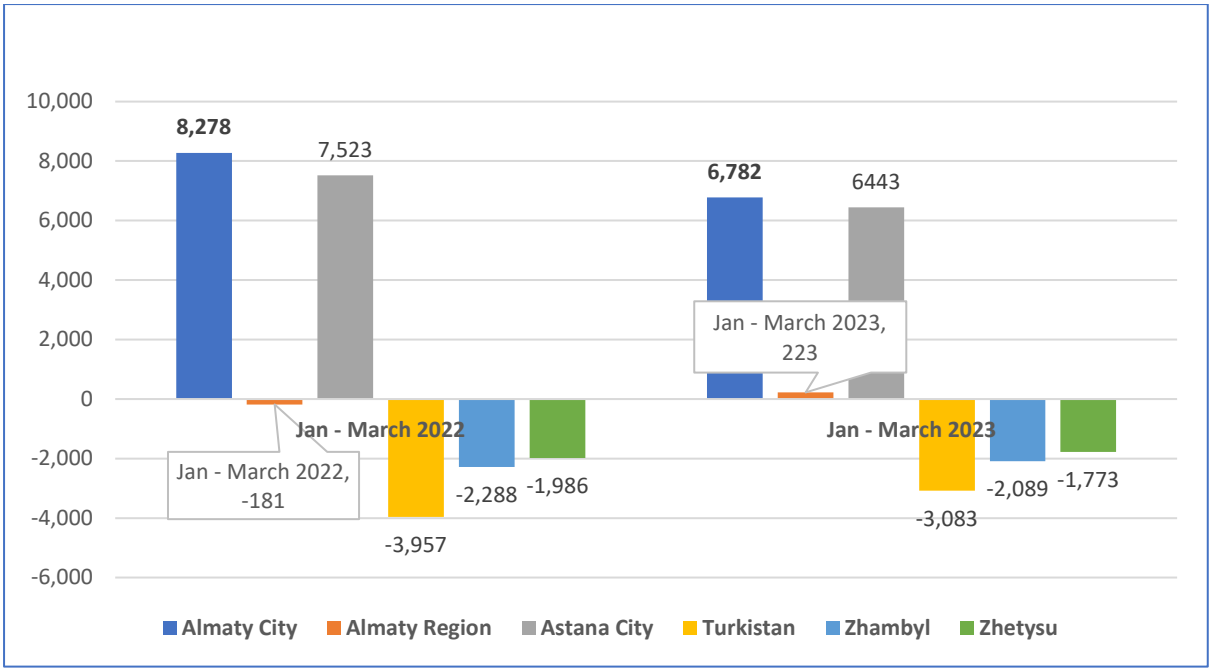
Between 2012 and 2021, almost 600,000 people migrated to Almaty to settle permanently and only 315,000 people left Almaty, resulting in a net positive migration balance of 285,000 people. The majority of newcomers are of working age (88.5 per cent in 2021) and the share of newcomers with higher education has increased significantly from 30.4 per cent in 2011 to 61.4 per cent in 2021.[18]

If the current pace of population increase continues, the population of Almaty is expected to exceed 3 million people by 2030, which will create new challenges for urban planning. At present, only the city centre is being developed in line with the population growth, which contains around 70 per cent of the social infrastructure of Almaty.[19]

In Kazakhstan, there are cities like Almaty and Astana that experience high positive rates of net internal and transnational migration. However, there are also southern regions such as Turkistan and Zhambyl that experience large negative migration rates and are traditionally seen as a source of internal migrants.[20]

Figure 3 **Net internal migration in Kazakhstan, by region, January to March 2022 and 2023**

[18] Almaty City Akimat. Almaty city development program until 2025 and the medium-term outlook until 2030.
[19] Almaty City Akimat. The Comprehensive Plan "New Almaty" for 2020 – 2024.
[20] Aidan Islyami, *Internal Migration in the Countries of Asia*, 2020. Available at https://link.springer.com/chapter/10.1007/978-3-030-44010-7_18.



Source: Bureau of National Statistics, Agency for Strategic Planning and Reforms of Kazakhstan.

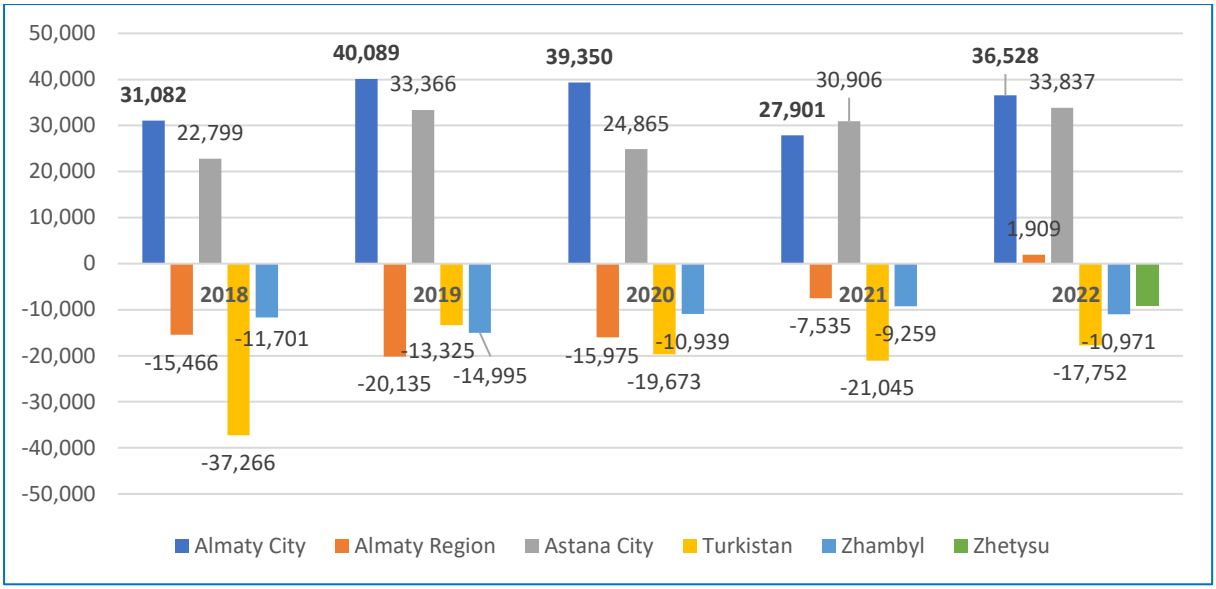
The oil and mineral resource sectors have been a driving force behind internal migration, particularly since 2000. Although the labour demand in the oil industry may not be very high, the economic benefits from its boom have led to increased construction activity and other related activities in the city.

Despite urbanization being one of the main pillars of the national development strategy of Kazakhstan for 2050, the rapid growth of Almaty has had significant impact on both housing prices and demographics.[21] Real estate prices have more than quadrupled between 2001 and 2016, which has made it difficult for many people to afford to live in the city. In the past six years alone (until 2020), the number of apartment buildings in Almaty has increased by 13 per cent, while the number of individual housing construction projects more than doubled.[22]

Figure 4 **Net migration in Kazakhstan, by region, 2018-2022**

[21] World Bank, Urbanization in Kazakhstan – Desirable cities, Unaffordable Housing and the Missing Rental Market(2018). Available at https://openknowledge.worldbank.org/server/api/core/bitstreams/414f85ef-1b5e-5374-b230-3e7d74f60620/content.

[22] The Government of Kazakhstan. Decree of the of 31 January 2020 No. 23, "On the Approval of the Comprehensive Plan "New Almaty" for 2020 – 2024." 2020. Available at: https://adilet.zan.kz/rus/docs/P2000000023.



Source: Bureau of National Statistics – Agency for Strategic Planning and Reforms of Kazakhstan.

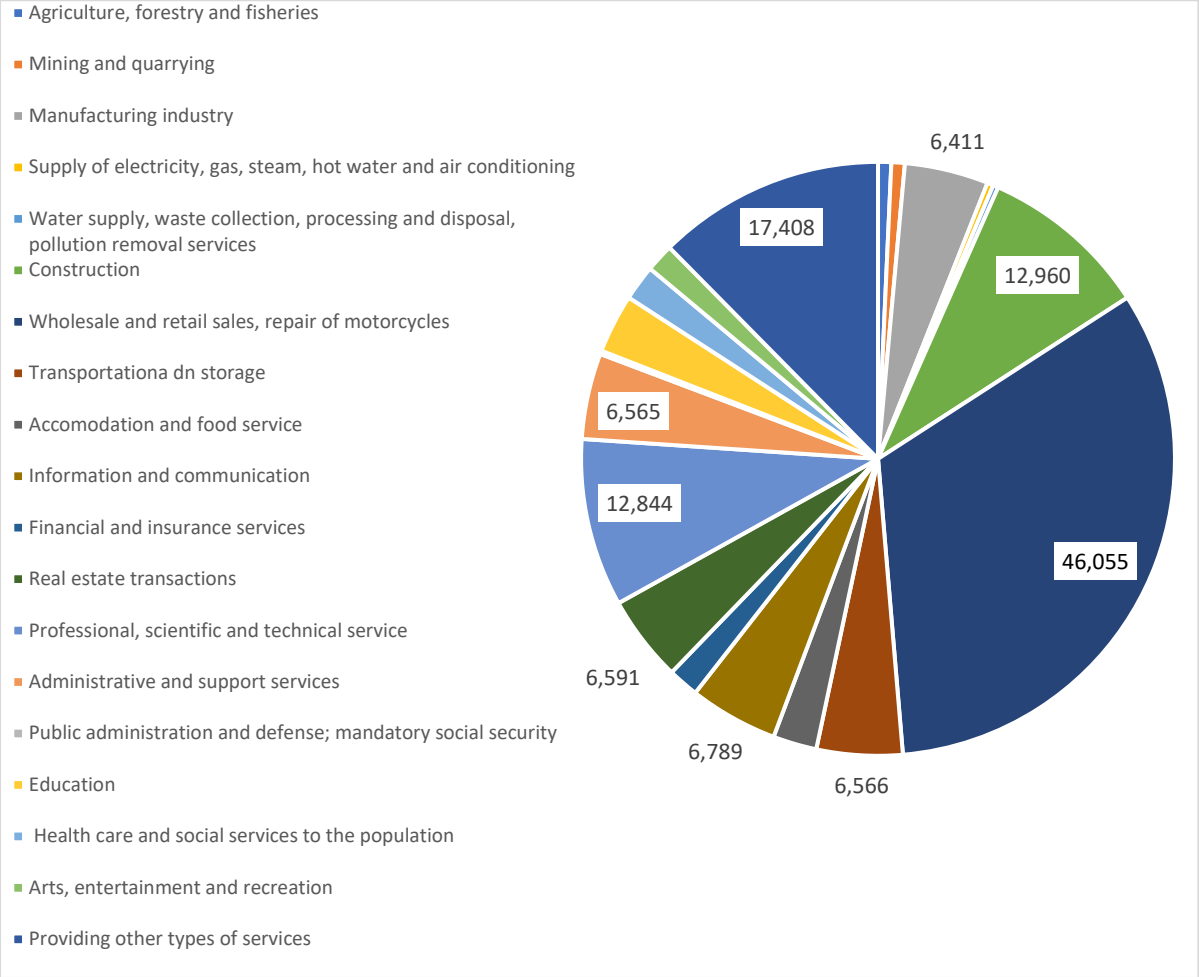
Urban economic profile

In the years following independence, Almaty experienced remarkable economic growth, with a shift towards a service-oriented economy. As the country's largest economic centre and a major hub for industrial development and trade, it ranks second in terms of gross regional product (GRP).[23] While Kazakh exports are heavily reliant on oil and related products, Almaty does not have this resource base.

Almaty is renowned as a city of small and medium-sized businesses, with the highest percentage of the country's total number of active small and medium enterprises (SMEs) in 2021 (see figure 5). As of December 2021, SMEs contributed 47.5 per cent of GRP and provided significant share of total employment in the city.[24]

[23] Kazakh Invest, web profile of Almaty: "Economy," 2022. Available at https://almaty.invest.gov.kz/about/economy/.
[24] Almaty City Akimat. Almaty city development program until 2025 and the medium-term outlook until 2030.

Figure 5 **Registered business entities in Almaty City by economic sector**

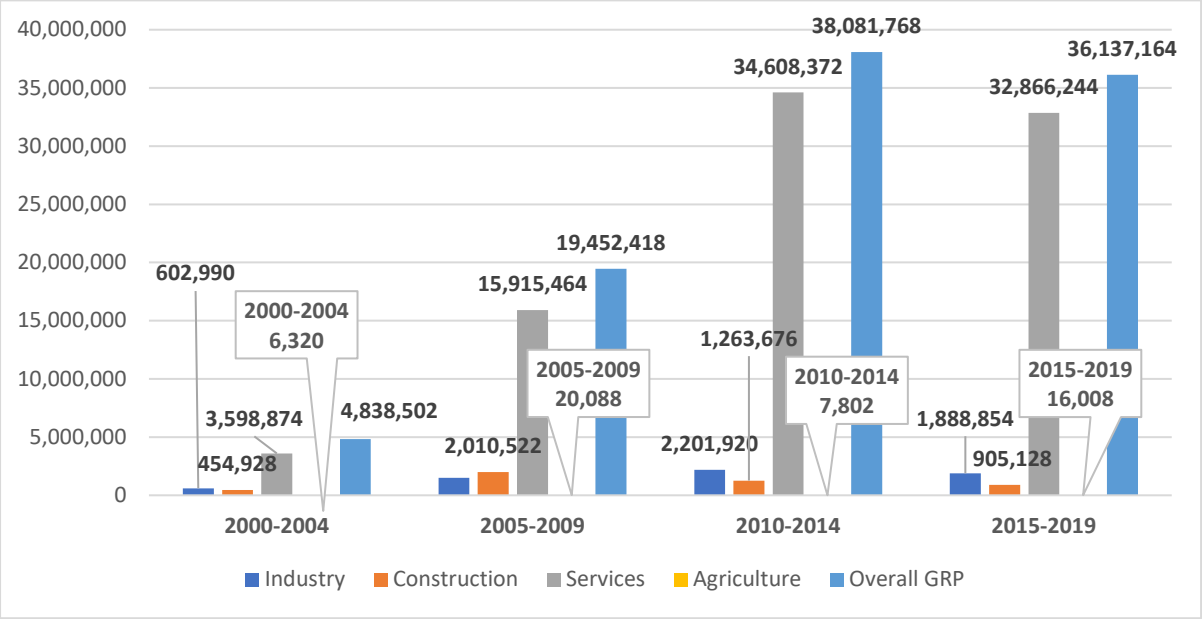


Source: National Bureau of Statistics, Agency for Strategic Planning and Reforms of Kazakhstan.

Over the past two decades, unemployment rates in Almaty are declining. However, the rate has been slightly higher than the national average during the period between 2001 and 2021. In 2021, the unemployment rate in Almaty stood at 5.2 per cent, while the national rate was 4.9 per cent.

A review of the main economic performance metrics of Kazakhstan clearly demonstrates the strategic importance of Almaty in promoting both regional and national economic growth. The city's GRP shows a growth trend, bringing its share of national gross domestic product (GDP) to 17.9 per cent in 2021. Additionally, Almaty is a major contributor to job creation, accounting for the largest share of the country's total employment (11.2 per cent) in 2021.

Figure 6 **Gross Region Product (GRP) of Almaty and share of selected economic activities, five-year average, 2000-2019**
(Thousands of United States dollars)



Source: Bureau of National Statistics – Agency for Strategic Planning and Reforms of Kazakhstan.

Note: Selected economic activities - industry, construction, services and agriculture.

The economy of Almaty is largely service-oriented. According to 2021 data, services and trade account for 86.1 per cent of the GRP structure,[25] with the largest contribution (34.6 per cent) from wholesale and retail trade).

[25] Almaty City Akimat . Almaty city development program until 2025 and the medium-term outlook until 2030.

3. Socio-economic impact of the COVID-19 pandemic

National overview

The first case of COVID-19 in Kazakhstan was detected on 13 March 2020. To mitigate the spread of the virus, the government implemented restrictive measures such as suspending activities in educational institutions, public places and non-essential businesses, and limiting public transport services.[26] Moreover, the government introduced policies to address the economic shock brought on by the pandemic, including banning exports of some key food products and regulating food prices for "socially important goods" through a national commodity distribution system.[27]

However, these measures had significant negative effects on the national economy, which was already struggling due to falling commodity prices, including oil. Weaker economic activity, travel restrictions and the reduced mobility were projected to contribute to reduced global demand for oil by 9 per cent in 2020.[28] In addition, reduced metal prices due to lower industrial commodity demand, particularly from China, compounded the exposure of the economy to fluctuations in the global market. The government is heavily dependent on commodity exports, such exports of hydrocarbons, minerals and metals (84 per cent of total exports in 2017). The fall in global commodity prices contributed to the country's economic crisis in 2020.

