



Moscow City Government
Department for Environmental Management
and Protection

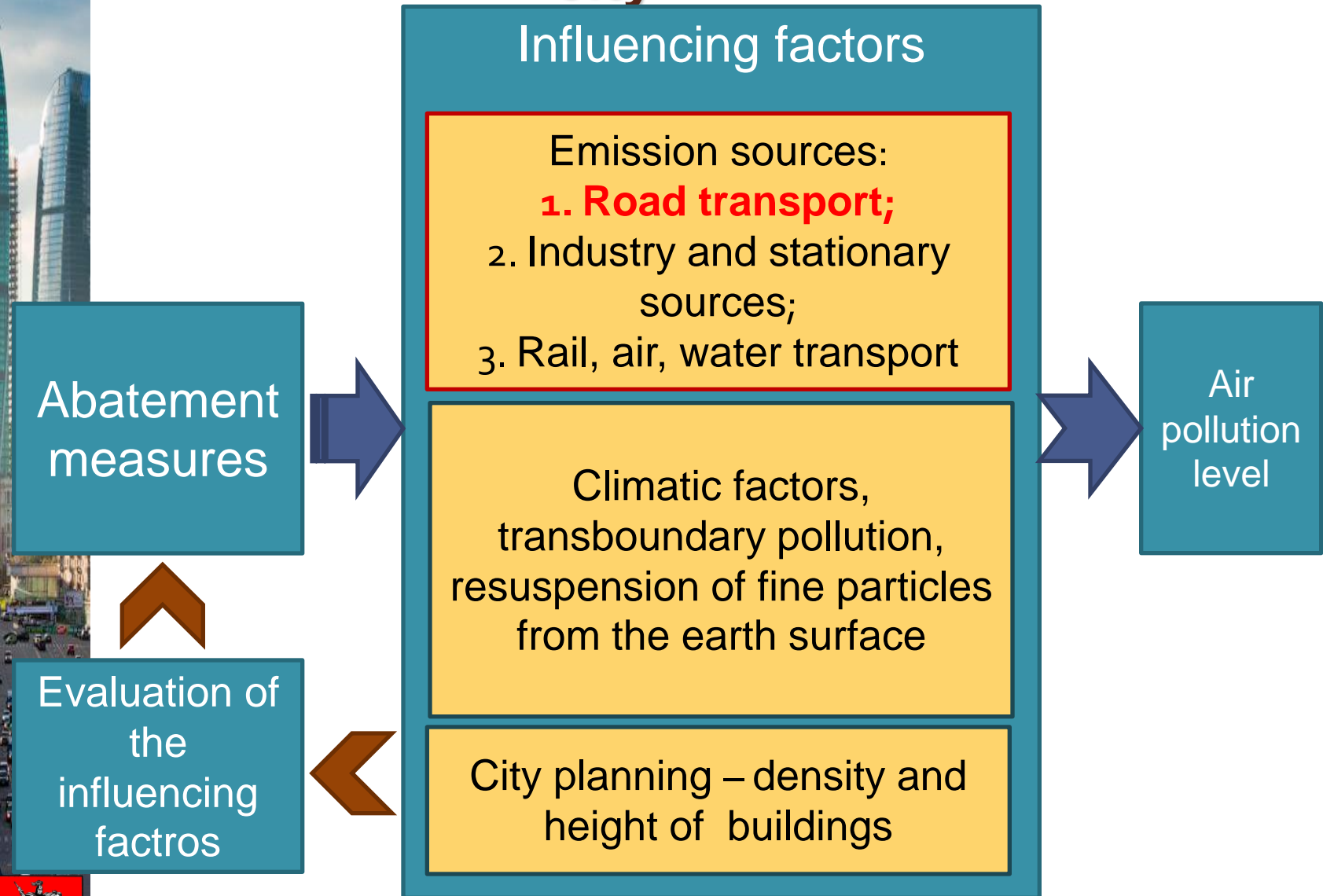


Ambient air pollution abatement strategy in Moscow

State Environmental Protection
Institution "Mosecomonitoring"

