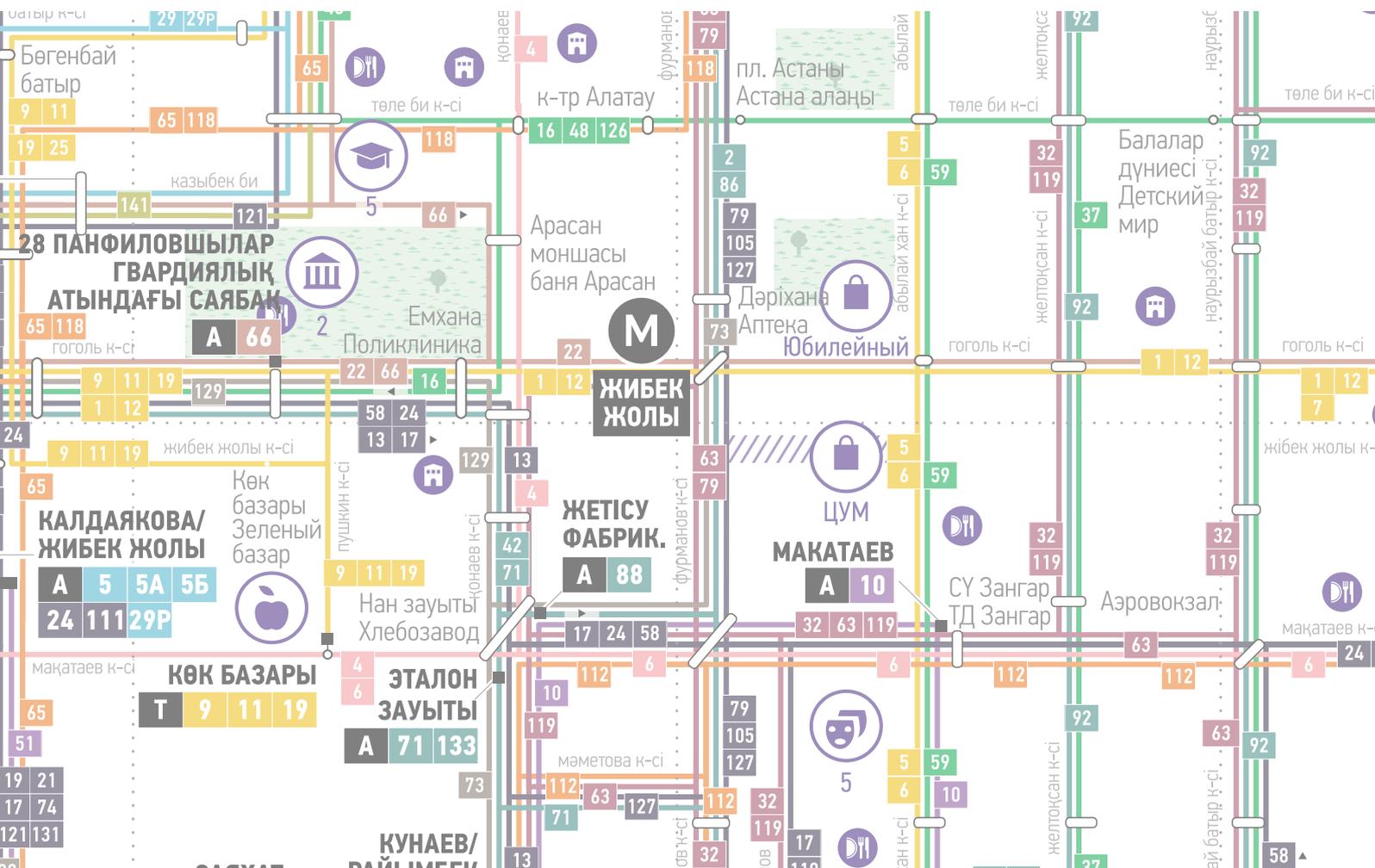


# CITY OF ALMATY SUSTAINABLE TRANSPORT



City of Almaty Sustainable Transport. Final Report. Almaty, 2017 – 48 p.

This publication presents final report of 'City of Almaty Sustainable Transport' Project: goals and achievements from 2011 to 2017, major conclusions and lessons learnt. The report reflects main Project's recommendations for central and local authorities in regard with key city transport reforms: legislation, financing, planning and organization of city transport network, including measures to increase sustainable modes of transportations such as public transit, cycling and walking.

The publication addressed to state authorities, managers and experts of city transport, as well as to all those interested in cities' sustainable development.

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All publications, reports, conference and training materials developed in frame of CAST Project implementation could be found at <https://alatransit.kz/ru/biblioteka>

Videos are available at <https://www.youtube.com/user/CASTprojectUNDP/videos>

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Resilient nations.

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Resilient nations.*

**UNDP/GEF Project 'City of Almaty Sustainable Transport'**

# **CITY OF ALMATY SUSTAINABLE TRANSPORT**

**UNDP/GEF PROJECT**

**FINAL REPORT**

**2011-2017**

## Contents

Foreword	3
The Project Timeline	4
Main Achievements	8
Sustainable Transport Strategy	12
Improvement of Traffic Management, Transport Infrastructure Planning and Design	20
Technologies and Tools in Public Transport	35
Civil Society Perspective: Can Mentality and Behaviour Potentially Change?	42
How Can We Make Ideas of the Project Viable After Its Completion?	48

Munkhtuya Altangerel  
Deputy Resident Representative  
United Nations Development Programme in Kazakhstan



Public transport is the lifeline of cities and when it provides comfortable, clean, low-emission, low cost and safe transit environment for passengers it becomes an indispensable positive attribute affecting on a daily basis the livelihoods of thousands of people. One of the main achievements of the GEF-funded UNDP project 'City of Almaty Sustainable Transport' is taking the public transport out of the transport sector and making it everyone's business – city municipality, private sector, NGOs and civil society, commuters, bus drivers, and pedestrians. We tried to make the public transport an issue of concern for every person living and working in and around Almaty city and thus helped spread a sense of shared responsibility. I believe this is one of the most significant steps towards developing a more sustainable transport system in the biggest and busiest city of Kazakhstan, which has the potential for a country-wide replication. It's very rewarding to see how people's behaviour is starting to change as they take more ownership of the future of their city, and make their own decisions for its benefit.

Still, there are a lot of private cars being used for transport in and around the Almaty city. It is an understandable trend: if the public transport doesn't fully satisfy people's needs, and cars become associated with higher comfort and are perceived as a 'status' symbol, gradually a lot more people will want to buy a car. This leads to clogged streets, increased pollution, and urban planning may start prioritizing the needs of cars over the needs of the people and pedestrians. Together with the Akimat of Almaty city our project helped expand options and choices in the favor for the 'greener' public transit such as rapid transit bus lanes, shift to more modern and comfortable buses, and opening of bicycle lanes. We also laid down the groundwork for eventually introducing the light railway transit systems in the city – I personally hope to see it becoming a reality in the near future! We also helped introduce new standards of low emissions for city transport. Within the framework of the global Sustainable Development agenda, and global Sustainable Development Goals, the city transport is recognized as a significant area affecting the overall well-being of humans and surrounding ecosystems.

I would like to thank the Akimat of Almaty city for their strong commitment and ownership of this project which greatly helped facilitate full implementation of our project. While recognizing the overall successful implementation and transformative impacts I've outlined earlier, there were also some challenges such as estimating the decrease in greenhouse gases emissions attributable to the project implementation. Another challenge which was beyond the scope of work but remains to be addressed is road safety, since all over the world thousands of children and adults unnecessarily become victims of unsafe driving practices. UNDP hopes to take up this topic and further work with the authorities and communities to make our roads safer and cleaner for all the people.

Due to scope of my work, I and my family live in Astana. My preferred choice of movement around the city is cycling and walking as they help clear my head after work and help me stay more connected with the surrounding environment. I enjoy watching the nature around, even in an urban setting, tree-lined alleys and river banks, away from the noisy streets and highways. We also greatly enjoy visiting Almaty every now and then: during each trip we try to visit the nearby mountains – they are truly majestic and breathtaking. Every time I see the snow peaked mountains of Alatau mountain range in Almaty, I think of how truly blessed the people in Almaty city are. I hope we can contribute to keeping the surrounding ecosystems in pristine conditions so that the future generations of Almaty city can love and protect them.

## Key Project Activities

## Almaty City Events Supported by the Project

## Project's Contribution to Almaty City Social Life

Workshop on estimation of transport emissions

2011

Study tour on planning LRT and Metrobus transit systems for representatives of Almaty City Administration (Kayseri and Istanbul, Turkey)

2012

Data collection and discussion of 'Almaty Sustainable Transport Strategy' with Project stakeholders

Data collection for development of Almaty transport demand model

International workshop on parking management

Training on maintenance of compressed natural gas (CNG) buses

2013

International workshop 'BRT for Almaty: international practice, ideas for Almaty'

Presentation of 'Parking Management Strategy' to Almaty Akimat

Training on TransCAD transport modeling software usage

Participation of Almaty cycling activists in the international Velo-City conference in Vienna

Workshop 'Requirements for monitoring and measuring transport-related emissions in Kazakhstan'

International conference 'Transport, Health and Environment' in Almaty

Presentation and adoption of 'Almaty Sustainable Transport Strategy' for 2013-2023

Cycling race for children – 200 participants

Transfer of transport modeling TransCAD software licenses to Akimat of Almaty

Opening of bicycle parking in KazNU

Distribution of 'Guidelines for maintenance of CNG buses' across bus depots

Training 'Quality Management in Public Transport' Eco-Driving Week in Almaty

2014

Development of pre-feasibility study for BRT

Development of LRT concession proposal

Training on planning and design of cycling infrastructure

Training for Transport Holding on transport demand modeling

Study tour on BRT systems (Guangzhou and Yichang, China)

Training 'Support Systems for Public Transport' in Almaty

Study tour on BRT for representatives of City Administration and Transport Holding of Almaty (Amsterdam and Utrecht, Netherlands)

Mr. Peñalosa's lecture on experience of Bogota City in transport systems transformation

International conference and master classes on transit-oriented development

Workshop on safe maintenance of CNG buses

Contest for the best social advertising – 17 participants

Development and release of 3 social videos promoting sustainable modes of transport

Cycling race for children

Launch of the first bicycle rental station in Almaty

## Key Project Activities

Presentation of 'Report on Energy Efficiency in Transport Sector of the Republic of Kazakhstan: Current Status and Measures for Improvement'

Training on BRT design

Training 'Public Transport Fare Management'

5 km of cycling infrastructure designed

Training 'Public Transport Planning and Management System'

Participation of Almaty delegation in the World Bike Forum in Medellin

Collection of data on passenger flows and discussion of the route network optimization principles

International conference 'Public Transport Ticketing and Regulation Systems'

Presentation of 'Tariffs and Ticketing' report

Workshops in Shymkent and Temirtau on sustainable mobility plans

Preparation of guidelines for sustainable mobility planning

Workshop 'Environmental Labeling of Vehicles as a Tool to Reduce Transport-related Emissions to the Environment'

Training on public transport routes planning

Distribution of 'Guidelines for Bus and Trolleybus Drivers on Interaction with Cyclists on the Road'

International conference for the cities of Kazakhstan to promote cycling and pedestrian mobility

Technical training for the Transport Holding on route network optimization

Study tour and training on procurement and operation of electric buses for representatives of ministries, city administrations, operators (Brussels, Rotterdam, Barcelona and Geneva)

Workshop on development of electric transport in Almaty

New cycling corridor Orbita-Atakent Exhibition Center designed and built – 5 km of cycling infrastructure

Release and presentation of 'Report on Public Transport Accessibility in Kazakhstan'

Workshop 'Review of Kazakhstan's Public Transport Development Policies'

Analysis and recommendations for public transport legislation reform

Training on intersections design in Astana

Training on socio-economic assessment of transport projects in Almaty

Training on intersections design in Almaty

Summer school on transit-oriented development

Grant projects to set up a bicycle-pedestrian alliance in Almaty

Development of training materials on public transport accessibility

Discussion and presentation to Almaty Akimat of 'Recommendations on LRT Project Financial Model'

# 2015

## Almaty City Events Supported by the Project

First dedicated lanes for public transport

Commissioning of a pilot cycling lane in Timiryazev street (1 km demo project)

# 2016

Launch of 'Onay' e-ticketing system

Route network optimization report presented to Almaty City Administration

'Transport Innovation Challenge'

IT projects competition – 3 winners awarded with grants for implementation

# 2017

Construction of the first BRT corridor in Orbita microdistrict began

Young architects contest for the best design of a bus stop

Development and presentation of 'Integrated Traffic Management Scheme' for Almaty city

Publication of 'Almaty City Streets Design Standard'

Round table with Almaty city administration on improving accessibility of public transport

Commissioning of cycling lanes in Baytursynov-Shevchenko streets

Installation of a cycling monitor

## Project's Contribution to Almaty City Social Life

Round table 'Future of Cycling in Almaty'

The First Parking Day – 'Car-Free Day' Festival

Open Streets Festival

Release of social videos on paid parking

Launch of the Young Cyclist School – 3 Almaty schools, 2000 children

Children's drawings contest 'We Are Transport'

Tour de Kids children's cycling race

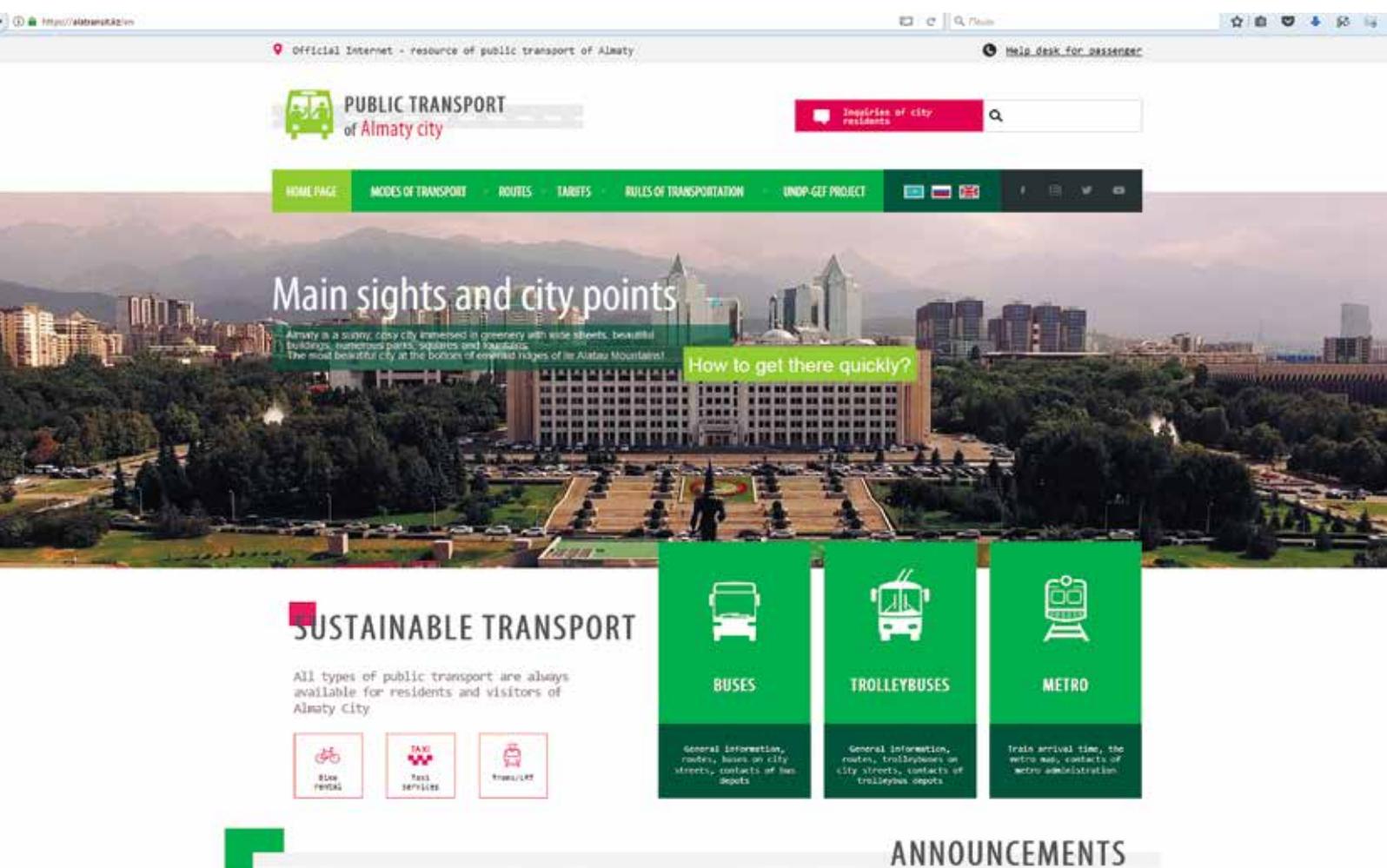
Commissioning of 50 bicycle rental stations for 270 bicycles

Youth campaign to promote public transport – Ecomon Go

Tour de Kids children's cycling race

Launch of 'Your safe bicycle for environment of your city and your health!' project in 20 schools of Nazarbayev Intellectual Schools network in 16 regions of Kazakhstan

Commissioning of additional 77 bicycle rental stations covering the city downtown



Initiated by Almaty City Administration, United Nations Development Programme (UNDP) and Global Environmental Facility (GEF), 'City of Almaty Sustainable Transport' Project has been aimed during 2011-2017 to reduce the growth of transport-related greenhouse gas emissions in Almaty by:

- 🌿 Improving public transportation and air quality management in Almaty
- 🌿 Improving public transport efficiency and quality
- 🌿 Integrated Traffic Management
- 🌿 Demonstration projects featuring sustainable transport

#### FINANCES:

TOTAL BUDGET: US\$ 81,412,000

ALMATY CITY ADMINISTRATION: US\$ 30,050,000

GLOBAL ENVIRONMENTAL FACILITY: US\$ 4,886,000

EUROPEAN BANK FOR RECONSTRUCTION AND DEVELOPMENT: US\$ 45,726,000

OTHER SOURCES: US\$ 700,000

UNITED NATIONS DEVELOPMENT PROGRAMME: US\$ 50,000

Almaty is a rapidly developing cosmopolitan city, with expected population growth of more than half a million residents in the next 20 years (1.7 million as of 2016, and 2.2 million in 2040, respectively). The city is already experiencing symptoms of a traffic collapse, where the lack of convenient public transportation is aggravated by a continuously increasing number of private cars. The average traffic speed is 15-17 km/h, decreasing to 12-15 km/h during peak hours. Moreover, expansion of residential development and corresponding population growth concentrates mainly in remote from city center areas, such as Alatau and Nauryzbai districts, which requires the authorities to not only properly plan further construction of housing, schools, medical facilities and shopping centers, but also to purposefully adopt and implement an integrated approach to provide reliable, efficient and affordable public transport services.