To help the local population cope with the economic impacts of the pandemic and support those most in need, the Government of Kazakhstan approved an "anti-crisis plan" amounting to USD 13 billion, which accounted for 9 per cent of the total GDP. The plan included health policy responses (USD 338.4 million), measures to protect employment and vulnerable groups, including women (USD 7.18 billion), and economic stimulus measures (USD 5.97 billion).[29]

The COVID-19 pandemic has had a profound impact on education in Kazakhstan, affecting students, parents, and teachers alike. The closure of schools has worsened existing inequalities in education, with a study revealing that COVID-19 pandemic-related changes in education have had serious implications for students in graduating classes and those transitioning from primary to secondary school. However, it is difficult to estimate the overall learning losses due to academic dishonesty and parents writing assessments for their children.[30]

In terms of health, Kazakhstan has experienced a cumulative number of COVID-19-related deaths of 101.5 per 100,000 people by February 2022. Although this number is lower than the average in the WHO European Region (196.5 per 100,000 people), it may have been undercounted. The pandemic

[26] Organisation of Economic Cooperation and Development, Tackling Coronavirus (COVID-19): Contributing to a Global Effort, 20 April 2020. Available at https://www.oecd.org/eurasia/competitiveness-programme/central-asia/COVID-19-CRISIS-IN-KAZAKHSTAN.pdf.

[27] The Times of Central Asia, Kazakhstan creating national distribution system for agricultural products, 29 April 2020. Available at https://www.timesca.com/index.php/news/22412-kazakhstan-creating-a-national-distribution-system-for-agricultural-products.

[28] World Bank Group, Navigating the Crisis: Kazakhstan Economic Update, Summer 2020. Available at https://documents.worldbank.org/en/publication/documents-reports/documentdetail/155811595364689964/kazakhstan-economic-update-navigating-the-crisis.

[29] Asian Development Bank, ADB COVID-19 Response: Kazakhstan and ADB, 2023. Available at https://www.adb.org/countries/kazakhstan/covid-19-response.

[30] Naureen Durrani and others , Education, gender and family relationships in the time of COVID-19: Kazakhstani teachers', parents' and students' perspectives. Partnerships for Equity and Inclusion (PEI) Pilot Project Report. Graduate School of Education, Nazarbayev University (2021). Available at https://www.researchgate.net/publication/352283100_GENDER_AND_FAMILY_RELATIONSHIPS_IN_THE_TIME_OF_COVID-19_KAZAKHSTANI_TEACHERS'_PARENTS'_AND_STUDENTS'_PERSPECTIVES_PILOT_PROJECT_REPORT.

has also negatively impacted access to essential health services in in the country with multiple repercussions on the society, including mental health.

The health system in Kazakhstan is undergoing a transition towards a more decentralized system, but the central government still has considerable authority in this field. The Ministry of Health is responsible for developing national health policies and legislation and facilitates international collaboration. The Ministry also owns all national clinics and research centres. Meanwhile, the regional (oblast) health departments are responsible for managing and delivering primary, secondary and tertiary health care services in their jurisdictions (excluding research centres run by the Ministry of Health), including state-owned hospitals and polyclinics with a relatively high degree of autonomy.

Box 1. Key COVID-19 recovery assistance received by Kazakhstan

The Government of Kazakhstan took extensive measures to combat the economic and epidemiological effects of the pandemic. In March-April 2020, the Government allocated KZT 125.2 billion (USD 297 million) to the health system to deliver a coordinated response aimed at containing the pandemic. Moreover, in order to safeguard households and local businesses from the economic recession, the Government, in collaboration with the Central Bank and the Agency of Kazakhstan for Regulation and Development of the Financial Market, introduced a set of anti-crisis measures amounting to USD 13 billion or 9 per cent of GDP.[31] In addition, Kazakhstan also benefited from funds from international initiatives aimed at supporting recovery from the pandemic:

- In April 2020, the European Union *Central Asia COVID-19 Crisis Response* (CACCR) solidarity package provided funding worth EUR 3 million (KZT 1.4 billion) to the World Health Organization in order to support the health system of Kazakhstan and other Central Asian countries better respond to the pandemic, especially the vulnerable groups.[32]
- In April 2020, the Asian Development Bank (ADB) announced a USD 20 billion response package to assist Kazakhstan in countering the severe macroeconomic and health impacts of the pandemic, including USD 2.5 billion in concessional and grant sources as well as USD 2 billion for the private sector (non-sovereign).[33]
- In June 2020, the European Bank for Reconstruction and Development (EBRD) provided a local currency loan of USD 40 million for the microfinance organization KMF aimed at addressing the liquidity needs of the micro-, small and medium-sized enterprises (MSMEs) throughout the pandemic period.
- In July 2020, the Asian Infrastructure Investment Bank (AIIB) approved a loan of EUR 661.8 million to provide budgetary support to the Government of Kazakhstan in its efforts to mitigate the effects of the pandemic on health, income and economic activities of the population.
- In December 2020, ADB announced the Asia Pacific Vaccine Access Facility (APVAX) amounting to USD 9 billion. The APVAX vaccine initiative offers rapid and equitable support to developing member countries in their efforts to procure and deliver safe and effective COVID-19 vaccines.
- In May 2021, the United States Agency for International Development (USAID) allocated USD 6.2 million to assist the local health system via the USAID Local Health System

[31] United Nations Economic and Social Commission for Asia and the Pacific , *Kazakhstan: COVID Country Responses, Policy Responses*, 15 July 2020. Available at https://www.unescap.org/sites/default/files/Kazakhstan_COVID%20Country%20Responses_updated.pdf.

[32] European Union External Action Service (EEAS). *EU global response to coronavirus in the Republic of Kazakhstan: Providing emergency response to the COVID-19 outbreak, enhancing long-term resilience of the health system*, April 2020. Available at https://www.eeas.europa.eu/sites/default/files/infographic_-_eu_response_to_covid-19_kazakhstan_eng.pdf.

[33] Asian Development Bank. ADB COVID-19 Response: Kazakhstan, Kazakhstan and ADB 2023.

Sustainability programme in addition to funding international organizations to better respond to the health impacts of the pandemic.[34]

Local overview: economy, unemployment and environment

On 19 March 2020, the city of Almaty declared a state of emergency and imposed a city-wide lockdown due to the COVID-19 pandemic and on 30 March, completely suspended economic activity except for vital deliveries. In the following months, selected industries were gradually reopened. However, these local economic restrictions had a significant negative impact on the local economy and unemployment rates in Almaty and Kazakhstan as a whole.

By April 2020, up to 300,000 SMEs had stopped working, while up to 1.5 million employees had lost their jobs or were put on unpaid leave. In the city of Almaty alone, the number of factory workers decreased by 266,000 and 80 per cent of entrepreneurs suspended their activities.[35] According to estimates carried out by OECD, the hardest-hit sectors were trade, tourism and catering services, which employed over 1.6 million workers in 2020.

To assess the environmental effects of lockdown measures, a study carried out by the Centre of Physical Chemical Methods of Research and Analysis of the Al-Farabi Kazakh National University in April 2020 measured the daily concentrations of air pollutants during pre- and lockdown periods. The results showed a decrease in $PM_{2.5}$ levels by 21 per cent, whereas CO and NO_2 levels decreased by 49 per cent and 35 per cent, respectively. However, 0_3 levels increased by 17 per cent compared to pre-lockdown levels.

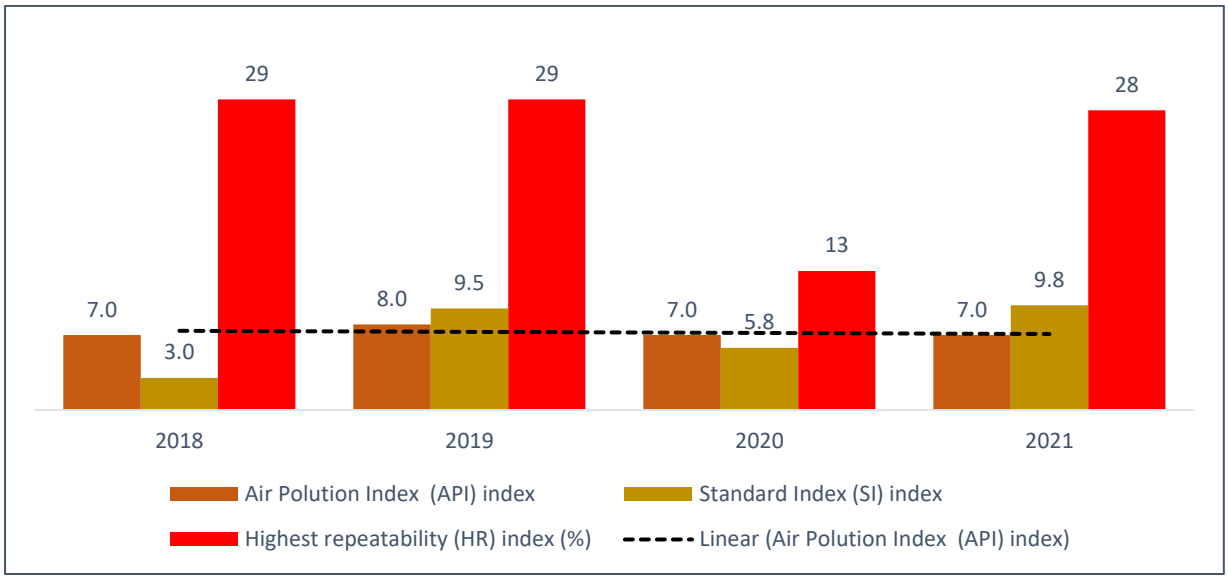
The study also revealed that non-traffic-related sources of environmental pollutants, such as coal-fired CHPs, heating systems, waste burning and bathhouses, significantly contributed to the overall air quality in the city.[36] While the decrease in traffic levels during the lockdowns may have had a positive environmental impact on the city's territory, factors, such as seasonal meteorological changes, did not allow for a definitive environmental impact assessment.

[34] United States Agency for International Development, U.S. Assistance to Kazakhstan for the COVID-19 Crisis (2020). Available at https://www.usaid.gov/kazakhstan/fact-sheets/us-assistance-kazakhstan-covid-19-crisis.

[35] Organisation of Economic Cooperation and Development, *Tackling Coronavirus (COVID-19): Contributing to a Global Effort*, 20 April 2020.

[36] Aiymgul Kerimray and others, Assessing air quality changes in large cities during COVID-19 lockdowns: The impacts of traffic-free urban conditions in Almaty. Science of the Total Environment, vol. 730 (2020). Available at https://www.sciencedirect.com/science/article/pii/S0048969720326966?via%3Dihub.

Figure 7 **Air pollution in Almaty, by main aggregated indicators, 2018-2021**



Source: KazHydromet, *Information* Bulletin on state of environment in Almaty city, Almaty and Jetisuu Oblasts for 2022.

The decrease in air pollution in 2020 was largely attributed to the lockdowns imposed throughout the city. With many public places closed and schools and businesses operating online, there were significantly fewer vehicles on the streets of Almaty.

Although the state of emergency in Kazakhstan was lifted on 11 May 2020 some quarantine and social distancing measures remained in place, with phased removal determined at the regional level. As of 13 January 2023, there have been 1,495,394 confirmed COVID-19 cases and 19,063 deaths attributed to COVID-19, but the country has administered 33,349,745 vaccine doses to help combat the spread of the virus.[37]

[37] World Health Organization Kazakhstan, WHO Coronavirus (COVID-19) Dashboard (2023). Available at https://covid19.who.int/.

4. Institutional and financial framework, urban development priorities

Almaty is defined a city that operates under state subordinance and is not considered part of the surrounding Almaty Oblast. Law No. 148 on Local State Government and Self-Government in Kazakhstan of 23 January 2001 defines the powers of local government bodies at all levels.[38]

Institutional framework

According to Law No. 148, local governance is carried out by local representative bodies known as Maslikhats (City Council) and local executive bodies known as Akimats (City Government). The City Councils are elected by the population of the local authority and are responsible for approving plans, economic and social programmes of development, the local budget and reports on their execution, as well as approving local laws and regulations. The City Government, on the other hand, is responsible for carrying out regulatory and control functions to provide solutions for problems of local significance within the corresponding administrative and territorial unit. It is hosted by a regional or city governor (Akim), and each of the city's eight districts is led by a District Authority (Akimat) and has its own Akim. These districts are the Alatau District, Almaly District, Auezov District, Bostandyk District, Zhetisu District, Medeu District, Nauryzbay District, Turksib District.[39]

The Mayor (Akim in Kazakh), who is a representative of the President and the Government of the Republic Kazakhstan, performs both the functions of state governance and local self-governance. The City Government is formed by the Akim and consists of Deputy Akims, the Akim's office, eight District Akimats and 21 Departments, and is financed from the local budget.

The City Council of Almaty approves the staff structure of each District Authority. The City Government is responsible for various fields, including education, health care, social assistance, transportation and local roads, environmental protection, public sanitation, fire protection, public order, culture and local libraries, as well as water supply and sewage systems.[40] However, urban development responsibilities in Kazakhstan are distributed across different levels of government, leading to areas of uncertainty and significant overlaps in expenditure powers. Housing and utility services, transport and energy efficiency are examples of urban-related fields where all levels of government seemingly having some portion of responsibility. For example, the Almaty Green Growth Project suffered from ongoing debates between the oblast and the City Government, with both interested to be responsible for the project. This complexity can cause expenditures to become less effective, and accountability to become unclear. [41]

In Almaty, the City Government produces a regional planning scheme for the region and master plans for the city and submits them to the City Council for review. The City Government also grants approval for the development of utility networks and infrastructure, as well as the building, reconstruction, and rehabilitation of city assets, municipal property, and social and cultural facilities. The City Government has 23 departments, which are sector-specific and function like ministries. Additionally, there are four

[38] For a copy of the law, see Legal information system of Regulatory Legal Acts of the Republic of Kazakhstan at https://adilet.zan.kz/eng/docs/Z010000148).

[39] Almaty City Akimat. *Green City Action Plan for the City of Almaty*, October 2022. Available at https://www.ebrdgreencities.com/our-cities/cities/almaty/.

[40] United Cities and Local Governments & Organisation of Economic Cooperation and Development (2016). *Kazakhstan*, Basic Economic Indicators. Available at https://www.oecd.org/regional/regional-policy/profile-Kazakhzstan.pdf.

[41] Organisation of Economic Cooperation and Development, *Urban Policy Reviews: Kazakhstan*. (2017). Available at https://read.oecd-ilibrary.org/urban-rural-and-regional-development/oecd-urban-policy-reviews-kazakhstan_9789264268852-en#page172.

Deputy Akims who supervise the activity of departments functionally clustered as: finance and utility sectors; economy, entrepreneurship, state assets and environment; religion, culture, sport and youth affairs; and health, social, labour and education. Only the Department of Digitalization falls under direct supervision of the Akim of Almaty.[42]

Funding and financial framework

On 15 July 2022, the Government of Kazakhstan adopted the Concept of the Investment Policy of Kazakhstan until 2026,[43] which aims to improve the investment environment in the country by increasing and diversifying foreign direct investments (FDI).

Table 1 **Target indicators of the Concept of the Investment Policy of the Republic of Kazakhstan by 2026**

Target indicator 1: Investment to main assets (% GDP)	17.5	21.0	23.0	25.0	25.1
Target Indicator 2: Gross FDI (billions of USD)	24.0	24.4	24.8	25.1	25.5

Source: The Action Plan to the Concept of the Investment Policy of Kazakhstan by 2026; https://ppp-center.kz/almaty.

To support investors in the regions, special deputy mayors have been appointed, and there are representatives of Kazakh Invest, investor service centres and regional investment headquarters in each region. The Socio-Entrepreneurial Corporation (SEC) was established as a regional development institution in the form of a joint stock company (JSC) to promote the region's economy, with the controlling stake belonging to the state.

SEC manages assets, provides business supports and implements the "one-stop shop" principle for domestic and foreign entrepreneurs and investors to attract investments and supports finished projects. In Almaty, the JSC SEC “Almaty" was established by Decree of the Government of Kazakhstan of 31 March 2010. All shares are held by the Department of Entrepreneurship and Investments of the Almaty City Government. SECs focus on:

1. Provision of resources (objects and land plots);
2. Attraction of investments;
3. Business lending;
4. Participation in programmes to support and develop entrepreneurship.

