

# SUSTAINABLE URBAN TRANSPORT DEVELOPMENT IN ALMATY, KAZAKHSTAN

April 2023





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## ACRONYMS

AET	AlmatyElectroTrans Company
ADB	Asia Development Bank
BRT	Bus Rapid Transit
CNG	Compressed Natural Gas
EBRD	European Bank of Reconstruction and Development
ESCAP	Economic and Social Commission for Asia and the Pacific
GEF	Global Environmental Facility
GHG	Green House Gases
GPS	Global Positioning System
HDI	Human Development Index
HSC	Hardware and software complex
LRT	Light rail tram
MAAS	Mobility as a service
NGO	Non-governmental Organization
PM	Particulate matter
PPP	Public Privat Partnership
PT	public transport
RK	Republic of Kazakhstan
SDG	Sustainable Development Goals
SUTI	Sustainable Urban Transport Indicators
UNDP	United Nation Development Programme
WHO	World Health Organization

## ● EXECUTIVE SUMMARY

The public transport of the city of Almaty plays a dominant role in the share of movements of people in the city. Together with active mobility, it accounts for at least 59 per cent of all trips. This robust public transport system not only facilitates the city's economy growth but also meets the population's need for affordable transport.

In 2022, the city made an average of 1.4 million trips by bus per day. Regular urban public road transport of passengers is carried out by 24 operators (as of February 2023), while the metro service is provided by the Almaty metropolitan company. Notably, there has been a significant 49 per cent increase in the number of public transport routes since 2017. The city's public transport mainly runs on electricity (trolleybuses and electric buses), compressed natural gases (CNG) and diesel. The municipal fleet occupies a dominant position in public transport. The city's development plans signify a future shift towards low-carbon transport, with the intention of eventually phasing out diesel-powered vehicles. However, specific timelines for achieving full zero-emission status are currently not yet determined.

The expansion of Almaty's territory in 2015 increased the area of the city due to low-rise estate development with the population growth as a result. The city plans to create a more systematic street network in the newly annexed districts, launch public transport routes there and expand sidewalks. The transport system sustainability reforms occurred between 2013 and 2018. During this period, significant projects related to urban transport planning, dispatching and the ticket system were planned and implemented. Dedicated bus lanes were introduced, and the first bicycle paths, sidewalks, stops, and other infrastructure were built and repaired. The foundations were laid for expanding the public transport, reconstruction of road transport infrastructure and building the electrical network began. In the same years, bicycle lanes and the first bicycle corridor were designed and built, and the Almaty bicycle sharing system was launched.

A significant achievement in reforming the public transport system was the introduction of subsidizing public transport routes in 2017. By the end of 2021, operational subsidies for the metro amounted to 4.5 billion tenge (equivalent to approximately 10.3 million USD) and 45.4 billion tenge (approximately 104.3 million USD) for land transport. In 2022, 159 regular urban and suburban public transport routes were subsidized. This contributed to the renewal of the rolling stock of bus fleets, the development of the route network, increasing the regularity of transport and increasing the wages of employees. However, it did not serve as a strong catalyst for the development of new routes due to the relatively low base fare.

An important element of the organization of passenger transport is to ensure the activities of a Centralized Dispatch Service (CDS), which monitors the implementation of bus schedules and provides the Urban Mobility Department of the city with the actual performance of enterprises. For ten years now, all buses in Almaty have been equipped with GPS trackers that function as on-board communication system for drivers. These devices enable drivers to communicate with CDS dispatchers and receive information about the status of the route and the traffic situation. In August 2017, the city changed fares and introduced differentiated payment when using electronic payments. It is planned to increase the fare in 2023. Today, the ONAY electronic ticketing system has become an integral part of the city's public transport. Its implementation allowed the city to see the real economy of transport and to start

allocating subsidies. Unfortunately, during the pandemic, the city couldn't significantly increase the share of bicycle movements due to limited infrastructure. Nevertheless, new plans were formulated, with the initiation of fresh projects set for 2023.

Simultaneously with the growth of the length of the bicycle infrastructure, the attention and requirements of stakeholders to its safety have increased. In 2021-22, there was an increase in the number of micromobility in the city, leading to conflicts over space among couriers on scooters, scooters and pedestrians and motorists. This situation stimulated discussions and the need to revise plans to regulate this transport and expand infrastructure. The new short-term program for the development of the city, as well as the draft master plan for the development of the city contain indicators for increasing the number of kilometers of dedicated bicycle lanes and bicycle paths. As of the beginning of 2023, the transport system of the city of Almaty is still facing challenges. This refers to the low level of road safety, quality of public services on bus routes, and the lack of progress in the reconstruction and construction of transport hubs or renewal of a new municipal bus fleet.

The problems of public transport are caused by inadequate funding of infrastructure projects, the lack of significant changes in tariff policy and low fare (urban and suburban transport), and often the lack of data analytics. Almaty has, however, garnered valuable experience with transport modeling tools, the introduction of electronic ticketing and mandatory subsidization public transport operators. An integrated assessment based on this experience would allow us to form a set of actions of local executive bodies to improve the organization of transport and prepare recommendations for both government agencies and bus fleets in other regions of the country.

The need to integrate transport and socio-economic data and make decisions based on them in Almaty and Almaty region for the development of sustainable mobility in the Almaty agglomeration is emphasized by many planning documents, but so far projects have not received priority status and are being implemented separately.

In the presence of a digitalization strategy of the city until 2025 and plans to create a digital twin of the city, nevertheless, the lack of requirements for unified open data protocols in Kazakhstan hinders the development of digital services and the widespread implementation of mobility-as-a-service (MAAS). With a large volume of data on transport and its users, the city needs to improve on data collection on a number of internationally accepted industry indicators and indicators of the quality of public transport on a regular basis as mandatory. Moreover, the fare box ratio (the ratio of transport costs coverage) is not an indicator for transport enterprises and city administration. In this regard, the ESCAP assessment project using SUTI can contribute to the development of managerial capacity both at the municipal level and at individual enterprises.

The evaluation of SUTI indicators revealed gaps in reporting within the public transport sector and the need for further digitalization in the industry. This will allow for more rapid monitoring of changes and more accurately planned investments in sustainable urban mobility. With seven out of ten SUTI indicators, Almaty demonstrates good development progress. However, the main shortcomings are primarily attributed to a lack of availability of updated data on certain indicators, indicating the need to build the capacity and capabilities of the city administration in a more comprehensive assessment of the situation in the transport system using digital tools.

According to the results of the assessment, the main recommendations to improve sustainability of urban mobility in Almaty are:

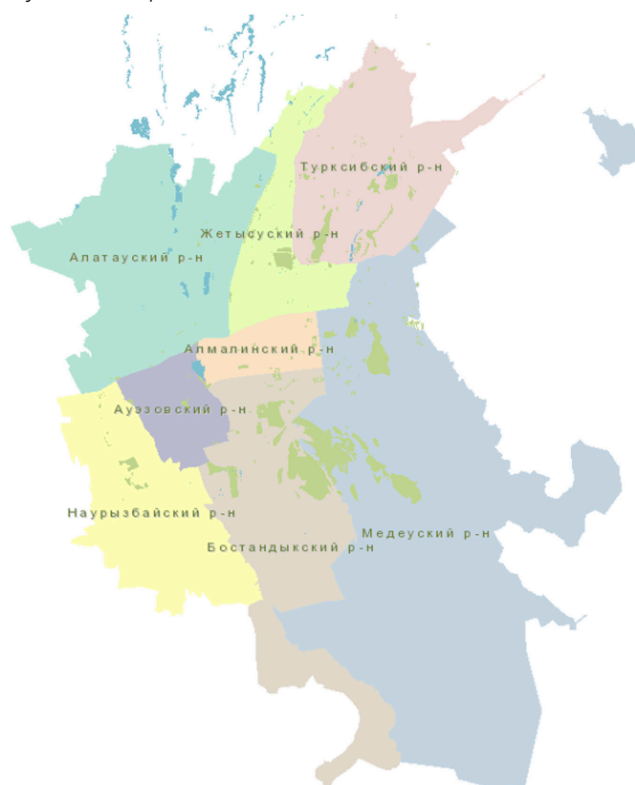
- Increase the share of active mobility (walking and cycling) in the city by increasing walking network/ infrastructure, implementing related measures like reducing transport speed, and improving lighting (visibility), especially around the city's schools, as well as developing a connected network of bicycle paths/lanes;
- Improve the quality of public transport services through the development and regular monitoring of individual quality indicators for different modes of transport;
- Accelerate implementation of infrastructure projects aimed at increased safety and speed of public transport, including better accessibility and organization of intermodal transport facilities;
- Improve working conditions for drivers, to enhance the safety of bus transport. Provide more opportunities for women for special training and jobs in the transport industry;
- Reform tariff plans and introduce new routes for better coverage of the public transport network throughout the agglomeration;
- Reduce harmful emissions from the transport sector of Almaty by introducing low-carbon transport, including electrical vehicles, strengthening control and penalties over transport emissions as well as digitalization of technical inspection;
- Accelerate potential of IT companies based in Almaty and the best experience of other cities to increase the share and quality of useful digital services for public transport passengers.
- Align state statistics in the urban transport sector with international indicators. For example, acting upon the findings of SUTI assessment would allow the municipality to improve planning and reporting to public authorities and the population.

Based on the results of the ESCAP project assessment and subsequent consultations, specific measures with specific timelines can be developed and the necessary support extended for the introduction of sustainable urban transport indicators into the strategic planning system in Almaty as well as in the Republic of Kazakhstan. As part of the project a user's survey on quality and reliability of public transport system and use of digital technology and mode preference was undertaken in 2023 after discussion with the city authority.

# INTRODUCTION

The city of Almaty is located in the south-east of the Republic of Kazakhstan, at 77 ° east longitude and 43° north latitude, at the foot of the Trans-Ili Alatau mountains - the northernmost ridge of the Tien Shan at an altitude from 600 to 1650 meters above sea level.

Almaty holds significant status as a city of republican importance and is the largest urban center in the Republic of Kazakhstan. It also served as the former capital of Kazakhstan until 1997. Today Almaty is the largest metropolis of Kazakhstan, the scientific, educational, cultural, historical, financial, economic, banking, and industrial center of the country. In 1997, through a presidential decree, the capital of the country was moved from Almaty to Astana. The following year, on July 1, 1998, the Law on the special Status of the city of Almaty was adopted.



The territory of the city of Almaty is 682 sq. km. including:

- residential and public buildings - 22 thousand hectares
- industrial and warehouse territories - 3.72 thousand hectares
- nature protected areas and water bodies - 21 thousand hectares
- public lands - 9 thousand hectares
- territories of streets roads and utilities – 4.5 thousand hectares
- special purpose land (cemeteries, landfills) - 1.3 thousand hectares
- agricultural lands – 6 thousand hectares
- others - 1 thousand hectares

The city of Almaty is administratively divided into 8 districts, namely: Almalinsky, Alatau, Medeu, Bostandyksky, Turksib, Auezovsky, Zhetysuisky, and Noiryzbaysky.

The city of Almaty, generates more than 20 per cent of the gross regional product of the country, continues its rapid development as a highly urbanized metropolis. This happens mainly due to the development of suburban areas since the main territories of the current city have practically exhausted their possibilities for settling the population and providing a favorable environment for its habitat.

The agglomeration zone includes 189 (187) settlements of the Almaty region and the city of Almaty. The total land area of the agglomeration is 939.5 thousand hectares<sup>1</sup>. All settlements located within the boundaries of the Almaty agglomeration have stable labor, economic, cultural and everyday ties. Currently, according to various estimates, 2.25 million people, which is over 60 per cent of the regional population, live in the agglomeration zone. Additionally, there are approximately 2.15 million residents directly registered in the city of Almaty as of 2022. The gender distribution is roughly 54 per cent women and 46 per cent men<sup>2</sup>. It turns out that in general, we have to ensure the mobility of about 4 million people in Almaty agglomeration. Forecasts indicate that by 2030, the city's population will reach 2.5 million, and by 2040, it is projected to grow to 3 million<sup>3</sup>. Simultaneously, the agglomeration will increase up to 4.5 million people. The growth rates dictate the need for systematic management of processes in the spheres of life activity throughout the designated territory.

