



ENVIRONMENTAL PERFORMANCES OF MOTOR VEHICLES AND FUELS IN RUSSIAN FEDERATION AND CIS COUNTRIES

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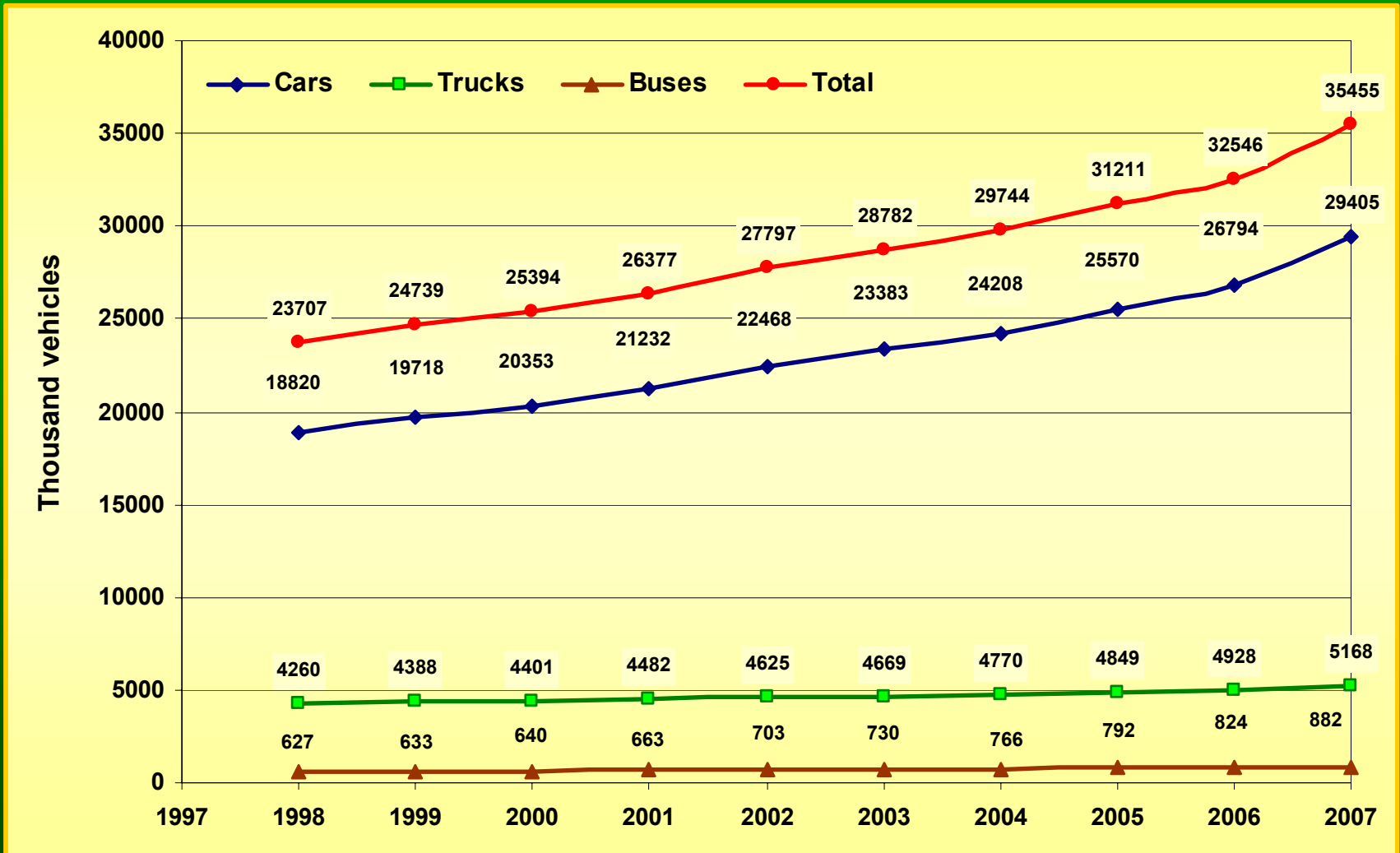
Overview of the CIS states

Country \ Parameter	Territory, thousand km ²	Population, million people	GDP, billion \$	Vehicle fleet, thousand units
Armenia	29,7	3,2	7,6	229,8
Belarus	207,6	9,7(2006)	22,9 (2004)	2600 (2004)
Azerbaijan	86,1	8,5 (2006)	59,7 (2006)	585,9
Georgia	69,7	4,4 (2005)	17,9 (2006)	328,4
Kazakhstan	2669,8	15,4 (07.2007)	143,1 (2006)	>2000
Kyrgyzstan	191,3	5,2 (2006)	10,7 (2006)	275,2 (2005)
Moldova	33,4	4,3 (07.2007)	2,9 (2005)	489,4 (2006)
Russia	17098,2	142,2 (12.2006)	1030 (2006)	32546 (2006)
Turkmenistan	488,1	6,8 (03.2006)	42,8 (2006)	336,4 (2004)
Tajikistan	142,7	7,1 (07.2006)	9,5 (2006)	300,0 (2004)
Uzbekistan	425,4	26,5 (2006)	55,75	1196,7 (2006)
Ukraine	603,7	46,5 (07.2007)	355,8 (2006)	6000,0 (2005)