Almaty residents, just like most residents of modern cities, require seamless mobility and convenience of public transport in order to make their daily door-to-door travel around the city as comfortable as possible. Integration and all-inclusive approach should become the cornerstones of the transport environment of the city and, above all, enable the use of multiple modes of transport (inter-modality) in a single trip. A research undertaken by the Project shows that development of cycling infrastructure can significantly change transport habits of Almaty residents,

thus increasing the share of sustainable modes of transport and reducing the number of private cars congesting the roads. Other potential ways to lower transport emissions include a promising initiative to develop modern modes of electric transport, such as construction of LRT, and a large-scale upgrade and expansion of existing trolleybus network, as well as organization of transit hubs at entrances to the city, and paid parking throughout the city center, which together will enable significant decrease in the number of private cars in daily traffic.

Implementation of these bold changes will enable establishment of a new paradigm of city life, a shift from universal car ownership to use of public transit, cycling or walking, which should become a fashionable trend among Almaty inhabitants, associated with their dearly loved city. Get rid of exhausting traffic jams and ugly spontaneous car parking, take a cycle ride with your family or friends on safe cycling paths within your own district, walk a clean, beautiful and unpolluted city, and, finally, feel yourself more important than cars – this vision is attractive to all city residents, regardless from their age or social status.

In this report, we will discuss the efforts undertaken by the UNDP-GEF 'City of Almaty Sustainable Transport' Project to promote the new paradigm, the results achieved so far, and the foundation laid down to build on the ideas developed by the Project.



# MAIN ACHIEVEMENTS OF 'CITY OF ALMATY SUSTAINABLE TRANSPORT' (CAST) PROJECT

## 1) Increase in the share of sustainable transport in Almaty

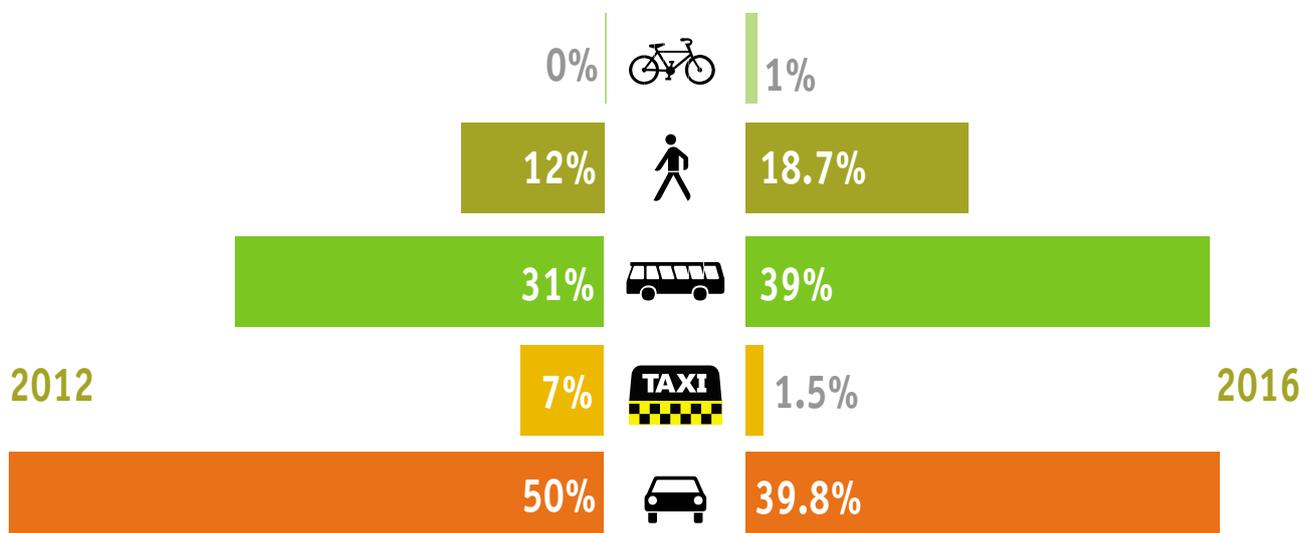
The target to the end of CAST Project: increase the share of sustainable modes of transport in daily travel (public transport, walking and cycling) from 43% in 2012 to 55% by 2017.

The **share of sustainable transport use** in Almaty increased **from 43% to 59%**, 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 will be the main factors contributing to the modal shift in urban transit preferences towards the public transport.



Preferred modes of transportation	2012	2016
Cars (driver or passenger)	50%	39.8%
Official taxi	7%	1.5%
Public Transport	31%	39%
Walking	12%	18.7%
Cycling	0%	1%

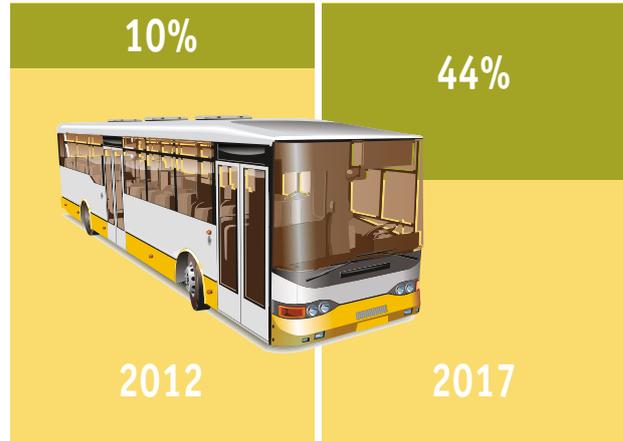
Sources: 2012 – 'Almaty Sustainable Transport Strategy'; 2016 – 'Transport Habits and Mobility of Almaty Residents'



## 2) Contribution to improvement of environmental situation in Almaty city

Cumulative **direct reductions in greenhouse gas emissions**, subject to implementation of CAST Project recommendations, will comprise **502,710 tons of CO<sub>2</sub> over 20 years**.

Joint efforts of CAST Project, European Bank for Reconstruction and Development and Almaty Akimat had influenced a significant rise in upgrade of ground public transport – from 10% to 44%. That became possible due to introduction of modern buses, operating on compressed natural gas (CNG).



## 3) Institutionalization of reforms

In order to implement the sustainable transport initiatives on a long-term basis, CAST Project assisted the city in the development of key policy instruments: the **Almaty Sustainable Transport Strategy for 2013–2023**, and the draft national standard **Organization of Street and Road Space in the City of Almaty** (PST RK 65 – 2017). Based on a number of studies, the Project produced and presented recommendations for the Ministry of Investment and Development and the Ministry of Energy of Kazakhstan in two documents: the **Energy Efficiency in Transport Sector of the Republic of Kazakhstan: Current Status and Measures for Improvement** and the **Review of Kazakhstan’s Public Transport Development Policies**.

CAST Project provided technical and financial support in the design of the Integrated Traffic Management Scheme and in optimization of the city’s public transportation network.

In order to disseminate the experience, the Project had prepared generic recommendations guiding the development of sustainable mobility plans tailored to the context of Kazakhstan cities, and drafted **sustainable urban mobility plans**, which proposed measures to improve transport infrastructure, for Shymkent and Temirtau as specifically requested by the cities’ administrations.

All CAST Project materials and publications could be found at <https://alatransit.kz/ru/content/proekt-proon-gef>.

## 4) Building transport-related technical capacity and management skills

Over its lifetime, the Project organized **22 conferences** that were attended by **more than 800 representatives of various authorities, design institutions, transport and construction companies**; conducted

**19 trainings** to improve the technical knowledge of over **250 professionals** ranging from drivers to city planners; arranged **5 study tours abroad** to present best practices in LRT-BRT systems, e-ticketing and electric transportation.



	Number of events	Participants (Male/Female)
Conferences (discussion of trends and knowledge dissemination)	22	Over 800
Seminars/trainings/study tours	19	Over 250 (170/80)
Activities to support city events (raising awareness about sustainable transport, civil society participation)	21	

## 5) New approaches to planning and design of transport infrastructure

CAST Project provided technical and financial assistance to the city authorities in development of the general mass rapid transit strategy (BRT and LRT) and design of the first BRT corridor, followed by preparation of preliminary feasibility study.

**June 2015** – introduction of the first dedicated bus lanes.

**Summer 2017** – beginning of construction of the first 19.2 km BRT corridor. Construction of the first LRT line is scheduled for 2019.



## 6) Development of high-quality cycling infrastructure

**June 2014** – training on the principles of cycling lanes and tracks design was provided to 20 representatives of city administration, developers, police, planners and architects of the city.

**2015** – for demonstration purposes, CAST Project financed the design of the **cycling lane along Timiryazev Street**. Pilot section of the cycling track running **1 km in length** and the width ranging between 2.8 and 3 meters was put into operation in the autumn of 2015; it was built in accordance with all requirements of safety and convenience based on both Kazakhstan and

international standards: the cycling track and pedestrian sidewalk are separated with a green zone to prevent unimpeded entrance of pedestrians to the cycling track; all intersections with the motor roads are marked with road signs, priority is indicated with road painting; the intersections are raised above the road level to reduce the speed of cars when crossing the intersection.

In total, CAST Project supported **the design of more than 10 kilometers of cycling infrastructure to create a cycling corridor and a connected cycling network.**



## 7) Raising awareness of citizens on environmental and traffic issues and building possibilities to address the challenges by civil society

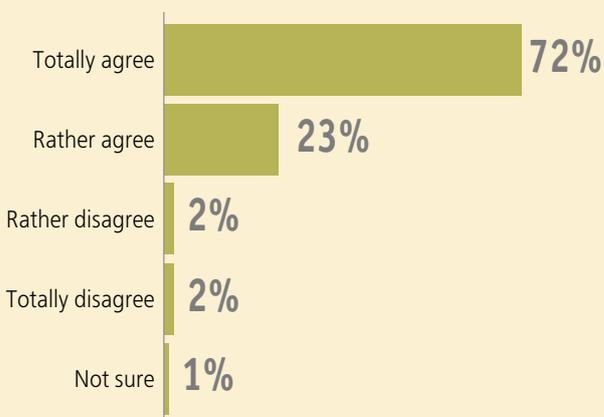
Social advertising initiated by CAST Project and supported by the city administration and the relevant outdoor advertising providers on a cost-free basis became an important component of promoting the use of sustainable modes of transport. In 2014-2015, the Project organized a **contest for the best visual advertising for sustainable modes of transport** with the aim of engaging young designers in the solution of transport and environmental issues of the city, and a **contest of children's paintings** (2016). The best works were displayed on banners across the city, from Almaty airport to Al-Farabi avenue. **For more than three years**, Almaty residents and visitors see and recognize the indelible banners calling to change their transport habits.

CAST Project had also supported release of a series of **social videos featuring benefits of cycling and walking, and rules of behaviour in public transport**, etc. For 2 years, the recognizable cartoon characters accompanied subway passengers.

Predominant majority of Almaty residents (95%) expressed high or complete agreement with the statement that exhaust gases have negative impact on public health in the city. Four of five city residents (81%) believe that the solution to environmental issues lies in banning the entry of smoke-emitting vehicles to the city.



**QUESTION:** Please rate the extent to which you agree with the statement that transport emissions/exhaust gases have negative impact on public health?



Source: 'Transport Habits and Mobility of Almaty Residents', 2016



**From awareness to action:** this is the principle guiding the enthusiasts of the city – cycling activists, urbanists and other passionate people – who are aware that there is a need to change the shape and life of their city, thus setting an example to those in doubt or indecisive.

CAST Project supported over 20 public events, among which the residents and guests of Almaty will certainly remember the Car Free Day, the Parklets and Open Streets festivals, as well as the annual children's cycling competition Tour de Kids.

# SUSTAINABLE TRANSPORT STRATEGY

Sustainable urban transport is a system that provides long-term and continuous high quality mobility and accessibility for all members of the population, while positively contributing to the environmental, social and economic sustainability of the community overall.

## Economic and environmental aspects

The need for reforms in public transport both in Almaty and at the national level was brought up among the first issues discussed at the beginning of cooperation between the UNDP-GEF 'City of Almaty Sustainable Transport' (CAST) Project and the city administration. In 2012-2017, the Project has developed and submitted to the city authorities, as well as to the relevant ministries and agencies, for their review and implementation, several key documents setting the policy and strategy for the development of sustainable modes of transport, including 'Almaty Sustainable Transport Strategy for 2013–2023', 'Energy Efficiency in Transport Sector of the Republic of Kazakhstan: Current Status and Measures for Improvement, and the Review of Kazakhstan's Public Transport Development Policies'. As requested by administrations of cities participating in the Low-Carbon Development of Kazakhstan Cities Programme, the Project developed recommendations for local administrations to guide the preparation of sustainable urban mobility plans that proposed measures to improve the transport infrastructure and increase urban mobility, specifically tailored for Kazakhstan cities.

The range of documents developed by the CAST project has a very wide span: from reviews of the international best practices to specific calculations and forecasting of transport and environmental situation development scenarios on a single city level.

“ In spite of the big investments in transport infrastructure in the recent years, the current urban transport system in Almaty is a long way away from being sustainable. Carbon Dioxide emissions from the transport sector in Almaty are expected to grow from an estimated 2.65 million tonnes in 2012 to 4.99 million tonnes by 2023. Other pollutants are also expected to grow dramatically. NoX pollutant which includes nitric acid, is likely to increase by 60%, while Carbon Monoxide (CO) which is toxic to human will increase 2 folds by 2023. If no urban development strategy change is made, pollution will increase by 75% in 10 years and the total time commuters spend sitting in traffic will more than double. Experts estimate that current congestion is responsible for an economic loss of 210 million tenge daily or 60 billion tenge annually. In 2023, the economic loss is expected to grow to 480 million tenge daily or 140 billion tenge annually. ”

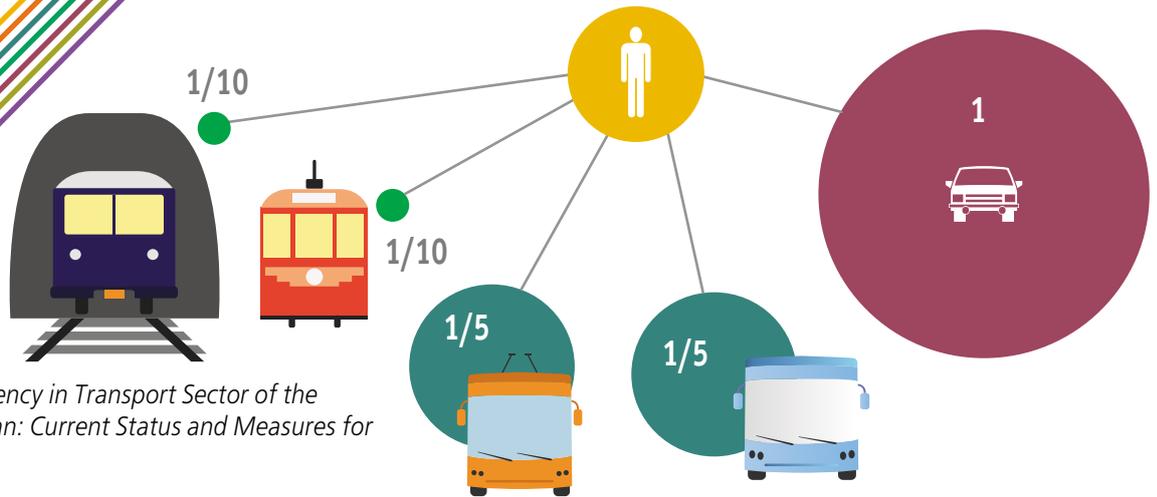
'Almaty Sustainable Transport Strategy', 2012

“ High energy intensity in transport sector stems from the following factors:

- 80% of motor transport has been in service for over 10 years;
- 87% of the total energy is consumed by road transport;
- over 70% of traffic in large cities is generated by cars;
- 8-11% of the cost of goods constitute transportation costs (in industrially developed countries, this indicator usually does not exceed 4%). ”

'Energy Efficiency in Transport Sector of the Republic of Kazakhstan: Current Status and Measures for Improvement', 2015