Kazakhstan has laws in place for public-private partnership (PPP)[44] and concession[45] that provide a legal basis for PPP projects. To facilitate PPP, including through FDIs, a Regional PPP Centre operates in Almaty. As of the end of 2021, there were 74 PPP projects registered in Almaty, including 65

[42] Organigram of the City Government of Almaty. Available at: https://www.gov.kz/memleket/entities/almaty/press/article/details/89805?lang=ru

[43] The Government of Kazakhstan. Resolution on approval of the Concept of Investment Policy in the Republic of Kazakhstan by 2026”, 2022. Available at https://ppp-center.kz/almaty

[44] Law on public-private partnership of Kazakhstan. Available at https://adilet.zan.kz/rus/docs/Z1500000379

[45] Law on Concessions of Kazakhstan. Available at https://adilet.zan.kz/rus/docs/Z1500000379

ongoing, 7 planned and 2 tendered projects. [46] Among the ongoing large PPP investment projects are the construction of the Almaty Ring Road (concession) for USD 1.4 billion; a Light Railway Transit in Almaty for USD 300 million and the Almaty Railway Bypass for USD 300 million.[47]

Table 2 **Budget of the city of Almaty, 2022 and 2023**
(Millions of United States dollars)

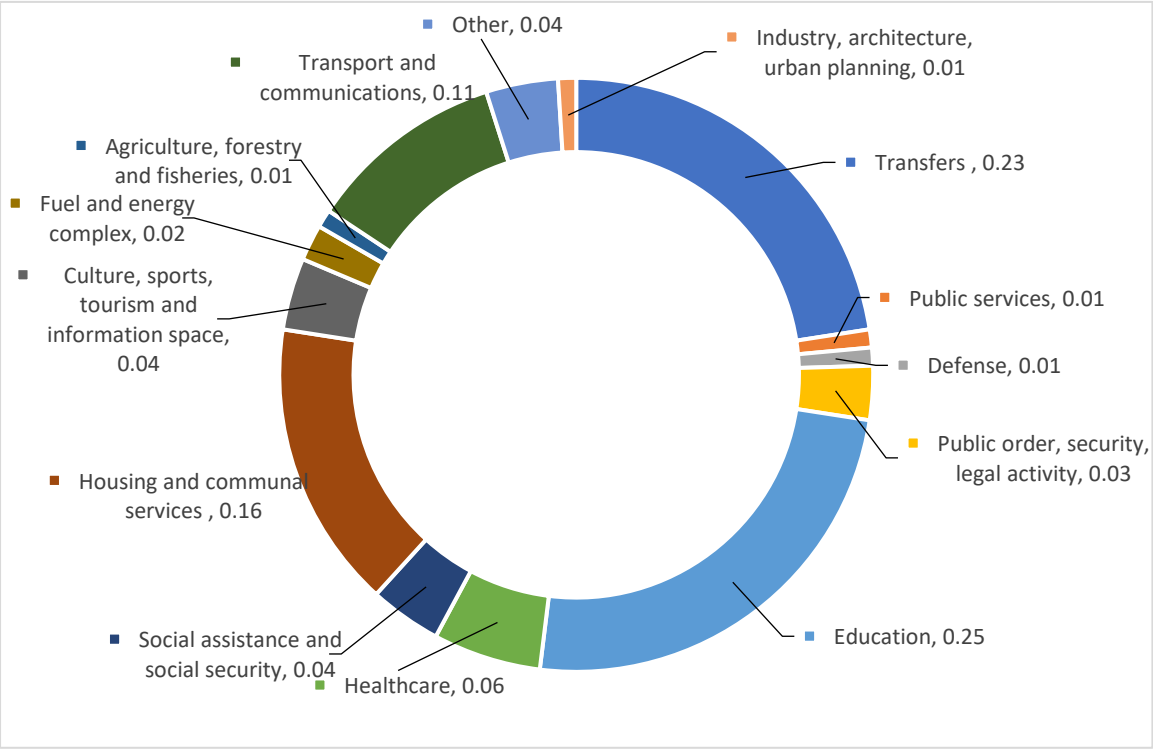
Income	2 615.76	2 231.44
Tax revenues	2 080.25	1 853.93
Non-tax revenues	39.48	9.63
Proceeds from the sale of fixed assets	64.04	34.02
Transfer receipts	432.08	333.87
Costs	2 407.25	2 217.52
Net budget lending	44.89	7.62
Balance on operations with financial assets	250.78	8.37
Acquisition of financial assets	251.71	8.74
Budget deficit (surplus)	-87.16	-2.07
Financing of the deficit (use of surplus) of the budget	87.16	2.07

Source: Akimat of Almaty.
Note: Rate 1 USD = 460.48 KZT (2022) and 1 USD = 452.9 KZT (average official USD-KZT currency rate by the National Bank for 2022 based on six months of 2023)[48]

Municipal spending in Almaty is determined by the Almaty City Strategy and Budget Department. In 2022, the city budget spent KZT 977.93 billion, which was adjusted in March 2022 due to the available free balances of funds from the previous year to the amount of KZT 48.9 billion.[49]

[46] Regional Public Private Partnership Support Centre in Almaty. https://ppp-center.kz/almaty
[47] Asian Development Bank. Kazakhstan Development Finance Assessment (2021). Available at https://www.adb.org/sites/default/files/publication/664451/kazakhstan-development-finance-assessment.pdf
[48] National Bank of Kazakhstan. Official Foreign Exchange Rates on average for the period. Available at: https://www.nationalbank.kz/ru/news/oficialnye-kursy
[49] United Nations Economic Commission for Europe . Smart Sustainable Cities Profile – Survey 2021.

Figure 8 **Budget cost structure of the city of Almaty, 2022**



Source: UNECE Smart Sustainable Cities Profile – Survey 2021.

National level development plans

The Government of Kazakhstan defines the legal and institutional mechanisms for urban development in the country. It is responsible for developing the General Plan (master plan) of Kazakhstan,[50] which is the most important urban planning document in the country.

The General Scheme provides decision-making guidance to state and business structures in the country, covering various areas such as industry, population distribution, engineering, transport, social and recreational infrastructure of national significance, environmental conservation, and territorial function zoning.[51] Additionally, all cities in the country, including the regional centres and the cities of Almaty [52] and Astana [53], are covered by general plans according to Article 47 of the Law on Architectural, Urban Planning and Construction Activities in Kazakhstan of July 2001, which dictates that all cities must have general plans.[54] The development and building of settlements is carried out on the basis of these plans.

Kazakhstan approved a new state planning system in 2021 to streamline monitoring of state progress at the national level towards achieving the SDGs. This is summarized in the Resolution of the Government of Kazakhstan No. 790 "On approval of the State Planning System in Kazakhstan",[55] which

[50] The Government of Kazakhstan. Resolution No. 1434 on General Scheme of the Republic of Kazakhstan, December 2013.
[51] The Government of Kazakhstan. *National report of the Republic of Kazakhstan on Housing and Sustainable City Development*, 2016.
[52] The Government of Kazakhstan, *General Plan*. Available at http://astana.gov.kz/ru/page/genplan.
[53] The Government of Kazakhstan, *General Plan*. Available at http://astana.gov.kz/ru/page/genplan.
[54] Law No. 242-II on architectural, urban planning and construction activities in the republic of Kazakhstan. Available at https://online.zakon.kz/document/?doc_id=1024035&pos=72;-88#pos=72;-88.
[55] The Government of Kazakhstan. Resolution No. 790 "On approval of the State Planning System in Kazakhstan." 29 November 2017. Available at https://adilet.zan.kz/rus/docs/P1700000790. Amendments to

establishes national SDG indicators for country-specific monitoring.[56] The key document for state planning according to the new state planning system is the Development Strategy of Kazakhstan until 2050.

City level development plans

Almaty is committed to urban development. It has several planning documents that outlines its vision for the future and the steps it will take to achieve that vision:

- **Almaty Development Strategy 2050** (2019) sets out the city's priorities for sustainable development. These include creating a high-quality urban environment, developing human capital, building a highly efficient economy, and effective city management.
- **Almaty City Development Program until 2025 and medium-term prospects until 2030** (updated September 2022) outlines the city's developments plans taking into account the experience and practices of leading cities around the world, the opinions of experts, and the suggestions and appeals of citizens. The aim is to form a harmonious metropolis that is an attractive and comfortable place to live, work, and visit).
- **New Almaty for 2020 - 2024** (January 2020) is a comprehensive plan that implements the first principle of the Strategy for the Development of Almaty until 2050. Also called "A city without outskirts", it is focused on achieving high living standards in all districts, a polycentric layout and convenient transport.
- **Green City Action Plan for the City of Almaty** (October 2022)**.** The City Government of Almaty joined the EBRD Green Cities in 2019 with the aim to build a better and more sustainable future for the city and its inhabitants. This plan is focused on seven urban sectors - land use, transport, water and wastewater, waste management, energy, buildings and industry. It provides an overview of all the necessary investments required in the next 5-10 years.
- **Municipal Energy Efficiency Plan for the City of Almaty** (2017). The document is part of the "Energy Efficiency Transformation in Astana and Almaty" study financed by the World Bank's Energy Sector Management Assistance Program. The document aims to improve energy efficiency in public and social facilities and the enabling environment for sustainable energy financing.

Annex 2 provides an overview of these planning documents and several other documents that aim to address the main urban challenges and priorities highlighted by City Government officials. These challenges and priorities are sustainable urban mobility, the creation of new green and recreational spaces, and the preservation of cultural heritage through housing renovations in the inner city.

Digital transformation

The digitalization of Almaty was given a high priority in the "Digital Kazakhstan" State Programme[57] implemented from 2018-2022. The current "Smart Almaty" Digitalization Strategy for 2020-2025 is

---

the 2017 Resolution are set forward in the Decree of the Government of Kazakhstan dated February 26, 2021 No. 99., "On amendments to the Decree of the Government of Kazakhstan dated November 29".

[56] The Government of Kazakhstan. Voluntary National Review Kazakhstan on the implementation of the 2030 Agenda for Sustainable Development (2022). Available at: https://hlpf.un.org/sites/default/files/vnrs/2022/VNR%202022%20Kazakhstan%20Report%20English.pdf.

[57] The Government of Kazakhstan. Digital Kazakhstan State Programme. Available at https://egov.kz/cms/en/digital-kazakhstan.

now being implemented.[58] The main goal of this strategy is to create a digital environment in the city that allows for efficient deployment of public services, smart interaction and collaboration with private initiatives, ensuring sustainable development. This will be achieved by deploying modern technologies and digital facilities in real-time, as well as building human capacities. The Smart Almaty builds on tripartite collaboration among state bodies, the private sector and science to accomplish its objectives. By efficiently utilizing all available resources such as digitalization roadmap, improved regulations and functional interactions and portfolio of IT projects to address main developmental problems of the city, Smart Almaty will be able to make a significant impact.

The Almaty City Department of Digitalization was established in 2019 [59]. To oversee the implementation of Smart Almaty, ensuring compliance with national ICT requirements and international standards, monitoring the quality of digital public services and optimizing them further. It also works closely the Ministry of Digital Development, Innovations and Aerospace Industry[60] to contribute to the implementation of the "Digital Kazakhstan" State Programme.

Box 2 **"Technological breakthrough through digitization, science and innovation" national project**

The national project "Technological breakthrough through digitalization, science and innovation" was established by the Decree of the Government of Kazakhstan of 12 October 2021, No. 727 and by the Reference Standard for Smart Cities of Kazakhstan, which was approved by order of the Minister of Digital Development, Innovation and Aerospace Industry of Kazakhstan in July 2022.

The project aims to promote digitalization in the country through the development of the ICT sector and promoting use of digital tools in different areas of work and life of people in the country. The national digitalization project also aims to increase security of online data.

As part of the national digitalization project, Reference Standards for Smart Cities of Kazakhstan were elaborated which establish common nation-wide approaches for building "smart" cities in Kazakhstan. Digitalization projects in Almaty are implemented under auspices of the above-mentioned national digitalization project and in accordance with the reference standards for smart cities.

The Almaty Data Lake[61] is a flagship project of the Department of Digitalization that aims to facilitate data exchange between public bodies, private companies and academic institutions. Its goal is to create a foundation for data-driven decision-making and provide a secure platform for external subscribers (IT-Sandbox) to improve services for city residents through data sharing. The project received support from the City Government and the private sector, and pilot segments were launched jointly by the Department of Digitalization, a Singaporean Crimson Logic PTE Ltd and a local company "ALSECO" JSC in October 2020.

These pilots integrated one public database (State Database of Individuals) and one commercial database (Unified Utilities Payments), resulting in a significant increase in the database of utility service providers (from 23% or more depending on the supplier). For example, the consumer base of "Almaty Su", a supplier of cold water, increased by almost 258,000 people, driving the increase of the company's revenue by KZT 58.7 million in March 2021 and KZT 55.7 million in April 2021. On the other

[58] Almaty city Department of Digitalisation. Strategy "Smart Almaty" for 2020-2025. Available at: https://www.gov.kz/memleket/entities/almaty-digital/documents/details/51909?lang=en.
[59] Almaty city Department of Digitalisation website. Available at: https://www.gov.kz/memleket/entities/almaty-digital?lang=en
[60] Official website of the Ministry of Digital Development, Innovations and Aerospace Industry. Available at https://www.gov.kz/memleket/entities/mdai?lang=en
[61] Almaty city Department of Digitalisation. Almaty Data Lake web-portal. Available at: https://adl.digital-almaty.kz/en/

hand, the supplier of hot water, Almaty Heat Networks, increased its income by KZT 57.8 million tenge or 11 per cent year-over-year and its consumer database by 243,387 people or 34.5 per cent.[62] Due to increase in the income of the utility service providers, it is envisaged that they will invest in the modernization and development of city's utility infrastructure.

Additionally, the project has a segment devoted to monitoring the fate of nearly 50 thousand annual graduates of Almaty universities and colleges. Furthermore, through this project, the City Government is working on improving and automating activities that will greatly benefit its inhabitants, primary health-care services.

Ongoing activities of the Data Lake include digitalizing the process of obtaining the preferential public transport card "O NAY!" for students and schoolchildren which will reduce the waiting time for receiving the card from several weeks to 15 minutes.

There is also a plan to automate the recognition of a citizen's social status based on their registered official addresses, which will allow city services to better plan social protection measures.[63] The City Government works with the National Chamber of Entrepreneurs "Atameken," the Ministry of Labor and Social Protection and "Uchet.kz" company to implement this project.

Box 3 **Electronic ticketing system "ONAY!" Card**

In 2015, Almaty introduced a new electronic payment and accounting system for public transport with the ONAY! Card. Today, the public transport network of the city covers 158 routes with 2,449 public transport units (buses and trolleybuses) equipped with card payment terminals, portable cash terminals, controller portable terminals and driver assistant on-board computers. About 3.5 million cards have been sold since the project began.

The Central Dispatch Office (CDO) provides round-the-clock monitoring, control and management of urban public transport traffic, contributing to the improvement of passenger service quality. Being an independent structure, as well as providing a centralized and automated approach to dispatching, the CDO provides a true picture of carriers' performance on routes.

The implementation of the ONAY! Card system has led to significant positive effects and allowed:

- To minimize the "shadow" turnover in the sphere of passenger transportation and increase the profitability of enterprises several times. Thus, the annual turnover of this industry for the period 2016-2022 increased by more than 2.4 times. It is also important to note a significant increase in annual passenger traffic on public transport compared to the period before the implementation of the project: the increase by 2023 was 52 per cent
- To upgrade the rolling stock of public transport by 98 per cent
- To provide a transparent and rational system of compensation and subsidies to carriers
- To bring the regularity of public transport services to 93 per cent by the end of 2022.

[62] Almaty city Department of Digitalisation. Press release of 26.05.21 on Almaty Data Lake pilot phase implementation. Available at: https://digital-almaty.kz/en/content/26052021-almaty-city-department-digitalization-invites-residents-share-ideas-data-governance

[63] Almaty city Department of Digitalisation. News Release of 08.11.22 on Almaty Data Lake. Available at: https://www.gov.kz/memleket/entities/almaty-digital/documents/details/368513?lang=en

The Almaty City Government develops a new digitalized urban transportation model including through O NAY! Card since 2016. With a strong focus on integrating smart data and data collecting systems, the Transport Holding of Almaty has introduced the geoinformation data and automated dispatcher control systems for urban passenger transport. The system allows to monitor passenger movement information, distribution of passenger traffic and traffic speed at various hours of the day.