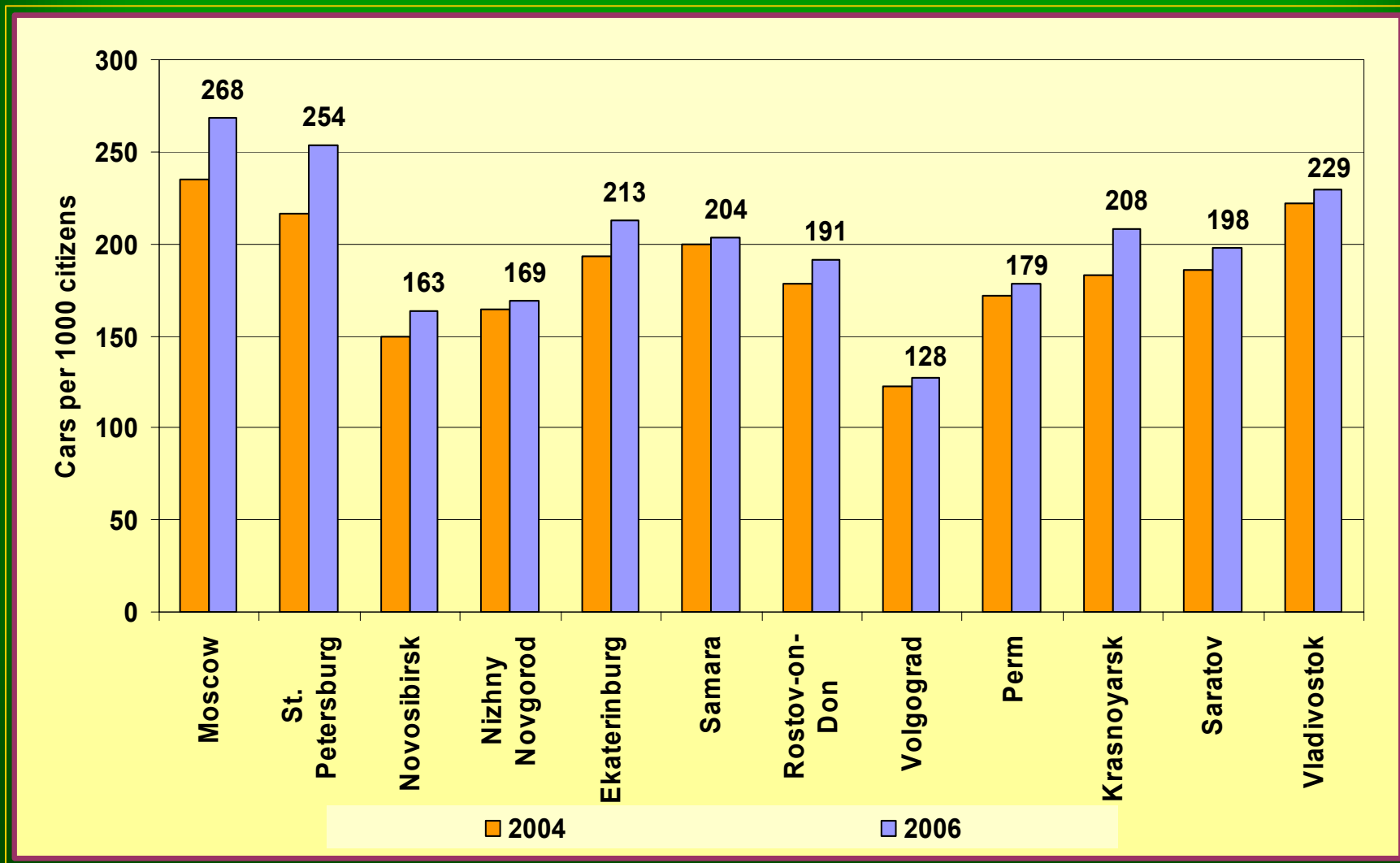
Dynamics of the main motor transport activity parameters in Russian Federation

Parameter	2001	2002	2003	2004	2005	2006	2007
Freight volume, million tons	6125	6348	6469	6568	6684	6753	6860
Cargo turnover, billion tons*km	159,9	167,2	173,2	182,1	193,6	198,8	205,9
Passenger transportation volume, million people	20883	19620	17898	16552	16084	15782	14736
Passenger turnover, billion passengers*km	155,1	150,1	138,6	129,6	137,7	134,7	148,0

Russian vehicle fleet dynamics



Urban motorization levels in Russia



Motor fleet structure by age in CIS countries (cars),%

Age Country	0-5	6-10	11-15	16-20	> 20
Uzbekistan	11.0	13.0	22.0	26.0	28.0
Russia	21.6	27.7	50.7		
Turkmenistan	n/d	n/d	n/d	n/d	n/d
Moldova	8.9	10.8	25.8	27.5	27.0
Kazakhstan	n/d	n/d	n/d	n/d	n/d
Kyrgyzstan (all motor vehicles)	1.6	6.3	21.4	70.7	
Georgia	4.4	12.2	26.3	24.6	32.5
Azerbaijan	15.8	26.2	58.0		
Armenia	n/d	n/d	n/d	n/d	n/d

n/d - no data

Motor fleet structure by age in CIS countries (buses), %

Age Country	0-5	6-10	11-15	16-20	> 20
Uzbekistan	11.0	13.0	22.0	26.0	28.0
Russia	26.2	26.8	47.0		
Turkmenistan	n/d	n/d	n/d	n/d	n/d
Moldova	2.8	9.0	25.9	37.1	25.2
Kazakhstan	n/d	n/d	n/d	n/d	n/d
Kyrgyzstan (all motor vehicles)	1.6	6.3	21.4	70.7	
Georgia	2.3	1.2	38.4	36.0	22.1
Azerbaijan	11.8	20.0	68.2		
Armenia	n/d	n/d	n/d	n/d	n/d