## ENERGY CONSUMPTION PER ONE PASSENGER



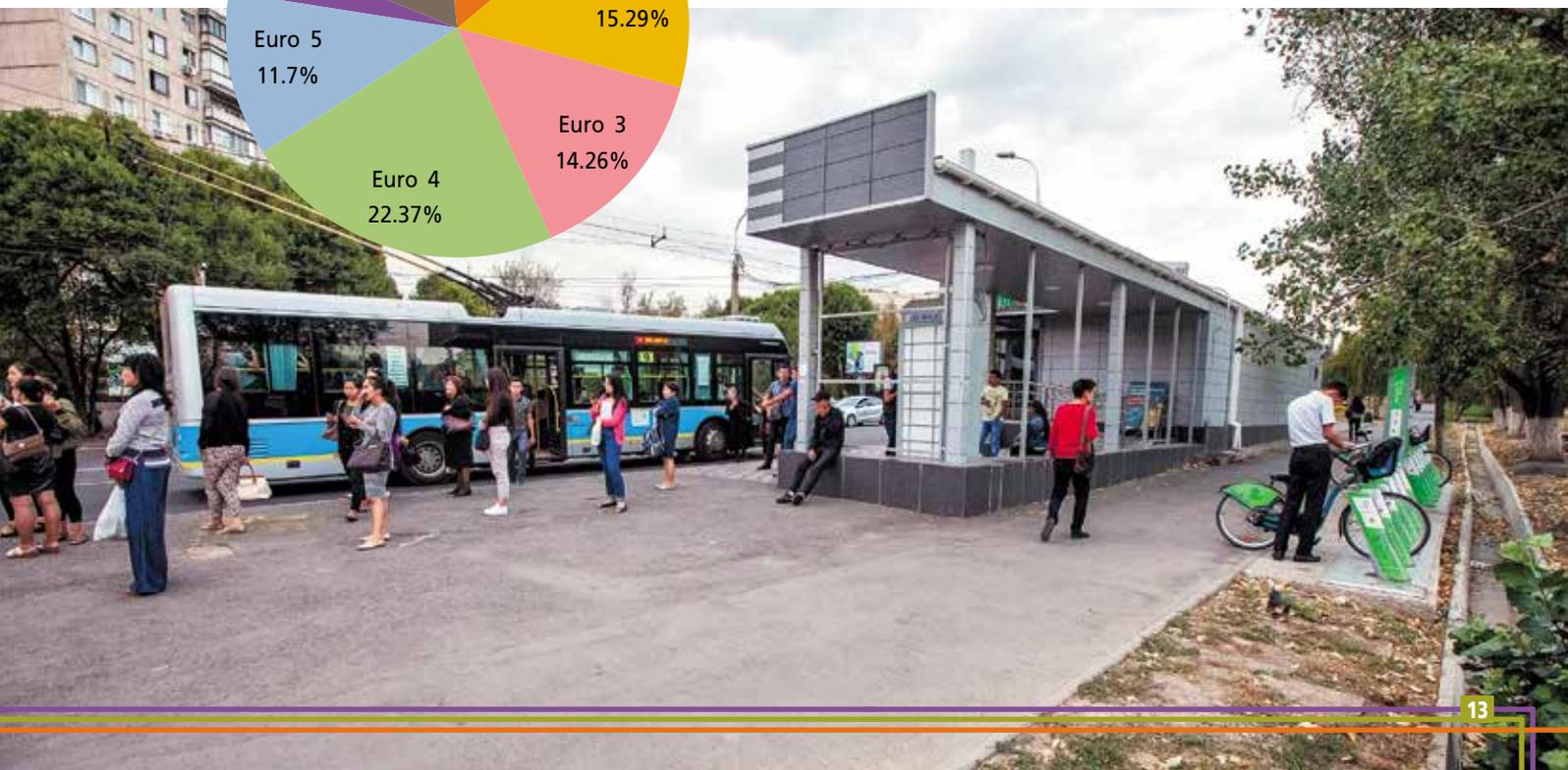
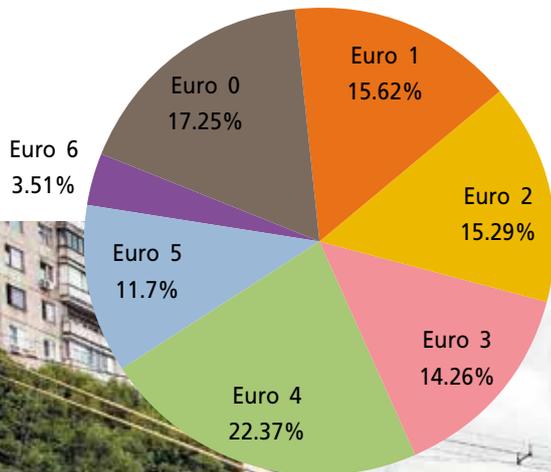
Source: 'Energy Efficiency in Transport Sector of the Republic of Kazakhstan: Current Status and Measures for Improvement', 2015

As of the end of April 2017, the number of motor vehicles registered in Almaty reached as high as 522,480. Of these, 473,899 were private cars, which accounted for 90.7% of the total number of vehicles. However, only 37.5% of cars registered in Almaty comply with the modern emission standards, such as Euro 4, 5 or 6. This number is aggravated by the commuter traffic that enters and leaves the city daily, the growth and environmental impact of which it is not possible to measure yet.

According to experts, the most efficient solution to reduce the high energy consumption in the sector of transport and to lower the greenhouse gas and pollutant emissions is to achieve the so-called 'modal shift'. In urban context, this means priority development of public transit. Indeed, a bus/trolleybus energy consumption per passenger is 5 times smaller the consumption of a car. And a tram or subway train energy use per passenger is over 10 times more efficient than that of a car.

The notion of a 'modal shift' also implies providing people with ample opportunities to cycle or walk. Development of public transport, cycling and walking infrastructure also allows addressing two other issues – traffic congestion and air pollution.

## DISTRIBUTION OF ALMATY CARS BY EURO EMISSION STANDARDS





Many urban centers around the world practice city-entry restrictions for cars, with the most advanced criterion for admission being compliance with the environmental requirements, but implementation of this approach would require introducing eco-labeling of vehicles in Kazakhstan.

Introduction of such a measure can limit entry of highest polluting transport into the city and facilitate conversion of not only cars, but also trucks to cleaner fuels.

Eco-labeling implies application of special labels, electronic chips (tags), databases, special marks in registration documents, etc., designating the environmental and fuel consumption characteristics of vehicles, their emission levels and other useful

information. Eco-labeling is one of the most powerful tools for creation of low-emission zones in cities. In Kazakhstan's context, mechanisms of governmental subsidies to incentivize purchase of the new energy-efficient and cleaner vehicles, or introduction of a differentiated vehicle tax scale depending on emissions level, year of manufacture, or fuel consumption, could significantly speed up renewal of motor transport fleet of the country. Measures to reduce or lift the vehicle tax off the hybrid vehicles, subject to creation of the appropriate infrastructure, can additionally increase public interest to this type of transport.

Public transport emissions per passenger are 5-10 times smaller the emissions from cars. Moreover, a passenger in public transport requires 10-20 times less of the road space.

In accordance with the State Program for Development and Integration of Transport Infrastructure in the Republic of Kazakhstan by 2020, consultants of the CAST project proposed a number of practical recommendations:

- convert local public transport to cleaner fuels (gas, electricity, biofuels, etc.), alongside with the mandatory development of the corresponding infrastructure of gasoline (petrol), gas and electrical charging stations;
- optimize public transport routes in cities, allocate lanes for public transport in major traffic corridors;
- develop cycling (organize cycling networks in urban areas, deploy bicycle rental programs) and walking infrastructure;
- promote the widespread adoption of energy-saving technologies in public transport sector and the use of sustainable modes of transport for everyday travel and leisure.

**Public transport emissions per passenger are 5-10 times smaller the emissions from cars.**

**A passenger in public transport requires 10-20 times less of the road space.**



Source: 'Energy Efficiency in Transport Sector of the Republic of Kazakhstan: Current Status and Measures for Improvement', 2015

# Public transport regulation and financing

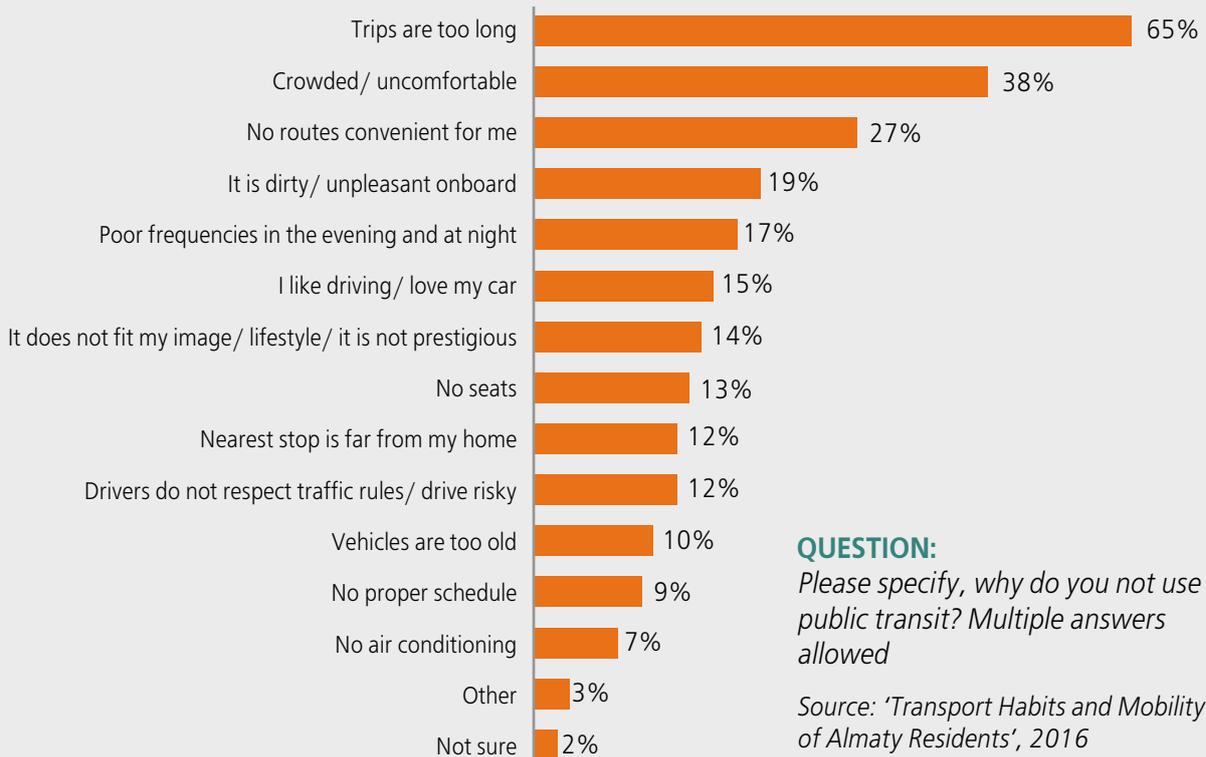
The component of public transport management and financing reform was envisaged back at the preparation stage of the CAST project in 2010, since the existing mechanism of urban transport financing and management, which resulted in a drastic reduction of routes and rolling stock, was actually the main barrier repelling Almaty residents from the use of public transit. According to the study of the transport habits of Almaty residents performed in 2016, the five main reasons for refusing to travel by public transport are: trips are too long, crowded buses/trolleybuses, no routes convenient for me, it is dirty onboard, poor frequencies in the evening and at night.

In fact, public transport in Almaty is financed solely by the fares collected from the passengers, and only in 2016 the city administration began to partially subsidize operators for transportation of discounted groups of passengers, and in 2017 – for operating socially significant routes. Other important matters such as modernization and technical control of the rolling stock, driver training and enforcement of requirements, adherence to schedule and travel speeds, processing of passenger complaints, not to mention collection of reliable information about the actual amounts of revenues collected – all was left to the discretion of the operators.



In Almaty, where the annual number of passenger trips exceeds 250 million, public transportation services are provided by more than 15 large and small operators, who compete incessantly and exercise different approaches to the management of operations, offering rolling stock of varying age, using different types of fuel. The existing practice of maximizing profits hardly facilitates any systematic development of public transport, and the city authorities do not have any substantial levers of influence on the operators.

## REASONS FOR REFUSING TO TRAVEL WITH PUBLIC TRANSPORT



### QUESTION:

Please specify, why do you not use public transit? Multiple answers allowed

Source: 'Transport Habits and Mobility of Almaty Residents', 2016

“Passengers are dissatisfied with the existing system, as they do not like to ride overcrowded buses offered only at times profitable for the operators. As long as the revenue collection plan – and not the quality of operations – remains the main performance indicator for a public transport driver, there will not be any room for a significant change.”

As of 2017, in cities of Kazakhstan, the responsibility for organization of public transport services rests fully with the local authorities, yet they are not entitled to make any adaptation of the rules or methodologies of calculating the tariffs and subsidies for public transport, or to introduce any significant changes to the provisions of contracts with the operators. The local legislative authority (city council) has the right to approve the budget for subsidies (while the procedures to calculate the subsidies are governed by the national-level regulations), but is often unable to perform their duty to allocate the subsidies for socially significant routes due to the complicated methodology of calculation and the lack of evidence-based data on actual ridership.

In the course of drafting and discussing the ‘Review of Kazakhstan’s Public Transport Development Policies’, the Project identified the following areas of the new transport policy that are crucial to improve the level and quality of urban transit services:

**1) Development of new approaches to public transport governance**, including delegation of greater powers to the local authorities and the city council. The main discussion subjects included ‘Who should be the regulator in the city?’ and ‘Is there a need for a single public transport operator in larger cities?’. The practice of contracting out individual routes of public transport to privately owned operators and financing the system solely at the expense of passengers, which has settled for over 20 years, brought about the situation where many cities shuffled the responsibility for the quality of this social service down to private entrepreneurs.

As a result, the operators are not motivated to upgrade their rolling stock, which undermines its ongoing compliance with the technical standards, exposes



National legislation grants preferential fares to participants and disabled veterans of WWII (free travel), and children under the age of 15 (50% of the standard fare).

However, a metropolis such as Almaty, with its more than 200,000 college and university students, required a greater range of preferential fares. Thus, Almaty city council introduced additional categories of discounted groups of passengers at the city level in 2011, where school pupils over 15 years of age, all students and pensioners, and in 2015, also a new category of ‘Mothers of many children’ were entitled to 50% tariff. The right to free travel was also granted to persons of 75 years or older, persons with disabilities of the first and second category, and children with disabilities under the age of 18.

the quality of service to permanent criticism of city residents, and the plume of exhausts from old diesel buses discredits public transit as an environmentally friendly mode of transportation. Moreover, operators prefer to serve only profitable routes, which leads to infringement of the rights of passengers from sparsely populated areas or suburbs of Almaty.

Establishment and endowment with additional powers of a single operator (a body responsible for the organization of public transport operations) could significantly improve the governance of the city’s public transport: package profitable and unprofitable routes, tighten the requirements for rolling stock and service quality en-route, and improve the schedule for the benefit of passengers.

**2) Compensation in Public Service Contracts with operators** shall be based on the number of kilometers (bus/km) travelled on the route, rather than the number of passengers transported.

The ‘Model agreement on organization of regular passenger and luggage transportation’, approved by the Ministry for Investment and Development of Kazakhstan, establishes general provisions governing the relationships between the transit organizer represented by the local executive authority, and the operators. It should be noted that the Model agreement provides no room for any possibility to specify quality indicators or evaluate performance of the operations, nor does it mention how a city administration can compel an operator to remedy violations. In addition, there are contradictions between several laws governing transportation, which prevents a full-scale improvement of the service quality requirements and a shift to a new financing mechanisms.

Experts of the CAST project believe that a way out of this stalemate is to compensate the services of the operators



under the Public Service Contracts based on the number of kilometers (bus/km) travelled on the route, rather than the number of passengers transported. Since the amount of cash-paid fare in Almaty is very high, and it is difficult to have a full account thereof, performance of operators in terms of the number of passengers actually transported and the corresponding allocation of subsidies are a debatable matter. On the contrary, the number of kilometers travelled on the route is an objective figure, since the movement of buses and trolleybuses is monitored through the Control center of the Transport Holding of Almaty. This approach will allow application of a standardized calculation methodology to determine the operating costs per one bus kilometer, and to plan the annual costs to the city budget.

### Contract types and risk allocation

Contract type	Net Cost Contract		Gross Cost Contract	
	Risk by Operator	Risk by Authority	Risk by Operator	Risk by Authority
Cost Risk	X		X	
Revenue risk	X			X

*Net Cost Contract*– the Operator keeps the fare revenues and may receive in addition a predefined fixed service fee (compensation/subsidy) from the Transport Authority for services provided.

*Gross Cost Contract* – the Transport Authority keeps all fare revenues and pays the Operator a service fee for delivered services (mostly: fee per vehicle kilometer).

In addition, penalties and incentives (malus and bonus) will be applied against a number of predefined Key Performance indicators.

*Guido Bruggeman, independent consultant of the CAST project, international expert in sustainable public transport:*

“Public transport is a public service, just like education or healthcare, and therefore, in most cases, its operation at an appropriate level of quality requires municipal subsidies or service-fee-based contractual relationships with the operators.

*It is widely accepted that the service quality and satisfaction of citizens with the public transport operations depend directly on the level of investments. It is typical for the global practice that the higher a city’s gross regional product (GRP) is, the greater is the share of investments allocated to public transport, and the better is its quality, resulting in a continuous growth in the number of public transport users in these cities.*

*If city authorities are unhappy with the quality of urban transit, they must enhance stringency of contracts with the private operators, and develop an equitable subsidy mechanism.*

*The prices level in Almaty is more or less equal to that of cities of Bucharest and Prague. It is worth to mention that in both cities public transport is subsidized by over 50%. In other words, less than 50% of the costs of public transport are covered by the fare revenues, and the remaining is funded by subsidies from the Municipality.*”

### Extract from the 'Ticket and Fare System in Almaty Public Transport' report:

According to the CAST project, as of the end of 2014, nearly 70% of the ticket revenues in the public transport of Almaty are originating from the sale of single tickets on-board of the vehicles. In the international context, this is a very high percentage, and in many cities, the revenues from single ticket sales do not exceed 10%. This is due to the fact that single tickets on board of vehicles are expensive and unattractive for the passenger and (monthly) travel passes are much more in favour.

Revenue leakage is defined as the loss of fare revenues caused by:

- non-paying passengers (fare dodgers);

- revenues, which are not accounted for (by conductor, driver, company).

No accurate data on revenue leakage are available. Transport officials estimate that the loss in revenues may be in the range of 25-30%.

Revenue leakage can in principle only occur through the sale of single tickets.

Under the assumption of a 25% loss of revenues on single tickets, the non-revenue generating passenger trips would account to 43 million in 2014, or 134,000 trips per working day. The loss in revenues would account to 3.3 billion tenge, where the actually received revenues in 2014 were 14.1 billion tenge. This would mean a revenue leakage of around 19% of the total potential revenues.