The Smart Almaty strategy seeks to support Almaty in its ambition to become smart and sustainable. This includes improving public transport accessibility and mobility through monitoring ongoing passengers flow and real-time unified video monitoring.

The Smart Almaty strategy also seeks to improve governance and public services by increasing the number of electronic public services, including those rendered by the Ministry of Health and the Ministry of Agriculture. It also aims to develop an Open Data platform that integrates a variety of geospatial data and layers. Furthermore, Smart Almaty aims to improve environmental governance by monitoring air and water quality, specifically at extremely polluted hotspots, and increasing the per capita number and area of green spaces.

In addition, Smart Almaty plans to integrate buildings' energy and utilities management systems, as well as implement projects for smart street lighting and municipal waste collection and removal.

To improve security, Smart Almaty plans to use smart video monitoring and response systems to prevent or respond to crimes in crowded places, as well as prevent and reduce fires. It also includes a number of projects aimed at improving health care, social inclusiveness and education systems through the development of digitized on-site and virtual platforms and services.

All these digital transformation efforts of Almaty complement and support the Almaty Master Plan by 2040, which foresees polycentric and digitally smart development of the city.

5. KPI evaluation results

The city of Almaty reported data for 101 of 112 indicators (50 of 54 economic indicators, 22 of 28 environment indicators, and 29 of 29 society and culture indicators). The results of the KPI evaluation are visualized using the following colour scheme:

- Red is assigned to indicators with values that are 25 per cent below the corresponding benchmarks.
- Orange is assigned to indicators carrying values that are 25 to 75 per cent below the corresponding benchmarks.
- Green is assigned to indicators with values that exceed 75 per cent of the corresponding benchmarks.

The city scored above the 75 per cent benchmark for 36 indicators, between 25 and 75 per cent for 8 indicators, and below 25 per cent for 22 indicators. Figure 10 shows a summary of the city's performance against the KPIs for SCC.

KPI evaluation results: Economy

Of the 54 economy KPIs, Almaty reported data for 50 indicators. The evaluation against these indicators revealed good performance in the sub-areas of ICT infrastructure, water and sanitation and public sector governance; moderate performance in employment and transport; and poor performance in electricity supply, buildings (energy efficiency) and innovation. For other indicators, data was unavailable or insufficient. A summary of the evaluation by sub-area follows.

ICT infrastructure

In terms of ICT infrastructure, Almaty is doing exceptionally well. Almost all households (93.7 per cent) reported having internet access with 75.4 per cent reporting having fixed broadband subscriptions, which corresponds to 95,000 wireless broadband subscriptions per 100,000 inhabitants. There are 6,268 public Wi-Fi spots located throughout the city and 3G and 4G mobile services coverage is 96 per cent and 83.5 per cent, respectively.

Water and sanitation

As for water and sanitation infrastructure, Almaty is performing strongly. All households (100 per cent) have access to drinking water and basic sanitation facilities. Furthermore, 83.8 per cent of households are served by wastewater collection services.

Almaty lost 30 per cent of supplied water within the distribution system indicating moderate performance in this indicator. Only 13.18 per cent of the water meters installed throughout the city qualified as "smart". However, there was no data to assess the total percentage of the water distribution system monitored by ICT.

Almaty sources its water from rivers and aquifers. Rivers provide 40 per cent of the city's water, while 60 per cent comes from aquifers. The state municipal enterprise "Almaty Su" is responsible for the city's drinking water and hot water supplies and wastewater treatment.[64] The enterprise covers 98.5 per cent of the city's population with a centralized water supply.[65]

To ensure continued improvement of the water supply and sanitation infrastructure, Almaty Su has a 2020-2024 investment programme in place. By 2025, the programme aims to introduce 775 km of water supply networks and 673 km of sewerage networks, as well as three water intake facilities with a total capacity of more than 46 m3/day. The sewage treatment facilities will also be reconstructed utilizing modern and efficient technologies.[66]

The centralized sewage system and biological wastewater treatment are available to 92.5 per cent of population of Almaty.[67] The quantity of treated wastewater naturally increases with the growth of the city. As of 2022, 98.8 per cent of wastewater were treated biologically.[68]

Despite these efforts, there is still a considerable capacity for reducing per capita water abstraction and use through further reduction of water losses. Water losses have already reduced from 30 per

[64] The Order of the Department of the Committee for the Regulation of Natural Monopolies of the Ministry of National Economy of the Republic of Kazakhstan for the city of Almaty dated June 23, 2023 No. 58-OD introduces the tariffs for water supply services from 1 July 2023 (http://almatysu.kz/?page_id=738&lang=ru).
[65] Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistic (2022). Statistical Compendium: Environmental Protection and Sustainable Development in Kazakhstan for 2017-2021. Available at https://old.stat.gov.kz/official/industry/157/publication
[66] Almaty-Su (2022). Investment Programme of Almaty Su for 2020-2024. Available at http://almatysu.kz/wp-content/uploads/2020/01/%D0%A3%D1%82%D0%B2%D0%B5%D1%80%D0%B6%D0%B4%D0%B5%D0%BD%D0%BD%D0%B0%D1%8F-%D0%98%D0%9F-%D0%92%D0%A1-%D1%80%D1%83%D1%81.pdf.

[67] Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics , Statistical Compendium: Environmental Protection and Sustainable Development in Kazakhstan for 2017-2021. Available at: https://old.stat.gov.kz/official/industry/157/publication
[68] Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics. Statistical Bulletin: Water supply and sanitation systems in Kazakhstan, 2022. Available at https://old.stat.gov.kz/region/268020/statistical_information/industry/75157.

cent in 2013 to 24 per cent in 2021,[69] but further improvement of water distribution infrastructure could significantly reduce water losses. Over 2,000 km of 3,600 km total water pipelines in Almaty are considered worn out, highlighting the need for infrastructure improvements.[70]

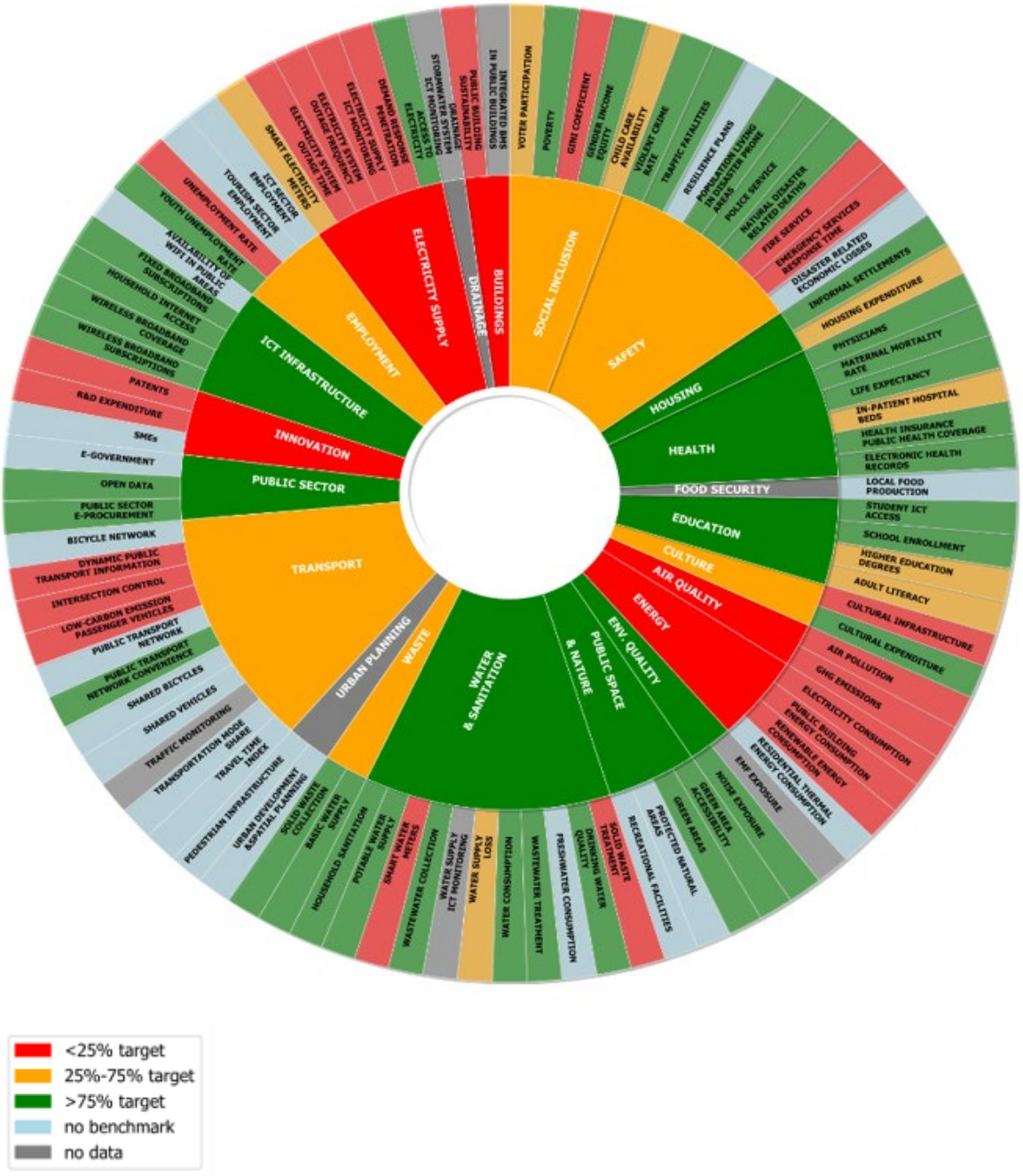
As of 2022, more than 12,000 meters per building and nearly 476,000 individual per apartment/house water meters were installed, of which 15 per cent are equipped by digital data transfer/monitoring.[71]

[69] Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics. Losses and non-accounted water consumption. Available at https://taldau.stat.gov.kz/ru/NewIndex/GetIndex/701767?keyword=.

[70] Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics. Statistical Bulletin: Water supply and sanitation systems in Kazakhstan, 2022. Available at https://old.stat.gov.kz/region/268020/statistical_information/industry/75157.

[71] Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics. Statistical Bulletin: Water supply and sanitation systems in the city of Almaty for 2022. Available at https://old.stat.gov.kz/region/268020/statistical_information/industry/75157.

Figure 10 **Performance of Almaty against the Key Performance Indicators for Smart Sustainable Cities**



Source: UNECE (2023).

Public sector management

The city of Almaty has shown strong overall performance in the public sector management sub-area, with 99.98 per cent of public sector procurement activities conducted online. This indicates excellent city performance. The availability of 154 public services online all inventoried open data sets published online for public consultation demonstrates the city's dedication to making public services more accessible to citizens.

Providing public services in electronic format not only makes it easier for citizens to receive them but also eliminates human error in data processing. In 2022 alone, 14.5 million public services were provided in the city of Almaty, with 93.3 per cent being electronic. This impressive performance is backed by the Register of Public Services (approved by the Order of the Acting Minister of Digital Development, Innovation and Aerospace Industry of the Republic of Kazakhstan on 31 January 2020), which lists 165 types of public services provided for local executive bodies of the City of Almaty:

- 156 types of services are available through the "Electronic Government Portal"
- 7 types of services - no alternative "paper"
- 2 types of services - paper, provided on the principle of "one application".

Urban transport

In terms of transportation, the overall performance of Almaty is moderate. Only 0.43 per cent of public transport stops in the city have dynamic public transport information. Additionally, only 19.96 per cent of intersections use adaptive traffic control, indicating poor city performance. Furthermore, only 4 per cent of registered vehicles in qualify as low- emission vehicles. On the other hand, Almaty scored favourably concerning public transport network convenience, with 86.43 per cent of the city's inhabitants living within 0.5 km of a public transport stop.

In 2022, there were 517,500 registered motor vehicles in Almaty, with cars comprising 90.2 per cent, trucks 6.4 per cent, buses 1.8 per cent and motorbikes 1.2 per cent of the total. The city's vehicle fleet has grown by more than 1,700 units annually over the past decade.[72] Moreover, the total length of the road network in Almaty is 3,097 km, which is around 20 per cent of all local roads in Kazakhstan.[73]

The daily traffic in Almaty is estimated to consist of nearly half a million motor vehicles, including those entering the city from outside its limits. This results in traffic congestion and an extra burden on the transportation system. Travel time is three times slower during peak periods. The vehicle fleet is responsible for 65 per cent of the dangerous pollutants released into the city's air, with more than 122,000 tons of pollutants being released annually.

To address these challenges and improve urban mobility, Almaty has been building different types of transport infrastructure. As of 2021, there are 140 overground and underground pedestrian crossings, 31 traffic interchanges, and 140 tunnels and bridges.

The total length of public transport lines is 176.28 km per 100,000 inhabitants, with 4.4 km of bicycle lanes per 100,000 inhabitants. Forty per cent of travelers in the city use private vehicles or public transport each, with 17 per cent of travelers reporting walking and 3 per cent travelling by bicycle. There were 87 shared bicycles and 24.7 shared vehicles per 100,000 inhabitants. However, no data was available to assess the percentage of major streets monitored by ICT.

[72] Kazhydromet. Information Bulletin on the State of Environment in Almaty, Almaty and Jetysuu Provinces for 2022. Available at https://kazhydromet.kz/ru/ecology/ezhemesyachnyy-informacionnyy-byulleten-o-sostoyanii-okruzhayuschey-sredy/.

[73] United Nations Economic Commission for Europe. Smart Sustainable Cities Profile – Survey 2021.

Employment

According to the survey for the KPI evaluation, Almaty performed poorly in the employment indicator with a 5.2 per cent unemployment rate, including the youth unemployment rate is of 5.7 per cent in 2021. Almaty has a strong presence in the tourism and ICT sectors, with 2.96 per cent and 1.61 per cent of the total labour force employed in those fields, respectively.

The unemployment rate in Almaty for young people is higher than at the national average (4.9 per cent unemployment rate in overall and 3.8 per cent youth unemployment rate).[74] The higher rates of youth unemployment in Almaty is explained by the strong influx of internal migrants from rural areas around the city whose employment needs the city could not meet.[75] Except for Almaty and Astana, the other regions of Kazakhstan are experiencing lower unemployment rates because of population outflow.

Electricity supply

The city's performance in the electricity supply sub-area is poor, with only 38.23 per cent of electricity metres being "smart" and just 1.33 per cent of the electricity supply system being monitored by ICT. However, despite these indicators, 100 per cent of households have an authorized connection to the electricity supply system. On average, there were 2.8 interruptions of the supply per year, each lasting around 3.1 minutes.

One of the main issues with the electricity supply of Almaty is the worn-out networks. The city's fast growth has overloaded existing capacities, and the reconstruction and modernization of the infrastructure and supply services are slower than needed. For example, the supply network of the Turksib District is worn out at a rate of 70 per cent, which leads to frequent power cuts.[76]

Even well-equipped networks experience service interruptions, and there are constant accidents in the electrical networks due to the deterioration of 5,600 km of transmission lines (65 per cent).[77] Inefficient tariff policies exacerbate the problems of deterioration and breakdown of networks. Heat tariffs have increased 1.8 times (by an average annual increase of 4.1 per cent), and electricity tariffs have increased by a factor of 3.2 (by an average annual increase of 8.1 per cent) in the past 15 years.

Since tariffs do not cover investment and operating expenditures , the system is in deficit, and utility companies' losses are covered by the local budget. Without an increase in investment and a well-connected tariff policy, it is impossible to improve the quality of housing and utility services.

Buildings

Only 0.57 per cent of public buildings have recognized sustainability certifications for ongoing operations, indicating poor performance in the buildings sub-area. Data was unavailable to assess public buildings using integrated ICT systems to automate building management.

The buildings in Almaty have unique passports containing relevant information such as construction materials used, year of construction energy efficiency (EE) ratings.

---

[74] Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics. Unemployment rate in Kazakhstan. Available at https://taldau.stat.gov.kz/ru/NewIndex/GetIndex/702944?keyword=

[75] Caravan-Kz. How the mass migration to Almaty and Nur-Sultan caused the marginalisation of the population. Available at https://caravan-kz.turbopages.org/caravan.kz/s/gazeta/kak-massovaya-migraciya-v-almaty-i-nursultan-privela-k-marginalizacii-naseleniya-808812/

[76] Vecher-Kz. Media report on the meeting of the Akim of Almaty with population of the Turksib District. Available at https://vecher.kz/kak-reshayutsya-voprosi-elektrosnabzheniya-v-turksibskom-rayone-almati

[77] Almaty City Akimat. Almaty city development programme until 2025 and the medium-term outlook until 2030.