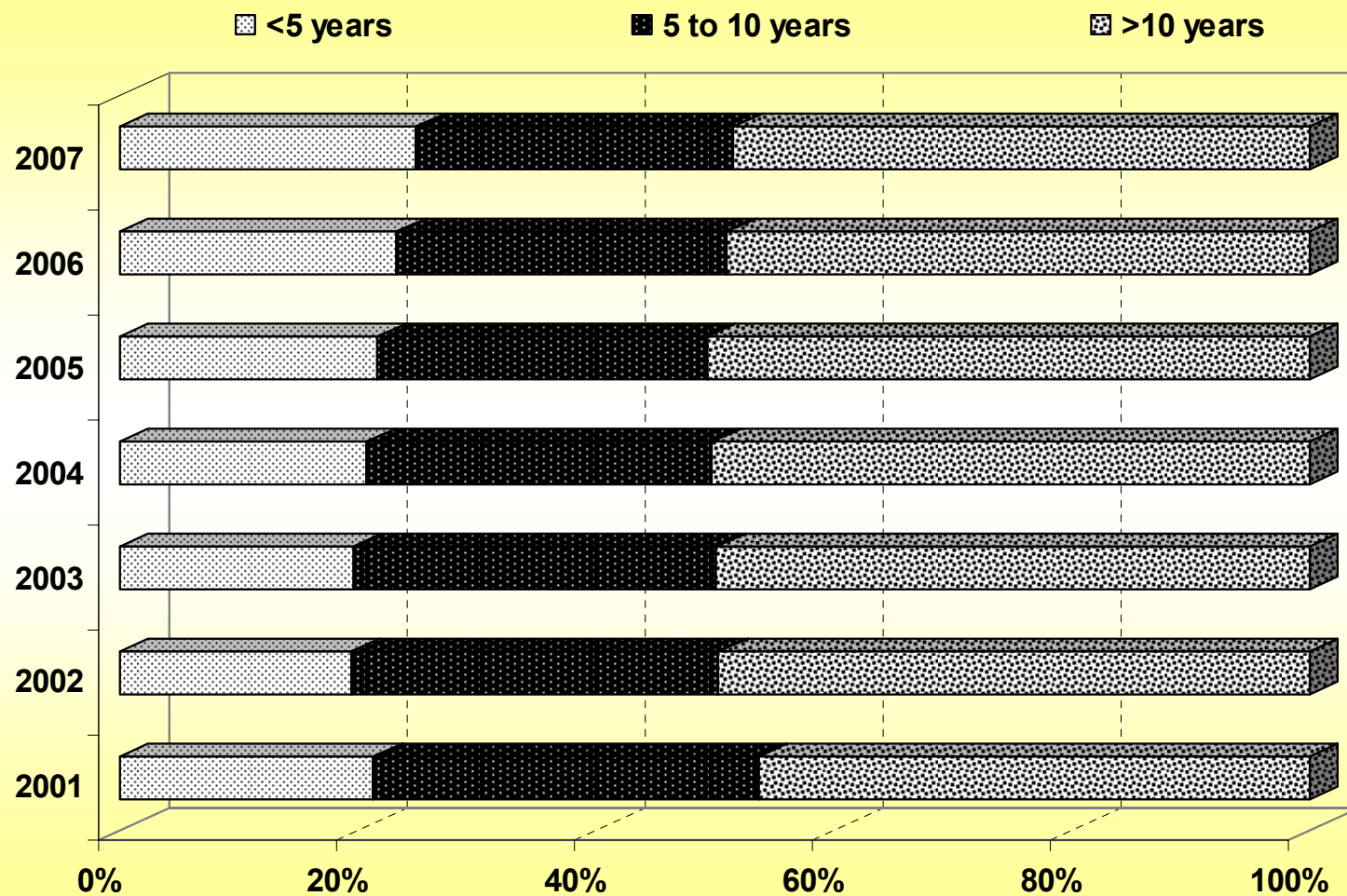
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Motor fleet structure by age in CIS countries (trucks and light duty), %

Age Country	0-5	6-10	11-15	16-20	> 20
Uzbekistan	2.1	7.6	26.3	64.0	
Russia	14.0	23.5	62.5		
Turkmenistan	n/d	n/d	n/d	n/d	n/d
Moldova	3.8	18.1	22.1	29.7	26.3
Kazakhstan	n/d	n/d	n/d	n/d	n/d
Kyrgyzstan (all motor vehicles)	1.6	6.3	21.4	70.7	
Georgia	2.2	9.2	18.1	43.3	27.2
Azerbaijan	7.7	15.3	77.0		
Armenia	n/d	n/d	n/d	n/d	n/d