Better cities for better life 2013, 12-13 May 2014

Factors influencing ambient air quality in a city



Reorganization of industrial zones into the public spaces

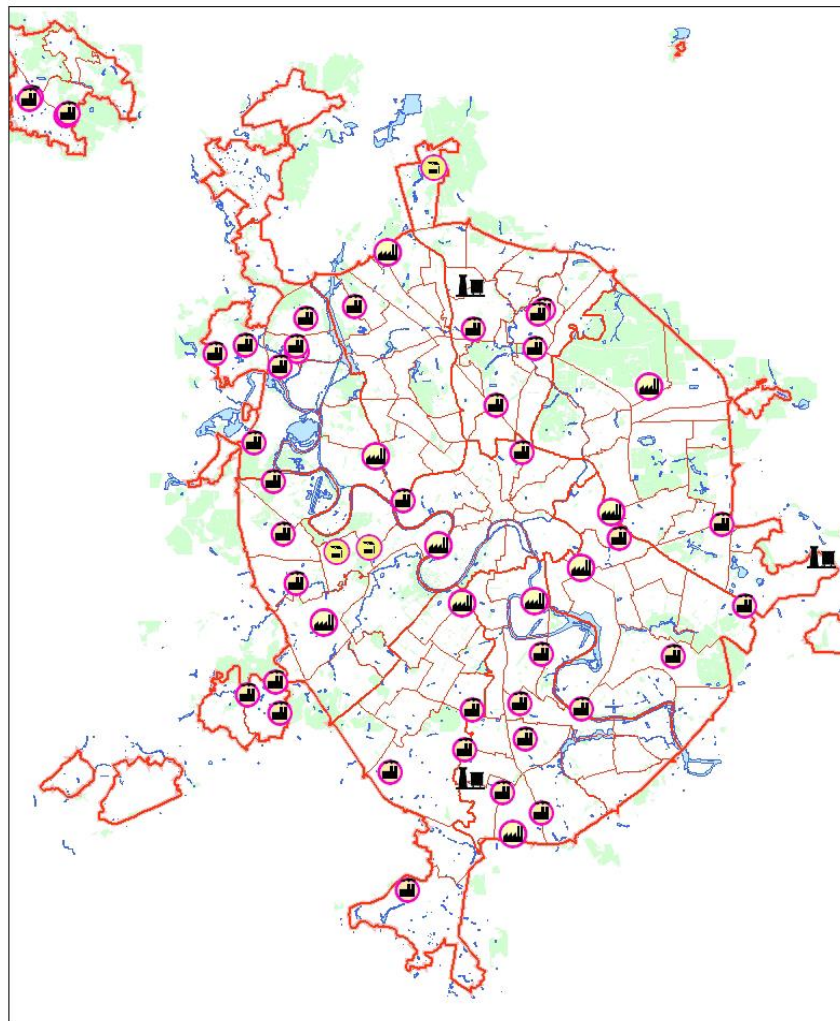


Moscow, prior to 2004.
Garages on the territory of the
“Red October” Factory

Moscow , 2010
[Strelka Institute for Media, Architecture and Design](#)
_Public space

Industrial zones take up about 20% of the city territory. During reorganization about 30% of these areas will be given to green plantations

Tailpipe emission monitoring system



Условные обозначения

- ТЭЦ
- РТС
- КТС

- Завод по термическому
обезвреживанию отходов
и мусороперерабатывающий комплекс
- Табачная фабрика



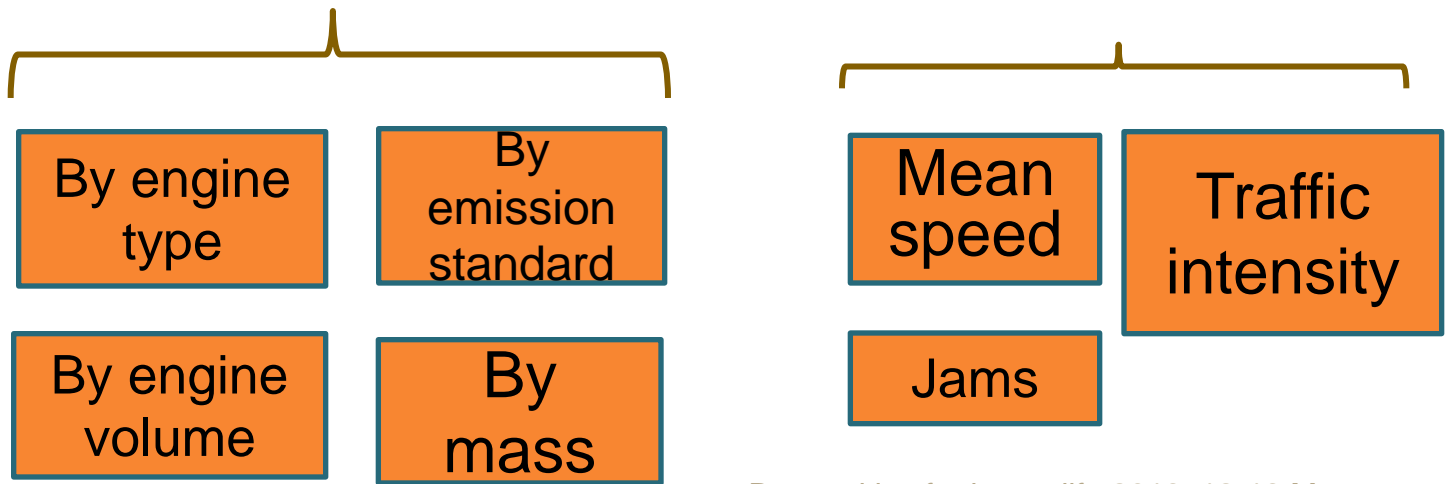
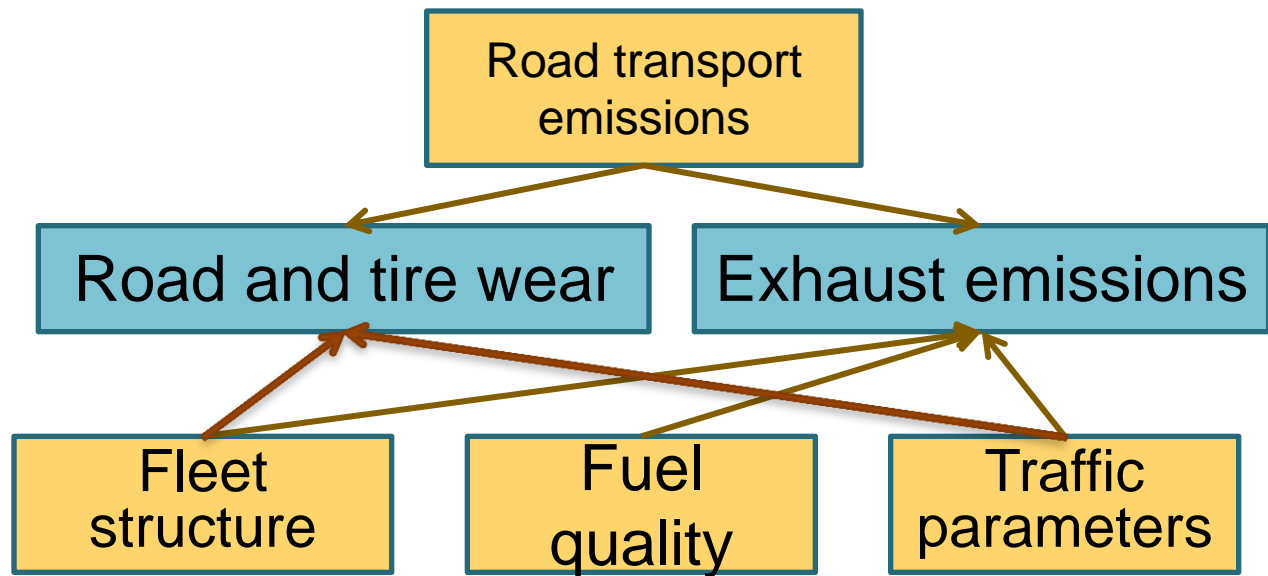
58 industrial
enterprises