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<sup>1</sup> Data from the interregional scheme of 2016 and the Akimat of the Almaty region. 2021

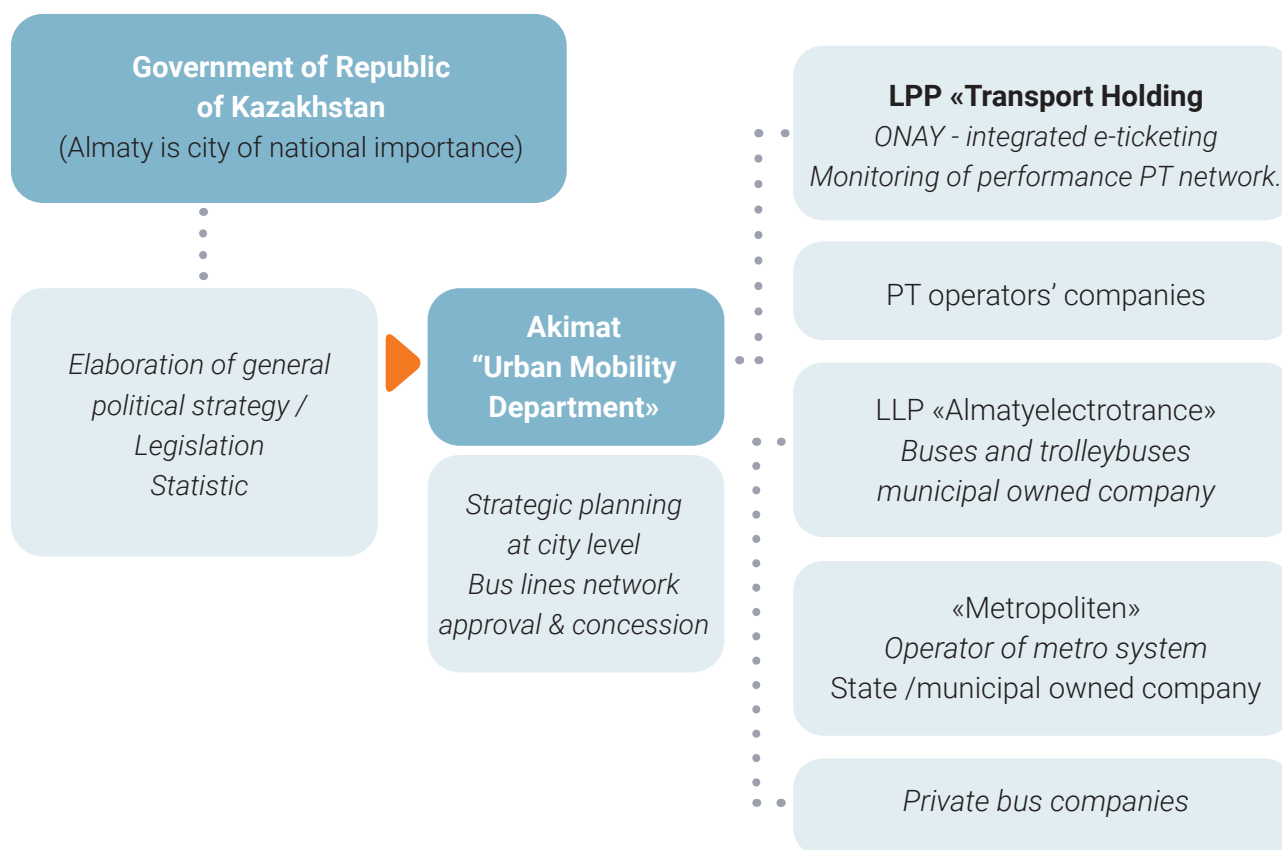
<sup>2</sup> Data from Summary of the population census 2021

<sup>3</sup> Data from Draft document of «City Almaty general plan up to 2040

# STATE OF URBAN PUBLIC TRANSPORT SYSTEMS AND SERVICES

Government authorities have long been attempting to achieve sustainable urban transport in Almaty through various initiatives, strategies, and programmes.

The structure of government authorities related to urban transport is as follows:



Local Government has no legal power or authority to apply special contract requirements concerning local aspects. For example, the methodology on tariff calculation is unified for all regions in Kazakhstan. Consequently, the cities have no devolved powers to design and adapt more intricate tariff systems (e.g., time-, distance-based) for their city/regions to develop and raise customer revenue in a socially acceptable manner. Currently there is no delineated public transport authority on national and local levels which should be responsible for public transport organization and revenue distribution. In Kazakhstan

cities the public transport is commonly supervised by the department of housing and communal services' transport division, including on such matters like transport planning and organization, tenders and procurement, subsidies functions. Almaty is an exception with a dedicated Urban Mobility Department established. Introducing of specific Public Transport Authority have been initiated in 2023-2025 but process is still ongoing due to contradiction with trend to the privatization of municipal enterprises.

The Almaty City Urban Mobility Department<sup>4</sup> implements the state policy in the field of passenger transport and highways at the local level and carries out management in the field of passenger transport and coordination of the activities of passenger transport enterprises, including the operation of the subway, buses, trolleybuses, and regulation of taxi and sharing services on the territory of Almaty and in the 50 km zone around the city.

The Urban Mobility Department is responsible for:

- Development of road transport infrastructure;
- Creation of a smart transport system according to the best world practices;
- Improving the quality of passenger service;
- Improving road safety;
- Development of suburban public transport services;
- Development of alternative modes of transport (carsharing, taxi, bicycle transport, electric scooters and others);
- Development of bicycle and pedestrian transport;
- Development of the parking space system.

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<sup>4</sup> <https://www.gov.kz/memleket/entities/almaty-upt/about?lang=ru>

# STRATEGIES AND PROGRAMMES

Ten years ago, Almaty city administration formulated and adopted a long-term document "City Almaty sustainable transport strategy 2013-2023" for the development of its transport network and transport services in accordance with the adopted national concept of transition to a "green" economy. This strategic document for 2013-2023 addressed a wide range of transport issues and formulated a comprehensive, integrated, long-term and systematic program of work for decision-makers in the field of transport. The development of this document was initiated by the Almaty administration and the UNDP, within the framework of the project "City Almaty Sustainable Transport"<sup>5</sup>.

The strategy set new key areas of activity, defined policy goals and plans for the city. By 2023, it was expected that the population of Almaty would have a transport system that provides high-quality, integrated, safe and sustainable services to all categories of the population. This system would contribute to the economic development of the city and the country as a whole and would significantly reduce the negative impact on the environment. This strategy would help improve the quality of life in Almaty, making it an attractive city for both residents and professionals seeking employment opportunities. The strategy was coordinated with the plans of the Government of the Republic of Kazakhstan, in the field of regional development and "green growth".

The Strategy included the following key policy goals and objectives:

## Goals:

- Support the use of sustainable modes of transport in the city centre: public transport, walking and cycling
- Significantly reduce air pollution from the transport system
- Comprehensively improve public transport services
- Make walking and cycling in Almaty convenient and attractive
- Design the road network according to the needs of a sustainable transport system to eliminate the movement of freight and Transit cars through the city
- Implement active management of traffic flows in the city center
- Implement a street parking management system on the roadsides in the city center
- Improve the integration of urban design with transport planning
- Integrate the transport system of Almaty with the suburbs

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<sup>5</sup> CAST project web page <https://alatransit.kz/en/content/undp-gef-project>

## Objectives:

- Reduce emissions of air pollutants, including GHGs, by 32 per cent compared to the upward trend observed today
- Increase the market share of sustainable modes of transport (public transport, walking and cycling) from the current 42 per cent to 55 per cent
- Reduce fatal accidents, especially involving pedestrians, by 35 per cent
- Reduce congestion in the city centre by 30 per cent
- Achieve full integration of urban planning and transport planning.

Another important milestone was the adoption of "Almaty City Development Program until 2025 and medium-term prospects until 2030".<sup>6</sup>

The Programme recognizes that a modern system of public transport linking all parts of the urban area together was required in Almaty. As the largest and most active city in the country, Almaty has been growing even more populated and mobile. Hence, pressure on public transport and transport infrastructure would only grow with the requirements for transport speed, accessibility and reliability increasing. The city needed a high-speed public transport system to address these challenges, and it was required to consolidate public transport, strengthen its position through sustainable growth, better availability and higher quality.

The Programme acknowledges that the transport sector in Almaty is well developed but not balanced. On a daily basis, there are about 700 thousand cars on the roads in Almaty, with 230 thousand from suburban areas). A large share of this flow is made up of trucks, accounting for about 15 thousand per day. In the republic, road transport is responsible for six times more cargo than railroad, and a large part of the heavy cargo goes in the direction of China - through Almaty and further dry port "Korgos".

Another objective of the Programme is to reduce the share of private vehicles. Today, 41 per cent of Almaty residents prefer to drive a private car, while 59 per cent use public transport, bicycles, scooters, and walking. By comparison, in cities like Moscow, the ratio is 30 per cent private vehicles to 70 per cent alternative modes, in Paris, it is 25 per cent to 75 per cent, and in Vienna, it is 20 per cent to 80 per cent. Over the past six years, passenger traffic on public transport has doubled, but at the same time, Almaty residents are dissatisfied with its quality.

The actions planned in terms of the development of urban mobility and transport connectivity should lead to an increase in daily trips by public transport by 1.6 times, up to a total of 2.3 million daily journeys.

The Programme notes that the problems noted above are formed due to various factors grouped in the following areas:

*The underdevelopment of high-speed public transport like metro, BRT, LRT is clear. High-speed transport in large cities of the world is the basis of the transport framework. In Almaty today, the situation is reversed: ordinary buses and trolleybuses prevail, and high-speed public transport is at the early stage of development. The lack of high-speed public transport, evenly accessible throughout the city, is a key challenge for the development of Almaty, on the answer to which the further development of the public*

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<sup>6</sup> [https://almatydc.kz/uploads/reports/38/file/programma-razvitiya-almaty-2025\\_rus\\_12-09.pdf?cache=1662974782](https://almatydc.kz/uploads/reports/38/file/programma-razvitiya-almaty-2025_rus_12-09.pdf?cache=1662974782)

*transport system and the mutual connectivity of new poly centers depend. There are 11 metro stations in the city with a length of only 13 km. Passenger traffic over the past ten years has increased from 30 to 70 thousand passengers per day, but further growth is limited because the lines duplicate land routes, and the construction of new stations is proceeding at a slow pace.*

*About 3.5 million Almaty residents and guests of the city choose to use the BRT line every month - this is a promising form of public transport, but the project has not been fully launched due to problems with the design, implementation of intelligent transport systems and the construction of new depots and turning platforms. In addition to the underrepresentation of the metro and BRT, the problem is that their lines, as well as the planned LRT line, run parallel to each other and mainly cover city center. The north, east, and west of the city remain uncovered.*

# 4

## PUBLIC TRANSPORT IN ALMATY

The public transport network of Almaty city was designed as an integrated system of metro, buses and trolleybuses. The tram operation was opened in 1937 and stopped in 2015. Since 2004, the construction of the first line of the Almaty metro with the first stage of the first 8.6 km long metro line was put into operation in December 2011. The metro line passes through seven stations: "Rayymbek Batyr", "Zhibek Zholy", "Almaly", "Abai", "Baikonur", "Drama Theater Auezova" and "Alatau".

To achieve the main goals of improving the transport structure of Almaty, it was decided to further develop the metro of the first line in the western direction, which should reliably ensure the transport connection of the historical center with the other areas. Hence, in April 2015 an additional 2.7 km with two new stations "Sairan" and "Moscow" were opened. In May 2022, the "Saryarka" and "B. Momysuly" stations were commissioned. The project documentation for 3 more stations is under development. The final station will be constructed as a big transport hub with a connection to BRT-LRT lines and the Park and Ride facility.

Currently, the metro line of 13.4 km, 11 stations has been serviced since February 2023 by 10 trains. Passenger traffic in 2023 increased to 85 thousand passengers per day. The operation of the next two stations is planned in 2025. The working hours of Almaty metro are from 06:20 to 00:00 daily. The train schedule is available online. The municipal state company «Metropoliten»<sup>7</sup> and LLP «Almatyelectrotrans»<sup>8</sup> (AET), who operate buses and trolleybuses are key municipal operators. The remaining operators serving bus routes are private. All bus routes are distributed among operators on a tender basis. The organizer of the tenders is the Akimat (Mayors Office) of Almaty.

Trolleybus operation was opened in 1944. In general, as of July 2022, 145 bus and 9 trolleybus routes operate in the city. Daily routes are serviced by about 2,509 vehicles. Of these, 1,484 units, constituting 59 per cent, belong to the municipal park, while 1,025 units, making up 41 per cent, are operated by private carriers.

In the first half of 2022, 185 million trips were made by public transport. For context, during the same period in previous years, there were 177 million trips in 2019, 127.7 million trips in 2020 during the pandemic, and 157.7 million trips in 2021.<sup>9</sup>

The main concern of citizens is the presence of diesel-powered rolling stock (buses), which make a significant contribution, accounting for 41.5 per cent of all transport of all particulate emissions and 30 per cent of GHG emissions.

<sup>7</sup> <http://metroalmaty.kz/?q=ru>

<sup>8</sup> <http://aet.kz/>

<sup>9</sup> Almaty city municipality data (Development plan) 2022

The average operating speed of buses along the allocated lanes in 2022 is 25 km per hour, while in the general traffic they move at a speed of 15-17 km/hour during rush hour. This variance leads to additional costs and inconvenience to passengers. Traffic schedules are built with the frequency of main route buses with an interval of 7-15 minutes during peak hours, but it is not always possible to uphold it due to traffic congestion, bus descents, accidents, etc.

With a total length of 3,097 km of roads, the length of dedicated lanes for general transport, designed to ensure priority movement of ground traffic, is about 150 km, which is roughly 4.8 per cent of the total road length. The possibilities of increasing them are limited by the nuances of legislation, as a dedicated lane can only be introduced if the road has three lanes and is further restricted by the above-mentioned shortage of main arterial streets.

The effectiveness of the existing dedicated bus lanes is worsened by the fact that other vehicles are allowed access at intersections and lack of police surveillance.

