"Megacity on a Human Scale“, Moscow Urban Forum,
December 4–5 2012

Moscow: Looking to the Future - Mobility

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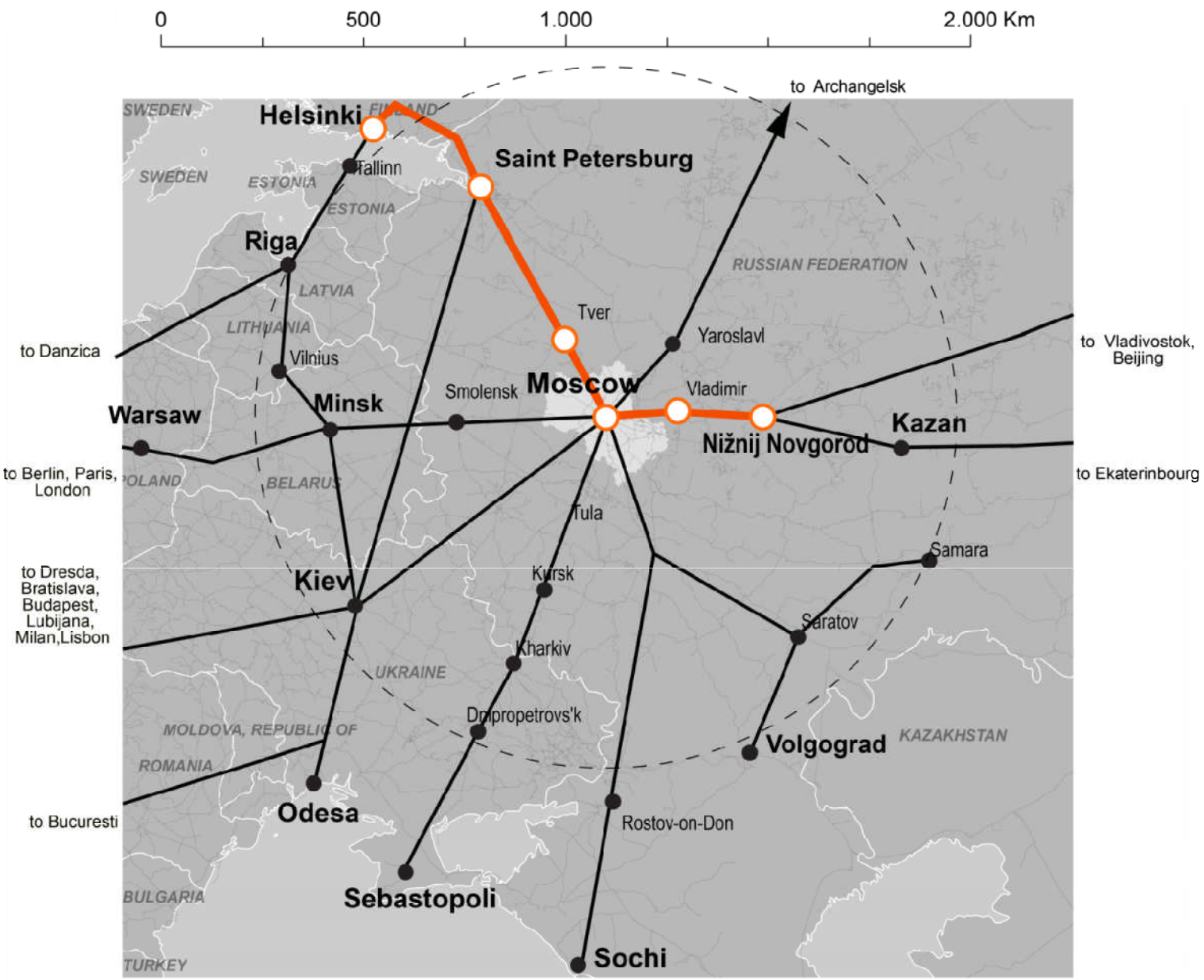
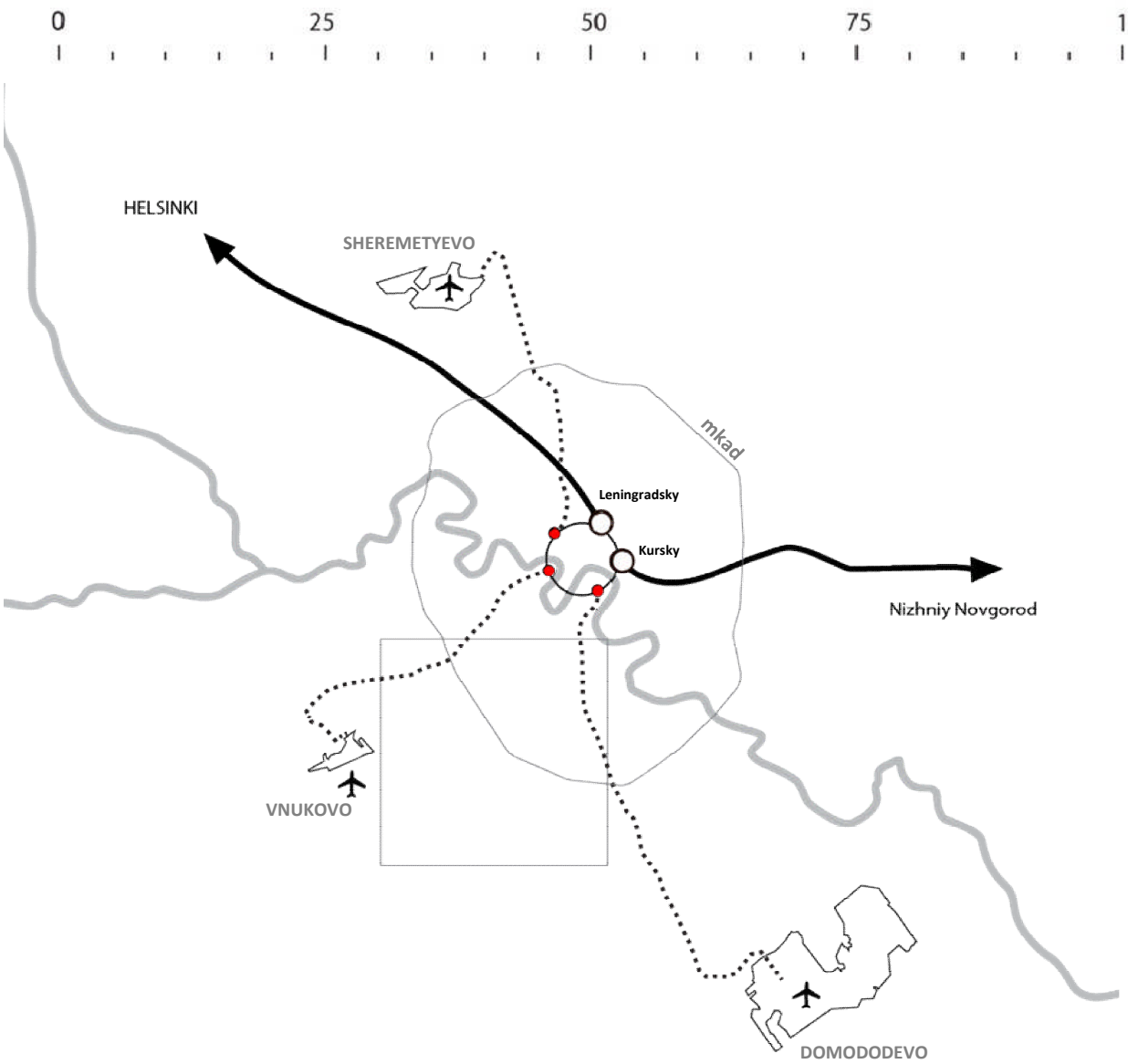


High speed rail as planned today. Parallel HSR track is under construction.