175 emission sources

213 monitoring
systems



Evaluation of road transport emissions



Air quality monitoring network

Mobile air quality monitoring stations (“mixed” areas - residential areas near industrial sources and minor motorways)



Moscow oil refinery AQMS

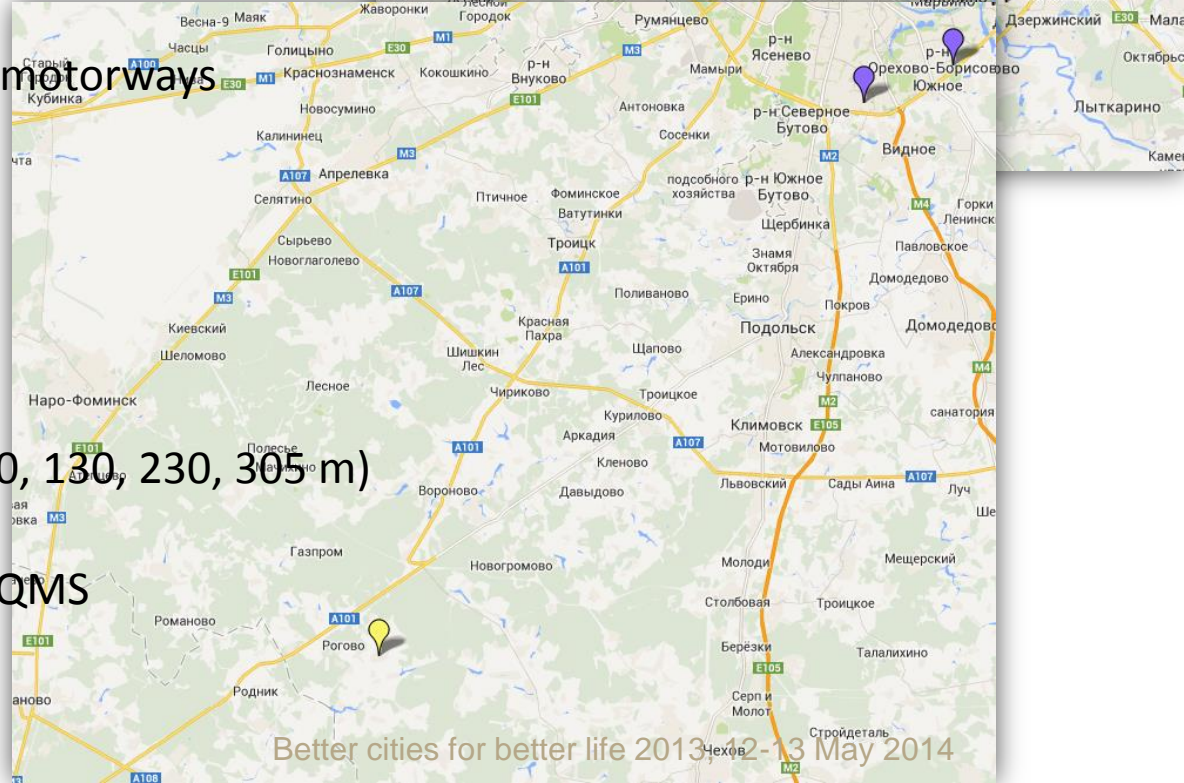
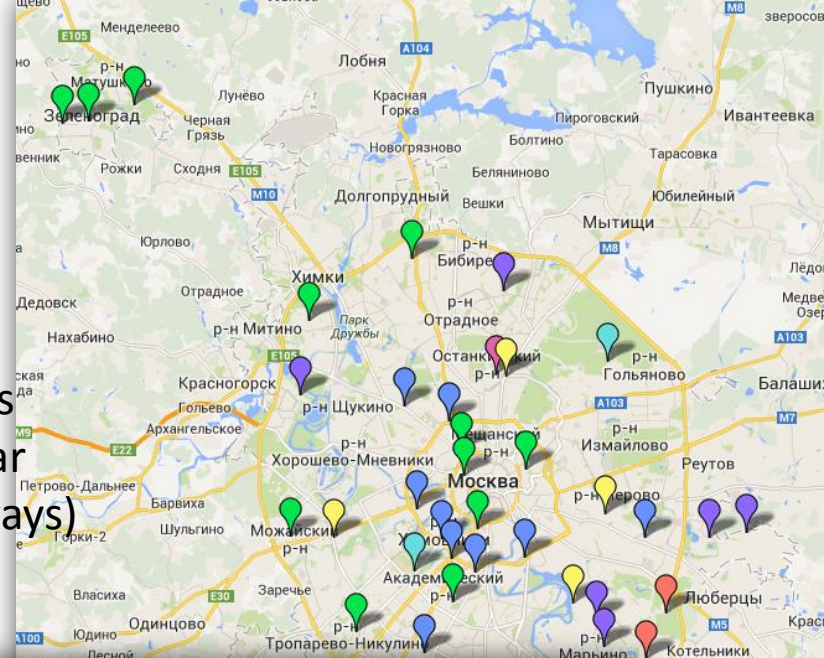
AQMS near major motorways