n/d - no data

Age structure of the Russian car fleet



Motor vehicle production in the CIS

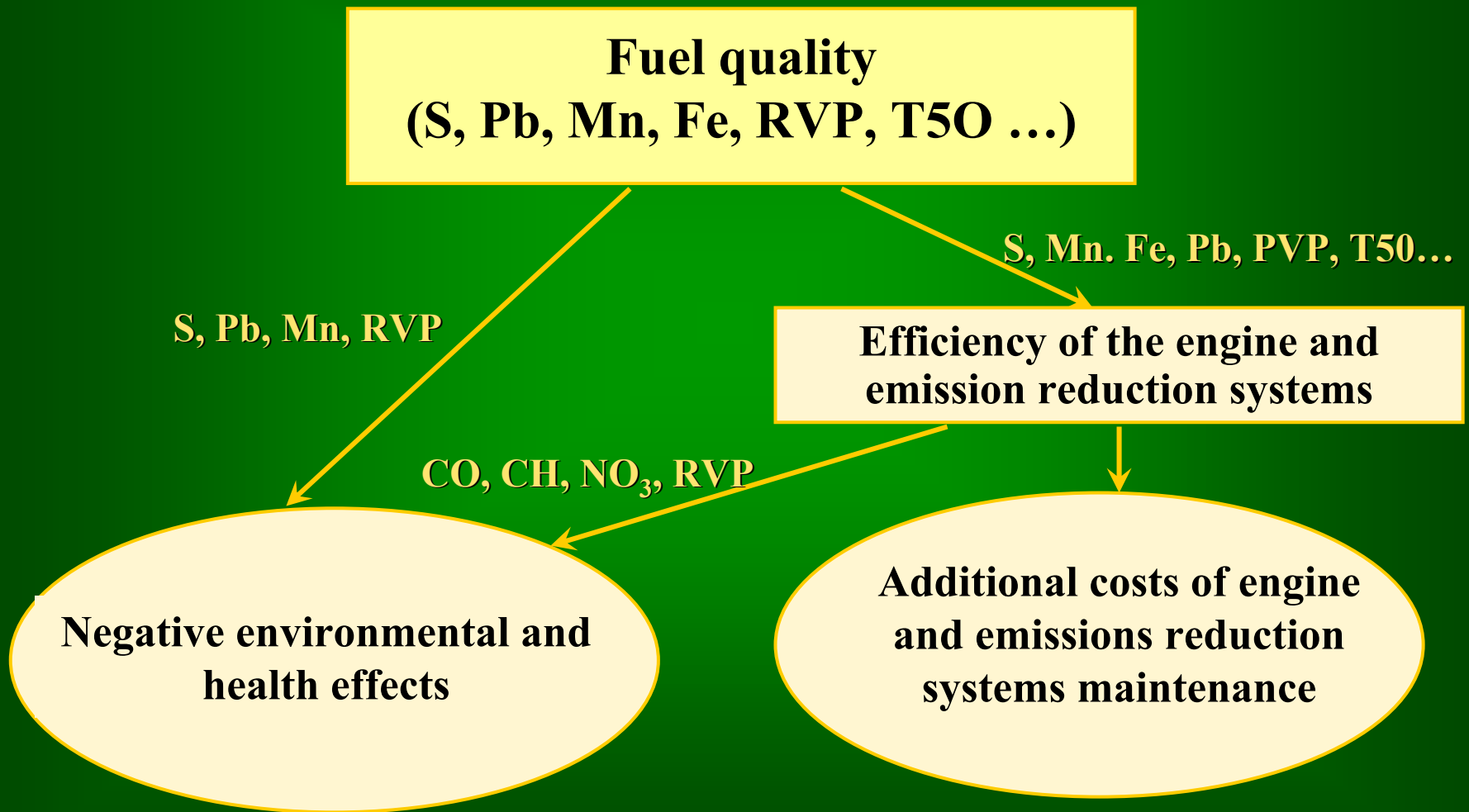
Country	Production in 2007	Plans for 2008	Production capacities to be introduced in 2009-2010	Brand
Russia	1169904	1478280 (+26,3%)	820 000	Lada, Chevrolet, GAZ, VAZ, KIA, VW, Ford, Skoda, Opel, Toyota, Renault, Fiat, Hyundai, Ssang Yong, Great Wall, Geely, FAW, Chery
Ukraine	386070	518600 (+34,3%)		ZAZ, Daewoo, Lada, Opel, Chery, Chevrolet, KIA, Hyundai, Great Wall, VW, Skoda, Seat
Belarus	232	2000 (8,6 times)		Iran Knodro
Uzbekistan	170 000	200 000 (+17,6%)	30 000	Daewoo
Kazakhstan	6311	8500 (+34,7%)		Lada, Skoda, Chevrolet
Azerbaijan	n/d	n/d		
Total:	1732517	2207380 (+27,4%)	850 000	