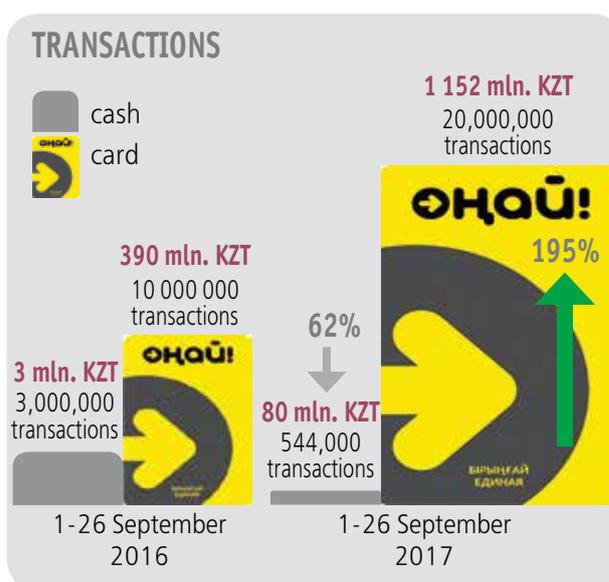
Sadir Khamraev,

Director of the Transport Holding of Almaty:

“A vivid example of how the existing legislative norms lag behind the real life requirements lays in the story of introduction of differentiated tariff – this norm was non-existent in our legislation, and it took us almost a year to convince the Government and the Parliament that there is a need for it.”

On 1 August 2017, the new measure was introduced in Almaty public transport – the differentiated tariff came about and made cash-paid single ticket almost twice more expensive (the standard fare is 80 tenge if paid by 'Onay' card, and 150 tenge if paid by cash). Using the measure, the Transport Holding and the city administration intend to reduce the number of cash-paid trips, and, accordingly, the unaccounted revenue, down to 3–4% by the end of 2017.

According to the Transport Holding, during the first day of application of the differentiated tariff in public buses in Almaty, the total revenue of all fleets amounted to 42,041,240 tenge. This was 61% higher than the amount declared on the previous Tuesday, 25 July 2017 (26,102,880 tenge). The number of transactions through the electronic fare collection system increased by 25%, from 462,631 (including 179,387 single tickets) to 580,095 (including 98,163 single tickets).



Data comparison of September 2017 with September 2016 demonstrates decrease of cash-paid trips by 5.5 times (from 3 million trips a month in 2016 to 554 thousand in 2017). In the same time, the number of trips with 'Onay' card increased 2 folds (from 10 million transactions in 2016 to 20 million in 2017), revenue growth from transactions made up 195%.

### Average daily number of transactions through the 'Onay' card

February 2016 (only non-cash payments in public transport were possible)	June 2017 (payments were possible with the 'Onay' card and in cash, at 80 tenge per trip)	August 2017 (after enactment of the differentiated tariff)	1-26 September 2017 (after enactment of the differentiated tariff)
592,218	460,602	580,645	769,230

Data provided by the Transport Holding of Almaty

## Main recommendations of the CAST project regarding the public transport governance and financing submitted to the Transport Committee under the Ministry for Investment and Development of RK:

### 1. The organization of public transport

- Central authorities should fully delegate the organization of public transport to the level of local administrations – all matters related to payment methods, tariffs, tickets and the like. The current situation, when the national government excessively regulates operational activities, is a strong impediment for the development of public transport in Kazakhstan.
- Local administrations should be directly involved in organization of public transport in a way best suiting particular cities, and hire operators for provision of public transport services through the price and quality-based tenders.
- Kazakhstan needs a completely new law on public transport. The national transport legislation in Kazakhstan must become less complicated and more flexible to enable reforms in public transport, which in turn will allow local administrations to introduce best practices of governance to regulate their relationships with the operators, such as the Public Service Contracts.

### 2. Tender procedure

- The process of selection of public transport service providers by the local administrations should be based on the principles of transparency and service quality criteria, and not just the price considerations.
- Central authorities should govern the process by establishing the best tender and contractual practices, and not regulate the details at each level.
- Introduction of Public Service Contracts will relieve the operators from being confined to the fares and will shift emphasis on fulfilling their obligations to the city and passengers. The criteria and amounts of payment under the Public Service Contracts must be based on bus/km, quality of service and other performance indicators.

### 3. Subsidies to cover losses of operators

The Project proposes to exclude from Kazakhstan's legislation agreements on subsidies covering losses of operators (as, for instance, it was done in the European Union in 2007) and replace these by a mechanism of compensation for services rendered under the Public Service Contracts.

*Sadir Khamrayev:*

“Many factors depend on the city administration – the implementation policy, effective tariffs and contracts with the operators. Therefore, in cooperation with the CAST project, we continuously invest great effort into the initiation and adoption of proper legislation, in order to lay down a foundation which one can use to actually build something commendable.”

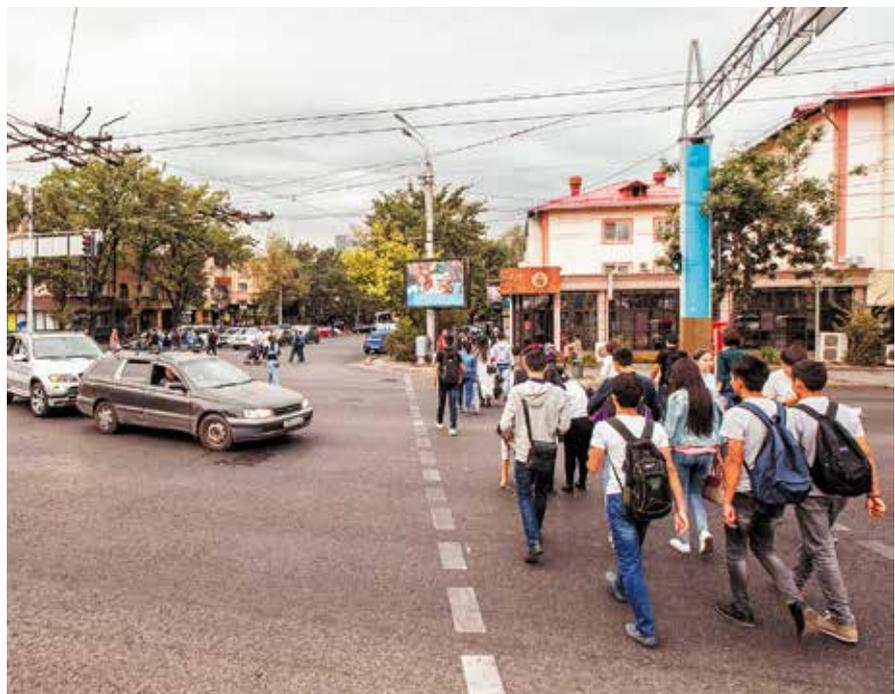


Improvement of legislation and financing of public transport can and must take place in collaboration on the national and local level. In their turn, to implement the announced initiatives, city administrations must have a strong political will, management skills and tools to build

a more efficient, clean and environmentally friendly public transportation system, and encourage the city residents in every way to shift towards mobility based on more sustainable modes of transport, such as public transit, cycling and walking.

# IMPROVEMENT OF TRAFFIC MANAGEMENT, TRANSPORT INFRASTRUCTURE PLANNING AND DESIGN

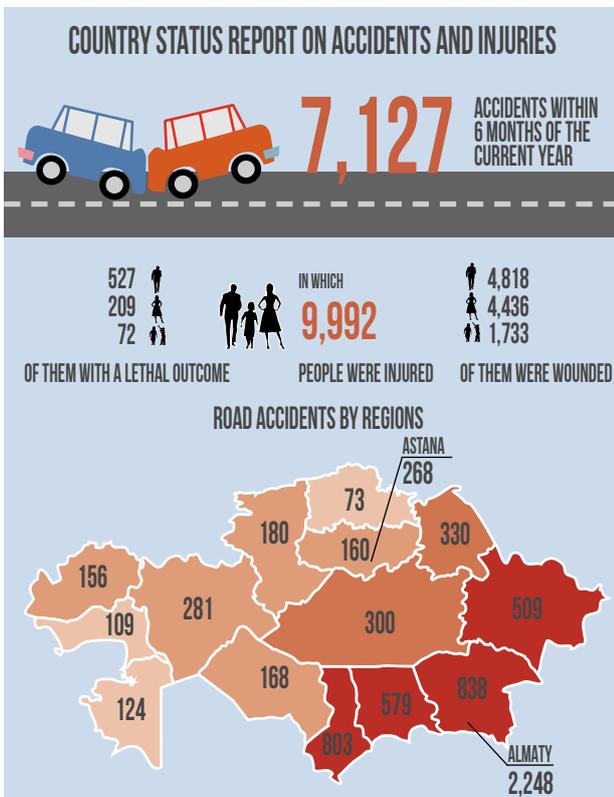
Modern transport infrastructure is not only about roads and interchanges, it is also about an integrated network of cycling and walking routes, an infrastructure for convenient transfers to public transit, and social and cultural facilities circled around it and unspooling its value. Airports, railway and bus stations become an important part of the city transport planning approach and should take into account the need for public transport accessibility.



*Yelena Yerkovich, CAST Project Manager:*

“Our Project participates in the design of modern urban transportation systems, where we try to engraft one basic principle into the thinking of local design institutes, engineers and decision-makers: when modernizing a particular street, people’s safety must always come as the first priority. Only then we will see safer intersections, pedestrian sidewalks and cycling tracks and lanes. Thus far, priority in Kazakhstan was always given to ensuring better road capacity for cars and minimizing project budgets. This focus is evident even from the number of negative responses to the decisions to reduce the maximum speed limits for motor vehicles within cities. Lit pedestrian crossings, warning road painting – this is not just a caprice of some city administrations, but a necessity, and it needs to be embedded in the law. Existing standards require strict compliance with the prescribed car lane width requirements, but there is no binding rule to build decent sidewalks, ramps or install signage to calm vehicle speeds when turning off to residential areas. There are many streets in Almaty where sidewalks are occupied with parked cars or construction site fences, which forces children to walk on the roadside when going to school, and many pedestrian crossings have no lighting. Right-turn slip roads are also considered a benefit for cars, in spite that the road space, which pedestrians have to cross, is thus doubled, consequently doubling the risk. This seems not a big deal, but as far as road accident rate is concerned, it can cost someone a life. ”

One of the tremendous achievements of the UNDP-GEF 'City of Almaty Sustainable Transport' (CAST) Project was the state approval in July 2017 of the draft national standard 'Organization of street and road space in the city of Almaty' (PST RK 65–2017) proposed and developed by the Project. The draft standard sets regulatory requirements for the arrangement of urban space: roads, intersections, walking and cycling paths, bicycle parking. It encompasses modern approaches to the design of intersections, introduces norms for cycling tracks and lanes, bicycle parking, and embeds the notion of 'dedicated lane for public transport'.

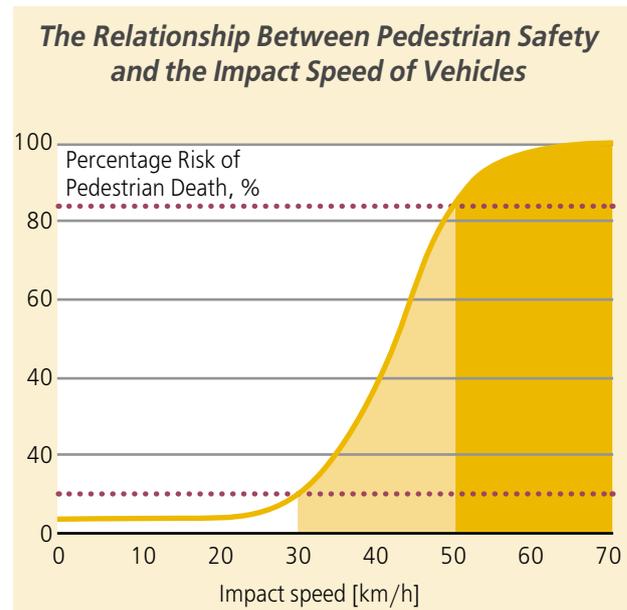


Source: Committee on legal statistics and special records of the General Prosecutor's Office of the Republic of Kazakhstan

According to the Committee on legal statistics and special records of the General Prosecutor's Office of the Republic of Kazakhstan, 3,227 road accidents causing injuries and deaths were registered in Almaty between January and July 2016, which accounted for one third of all road accidents in the country. In the first half of 2017, Almaty retained the sad primacy – it accounted for 2,248 road accidents out of total 7,127 registered in the country.

How can we improve traffic safety, while giving priority to pedestrians and cyclists? The first and most obvious solution is to reduce traffic speeds in city boundaries, and to improve street design.

A city that seeks to be comfortable and environmentally friendly should not provide excessive rights to cars allowing to move around the city at a speed of 60 km/h, and certainly should not to turn the city streets into highways with speed limits as high as 80-90 km/h. Cars moving at such a high speed represent an everyday threat to the lives of citizens. On the contrary, a vehicle travelling with a speed below 30 km/h reduces the risk of pedestrian death to nearly a zero. If this limit is exceeded, the risk of death quadruplicates as the kinetic energy of a fast moving vehicle increases.



Source: World Resources Institute [www.wri.org/cities-safer-design](http://www.wri.org/cities-safer-design)

# New paradigm of city life

Modern trends in urban infrastructure planning follow the standards of Transit Oriented Development (TOD). TOD implies high-quality well-devised planning and design of various types of land use, buildings and structures, aimed to support, promote and prioritize the use of not only the public transport but also the most basic types of transportation, such as walking and cycling.

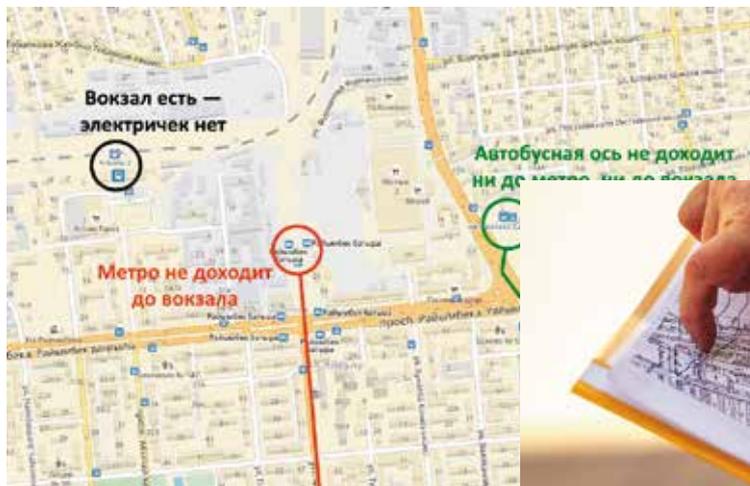
Modern cities that struggle with the growth of car ownership implement a set of measures, based on push factors, aimed at increasing the cost of owning and maintaining a car, and pull factors, motivating citizens to travel by public transport, cycling and walking.

the Almaty audience through an organized series of public lectures.

The Sustainable Urban Mobility summer school held in Almaty in summer 2017 with the support of the CAST project provided the opportunity to learn and attempt practical application of the TOD principles. Participants of the school – students, transport and city planners, and NGO representatives – discussed and formulated proposals for the transformation and redevelopment of three existing city infrastructure facilities: the territory of the Narxoz University (Almaty), the Sayakhat bus terminal (Almaty), and the Tselinny micro district (Astana).

During discussions and practical land measurements, participants applied the basic TOD principles, such as ‘the pedestrian realm and the cycling network are safe and complete’, ‘high quality transit is accessible by foot’, ‘the land occupied by motor vehicles is minimized’, etc. The formulated proposals were submitted to the administrations of Almaty and Astana cities.

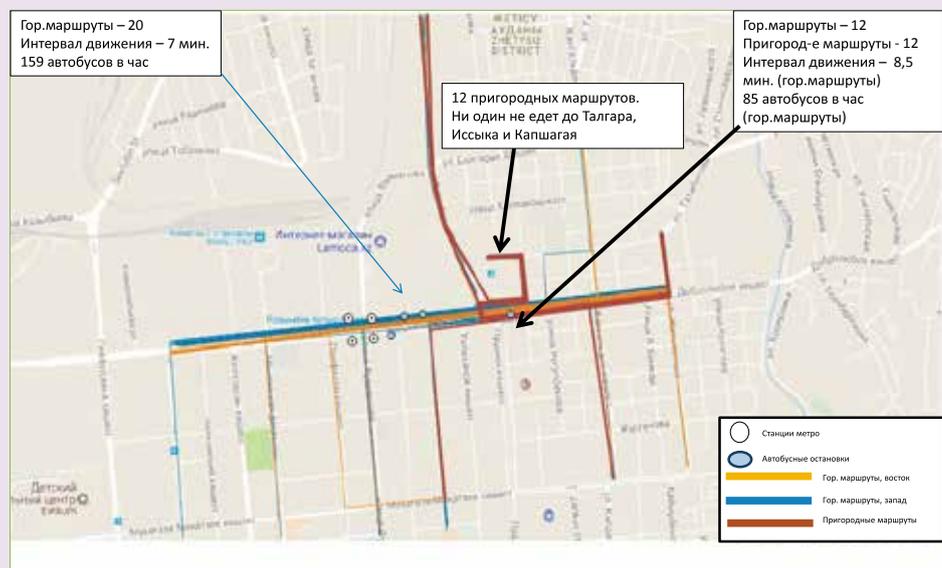
## TRANSPORT INTERCHANGE HUB



For example, one of the eight TOD principles, *Shift*, essentially concerns the reduction of the space given over to cars. This push factor is, however, practically and politically viable only when combined with the implementation of the seven other principles on provision of a rewarding and attractive alternative.