high speed rail today station connections

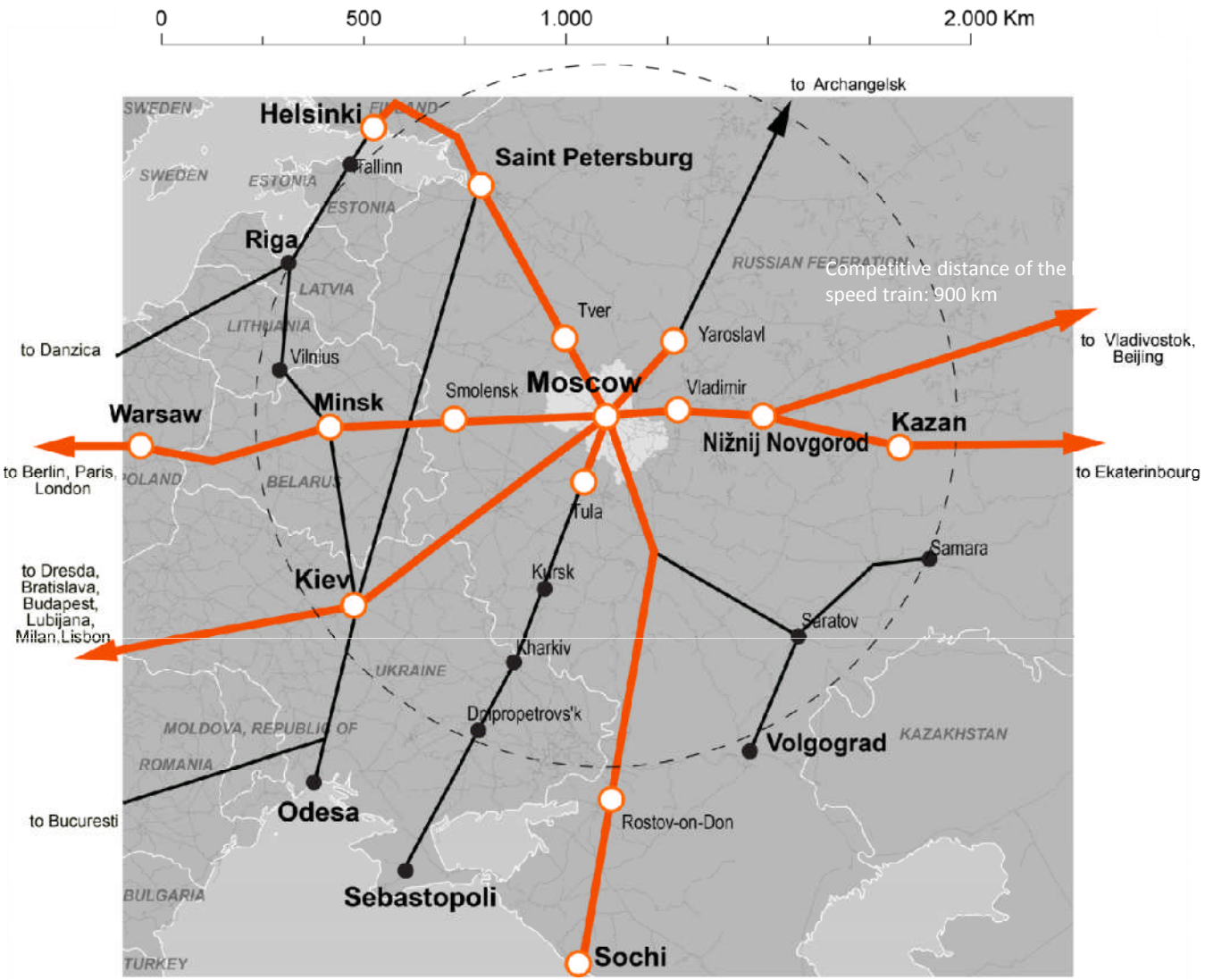
high speed line (speed up to 300km/h)

airport express

Leningradsky and Kursky station

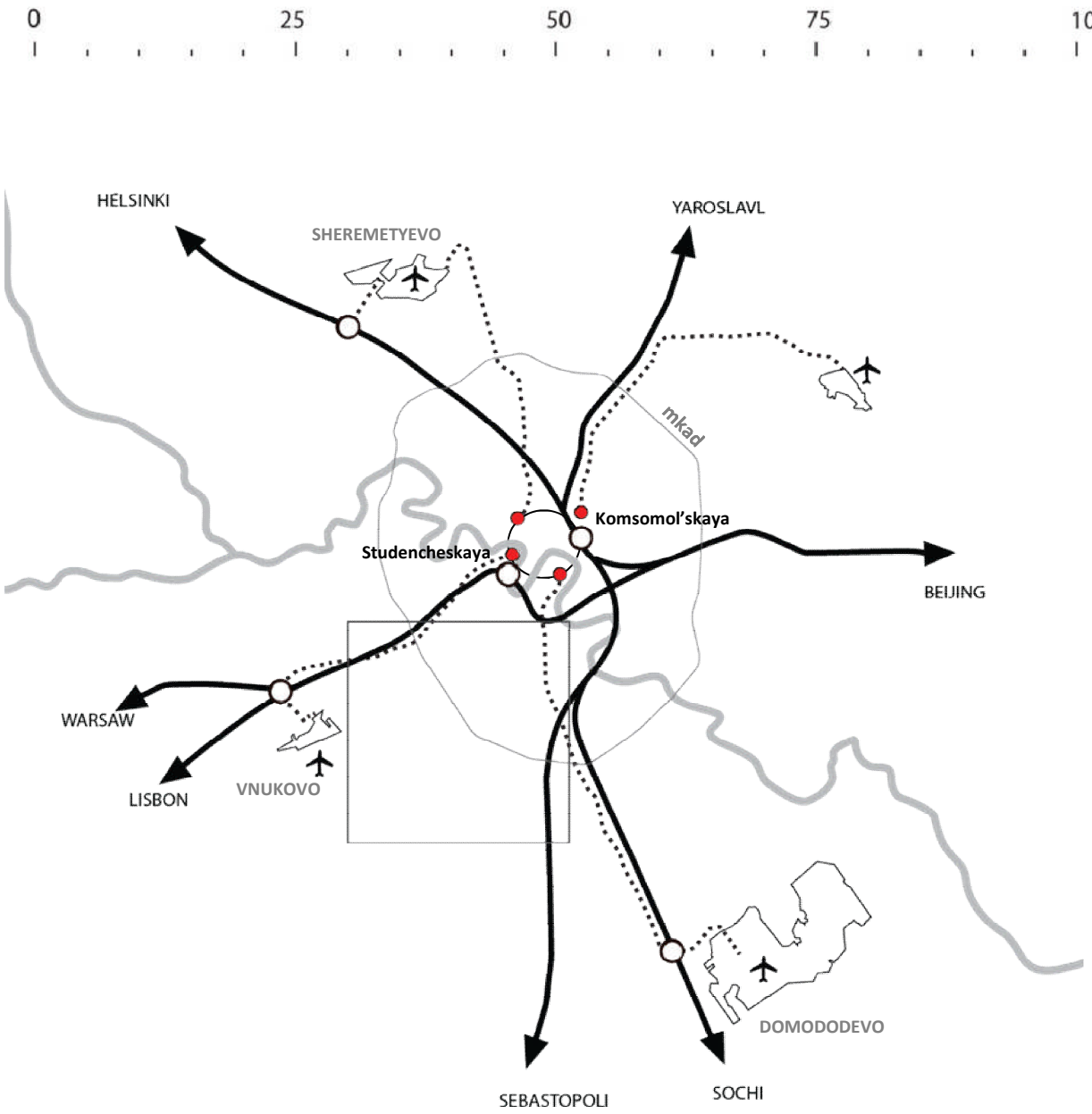
airport express station linked to M5

metro 5 ring



High speed rail tomorrow.

Moscow will be then strategically connected with Europe (Helsinki in the north, Berlin in the west). It also will serve the main regional capitals close to Moscow (Proposal by Secchi-Vigano).



high speed rail tomorrow – links with urban rail.

The line from Berlin merges with the one from Kiev before entering the city, then using the south railway ring to reach the north-south bypass that crosses the city. Two new passing stations could improve the north south/east-west passage : one station in the south-west (Studencheskaya close to the CBD Moskva City), the second in the center of the city at Komsomolskaya.

(proposal by Secchi- Vigano)

- high speed line (speed up to 300km/h)
- airport express
- New High speed station
- airport express station linked to M5
- metro 5 ring

Mosow mkad

Intercity line

Intercity station (one stop every 30 Km)

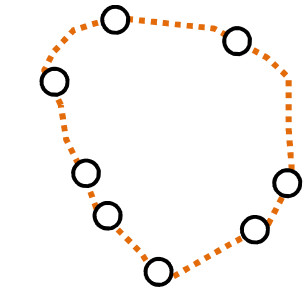
Regional rail exists but is underused.

Improvement of existing rails for regional passenger integration requires an adaptive reuse of industrial rail and railway ring, and good frequencies

(proposal Secchi-Vigano)

Regional rail in connection with Metro, one of the best in the world.

Moscow stations should not be end-stations. Trains could connect different urban areas without transfers through the city center. New interchange stations could connect the ring stations with the radial metro going out of Moscow. (see hereafter Moscow master plan page 9)



metro 5 ring

old industrial railway ring Reused for passengers

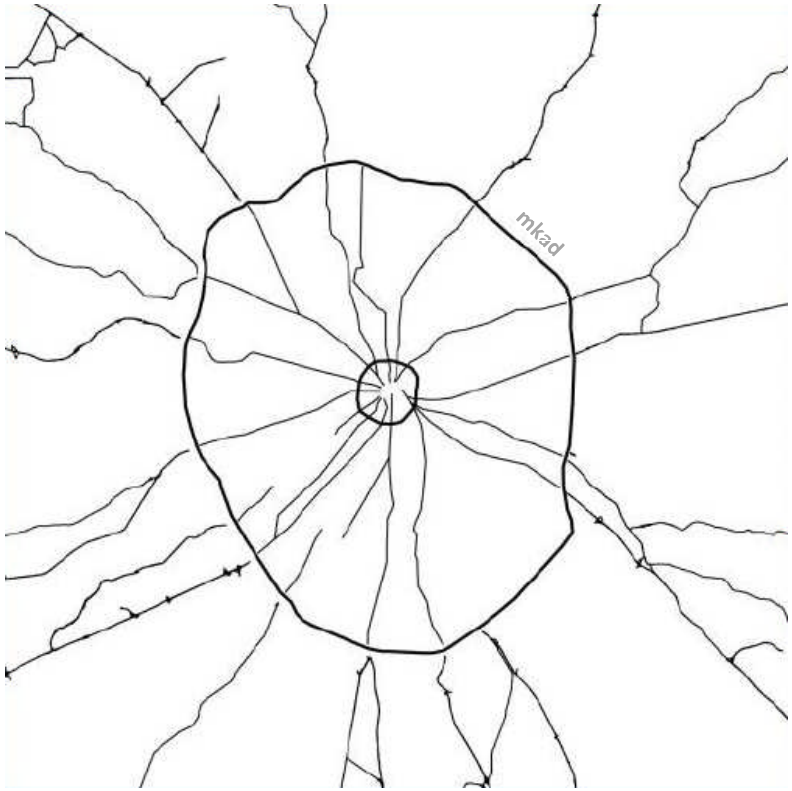
regional railway system (one stop every 3 km)