Residential AQMS

“Mixed” AQMS

Multilevel AQMS (0, 130, 230, 305 m)

City background AQMS (natural areas)



Moscow transportation system: issues

296,8
(345,8*)
vehicles/1000
persons

Motorization rate, with population density 100,3 persons/Ga and road density 3,95 km/km² (motorization is 2 times lower than in European cities, with road density 2-4 times lower)

350-450 km

Road length shortage



Growth of
mean trip
distances



Emissions
growth for up
to 30% **

60%

Portion of overloaded
roads in total road length,
with mean vehicle speed
in the city of 15-20 km/h



"start-stop"
traffic



Growth of
mileage
emissions by
up to 2 times

74%

Portion of public transport
in total transportation
volume



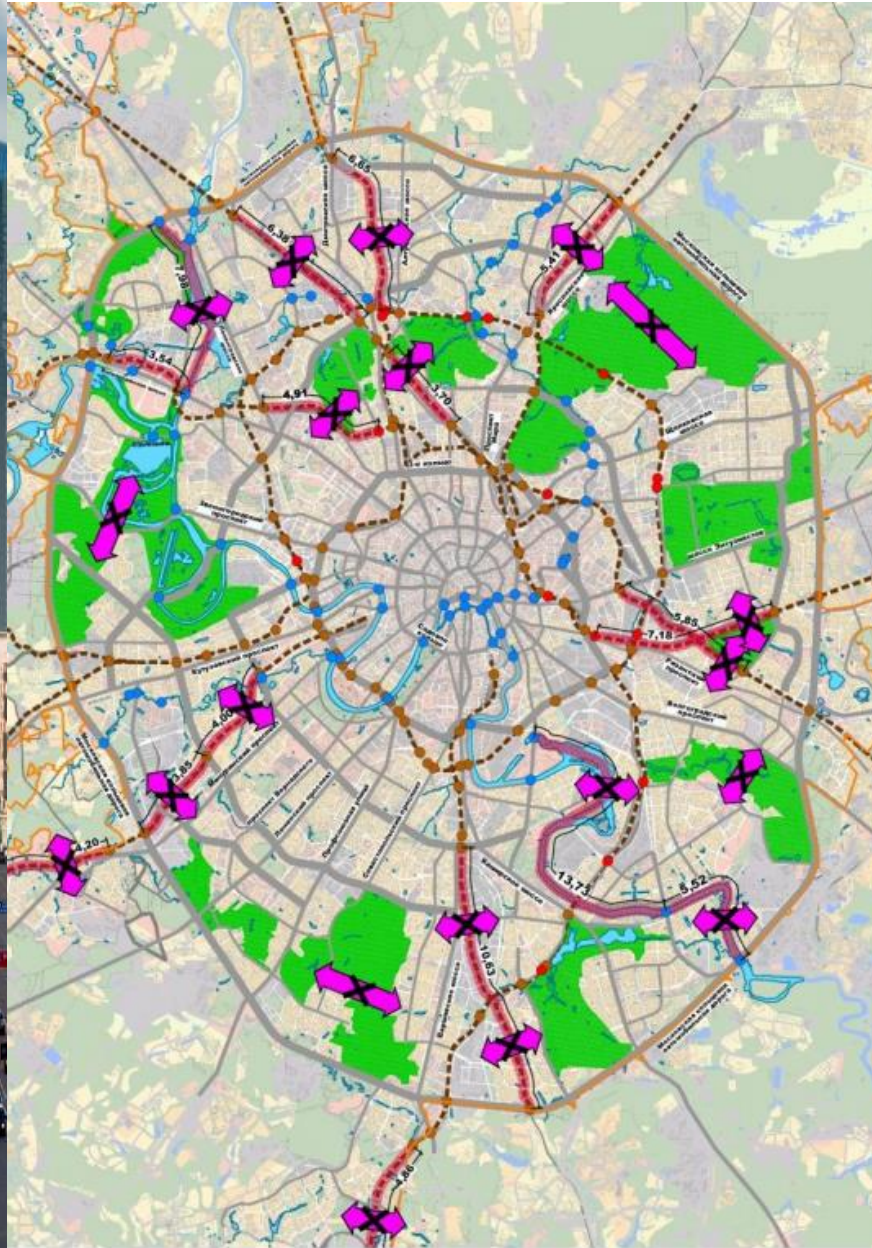
Extensive development of
public transport is needed
to take on more passengers

Transport system in Moscow in 2011 was limiting further development of the city

* All registered cars including heavy duty and buses. ** Based on trip distance



Bad transport connections in Moscow



- City territory is divided by the railways, rivers and city forests:
- maximum distance between railway underpasses is 10,6 km, minimum – 0,8 km;
- maximum distance between bridges – 13,7 km, minimum - 0,7 km);
- Lack of correspondence between Moscow city and Moscow region transport systems (lack of 23 road lanes)

Existing under and overpasses:

● Properly sized

● Outsized

● Existing bridges

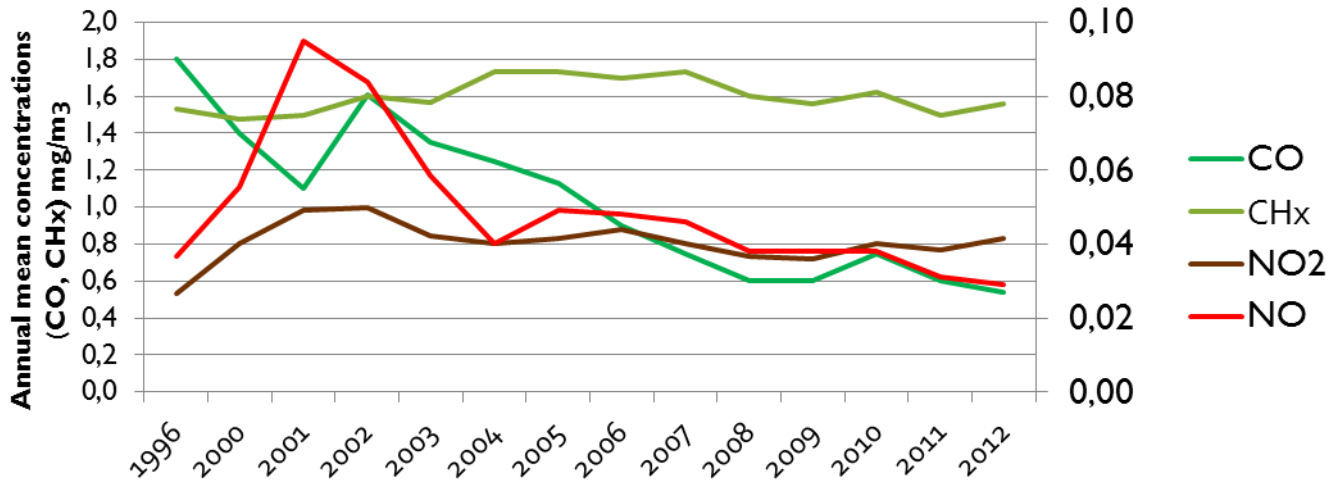
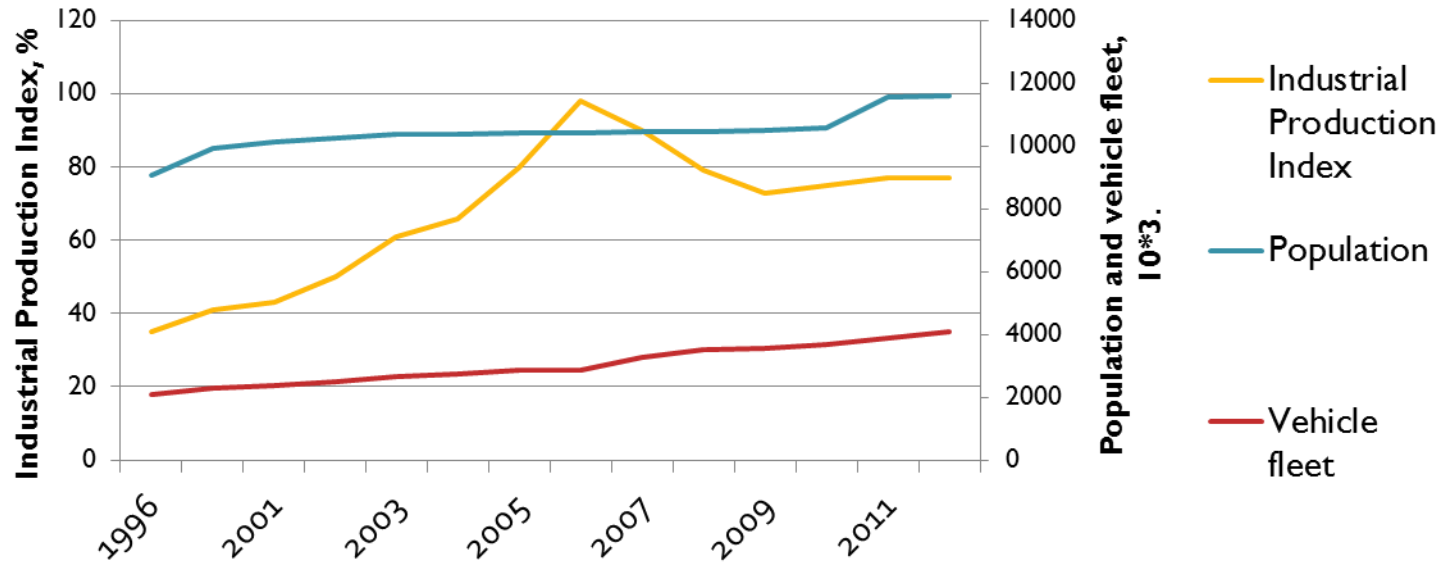
13,67 ----- Distances between passes