In 2014, the CAST project prepared the Russian translation of the TOD standard published by the Institute for Transportation and Development Policy (ITDP), and invited leading international experts to share their knowledge with

## ROUTE NETWORK CHANGES





The summer school participants also discussed future of the cities:

### WHAT DOES A 'MOBILE CITY' MEAN TO YOU?

*"A city where every citizen, regardless of his financial or physical capabilities, is free to live a full life"*

- Konstantin Zdyshev, St. Petersburg

*"It is a city with developed transport network, where getting around the city is easy"*

- Nurgis Azhirov, Almaty

*"A city convenient for life, where all places and services are accessible; safety, no pollution, aesthetic appearance, inclusiveness, all categories of people are able to move around"*

- Aliya Tankibayeva, Almaty

### WHAT URBAN TRANSPORT/MOBILITY MANAGEMENT TECHNOLOGIES SHOULD BECOME AVAILABLE TO ALL CITIZENS IN THE NEAR FUTURE?

*"Bicycles, electric cars, alternative energy, metro, cheap flights"*

- Damir Abdualiyeu, Astana

*"Bicycle rental system should become more accessible; there should be a single transport card; an application to track times and routes of public transport approaching/leaving stops"*

- Adiya Karsybek, Almaty

*"Development of public transport is the main solution for the transport problems of cities"*

- Ilya Shafranov, Moscow

### WHAT ARE YOU PERSONALLY PREPARED TO DO TO MAKE IT EASIER TO MOVE AROUND YOUR CITY?

*"Comprehensively improve the yards in residential areas to enable maximum land use. Create conditions for walking and cycling within neighborhoods"*

- Damir Abdualiyeu, Astana

*"Implement the TOD standard requirements"*

- Kabdulla Murzakhmetov, Astana

*"Ensure high-quality design of streets and traffic signals"*

- Igor Mogila, Lvov

*"Use public transport, do more walking. As one of the organizers of the Urban Forum Almaty, I'm prepared to actively promote the improvement of the transport situation in Almaty"*

- Asel Yeszhanova, Almaty

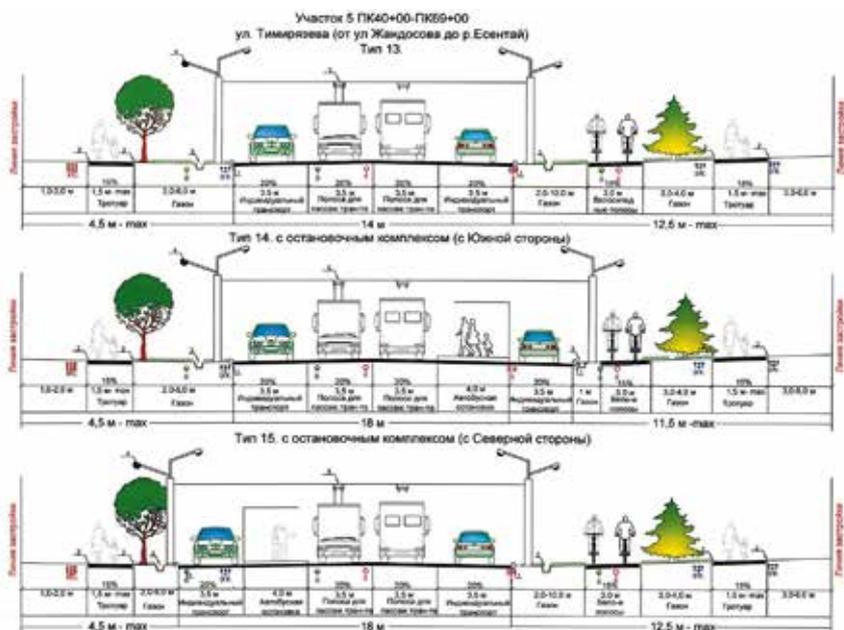
*"I report open manholes, lack of ramps, non-functioning traffic lights, etc. I comply with traffic rules both as a driver and as a pedestrian"*

- Asel Dmitriyeva, Almaty

The CAST project supported development of the concept and the scheme of mass transit corridors, which was used by the city administration as a basis for the detailed design of dedicated public transport lanes, the first bus rapid transit (BRT) corridor project and the light rail transit (LRT) project. The city has an ambitious goal – to increase the share of public transport by 20% by 2023, which can only be achieved if car owners are provided with a realistic alternative, such as LRT, well connected with metro network and bus rapid transit (BRT) corridors.

Today, Almaty has arranged dedicated public transport lanes on Abay and Raiymbek avenues, and Tole-bi, Zheltoksan, Nauryzbai-batyr and Altynsarin streets. In the coming years, the city authorities plan to organize additional 245 kilometers of dedicated lanes for buses and trolleybuses.

The CAST project assisted in preparation of the first BRT line feasibility study. The first BRT corridor (Orbita microdistrict – city center – transport terminal on the eastern fringe of the city) is designed with a length of 19.2 km, planned operational speed of 23 km/h, and the ridership of 140,000 passengers a day. The forecasted time savings for passengers will be considerable: a whole trip will take 32 minutes, instead of 52 minutes that it takes now when traveling with other modes of transport. Construction of the first stage commenced in 2017.



- BRT Corridor is a section of road or contiguous roads served by a bus route or multiple bus routes with a minimum length of 3 kilometers that has dedicated bus lanes and otherwise meets the BRT basic minimum requirements, including:
- busway alignment;
  - safe and comfortable stations;
  - off-board fare collection;
  - platform-level boarding;
  - integration with other public transport;
  - pedestrian access and safety;
  - bicycle lanes and secure bicycle parking.



# LRT: the new life for Almaty tram

Since 2012, the CAST Project has been working on a light rail transit (LRT) project, which should become the backbone mode of mass rapid transit in Almaty. The Project attracted international and local experts to develop tender documentation, and promotes electric transport in general as the most environmentally friendly mode of transport. The transport experts discuss and prepare design estimates for the first stage of the LRT system, which is considered the most energy efficient and high-capacity urban transit in the world.

Moreover, according to all international assessments, LRT systems improve the overall urban environment and quality of life by reducing traffic, creating new urban landscape, areas of attraction on streets and squares along the LRT route, and improving accessibility and connection of remote areas with the city center.

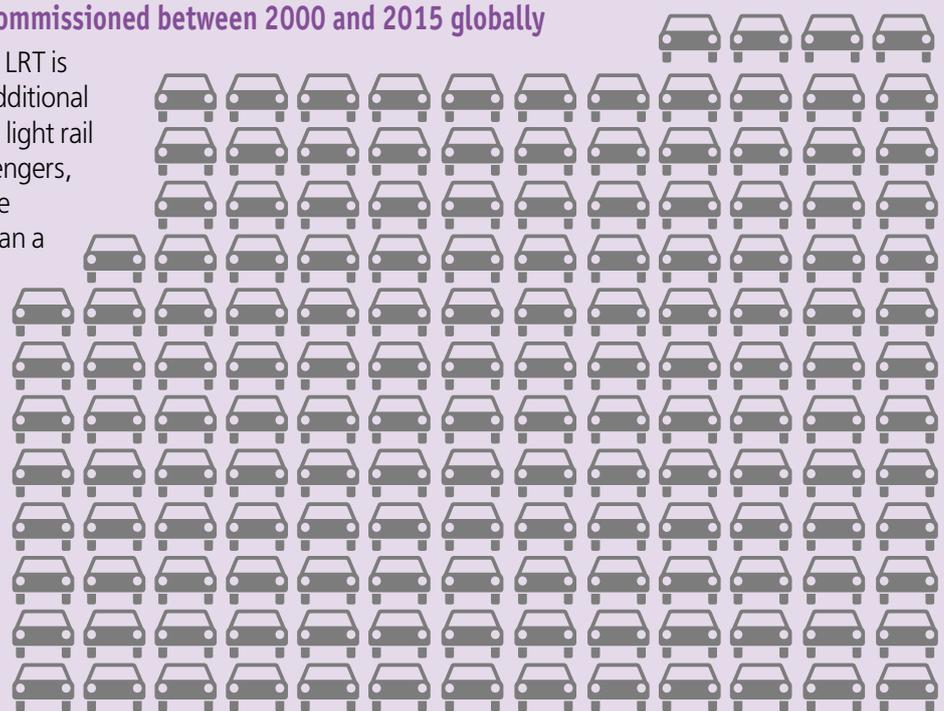
From an engineering point of view, LRT systems have lighter axle load as opposed to a traditional railway, electric train or subway. Compared to the traditional tram, LRT requires a greater degree of road-space dedication, but it is also excellent for operation in historical city centers, and nicely fits pedestrian zones, thereby displacing buses. Energy consumption of urban rail transport is 0.12 kW/h per passenger per kilometer, which is 7 times smaller than the average car consumption in urban conditions.

It is worth mention that the city administration had been contemplating an LRT system since 2005. The current



## 78 new LRT systems were commissioned between 2000 and 2015 globally

The undisputed advantage of LRT is that it can attract **30-40%** additional passengers; a double traction light rail car can carry up to **520** passengers, thus replacing **435** cars, while LRT system is 6 times safer than a car-based.



city Master plan envisages the construction of LRT line on Tole-bi street, from Momysh-uly street to Panfilov street, and onwards, with a branch towards Kalkaman to integrate with the metro network and the projected Western bus station. In total, stage one of the project estimates 23 kilometers of tracks, with 36 trains travelling in 4-minute intervals. Its depot will be positioned in the industrial zone down Momysh-uly street. Stage two will be designed later, along the already existing dedicated right-of-way: Orbita micro-district – Zharokova street, connecting with the first line. In order to preserve this corridor unoccupied, the CAST project assisted in designing a dedicated cycling and pedestrian zone along these streets.



According to preliminary estimates, it will take 52 months to implement the LRT project in the format of public-private partnership (PPP). And, to a great extent, this duration is associated with the difficulties of preparing the project for international tender, the imperfection of PPP legislation, and the need for multiple approvals required at various stages of the project.

Preliminary cost of Almaty LRT project (according to 2014 feasibility study) is estimated at 116.5 billion tenge, of which 23 billion tenge will be required for reconstruction of underground engineering networks, and 92.9 billion – to build new infrastructure, purchase modern energy-efficient low-floor rolling stock, and to maintain the system. But even if relatively large sections of streets will need to be re-built, the cost of LRT is still 20-30% lower than that of the metro, which is coupled with the fact that Almaty LRT will have a much greater capacity than the existing metro line. Almaty city administration is currently adjusting the feasibility study to update the design estimates for works to be carried out by the city, and prepares the international tender with the support of the United Nations Development Programme and the European Bank for Reconstruction and Development.

When implementing complex projects such as LRT, it is important to understand that it is not only about the physical repair of rails, or purchase of additional trains; it is rather about complete reformatting of the system and transition to an entirely new level of quality, provision of tram services to rapidly developing city areas, and prioritization of LRT.

## Modernization of the trolleybus catenary network

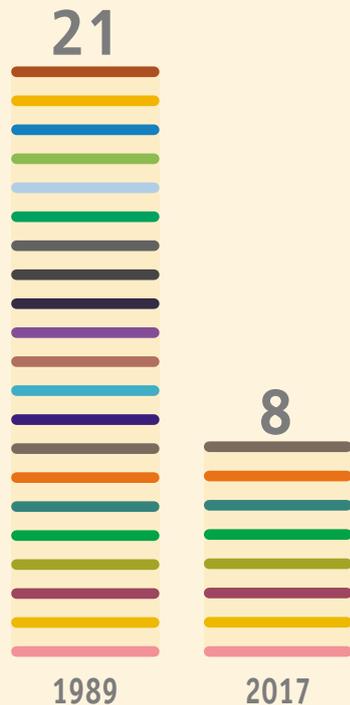
Trolleybus is a proven public transportation system operating in more than 310 cities in 56 countries, with more than 40,000 vehicles in operation. Trolleybus transit is far from becoming an 'obsolete' mode of public transportation: since 1990, 45 new trolleybus systems have emerged globally, of which 27 were built in Europe.

Since 1944, Almaty has had a history of operating a trolleybus system, covering most of the city. Traction motor is much more efficient, less noisy and more practical in hilly and foothill conditions; it is an advantageous solution to environmental and transport challenges. Trolleybus adheres to the schedule in 90% of times – which is a very high rate for public transport. As of today, Almaty is the only city in Kazakhstan that uses trolleybuses.

In view of the above, the CAST Project has been actively promoting at various levels the reconstruction and modernization of trolleybus operations. Thus, in 2016-2017, the Project performed a number of activities, which included a workshop in Almaty with the international experts in electric transport as invited speakers, and an assessment of the current situation, which informed the relevant recommendations for the city authorities.



## NUMBER OF TROLLEYBUS ROUTES IN ALMATY



The highest use of trolleybuses in Almaty was recorded in 1989, when the trolleybus fleet comprised more than 300 vehicles, serving 21 routes with the total length of 220 km, carrying 205,000 passengers per day. In 2017, the trolleybus fleet consists of 212 vehicles, and services only 8 routes, struggling with heavy wear of catenary network. Most of the trolleybus infrastructure has not been repaired for more than 20 years, which led to the deterioration of 80% of the system.

Almaty city administration and Almatyelectrotrans LLP plan a large-scale modernization of the overhead catenary in 2017-2018, which will allow not only to preserve the existing trolleybus fleet, but also to expand the routes network, thus increasing the ridership.



Trolleybus ZiU-5 turns from Abay Avenue to Lenin Avenue in Alma-Ata.  
 Photo taken on 14 May 1977.  
<http://www.opocuu.com/ziu-5.htm>

Trolleybus is the only type of high-capacity electric public transport available in sizes of 12, 18 and 24 meters, which, in terms of performance characteristics, is not only equal to self-propelled diesel buses, but exceeds them. For example, if a diesel bus carrying passengers can travel for about 24 hours without refueling, whereupon it will need to get off the route and return to the park, the operating time of a trolleybus is not limited by the need to refuel, since the trolleybus is a dynamically charging electric bus. The trolleybus can continue to service passengers during very late hours and travel autonomously for short distances of up to 7 kilometers off the overhead catenary, running solely on the on-board batteries.

### According to the plan, modernization of catenary network will allow:

- Increase the trolleybus operating speeds to almost the bus speeds – from the current 12 km/h to 16-17 km/h;
- Make 90 degree turns at intersections without dewirement of poles;
- Eliminate the sagging of catenary crossings and switches above intersections, which often leads to catenary wire breakage.

Given the growing interest of local administrations and major operators to the development of electric transport, the CAST project, in collaboration with the International Union of Public Transport, conducted a study tour training on the use of electric vehicles in public transit, with site visits to operators in three European cities. At request of the Ministry of Energy of the Republic of Kazakhstan, the project prepared 'Comparative analysis of CO<sub>2</sub> and pollutants emissions from electric vehicles and internal combustion engine cars' and 'Analysis and recommendations on tax incentives for the development of electric vehicles market'.

# Planning the public transport route network

Public transport route network optimization was designed to increase the number of passengers using public transport.

Main reasons for the low public transport ridership in Almaty include:

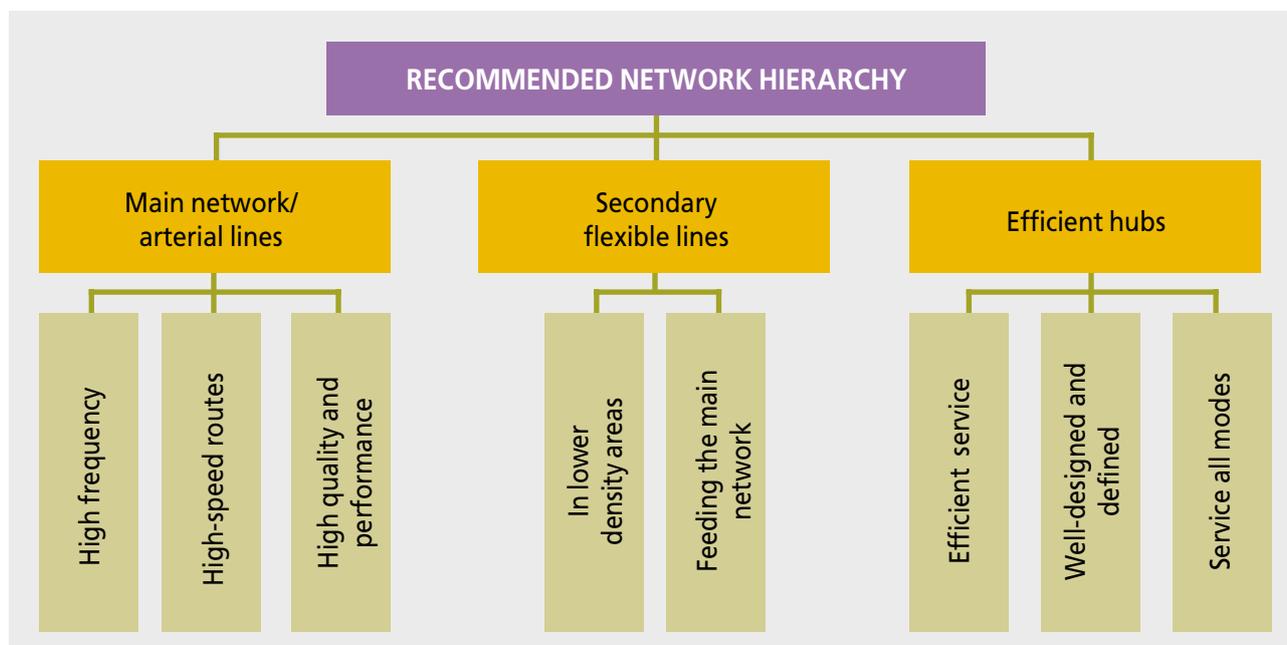
- Indirect and duplicated routes, which are difficult for passenger understanding;
- Long waiting times (low frequency);
- Overcrowded buses/trolleybuses;
- Ageing rolling stock (comfort issues);
- Lack of an integrated fare collection system – transferring passengers have to pay twice (or more) during one trip.

In 2015, the international experts of the CAST project developed principles for reorganization of the route network based on the specific city requirements and international experience, proposed and calculated various scenarios using transport modelling software.

It was suggested to implement a two-stage reform, featuring the following components:

- Simplification of the bus network and definition of the main routes (metro, BRT, LRT, trolleybus and 24 main bus routes on arterial roads);
- Splitting long bus routes into short sections ending at certain intersections;
- Reduction or elimination of duplicating routes (including metro and tram);
- Construction of new interchange terminals at periphery and restructuring of the bus network to enable their optimum use;
- Ensuring priority right of way for public transport, especially for trolleybuses.

It was proposed to reorganize the route network in two stages: in 2016 and 2018, but the timing of the second stage was shifted, due to the delayed commissioning of the BRT and LRT corridors. Full-scale public transport optimization will help reduce congestion on roads and improve travel times in the city for all, thus contributing to greater economic efficiency and reducing the negative impact of congestion on the economy of Almaty.



At the onset of the route network optimization in 2014, the public transport network included 110 bus and 12 trolleybus routes, 2 tram lines and 1 metro line (7 stations). As of 2017, the city has 98 bus and 7 trolleybus routes and 1 metro line (9 stations).

A comprehensive route network optimization will become possible only after infrastructure modernization of interchange terminals, acquisition of new rolling stock, and completed introduction of new tariffs, enabling a discounted or free transfer during one trip.