While some private buildings certified as green buildings using the international certification system BREEAM or LEED,[78] there is no current national practice of green building certification in Kazakhstan. Even though new buildings need to comply with more stringent energy efficiency norms, these are not as strict as a dedicated standard for Green Buildings.

Many public buildings in Almaty were built several decades ago, before energy standards existed, resulting in limited insulation and high energy consumption. The annual energy bill for these buildings represents 2 per cent of the municipal budget. Refurbishment needs cannot be identified because of the absence of energy audit.

Innovation

In terms of innovation, the performance of Almaty is poor, with low R&D expenditure at only 0.29 per cent of the city's GDP and a high percentage of SMEs (98.79 per cent) without established benchmarks At the time of the evaluation, there were 32.64 patents issued per 100,000 inhabitants.

Urban planning

Based on reported data, only 0.10 per cent of the total city area of Almaty is designated as a pedestrian/car-free zone. The city developed its strategic planning documents in place for urban development, including compact development, connectivity, integration, urban land use, social inclusion and resilience to climate change.

Spatial development in Almaty has undergone several changes since 2002. Improper redistribution of land resources, multiple enlargements of city limits by annexing land in the suburbs, land grabbing or self-build and modifications to legal criteria are some of the causes of unequal development of the urban area.[79] Many of the urban challenges faced by Almaty now are urban sprawl, poor and unaffordable housing stock, traffic congestion, air pollution and lack of green spaces.

To address these issues, Almaty has introduced a new urban planning approach, including the Master Plan of Almaty until 2040,[80] which is based on polycentricity and polyfunctional development. The Master Plan is based on the concept of comfortable compact living with human-scale neighborhood development that allows for varied scenarios of city inhabitants' life activities. The plan aims to create five polycentres with economic specializations and a culturally significant historical centre linked to these polycentres by 2030:

- North: removal of industries, new recreation areas, developed service sector
- Eastern Gate, logistics hub exhibition and entertainment center in the airport area, medicine, pharmaceuticals
- Historic centre: tourism and developed services
- West: large industries, transport and logistics hub
- Southwest: mini-industrial parks, trade and logistics.

Each of the polycentres will have a master plan synchronized with the plans of the city of Almaty and its suburbs and Almaty region.

[78]The Green Building Information Gateway. Map of the BREEAM and LEED certified buildings in Almaty. Available at https://www.gbig.org/places/58214

[79] Almaty City Akimat. Almaty city development programme until 2025 and the medium-term outlook until 2030.

[80] The Astana Times. The Master Plan of Almaty until 2040 was approved on 22nd May 2023 (New Master Plan for Almaty to Decentralize City and Address Environmental Issues - The Astana Times; https://astanatimes.com/2023/05/new-master-plan-for-almaty-to-decentralize-city-and-address-environmental-issues/).

Other

Data on drainage performance was insufficient to assess the performance of Almaty in this area, with no available data on the percentage of the drainage storm-water system covered by ICT monitoring.

KPI evaluation results: Environment

Almaty reported data for 22 out of 28 environmental KPIs. The city displayed a good performance in the areas of environmental quality, public space, as well as nature, and water and sanitation. The performance was found to be moderate in waste, while air quality and indicators within the energy sub-area showed poor results.

Environmental quality

Almaty has shown strong performance in terms of environmental quality, particularly regarding exposure to excessive noise levels (i.e., beyond 55 decibels which are considered acceptable for humans), with only 20 per cent of inhabitants experiencing this issue. However, there is a lack of data regarding electric and magnetic fields (EMF) exposure compliance, as no data has been reported for mobile network antenna sites throughout the city.

Water and sanitation

With regard to water and sanitation, the performance of Almaty is also strong city, with 97.7 per cent of drinking water samples covered by an audited Water Safety Plan. The city's freshwater consumption is 359 liters per person per day, 100 per cent of which is potable freshwater.

Wastewater treatment is also at a high level, with 99.7 per cent and 98.7 per cent of wastewater undergoing primary and secondary treatment, respectively.

The quality of tap water in Almaty is higher compared to many other places in Kazakhstan that it can be consumed without additional purification. The water does not contain heavy metals, phenols and oil products. Its chemical composition shows it is naturally balanced and has microelements necessary for humans. Moreover, it has safe radiation levels and is not contaminated by bacteria. However, due to the high volume of water coming from aquifers, mineralization of drinking water in Almaty has increased.

The water is regulated by nationally established standards,[81] and the chemical and bacteriological laboratory of the Almaty Su conducts regular monitoring. Surface and artesian fresh water undergo four-phased mechanical and chemical treatment before it is supplied to the population.[82]

Per capita water abstraction and use are gradually decreasing, with water metering playing a role in increasing efficiency. According to the data of the Bureau of Statistics for 2013-2021, water abstraction decreased from more than 450 liters per capita per day in 2013 to almost 378 liters in 2021. Water use decreased from 404 liters per capita in 2013 to 359 liters in 2021. As of 2022, there were more than 12,000 water meters installed for multiapartment building (one per a building) and

[81] On approval of the Sanitary Rules "Sanitary and epidemiological requirements for water sources, places of water intake for domestic and drinking purposes, domestic and drinking water supply and places of cultural and household water use and safety of water bodies" Order of the Minister of Health of the Republic of Kazakhstan dated February 20, 2023 No. 26. Registered with the Ministry of Justice of the Republic of Kazakhstan on February 20, 2023 No. 31934 https://adilet.zan.kz/rus/docs/V2300031934#z18

[82] Almaty-Su. Water disinfection web-page . Available at https://almatysu.kz/?page_id=774&lang=ru

nearly 476,000 individuals per apartment/house water meters installed, of which, 15 per cent are equipped with remote data transfer/monitoring.[83]

Public space and nature

Almaty scored strongly in terms of public space and nature. The city has an impressive 1,253 hectares of green spaces per 100,000 inhabitants, which is an indicator of the city's excellent performance. Furthermore, 77 per cent of inhabitants live within 300 metres of green spaces, which is another strong performance indicator. The city also has 5,206 m^2 of public recreational facilities.

Existing green spaces, which cover about 26,000 hectares, collect up to 1.3 million tons of dust per year and produce up to 16,000 tons of oxygen. This highlights the importance of preserving and sustainably developing green spaces in the city, which is also a major goal of the City Government's draft Green Space Development Strategy 2030. The Strategy aims to achieve 10 m^2 of green space per person by 2030, up from the current 7.7 m^2 per person and increase the number of trees to five million, while considering polycentricity and the link between green infrastructure and blue water networks. To achieve this goal, the City Government plans to plant 1,158,380 trees by 2025 and 1,300,000 trees by 2030.[84]

The planting volume of new seedlings vary across different administrative districts, ranging from 5-7 m^2 per person in the western and northern sections to 17 m^2 per person in the Medeu district. The Bostandyk district has the highest amount of park spaces at 200.5 hectares and Nauryzbai district has the lowest at only 8.46 hectares (see table 4). Protected areas - Ile-Alatau National Park, the Main Botanical Garden, the State regional natural park Medeu and the Almaty Museum - cover 31.3 per cent of green spaces in Almaty.[85]

Overall, Almaty is a city that values its green spaces and recognizes the importance of sustainable development for the benefit of its residents. With its Green Space Development Strategy 2030, the city is taking concrete steps towards achieving its goals and improving the well-being of its citizens.

Table 3 **Parks on the territory of the city of Almaty, 2022**

Districts	*Number of hectares*	*Percentage to total*
Alatau	29.57	5
Almaly	91.68	15
Auezov	59.38	9
Bostandyk	200.50	32
Medeu	97.43	15
Nauryzbai	8.46	1
Turksib	87.60	14
Zhetysu	56.75	9
Total:	**631.37**	**100**

[83] Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics (2022). Statistical Bulletin: Water supply and sanitation systems in the city of Almaty for 2022. Available at https://old.stat.gov.kz/region/268020/statistical_information/industry/75157.

[84] Almaty City Akimat (2020). Almaty city development programme until 2025 and the medium-term outlook until 2030.

[85] Almaty City Akimat. Green City Action Plan for the City of Almaty, 2022. Available at: https://www.ebrdgreencities.com/our-cities/cities/almaty/.

Source: Elaborated from Almaty City Government, 2022.

The city of Almaty is facing a significant challenge with its trees as a variety of factors are causing them to age quickly and become damaged. Emissions from cars, utility networks, street cleaning chemicals, and construction works all contribute to these issues.[86] This has led to an estimated 84,000 damaged trees in the city, with 5,000 of them needing to be cut down by the end of 2022 for safety reasons broken down as follows: 350 in Alatau district, 900 in Almaly district, 900 in Auezov district, 900 in Bostandyk district, 500 in Zhetysu district, 700 in Medeu district, 50 in Nauryzbai district and 700 in Turksib district. However, efforts are being made to address the problem, with over 130,000 trees and shrubs planted in Almaty over the last three years.[87]

Waste

In terms of waste management, Almaty has a moderate score, with 86 per cent of total waste being sent to sanitary landfills and 14 per cent being recycled. However, there is no data reported regarding solid waste that is disposed of through burning, incineration, or in an open dump.

Currently, municipal garbage is collected without any segregation, and research has found that food waste makes up 39.77 per cent of municipal solid waste (MSW), 10.53 per cent plastic trash and 8.99 per cent paper waste, including packaging waste, while the rest is unclassified due to non-segregation.[88]

There is only one municipal solid waste sorting facility (MSWSF) in the city, with plans to develop additional capacities for the deep processing of secondary raw materials. The current MSWSF was built in 2018 as a public-private partnership project and cost KZT 5.4 billion. It has a capacity of 550 thousand tons/year. The facility has a site for storage and processing of wood waste and it is planned to provide a site for construction wastes.[89]

There are 82 waste collection operators in Almaty, in addition to Tartyp Company which is the major waste collection operator,[90] and the whole population enjoys their services.[91] However, there are no established guidelines for municipal waste management. Only 20 per cent of landfills or 603 units nationwide meet hygienic and environmental standards, and the Karasai landfill that services Almaty does not conform to sanitary standards.[92]

Air quality

Almaty has poor performance in terms of air quality with samples of collected air revealing an unfavourable air quality index (AQI). Environmental surveys in the city of Almaty revealed that there are high levels PM2.5 at 36 micrograms (µg), PM10 at 475 µg, nitrogen dioxide (NO_2) at 81µg, sulfur

[86] Almaty City Akimat. Almaty city development programme until 2025 and the medium-term outlook until 2030.
[87] Almaty City Akimat. Green City Action Plan for the City of Almaty, 2022. Available at https://www.ebrdgreencities.com/our-cities/cities/almaty/.
[88] Almaty City Akimat. Almaty city development programme until 2025 and the medium-term outlook until 2030.
[89] Ministry of Ecology and Natural Resources. State of Environment Report of Kazakhstan 2021. Pgs 491-492, available at https://ecogosfond.kz/orhusskaja-konvencija/dostup-k-jekologicheskoj-informacii/jekologijaly-zha-daj/r-orsha-an-ortany-zhaj-k-ji-turaly-ltty-bajandamalar/
[90] Almaty City Akimat. *Green City Action Plan for the City of Almaty*, 2022. Available at: https://www.ebrdgreencities.com/our-cities/cities/almaty/.
[91] The Government of Kazakhstan. Voluntary National Review of Kazakhstan on the implementation of the 2030Agenda for Sustainable Development. p. 139. Available at: https://hlpf.un.org/sites/default/files/vnrs/2022/VNR%202022%20Kazakhstan%20Report%20English.pdf.
[92] Almaty City Akimat. *Green City Action Plan for the City of Almaty*, 2022. Available at: https://www.ebrdgreencities.com/our-cities/cities/almaty/.

dioxide (SO_2) at 34 µg and ozone (O_3) at 24 µg in the air. However, total greenhouse gas emissions per capita are relatively low, with only 13.9 tonnes of CO_2 emitted per person per year.

Growing industries and air pollution are the main contributors to air pollution in Almaty. Stationary sources alone emit a significant amount of air pollutants, with over 10,350 registered stationary sources emitting air pollutants, including 151 centralized heat plants and localized boilers.[93] Air pollutants from these sources have substantially increased from 15,100 metric tons in 2005 to 46,100 metric tons in 2022. Meanwhile, the motor vehicle fleet was responsible for over 44,845 metric tons of air pollutants in 2020, which is more than 50 per cent of total emissions in Almaty.[94]

With the city`s natural depression and temperature inversions, emissions accumulate and generate high concentrations of air pollutants. It is clear that geographical features contribute to high levels of urban air pollution.

Energy

The energy consumption performance of Almaty was found to be poor, with only 5.1 per cent of energy coming from renewable sources. The city's electricity consumption was also high, averaging approximately 650 kilowatts (kWh) per capita per year. Public buildings were found to consume more energy than target levels, reported at 138 e-kWh per m^2 of floor space per year. Total thermal energy consumption per capita in Almaty was 10.21 gigajoules (Gj) per year.

According to the Almaty Municipal Energy Efficiency Plan for 2030, among public buildings, schools are the largest energy consumer, followed by health-care units. Educational facilities and public offices tend to overheat because of the lack of thermostat valves to regulate temperature of heating systems.

The housing stock of Almaty is also highly deteriorated with low energy efficiency, contributing to high energy usage for heating.[95] In 2018, the residential sector accounted for 30 per cent of the final energy consumption of Kazakhstan, making it the second-largest user after industry. Long winters, dilapidated housing stock and heat losses all contribute to high energy usage for heating.[96]

Additionally, deteriorating communal utilities networks and an inefficient tariff policy were found to be contributing factors to the city's energy consumption issues. About 811 km of heat networks or 60 per cent of the total network have reached the end of their service life and 36 per cent of gas networks are already worn out. The latter is also causing a challenge in guaranteeing an accident-free, continuous and secured gas supply to people. The deterioration and breakdown of the energy supply networks are also related to an inefficient tariff policy. In the past 15 years, heat tariffs have increased 1.8 times on an average annual increase of 4.1 per cent and gas tariffs have increased by 2.1 times on an annual average increase of 5.2 per cent.[97]

[93] Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics (2022). Emission of air pollutants from the stationary sources timeseries. Available at https://stat.gov.kz/ru/industries/environment/stat-eco/

[94] Ministry of Ecology and Natural Resources. Collection of the National State of Environment Reports of Kazakhstan, 2020, pgs 484-485. Available at https://ecogosfond.kz/orhusskaja-konvencija/dostup-k-jekologicheskoj-informacii/jekologijaly-zha-daj/r-orsha-an-ortany-zhaj-k-ji-turaly-ltty-bajandamalar/

[95] Almaty City Akimat . Green City Action Plan for the City of Almaty, 2022. Available at: https://www.ebrdgreencities.com/our-cities/cities/almaty/.

[96] International Energy Agency. Clean Household Energy Consumption in Kazakhstan: A Roadmap, 2020. Available at https://iea.blob.core.windows.net/assets/a064b82a-4e4c-41ce-a8ac-047e410f0582/Clean_Household_Energy_Consumption_in_Kazakhstan_-_A_Roadmap.pdf.

[97] Almaty City Akimat. Almaty city development programme until 2025 and the medium-term outlook until 2030.

KPI evaluation results: Society and Culture

Almaty provided data for all 29 society and culture KPIs. The assessment of the KPI data for Almaty within the society and culture dimension showed excellent performance of the city in the housing, health and education sub-dimensions and moderate performance in safety, culture and social inclusion.

Housing

The analysis of the data showed that Almaty has a strong overall performance within the housing sub-area. Only 3.7 per cent of the population of Almaty was reported as living in slums, informal settlements or inadequate housing as of 2022, indicating strong performance. However, housing expenditure is moderately scored, with 7.3 per cent of total household income reported as spent on housing at the time of the evaluation.

Almaty has the largest portion of urban housing stock in the country, accounting for 19.9 per cent as of 2021. The city also has the second highest housing provision rate, with 29 m^2 per resident after Astana with 30.6 m^2 per resident.