n/d - no data

Motor vehicle industry in CIS countries



Environmental, health-related and economical impacts of fuel quality



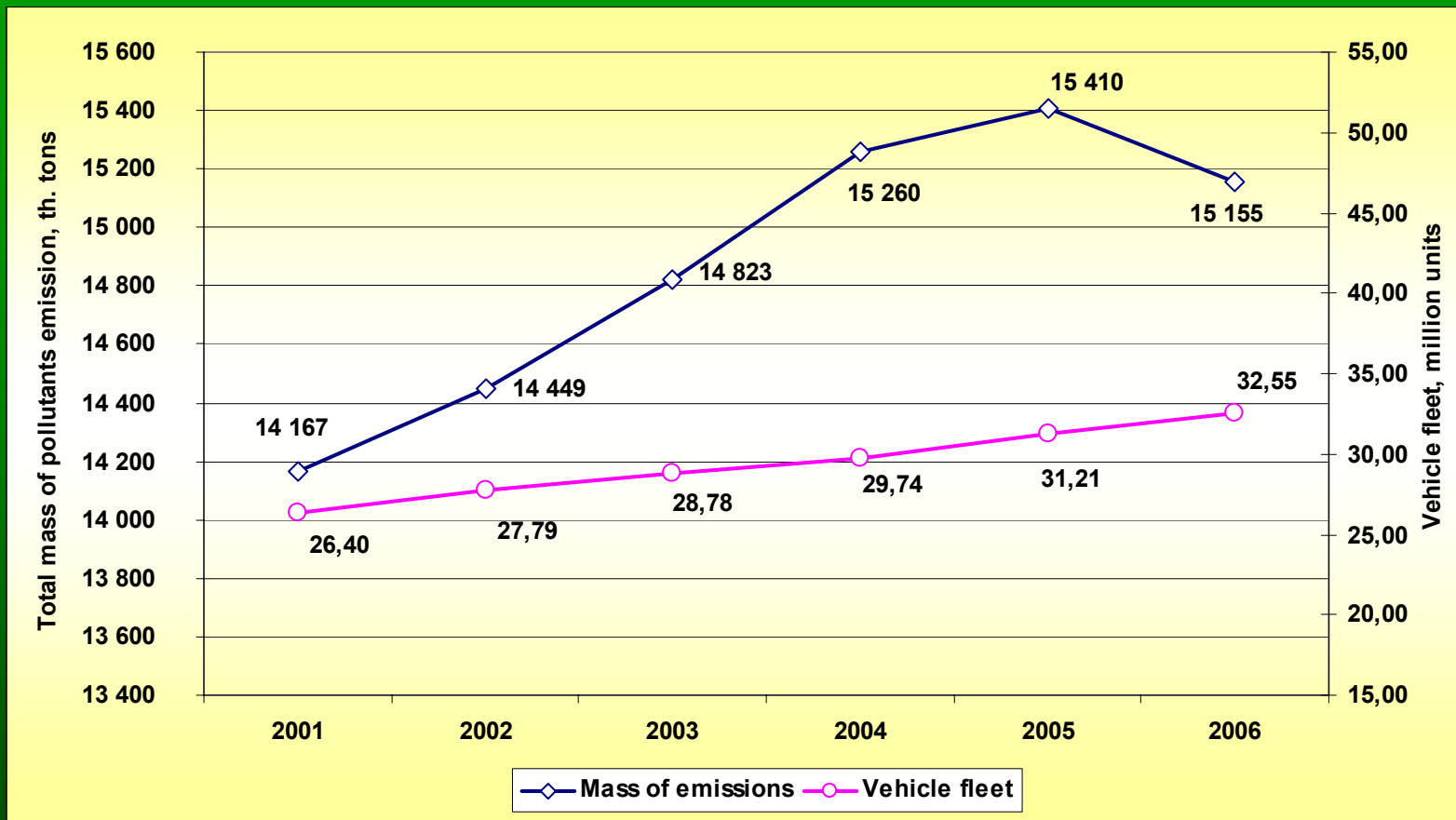
Some problems which define negative environmental and health impacts of motor transport in CIS countries

- Inconsistence between motor fleet growth and development of road infrastructure, resulting in traffic congestion;
- Shortcomings in traffic engineering and control, lack of parking policy in cities;
- Lack of public transport financing, insufficient quality of its services;
- Insufficient rate of vehicle fleet renewal and suboptimal structure of the fleet (mainly concerns truck and bus fleet);
- Insufficient quality of produced and retailed motor fuels, lack of system of “assured provision” of consumers with the appropriate fuel;
- Insufficient use of alternative fuels.

Pollutant emissions from Russian motor vehicle fleet (2006)

Pollutants	CO	VOC	NO _x	PM	SO ₂	Total
Total mass of emissions, th. tons	11202	1723,8	2055	53,91	119,8	15154,8
% to level of 2005	96,1	100,3	110,5	110,3	98,3	98,3

Dynamics of pollutant emissions by the Russian motor vehicle fleet



Improvement of vehicle fleets' environmental performance across CIS

Measures	Russia	Uzbekistan	Turkmenistan
Ban on production and import of vehicles not complying with EURO requirements	from 01.01.06 ≥ EURO-2 from 01.01.08 ≥ EURO-3 from 01.01.10 ≥ EURO-4 from 2014 ≥ EURO-5 (cars)	from 01.03.07 ≥ EURO-2 from 01.01.10 ≥ EURO-3 (import only)	-
Ban on sale of the new cars without catalytic converters	from 01.01.06	-	-
Availability of emission standards for:			
• new motor vehicles (produced and imported)	UN ECE Requirements	UN ECE Requirements	
• vehicles in operation	New national standards harmonized with EU Directive	Russian standards (previous version)	Russian standards (previous version)
Mandatory environmental technical inspection	+	+	+
Tax differentiation	-	-	-
Subsidies	-	-	-
Programmes for vehicle fleet modification	+	+	planned
Ban on access of motor vehicles not complying with EURO requirements to city centres	+	-	-
Renewal of bus fleet with EURO-2+ vehicles	+	+	+
Programmes for transfer to CNG and other alternative fuels	+	no data	planned

Improvement of vehicle fleets' environmental performance across CIS

Measures	Moldova	Kazakhstan	Kyrgyzstan
Ban on production and import of vehicles not complying with EURO requirements	Age restrictions for imported vehicles: <ul style="list-style-type: none"> • cars ≤ 7 years • trucks ≤ 10 years 	from 01.01.09 \geq EURO-2 from 01.01.11 \geq EURO-3 from 01.01.14 \geq EURO-4	Age restrictions for imported vehicles under consideration
Ban on sale of the new cars without catalytic converters	-	-	-
Availability of emission standards for:			
• new motor vehicles (produced and imported)	-	-	-
• vehicles in operation	Russian standards (previous version)	Russian standards (previous version)	Russian standards (previous version)
Mandatory environmental technical inspection	+	+	+
Tax differentiation	-	-	-
Subsidies	-	-	-
Programmes for vehicle fleet modification	-	no data	-
Ban on access of motor vehicles not complying with EURO requirements to city centres	-	-	-
Renewal of bus fleet with EURO-2+ vehicles	-	no data	-
Programmes for transfer to CNG and other alternative fuels	+	no data	-

Improvement of vehicle fleets' environmental performance across CIS

Measures	Georgia	Azerbaijan	Armenia
Ban on production and import of vehicles not complying with EURO requirements	no data	Decree on age restrictions for imported vehicles is being prepared	Ban on import of motor vehicles without catalytic converters since 01.01.07 Maximum permitted age of small buses and taxis is 15 years
Ban on sale of the new cars without catalytic converters	no data	-	-
Availability of emission standards for:			
• new motor vehicles (produced and imported)	-	-	-
• vehicles in operation	-	Russian standards (previous version)	no data
Mandatory environmental technical inspection	-	+	+
Tax differentiation	-	-	+
Subsidies	-	-	-
Programmes for vehicle fleet modification	-	-	-
Ban on access of motor vehicles not complying with EURO requirements to city centres	-	-	-
Renewal of bus fleet with EURO-2+ vehicles	-	-	-
Programmes for transfer to CNG and other alternative fuels	-	no data	planned