◇ No connection between areas





Ambient air pollution in Moscow

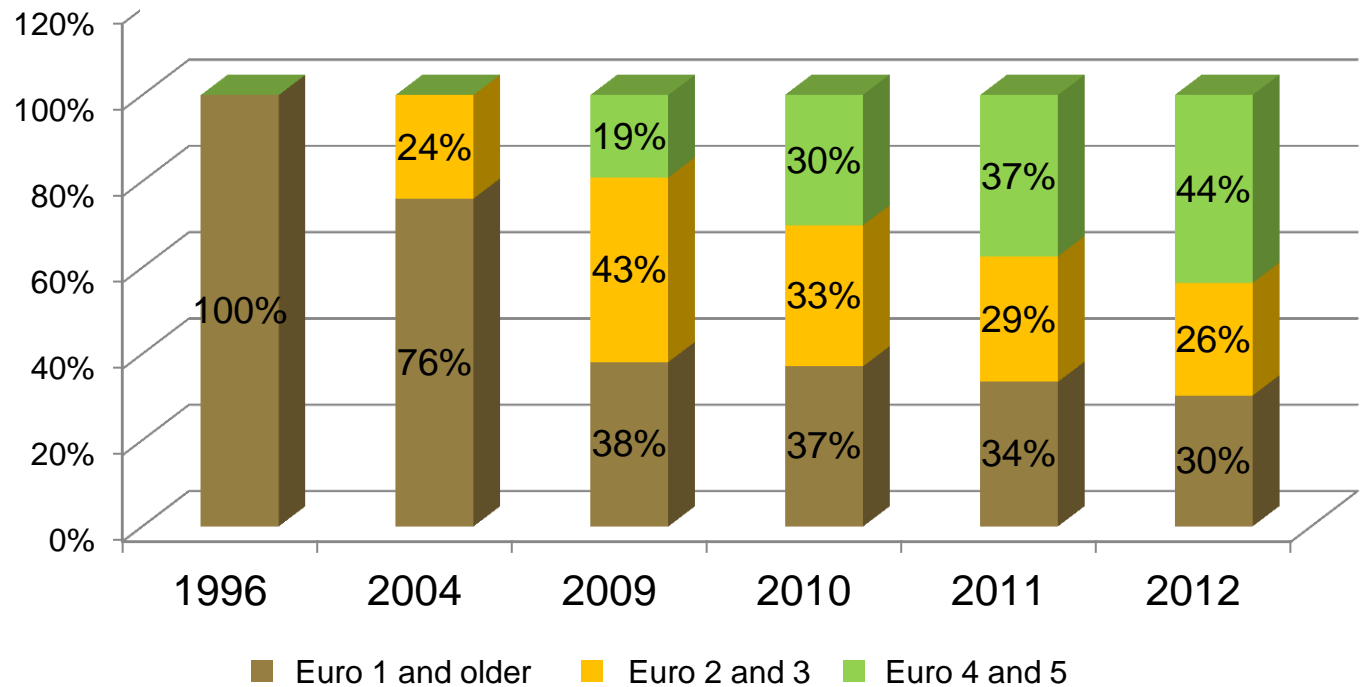


Air pollution near roads is up to 3 times higher than in residential areas far from major roads.





Emission characteristics of PC fleet in Moscow



In traffic conditions of 2012 if PC fleet in Moscow consisted of the same vehicles as it did in 2004 emissions would have been by 45% higher.

Measures to reduce transport emissions in Moscow (introduced prior to 2011)

Measure	Emissions reduction
City fuel quality standards (since 2006 – Euro 3; since 2013- Euro 4), fuel quality control	11 % ; 3,5%
Ban on entry to the city center of LDV&HDV which do not meet Euro 2 (since 2008)	8 000 tons/year
Replacement of HDV used in city communal and building sectors with vehicles meeting Euro 2 and higher requirements – since 2009 (for public transport – Euro 3 and higher)	9000 tons/year 3 000 tons/year
Since 2006 only buses meeting Euro 2 and higher requirements are allowed to operate on newly opened city routes, since 2008 – only those meeting Euro 3 and higher requirements	2,3-3,4 g/km (28-32%)
Public transport using compressed natural gas – 270 in 2013	Euro-4,5 vehicles
Experiment to stimulate use of small-capacity cars (2008 - 2011)	4 000 tons/year
Special lanes for public transport (2010-2011)	Effect in future



Currently implemented measures to reduce transport emissions in Moscow*

Direction	Implemented measures
Measures to decrease number of vehicles on roads	Improvement of public transport, restriction of HDV use during daytime, paid parking in the city centre
Measures to improve fuel quality	Higher fuel quality requirements (since 1 January 2013 – Euro 4); development of infrastructure to use natural gas, public transport on natural gas
Measures to improve environmental characteristics of automobile transport	Emission standards (implemented by Federal government); restriction of HDV use by environmental characteristics; incentives for electric cars (free parking in the city centre, development of electric charging infrastructure)
Better city planning	New road junctions, bridges, rail crossings, better planning of new districts to minimize travel demand etc.



Transportation impact reduction

Special bus lanes



New public transport Euro 4 - 5



Low emission zones



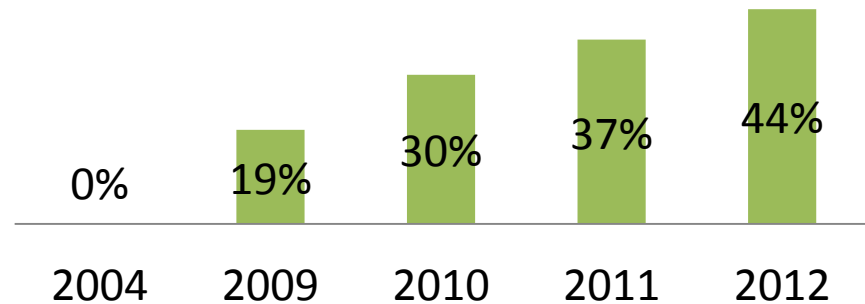
Improvement of fuel quality/
alternative fuels