# TRAFFIC MANAGEMENT ISSUES

## Integrated Traffic Management Scheme (ITMS)

Congested roads became an everyday reality of Almaty. Further increase of road capacity by adding additional lanes is impossible due to the current location of roads and lack of space along most of them. Meanwhile, congestions lead to longer travel times, poor accessibility, low quality, inefficient and slow public transport services, environmental pollution, noise, and deteriorated road safety.

The traffic issues that Almaty experiences are primarily associated with the lack of an integrated and long-term traffic management plan for the city center. There is a need for a single document that would set out the purpose and function of each section of the road, how the road infrastructure should be used by different modes of transport, or how the overall circulation of traffic in the study area should be organized. Today, when any measures are taken, it occurs on an ad-hoc basis only. Often, reconstruction of road intersections makes no account of its impact on adjacent areas, or on pedestrians and public transport, and is done without any road safety improvement measures.

Multiple measures could be applied in Almaty and incorporated in ITMS, including but not limited to:

- optimized use of road space;
- optimized design of intersections;
- changes in traffic circulation (for example, introduction of one-way streets);
- improved control (enforcement of traffic rules);
- optimization, monitoring and control of traffic lights operation;
- introduction of Intelligent Transport Systems components;
- accidents control;
- introduction of paid parking and limiting car access to the city center.





It should be noted that the most effective approach for Almaty would be to use a combination of activities, such as development of a set of measures for improved traffic management, enforcement of traffic rules and the actual traffic management using the Intelligent Transport Systems (ITS). Introduction of ITS alone will not be sufficient to cope with the main causes of congestion. Traffic management measures developed for the ITMS must include giving priority to public transport flows, and creating comfortable accessibility for pedestrians (including those with disabilities) and cyclists. Experts will produce a broad assessment of the design options, based on conceptual proposals and solutions for main traffic management measures for each option.

ITMS is developed with the engagement of Kazakhstani and international experts, and the results will be presented at the end of 2017.

**PARKING MANAGEMENT** is an essential element in the framework of a sustainable transport system in Almaty, and an element of traffic governance.

Advantages of an organized parking management for Almaty city administration include the possibility to introduce city-entry restrictions for cars and to generate revenues, which can later be used for sustainable urban transport development purposes.

There are two main challenges with parking in Almaty: the first one is the very existence of free parking on public roads, which encourages people to use cars for their daily travel within the city. The second challenge relates to the decrease in road space by 30-50%, which is occupied with the cars parked along the roadside, but could otherwise be effectively used for public transport moving on the right-most lane.

In 2013, the CAST project prepared and handed over to the city the Parking management strategy and recommendations for on-street parking regulation, which discussed matters such as parking fee collection system, staged reduction of roadside parking followed by utilization of the space for public transport and dedicated bus lanes. The CAST Project recommends assigning the responsibility for the parking management on the Office Public Transportation and Motor Roads of the city of Almaty, to ensure coordinated action in addressing the traffic management issues.

In order to reduce the number of cars on city streets, experts of the CAST Project also proposed creation of transport interchange hubs (TIH) at city entries, applying the Park & Ride principle. Specific location of such TIHs shall be decided using the city transport model, which will help reasonable selection of a concrete point of interchange, the required capacity of the TIH, and the

area of parking space that must be available therein, as well as the number of new public transport routes required, and how the TIH will improve the city mobility in general.

Busterminals in Kazakhstan are designed using Soviet SNIPs (building codes), which require building multistory stations and hotels, if the terminal is to provide service to more than 500 people a day. The SNIPs contain no notion of a 'transport interchange hub' and, consequently, no specifications for these exist yet. In reality TIH in many major cities of the world is a facility featuring large parking space, sheds to wait for public transport, a restaurant or a café, and a store. As an incentive, the parking ticket may be used as a ticket in public transport.

As an alternative to SNIPs, CAST experts suggest considering the use of 'custom design specifications', an instrument that was used in the construction of some new buildings in Astana, to eliminate the unnecessary functionality in the design of simplified structures using modern architectural solutions.

## WE ALL CARE ABOUT APPEARANCE OF OUR CITY

Contest for the best bus stop design in Almaty was held to support the most advance ideas of future architects and designers, which were aimed at a qualitative change in the image of our city. Three finalists were selected from the 10 submitted designs based on the results of two stages of evaluation. The winner got the opportunity to implement his design at the Moscow bus stop.

The jury awarded the first prize to the work of Zhumat Nurbol, a 2nd grade student of the Higher School of Engineering of the Caspian Public University, commending the elegance and expressiveness of his idea.

*"I developed my design being inspired by the Moscow metro station, most notably, its columns. To connect it with the image of Almaty, I decided that apple trees should grow on both sides of the stop. I use renewable energy sources, i.e. roof-tile-shaped solar panels. For the main structure, I use wood and anti-vandal glass; I provided a LED display for advertising, and city maps showing public transportation routes. The stop will be lit at night. As an accessory, I added lanterns, trash bins and benches of red color, located outside the bus stop itself."*



## Emergence and development of high-quality cycling infrastructure

Cycling is an environmentally friendly and affordable mode of mobility in the city. It combines the convenience of a door-to-door trip, route flexibility, and the ability to travel the same distance with the speed offered by many types of public transport. However, cyclists are among the most vulnerable road users, their bicycles often become targets of theft. Therefore, the key factors helping to promote cycling include safety for cycling on the streets, and the arrangement of safe parking and storage for bicycles.

An important component of urban infrastructure, developed through the efforts of the CAST Project, emerged as the new cycling line in the city. It should be noted that the city administration built the first cycling track in Almaty in 2011 – only 2.5 km in length, it runs on Abai avenue from Baitursynov street to Dostyk avenue. Nevertheless, that was the first cycling track in Almaty and Central Asia, a great delight for cycling activists as a recognition of the need for change.

Activities of the CAST Project focused on raising the

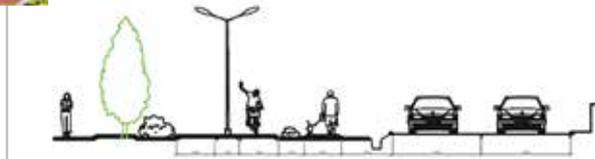
quality of cycling infrastructure to an entirely new level through training and implementation of demo projects, as well as by promoting safe cycling using public campaigns, supporting cycling activists, arranging for extensive social advertising and media coverage. Special workshops were organized for state agencies and developers to provide training in design and proper construction of cycling tracks. As a result of these activities, a 5 km section of cycling infrastructure was designed in 2015, and another 5 km in 2017.

Using the CAST Project design, the city has built a demo section of the cycling track along Timiryazev street running 1 km in length and the width ranging between 2.8 and 3 meters. This created a precedent, when the designers didn't just do what they deemed fit, but rather they studied the demand and consulted with the cyclists. As a result, the cycling track along Timiryazev street was built in accordance with all requirements of safety and convenience based on both Kazakhstan and international standards: the cycling track and pedestrian sidewalk are separated with a green zone to prevent unimpeded entrance of pedestrians to the cycling track; all intersections with the motor roads are marked with road signs, priority is indicated with road painting; the intersections are raised above the road level to reduce the speed of cars when crossing the intersection. This section is part of a large cycling corridor (more than 10 km in length), running from Orbita microdistrict to the city center where it connects with the existing cycling track on Abai avenue.





Сечение 1-1  
Торайғырова Салма



**Svetlana Spatar, Velo-Almaty activist:**

“For the past several years, city administration had been massively building cycling tracks, with more than 25 kilometers constructed over 6 years, but unfortunately, half of them are substandard, designed in violation of building codes, although SNIPs for the construction of cycling tracks do exist. There are very specific comments on every track, which we compiled in a special report, but the deficiencies have not been addressed yet. We regularly send letters to the city administration, saying that if they build cycling tracks, they need to do it with due quality – otherwise they expose lives of cyclists to danger. And I am almost tempted to say – do not reinvent the bicycle, everything has long been invented, and the features of quality cycling infrastructure are known.”

Nevertheless, there are positive aspects about the development of cycling infrastructure in the city, and we must note that thanks to the efforts of the cycling activists and the CAST project, every road project in Almaty, be it capital construction or repair, now provides for cycling infrastructure. Examples include cycling tracks being built in new microdistricts, which are integrated in the design at the stage of planning the district roads. This is a forward looking effort – when the microdistricts are fully populated, the cycling infrastructure will be prepared for use.

Another separate issue is bicycle parking. Over the last 10 years, more than 100 cycle parking facilities were built around the city. This became possible through the tireless work of cycling activists, who sent out hundreds of explanation letters to business and shopping centers, restaurants, etc. Cycling activists believe that installation of cycle racks near buildings of state authorities is one of the indicators of their successful awareness-building work. Restaurants and cafes in the center of the city have started installing cycle parking facilities too, looking to increase the attractiveness of their offer for customers.





## Impact of female cyclists on city environment

If a woman cycles with a child, you can confidently assume that using this mode of transport on city streets is safe. *“Without a doubt, women facilitate creation of safer walking and cycling spaces. Thus, they help improve the residential livability,”* – says the American Association of pedestrians and cyclists.

### Why do female cyclists have great impact on urban cycling?

Here are the two reasons:

1. In general, women use bicycle for its practicality, ease of operation, and sometimes to expand the range of opportunities for themselves. Cycling is of little interest to them from the sports perspective. Thus, women on bikes promote the idea that cycling is not only about leisure or fitness, but also a mode of transportation.

2. Thanks to women, bicycles seem more culturally acceptable. As cycling becomes widely used by general population, the necessary political will builds up, enabling the creation of appropriate infrastructure. Women tend to risk less than men do, and less often cycle on roadside. Most often, they tend to use specialized boulevards, quiet streets with traffic calmers, parks, and segregated cycling tracks. Women’s desire to travel only safe routes contributes to the increase in demand for reliable and safe cycling infrastructure.

It is forecasted that high quality cycling tracks, protected cycling lanes, wider cycling lanes along highways, a network of interconnected cycling tracks, and directness of routes will attract more women.

As one can see, this resembles an attempt to solve the question of what came first – the chicken or the egg. What must come first – the cycling safety or cycling women? Perhaps, both answers are correct. The more cycling women we will have, the better the city infrastructure will become. On the other hand, the better is the cycling infrastructure, the more women will use it.

When cycling is safe and attractive for women, it is safe and attractive to everyone.



# TECHNOLOGIES AND TOOLS IN PUBLIC TRANSPORT

## Electronic ticketing system

In the beginning of 2010, city authorities came to realize that the transport sector requires a radical reform, and that such a reform is impossible without shifting to modern accounting, control and management tools. The UNDP-GEF 'City of Almaty Sustainable Transport' (CAST) Project and the international financial institutions strongly advised the city administration to introduce an electronic ticketing system, and offered various technologies and ways of financing.

It should be noted that at the time, no city in Central Asia had an e-ticketing system, and Almaty became 'the first robin'. Therefore, discussion of such an initiative with international consultants and experts of the CAST project took city administration almost two years, and another year to find an investor for this socially important but risky business model.

*Sadir Khamrayev,  
Director of the Transport Holding of Almaty:*

“For comparison, it took Seoul 15 years to introduce e-ticketing. We implemented 'Onay' in three months, and over the 1.5 years of its existence, we've added many bold functions that other systems do not have.”



Nevertheless, technical implementation of the electronic ticketing system using the brand-name 'Onay' took only three months, where the typical deployment time is usually around two years. The Transport Holding of Almaty became the main partner of the city administration in this project.

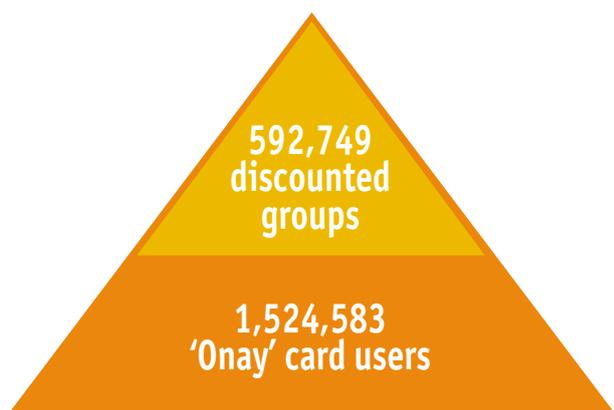
When choosing an e-ticketing system, Transport Holding decided not to introduce traditional solutions (off-line systems) when money is stored on the card – if a user loses the card, the money is lost too.

'Onay' electronic ticketing system is an on-line system, where the card essentially acts as an identifier of an electronic wallet, with the technology being rather similar to that of banking. The 'Onay' card does not store neither the holder's account information or the money, nor the user's personal data – if the card is lost and blocked promptly, the user will retain the balance, and his personal data security will not be compromised.



The card can be topped up using various payment methods, including via Internet. There are 1,200 'Onay' distribution points in Almaty and more than 10,000 recharge shops. Passenger service centers are being established in different parts of the city. Moreover, for passenger convenience, cards can be purchased directly onboard a bus or trolleybus.

The introduction of e-ticketing system in 2016 enabled collection of actual data on passenger flows – when and where do passengers travel, how many transfers do they make, and what is the total duration of the trip. Moreover, 'Onay' allows personalized collection of travel data of discounted groups of passengers, which constitute one third of the city's population – more than 592 thousand people. Each discounted passenger has their own unique number in the system, and is included in one of the groups entitled to discounts (pupils, students, pensioners). Transparent accounting system allows the city administration to see the exact number of trips the discounted passengers make on a particular route and, based on this data, to reimburse operators for the trips made by the subsidized groups. This feature of the e-ticketing system also enables the city authorities to allocate reimbursement budget more accurately.



As of the end of July 2017, there were 1,524,583 users registered in the 'Onay' database, of which 592,749 belong to one or another discounted group. At the same time, it is important to consider that a significant increase in the number of new users is expected after the introduction of differentiated tariff on 1 August 2017, when the fare will be almost twice less if paid by a regular 'Onay' card, as compared to a cash-paid trip.

### 'Onay' card users

Card category	Number of cards
Pupils	213,405
Students	213,173
Social	118,867
Other discounted groups	47,304
Regular	931,834
Total users	1,524,583

Data provided by the Transport Holding of Almaty

On-line technology enables expansion of the 'Onay' card functionality – in 2016, the card was integrated with the access system of Medeo ice-skating rink. You can now pay the entrance fee to Medeo by simply validating the 'Onay' card. The card instantly indicates the tariff applied to a user according to the approved service rates. For example, if the 'Onay' holder is a student, the student's ticket cost will be deducted from the card, including all the discounts effective on working days, weekends and holidays, as well as certain times of the day.

Vladimir Smirnov,

Technical Director of the Transport Holding:

“ We have completed development of software interfaces to integrate 'Onay' with almost all city systems. We begun integration with the zoo, negotiations are underway with other organizations that use access control systems, for example, stadiums, so that people would not need to wait in line to buy a ticket, but can rather validate the 'Onay' card and the corresponding tariff will be deducted from their account. ”

By the end of 2017, the Transport Holding is planning to make 'Onay' not only a transport card, but also a payment card offering numerous possibilities. Since the service mainly targets students, the Holding intends to offer student-oriented 'Onay'-based payment functions at food courts and in cinemas – of course, with a discount.

# Public transport monitoring and management system

In 2010, Transport Holding (CenterAlmatyGorTrans LLP at the time) launched a pilot project to monitor public transport vehicles using GPS trackers installed onboard all buses and trolleybuses. This was the first attempt at a transport reform, when data on the number of vehicles and their actual travel en-route started to arrive not just by phone from the operators, but directly from the city streets to the control center of the Holding. Even such a simple measure of control invoked strong resistance among operators, but enabled the city administration to see the real picture of operations. Today, the city authorities understand that dispatching control is the basic element of a transport system reform.

Therefore, when the 'Onay' system was introduced in 2016, new monitoring devices were installed onboard buses and trolleybuses – the 'driver assistants', representing an electronic display with integrated GPS. Thus, the control center can now communicate directly with the driver, and provide timetables in real time.

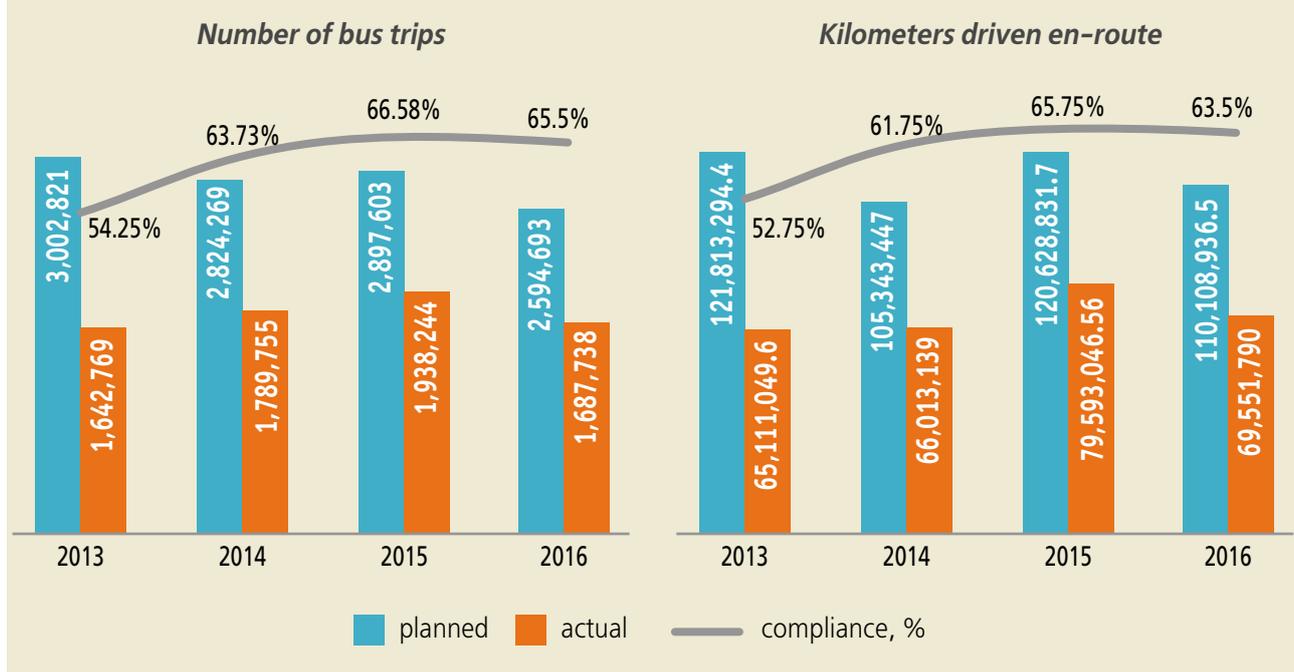
Starting from 2017, the Transport Holding is gradually shifting from mere monitoring to process management. Today, a dispatcher can call a driver to find out the reason for a stop or delay, or encourage them to catch up with the schedule. Although Transport Holding has tremendous management tools at its disposal, it can not use them in full yet due to imperfections of the legislative framework. High hopes are placed on introduction of public service contracts between the city administration



and operators, where the latter will be compensated based on kilometers en-route, which will enable using the current vehicle travel information for the process management purposes.