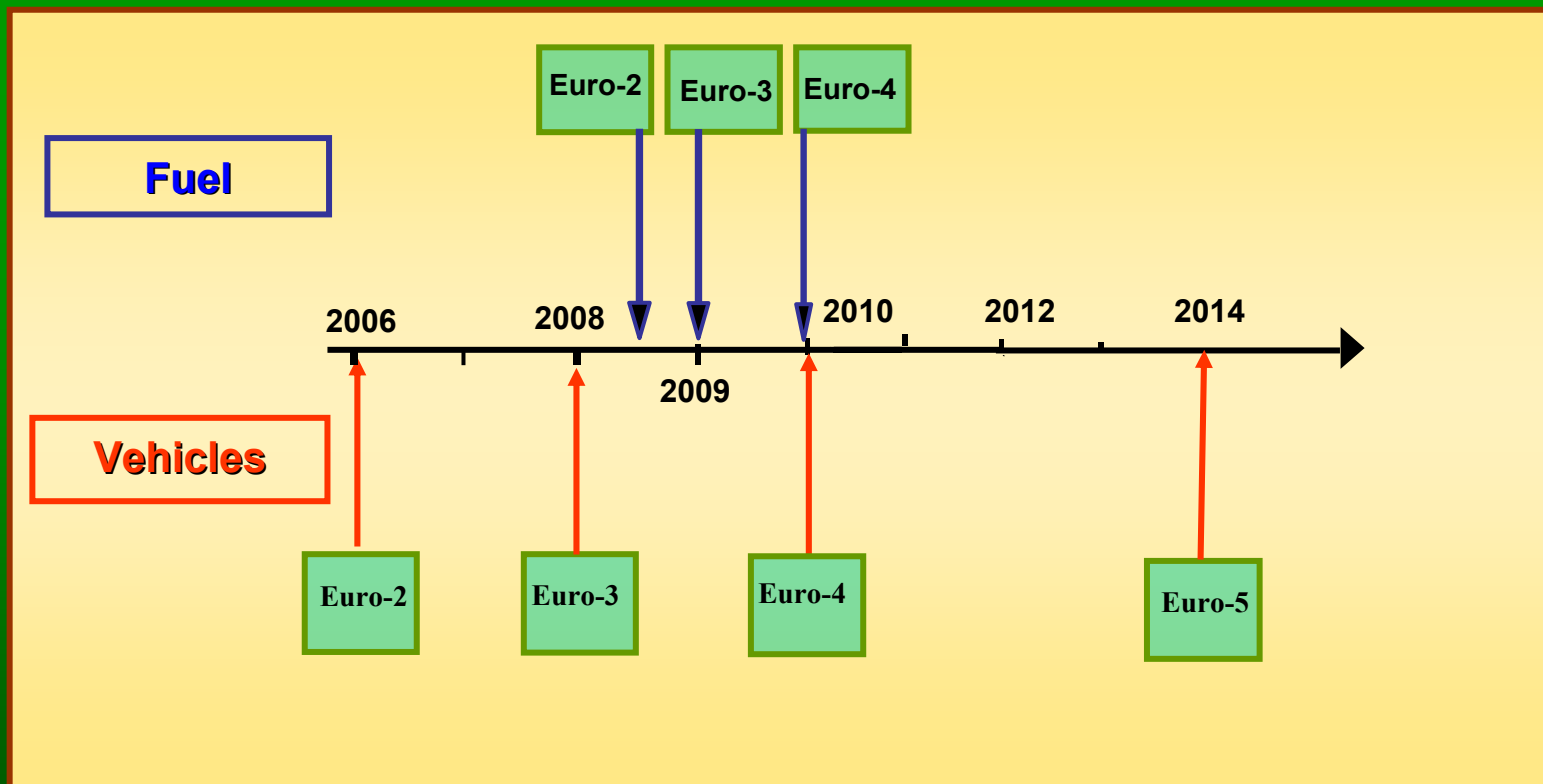
CIS countries where the use of leaded petrol is still not prohibited

- Uzbekistan: leaded petrol constitutes about 10% of total petrol production;
- Kyrgyzstan: use of leaded petrol is prohibited in the capital city of Bishkek only;
- Tajikistan: there is no official ban on the use of leaded petrol. It is estimated that leaded petrol will be in the country's fuel market at least until 2009.