new transit station along the new passenger railway ring

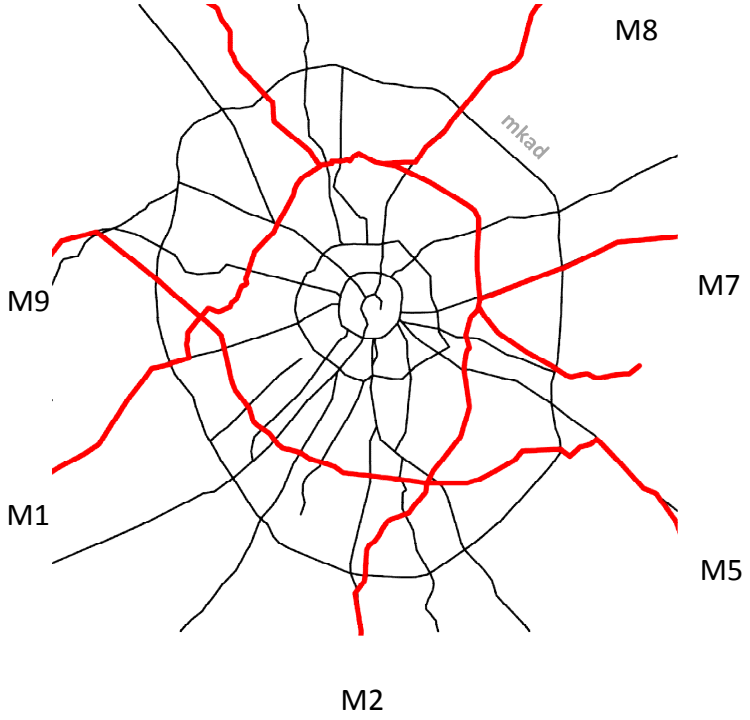
Highways (planned)

A new highway ring into the city is planned but only 10 out of 70 km have been built (at a cost of 2bn US $ and doubts are voiced about its necessity .

Existing road system with MKAD ring road.



Existing situation



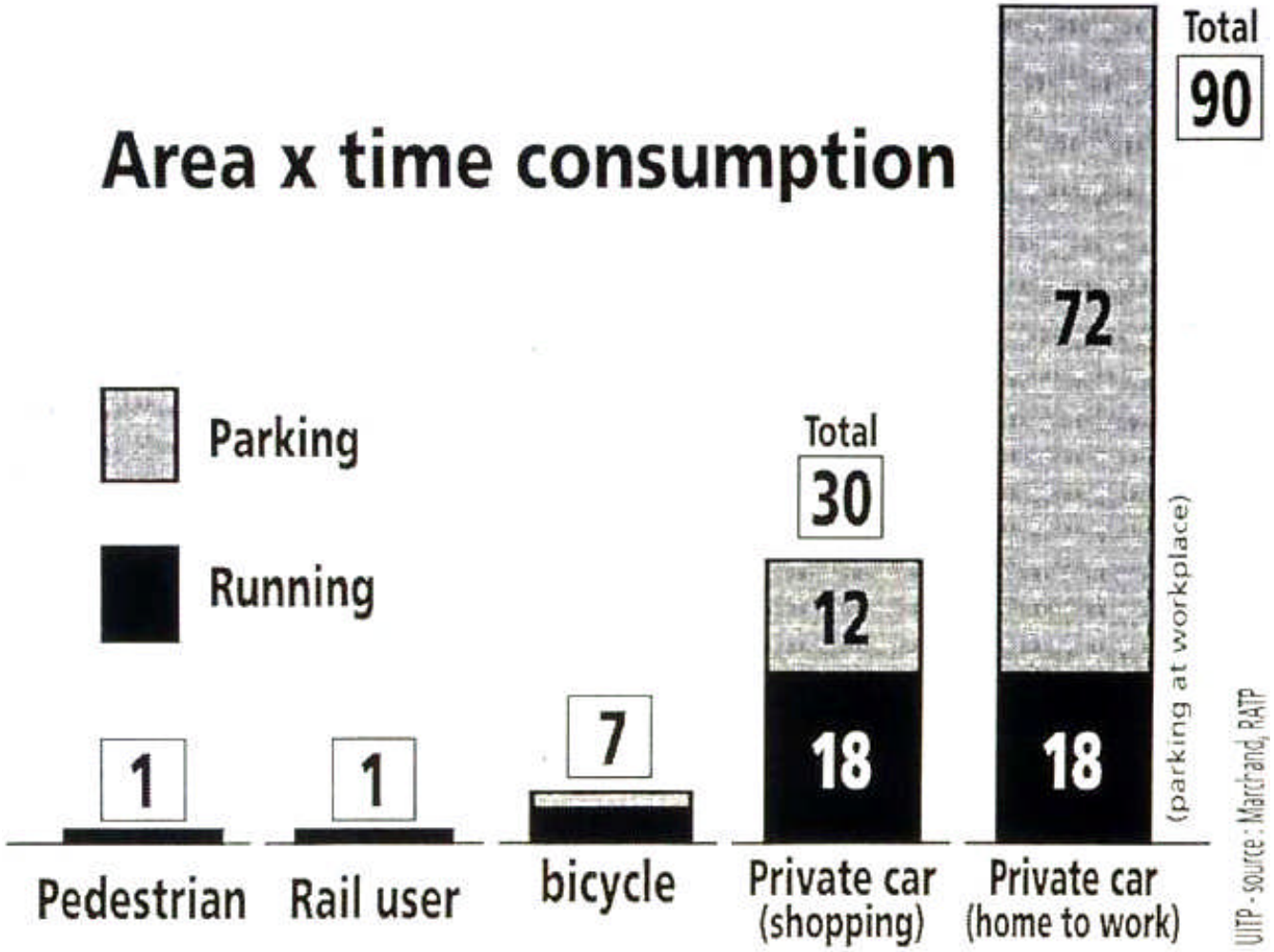
Moscow city masterplan

How to choose transport investments? What criteria?

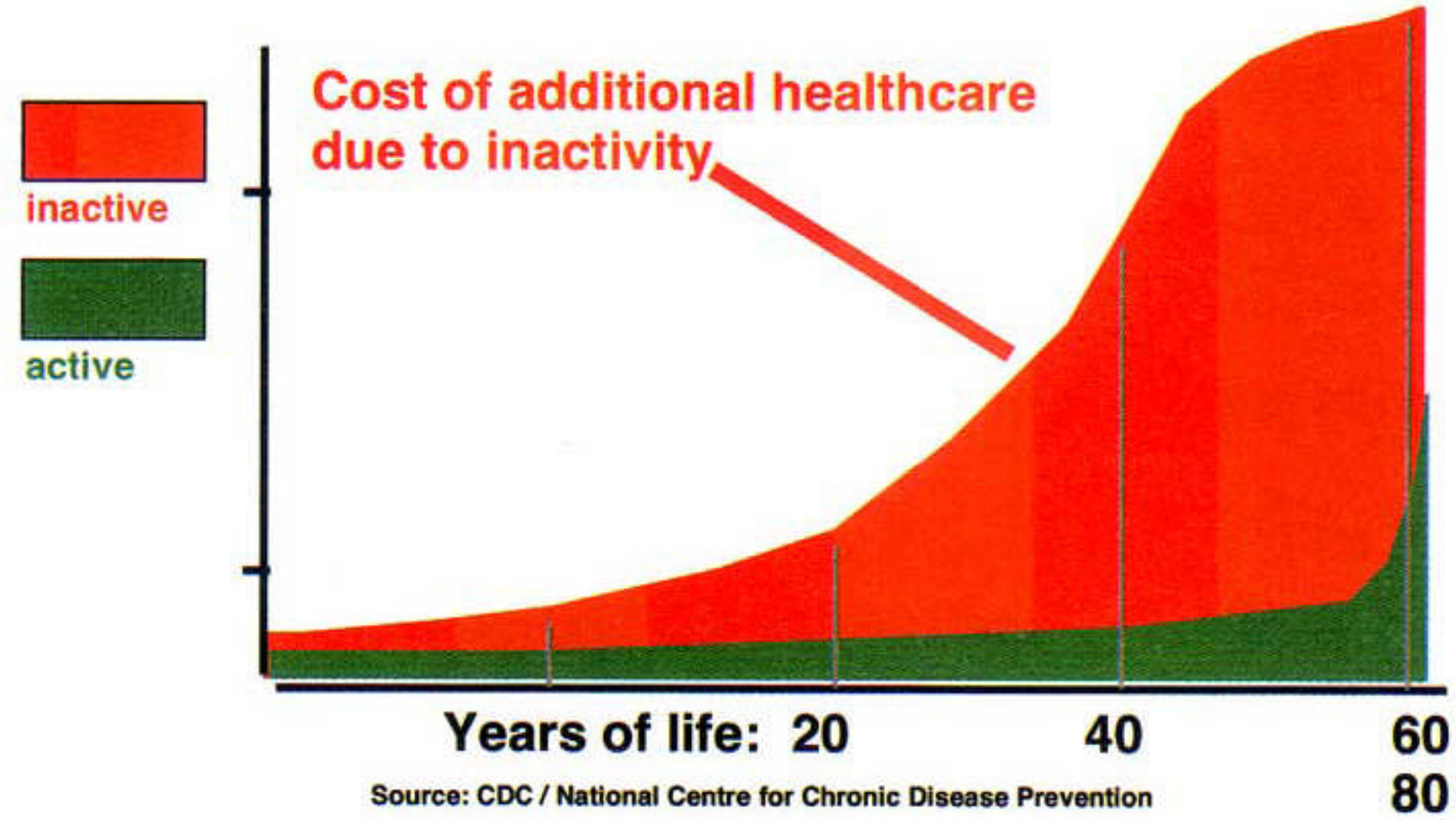
- 1 Space savings
- 2 Health savings
- 3 Saving the liveable city