The CAST project procured and handed over to the Transport Holding several licenses for TransCAD urban transport modelling software, which is used for analysis, forecasting and management of transport data, and was applied to build the route network.

## Examples of the Transport Holding monitoring data



## We are sharpening our pencils

Georgy Taubkin, CAST project consultant, WSP

“My cooperation with the CAST project began in 2015, when we attempted to understand how the transport planning process in Almaty is organized, and to assess what has already been done, and what is missing. It is worth mention that at the time, many macroplanning tasks were already fulfilled – the city development concept was prepared, transport demand model was developed using statistical methods to study population by zones, and by distribution of residence and job locations. The model enabled analysis of hypothetical passengers distribution – how many passengers should be collected from an area, where should they be delivered to, and what routes should be used.



In 2016, we conducted a pilot route network optimization project. We selected the so-called ‘routes tree’ of 8 intercrossing routes on Seyfullin avenue, from Almaty-1 train station to Abai avenue. This was an attempt to reduce the inefficient duplication of routes on this segment, and the main task was to develop several potential optimization scenarios: ‘reduction of routes is cheaper, but less convenient for passengers; ‘shorter routes – higher frequency’, etc. Thus, we tried to strike a balance between the quality and efficiency of operations in the real-life setting of Almaty.

One needs to understand that remodeling of a city’s route network requires changing the transport infrastructure – you need to build new stops and interchange hubs, and if you enable multi-route trips, tickets have to remain valid over a certain period of time, allowing for free transfer from one route to another.

In 2017, the Transport Holding of Almaty initiated micro level planning, addressing issues such as how to get data on passenger traffic from ‘Onay’ validations, and how to get time and performance data from the GPS signals. The toolkit being now created will enable building schedule for the routes, help approve the methodology used for its development, and apply the scenarios used for the Seyfullin avenue to the whole city. Figuratively speaking, we are sharpening our pencils now, and next year we have to start drawing.

For the proper organization of public transit, the organizer of operations (in the case of Almaty it is the Transport Holding) must develop the necessary routes and schedule. The city authorities can thereafter tender the routes out and award contracts to the best operators, who shall then strictly comply with the approved timing. Thus, there should be no situations like Almaty experiences now, when several operators compete for the passenger on one section of the road, and on one route. ”



The Holding's control system collects telemetry data every 5 seconds from each of 1,400 buses and trolleybuses running on their respective routes. The data is kept in the Control center and represents a very detailed picture of public transport flows over a seven-year period.

However, build a city transport model requires more than just information on rolling stock travel; there is a need for information on passenger flows accumulated over a period of at least three years. Even now, the data collected through 'Onay' allows develop an approximate understanding of passenger behavioural patterns. For example, it has been noticed a peak in passenger traffic on Tuesdays, when bazaars start to operate and pensioners go shopping.

The CAST project regularly conducted trainings on transport modeling and public transport monitoring, and persuaded the city authorities to create a permanent analytical center responsible for urban transport planning. The analytical group was established on the basis of the control center of the Holding; among other things, the group's tasks include maintenance of the city transport model. If before the transport model was only fed with statistical data collected manually, today the Holding plans to integrate dynamic data on actual passenger flows collected through 'Onay', real-time public transport data collected through the control center, and the actual traffic flow data on all vehicles collected through surveillance cameras. Thus, there will be an understanding of not only how the public

*Sadir Khamrayev:*

“How can the control center help improve quality of public transport operations? First, we have to produce an optimal timetable for public transport drivers, based on the actual road situation, with account of the current traffic congestion, road accidents or road works, to ensure proper frequencies. Thus, we will increase the attractiveness of public transport, since its adherence to the timetable will be the first factor of motivation for car owners to shift to the use of public transport.

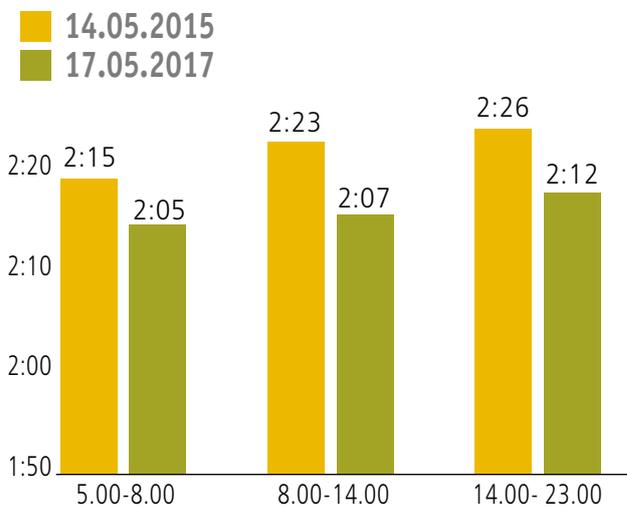
Second, the control system enables, albeit indirectly, increased road safety by regulating the speed limits. We already have technical possibilities to enforce driver compliance with the recommended operating speeds, which in Almaty do not exceed 20-22 km/h for buses, and can in turn ensure adherence to the schedule.

Third, the city has greatly benefited from the introduction of dedicated lanes for public transport. This immediately enabled an increase in public transport operating speeds, for example, from 16-17 km/h to 19.5-21 km/h on Abai avenue. Also, duration of a full bus trip reduced to about 2 hours, saving from 10 to 25 minutes on each round. ”

**Bus operating speeds on the dedicated lane along Abai avenue, segments between Seifullin avenue and Rozybakiyev street (westward), and between Turgut Ozal and Baytursynov streets (eastward)**

Route No	Speed on the dedicated lane, westward, km/h	Speed on the dedicated lane, eastward, km/h
118	19.54	20.79
120	21.49	20.79
34	19.54	20.79
65	19.54	20.79
92	19.54	20.79

**Route 118, duration of a full round trip, including intermediate layovers**



Data provided by the Transport Holding of Almaty

transport moves, but also why it moves the way it does – for example, stalled in congestion. Video from surveillance cameras will enable classification of the total road traffic by type of transport: cars and trucks, trucks exceeding 11 meters in length, public transport. This is important, because it will help the city authorities to see which streets are overloaded and why – for example, Raimbek avenue is congested with heavy trucks. This may be an additional incentive for the construction of the Big Almaty Ring Road (BAKAD highway).



# Mobility as a Service

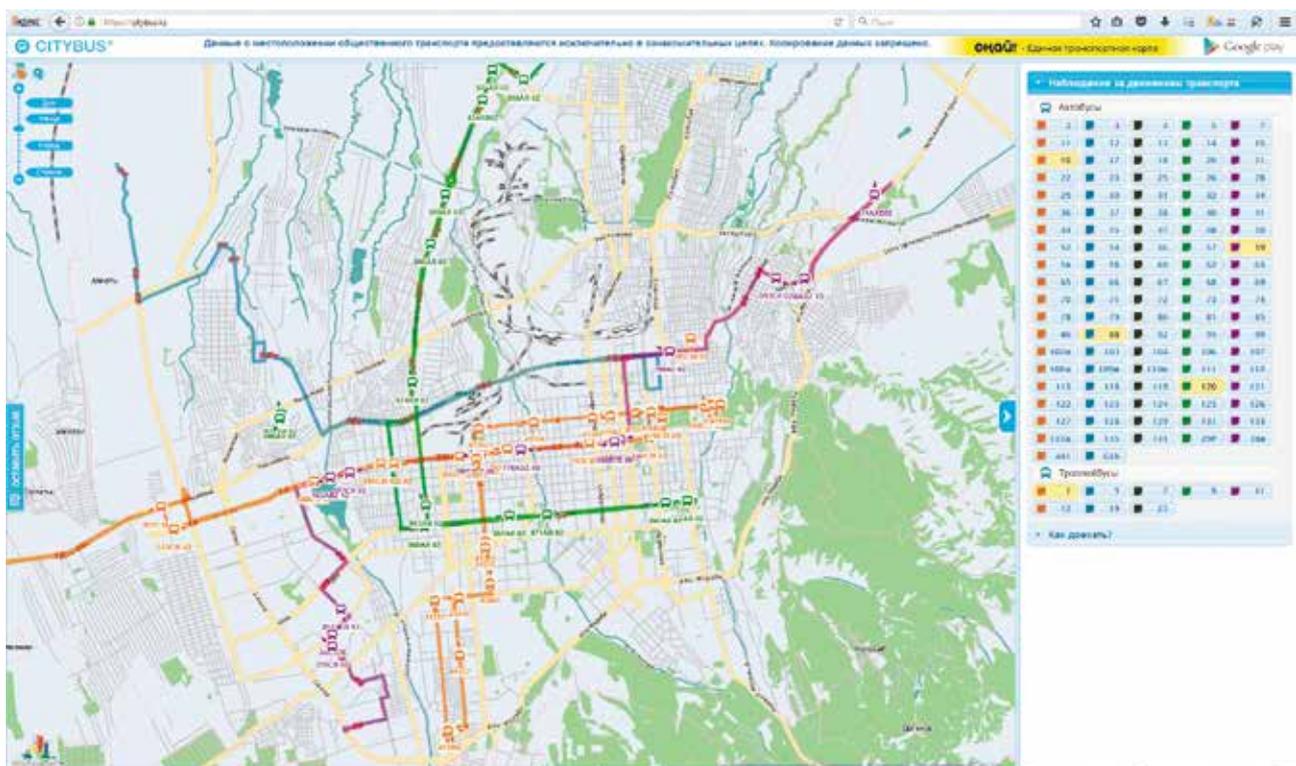
MaaS (Mobility as a Service) is a new trend of application of IT technologies in transport sector, where one platform integrates different IT modules: route planning, traffic management, seat reservation and fare collection system. Main objective of MaaS in the transport sector is to ensure a smooth transition for car owners to the use of public transport, shared cars and/or other forms of collective travelling through:

- improving the quality of public transit;
- car-sharing – club-type systems of short-term car rental with per-minute payment;
- driverless cars (solo and collective riding);
- other models of shared car use, including taxi.

In order to improve the quality of service, Transport Holding ordered development of a passenger application CityBus, which enables monitoring of public transport locations and building trips in real time. The application has rating 4.5 out of 5.0 on the PlayMarket, 10-15% of Almaty residents use CityBus daily. According to statistics, 2-3 changes in the route network occur in the city every day (for example, due to road works), and the relevant information from the control center enables almost real-time updating. Recognizing the importance of up-to-date information for citizens, the CAST project provided financial assistance to CityBus developers, which enabled significant expansion of the application's functionality.



The interface for smartphones is under modernization, with new functions being added to allow passengers to comment the quality of service. For example, posting feedback about a trip will become possible. The feedback button will be displayed at the application's main page; passengers will be able to take photos or record video, and write comments.



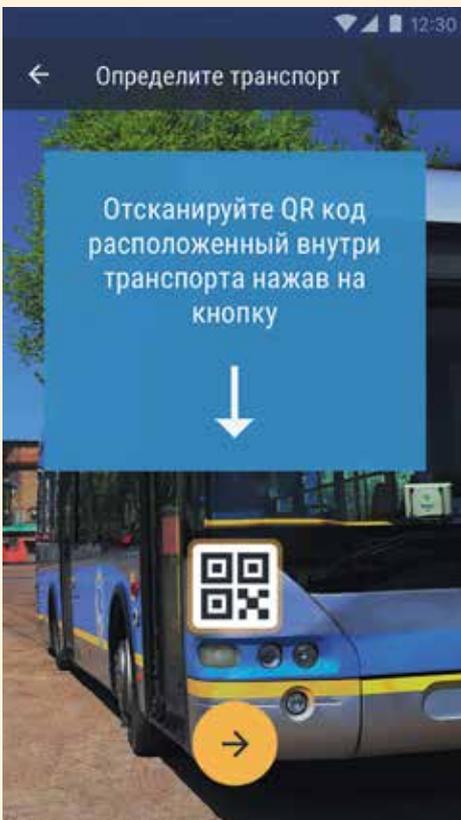


## STARBUS

# How to teach your smartphone to read the bus plates?

In autumn 2016, the CAST project supported a contest for IT projects in transport, and independent experts selected three winner works: Pedestrian (by Anuk Dyusembaeva, awarded US\$ 3,000) aimed at improving road safety near schools of the city; Starbus (Piroq team, awarded US\$ 20,000) – a mobile application for assessing the quality of public transport services; and Almaty Go (Singularity Lab team, awarded US\$ 35,500), who implemented the idea of a social game application to count a distance walked.

*Beibut Amirgaliyev, head of the Piroq team:*  
“We want to use new technologies to improve the quality of living for our citizens. We can not speak of any direct impact on reduction of emissions, which would fit the goals of this project. However, if a driver drives very carefully, he burns less fuel and produces smaller amounts of emissions. The service quality rating of public transport operations can attract more passengers from the group what does not use public transport yet, or uses it rarely.”



The Starbus mobile application developed by the Piroq team for Android and iOS helps passengers monitor and evaluate public transport drivers' performance. The application is built by analogy with Uber and Yandex. Taxi services: a passenger can rate his/her satisfaction with the trip and leave comments. At the same time, all buses and trolleybuses will have a QR-code, which can be scanned with the passenger's smartphone and shall provide the control center of the Transport Holding not only with the route number, but also the vehicle plate number and the driver's information. Thus, passengers can make their contribution to encouraging drivers and operators to provide better services.

In its turn, Almaty Go social game application for smartphones by the Singularity Lab team will count the distance that the user (or group of users) walked or travelled with green transport, and, as an incentive, will award them with bonuses or discounts in partner stores and other outlets. The developers also decided to give businesses an opportunity to create city quests for their customers. Thus, interest in the application will be supported by initiatives of the community itself.

# CIVIL SOCIETY PERSPECTIVE: CAN MENTALITY AND BEHAVIOUR POTENTIALLY CHANGE?



## Transport for all

Kasiyet Omarova, member of 'Arzhan' NGO, person with 1st category sight disability

*We contacted the CAST project when we decided to study, why there are problems for people with disabilities in public transport. In course of the research, we, to our great regret, learned that the mandatory requirement for sound announcement of stops was removed at the legislative level, and the visual displays in the ground public transport disappeared as well. Another thing, for example, it is allowed to hang informational posters in public transport, but there is no specific regulation as to where exactly they can be hung and how to ensure that they are not torn off.*

*One of the aims of our research was also to develop practical recommendations to increase the accessibility of public transport in Almaty. We already had relevant experience – prior to this initiative, we have created a map of accessible social facilities for people with disabilities throughout Kazakhstan, developed and tested the methodology for examination of existing buildings and structures for compliance with the accessible environment requirements. We have mapped 2,500 different facilities, including stations, government agencies, universities, museums, libraries, etc. 150 volunteers helped us create the map. Therefore, the next step for us was to study, how to make public transport comfortable and accessible for people with disabilities.*

*People with disabilities are citizens with equal rights, just as everyone else. I have been engaged in public activities for 15 years, and I can say that the attitude towards people with disabilities is gradually changing, even in state bodies. I would also like to change the attitude of drivers and passengers in public transport.*

*The behaviour of ordinary citizens, oddly enough, varies – people behave outside the bus/trolleybus differently from when they are onboard as passengers – regular people for some reason do not want to notice passengers with disabilities, they go by 'I see nothing, I hear nothing, I know nothing and I will not give up my seat'. But it also happens that passengers do want to help, but do not know how, they hesitate or, on the contrary, are too intrusive.*

*We decided to start with information posters for passengers – these are A4 format stickers that will be placed inside the bus or trolleybus and will explain to passengers how to help people with various disabilities, because each of the six most encountered types needs different assistance.*

*At the same time, we prepared video instructions for drivers on how to provide services to passengers with disabilities. It's not a secret – it sometimes happens that drivers just pass a stop if they see someone in a wheelchair or with a white cane, although the driver's direct duty is to help the passenger with a disability when entering and leaving the vehicle. Moreover, some buses do not have the special ramp, or it is non-functioning, although it must be available and operational, according to the public transportation requirements. Another requirement, for example, is that each bus/trolleybus must be equipped with the straps that can fasten the wheelchair, but in most cases, the straps are simply not there. We sent the video instructions to the Center of competence training of GreenBus public transport operator, and organized a round table attended by the Almaty Public Transport and Highways Department and the operators at the end of August 2017.*

*While conducting the research, we wanted to understand, what is the mechanism to address challenges of people with limited mobility in public transport. We succeeded: we understood what the problems are and how, and at what level, they should be resolved. When we ensure that public transport is accessible to passengers with disabilities, we make it more convenient and comfortable for everyone.*



# Bicycle as the mode of transport

About ten years ago, when the Velo-Almaty movement was born, it started as a group of activists who gathered through Internet forums, just a couple dozen people. Today the cyclists' movement has thousands of active participants, the like-minded people who exchange experiences, find the right contacts in different cities, ready to defend their rights and write letters to the mayors about low-quality cycling infrastructure.

The activists consider the cycling component of the UNDP-GEF 'City of Almaty Sustainable Transport' (CAST) Project the largest so far, primarily due to its support of information campaigns aimed at improving the skills of public transport drivers to interact with cyclists on the roads, as well as at educating the cyclists themselves to observe traffic rules and provide first aid in road accidents. After all, the number of cyclists on the city roads increased several folds now, and the number of accidents increased correspondingly, especially because the car drivers do not perceive cyclists as road users with equal rights.