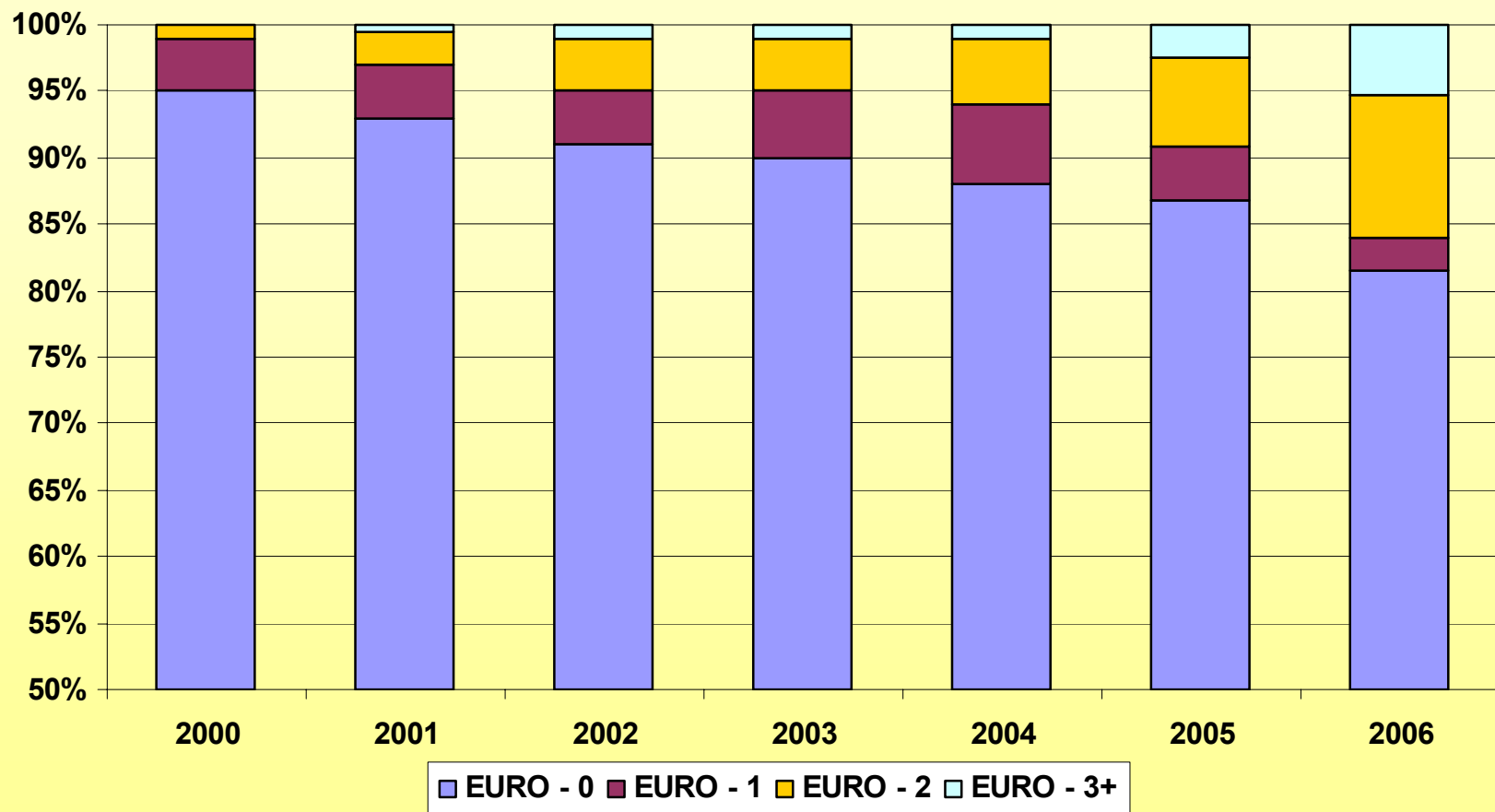
Schedule of introduction of environmental requirements to motor vehicles and fuels in Russia

Requirements	Year of introduction					
	Vehicle emissions		Petrol		Diesel fuel	
	Western Europe	Russia	Western Europe	Russia	Western Europe	Russia
EURO-2	1996	2006	1994-1995 (EN 228:1993)	1997 (GOST R 51105)	c 01.1996 EN-590:1996	-
EURO-3	2000	2008	2000 (EN 228:1999)	2002 (GOST R 51866)	2000 EN-590:1999	2005 ГОСТ Р 52368
EURO-4	2005	2010	2005 (EN 228:2004)	2005 (TU 38.401-58-350-2005)	2005 EN-590:2004	2005 ГОСТ Р 52368