Space savings

If one takes the space consumption by a pedestrian as the benchmark, the car takes up about 18 times more space than a pedestrian, as it moves, but it requires parking for the time it does not move, i.e. for some 90 % of its life cycle. Space consumption therefore has an area x time dimension. The space consumption generated by traffic on new highways is nearly 100x higher than by rail transport. The UK SACTRA Report (1995) has shown that additional roads generate more additional traffic than their additional capacity.



Health savings



The cost of additional healthcare costs entailed by physical inactivity (less than 30’ walking/day) has been estimated by the UK National Centre for Chronic Disease Prevention.

Saving the liveable city

Mobility at human scale makes Cities more liveable and enjoyable – poster by Friedensreich Hundertwasser for UITP (1995).

Moscow City Government

Moscow Transport Hub Strategy

September 2012

Moscow Transport Hub (MTH) is the largest transport hub in Russia

Moscow and Moscow region are a single integrated entity in terms of employment, transport infrastructure, and passenger traffic

	Moscow	Moscow region
Population People, mn	11.6	7.2
Area Sq. km.	1,900 (~2,600 with annexed areas)	46,000
Road length Km	3,700[1]	31,000
Railroad length Km	395	2,700
Registered cars per 1,000 people Units, 2010	279	293
Number of long-distance transport stations (railroad and subway) Stations	279	506

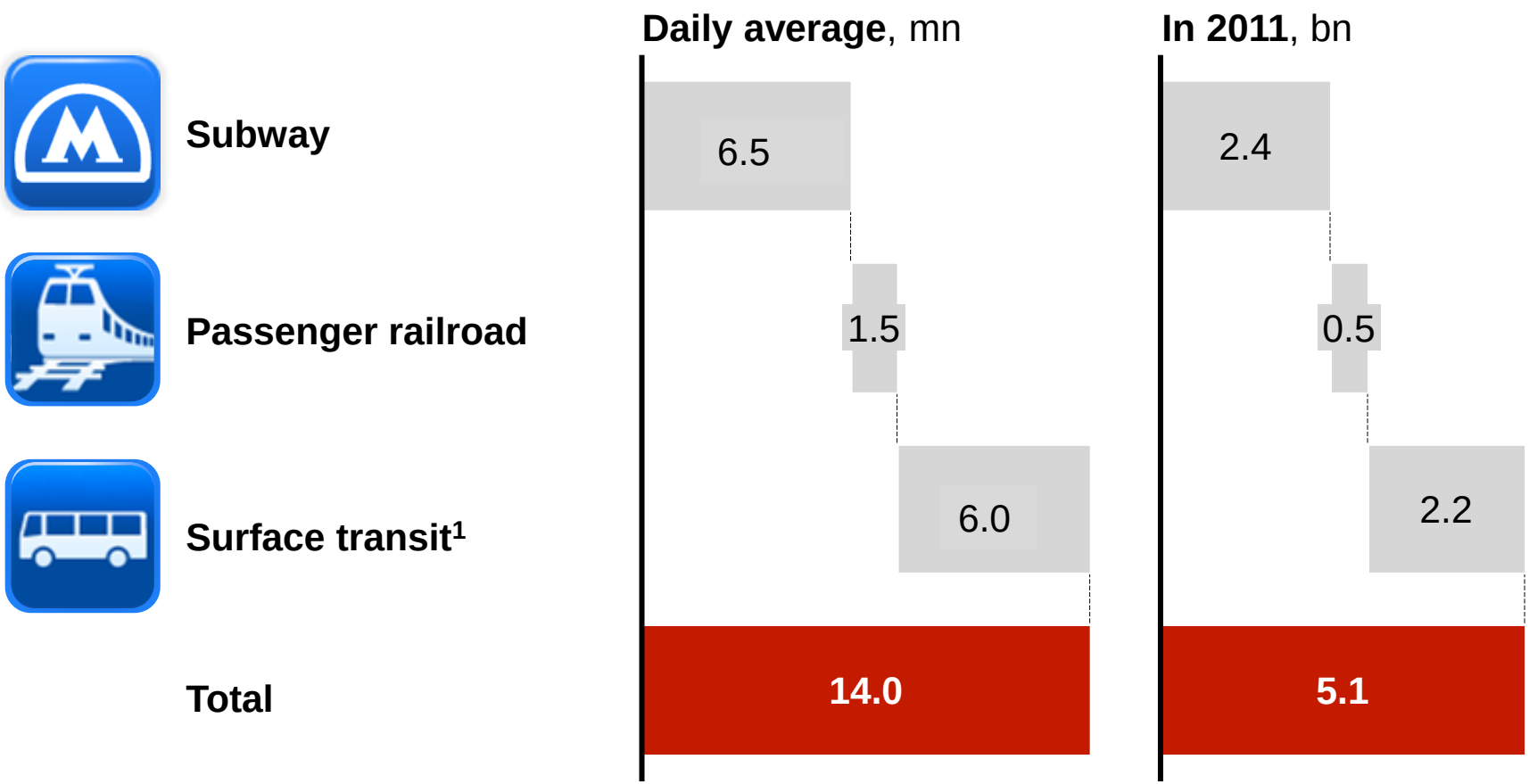
1 Without annexed areas

SOURCE: Rosstat, investment programs of the Moscow region "Development of the Transport and Logistics System in the Moscow Region for 2011-2015", "The Roads in the Moscow Region for 2012-2015"; Budget of the Moscow region for 2012; State program of the City of Moscow "Development of the Transport System for 2012-2016"

More than 14 million trips by public transport are made within MTH every day

Number of passengers carried in the MTH

People, mn, 2011



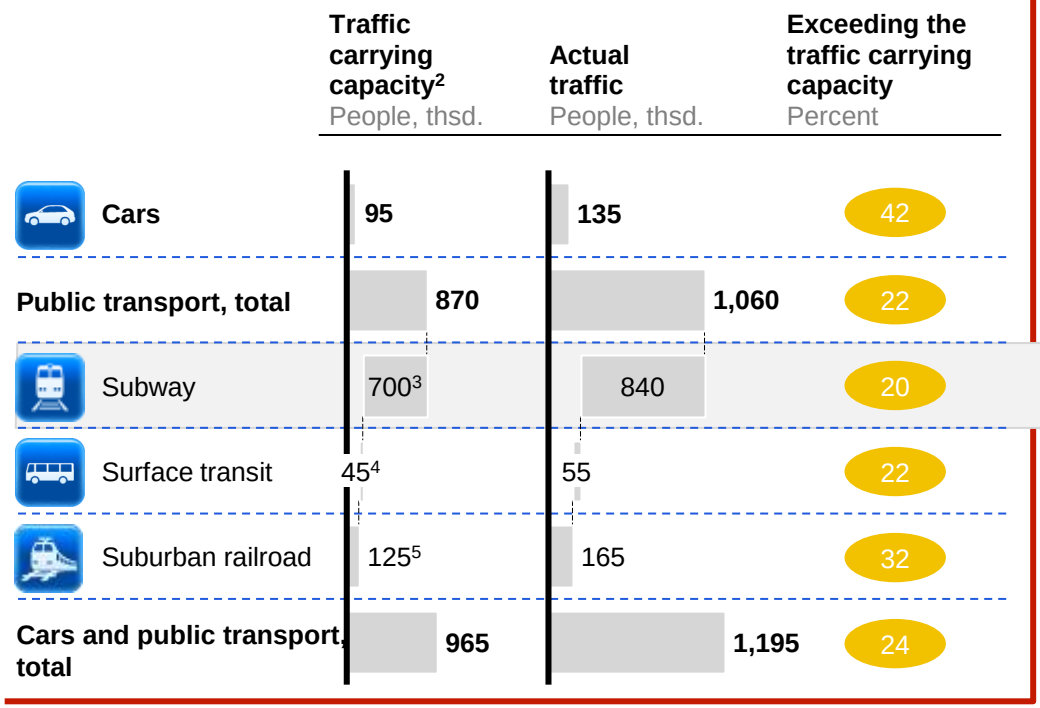
1 Buses, trolley-buses and tramways. Volumes of carriage by SUE "Mosgortrans" and commercial carriers in the City of Moscow (estimated)