Euro 4-Euro 5
CNG

Fleet turnover

Euro 4 and Euro 5 portion in
Moscow passenger car fleet

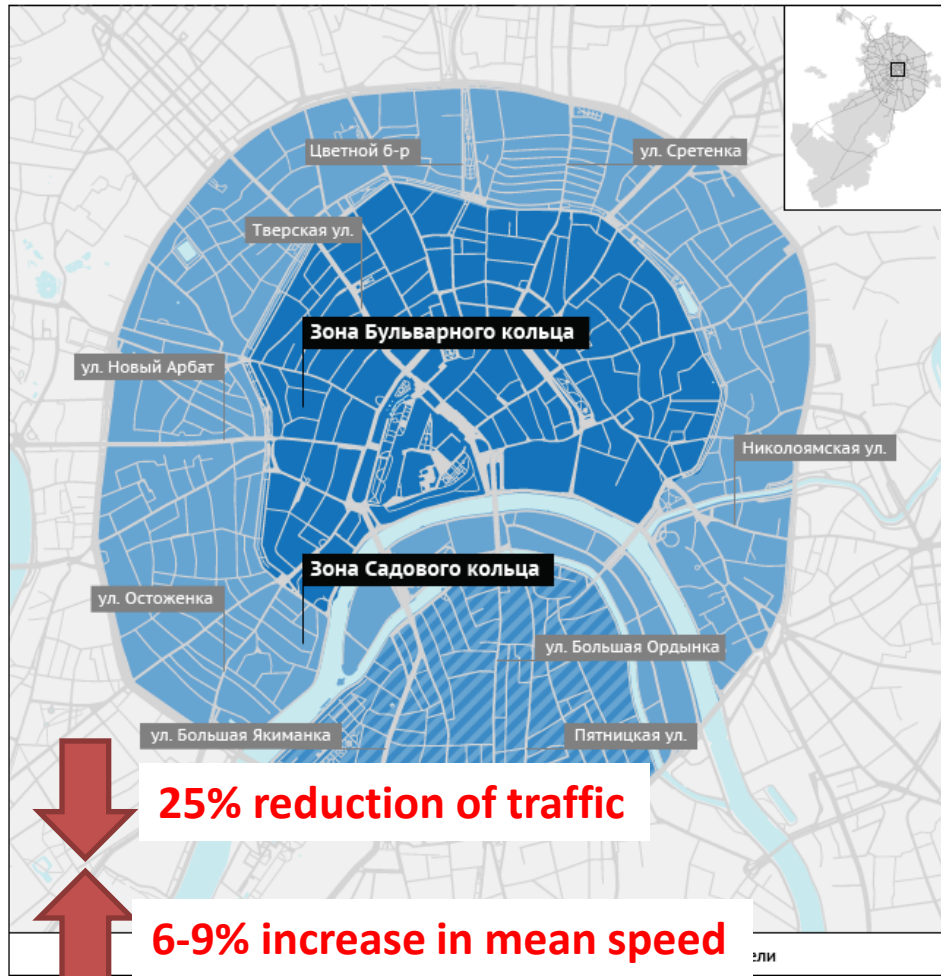


Electric public transport

Paid parking in the city center



P	Зона Бульварного кольца	
	1 час (руб.)*	80
	Абонементы	
	1 месяц (руб.)	16 000
	1 год (руб.)	160 000
P	Зона Садового кольца	
	1 час (руб.)**	60
	Абонементы	
	1 месяц (руб.)	12 000
	1 год (руб.)	120 000



РИА НОВОСТИ

Free parking for electric vehicles – economy up to 3,200 Euro/year

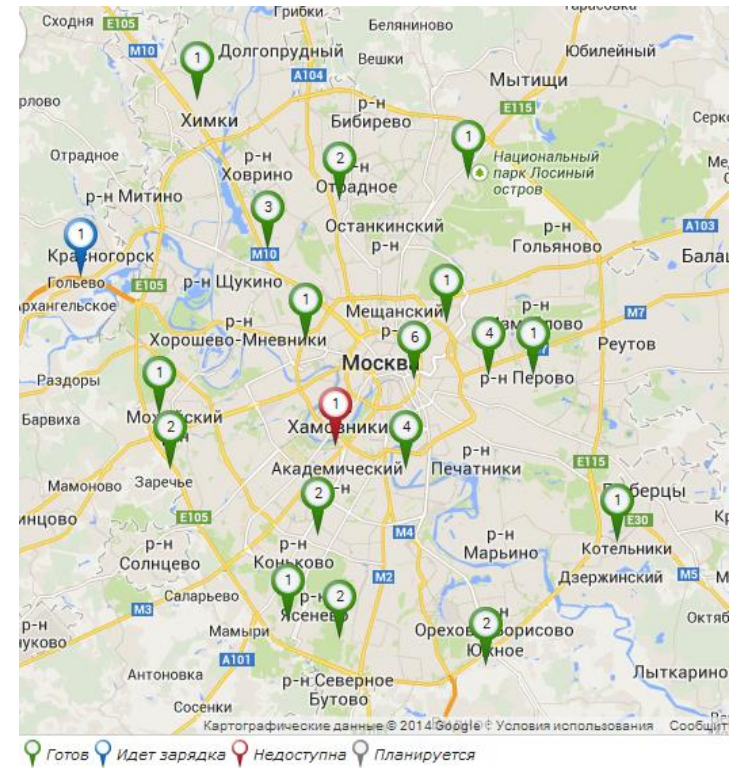
Electric vehicles for Moscow

In 2012, 43 electric charging stations are set up in Moscow region
+ 10 stations on protected nature areas



Government incentives:

- ✓ Since February 2013 until February 2015 **import duty** on electric vehicles is **ZEROed** (used to be 19% of the price)
- ✓ **Free parking** for electric vehicles can save 2 400 - 3 200 Euro/year



100 more electric charging stations are to be opened in 2015-2016 near trade centers + around 100 are planned on paid parking spaces



Incentives to promote use of environmentally friendly vehicles

- **paid parking/paid entrance** to the city centre and/or in the overloaded areas, with discounts for environmentally friendly vehicles (for example, hybrid cars, electric cars, cars using natural gas, euro-5 cars);

- **fuel tax**, with lower rates for high quality fuels (diesel and gasoline) and for natural gas;

- **transport tax**, with lower rates for environmentally friendly vehicles;

- **import tax**, with lower or null rates for environmentally friendly vehicles and higher rates for used vehicles;

- **subsidies/one-time tax discounts** for purchase or registration of environmentally friendly vehicles.

Incentives in RED are introduced in Russia and/or Moscow



Low emission zones

➤ Step 1. Low emission zones for LDV and HDV

1.1. since 2008 – Euro 1 and lower prohibited in the city center

➤ 1.2. September 2015 –

- Euro 2 and lower prohibited in the city center;
- Euro 1 and lower within the boundaries of the Moscow ring automobile road

➤ Step 2. Low emission zone for buses

- January 2015 buses Euro 2 and lower are not to enter city boundaries within the Moscow ring automobile road

➤ Step 3. Low emission zone for passenger cars

- Since 2017 (?)