The “Sergek” video monitoring system operates in the city, with 766 “Sergek” hardware and software complexes operated under the PPP agreement. Of these complexes, 383 are positioned along linear sections, while the remaining 383 are at intersections. There are plans to expand the “Sergek” complexes by adding an additional 575 hardware and software complex (HSC), with 493 of them on linear sections and 82 at intersections. The deployment of these 575 hardware and software complexes are planned to be launched in April 2023, including an early partial launch of 100 HSC in February 2023, 150 HSC in March 2023. The “Sergek” system logs data for a duration of 30 days, which is determined by the rules of operation of the national video monitoring system.

Currently, there are several types of tariffs in the city, including basic, differentiated, preferential rates. These tariffs provide the flexibility to purchase a monthly pass worth from 1,000 KZT (approximately USD2.21) for school students to 7,200 KZT general (approximately USD 17) for the general population. These monthly passes grant an unlimited number of trips within one calendar month.

Tram operations ceased within the city in 2015. Nevertheless, initiatives to revitalize and introduce LRT are outlined in the city's agenda. Yet, execution faces delays attributed to diverse factors.

The major issues that the public transport in Almaty currently face are as follows:

- **Traffic congestion:** Buses and trolleybuses account for the bulk of passenger traffic (about 95 per cent). The average speed of buses on dedicated lanes is 27 25 km/h, while in the general flow during rush hour they move at a speed of 15-17 km/h.
- **Depreciation of the fleet:** In 2023, the service life of about 360 transport units ends, and this number is expected to increase to 952 units by 2025. By the end of 2022, bus removal from routes for technical breakages increased to 300 cases per day, accounting for about 15 per cent of the total number of buses. The deterioration of rolling stock in municipal and private fleets is relatively the same, with approximately one-third of the fleet showing signs of wear and aging. Depreciation of the fleet is one of the important reasons for dissatisfaction with urban public transport.

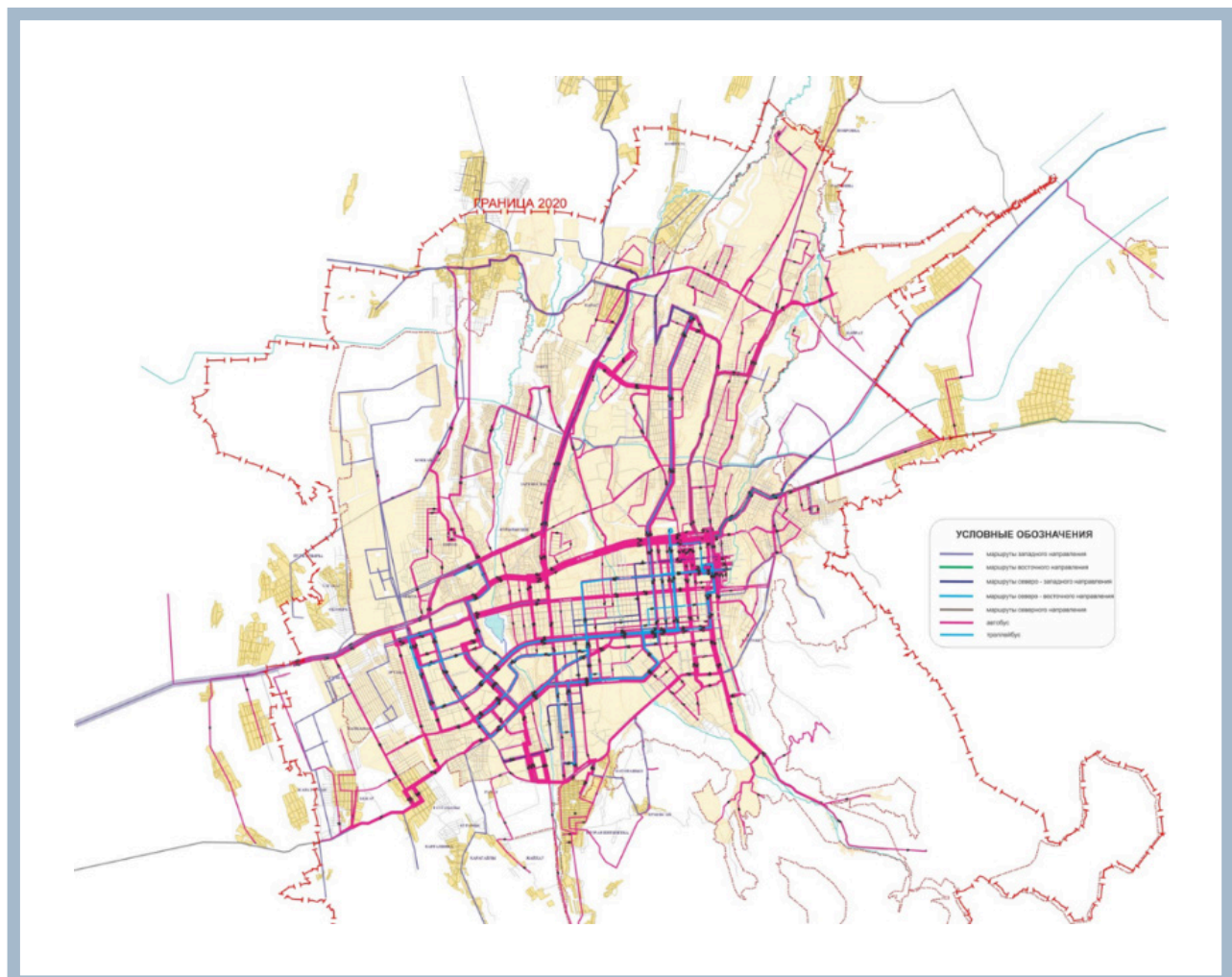
- **Route network:** Today, the route network is not organized efficiently. The reason lies in several factors. Most urban routes are unreasonably long because there is no clear connection between suburban and urban transport, and there are no convenient transport hubs for transfer. Almost 76 per cent of routes have a length of more than 15 km, and only 8 per cent of the total passenger traffic overcomes this distance.

**Table 1: Bus and trolleybus network**

	2017	2018	2019	2020	2021	2022
Number of routes	111	122	136	150	156	162

Source: Transport Holding of Almaty city

**Figure 1: Public transport network**



Source: Almatygenplan / NIITK 2021

Tariff policy, subsidies, and quality of transport services: According to forecast estimates, the emergence of a more convenient route network will attract new users of public transport. As a result, the number of trips and the revenue generated from travel fares will increase. This, in turn, will lead to a reduction in the financial burden on the city budget.

Budget expenditures can also be reduced through tariff policy instruments. By implementing a range of diverse tariffs, each tailored to specific passenger categories, it becomes possible to attract more public transport users, make more profit and thereby reduce budget spending.

It should also be noted that the number of private operators in Almaty is excessive compared to other cities. The city has 21 bus fleet (20 private and 1 municipal). The challenges associated with a high number of carriers become evident when the model contract lacks effective management mechanisms. In such cases, issues can arise in ensuring the fulfillment of mutual obligations. As a result, it is difficult to implement an effective fleet renewal plan, the application of effective tariff plans, and mechanisms for redistributing rolling stock between routes.

In Almaty, the reform of the tariff system and the emergence of a more convenient route network that will attract new users of public transport are long overdue. By doing this, the steady growth of revenues from the sale of tickets and travel cards will stabilize subsidies from the budget.

Street and road network, transport infrastructure: The area of the street & road network of Almaty is more than 107 km<sup>2</sup>, accounting for 15.7 per cent of urban land. A network of streets has historically developed in the central part of the city of Almaty. In addition, ring detours are being formed – a small bypass ring based on streets: Saina Street; Al-Farabi Avenue, Eastern Bypass Highway and Ryskulov Avenue. After finalizing construction of Big Almaty Ring Road (BAKAD) main transit, traffic flows are supposed to pass through it without entering the city.

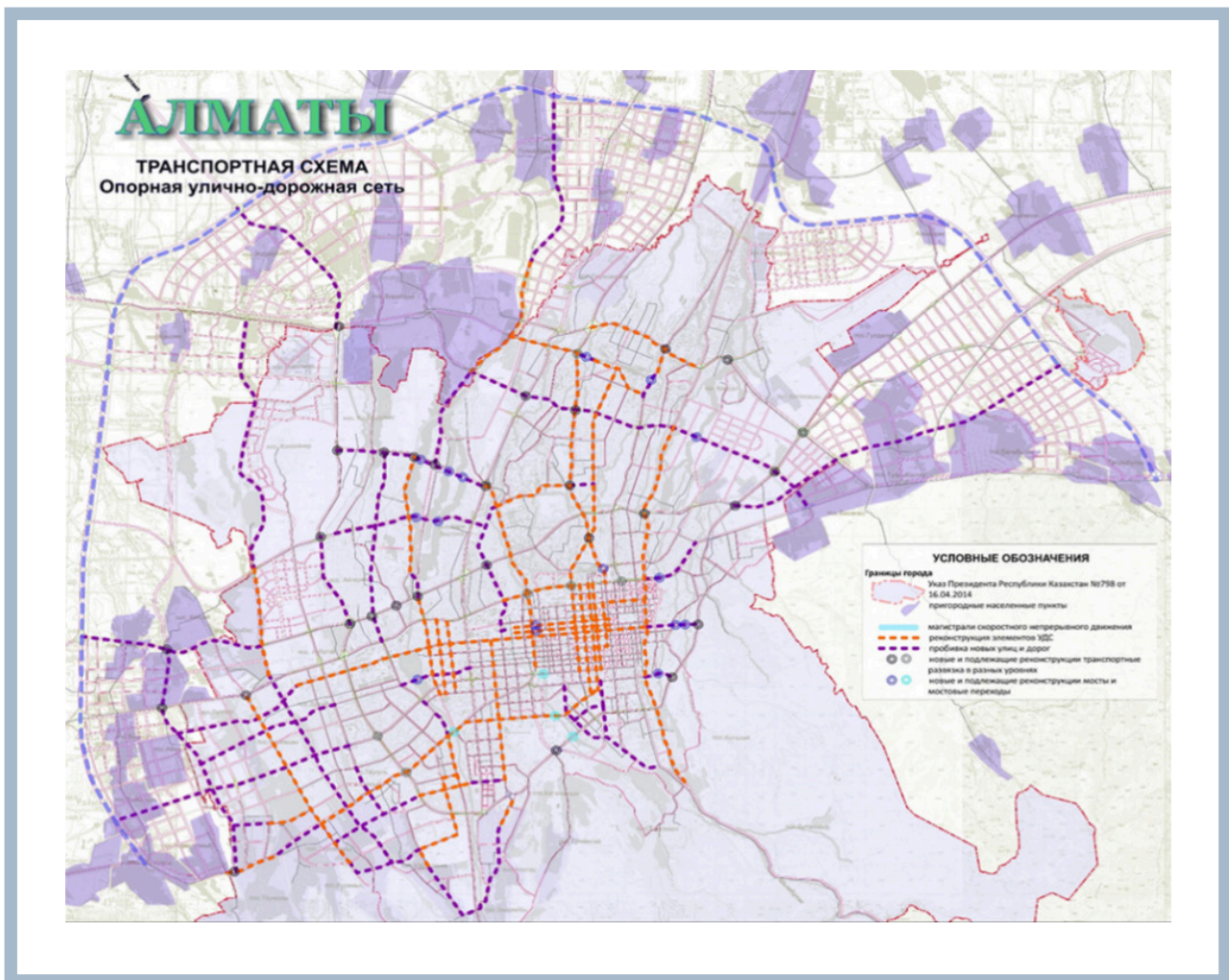
There are various issues related to transport infrastructure such as the lack of main streets, low priority of public transport traffic, a lack of underground or multilevel parking facilities etc.

In Almaty, there is a shortage of main streets, with local streets predominating, and 1/6 of these local streets do not have an asphalt-concrete surface. The road network with similar characteristics makes it difficult to effectively organize traffic and passenger flows between parts of the city. It hinders the ability to provide adequate public transport coverage to large residential areas with.

In 2019, an adjustment was made to the certification of the road of Almaty city with the determination of the length of streets, their stripes, parameters of the transverse profile, sidewalks, etc. Despite a total roads length of 3,097 km, the portion allocated for the exclusive use of public transport lanes is about 150 km, accounting for only about 4.8 per cent of the entire road network. The effectiveness of the existing dedicated lanes is worsened by the practice of allowing other vehicles access to these lanes at intersections, the existing parking arrangements, and challenges stemming from the loading and unloading of goods.

Parking is one of the major issues too. In the last five years, after the reorganization of parking space management in the city, the number of paid parking spaces has increased by over sixfold. However, the system has constantly faced criticism from the public, due to management approaches, a lack of transparency in the collection and distribution of fees and payments.

**Figure 2: Street network**



Source: Almatygenplan / NIITK 2021

Micro-mobility: shortcomings of infrastructure and regulation. In Almaty, there is a growing trend in the use of bicycles, electric scooters, as well as unconventional modes of transport like unicycles and hoverboards. As of July 2022, the total number of trips on micro-mobility amounted to more than 130 thousand trips per day, which is comparable to the number of taxi trips.