SOURCE: Department of Transport and Road Infrastructure Development

Almost all types of Moscow transport are heavily overloaded during morning rush hour

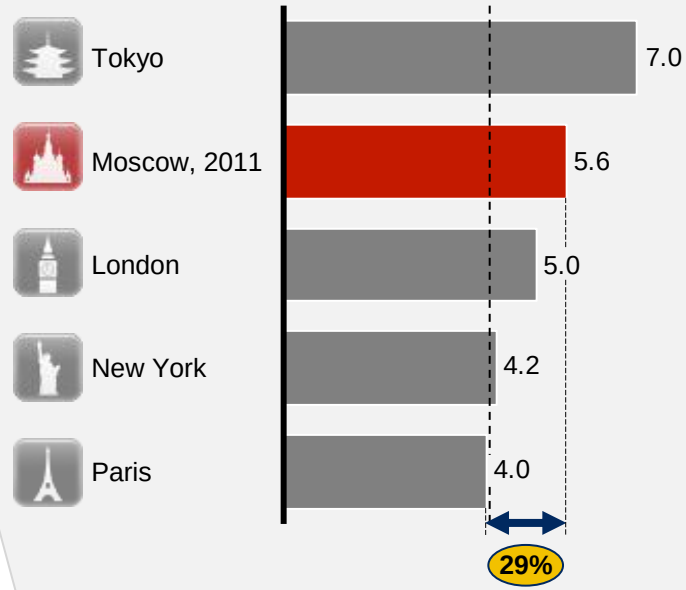
ESTIMATE

Actual traffic and traffic carrying capacity by type of transport in 2011 (when moving towards the city center, weekdays, 8-9 am[1])



Subway average load factor

People/m^2 during rush hour on most critical segments



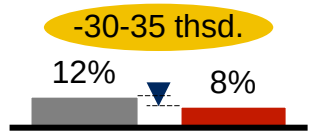
1 With entering the Third Transport Ring; 2 With current route network and time schedule; 3 On the basis of the standard: 4.5 passengers per 1 sq.m of carriage floor area; 4 On the basis of the standard passenger capacity of the relevant transport vehicles; 5 On the basis of the standard : ~1,200 passengers in the suburban electrical train; within current scheduling of the suburban trains

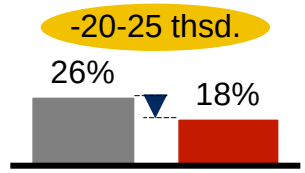
SOURCE: Yandex; Mosgortrans; Moscow subway; State Road Traffic Safety Inspection; Center of Traffic Management; field observations; transport strategies of cities; Department of Transport and Road Infrastructure Development

Moscow has set ambitious goals to improve the transport situation and reduce the average trip time during rush hour to 50 minutes by 2025

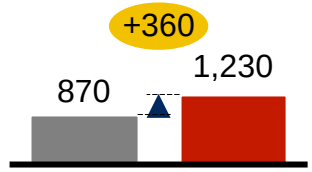
Sub-targets for all modes of transport

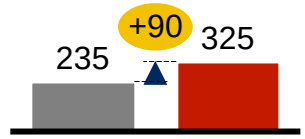
Decrease car usage
Thsd. cars,
% of all trips made during morning rush hour



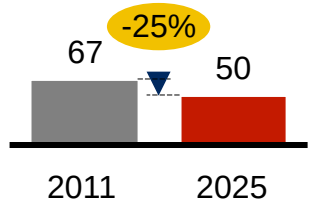


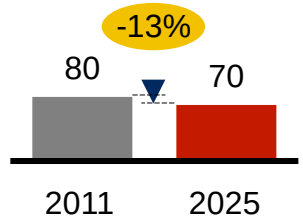
Increase capacity of public transport
Thsd. passengers during rush hour





Reduce travel time by public transport during rush hour
Min.



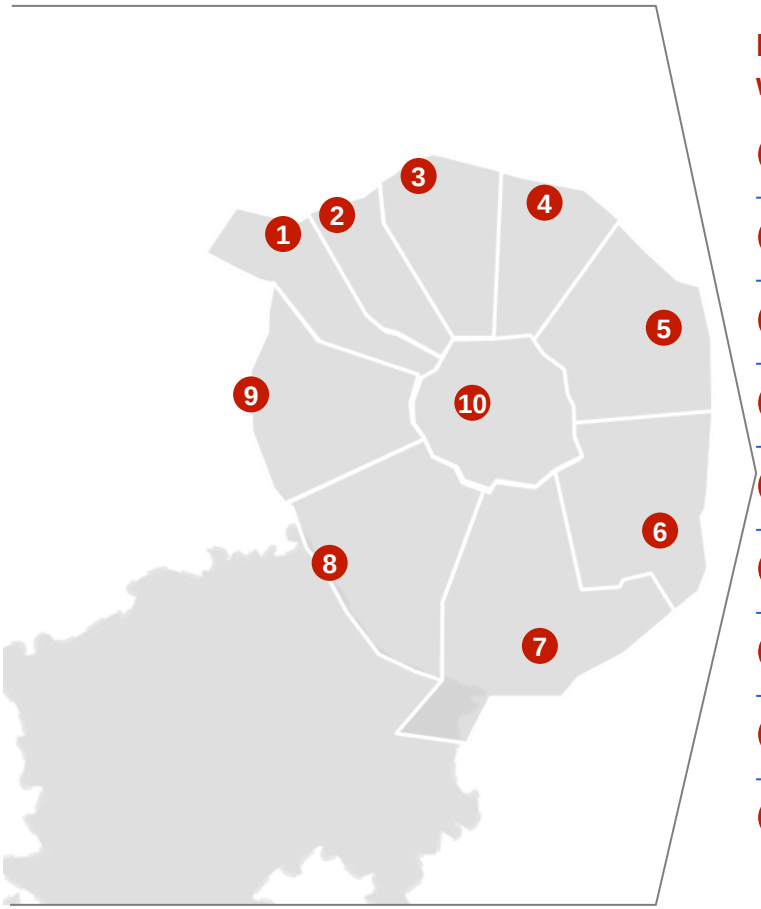


1 Calculated by the Department of Transport and Road Infrastructure Development of Moscow
2 By all types of transport, including personal automotive transport

SOURCE: Department of Transport and Road Infrastructure Development

The transport strategy was developed considering the situation in different geographic segments of the city

For detailed analysis, Moscow was divided into 10 geographic segments

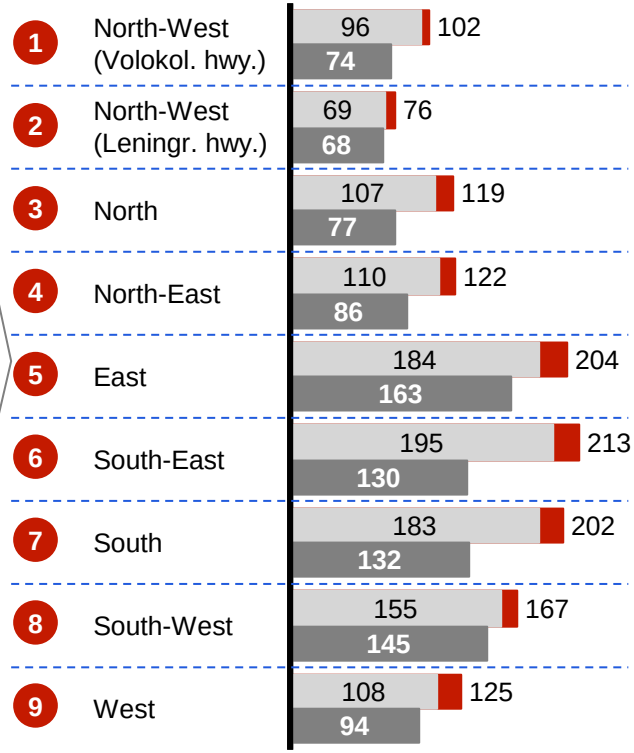


Passenger traffic into the city center from 8:00 to 9:00, 2011, People, thsd

Traffic carrying capacity into the city center from 8:00 to 9:00, 2011, People, thsd

Passenger traffic into the city center from 8:00 to 9:00, 2025, People, thsd

Expected passenger traffic during rush hour in 2025 was compared with current traffic capacity (by geographic segment)



Overload level of the transport system is extremely high and uneven by geographic segments

SOURCE: Moscow subway; Mosgortrans; the sensors of the Center of Traffic Management; Yandex; team analysis