Despite the governments' efforts, housing still represents a significant socio-economic issue in Almaty due to its excessive cost and poor condition. The urban centre of Almaty is 190 per cent more expensive to live in than the national average. Between 2001 and 2015, housing expenses quadrupled after accounting for inflation.[98]

Moreover, the city is facing challenges in replacing the old housing stock. It currently has around 1,400 two-story homes from the 1930s to 1975 that have reached the end of their service life, and more than 60,000 citizens live in them. The city has demolished 56 dilapidated houses in the past ten years (out of a total number of 948 dilapidated houses) and constructed 63 multi-apartment residential buildings with 2,368 flats.[99]

The demand for affordable rental accommodation is particularly strong in developing metropolitan agglomerations that serve as destinations for internal migratory movements. Currently, it is solely met by the provision of rental housing held by citizens in a semi-legalized commercial rental housing sector.[100]

Health

The performance of Almaty across the health sub-dimension was excellent, with 100 per cent of city inhabitants having electronic health records and 81.8 per cent covered by basic health insurance or the public health system. The city also has favourable maternal death rates and a high number of physicians and hospital beds per 100,000 inhabitants.

Maternal deaths per 100,000 inhabitants totalled 73.84, 685.68 physicians were working and 584.63 in-patient hospital beds per 100,000 inhabitants were reported in Almaty at the time of the survey.[101]

---

[98] Kenzhekhan Kabdesov . Worldwide commuting trends in megacities and the case of Almaty. Conference: Sustainable Economics at Dunaújváros, Hungary, July 2022. Available at https://www.researchgate.net/publication/362761347_Worldwide_commuting_trends_in_megacities_and_the_case_of_Almaty.

[99] Almaty City Akimat. Almaty city development programme until 2025 and the medium-term outlook until 2030.

[100] United Nations Economic for Europe. Country Profiles on the Housing Sector – Republic of Kazakhstan (2018).Available at https://unece.org/sites/default/files/2022-01/CP_Kazakhstan_web.ENG_.pdf.

[101] The total number of in-patient hospital beds corresponds to moderate city performance relative to the established benchmark.

The average life expectancy of new-born residents in Almaty was 71.97 years for the period 2017-2021, indicating strong performance.

Education

Within the education sub-area, Almaty has strong overall performance, with 100 per cent of primary and secondary school-aged children enrolled in public or private schools and 98 per cent of students with access to classroom ICT facilities. However, to the city's higher education attainment at 33,000 higher education degrees per 100,000 inhabitants and adult literacy rate at 73.4 per cent at the time of survey are only moderately scored.[102]

Safety

The analysis of KPI data for Almaty falling in the safety sub-dimension revealed moderate overall performance. There were 47.06 violent crimes and 4.79 traffic-related fatalities per 100,000 inhabitants reported in the survey year. The police service in Almaty also scored favourably, with 276.41 police officers per 100,000 inhabitants registered in the city. However, the city showed poor performance in terms of fire service and emergency services response time, with only 39.51 firefighters per 100,000 inhabitants and an average emergency response time of 9.7 minutes.

Although there were no natural disaster-related deaths reported in 2022, 24.7 per cent of the population of Almaty reported living within disaster-prone areas. The city has risk and vulnerability assessments for disaster mitigation available, and total disaster-related economic losses amounted to 0.012 per cent of the city's GDP in 2021.

Most of the emergency events in Almaty come from fires and the other man-made events, with the COVID-19 pandemic giving 19,028 cases and 389 deaths in 2020 and 185,766 cases and 2,194 deaths in 2021.[103] The Almaty City Department of Emergency Situations registers up to ten earthquakes and several other cases of natural disasters annually, which usually form no more than 2 per cent of emergencies in the city. [104] According to the "Risk Informed Infrastructure Planning Central Asia Pilot in Kazakhstan and Kyrgyzstan" study by the United Nations Economic and Social Commission for Asia and the Pacific, the ratio of Average Annualized Loss (AAL) to capital stock in Almaty Province was 1.4 per cent and its contribution to total AAL in Kazakhstan was 36.3 per cent.

Risk from flash floods coming from the rivers of Almaty is high, despite a flood protection infrastructure. The infrastructure is old (built 50-70 years ago) and, as such, requires considerable investments for its reinforcement. Monitoring and early warning could save lives, but floods cause damage that could potentially cause casualties. The flash floods on Kargaly River in 2015[105] and 2019[106] brought significant damages to many households in Almaty, which bring the importance of better disaster preparedness and risk reduction for Almaty.

Culture

[102] Data corresponds to data obtained during the 2009 Census for Almaty, during which time 31 per cent of all city inhabitants were reported as having obtained at least one higher education degree; cf. 36 per cent nationally according to media reports for Kazakhstan in 2017.

[103]Almaty City Department of Emergency Situations . Analysis of Emergency Situations in the city of Almaty for 2021. Available at https://www.gov.kz/memleket/entities/emer-almaty/documents/details/261186?lang=ru

[104] Almaty City Department of Emergency Situations. Official website. Available at https://www.gov.kz/memleket/entities/emer-almaty?lang=ru

[105] *Tengri News (Almaty) (2015).* "Village in Almaty. How it was", 23 July 2015. Available at https://tengrinews.kz/fotoarchive/sel-v-almatyi-kak-eto-byilo-728/

[106] *Zakon.Kz* (Almaty) (2019). "A bird's eye view of the mudflow in Almaty", 14 August 2019. Available at https://www.zakon.kz/4981478-sel-v-almaty-s-vysoty-ptichego-poleta.html

Almaty performed moderately in the culture sub-area, with 1.5 per cent of the total city operating budget reported as spent on the preservation, protection and conservation of natural heritage and culture. However, the city demonstrated weak performance in terms of cultural infrastructure, with only 15.85 reported cultural institutions per 100,000 inhabitants.

Social inclusion

Almaty revealed moderate performance within the social inclusion sub-category. The city performed strongly with regard to poverty at 5.2 per cent of city inhabitants living below the poverty line and gender income inequality at 0.88 female to male ratio of average hourly earnings in 2021.[107] In terms of income inequality, the performance of Almaty was weak, with a Gini Coefficient of 0.31 in 2021.[108]

The city also showed moderate performance in terms of voter participation, with 30.15 per cent of eligible voters reported as having voted in recent municipal elections.[109] Its performance in availability of childcare services was also moderate, with 62.51 per cent of pre-school aged children reported as having been covered by public and private day-care centres at the time of survey.

Other

In terms of local food production, 35 per cent of the total food supplied to the city was produced within 100 km of the urban area.

Overall, while Almaty has performed well in some areas, there is room for improvement in others, especially disaster preparedness and risk reduction.

[107] "8.5.1 "Average hourly earnings by gender, age, types of economic activity and regions", in the city of Almaty for 2021 - 1572 KZT. Among men in the city of Almaty - 1679 KZT, among women - 1472 KZT. Average USD rate 2021 - 431,8", Akimat of the city of Almaty, 2022.

[108] The figure of 0.31 corresponds to the Gini Coefficient when selecting for the top and bottom 20% of income earners in the city of Almaty, in contrast to the top and bottom 10%. Information and analytical system Taldau of BNS, Gini Coefficient, for 10% and 20% population groups, BNS, 2021.

[109] As per municipal elections for deputies of the Maslikhat of the city of Almaty of the VII Convocation taking place on 10 January 2021. Akimat of the city of Almaty, 2021. Available at https://www.gov.kz/memleket/entities/almaty/press/article/details/34689?directionId=8424&lang=ru&ysclid=lbd8eji4si435505072.

6. Recommendations

Urban policy and governance framework

The City Government of Almaty is presented with recommendations which aim to address the main areas of concern and relevant issues that emerged from the evaluation of Almaty based on the KPIs for SSC. The City Government is invited to consider the recommendations.

Urban planning

Almaty faces multiple urban challenges, including urban sprawl, unaffordable housing, traffic congestion and air pollution. To address these issues, Almaty has introduced a new urban planning approach, including the Master Plan of Almaty until 2040 based on the concept of comfortable compact living with human-scale neighborhood development. To further improve urban planning, it is recommended to:

1. Strengthen the capacities of relevant departments of the City Government and respective institutions for the implementation of ongoing sectoral programmes **(short and medium-term)**.

2. Empower the City Government and relevant departments and institutions to enable participatory and intersectoral approaches to implementation of the newly adopted Master Plan of Almaty by 2040 **(short and medium-term)** through:

    a) Establishing regular dialogue among authorities, developers and stakeholders to communicate the concept, scope and objectives of the Almaty Master Plan by 2040;
    b) Developing a comprehensive stakeholder participation plan for the Master Plan to engage the inhabitants, especially representatives of vulnerable groups (women, disabled, migrants etc.);
    c) Connecting the city level spatial planning with the planning at the district and area level;
    d) Promoting research support to the implementation of the Master Plan through launching programmes at universities in cooperation with the research Institute “Almatymasterplan”, which was tasked to organize the implementation of the Almaty Master Plan by 2040.

Financial framework

The national government of Kazakhstan provides institutional support to promoting investments into the economy of the city: there are representatives of Kazakh Invest, the Socio-Entrepreneurial Corporation which provides business supports and implements the "one-stop shop" principle for domestic and foreign entrepreneurs and investors to attract investments. Almaty city government also established a joint stock company “Almaty" to promote investments and support entrepreneurship. Kazakhstan has sufficient legal framework to support public-private partnerships; and a Regional PPP Centre already operates in Almaty. It is therefore recommended to :

Increase the effectiveness of the institutional framework for FDIs in order to increase the volume and quality of attracted investments. This can be done through the support of the City Government and the Regional Almaty Centre on Public Private Partnership to further building capacities of the existing regional and city level institutions for the attraction of investments, such as the Almaty PPP Centre **(medium-term)**.

Urban mobility

The daily traffic in Almaty is estimated to consist of nearly half a million motor vehicles, including those entering the city from outside its limits. This results in traffic congestion and an extra burden on the transportation system. To address these challenges and improve urban mobility, Almaty has been building different types of transport infrastructure. To address negative consequences of the traffic congestion, the following measures are recommended.

1. In order to decrease air pollution from the motor vehicle fleet in Almaty, a number of measures can be implemented:
   a) Adopt temporary measures during peak-pollution periods, such as alternating driving days for cars with even- and odd-numbered license plates, and, at the same time, making public transport free during these limited periods, and restricting the circulation of old and polluting cars from the city centre **(short-term)**.
   b) Improve access for car and truck drivers to higher-quality fuels and incentivize car owners to transfer from liquid fuels of low quality to natural gas, petroleum gases or electric propulsion. Economic incentives can also help facilitate the renewal of the car fleet **(short-term).**

2. The city should also consider to:
   a) Deploying intelligent transportation systems.
   b) Ensuring effective and reliable public transport systems.
   c) Promoting active (non-motorized) mobility in cities.
   d) Enforcing environmental considerations in urban spatial planning. - Proactively consider the characteristics of the sites to develop, such as prevailing winds and morphology and the possible effects of the localization of future built-up volumes, to maximize the exploitation of natural light and avoid drawbacks such as street canyons determined by the buildings' height **(mid and long-term)**

Housing

The city implements programmes to provide affordable housing to vulnerable groups however there are still multiple challenges in the provision of affordable decent housing, especially because of a large portion of the housing stock which is outdated and requires refurbishment. In addition, due to the internal migration, there is high demand for affordable rental accommodation, which is not addressed.To address the housing needs of Almaty beyond 2025, the city should take a comprehensive approach that integrates the requirements of the Almaty Master Plan by 2040 and the needs of the city's older neighbourhoods. This includes:

1. Carrying out inventory work on old residential buildings and taking steps to protect the interests of socially vulnerable population, with a focus on integrating a gender dimension **(short-term)**
2. Developing new standards for housing that accommodate the requirements of the new Master Plan of Almaty by 2040, especially in regard to polycentres **(medium-term)**
3. Develop a programme for improved municipal management and self-governance in the housing sector, which may consider a diversified, better established service providers and customer relationship management and maintenance of the housing stock **(long-term)**
4. Develop a sustainable community management programme for micro districts that considers the importance of co-governance and sustainable utilities and municipal solid waste management. This programme should prioritize greening the city and neighbourhoods, reducing air pollution and promoting energy-saving and efficiency practices **(long-term).**

Energy

The energy production of Almaty requires improvement and diversification. At the moment, only 5.1 per cent of energy coming from renewable sources. The city's electricity consumption is high, averaging approximately 650 kilowatts (kWh) per capita per year. Energy performance of buildings is low, with high level of energy consumption - total thermal energy consumption per capita in Almaty was 10.21 gigajoules (Gj) per year.

It is recommended to:

1. Explore opportunities for transferring from direct gas supply to secondary energy sources in order to increase energy efficiency. This will require replacing or rehabilitating obsolete supply infrastructure and implementing cost-reflective regulation of retail tariffs. Consumers should be made aware of the true cost of energy to incentivize them to save energy.
2. Implement clear regulatory measures for heat supply to public buildings and housing funds under the Law on Energy Saving and Increase of Energy Efficiency.[110] .

Air pollution

It is crucial to address the issue of air pollution in urban areas, particularly in and around Almaty (se above the section on urban mobility). To do this, the following are recommended:

1. Increase the capacity for urban environmental monitoring and management. This can be achieved by strengthening the network and enhancing the capacities of ambient air quality monitoring. It is also important to control and manage the levels of harmful pollution to ensure the safety of the population. Additionally, it is recommended to conduct a detailed study of the health status of the population **(short-term)**
2. It is essential to focus on improving air quality and this could be done through the following:
   a) Provide incentives to encourage cleaner production and the installation of air pollution prevention technologies.
   b) Support oblast and other local authorities to analyze industrial emissions and urban developments such as traffic and heating and include in their air quality plans and programmes measures for reducing air pollution.
   c) Encourage oblasts and other local authorities to draw up air quality plans and programmes that includes ways to reduce and prevent exceeding air quality standards **(medium-term)**

Green and open spaces

The city government supports the preservation of green spaces, including through its Green Space Development Strategy 2030. It is further recommended to:

1. Preserve and promote green spaces in urban areas, especially in older residential areas in the city centre **(short-term).**
2. Integrate urban forestry practices in Almaty through awareness-raising and capacity-building initiatives among local authorities, institutions and communities **(short-term).**
3. Build awareness and capacity among institutions and local authorities on the Trees in Cities Challenge and its potential for greening Almaty **(medium-term).**

[110] The Law on Energy Saving and Increase Energy Efficiency. Available at https://adilet.zan.kz/eng/docs/Z1200000541.

Urban water management and blue spaces

The Almaty Development Strategy 2050 includes important activities aimed at the preservation of green and blue spaces, including through the planned creation of a "green" river corridor crossing the city from foothills to lowlands and supportive natural ventilation of the city. As the city is growing fast, including through the internal migration of the population, there are needs in the future development of the water management system. It is recommended to:

1. Prioritize the rehabilitation and conversion of riversides in Almaty into recreational zones. This will not only extend the area of blue spaces but also potentially rehabilitate the banks of the manmade/irrigation infrastructure in the city **(medium-term).**
2. Review and assess causes of the poor functioning of the rainwater drainage network and infrastructure in the city **(short-term).**
3. Take measures to assess and reinforce natural drainage on sub-mountainous parts of Almaty to prevent small-scale landslides and flash floods. This includes exploring the opportunity for integrating watershed management practices in the city, which could also help to manage the street waste waters **(medium-term).**
4. Elaborate and further implement the Programme on Improved Water Supply and Sanitation for the period beyond 2025. This includes further rehabilitation of water transportation and its end use in order to reduce transportation water losses **(short-term).**
5. Continue the practice of water metering and its digitalization **(medium-term).**

Waste management

The Almaty City Development Programme until 2025 and medium-term prospects until 2030 includes measures aimed at providing the population with services for the collection of solid waste and creating the necessary infrastructure for waste collection. The programme aims to increase waste recycling by 30-40 per cent by the end of 2030. To improve the waste management system, it is recommended to:

1. Undertake specialized studies on the lifecycle of the main components of municipal solid waste in Almaty. Elaborate and propose long term measures for improvement of the municipal waste management in Almaty **(short-term).**
2. Design and run a mass awareness-raising campaign among the population on household waste separation, recycling and management. This will help people understand the importance of waste management and encourage them to take responsibility for their own waste **(medium-term).**
3. Design, justify and elaborate a long-term sustainable waste management vision and strategy for Almaty. This will guide efforts to reduce waste, increase recycling and create a cleaner, healthier environment for all Almaty residents **(long-term).**

Quality of construction, urban infrastructure and utility services

1. When it comes to the quality of construction, it is important to consider the seismic activity in the region. The city can learn from recent earthquakes in neighbouring countries, such as Turkiye and Syria, to ensure that buildings are designed with safety in mind, using appropriate construction materials and taking into account the spacing of streets and infrastructure **(short-term).**
2. Look into advanced urban planning practices and concepts like smart sustainable cities and new standards for urban housing and infrastructure to improve the overall quality of construction and urban infrastructure development **(medium-term).**
3. Further improve utility services in terms of customer relationships, billing and encouraging customers to save on their usage **(long-term).**

Monitoring and evaluation framework for strategic planning

Despite some progress in implementing development programmes and setting target indicators, more could be done to improve data availability at the city level in Almaty. The Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan has made progress in producing available data, but there is still significant space for improvement.