The impetus for the use of micro-mobility transport is driven by the creation of infrastructure, including the installation of 79.2 km of bicycle lanes and paths. Additionally, there is an Almaty Bike bicycle sharing system for 1,000 bicycles and 187 stations, and the services of 4 electric scooter rental operators are available in the amount of 15 thousand units of scooters. Notably, the primary network of bicycle paths and rental services is concentrated in the city center, which enhances the urban environment of the historical district. However, there are gaps of connectivity between the districts of the city and within the planned poly centers. Such a concentration hinders the development of micro-mobility for short-distance journeys (up to 5 km). With reasonable organization, micro-mobility could play an important role in the first and last kilometer of the way, making it a vital component of the city's public transport system. Currently, in Almaty, micro-mobility does not fully perform its potential for serving as a delivery or recreational function.

Almaty administration is also developing a strategy for enhancing bicycle and pedestrian infrastructure of the city. The strategy aims to achieve several key objectives, including promoting micro-mobility and encouraging a healthy lifestyle among the population. It also seeks to establish comfortable conditions for alternative modes of transport, facilitate the transition to environmentally friendly modes of transport, and create connection of bicycle networks covering sleeping and connected areas.

As part of the implementation of the strategy, it is planned to prepare more than 185 km of bicycle infrastructure by 2030, increasing its length by 2.5 times to a total of 262.8 km. This will be achieved through a phased approach, with milestones set for 2024 (190.9 km), 2026 (223.6 km), and the ultimate target of 262.8 km by 2030.

As of July 2022, more than 50,000 trips per day were made within the framework of electric scooter rental services, and the total number of trips by micro-mobility transport in the city is estimated to be more than 130,000 trips per day, which is comparable to the number of taxi rides. As of today, 79.2 km of bicycle infrastructure has been built in the city encompassing 21.5 km of dedicated bicycle lanes and 57.7 km of bicycle paths.

It is worth noting, that in Almaty, centralized collection and accounting of citizens' pleas is carried out through the Open Almaty digital platforms (<https://open-almaty.kz/ru>) and a national system that allows you to accept complaints at the state level OTNISH (<https://eotinish.kz/>) as part of the e-government project.

Almost every tenth appeal (11 per cent) of citizens to the public reception of the Akimat of Almaty concerns public transport, while one in every five addresses concerns the road network. According to opinion polls, residents' concerns are of the quality of driving, non-compliance with the traffic schedule, bus congestion, irrational duplication, and stretching of routes.

# 5

## DATA COLLECTION APPROACH FOR SUTI INDICATORS

The data for this report was collected from December to February 2022 in the following ways:

- 1) Data from the website of the Akimat of Almaty on programs and plans for the development of the city and public discussions of the general plan of the city that were held during January 2023, including data reports
- 2) Statistics on the number of residents, vehicles and data on offenses from the websites of state agencies
- 3) Information on request from the Akimat of Almaty on the operational characteristics of public transport operators, as well as the environmental situation
- 4) Request to the Akimat of Almaty to the Office of Urban Mobility - Data obtained through requests from the operator of the dispatching system - the Transport Holding of Almaty, calculations on investments and long-term development plans
- 5) Expert assessments based on data not published in open sources, but obtained during various meetings and discussions

**Table 2: Description of the data collected for each indicator**

Indicators	Year	Comments about data sources or issues relevant for interpretation
1. Extent to which transport plans cover public transport, intermodal facilities, and infrastructure for active modes	2022	Four main documents directly related to strategic planning in Almaty were analyzed. Experts also participated in the discussion of amendments to the general plan for the development of the city until 2035, which also contains a transport section that defines the urban foundations and main corridors for public transport.

**Table 2: Description of the data collected for each indicator (cont.)**

Indicators	Year	Comments about data sources or issues relevant for interpretation
2. Modal share of active and public transport in commuting	2016	Data from Travel habitat survey (3000 households) collected in 2016 by UNDP-GEF "City Almaty sustainable transport project".
3. Convenient access to public transport service	2022	Data provided by "AlmatyGenplan" agency based on following local regulation for public transport accessibility in 400 m for residential development.
4. Public transport quality and reliability	2016	No survey data available at the January 2023
5. Traffic fatalities per 100.000 inhabitants	2022	Data from Bureau of National Statistics / Ministry of Internal Affairs
6. Affordability – travel costs as share of income	2021	This indicator is calculated based on the data of the Bureau of National Statistics
7. Operational costs of the public transport system	2021	Ratio calculated by expert based on key municipal operators' data
8. Investment in public transport systems	2021	Data from Almaty City Mobility Department
9. Air quality ( $pm_{10}$ )	2022	Data from Kazhydromet reports (Information bulletin about environmental situation in Almaty and region)
10. Greenhouse gas emissions from transport	2021	Greenhouse gas emissions (GHG) emission data extracted from the Report prepared for Almaty Environmental Department (Green Economy Department) in 2021 based on the data collected for the transport emission chapter/ The GHG data report is not official, as it is not included in the list of emissions that are subject to monitoring at the city level.

# 6

## ENERGY USE, GENDER AND INCLUSIVENESS IN PUBLIC TRANSPORT SYSTEMS

### 6.1 Low carbon transport

As of the beginning of 2023, 22 electric buses and 931 gas-powered buses are operating in the city, however, the volumes of fuel consumed are not published.

There is no available data on the use of renewable energy sources in the context of public transport, since these statistics and reports are not kept maintained. The city has one private fleet with electric buses, as well as a trolleybus fleet (195 trolleybuses) as part of the municipal carrier. The city's plans have identified the needs for the resumption of tram service for several years (stopped in 2015 due to the deterioration of infrastructure) and the purchase of new trolleybuses.

Emission reduction from motor vehicles is the first priority of programs to improve the condition of the air basin, and in 2021, the mayor of the city announced a ban on the purchase of diesel-powered rolling stock. However, compliance with this procurement parameter applies only to the municipal carrier, although the requirement should also apply to private carriers. Currently, action plans to improve air conditions include projects for the development of public transport infrastructure, non-motorized movement (new bicycle paths and the expansion of the bicycle sharing system). The plans of private companies include projects to launch electric taxis, which are still working in pilot mode.

### 6.2 Gender and inclusiveness

According to UN-Women<sup>10</sup>, Kazakhstan stands out as a regional leader in advancing gender equality in Central Asia. Kazakhstan improved its overall ranking and ascending 15 positions to 65th place in the Global Gender Gap Index 2022, a report designed to measure gender equality among 146 countries. The country has eliminated gender gaps in education levels and has exhibited noteworthy enhancements in economic opportunities, wage equality, and the representation of women in leadership positions. However, the report shows that while the number of women in government and in parliament continues to grow, progress is still modest.

Kazakhstan ranks 51st among 189 countries in the Human Development Index (HDI) 2020 (UNDP) and 65th of 166 countries in the 2020 SDG Index, which assesses country performance on the UN Agenda 2030 and the Sustainable Development Goals.

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<sup>10</sup> <https://eca.unwomen.org/en/where-we-are/kazakhstan>

Kazakhstan was one of the first Central Asian countries to establish a national entity to promote gender equality (the National Commission on Women, Family and Demographic Policy). In addition, the Constitution of the Republic of Kazakhstan guarantees equality of rights and freedoms of all citizens and prohibits gender discrimination. Its Gender Equality Strategy for 2006 - 2016 established measures to create and improve legislation in the interests of gender equality. The updated Concept of Family and Gender Policy until 2030 now includes plans to increase to 30 per cent by 2030 the share of women at decision-making levels in executive, representative and judicial authorities, state, quasi-state, and corporate sectors. The same policy sets steps to decrease domestic violence against women, improve the gender wage gap, and increase women's ownership of assets.

The country had established a legal and regulatory framework for the effective implementation of gender policy. Kazakhstan has ratified various fundamental international acts, namely the Beijing Platform for Action for the Advancement of Women (1995), the UN Convention on the Elimination of All Forms of Discrimination against Women (1998), the Convention on the Political Rights of Women (2000), the Convention on the Nationality of Married Women (2000), the ILO Convention on Equal Remuneration for Work of Men and Women for Work of Equal Value (2000), etc. The effect of these laws is mainly aimed at regulating social relations in the field of ensuring State guarantees of equal rights and equal opportunities for men and women, establishing basic principles and norms relating to the creation of conditions for gender equality in all spheres of state and public life.

In implementing gender policy, Kazakhstan closely cooperates with several international organizations: UN-Women, OSCE, the International Organization for Migration (IOM), USAID, UNDP etc. A significant role in promoting gender equality issues was played by the institutions of women's participation - women's non-governmental organizations, the number of which has increased significantly over the years of independence.

Kazakhstan maintains a stable level of employment of women and is on par in this respect with many countries. In Kazakhstan, the level of participation of women in the economically active population in 2018 was 64.8 per cent.<sup>11</sup>

Despite this, there is a gender gap in the transport industry of Almaty. According to the Almaty Urban Mobility Department, as of July 2022, out of 3530 bus and trolleybus drivers working in Almaty, only 80 are women. Trolleybuses are driven by 72 female drivers, and buses by just 8 female drivers.<sup>12</sup> The youngest female bus driver is 26 years old, and the trolleybus driver is 31 years old. The oldest bus driver is 58 years old, and most female drivers fall within the age group of 35-45 years.

To show the progress, it is worth noting that on the basis of trolleybus park No. 1, in November 2014 a women's team of 28 female drivers has been formed on trolleybus route No. 7 and in May 2015, the first female bus driver went on the route. It is important to highlight that in the work of bus fleets, there is no practice of selection based on gender, and when selecting drivers, and the employers rely on the Labor Code of the Republic of Kazakhstan. However, it seems that there a number of factors impeding women to participate as a labor force in the transport sector of Almaty.

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<sup>11</sup> <https://strategy2050.kz/ru/news/gendernaya-politika-v-kazakhstane-sostoyanie-i-perspektivy/>

<sup>12</sup> <https://the-steppe.com/novye-znaniya/pochemu-v-almaty-zhenshchin-voditeley-obshchestvennogo-transporta-menshechem-muzhchin>

Between 2015 and 2020, the Municipal carrier AlmatyElectroTrans, with the assistance of the EBRD, implemented a program to improve working conditions for women in the city's transport operators.

The Akimat of Almaty initiated amendments to the legislation on simplifying the admission of women to bus management. This move came in response to the challenges posed by the 2016 amendments to the rules governing the acquisition of category D licenses, which complicated the process for women and resulted in a personnel shortage in the trolleybus fleet.

There are no separate rolling stock /cars in the metro for women and there are no plans to introduce them. Seats for passengers with children and the disabled, as well as the elderly, have always been part of the culture of public transport and are preserved at the present time.

The metro and all municipal public transport are equipped to cater to the needs of individuals with reduced mobility. Requirements for accessibility of transport infrastructure are included in the national standards and regulations, and they are a priority area of the city development plan until 2030.

However, in fact, the implementation of these rules, especially the quality of the organization of underground and ground ramps, is criticized by the population due to weak control during construction. In 2017, with the support of UNDP, a report "Accessibility of public transport for low-mobility groups of the population in the Republic of Kazakhstan (using the example of the city of Almaty and international experience)" was compiled. This report includes valuable recommendations for addressing these concerns.<sup>13</sup>

Within the framework of this study, several serious problems were identified regarding the accessibility of public transport and pedestrian space, which required an integrated approach to solve. The "Accessibility Guide" produced by the International Association of Public Transport (UITP) has been translated into Russian<sup>14</sup>. Also, local NGOs produced training materials for drivers and passengers of public transport. These educational resources have been subsequently delivered to the management of transport companies.

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<sup>13</sup> <https://alatransit.kz/ru/content/issledovanie-dostupnosti-obshchestvennogo-transporta-na-primere-g-almaty>

<sup>14</sup> <https://alatransit.kz/ru/content/rukovodstvo-po-dostupnosti-obshchestvennogo-transporta>

# DIGITALIZATION OF PUBLIC TRANSPORT AND INTELLIGENT TRANSPORT SYSTEM

Over the past decade, Almaty has been at the forefront of digitalizing its public transport sector, enabling the system to automatically record data on the movement of all municipal mobile units, record the frequency and regularity of public transport routes, track transactions, etc. Tracking the use of bicycles in the Almatybike sharing system also allows you to use this data for network planning and development. In the ranking of the International Data Corporation, Almaty holds 25<sup>th</sup> place in terms of digitalization.

The present state of digitalization enables evidence-driven decision-making and enhances the precision of planning and management processes. Thus, "Almaty Transport Holding" uses various digital tools in its daily work, including geoinformation system data, automated dispatch control systems for urban passenger transport, as well as accounting and fare payment. The software allows you to see the statistics of passenger movements in sections for different time periods, the distribution of passenger traffic and the speed of passage from at different times of the day.

Almaty became the first city in Central Asia to introduce centralized monitoring systems for public transport using its own IT products, to introduce ONAY electronic ticketing and to use transport modeling to build a route network of ground transport. When building the public transport route network in 2019, an innovative solution was applied when ticket validation data and passenger traffic data were combined into a single register, which made it possible to make more accurate forecasts. The dispatcher of Transport Holding works 24 hours a day and provides reports on the exits of rolling stock on routes, carries out operational communication with drivers and adjusts traffic schedules. Reports generated automatically are the basis for the payment of compensation to carriers. Also, this dispatcher monitors the movement of cleaning rolling stock and some other municipal services of the city.

The Onay transport payment card contributed to the growth of non-cash turnover of passenger traffic by 60 per cent after only 2 weeks after the introduction of this new and convenient form of payment.