Future for HDV and LDV low emission zones in 2015



Better cities for better life 2013, p2-30 May

2014

Up to 30% reduction of emissions

Emission reduction for some of the possible LOW EMISSION ZONES configurations

Scenario	Restriction	HDV		LDV	PC	Emission reduction (compared to scenario without restrictions), %				
		CO	VOC	NO _x	PM					
1	Emis. standard	EURO 2		EURO 2	no	3,3	4,6	5,4	5,7	
	Zone	МК МЖД		ТТК						
	Vehicle type	< 7 tons (weight)		< 1 tons (load)						
	Hours	7-22 hours		7-22 hours						
2	Emis. standard	EURO 2	EURO 3	EURO 3	EURO 2	35,9	34,2	-7,9	3,6	
	Zone	МКАД	МК-МЖД	ТТК	СК					
	Vehicle type	>12 tons	<3,5 tons	all	all					
	Hours	24 hours		24 hours	24 hours					
3	Emis. standard	EURO 3		EURO 2	EURO 3	EURO 2	48,4	53,3	35,4	23,3
	Zone	МКАД		МКАД	ТТК	СК+ТТК				
	Vehicle type	all		bus	all	all				
	Hours	24 hours		24 hours	24 hours					
4	Emis. standard	EURO 3		EURO 3	EURO 2	EURO 3	59,8	64,5	36,8	31,7
	Zone	МКАД		МКАД	МКАД	МК-МЖД				
	Vehicle type	all		all	all	all				
	Hours	24 hours		24 hours	24 hours					
5	Emis. standard	EURO 3		EURO 3	EURO 3	EURO 4	62,6	66,9	31,5	34,3
	Zone	МКАД		МКАД	МКАД	СК				
	Vehicle type	all		all	all	all				
	Hours	24 hours		24 hours	24 hours					



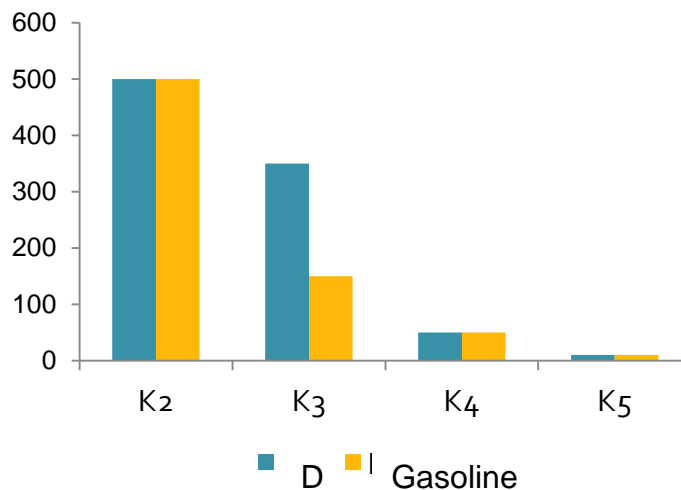


Perspectives of emission reduction due to improvement of fuel quality

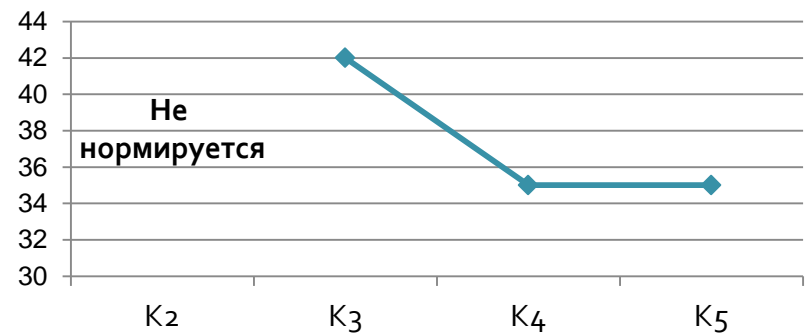
Since 1 January 2013 new fuel quality standard is introduced in **Moscow** – all fuel must meet EURO 4 requirements (environmental effect – emission reduction: sulfur dioxide by 70%, benzo(a)pyrene-by 22 %, particulate matter - by 9 %)

27 August 2013 Moscow City Government and JRC “Gasprom” have signed an agreement to further increase use comprised nature gas as motor fuel in Moscow

Permissible portion of sulfur, mg/kg



Permissible portion of aromatic hydrocarbons in gasoline, %



Better cities for better life 2013, 12-13 May 2014

Projected improvement of Moscow transport system by 2016

	2011	2016
Road density	3,95 km/km ²	4,28 km/km ²
Road length	3600 km	4000 km
Mean length of overloaded roads	533,5 km	491 km
Over-run index	1,58	1,42
Portion of public transport in total transportation volume	74%	74%



Emission reduction by up to 25% (depending on the scenario of traffic growth)





Perspective ways to reduce emissions from transport in Moscow

- Polycentric development of the city;
- Improvement of communication between peripheral areas of the city;
- Intensive development of public transport, including special bus lanes;
- Expansion of the paid parking zone to TTK;
- Restriction of traffic of the oldest vehicles (low emission zones);
- Incentives to promote environmentally friendly vehicles (hybrids, electric cars, cars on natural gas etc.)



MOSCOW CITY GOVERNMENT

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and Protection

State Environmental Protection Institution
“MOSECOMONITORING”

THANK YOU FOR ATTENTION!

www.mosecom.ru

info@mosecom.ru

kislova@mosecom.ru