## Aide Memoire for Bus and Trolleybus Drivers



**ВЕЛОАЛМАТЫ**




Полноправные люди.  
Устойчивые страны.



**Заторы на дорогах становятся все большей проблемой, все больше людей отдают предпочтение велосипедному передвижению.**

**ПАМЯТКА ВОДИТЕЛЮ АВТОБУСА И ТРОЛЛЕЙБУСА!**

- Помните о велосипедистах. Всегда проверяйте слепую зону и зеркала, особенно в начале движения, на перекрестках и кольцевых развязках.**  
*Автобусы и троллейбусы из-за своих больших габаритов опасны для велосипедистов на перекрестках, поэтому избежать столкновения с крупногабаритным транспортным средством (ТС), которое внезапно начинает перестроение и перегораживает весь проезд, намного сложнее, чем с легковым.*
- Перед поворотом направо и остановкой смотрите в правое зеркало, т.к. вдоль обочины рядом с автобусом в этот момент может двигаться велосипедист.**
- Подавайте сигнал о маневре заблаговременно.**  
*Самые опасные для велосипедиста ДТП происходят, когда автобус пытается повернуть налево, не пропуская движущегося справа велосипедиста. Важно помнить, что велосипед невозможно остановить мгновенно! Соответственно, поворачивая налево, водитель автобуса обязан пропустить ВСЕ движущие навстречу транспортные средства, в том числе, велосипеды (пункт 13.14 ПДД РК).*

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- Никогда резко не останавливайтесь, не подъезжайте к остановкам и не отъезжайте от них слишком быстро.**  
*Также часто ДТП происходят, когда водитель выпускает пассажиров в неподобающем месте (вне остановочных комплексов). При этом велосипедист не ожидает выхода пассажира, не может объехать автобус и пассажиров и не может резко остановиться. Известны случаи, закончившиеся леталью для велосипедиста! Просим обратить внимание на то, чтобы водители автобусов и троллейбусов не открывали двери и не выпускали пассажиров вне остановочных комплексов.*
- Будьте особенно осторожны при обгоне велосипедистов, удостоверьтесь, что вы оставляете им достаточно места. Не подрезайте их внезапно, тормозной путь велосипедиста, едущего со скоростью 25 км/ч, достигает 8 метров!**
- Уважайте велосипедные дорожки и стоп-линии на перекрестках перед светофором - не занимайте пространство для велосипедистов.**

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- ДТП с велосипедистами случаются, когда происходит столкновение велосипедиста едущего по главной дороге, с автобусом, едущим по второстепенной. Чтобы избежать подобного происшествия, важно помнить, что водитель обязан пропускать ВСЕ транспортные средства, едущие по главной дороге, в том числе и велосипеды (пункт 13.1 ПДД РК).**
- Учитывайте возможные резкие движения велосипедистов, особенно на плохой дороге, там, где есть мусор на проезжей части или при неблагоприятных погодных условиях.**
- Будьте всегда терпеливы с велосипедистами.**
- Дайте велосипедистам пространство. Занимайте позицию на перекрестках и кольцевых развязках с учетом безопасного нахождения велосипедистов между вашим транспортным средством и краем проезжей части; учтите, что если велосипедист перед вами - он имеет приоритет.**



*Svetlana Spatar, Velo-Almaty activist:*

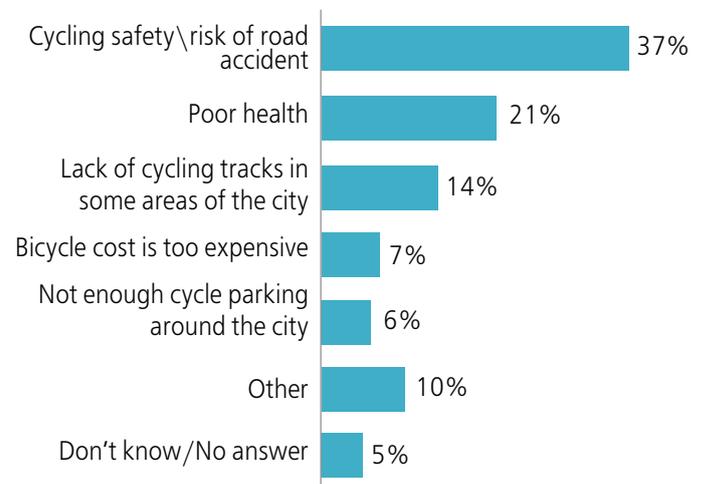
“ One of the significant contributions of the CAST project is the change in the city administration’s perception of cyclists. Earlier, for example, 10 years ago, we were told – you are too few for us to do something for you. Do not get in the way, go cycle in the courtyards or somewhere else. Years later, thanks to the information campaigns, the authorities realized that bicycle is not only for sports and not just for children’s entertainment, but it is one of the modes of transport. ”

Indisputably, the main deterrent to using a bicycle for moving around the city is the unsafe traffic conditions. According to the new traffic rules, in the absence of dedicated cycling infrastructure, the cyclists must, regardless of their age, ride on the motor road with the mixed traffic, which results in manifold increase of the risk of accident for them. Moreover, some drivers still do not know that cyclists have the right and must use the motor road; they do not know that the braking distance of a bicycle is much longer than that of a car; they often recklessly open the passenger door on the right, inducing collision with cyclists.

According to the CAST Project study of transport habits of Almaty population, 16% of families own at least one bicycle (exclusive of children’s). However, it is true that in more than half the cases it is used for entertainment or sports, and not to get around. Nevertheless, 3% of residents report regular cycling for a distance of more than 500 meters in the city, and another 8% of residents are prepared to use bicycle to get around in case the cycling infrastructure is well developed and cycle parking racks are sufficiently available. At the same time, we must again emphasize the need for information campaigns – many city residents are often not aware about availability of a cycling track right next to their home or place of work.

The bike-sharing system is very popular in many cities around the world. In Almaty, it has a small geographical coverage for the moment – only 50 bicycle stations with 270 bicycles are available in the old city center, and in the summer of 2017, additional 77 stations were installed; there is already a great demand. In total, by the end of 2017, it is planned to expand the network to 200 stations and 1,730 bicycles (including 50 stations commissioned in 2016), which will cover the main downtown, and by the end of 2018, it is planned to have 300 stations with 2,410 bicycles. This system is very convenient for beginners – you do not need to buy your own bicycle, which will cost much more than the rental, you also do not need to worry about its repair or storage space.

**QUESTION: What is the primary cause that prevents you from using bicycle for moving around the city?**



Source: ‘Transport Habits and Mobility of Almaty Residents’, 2016



The CAST Project supports major efforts aimed at children – cycling schools, children’s competitions, drawing contests. After all, if you develop children’s skills of cycling in the city, teaching them the traffic rules, you be confident that as adults these children will use the bicycle as a means of transportation with greater willingness and enjoyment.

An exemplary project was the School of a Young Cyclist organized in 2016. This pilot project was executed by the public foundation ‘Saktau’ in three schools of Almaty (No 5, 64 and 106) with 800 children aged 10-13, and 1,200 teenagers aged 14-17. Using the cycling equipment donated by the CAST Project (30 bicycles, helmets, protection gear, and repair tools), workshops on ‘10 simple steps, or how to learn cycling’ were organized for children, followed by practical exercises on cycling to consolidate knowledge. Young cyclist lessons were also taught in school summer camps; the Project supported various competitions, and the most significant experience was, perhaps, the participation in a real cycling race.

The pilot project helped identify a number of problems common to all schools in Almaty, such as the lack of cycling infrastructure near schools, lack of bicycle parking or bicycle storage at schools’ premises. In order to make systemic changes, it was proposed to use the Schools of Young Cyclist as the basis for curriculum to be introduced in educational institutions (consider integration into physical education lessons, lessons on traffic rules, or teach as an elective course).

A new evolution phase of this initiative began in August 2017, when the CAST Project signed a grant agreement with the public fund ‘Akбота’, to implement the project ‘Your safe bicycle for environment of your city and your health!’ across 20 schools of Nazarbayev Intellectual Schools network, in all 16 regions of the country. Under the new project, 440 bicycles and sets of bicycle equipment will be handed over to the schools, the methodology for cycling lessons will be practiced with teachers of physical education, and the principles of proper supply with cycling equipment will be developed, with further scale up to all schools in Kazakhstan.



## We love our cars too much

Asel Mukasheva, journalist, urbanist, blogger

*We love our flyovers too much, and most importantly our cars. These things have become almost archetypes, an inseparable part of the collective unconscious: a child goes to college with plans to buy a used car with loan money at the first opportunity.*

*I remember being stuck in a traffic jam on Al-Farabi Avenue a couple years ago. Of course, living like that is impossible. A city stowed full of private cars, unable to move in congestion – that is just a little more effective than riding a horse cart and hoping to keep up with the pace of modern urban life in a multi-million megalopolis.*

*What approach should be taken, how can a city transform itself from a Soviet town to an effective megalopolis that functions on principles that are diametrically opposite to those on which this city was originally built...*

*All these questions remain unresolved year after year, the road traffic presents a risk of becoming a real abscess on the body of the city – you're afraid to touch it, but leaving it without any action poses threat to the patient's health.*

*But what does it take? It takes a firm hand to dissect the issues to the very bottom.*

*I learned about the 'City of Almaty Sustainable Transport' Project relatively recently. Not being an expert in transport, I was able to appreciate the great work that had been done, attention to detail and the correct approach.*

*The main merit of the Project, as I see it, is that it managed to set the right discussion, where should soon remain no doubts or disputes: the proposed management models and sustainable urban transport are common sense, axioms.*

*All the rest will follow quickly – the physical reality will promptly adjust to the new consciousness, to the new knowledge. When the last piece of the puzzle is set to place in people's heads, the reality transforms along accordingly, and we find money, and resources, and patience.*

*Take a look around and keep your ears open: today we already understand that something is not going right, that something needs to be changed, and therefore, effective urban mobility is not far off.*



# HOW CAN WE MAKE IDEAS OF THE PROJECT VIABLE AFTER ITS COMPLETION?

**Yelena Yerzakovich, the CAST Project Manager:**



In order that all the UNDP-GEF 'City of Almaty Sustainable Transport' (CAST) Project plans, proposals and recommendations do not only remain on paper, the city needs a strong team of professional public transport managers, who will believe in what they do, who will be able to break the vicious circle of dependence on the moods of private operators or short-run ambitions of businesses, and most importantly, will turn towards the true customers – the citizens, and will take into account and protect their interests and persistently follow the intended plans. For a long time, we have been speaking and demonstrating that public transport is not only about engineering and technologies, but above all, it's about people who manage these, both in direct and figurative sense.

The city is set for ambitious goals: to make the public transport comfortable and reliable, and to ensure that cycling and walking are safe. The time has come to invest in people, engage the best players of the industry, provide training and give them the opportunity to address the ambitious goals, while keeping focus on the efficiency. We must shift away from designing transport projects in isolation, but rather closely link them to citywide planning – projects for improvement of public spaces and urban development must be approved only after analyzing the impact on the transport situation in areas under consideration and the city as a whole.

The time has also come to reform the legislation, which, on the one hand, needs to be simplified and should delegate more authority to the local level, and on the other hand, needs to revise the approaches to public transport financing.

We need to educate our members of parliament on sustainable mobility, since they must more determinately advocate for road safety, and in considering amendments to legislation, shift the emphasis from addressing the needs of car owners towards promoting non-motorized mobility.

In general, the six years we had are not enough to implement large institutional reforms in urban transport, especially in a large metropolitan area environment. Transport infrastructure is something that is planned for decades, and requires large and long-term investment. At the same time, poorly considered, fragmented or politically charged decisions are causing great damage to the city for several generations ahead. Therefore, all the stakeholders involved – policy makers, operators, city planners and the public – must be taught to consider, calculate and recalculate everything many times before breaking the established models. Development projects are not easy to implement, they do not come unambiguously, and often require significant resources to be spent on educating and promoting new behaviours. Our consultants understood this, and always tried to think through the problem and study the local capacity before giving any advice, or proposing action programs. The implementation has always been and will depend on the local context, and we must train our specialists to make the plans a reality.

**Almaty city administration and Almatyelectrotrans LLP are purchasing 370 new Euro 5 buses that in 2018 will replace worn-out rolling stock, of which:**

**20 vehicles will have extra large capacity (18 meters);**

**200 vehicles will have large capacity (12 meters);**

**73 vehicles will have average capacity (8-10 meters);**

**77 vehicles will have low capacity – these already operate social (low-demand) routes.**

**Almara Kalipanova,  
the CAST  
Project  
Assistant:**



I believe our project played a significant role in getting understanding of sustainable transport development needs among city authorities as well as Almaty residents – due to numerous events, international and local consultancy.

Among major project achievements I would name development by Almaty Akimat of cycling and walking infrastructure. The realization might not be perfect yet, however, the city has started changing – and that's a great breakthrough, I think. It is important to acknowledge enthusiasm of city activists, who put a lot of efforts, time and personal energy to make their ideas the reality at a new quality level.

**Sadir Khamrayev,  
Director of  
Transport  
Holding of  
Almaty:**



Thanks to the CAST project, we already have plans for future development – for example, we are now discussing the project of electric trains to Kaskelen and Kapchagai towns, which, after being commissioned, will also be serviced by the electronic ticketing system and the control center, to monitor and manage the public transport operations.

Another issue that we are bringing to the city authorities is the need for current information on planned road works to timely adjust the public transport routes. This must be complemented by information on special operations (snow cleaning, street flushing, waste collection), which often causes road congestion.



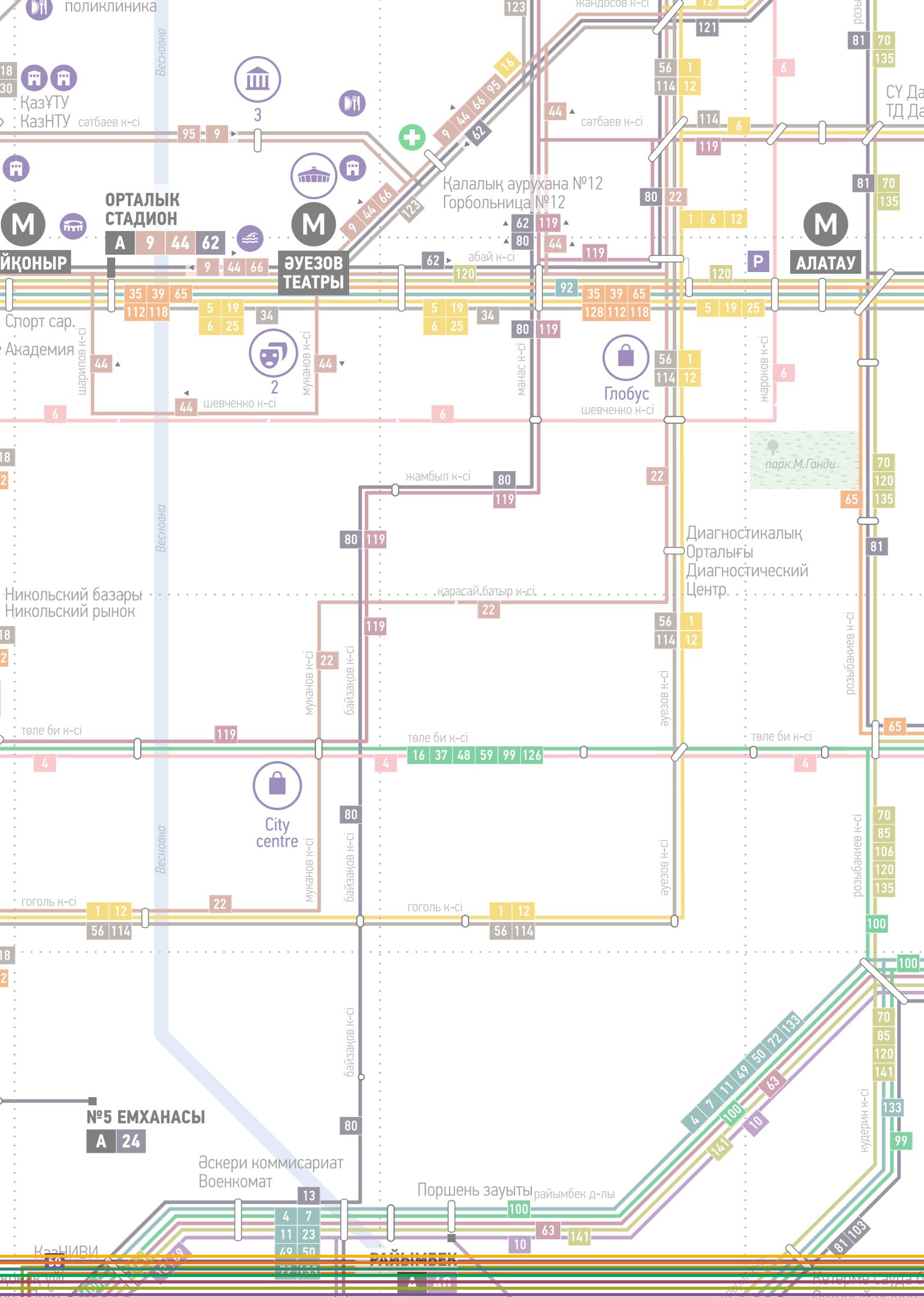
**Rizvan Tsinayev,  
Director of  
Almatyelectrotrans:**

We will change the public transport service quality, first of all, by commissioning the modern rolling stock – higher capacity, equipped with climate control, and functioning amenities for passengers with disabilities. Secondly, we will recruit qualified personnel who will not smoke at the workplace or talk on the mobile phone, but, on the contrary, will comply with the operating speeds, announce stops and help passengers with limited mobility. This will become possible when the drivers will not work for more than 220 hours per month, while being paid the salary consisting of a fixed and variable components, where the variable component will be based on the number of kilometers travelled on the route and passenger feedbacks.



**Svetlana Spatar,  
cycling activist, Velo-Almaty:**

We will continue to lobby the construction of quality cycling infrastructure in Almaty and other cities; we do not need cycling tracks for the sake of box-checking. We will work with the cyclists to improve their knowledge of traffic rules, and also insist on changes in traffic rules – both in the Parliament and the Government – to ensure safe cycling.



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