The A-parking project, which covered 10 per cent of the territory of Almaty, in just a few weeks, generated tax revenues five times greater than the combined income from all parking lots in the previous year through the implementation of automated paid parking lots. Furthermore, there are "smart" traffic lights with adaptive mode in the city (so far, they serve only 12 per cent of intersections), "Sergek" traffic monitoring system has been developed and implemented in Almaty as well. The cameras of "Sergek" system are focused on road safety. They are installed at hazardous sections of the city, pedestrian crossings, and intersections. The number of installed cameras depends on the number of hazardous sections, pedestrian crossings, intersections and on the requests of citizens, considering the area of

each district of the city. The video monitoring system recouped the costs in double amount in a year. In 2021 alone, according to the press service of the city police department, the Sergek cameras “earned” 9.3 billion KZT (approximately 2.06 million USD) to the city’s budget.

Also, “Sergek” cameras are actively used to track traffic, including data collection at the entrances to the city (along the suburban route). The city’s development plans include the expansion of these systems with increased coverage of video surveillance and the expansion of the possibility of automatic issuance of fines for violations. The intelligent system of public and road safety “Sergek” is a product of Kazakhstani developers, a group of companies “Sergek” Group. At the end of 2022, 800 hardware and software complexes were operating, and their number will increase to 1300 units by mid-2023.

With the help of the “Sergek – Patrol” complex, traffic violations are detected in the general flow, addressing issues that are negatively affecting the traffic situation in the metropolis and affecting the accident rate. This includes identifying cars with fake license plates that have not passed technical inspection and do not have an insurance policy or are being stolen or wanted for committing a crime, and a driver with unpaid fines is also being identified.

In addition, the system records violations on lanes intended for public transport in automatic mode and transmits data to the unified register of administrative offenses for processing of traffic violations. This system has the potential to implement solutions for control of low emission zones (LEZ).

To inform citizens about the level of traffic jams or air quality index, 64 advertising light displays- media boards were installed on the main highways of the city. These boards display data collected from monitoring stations. The Media Boards project has been implemented since 2016 as a commercial one and has received awards at international exhibitions.

Citybus was launched, enabling the tracking of public transport movement in Almaty. The CityBus website and mobile application help Almaty residents and visitors to determine their location, mark their destination on the map, and choose the most appropriate route and type of public transport.

In the past, individuals exploring unfamiliar areas of the city frequently relied on asking passers-by for directions to the correct bus route, which was not always dependable. Now the CityBus app can be launched to find out the real-time location of awaited bus or trolleybus and arrival time at the specific bus stop. This functionality is also available in Yandex maps.

Almaty also has the potential to develop MAAS systems, as various sharing services are being created both in the field of private trips, school transport, and scooters. However, there is currently a lack of available information regarding their integration into a unified system. This integration is pending strategic agreements between the service providers and the regulatory body, the Akimat of Almaty, as each business currently operates independently.

It is planned to create a single Traffic Management Center and a digital twin of the city, where data from various systems would be accumulated and which would allow online monitoring of the entire transport complex and data-based flow management. However, as of the beginning of 2023, all these projects are only in the state of preparing technical tasks.

In December 2017, the State Program "Digital Kazakhstan" was approved, aimed at accelerating the pace of development of the country's economy and improving the quality of life of the population, as well as creating a digital economy of the future.

The program provides for the transition to a digital state, including through the introduction of the concept of "smart" cities. The "Smart city" initiative aims at the creation of cities convenient for citizens, by improving urban infrastructure. The main goal of the initiative is to create an urbanized area, in which the resources of city services and private initiatives interact and cooperate to ensure the sustainable development of the city and create favorable conditions for residents and visitors of the city through the implemented technologies in real time.

The Smart Almaty strategy for 2020-2025 was adopted in July 2020 and it defines the role and application of digital and information technologies in achieving the strategic goals of the city through the involvement of all resources and the integrated development of the entire infrastructure.

The objectives of creating a strategy are:

- 1) Formation of a single vision of the direction of development of digitalization, taking into account the needs and resources of the city;
- 2) Revision and regrouping of IT project portfolios in the city system, taking into account the prioritized problems of residents through the development of digitalization;
- 3) Approval of the roadmap for the implementation of IT projects of the city;
- 4) Approval of the methodology, regulations, and functionality of interaction with other structural units of the city.

One of the main goals of the strategy is to advance smart city initiatives aimed at increasing investment attractiveness and economic efficiency. This includes the development of transport in Almaty, involving the implementation of smart transport, automation of traffic systems, integration of all types of public transport into the navigation system, and the introduction of automated multimodal. To this end, smart technologies will be used, including the use of big data technologies for the analysis of transport and other data.

It is important that the development of transport is included in the Smart City strategy. One of the key projects of Smart Almaty is the "Intelligent Transport System" and "Safe City", which includes the integration of the city transport network into a single system, the allocation of lanes for public transport, the arrangement of bicycle corridors, parking lots and pedestrian zones, and the organization of video monitoring.

The Almaty Akimat is working on the implementation of the tasks set in the development project for 2022-2025. To do this, it is necessary to build stable ties between business, academia, and the state. This also involves fostering the city's own personnel potential by establishing links between educational institutions and business and strengthening the role of business in the implementation of urban projects.

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<sup>15</sup> [https://digital-almaty.kz/sites/default/files/140720\\_cifrovizaciya\\_almaty\\_strategiya\\_rus\\_0.pdf](https://digital-almaty.kz/sites/default/files/140720_cifrovizaciya_almaty_strategiya_rus_0.pdf)

One of the important projects will be the city's data processing center (DPC), set to become the brain of the Smart City. It will consist of thousands of sensors and sensors for collecting data, working in real time. The data center provides a link between the world of the physical and digital infrastructure of the city, the data will be analyzed and transferred to the appropriate services to solve emerging problems.

For the efficiency of data analysis processes, Artificial intelligence systems will be employed for efficient data analysis, it is planned to create an intelligent city management and control platform (City Management and Control Platform), which, together with the data center, will ensure the operation of the Smart City infrastructure.

The tasks to be solved for the near future are defined and affect all spheres of life in the city, from public transport and security to education and healthcare. Teams of specialists are working on electronic health records and telemedicine, distance education and e-services, police response to calls and ecology. By 2025, the planned steps will provide citizens with a comfortable transition to Smart City status.

In December 2022, road maps for the development of the city were approved in Almaty, drawn up on the basis of the instructions of the President of Kazakhstan and the "Program for the Development of the City of Almaty until 2025 and medium-term prospects until 2030".

The program includes the development of 5 poly centers, each of which is designed as a separate project. Filling poly centers with social, commercial, engineering and transport infrastructure facilities is included as subprojects. In addition to the development of new districts, attention is also being paid to the historical center of the city, where the renovation of dilapidated houses and the reconstruction of cultural and historical heritage sites are to be carried out.

In terms of the developing public transport, transport connectivity of poly centers and the core of the city in an integrated manner, among the roadmap projects are the development in the first half of 2023 of a master plan for the development of the transport framework of the city of Almaty until 2040, increasing the attractiveness of public transport through the development of high-speed modes of transport, and more.

As far as «green Almaty» is concerned, it is expected to significantly clean the city's atmospheric air by gasifying industrial enterprises, and greening public transport, and reducing the use of personal vehicles.

"Almaty is a smart city". The 22 roadmap projects include creation of a "digital twin" of the city, further digitalization of city services for Almaty residents, introduction of "smart" solutions in the field of transport.

# ANALYSIS OF SUTI DATA

## 8.1. Indicator 1: Extent to which transport plans cover public transport, intermodal facilities and infrastructure for active modes

The assessment was carried out by an expert on the basis of documents that develop and complement each other over a decade, collectively shaping the city's development policy. This policy emphasizes the primacy of public transport, cycling infrastructure, and pedestrian mobility as foundational elements of the city's transport system.

The following documents were analyzed:

1. Sustainable transport strategy of Almaty 2013-2023 (2013)
2. Strategy for the development of cycling and pedestrian infrastructure in Almaty (2021)
3. Strategy of Almaty until 2050 (2019)
4. Almaty city development program until 2025 and medium-term prospects until 2030 (2022)
5. Draft document "Adjustment of the general plan for the development of the city until 2040" (2023)

The Sustainable Transport Strategy 2013-2023 was the first document in the Central Asian region in which the definitions and principles of a sustainable transport system in Almaty were laid down at the city level. The document was prepared by international consultants in active discussion with city authorities and NGOs based on transport modeling data. The document became a model for many subsequent urban planning documents, since it was the first time that indicators on the main parameters of the city's development were outlined and calculated. It was accompanied by an implementation plan, which in a matrix structure described all the necessary actions in the field of development of various types of transport, infrastructure, propaganda, including public transport, cycling and transitional movements, parking, private motor transport, urban planning policy, connection of suburbs and cities and many others that have never been mentioned in planning documents before.

The data from this sectoral document was then used in subsequent City Development Programs, where the budget allocated for implementation was already indicated. The weaknesses of the city development plans are the lack of consistent monitoring of the progress and outcomes.

The city set ambitious plans for the development of sustainable modes of transport more than 10 years ago and began implementing ambitious projects. However, the pace of implementation has slowed down over the past three years. The updated city development plan supports the ideology for the development of public transport, is partially funded, but implementation depends on the availability of qualified personnel. The main projects for the development of high-speed and mass public transit corridors are laid down in the city's general plan (tram, metro, BRT development).

The development of pedestrian infrastructure is laid down in Document 4, in the polycentric development section (the 15-minute city direction) and is supported through the section of the road safety program (VISION ZERO Almaty) / The construction of bicycle paths and the development of micro-mobility services are also presented in the plans and supported by the budget for the next three to five years. A program has been formed for the development of public spaces until 2025, including the territory of the new districts of Almaty.

The Almaty 2050 Development Strategy is a rather political document showing prospects, contains longer-term plans for the transition from car-centric development with a 30-year perspective, but therefore is not supported by a more detailed calculation of the required investments.

The most recent document (4), approved at the end of 2022, aims to increase the number of daily trips by public transport from 1.4 million in 2022 to 1.7 million people in 2025, to 2.3 million people by the end of 2030, create additional 40 km of segregated bus lines. A phased upgrade is planned with the transfer of rolling stock to gas in bus fleets for 1000 buses. Partially the purchase of rolling stock (including 200 trolleybuses) is made at the expense of the city budget. The financing of the metro development is carried out at the expense of the republican budget.

City development plans and sections devoted to urban mobility have a budget in the three-year perspective, but require more consistent monitoring, especially in terms of the implementation of projects for the development of main public transport systems (Metro, LRT, BRT). For example, plans to launch/resume tram services have not yet been implemented, and the BRT project, which has sections in each plan after 2017, is being implemented late. Projects for the development of the trolleybus fleet and the purchase of CNG equipment were financed from the EBRD loan. In 2022 the World Bank funded research and a project to develop the potential of local transport specialists in the field of urban mobility in the form of a grant.

Documents 1, 3, 4 are posted on open resources and are available to the public, while documents 2 and 5 have been developed and approved at the level of the city administration but have not yet been approved in accordance with the rules by the City Council (maslikhat) or Government.

**Table 3: Scoring analysis for indicator 1**

Walking networks	<p>The policy documents and last plan of Almaty has clear vision or goals for the role and priority of pedestrians in the city's transport system. 15 min city is stated in the main documents and some budgets allocated for renewal of pavements / zebra crossing and improvement of lighting along main corridors.</p> <ul style="list-style-type: none"> <li>• The plan focuses on the new areas and facilities around the schools</li> <li>• Funding is allocated via line for reconstruction of road and streets</li> </ul>	4
Cycling networks	<p>All city documents mentioned that cycling and micromobility (from 2021) are an important mode of transport that should be given priority where it is possible.</p> <p>Number of quantitative goals to enhance cycling safety and comfort or share of bicycles in the modal split (from 1 per cent to 5 per cent)</p> <ul style="list-style-type: none"> <li>• The plan provides separate cycle lanes covering 60 km plus 200 km of painted lines to fix a comprehensive network.</li> </ul> <p>There are also detailed plans for the extension of bicycles/ scooters sharing project across the city.</p> <ul style="list-style-type: none"> <li>• The plan indicates investments needed for the planned facilities. Support from the local municipal budget is applied, but not yet secured.</li> </ul> <p>No final commitment to a long-term budget for the cycling plan.</p> <ul style="list-style-type: none"> <li>• Some plans are not monitored properly and faces delays</li> </ul>	3
Intermodal transfer facilities	<p>The documents contain clear goals on the need to improve the infrastructure for public transport and the connectivity of bus routes into the agglomeration to increase services for commuters.</p> <p>Almaty has planned the construction of four multimodal transfer complexes in new polycenters.</p> <p>It is also planned to improve the infrastructure of two railway stations and build a new one to provide transfers for people coming regularly from the suburbs.</p> <p>The format of the allocation of funding for this infrastructure has not been determined at the moment.</p> <p>Monitoring of the implementation is required as some plans have already been postponed several times.</p>	3

**Table 3: Scoring analysis for indicator 1 (cont.)**

Public transport	<p>Almaty aims to achieve the goal of increasing the number of daily trips by public transport from 1.4 million in 2022 to 1.7 million people in 2025, to 2.3 million people by the end of 2030.</p> <p>Priorities to improve the safety of public transport have been identified.</p> <p>The introduction of 160 km of dedicated bus lanes within the framework of medium repairs, the reconstruction of more than 500 stops is budgeted.</p> <p>At the time of preparation of the report, there is no funding for LRT - tram projects and insufficient attention is paid to financing trolleybus routes.</p> <p>In general, the plans are much more ambitious than the implementation, and therefore additional monitoring of the implementation of the stated goals and more projects aimed at the quality of public transport is required.</p>	3
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**Table 4: Overall score for indicator 1**

INDICATOR	VALUE	YEAR	COMMENTS
Extent to which transport plans cover public transport, intermodal facilities and infrastructure for active modes	13	2022	Score is based on review of four main city document designed in 2013-2022 and available for expert

## 8.2. Indicator 2: Modal share of active and public transport in commuting

Data on the division by mode of transport was first collected between 2012 and 2013 and presented in the Sustainable Transport Strategy of Almaty, which is the first document to show the importance of taking into account all sustainable modes of movement in the city and methodology to calculate it.