The strategy comprises initiatives encouraging the use of public transport

Focus areas	Major initiatives
Subway	▪ 145 km of new lines, 67 new stations
Suburban rail	▪ 226 km of additional main lines
Surface transit	▪ Special lanes for buses and other public transport vehicles ▪ Optimization of the route network and management system
Tariffs and tickets	▪ Combination tickets for all modes of transport ▪ Expansion of the ticket sales network
Development of transport infrastructure	▪ Lines of the Light Rail Transport (LRT) and the Bus Rapid Transit (BRT) ▪ Transport interchange hubs and “park and ride” facilities
Taxi	▪ Legalization of taxi market and clear rules for how it works ▪ Short-distance traffic
Parking	▪ Paid parking in the city center (with special conditions for handicapped people, local residents, and property owners)
Freight logistics	▪ Limitations on freight transport traffic ▪ Optimization of logistics-hubs arrangements
Cycling, pedestrians, air and water transport	▪ Development of the cycling and pedestrian areas, as well as water and air transport
Intelligent transportation system (ITS) and traffic flow model	▪ Intelligent transportation system ▪ Traffic-flow model

SOURCE: Department of Transport and Road Infrastructure Development

Construction of additional subway lines will reduce the level of overload by 2020

New stations

Subway in 2020

2012

- 306 km of lines
- 185 stations
- 88% of all trips during rush hour
- 6.5 mln passengers daily

by 2020

- 450 km of lines (+47%)
- 252 stations (+36%)
- 92% of all trips during rush hour

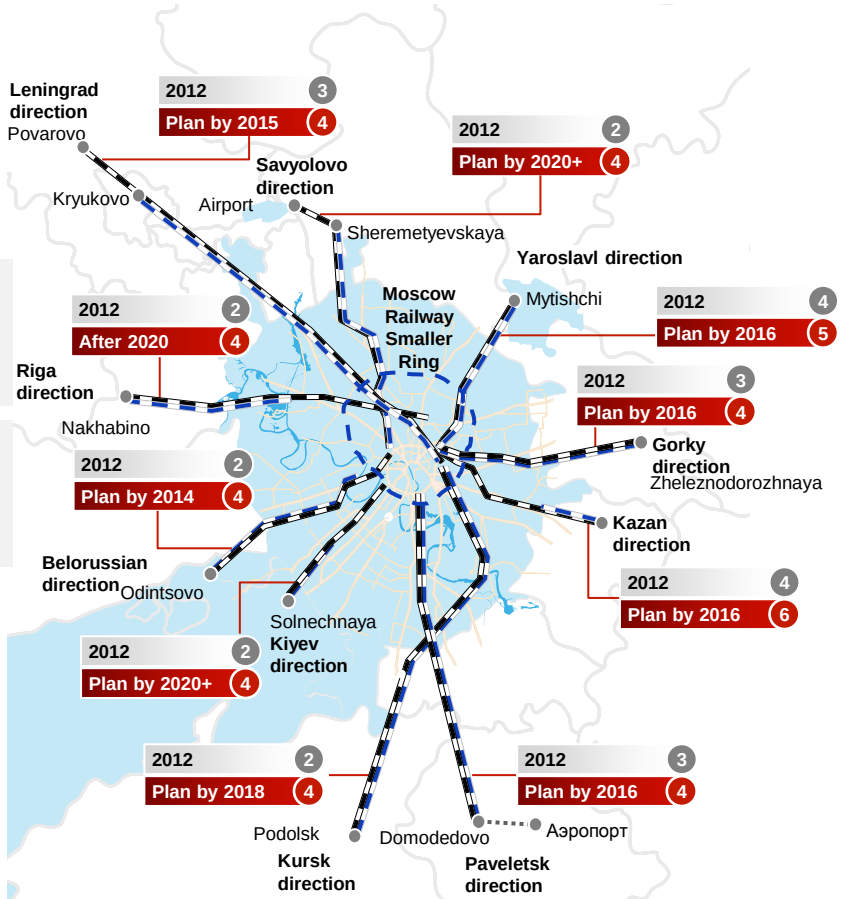
SOURCE: Department of Transport and Road Infrastructure Development

Development of suburban rail will lead to increased capacity, frequency and passenger flow

2012

532 million passengers per year (plan)

Average interval: 8 minutes



by 2020

846 million passengers per year **(+59%)**

Average interval: 3 minutes **(-62.5%)**

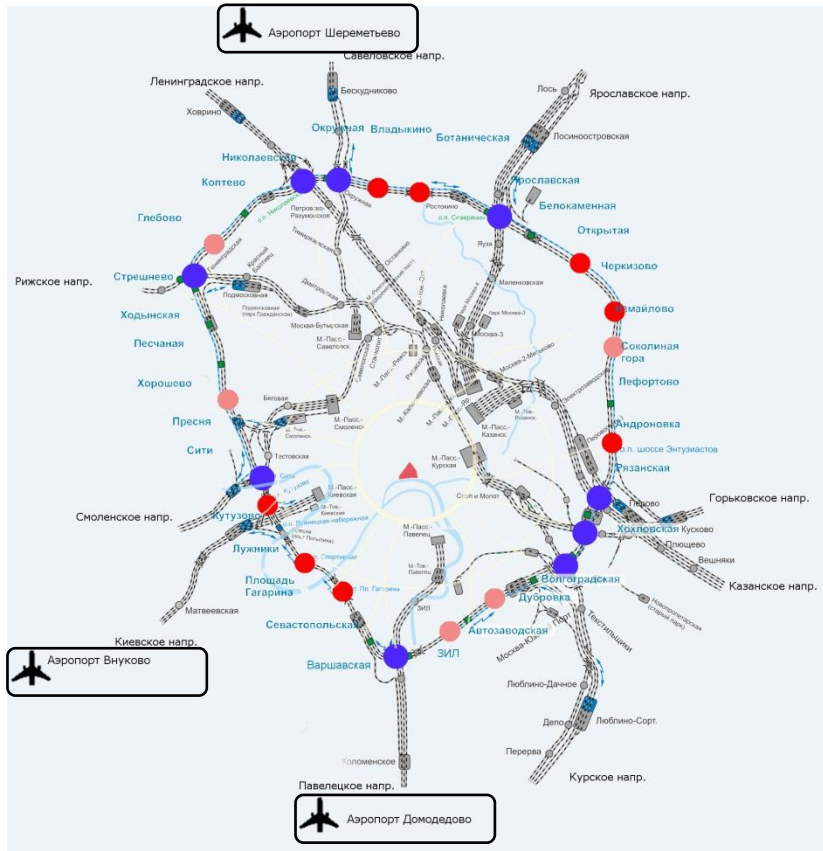
+226 km of additional main lines

SOURCE: Department of Transport and Road Infrastructure Development

Passenger traffic on the Moscow Ring Railway will total 285 million passengers per year

2012

- No passenger traffic
- 54 km of lines are not electrified
- Industrial area that is not developed

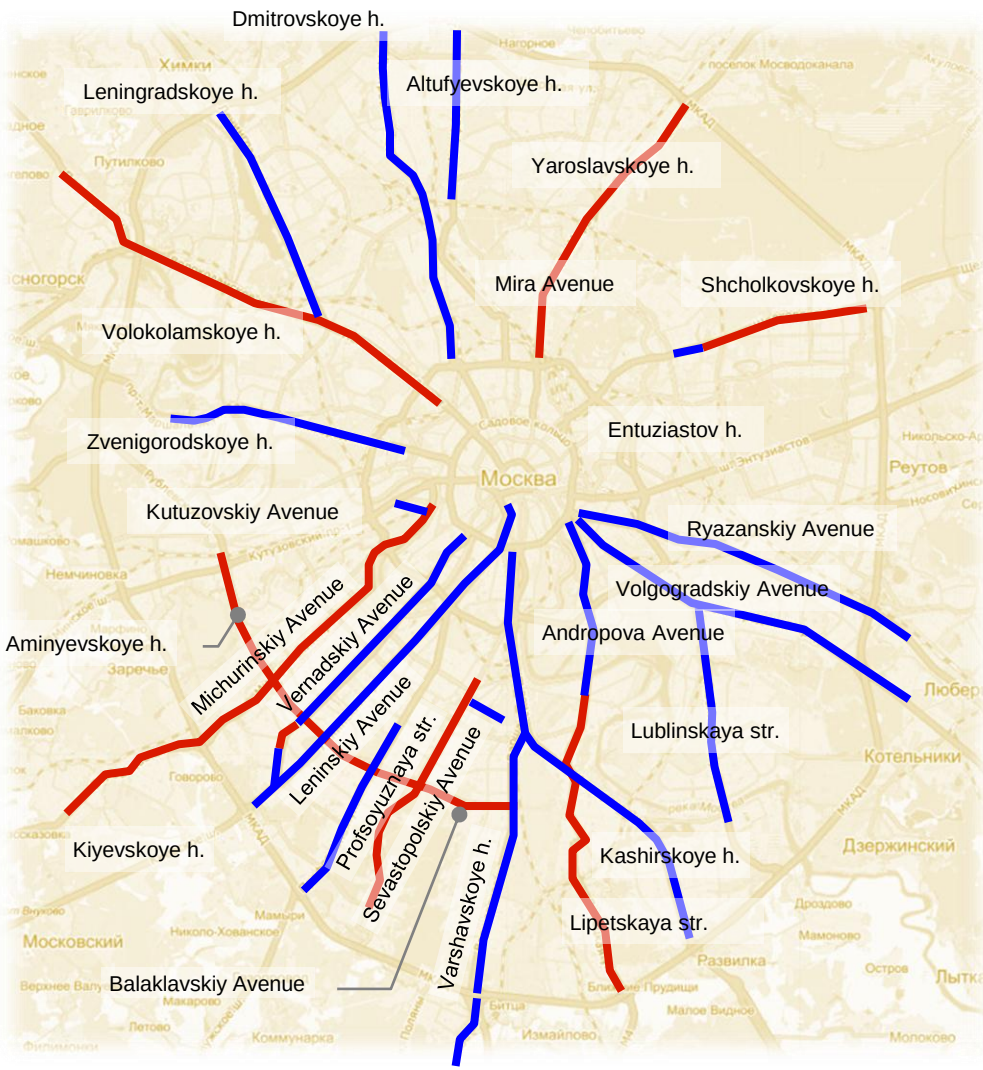


by 2020

- 285 million passengers per year
- Possibility to establish transportation between airports
- Full integration with subway and suburban railroad infrastructure