Efforts need to be made to improve resource use in the city, which could help trace product lifecycle chains, and provide proper waste management and environmental statistics on water use, sanitation, urban land use and infrastructure.

The Bureau of Statistics and the other institutions are needed to collect and provide to the city data on the following indicators:

Economy dimension

- Water Supply ICT Monitoring
- Drainage/Storm Water System ICT Monitoring
- Traffic Monitoring
- Integrated Building Management Systems in Public Buildings

Environment dimension

- Wastewater Treatment
- Solid waste management and treatment

7. Bibliography and references

Almaty City Akimat (2019). Shifting Paradigms, Circular Economy Opportunities in Almaty, a metabolic approach to define a resource efficient and low-carbon future for the city, May 2019. Available at https://shiftingparadigms.nl/wp-content/uploads/2019/02/Circular-Economy-opportunities-in-Almaty-Web-spread-20190627-1.pdf.

United Nations Economic Commission for Europe (2019). Kazakhstan, Environmental Performance Reviews, Third Review. Available at https://unece.org/sites/default/files/2021-08/ECE_CEP_185_Eng_0.pdf.

Carlsen, Lars and others (2013). Assessment of the Air Quality of Almaty. Focusing on the Traffic Component. International Journal of Biology and Chemistry, 5, №1, 49, 2013.

Grützner, Christofer and others (2017). Active Tectonics Around Almaty and along the Zailisky Alatau Rangefront, 2017. In: Tectonics 36 (10), P. 2192-2226. Available at http://dx.doi.org/10.17863/CAM.15800.

Mushketov, Ivan (1890). Le tremblement de terre de Verny, 28 Mai (9 Juin) 1887. Memoires du Comite Geologique, X(1), 65; Tatevossian, R. E. (2007). The Verny, 1887, earthquake in Central Asia: Application of the INQUA scale, based on coseismic environmental effects. Quaternary International, 173, 23–29.

World Bank (2021). Climate Risk Country Profile: Kazakhstan. Available at: https://climateknowledgeportal.worldbank.org/sites/default/files/2021-06/15834-WB_Kazakhstan%20Country%20Profile-WEB.pdf.

United Nations Framework Convention on Climate Change (2017). Seventh National Communication and third Biennial report of Kazakhstan to the UN Framework Convention on Climate Change.

United Nations Environment Programme (2017). Outlook on Climate Change Adaptation in the Central Asian Mountains. Available at https://gridarendal-website-live.s3.amazonaws.com/production/documents/:s_document/339/original/CentralAsia_screen.pdf?1496827676.

Almaty City Akimat (2020). Almaty city development program until 2025 and the medium-term outlook until 2030.

Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics (2023). “Dynamics of main socio-economic indicators.” Available at: https://stat.gov.kz/region/268020/dynamic.

Almaty City Akimat (2020). The Comprehensive Plan "New Almaty" for 2020 – 2024.

Islyami, Aidan (2020). Internal Migration in the Countries of Asia, 2020. Available at https://link.springer.com/chapter/10.1007/978-3-030-44010-7_18.

World Bank (2018). Urbanization in Kazakhstan – Desirable cities, Unaffordable Housing and the Missing Rental Market. Available at https://openknowledge.worldbank.org/server/api/core/bitstreams/414f85ef-1b5e-5374-b230-3e7d74f60620/content.

The Government of Kazakhstan. Decree of the of 31 January 2020 No. 23, “On the Approval of the Comprehensive Plan "New Almaty" for 2020 – 2024.” 2020. Available at: https://adilet.zan.kz/rus/docs/P2000000023.

Kazakh Invest (2022). Web profile of Almaty: Economy. Available at https://almaty.invest.gov.kz/about/economy/.

Organisation of Economic Cooperation and Development (2020). Tackling Coronavirus (COVID-19): Contributing to a Global Effort, 20 April 2020. Available at https://www.oecd.org/eurasia/competitiveness-programme/central-asia/COVID-19-CRISIS-IN-KAZAKHSTAN.pdf.

The Times of Central Asia (2022). Kazakhstan: creating national distribution system for agricultural products. Available at https://www.timesca.com/index.php/news/22412-kazakhstan-creating-a-national-distribution-system-for-agricultural-products.

World Bank Group (2020). Navigating the Crisis: Kazakhstan Economic Update, Summer 2020. Available at https://documents.worldbank.org/en/publication/documents-reports/documentdetail/155811595364689964/kazakhstan-economic-update-navigating-the-crisis.

Asian Development Bank (2023), ADB COVID-19 Response: Kazakhstan and ADB, 2023. Available at https://www.adb.org/countries/kazakhstan/covid-19-response.

Durrani, Naureen and others (2021)., Education, gender and family relationships in the time of COVID-19: Kazakhstani teachers', parents' and students' perspectives. Partnerships for Equity and Inclusion (PEI) Pilot Project Report. Graduate School of Education, Nazarbayev University. Available at https://www.researchgate.net/publication/352283100_GENDER_AND_FAMILY_RELATIONSHIPS_IN_THE_TIME_OF_COVID-19_KAZAKHSTANI_TEACHERS'_PARENTS'_AND_STUDENTS'_PERSPECTIVES_PILOT_PROJECT_REPORT.

United Nations Economic and Social Commission for Asia and the Pacific (2020). Kazakhstan: COVID Country Responses, Policy Responses, 15 July 2020. Available at https://www.unescap.org/sites/default/files/Kazakhstan_COVID%20Country%20Responses_updated.pdf.

European Union External Action Service (EEAS) (2022). EU global response to coronavirus in the Republic of Kazakhstan: Providing emergency response to the COVID-19 outbreak, enhancing long-term resilience of the health system, April 2020. Available at https://www.eeas.europa.eu/sites/default/files/infographic_-_eu_response_to_covid-19_kazakhstan_eng.pdf.

United States Agency for International Development (2020), U.S. Assistance to Kazakhstan for the COVID-19 Crisis. Available at https://www.usaid.gov/kazakhstan/fact-sheets/us-assistance-kazakhstan-covid-19-crisis.

Kerimray, Aiymgul and others (2020). Assessing air quality changes in large cities during COVID-19 lockdowns: The impacts of traffic-free urban conditions in Almaty. Science of the Total Environment, vol. 730. Available at https://www.sciencedirect.com/science/article/pii/S0048969720326966?via%3Dihub.

World Health Organization (2023), Kazakhstan, WHO Coronavirus (COVID-19) Dashboard. Available at https://covid19.who.int/.

Almaty City Akimat. Green City Action Plan for the City of Almaty, October 2022. Available at https://www.ebrdgreencities.com/our-cities/cities/almaty/.

United Cities and Local Governments & Organisation of Economic Cooperation and Development (2016). Kazakhstan, Basic Economic Indicators. Available at https://www.oecd.org/regional/regional-policy/profile-Kazakhzstan.pdf.

Organisation of Economic Cooperation and Development (2017), Urban Policy Reviews: Kazakhstan. Available at https://read.oecd-ilibrary.org/urban-rural-and-regional-development/oecd-urban-policy-reviews-kazakhstan_9789264268852-en#page172.

Almaty City Akimat. Organigram of the City Government of Almaty. Available at: https://www.gov.kz/memleket/entities/almaty/press/article/details/89805?lang=ru

The Government of Kazakhstan (2022). Resolution on approval of the Concept of Investment Policy in the Republic of Kazakhstan by 2026", 2022. Available at https://ppp-center.kz/almaty

Law on public-private partnership of Kazakhstan. Available at https://adilet.zan.kz/rus/docs/Z1500000379

Law on Concessions of Kazakhstan. Available at https://adilet.zan.kz/rus/docs/Z1500000379

Asian Development Bank (2021). Kazakhstan Development Finance Assessment. Available at https://www.adb.org/sites/default/files/publication/664451/kazakhstan-development-finance-assessment.pdf

National Bank of Kazakhstan (2023). Official Foreign Exchange Rates on average for the period. Available at: https://www.nationalbank.kz/ru/news/oficialnye-kursy

United Nations Economic Commission for Europe. Smart Sustainable Cities Profile – Survey 2021.

The Government of Kazakhstan. Resolution No. 1434 on General Scheme of the Republic of Kazakhstan, December 2013.

The Government of Kazakhstan. National report of Kazakhstan on Housing and Sustainable City Development, 2016.

The Government of Kazakhstan, General Plan. Available at http://astana.gov.kz/ru/page/genplan.

Law No. 242-II on architectural, urban planning and construction activities in Kazakhstan. Available at https://online.zakon.kz/document/?doc_id=1024035&pos=72;-88#pos=72;-88.

The Government of Kazakhstan. Resolution No. 790 "On approval of the State Planning System in Kazakhstan." 29 November 2017. Available at https://adilet.zan.kz/rus/docs/P1700000790.

The Government of Kazakhstan (2022). Voluntary National Review Kazakhstan on the implementation of the 2030 Agenda for Sustainable Development. Available at: https://hlpf.un.org/sites/default/files/vnrs/2022/VNR%202022%20Kazakhstan%20Report%20English.pdf.

The Government of Kazakhstan. Digital Kazakhstan State Programme. Available at https://egov.kz/cms/en/digital-kazakhstan.

Almaty city Department of Digitalisation. Strategy "Smart Almaty" for 2020-2025. Available at: https://www.gov.kz/memleket/entities/almaty-digital/documents/details/51909?lang=en.

Almaty city Department of Digitalisation website. Available at: https://www.gov.kz/memleket/entities/almaty-digital?lang=en

Almaty city Department of Digitalisation. Almaty Data Lake web-portal. Available at: https://adl.digital-almaty.kz/en/

Almaty city Department of Digitalisation. Press release of 26.05.21 on Almaty Data Lake pilot phase implementation. Available at: https://digital-almaty.kz/en/content/26052021-almaty-city-department-digitalization-invites-residents-share-ideas-data-governance

Almaty city Department of Digitalisation. News Release of 08.11.22 on Almaty Data Lake. Available at: https://www.gov.kz/memleket/entities/almaty-digital/documents/details/368513?lang=en

Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistic (2022). Statistical Compendium: Environmental Protection and Sustainable Development in Kazakhstan for 2017-2021. Available at https://old.stat.gov.kz/official/industry/157/publication

Almaty-Su (2022). Investment Programme for 2020-2024. Available at http://almatysu.kz/wp-content/uploads/2020/01/%D0%A3%D1%82%D0%B2%D0%B5%D1%80%D0%B6%D0%B4%D0%B5%D0%BD%D0%BD%D0%B0%D1%8F-%D0%98%D0%9F-%D0%92%D0%A1-%D1%80%D1%83%D1%81.pdf.

Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics (2022). Statistical Bulletin: Water supply and sanitation systems in Kazakhstan, 2022. Available at https://old.stat.gov.kz/region/268020/statistical_information/industry/75157.

Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics (2022). Losses and non-accounted water consumption. Available at https://taldau.stat.gov.kz/ru/NewIndex/GetIndex/701767?keyword=.

Kazhydromet (2022). Information Bulletin on the State of Environment in Almaty, Almaty and Jetysuu Provinces for 2022. Available at https://kazhydromet.kz/ru/ecology/ezhemesyachnyy-informacionnyy-byulleten-o-sostoyanii-okruzhayuschey-sredy/.

Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics (2022). Unemployment rate in Kazakhstan. Available at https://taldau.stat.gov.kz/ru/NewIndex/GetIndex/702944?keyword=

Caravan-Kz (2022). How the mass migration to Almaty and Nur-Sultan caused the marginalisation of the population. Available at https://caravan-kz.turbopages.org/caravan.kz/s/gazeta/kak-massovaya-migraciya-v-almaty-i-nursultan-privela-k-marginalizacii-naseleniya-808812/

Vecher-Kz (2022). Media report on the meeting of the Akim of Almaty with population of the Turksib District. Available at https://vecher.kz/kak-reshayutsya-voprosi-elektrosnabzheniya-v-turksibskom-rayone-almati

The Green Building Information Gateway. Map of the BREEAM and LEED certified buildings in Almaty. Available at https://www.gbig.org/places/58214

The Astana Times. The Master Plan of Almaty until 2040 was approved on 22nd May 2023 (New Master Plan for Almaty to Decentralize City and Address Environmental Issues - The Astana Times; https://astanatimes.com/2023/05/new-master-plan-for-almaty-to-decentralize-city-and-address-environmental-issues/).

Almaty-Su. Water disinfection webpage . Available at https://almatysu.kz/?page_id=774&lang=ru

Ministry of Ecology and Natural Resources (2022). State of Environment Report of Kazakhstan 2021. Pgs 491-492, available at https://ecogosfond.kz/orhusskaja-konvencija/dostup-k-jekologicheskoj-informacii/jekologijaly-zha-daj/r-orsha-an-ortany-zhaj-k-ji-turaly-ltty-bajandamalar/

The Government of Kazakhstan (2022). Voluntary National Review of Kazakhstan on the implementation of the 2030 Agenda for Sustainable Development. p. 139. Available at: https://hlpf.un.org/sites/default/files/vnrs/2022/VNR%202022%20Kazakhstan%20Report%20English.pdf.

Agency for Strategic Planning and Reforms of Kazakhstan, Bureau of National Statistics (2022). Emission of air pollutants from the stationary sources timeseries. Available at https://stat.gov.kz/ru/industries/environment/stat-eco/

Ministry of Ecology and Natural Resources. Collection of the National State of Environment Reports of Kazakhstan, 2020, pgs 484-485. Available at https://ecogosfond.kz/orhusskaja-konvencija/dostup-k-jekologicheskoj-informacii/jekologijaly-zha-daj/r-orsha-an-ortany-zhaj-k-ji-turaly-ltty-bajandamalar/

International Energy Agency (2020). Clean Household Energy Consumption in Kazakhstan: A Roadmap, 2020. Available at https://iea.blob.core.windows.net/assets/a064b82a-4e4c-41ce-a8ac-047e410f0582/Clean_Household_Energy_Consumption_in_Kazakhstan_-_A_Roadmap.pdf.

Kabdesov, Kenzhekhan (2022). Worldwide commuting trends in megacities and the case of Almaty. Conference: Sustainable Economics at Dunaújváros, Hungary, July 2022. Available at: https://www.researchgate.net/publication/362761347_Worldwide_commuting_trends_in_megacities_and_the_case_of_Almaty.

United Nations Economic Commission for Europe (2018). Country Profiles on the Housing Sector – Republic of Kazakhstan. Available at https://unece.org/sites/default/files/2022-01/CP_Kazakhstan_web.ENG_.pdf.
Almaty City Department of Emergency Situations (2022). Analysis of Emergency Situations in the city of Almaty for 2021. Available at https://www.gov.kz/memleket/entities/emer-almaty/documents/details/261186?lang=ru

Almaty City Department of Emergency Situations. Official website. Available at https://www.gov.kz/memleket/entities/emer-almaty?lang=ru

Tengri News (Almaty) (2015). "Village in Almaty. How it was", 23 July 2015. Available at https://tengrinews.kz/fotoarchive/sel-v-almatyi-kak-eto-byilo-728/

Zakon.Kz (Almaty) (2019). "A bird's eye view of the mudflow in Almaty", 14 August 2019. Available at https://www.zakon.kz/4981478-sel-v-almaty-s-vysoty-ptichego-poleta.html

The Law on Energy Saving and Increase Energy Efficiency. Available at https://adilet.zan.kz/eng/docs/Z1200000541.

List of figures, tables and boxes

FIGURES

TABLES

BOXES

List of Interviewees[111]

- Department of Digitalization
- Department of Urban planning
- Department of Environment
- Department of Water supply
- Department of Energy and Energy Companies
- Department of Housing Construction
- Department of Development of Communal Infrastructure
- Department of Mobility
- Department of Green Economy

[111] All interviews were carried out in-person during the UNECE Mission to Almaty in November 2022.

Annex 1. Summary of national-level strategy planning documents according to year of issuance and expiration in the Republic of Kazakhstan (2022).