The share of sustainable transport use in Almaty increased from 43 per cent in 2011 to 59 per cent in 2016 primarily due to the commissioning of 7 metro stations in late 2011, and additional two stations in 2015, thus bringing metropolitan to the sleeping districts of the city.

It can therefore be assumed that introduction of other modes of rapid transit, such as the light rail transit (LRT), development of bus rapid transit (BRT) corridors, further expansion of the metro network, as well as walking distance accessibility and cycling infrastructure will be the main factors contributing to the modal shift in urban transit preferences towards the public transport.

The data was obtained on the basis of a survey and modeling with the help of external experts involved. Then the data was updated in 2017 when conducting a survey of the transport mobility of the city's population. The data was used to assess the effectiveness of the proposed strategy to displace/reduce the share of traffic by cars. As a result of the latest 2017 survey, 3,000 households were surveyed. The study was carried out with the support of the UNDP-GEF Sustainable Transport Project in Almaty, and the results were published in the final report and used later in other planning documents.

According to a study in 2016, the modal shares were as follow:

- 19 per cent – by walking;
- 1 per cent – by bicycle;
- 39 per cent – by public transport;
- 41 per cent – by car.

Public transport means metro, buses, and trolleybus.

In 2022, it was planned to conduct another study and put the data in the transport model, but the project was postponed. Passenger traffic statistics were not used in the calculations, since transport statistics on urban transport are not considered accurate due to approaches to the indexing of enterprises that are covered by it. The low indicator for cycling, according to expert estimates, was influenced by the period of data collection, which occurred in November 2016. During that period, weather conditions limited bicycle usage for city travel.

**Table 5: Overall score for indicator 2**

INDICATOR	VALUE	YEAR	COMMENTS
Modal share of active and public transport in commuting	59%	2017	The data from CAST project report is based on the mobility study conducted during autumn 2016

### 8.3. Indicator 3: Convenient access to public transport service

In Kazakhstan, there is a standard for providing public transport stops within a 400-meter radius in city areas. In the City Almaty sustainable transport strategy in 2013, an indicator was introduced to provide 500 m of access to the mass transit (metro, LRT, BRT) for the city of Almaty. The goal was to increase the proportion of citizens living within 500 meters from the nearest mass transit stop from 12 per cent to 60 per cent in ten years period.<sup>16</sup>

The data in table 6 were provided by Almatygenplan LLP. This municipal body is a division of the Department of Urban Planning and Urban Studies and is responsible for updating the city's master plan.

**Table 6: Number of bus stops in 2022**

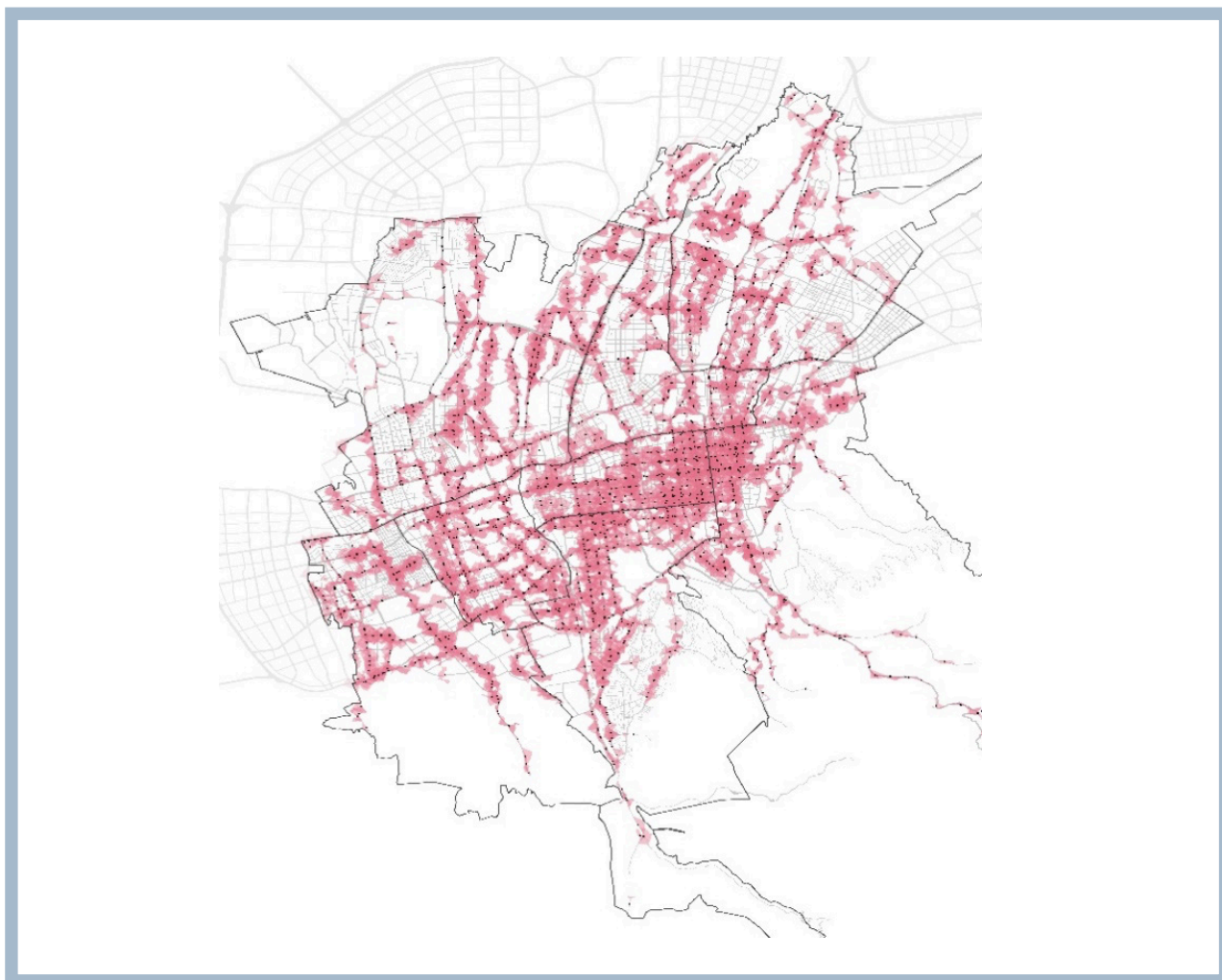
	Number of buildings	Number of population	Residential blocks area (sqm)
General	207 000	2 150 000	18 500
Coverage	117 000 (56%)	1 431 000 (67%)	8 6000 (46%)
Number of bus stops			
2022	2382		
Deficit	1187		

According to the Almatygenplan data, there are 2882 stops in the city and it is planned to equip 1187 more stops in the next few years. The average density in the city is 40 people/ha. The availability coefficient in 2022 was 67 per cent

Space syntax technology was used to calculate this indicator <https://spacesyntax.com/project/space-syntax-toolkit/>

<sup>16</sup> City Almaty sustainable transport strategy 2013-2023\*

**Figure 3: Accessibility of bus stops**



Source: Almatygenplan 2022

**Table 7: Overall score for indicator 3**

Indicator	Value	Year	Comments
Convenient access to public transport service	67%	2022	The data is based on the assessment of Almatygenplan, in areas within 400 m from the main stops

#### **8.4. Indicator 4: Public transport quality and reliability**

Public transport passenger surveys have not been conducted regularly in Almaty for the past seven years. These are conducted by different organizations on a limited list of issues and for different purposes. The Office of Urban Mobility has no practice of annual passenger surveys and assesses the

level of satisfaction only by the number of complaints received by the Akimat from passengers. Public concerns are processed manually, and complaints analytics are not conducted specifically on certain aspects of quality.

In this regard, it is impossible to provide data that fully meets all the quality criteria mentioned in the evaluation methodology. In 2020, public transport routes were adjusted, and an online survey was conducted through the transport holding of Almaty. The expert requested the data, but it is impossible to apply them for the purposes of this assessment.

In 2022, the World Bank, through partners, conducted a survey of 500 passengers at bus stops, but data is not yet available. Based on the samples of the questionnaire received by the expert, not all aspects of quality were included in the questionnaire.

Therefore, this assessment uses a survey conducted in 2016 as part of a survey of transport behavior funded by the UNDP-GEF Sustainable Transport project in Almaty. 4,616 respondents answered the question "How satisfied are you with the work of public transport?" 49 per cent considered its quality satisfactory, 1 per cent could not evaluate.

When more new data is received, the indicator can be updated. It is also planned to update the transport model in 2023. On the recommendation of the expert, it is proposed to formulate questions about quality using the formulations and methodology of SUTI.

**Table 8: Overall score for indicator 4**

Indicator	Value	Year	Comments
Public transport quality and reliability	49.5%	2022	The data is based on Travel Habitat survey conducted in 2016

**8.5. Indicator 5: Traffic fatalities per 100.000 inhabitants**

For decades, transport safety has been the responsibility of the Ministry of Internal Affairs. The situation with high mortality rates in road accidents began to be actively discussed only in 2015 when an attempt was made to study international approaches and develop some national road safety strategy. However, the document was presented in 2017, but not accepted by the government. Subsequently, Kazakhstan began to implement Vision Zero program approaches at a faster pace at the local level and Almaty was an example for other cities.

**Table 9: Traffic fatality in Almaty by years**

Year	Number of populations	Deaths	Fatalities per 100 000 inh.
2018	1851710	133	7.2
2019	1909471	161	8.4
2020	1972126	84	4.3
2021	2020547	84	4.2
2022	2156700	96	4.5

Sources: e-Portal Qamkor, designed by Ministry of Internal Affairs. <sup>17</sup>

The leading cause of fatalities among Almaty residents is road accidents resulting from excessive speed, accounting for 52 per cent (310 casualties). If we examine the impact on individuals, pedestrians are the most affected, representing 40 per cent of those injured and 62 per cent of the total fatalities. Notably, 21 per cent of accidents from the total number of accidents were committed with the participation of minors.<sup>18</sup>

If we analyze the period from 2017 to 2021, 52 per cent (310 dead) of the total number of Almaty residents who died in an accident, have died in accidents caused by speeding by drivers of vehicles. At the same time, accidents due to speeding also account for 30 per cent (6106 units) of the total number of accidents. In addition, such accidents account for 29 per cent (7023 people) of the total number of wounded over the specified five-year period.

The strategy adopted involves the adaptation of Vision Zero program by Almaty. This program designed in 2018 – 2019 encompasses various physical measures such as curb extensions, chockers, pedestrian refuge islands, raised crosswalks, speed bumps, and public campaign, deployment of traffic violation detection cameras Sergek (first stage in 2020).

**Table 10: Overall score for indicator 5**

Indicator	Value	Year	Comments
Traffic fatalities per 100.000 inhabitants	4.5	2022	Based on official police reports. The average for the years 2018-22 was 5.7

<sup>17</sup> <https://qamqor.gov.kz/crimestat/indicators/accident>

<sup>18</sup> City Almaty Development programme 2023-2030

## 8.6. Indicator 6: Affordability – travel costs as share of income

To calculate this indicator, after consulting with expert economists, the median income indicator for Almaty and monthly network-wide travel card for an adult as a cost of public transport was taken. The latest data available at the time of preparation of the report is the median income for 2021 according to the calculations of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. <https://www.stat.gov.kz/official/industry/64/statistic/7>

The median income for 2021 amounted to 74770 tenge, which is equivalent to 175 USD, using the exchange rate of 1 USD to 426 tenge. In the past five years, the cost of the adult travel card has remained unchanged at 7,200 tenge, which is approximately 16.9 USD. The travel pass is valid for one calendar month and allows you to make an unlimited number of trips during that timeframe. Data on the types of travel cards are available on the website of the Transport Holding of Almaty, which is the operator of the electronic ticketing system (<https://onay.kz/#/cards>)

To date, valid travel cards in Almaty are as follows:

1. Travel card on a single transport card (standard for all citizens)
2. School travel card
3. Student travel card
4. Pension travel card

There are also social cards with distinct travel arrangement, including a student card, a school student card, a social card of a mother with many children, a social card of a disabled person under 18, a transport card of a WWII veteran, a pensioner card over 75, etc. Some of these categories are eligible for free travel upon presentation of these cards.