SOURCE: Research and Design Institute of the General Plan of Moscow; feasibility study of the Moscow Ring Railway; Moscow subway

Reserving additional lanes for public transport along major routes will increase the average speed of surface transit



Existing lanes
Planned lanes

Impact

- + 20% in speed
- + 15% in passengers
- Schedule based on even cycles (interval during rush hour 40 sec. to 3 min.)
- Increased safety and availability

SOURCE: Department of Transport and Road Infrastructure Development

New public transport operator contracting model is focused on improving service quality and reducing travel time

Approved management principles

- The city pays operators for their **fixed transportation service per route**
- **Unified standards**
  - Service quality
  - Bus fleet
  - Tickets and tariff plans for the entire surface public transport system
- **Regulation of tariffs** for all operators
- **Responsibility for carriage of reduced-fare passengers** on all routes
- Agreement with an operator is made for **5 to 7 years**

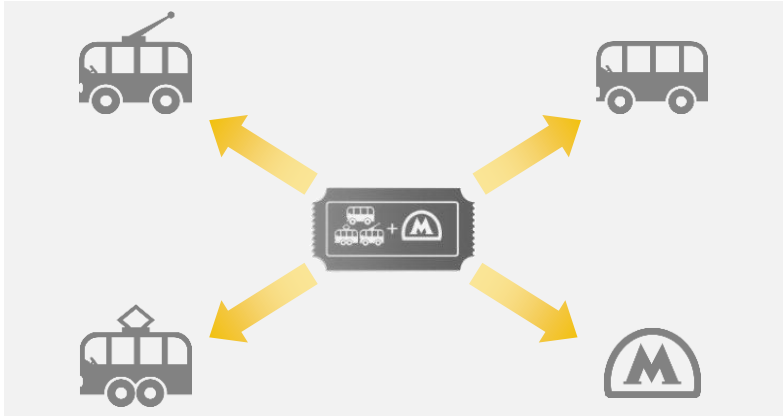
Expected impact

- **Increased traffic frequency of surface transit up to**
  ~3 minutes during rush hour
- **Improved usability:**
  - Unification of service standards
  - Unification of ticket and tariff systems
- **Reduced load on street-road network**
  via standardized large-capacity bus fleet
- **Private operators share** of the route network: 40%

SOURCE: Department of Transport and Road Infrastructure Development

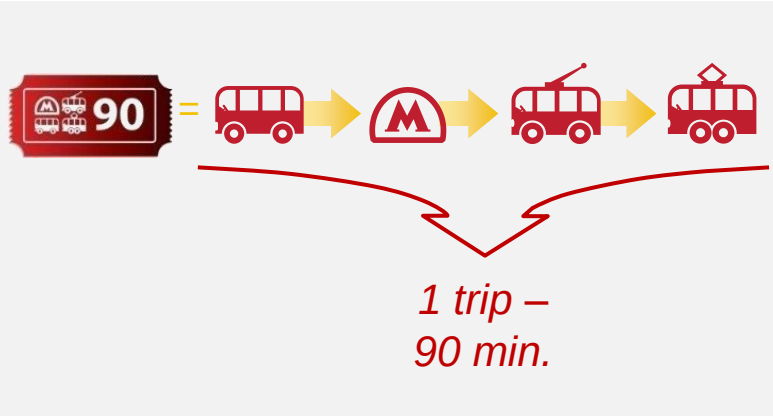
Implementation of intermodal tickets will improve convenience and reduce lost time for passengers

Universal ticket



- 1 validation = 1 trip on 1 mode of transport
- Valid for all modes of transport
- Equal price on all modes of transport

Combined ticket



- 1 validation = entire route with transfers
- Unlimited number of transfers between all modes of transport for 90 minutes (1 trip by subway only)

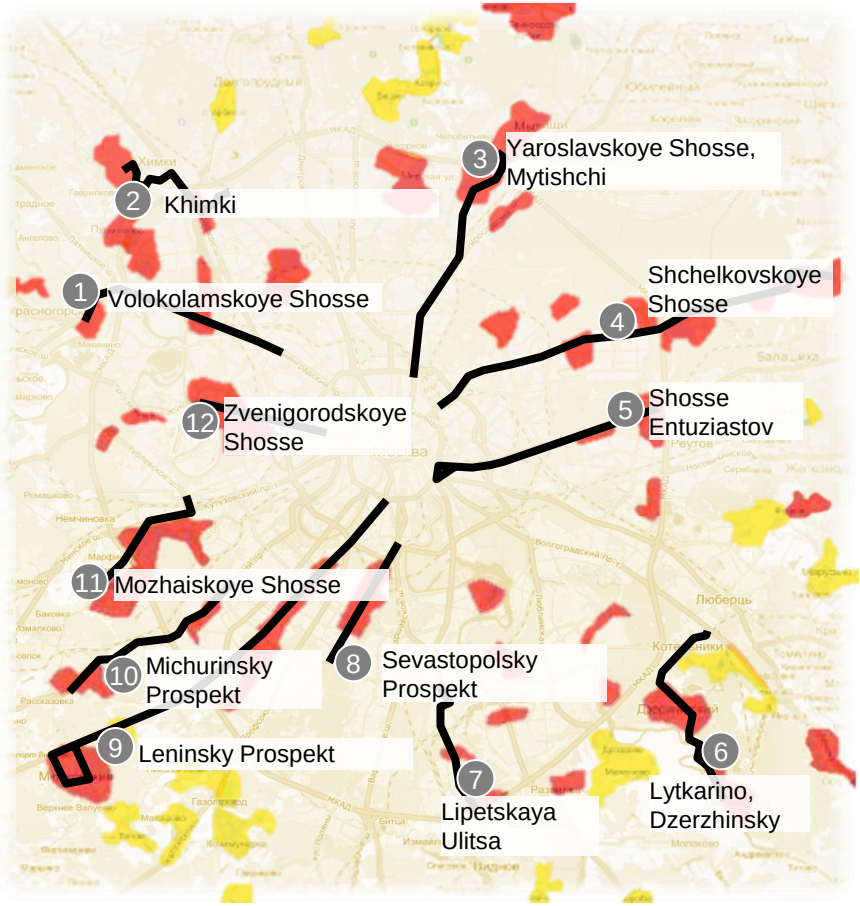
SOURCE: Department of Transport and Road Infrastructure Development

Creation of LRT and BRT routes will offer rapid transit service to residents without access to subway

Map of prospective LRT and BRT routes

Areas with poor public transport accessibility and population of over 500 people

Areas with poor public transport accessibility and population of less than 500 people



Impact

- Additional carrying capacity of up to 15,000 people per hour, per route
- Schedule based on even cycles (interval during rush hour 40 sec. to 2 min.)
- Public transport for residents with no access to metro