Policy	Year of issuance	Expiry date
Environmental Code of RK	2007 2021 New Reduction	
Strategy Kazakhstan 2050	2012	2050
Concept for Transition of the Republic of Kazakhstan to Green Economy	2013	2050
Action plan for the implementation of the Concept for transition of Kazakhstan to Green Economy 2021-2030	2020	2030
Decree of the Government of RK "On the State Planning System in RK"	2017	

Forecast scheme of territorial and spatial development of Kazakhstan	2019	2030
State program of regional development	2019	2025
National project for the development of entrepreneurship	2021	2025
National Project Zhasyl Kazakhstan	2021	2025
National project "Quality and affordable healthcare for every citizen" Healthy Nation	2021	2025
National project "Quality Education "Educated Nation"	2021	2025
National project "Technological breakthrough through digitalization, science and innovation"	2021	2025
National project "Strong regions - the driver of the country's development"	2021	2025
National project "Sustainable economic growth aimed at improving the welfare of Kazakhstanis"	2021	2025
National project for the development of the agro-industrial complex	2021	2025
National project "Safe country"	2021	2025
National Program Nurly-Zher 2020-2025	2019	2025
The State program of business support and development "Business Roadmap-2025"	2019	2025
Law of RK “On Energy Saving and increase of Energy Efficiency”	2012	
Interregional scheme of territorial development of Almaty agglomeration	2016	2035
Interregional Action Plan for the development of the Almaty agglomeration	2020	2030

Annex 2- Overview of local plans, programmes and strategies for Almaty

Areas	Plans, programmes, and strategies	Objectives	Policy measures
Policy framework and governance	Almaty Development Strategy 2050	• Effective city management • Reducing the share of state participation in the management of municipal assets and the economy of the city, and bringing the share of state participation in the competitive environment to the level of OECD countries • Increase the "Participation Budget" by at least 10 times	• Improve the quality of urban planning through transparency and open access to data, allowing informed decision making using smart city technologies • Polycentric model development • Effective management of existing assets, as well as a high level of involvement of citizens in decision-making processes and public consensus • Management of city assets based on the principles of

Areas	Plans, programmes, and strategies	Objectives	Policy measures
			maximizing the socio-economic return from them while minimizing risks to society and the environment • Application of the best world practices to improve the transparency and efficiency of budget expenditures, attract private financing, transfer of advanced technologies • In those areas where the private sector can operate, the functions of managing state assets will be transferred to a competitive environment • The development of the city will be based on the initiatives and proposals of citizens • Creation of an urban crowdsourcing platform to involve citizens in the implementation of urban tasks
	Green City Action Plan for the city of Almaty	Institutional structure for GCAP coordination and implementation 5 financed projects in the first 3 years	• Akimat Office for Green Project Implementation
Urban mobility	Almaty Development Strategy 2050	• Reduce up to 20% car trips • 90% of the city has sufficient density for public transport	• Transport links between the city and suburbs (electric train, light rail LRT) will be developed • Infrastructural development of the outskirts of the city, with easy access to public transport • Smart transport system for optimally traffic flows distribution • Awareness raising campaign • Creation of car-free or low-emission zones • Phase-out of diesel vehicles • Development of green, energy efficient public transport
	Almaty City Development Program until 2025 and medium-term	• Creation of a modern public transport system connecting all parts of the urban and suburbs areas • Stimulation of residents and visitors of the city to use public	• Optimization of the route network • Implement a new tariff policy for urban and suburban routes • Implementation of Vision Zero in the development of design

Areas	Plans, programmes, and strategies	Objectives	Policy measures
	prospects until 2030	transport	and estimate documentation for projects in the field of road transport infrastructure, road network, etc. with the adaptation of the necessary regulatory legal acts • Prepare and use for the purposes of urban planning and transport planning a unified transport model of the Almaty agglomeration • Strengthen technical and human resources • Create a link between the amount of subsidies and quality of service, improve the stability of the conditions for attracting private investment in public transport • Improve the system of regulation of taxi services and expand the practice of application in electric transport • Renewal of public transport stock and its conversion to an ecological type of fuel. By the end of 2025 transition of municipal and special equipment to compressed natural gas (methane) and electric traction • Promote sharing services through improved regulation and the creation of an appropriate infrastructure • Creation of a single traffic management center • Introduction a permit system "electronic waybill" for managing traffic in the city • Introduce 40 km of dedicated lanes for priority public transport • Translation 1,200 units diesel buses for gas and electric traction • Updated trolleybus fleet (200 units) • Commissioning of 2 new car parks and 5 new filling stations

Areas	Plans, programmes, and strategies	Objectives	Policy measures
			• Build charging infrastructure networks for public and personal electric transport • To introduce 3 new modern depots for electric buses • Install at least 200 stopping complexes of modern formats in different districts of the city • By 2027 put into operation the first line of high-speed light rail. • To introduce an additional 125 km of bike paths and bike lanes • Launch 30 new main suburban routes and ensure their connection with the existing 22 routes and new transport hubs in all directions
	The comprehensive plan New Almaty	Development of infrastructure, improvement of the quality of life of the population	• Road construction in 51 microdistricts • Reconstruction of the road network • Construction of transport interchanges and U-turn overpass
	Municipal Energy Efficiency Plan for the city of Almaty	• Extend and improve public transport services in Almaty city • Transport modal shift from private to public transport	**Investment measures: Energy Efficiency Investment Program** • Priority 3. Investments in Public Transport (9 EE measures including LED Metro lighting & EE escalators, Replacement of diesel busses by CNG, Extend of bike renting system, Traffic flow optimization and others) • Priority 8: Investments in Private Transport (3 measures including Enforcement of Vehicle Emissions Standards, empower technical inspectors, service stations, penalty system for non-compliance, Increase attractiveness of low emission vehicles: Development of Vehicle Charging Infrastructure Electric, LPG and CNG vehicles, Car parking Management and

Areas	Plans, programmes, and strategies	Objectives	Policy measures
			Restraint Measures in city center + inspection service)
	Green City Action Plan	• Coverage of the transport needs in the suburbs • Increase number of public transport users • Increase the share of shared mobility and increase the share of electric mobility • Increase traffic safety • Reduce private cars in the city centre	• Developing a high-performance public transport network • Transit Oriented Development (TOD) – Applying TOD in satellite city development • Connecting different transport modes: multimodal hubs • Increase the visibility of school areas in the city • Creating enjoyable cycling and walking routes • Establishment of Low Emission Zones
Housing	Almaty Development Strategy 2050	Reduce the degree of wear of the city's water supply networks to 45%	• Optimization of urban development, replacement of dilapidated and low-rise housing, moving large industrial sites out of the city • Introduction of innovative solutions that ensure high rates of construction and low cost of housing • The priority direction will be the use of energy-efficient technologies in the construction, modernization and operation of facilities. • All facilities will use the mode of rational and reasonable use of utilities. • Smart technologies for collecting and processing utility consumption, using differentiated tariffs. • Investments in the construction and reconstruction of utility networks will be increased to reduce network wear • To ensure transparency in the housing and utilities sector, a system of self-management of residential buildings will be introduced

Areas	Plans, programmes, and strategies	Objectives	Policy measures
	Almaty City Development Program until 2025 and medium-term prospects until 2030	The highest quality standards in the provision of public services	• Introduction of a new tariff policy for housing and communal services on the principle of "tariffs in exchange for investments" with the transition to the tariff policy "high consumption = more expensive tariff" by 2025 • Compensation of utility costs for socially vulnerable segments of the population • Till 2026 to construct 280 km of water supply networks in ten settlements for providing 100% access to centralized water supply in the city • Reconstruction of at least 104 km of water networks annually • Almaty will be 99.4% gasified by 2023. • Accelerated digitalization and introduction of smart grid technologies to reduce transportation losses and the share of unpaid water in the city's water supply system by 50% • 30 sewage pumping stations will be built by 2026 • Increase the coverage of residents with centralized sanitation to 95% by 2030 • Modernization of 22 small urban boiler houses by 2026 • Annual reconstruction of at least 39 km of heating networks • Implementation of a program to improve the energy efficiency of public buildings by 2026, which will increase heat savings by up to 40% • Reconstruction of 467 km of electric networks until 2025 • Implementation of a new software package and modernization of 44,000 LED lamps with SMART system support, with completion in 2026.

Areas	Plans, programmes, and strategies	Objectives	Policy measures
	The comprehensive plan New Almaty	Development of infrastructure, improvement of the quality of life of the population	• Construction of water supply and sanitation networks in 7 districts of the city
	Green City Action Plan for the city of Almaty	Increased resources use efficiency	• Energy Efficiency Programme for public buildings and facilities • Residential buildings retrofit programme • Almaty CHP-2 modernisation • Rehabilitation and modernisation of the District Heating (DH) infrastructure • Heat pumps and solar heating programme for residential buildings which are in areas not connected to DH • Development of the Almaty Smart Grid Programme and pilot project implementation • Developing a leakage reduction programme for drinking water supply • Wastewater collector retrofit • Feasibility study on WWTP modernization and industrial wastewater treatment options
	Municipal Energy Efficiency Plan for the city of Almaty	To reduce energy consumption, diminish related expenditures from the municipal budget, and improve municipal service delivery for city residents	**Investment measures: Energy Efficiency Investment Program** • Priority 1: Investments in District Heating (10 measures including Automation of DH distribution and improved heat metering; Implementation of SCADA, Rehabilitation/Replacement of DH Pumping stations, DH Network Maintenance and Upgrade Program, DH pipeline insulation, regulation and balancing, Conversion of 100 autonomous boilers (coal, power, mazut) at public facilities, to efficient gas fired boilers, and others) • Priority 2: Investments in

Areas	Plans, programmes, and strategies	Objectives	Policy measures
			Municipal Public Buildings (7 measures including EE Retrofit Program of municipal facilities, Solar Hot Water Program for education and medical facilities, Building Energy Management Systems (BEMS) for large buildings (> 20,000 m^2)) • Priority 5: Investments in Potable Water & Wastewater (9 measures including Improve Efficiency of Pumps and Motors in water supply system, Active Leak Detection and Pressure Management Program, Support program for residential users for Water Efficient Fixtures and Fittings, Retrofit of WW Treatment Plant, Biogas production from WW sludge at WW treatment plant) • Priority 7: Investments in Residential Buildings (5 measures including Implementation of individual automated heating stations (IHS) in the multi-store residential buildings, Installation of individual heat meters in all apartments and introducing consumption based billing, Replacement of elevator equipment, Retrofit of residential multi-store buildings, Solar Rooftop for Residential Buildings) **Non-investment measures and policies:** • A benchmark analysis on energy consumption and energy audit program for all buildings • Capacity building program for the technical staff operating the facility • Education and behavioural change training for employees/users of municipal

Areas	Plans, programmes, and strategies	Objectives	Policy measures
			buildings • Introduction of green public procurement criteria for energy appliances in public buildings • Certification scheme for buildings
Waste 	Almaty Development Strategy 2050	Bring up to 80% recycling of waste	• Phased introduction of the practice of separate waste collection and reduction of the area of solid waste landfills • Minimization the impact of waste on the environment – converging waste into resources
	Almaty City Development Program until 2025 and medium-term prospects until 2030	• Providing the population with services for the collection of solid waste and creating the necessary infrastructure for waste collection • Enhance cooperation in the field of solid waste management with the Almaty agglomeration • Increase waste recycling by 30-40% by the end of 2030	• Development of a Waste Management Program and a set of measures • Improvement of Waste Management Rules. Introduction of mandatory separate collection of waste into “dry” and “wet” • The network of recycling collection points will be expanded through private investment • Special sites for the collection of industrial construction waste, their processing into secondary material resources • Construction of a full-cycle waste processing plant using the Meriolysis technology (biogas production) together with the Kazakh-Spanish company WasteEnergyKazakhstan LLP. As part of the integrated MSW management system in Almaty and Almaty region biodegradable waste collected in Almaty will be sent to the Meriolysis waste processing plant • Implementation of digital tools to encourage residents to collect and transfer waste for

Areas	Plans, programmes, and strategies	Objectives	Policy measures
			recycling • To increase environmental awareness, launch the Green School Project • By 2025 introduce a dispatching system for special equipment of all waste collecting organizations equipped with GPS systems • Until 2027, it is planned to build a waste incineration plant with a capacity of 500,000 tons of waste per year and electricity generation of 40 MW per year • Construction of a plant for the production of alternative fuel from unsorted waste
	Green City Action Plan for the city of Almaty	Environmentally neutral governance of waste management activities and increase of resource efficiency	• Development of an Integrated Waste Management Strategy • Establishment of a construction and demolition waste recycling facility • Feasibility Study for establishment of a biowaste management system and pilot project for green waste composting • Feasibility Study for upgrading the existing waste sorting plant • Implementation of separate waste collection system for dry recyclables
	Municipal Energy Efficiency Plan for the city of Almaty	Improve performance of the solid waste sector in Almaty city	**Investment measures:** • Investment Package in Municipal Solid Waste (6 measures including Conversion of waste collection vehicles to CNG + fuelling infrastructure, Bio waste to energy: Biogas plant, Landfill Gas Capture Program, Waste-to-Energy Plant)

Areas	Plans, programmes, and strategies	Objectives	Policy measures
Green and open spaces 	Almaty Development Strategy 2050	Bring up to 20 m² per person the available public green space	• Creation of a "green network" of the city which unites the urban ecosystem and will support biodiversity • Upgrading the city's green fund • Creation a new world-class recreational park • Mountain Cluster Conservation Measures • Planning the growth of an urban agglomeration according to the principle - not a city grows into mountains, but mountains grow into a city
	Program until 2025 and medium-term prospects until 2030	• Maintain the ecological balance and support biodiversity • Conservation and development of protected areas	• Creation a sustainable "ecological" framework of the city which will unite the urban ecosystem • The draft new Rules for the maintenance and protection of green spaces in the city of Almaty will include norms for the quality of seedlings, watering of green spaces, as well as strengthening control over the implementation of compensatory plantings, the procedure for cutting down trees included in the List of Red Book Plants • Creation of 2 plant nurseries with an area of about 30 hectares in the city • Preservation and further sustainable development of the green fund of the city. Plant 1,2 million trees by 2025, and about 1,3 million by 2030 • To improve the green fund, pest control of green spaces will be strengthened with an increase in cultivated areas (based on biological, chemical methods) • Introduce drip irrigation for watering green spaces, eco-paths • Making adjustments to the general development plan,

Areas	Plans, programmes, and strategies	Objectives	Policy measures
			taking into account the wind regime • Permission to enter protected areas only by environmentally friendly means of transport
	Green City Action Plan for the city of Almaty	• Double the available public green space per person (up to 10m^2/person) by 2030 • Include the rivers and their embankments in the recreational park areas	• Development of a city-wide Blue and Green Strategy and Implementation Plan • Implementing priority blue green infrastructure projects at the district level
Urban water management and blue spaces 	Almaty Development Strategy 2050	Sustainable preservation of the ecological balance	• Creation a "green" river corridor crossing the city from foothills to lowlands and supportive natural ventilation of the city
	Program until 2025 and medium-term prospects until 2030	• Improving the condition of small rivers and reservoirs • Flooding elimination	• Carrying out work on the restoration, cleaning, dredging, bank protection and landscaping of adjacent water protection zones 7 reservoirs, 26 irrigation canals, 30 km of rivers and streams by 2025; until 2030 - restoration and cleaning of 21 reservoirs, 20 irrigation canals and 50 km of rivers and streams • Reconstruction of 276 km of canal networks and storm sewers; construction of 100 km of new canal networks and restoration of 25 km of storm sewers • Reconstruction and construction of 27 water intake facilities, including new construction - 15, reconstruction – 12
	Green City Action Plan for the city of Almaty	Improve city resilience to flood risks and other climate related pressures	• Development of a water saving plan • Increase the water permeability of the city of Almaty • Preventing and curing

Areas	Plans, programmes, and strategies	Objectives	Policy measures
			landslide-prone situations • Awareness raising and education centre for landslide prevention

Category	Indicator
Air Quality	Air pollution
	GHG emissions
Energy	Renewable energy consumption
	Electricity consumption
	Public building energy consumption
Culture	Cultural infrastructure
Employment	Unemployment rate
Safety	Emergency service response time
	Fire service
Social inclusion	Gini coefficient
Buildings	Public building sustainability
Electricity supply	Demand response penetration
	Electricity supply ICT monitoring
	Electricity system outage frequency
	Electricity system outage time
Innovation	Patents
	R&D expenditure
Transport	Dynamic public transport information
	Intersection control
	Low-carbon emission passengers vehicles
Water and sanitation	Smart water meters
	Solid Waste Treatment

Source: UNECE, 2023