The cost of a one-time ride on public transport (metro-bus-trolleybus) on an electronic card is 80 Tenge (~USD 0,18), for cash payment 150 tenge (~USD 0,35), regardless of the time of the trip. In 2021, all types of travel cards were sold totaling the amount of 1,223,417,400 tenge (~2.87 mil USD). Thus, following the methodology, the share of monthly income that residents of Almaty spend on public transport is calculated, which is 9.6 per cent.

**Table 11: Overall score for indicator 6**

Indicator	Value	Year	Comments
Affordability – travel costs as share of income	9.6%	2021	Income level data from Bureau of National Statistics

## 8.7. Indicator 7: Operational costs of the public transport system

The operational costs of the public transport system of Almaty in the context of carriers are not published in open sources.

The carrier companies provide their data to the Akimat of Almaty on the costs of individual routes, which are recognized by law as social. Subsidies are then allocated based on the specific costs associated with each route, with calculations conducted using methods approved by the Ministry of Industry and Infrastructure Development. Both the Akimat and the carriers have initiated requests to revise the calculation methodology, but the timing of the changes is unknown. The main challenge is the absence of the practice of paying for transport work in Kazakhstan (net-contract), and all cost calculations are correlated with the number of passengers transported on each route. The proceeds from the sale of tickets are collected in the Almaty Transport Holding, which, under a PPP agreement, records incoming payments and makes settlements with service providers.

Operational subsidies to carriers are paid from the budget of the city of Almaty. In 2022, inflation increased in the country and the municipality wanted to raise the fare, but the decision on this issue was postponed until 2023.

The need for the publicity of this indicator was discussed with the head of the Urban Mobility Department, but to use this indicator in the planning system, additional consultations should take place and a separate instruction should be prepared for approval. Then this indicator can be used on an annual basis as one of the parameters for assessing the stability of the system. To calculate this indicator, an expert was involved who analyzed the audit reports of the two largest carriers of Almaty. These reports are provided to the Akimat of Almaty and are available only to their employees.

The following operating expenses were analyzed:

- the capital-intensive system (metro), the operating costs of which are subsidized from the budget of the city of Almaty. Since its launch, this system has carried only 30-50 thousand passengers per day for many years, against 1.2 million passengers transported by all ground transport, depending on the season. The market share of this carrier is on average 3 per cent.
- the largest operator is the municipal company Almaty Electrotrans, which occupies a leading share (45 per cent) in the transport market and operates buses of various capacities on diesel, gas-fuel, and trolleybuses.

**Table 12: Market shares by type of operator**

Services	Market shares (estimated)	Fare revenues in million tenge	Transport operating expenses million tenge	Farebox ratio
METRO	3	624	12 203	5%
AET	45	10 977	29 004	38%

**Table 13: Overall score for indicator 7**

Indicator	Value	Year	Comments
Operational costs of the public transport system	36.25%	2021	Ratio calculated by expert based on key municipal operators' data

### 8.8. Indicator 8: Investment in public transport systems

Investments in public transport in the context of Almaty include investments in the development of regular bus, BRT, metro, and trolleybus transport. These investments also cover the purchase of rolling stock, infrastructure development, including dispatching and ticketing, the development of pedestrian infrastructure and non-motorized transport infrastructure. General transport investments include funding for the development of roads, bridges, overpasses, and other infrastructure serving mixed traffic. Open budgets (published in open access by the Akimat of Almaty) do not give a breakdown of expenditures within budget programs. Therefore, the calculation after the request from the expert was made by an employee of the Urban Mobility Department of the Akimat of Almaty, which is the administrator of the programs.

This calculation did not account for the costs of maintaining/cleaning bus stops and cleaning roads that are administered under other budget items and managed by other departments. When calculating, only the actual investments over the past five years should be considered (while the 2020-2021 year was abnormal due to the pandemic).

**Table 14: Investments**

Investments by the city (In tenge)	YEARS					AVERAGE
	2017	2018	2019	2020	2021	
Public transport facilities	17 288 137	13 061 919	2 662 407	13 770 664	8 167 265	10 990 078,4
Total transport	40 239 792	35 735 124	24 618 827	36 212 471	40 454 276	35 452 098
Share						<b>31%</b>

Source: Urban Mobility Department 2022

**Table 15: Overall score for indicator 8**

Indicator	Value	Year	Comments
Investment in public transport systems	31%	2021	Ratio calculated by City Almaty Mobility Department

### 8.9. Indicator 9: Air quality (PM<sub>10</sub>)

Traffic is one of the major sources of air pollution in Almaty causing significant health problems, impairing visibility, and ecological impacts. Motor vehicles are amongst the main contributors to PM pollution.

Air quality monitoring in Almaty is carried out by environmental protection authorities, specifically Kazhydromet (<https://www.kazhydromet.kz/en/>). Observations of the state of atmospheric air in the territory of Almaty are carried out at 16 observation posts, including 5 manual sampling posts and 11 automatic stations. Additionally, public monitoring sensors are also included in the monitoring system. In 2023, PM data will also be visible from 50 sensors installed by the Akimat of Almaty with the assistance of the ADB.

In general, to the city assesses up to 11 air quality, which encompass: 1) suspended particles (dust); 2) suspended particles PM-2.5; 3) suspended particles PM-10; 4) sulfur dioxide; 5) nitrogen dioxide; 6) carbon monoxide; 7) formaldehyde; 8) phenol; 9) nitrogen oxide; 10) ozone; 11) benzopyrene.

Kazhydromet issues monthly bulletins on air quality, indicating the readings of monitoring sensors and exceeding the maximum concentrations per day, month and year. However, this information is presented for the entire city without specifying the specific districts. (<https://www.kazhydromet.kz/en/ecology/ezhemesyachnyy-informacionnyy-byulleten-o-sostoyanii-okruzhayuschey-sredy>). An interactive map of air pollution with data on observation posts can be viewed online ([http://ecodata.kz:3838/app\\_dem\\_visual/](http://ecodata.kz:3838/app_dem_visual/))

Kazhydromet data in the KZ in monthly and annual bulletins are given in mg/m<sup>3</sup>, while WHO uses µg/m<sup>3</sup>, so we convert the data given in the RK from mg/m<sup>3</sup> to µg/m<sup>3</sup>.

In Almaty, there is no official division of stations separately by districts of the city, therefore, the calculation of the impact on the population in the context of different districts of the city was not made.

According to Kazhydromet data for 2022, the quality of the atmospheric air of Almaty was assessed as a "high" level of pollution according to the standard index. The number of exceedances of the MPC of the Republic of Kazakhstan for PM-10 for 2022: 2476 cases.

Kazakhstan standard for maximum average daily concentration:

- PM<sub>10</sub> 0.06 mg/m<sup>3</sup>
- PM<sub>2.5</sub> 0.035 mg/m<sup>3</sup>

In Almaty, on 75 per cent of days in 2022, the average daily concentration exceeded the WHO daily norm (15 micrograms/m<sup>3</sup>). In 2022, the excess of the WHO annual norm (5 micrograms/m<sup>3</sup>) was 7.0-13.6 times, depending on the area of the city.

Most of the days with excess of the WHO daily limit fall on the period from October to March. During this period, on average, there were no "clean days" in the city. In addition, the Akimat of Almaty conducts calculations to estimate emissions of harmful substances into the atmosphere from motor vehicles. These calculations follow a methodology developed based on the international methodology for the inventory of emissions of harmful substances EMEP/ EEA(CORINAIR), COPERT 5, while also taking into account the peculiarities of the structure and condition of the vehicles fleet and road-climatic conditions of their operation in the Republic of Kazakhstan and Almaty

According to these calculations, the annual estimated emissions of harmful pollutants from road transport in the city of Almaty for 2022 will be 34718.2 tons. The largest share of harmful emissions is accounted for by carbon monoxide CO 30385 tons (87 per cent of the total amount). Emissions of nitrogen oxides (NOX) will amount to 5610.7 tons (16 per cent), while emissions of solid particles PM<sub>2.5</sub> and PM<sub>10</sub> are estimated at 213.4 tons (0.6 per cent).

**Table 16: Air quality in Almaty**

No of stations	Location	Average yearly	in area	%
16	Almaty city	40		
	Total city population	40	2156700	100
	<b>Population weighted concentration</b>	<b>40.00</b>		

**Table 17: Overall score for indicator 9**

Indicator	Value	Year	Comments
Air quality (PM <sub>10</sub> )	40	2022	Average concentration PM <sub>10</sub> based on Kazhydromed data

## 8.10. Indicator 10: Greenhouse gas emissions (CO<sub>2</sub>eq tons/year)

In Kazakhstan, according to the current rules, greenhouse gas emissions are not recorded in the context of cities and modes of transport at the city level. The inventory of greenhouse gases is conducted on a national scale based on the volume of fuel sold.

All calculations for the city that were indicated in the literature or reports were not carried out regularly within the framework of international projects or by researchers on individual projects using transport modeling data.

Calculation of the quantity of fuel sold within Almaty is also not available since fuel is sold not only for transport purposes but also for household consumption and transit transport.

The last time greenhouse gas emissions data were provided on request, according to modeling data for 2021 using the COPERT 5 model, considering the peculiarities of the structure and condition of the fleet of vehicles and the road and climatic conditions of their operation in the Republic of Kazakhstan and Almaty. The calculation also includes GHG. The expert provided only the final data without details.

According to these calculations, the annual estimated amount of greenhouse gas emissions from road transport in the city of Almaty for 2021 amounted to 2,466,788 CO<sub>2</sub>eq tons/year. The population of Almaty in Dec 2021 was reported as 2020547 people.

**Table 18: Overall score for indicator 10**

Indicator	Value	Year	Comments
Greenhouse gas emissions (CO <sub>2</sub> eq tons/year)	1.22	2021	Ratio was calculated based on greenhouse gas emissions (GHG) emission data extracted from report prepared for Almaty environmental Department (Green Economy Department) in 2021 based on the data collected for Transport emission chapter/ Population data is from Bureau of National statistic

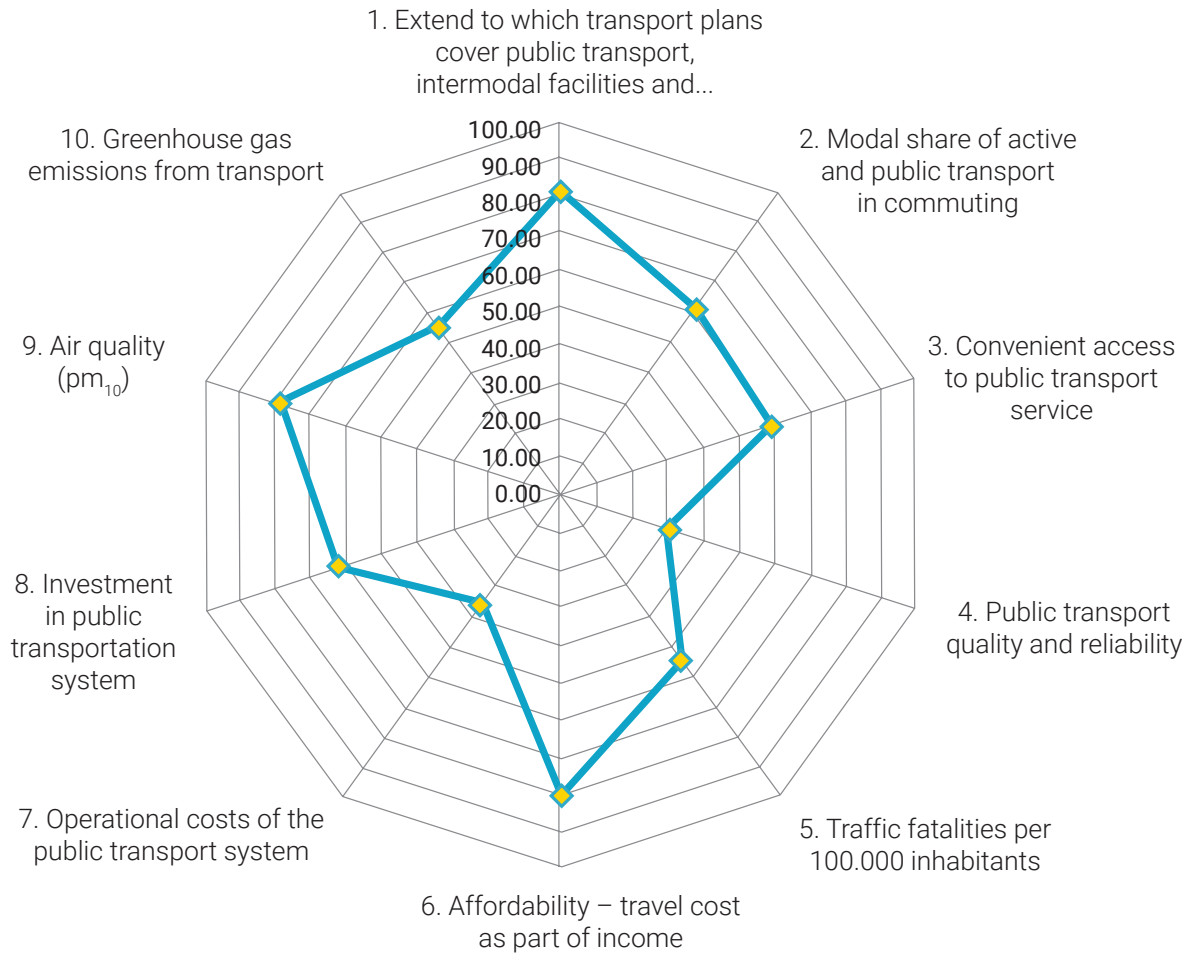
## 8.11. Combined final results

The aggregate value for SUTI for the city of Almaty is 57.38

**Table 19: Combined final results for SUTI in Almaty**

#	Indicators	Natural	Weights	Normalization		
		units		MIN	MAX	
1	Extent to which transport plans cover public transport, intermodal facilities, and infrastructure for active modes	0 - 16 scale	0.1	0	16	81.25
2	Modal share of active and public transport in commuting	% of trips	0.1	10	90	61.25
3	Convenient access to public transport service	% of population	0.1	20	100	58.75
4	Public transport quality and reliability	% satisfied	0.1	30	95	30.11
5	Traffic fatalities per 100.000 inhabitants	No of fatalities	0.1	10	0	55.49
6	Affordability – travel costs as share of income	% of income	0.1	35	3.5	80.3
7	Operational costs of the public transport system	Cost recovery ratio	0.1	22	100	36.25
8	Investment in public transport systems	% of total investment	0.1	0	50	62.00
9	Air quality (pm <sub>10</sub> )	µg/m <sup>3</sup>	0.1	150	10	78.57
10	Greenhouse gas emissions from transport	Tons/cap	0.1	2,75	0	55.61
MUST SUM TO 1			1.0			
<i>Note: Decimal points used to allow reproduction in US format for report</i>						
			INDEX	SUTI RESULT Geometric mean		<b>57.38</b>