SOURCE: Department of Transport and Road Infrastructure Development

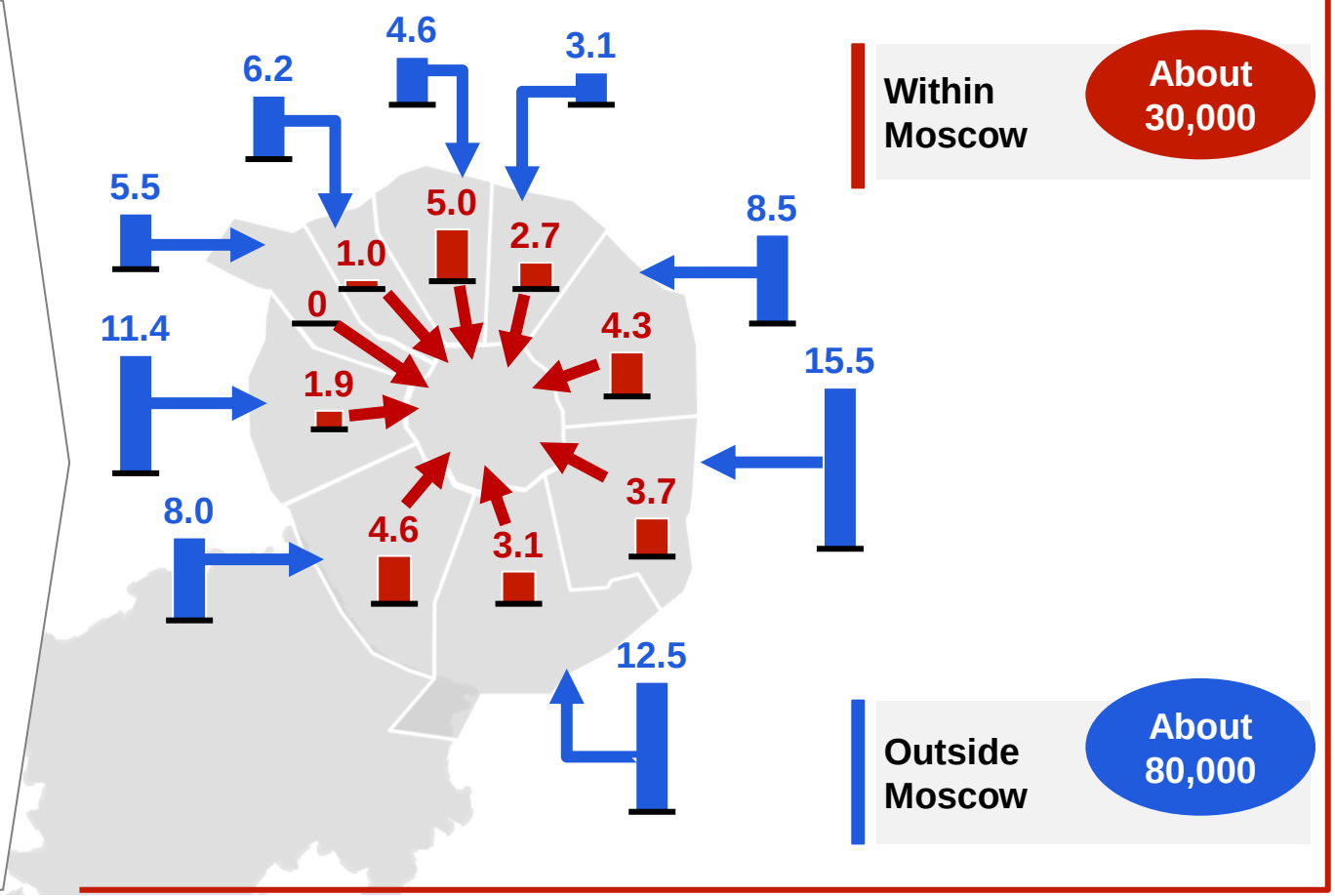
Park and ride facilities are required for 80,000 cars outside Moscow Ring Road and 30,000 cars within Moscow

Targets for reducing car use

Within Moscow
- Reduce number of car trips by 33% during peak hours

Outside Moscow
- Reduce number of car trips by 31% during peak hours

Required additional parking slots at park and ride facilities, thousands



SOURCE: Department of Transport and Road Infrastructure Development

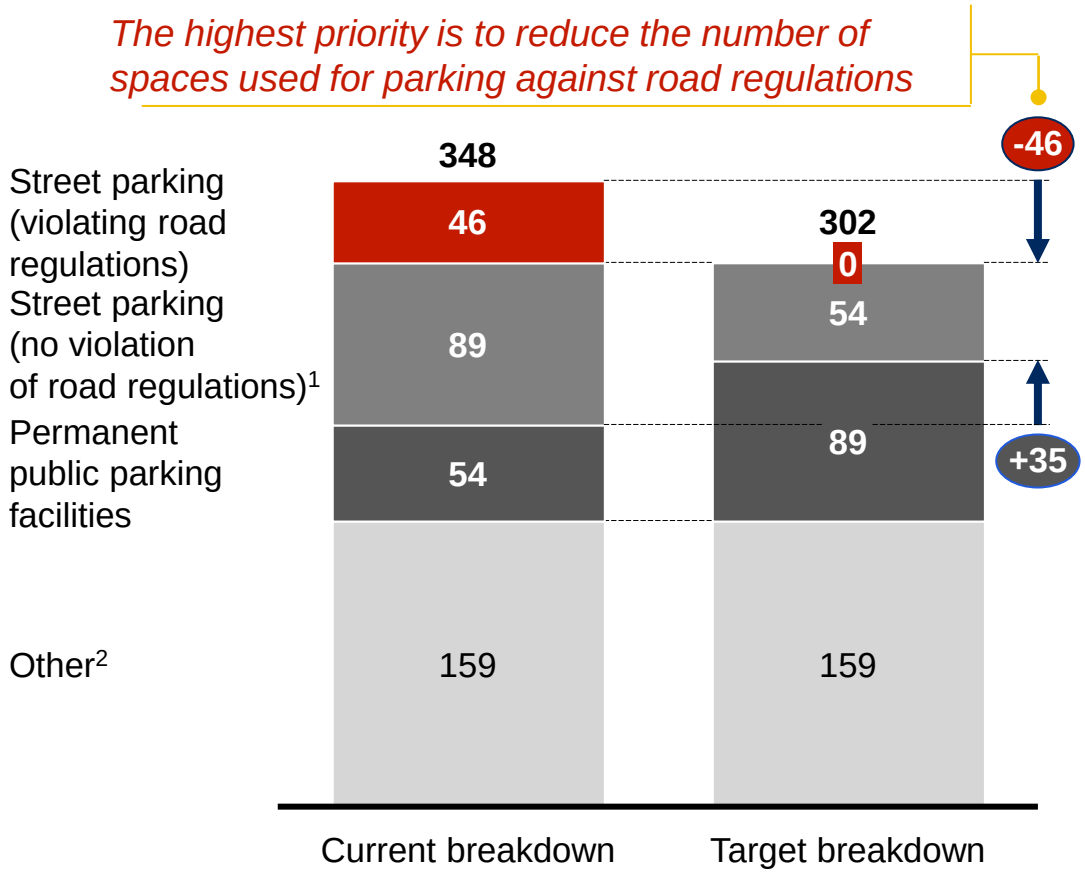
Developing legal taxi servicse will allow for reduced waiting times, more comfortable and safer trips

	Current situation	Target model
Market supply	▪ Share of the illegal segment - **about 50%** ▪ **20,000** legal taxi cabs	▪ Total taxi **fleet** of **50,000-55,000** cars ▪ Share of the **illegal** segment – **about 0%** ▪ **Two types of taxis** (standard and premium class) with different approaches to regulation
Taxi cars and drivers	▪ No car quality or trim-level standards ▪ Low requirements for drivers to obtain a license	▪ Standard taxi: minimum required **technical specifications and appearance** ▪ Premium class – more expensive and comfortable cars than in the standard class ▪ **Requirements** for **taxi drivers** based on taxi class
Trip tariffs	▪ Fare for taxi cabs hailed on the street determined on the spot ▪ Focus of legal taxi service on long-distance trips	▪ **Tariff regulation for standard-class taxi service**, focus on availability of short-distance trips ▪ **Deregulated tariff for premium-class taxi service**
Other elements	▪ No responsibility for passengers	▪ **Compulsory insurance** covering passengers, drivers, and cars ▪ Special taxi **stands**

SOURCE: Department of Transport and Road Infrastructure Development

Introduction of paid parking facilities and reduction in the use of illegal parking space will increase road capacity

Parking space breakdown in the city center (Central Administrative District), thousand parking spaces



Comments

- Reduction in the total number of **parking spaces** in the Central Administrative District by **approximately 46,000** by eliminating street parking that violates road regulations
- Introduction of a pilot for **paid parking** in November 2012
- **Privileges** for people with limited mobility, local residents, and property owners

1 In 2011 fully free-of-charge, by 2016 – paid parking
2 Yards, houses, cooperatives, garages, guest houses

SOURCE: GUP DGS; Department of Housing and Utilities Infrastructure; Prefecture of the Central Administrative District; Department of Transport and Road Infrastructure Development

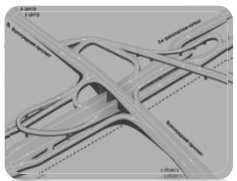
Deployment of an Intelligent Transportation System will help increase of average speed and decrease the accident rate

Item	Purpose	Number of items by the end of 2013
 **Traffic flow sensors**	Monitor traffic flow indicators in the streets and roads on a real-time basis	6,700
 **Information displays**	Inform road users of the actual traffic situation while they are underway	300
 **Adaptive traffic lights**	Create control stations for adaptive and coordinated control over traffic lights aimed at increasing street and road network capacity	1,700
 **Road violation-recording facilities**	Maintain control of vehicular traffic and impose administrative fines on drivers	800[1]

1 Number of control points

SOURCE: Department of Transport and Road Infrastructure Development

A traffic flow model will enable informed decisions on transport infrastructure development

Possible applications of the model	Examples of decisions made
 Assessment of transport policy measures' efficiency	▪ **Traffic management** based on a mathematical model ▪ Estimating the efficiency of the efforts to create **dedicated** public transport **lines** ▪ Minimization of transport losses caused by **restricted traffic** due to construction and repair work
 Assessment of transport-related CAPEX projects	▪ **Prioritization of investment in transport infrastructure development** – Roads and bridges – Subway and surface transit lines – Park and ride facilities
 Alignment of city and transport infrastructure development plans	▪ **Forecast of the following activities' impact on the transport infrastructure** – Development of residential areas – Construction of industrial and office facilities
 Control over transport policy effectiveness	▪ **Monitoring** of the implemented measures' **efficiency** ▪ **Forecast** of traffic situation in the city

SOURCE: Department of Transport and Road Infrastructure Development