## 8.12. Spider diagram



# 9

## CITY'S PERSPECTIVE ON THE SUTI PROCESS

Currently, the Mayor's Office of the city uses different methods for monitoring transport systems and do not use an indicator-based system for assessing the sustainability of the transport system such as the integrated SUTI indicators. Some indicators, developed through earlier projects in the city with technical assistance, such as UNDP-GEF Sustainable Transport Project in Almaty city, are used in planning at the level of five-year programs. However, they are not included in any programs at the national level and not mandated for local executive authorities and transport administrations.

For many decades, the city development program for the transport section has been based on infrastructure indicators (roads). It is only in recent few years that the program has begun to integrate an indicator for the modal share of types of transport and road safety. However, the measurement of the mode share indicator is limited due to the lack of full-scale research and sociological surveys of the population over the past five years, which require resources.

The data collected by the Almaty Transport Holding is mainly used for operational monitoring of the activities of public transport operators and for compensation of payments. The documents of urban strategic planning, which were prepared earlier in the city, used only a few indicators. The applied indicators do not have a long history of documentation, thus complicating the assessment of effectiveness. This problem occurs from the lack of a single methodological guide for formulating urban mobility development plans that are approved at the national level.

The establishment of such a guide, potentially through an official order, could change approaches to the planning system in the field of public transport. It would introduce uniformity in the process of data collection and processing and would allow to compare the cities of Kazakhstan with each other and other cities of Central Asian countries and the world as a whole.

The main challenges of implementing SUTI indicators are:

- The lack of capacity for the preparation of methodological documents allowing the introduction of these indicators into the planning system in the Ministry of Industry and Infrastructure Development, i.e., there is no separate department dealing with the development of urban mobility and there are no specialists who possess knowledge and skills on international approaches and in particular indicators of sustainable mobility.
- Plans for the development of the urban transport system are not approved as a separate planning document and are of a short-term nature, and often change when the mayors of the city change.
- The lack of a unified and transparent reporting system on the public transport sector (on investments, infrastructure for cycling and walking, micromobility), data on atmospheric air pollution are not linked to certain areas of the city, etc.).

Most of these challenges can really be solved if the leadership of the transport industry and the population had the political will to increase the sustainability of cities in general and transport systems in particular as well as the availability of a think tank for the implementation period.

# 10

## COVID-19 IMPACT ON MOBILITY

This analysis focuses on micro-mobility and active mobility. In Kazakhstan, during the spring of 2020, there was a complete ban on movement on the streets, and public transport did not work. As in other countries of the world, there were restrictions on the operation of public transport, which affected passenger traffic and the potential of carriers to improve services. During the period of partial restrictions, when public transport was restored, there was a surge in the use of scooters and bicycles, but no temporary bicycle lanes were developed. During this period, an Infrastructure Development Strategy for non-motorized movements was developed, but the implementation of the plans started only in 2022. In 2022, the consequences of the restrictions were already invisible, and passenger traffic gradually recovered.

# CONCLUDING REMARKS AND RECOMMENDATION TO IMPROVE SUSTAINABILITY OF URBAN MOBILITY

The SUTI assessments showed the strengths of the transport policy, the offer of mobility services in Almaty, and the existing systemic shortcomings. Since 2012 the city of Almaty was at the forefront of cities within the post-Soviet space to prepare transport planning documents (strategy and implementation plans) based on the best international practices in the field of sustainable urban development, propose development indicators in the field of urban mobility and carried out institutional reforms. Almaty has become a leader in the implementation of projects on the organization of priority for public transport, non-motorized modes of transport, street parking, automation of traffic management. This made it possible to show the population the importance of moving from individual mobility to the formation of a more sustainable transport system, with an emphasis on reducing transport emissions.

At the same time, during the evaluation process, it was revealed that further improvements are required for the institutionalization of projects, the definition of clearer indicators of the effectiveness of each event, and especially for improving the efficiency of municipal enterprises. The city authorities should further formulate long-term priorities for the transition to low-emission vehicles clearly both in the public transport sector and for freight transport.

Additional policy decisions and measures are required to build the capacity of employees in the areas of financial sustainability of enterprises, monitor the effectiveness of projects to reduce emissions, including requirements for assessing greenhouse gas reduction. In particular, improved communication with the population, increased transparency through open data on the operational activities of enterprises and city administration projects will improve the perception of public transport and micro-mobility and offer more alternatives to private vehicles travel.

Additionally, during expert interviews, the problem of fragmentation of individual projects or the lack of continuity in approaches to the implementation of large investment projects, which could improve the indicators of the quality of OT services and its reliability, was revealed by the akims of the city appointed by the president of the country. Project deadlines are often shifted, locations or plans for financing projects are already in the process of implementation. For example, according to the project of automated traffic management system (ATMS), the second stage of implementation was shifted in funding by almost two years. The light-rail tram project was stopped at the tender stage and its implementation has been lagging for almost five years.

To reduce the car traffic in the city center and reduce transport related emissions, experts proposed to restrict entry of freight transport in the city center, with the exception of transport of special services, utilities and providing continuous technological processes. During the consultations, the areas that need to be improved both in terms of technology, integration and staffing of the industry were also identified. These are information services for passengers, reforming the system of municipal parking along the streets, creating a single traffic management center. Experts note the need to change the methods of calculating subsidies and greater transparency in their distribution. This issue is also associated with the need to adopt new approaches when forming routes and changing the system of concluding contracts in this industry. In the field of micromobility, more coordinated actions with the national government in the field of regulation and safety are required.

- a) Views on sustainable development of public transport (energy/renewable energy use, inclusiveness- addressing the concerns for gender equality and needs of differently abled and aged users).

The use of renewable energy in the energy supply of transport enterprises is not yet taken into account in national or city transport planning documents. The city administration, following international trends and taking into account the history of the development of electric transport, is currently trying to increase its share through the reconstruction of trolleybus traffic. The project of a light-rail tram, several lines are included in the long-term development plans of the city, but its implementation is postponed due to the change of akims of the city and insufficient local capacity for the implementation of infrastructure projects.

Experts believe that the limited focus on the use of renewable energy in transport at the city level is a direct result of the lack of a common policy at the country level on this issue. Coal-fired generation in the production of electricity, according to some politicians and residents of the city, is a deterrent to the introduction of electric buses. Educational work and measures to stimulate the transition to renewable energy will pave the way for a shift from small local solutions (such as the use of solar panels at public transport stops for lighting or information boards) to full-scale projects for the use of public transport at enterprises for depot lighting.

There has been a positive trend in the transition to electric mobility in the city, but the regulatory and legislative framework is still insufficient to accelerate the development of energy supply infrastructure based on renewable energy sources. While there are no indicators on the use of low-carbon transport at the country level, it is difficult to expect changes in priorities at the local level in Kazakhstan.

Currently, in Kazakhstan, the Ministry of Industry and Infrastructure Development is developing a new concept for energy efficiency, where positive changes are planned also for urban transport. Carriers need to be supported through tax incentives and subsidies to switch to more modern and environmentally friendly rolling stock, introduce electric taxis, train personnel in eco-driving. Only an integrated approach to the planning and integration of territorial development projects in the field of energy, education or road safety will make cities more sustainable in the field of urban mobility.

- b) Best practices and innovative solutions, if any, on integrated public transport systems with smart transport systems.

Almaty became the first city in Central Asia to introduce centralized monitoring systems for public transport using its own IT products. The introduction of ONAY electronic ticketing and the utilization of transport modeling to build a route network of ground transport are among these achievements. When building the public transport route network in 2019, an innovative solution was applied when ticket validation data and passenger traffic data were combined into a single register, enabling more accurate forecasts. The dispatcher of the Transport Holding works 24 hours a day, providing reports on the exits of rolling stock on routes, maintaining operational communication with drivers, and adjusting traffic schedules. Automatically generated reports serve as foundation for the payment of compensation to carriers. Additionally, this dispatcher monitors the movement of cleaning rolling stock and some other municipal services of the city.

The city is also successfully implementing video surveillance systems "Sergek" for monitoring the traffic flows with plans for enhancing monitoring coverage of dedicated lanes for public transport in 2023. It has the ability to calculate average speeds and transmit this data for further analytics. These systems need to be developed towards greater data transparency for independent researchers and to facilitate the introduction of various MAAS products, thereby improving road safety.

- c) Recommendations on how to improve sustainability of urban mobility and how to utilize innovative solutions on integrated public transport systems and/or smart transport systems in Almaty.

According to the results of the assessment, the main recommendations to improve sustainability of urban mobility in Almaty are:

- Increase non-motorized transport around the city with the construction of interconnected bicycle paths/lines and walking paths through speed reduction projects and lighting (visibility), especially around schools.
- Improve the quality of public transport services through regular monitoring of individual quality indicators for different modes of transport.
- Application of the main SUT indicators would allow the municipality to improve planning and reporting to public authorities and the population. State statistics in the field of transport should be guided by international indicators.
- Accelerate implementation of infrastructure projects aimed at safety and speed of public transport, including issues of accessibility of infrastructure and organization of multimodal transport hubs.
- Improve working conditions for drivers, to enhance the safety of bus transport. Provide more opportunities for women to study and get jobs in the transport industry.

- Reform tariff plans and introduce new routes for better coverage of the public transport network throughout the agglomeration.
- Plan to reduce harmful emissions from the transport sector of Almaty via through strengthening control and digitalization of technical inspection.
- Call on the central government and local administration to contribute to the growth of funding for low-carbon public transport.
- Accelerate potential of IT companies based in Almaty and the best experience of other cities to increase the share and quality of useful digital services for public transport passengers.

### **Follow-up activities on the recommendation of the study**

As indicated in the SUTI assessment, Almaty city faced the challenge of outdated information regarding the quality and reliability of public transport system and mode share. As part of the project a user's survey on quality and reliability of public transport system and use of digital technology and mode preference was undertaken in 2023 after discussion with the city authority. The findings of the survey were presented and discussed during the National Workshop on the Integration of Urban Public Transport Systems and the Application of Digital Technologies on 28 May 2024 in Almaty.

# USEFUL REFERENCES AND PERSONS, EXPERTS AND OFFICIALS MET

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## ● REFERENCES

"City Almaty Sustainable Transport Strategy 2013-2023"

"Almaty City Development Program Until 2025 And Medium-Term Prospects Until 2030"

"Strategy For the Development Of Bicycle And Pedestrian Infrastructure Of The City 2021"

"Strategy "Smart Almaty" For 2020-2025"

Strategy Of Almaty City Until 2050 (2019)

Draft document "Adjustment of the general plan for the development of the city until 2040" (2023)

### Web resources

Akimat of Almaty city <https://www.gov.kz/memleket/entities/almaty?lang=en>

Almaty Bike <https://almatybike.kz/>

Almaty city Development Center <https://opendata.smartalmaty.kz/>

Almatygenplan <https://almatygenplan.kz/>

Bureau of National Statistics Under the Agency For Strategic Planning and Reforms of the Republic of Kazakhstan <https://new.stat.gov.kz/ru/>

Department of ecology and environment of Almaty city <https://www.gov.kz/memleket/entities/almaty-eco?lang=ru>

Digitalization Department of Almaty <https://digital-almaty.kz/ru/content/poleznaya-informaciya>

Ecoportal of Almaty city - Smart ECO <http://185.125.44.116:8085/Maps/AlmatyFree>

Kazhydromet <https://www.kazhydromet.kz/ru/>

Public transport portal and information, incl library of the UNDP-GEF «City Almaty Sustainable Transport project» <https://alatransit.kz/ru>

Urban Mobility Department <https://www.gov.kz/memleket/entities/almaty-upt?lang=ru>





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