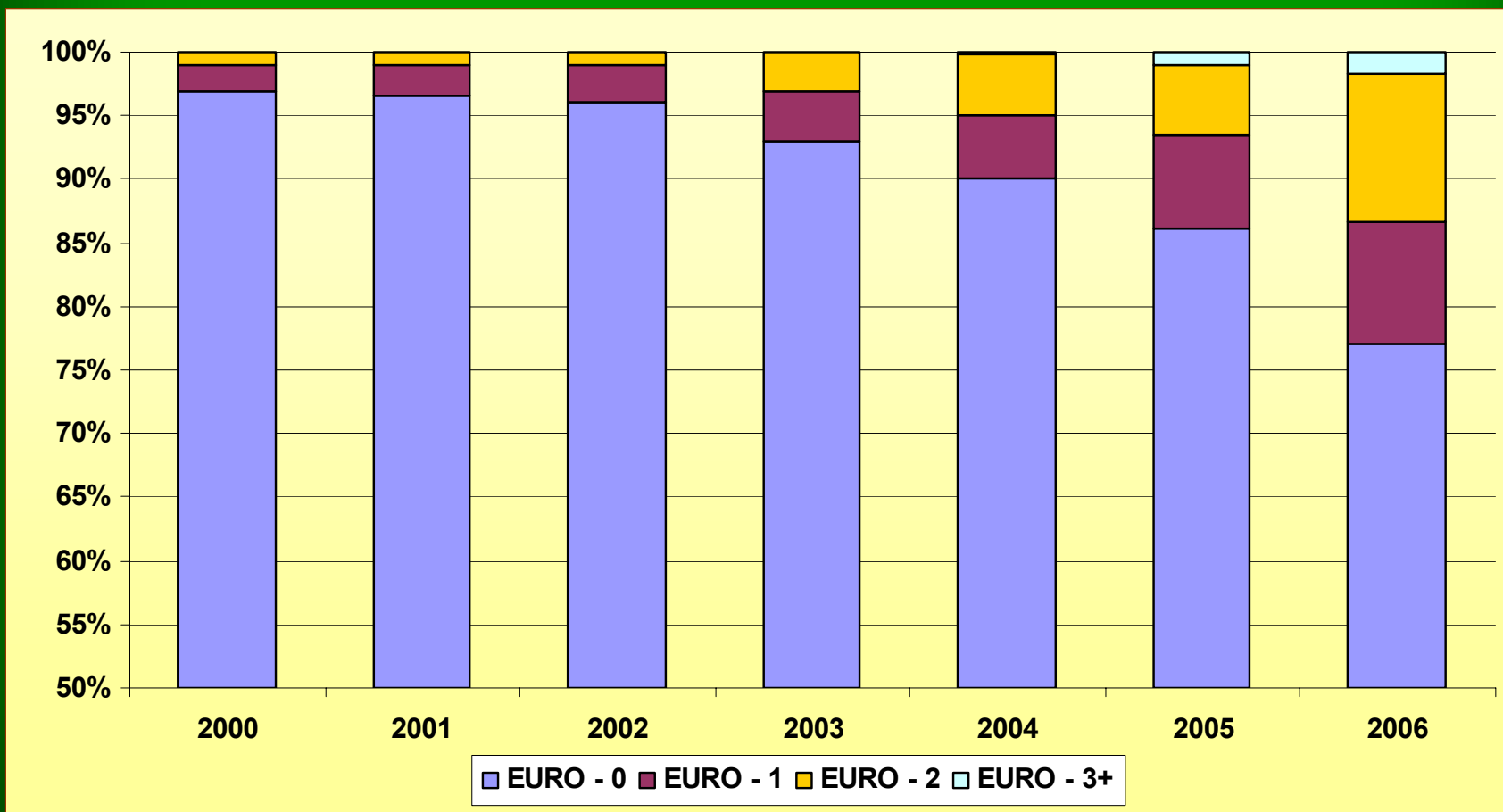
Schedule of introduction of environmental requirements to motor vehicles and fuels in Russia



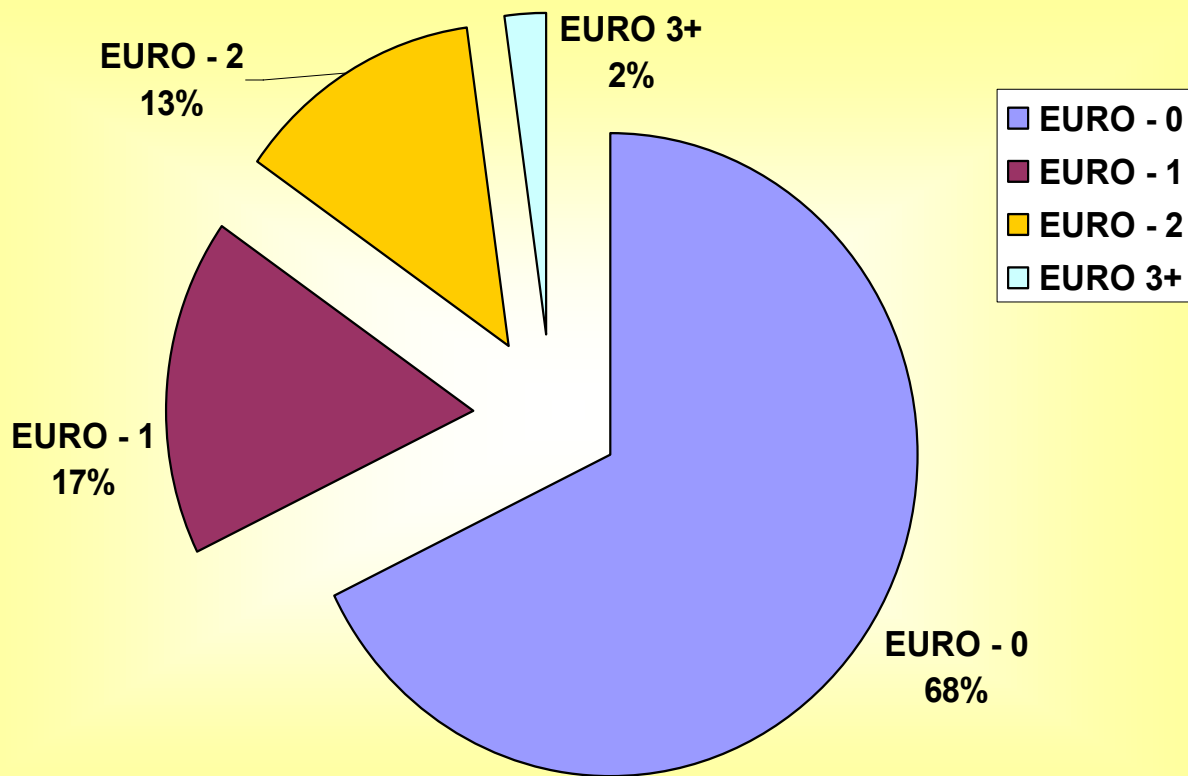
Russian car fleet structure by environmental class



Russian truck fleet structure by environmental class



Russian bus fleet structure by environmental class (2006)



Fuel specifications in CIS countries

Petrol

	GOST 2084-77	GOST R 51105-97	GOST 31077-2002	EN 228:2004 (EURO-4)
Lead, g/dm ³	0.013	0.010	0.010	0.005
Benzene, vol%	-	5.0	5.0	1.0
Aromatics, vol%	-	-	55	35
Sulfur, ppm	1000	500	500	50 or 10

Diesel fuel

	GOST 305-82	EN 590:1993 (EURO-2)	EN 590:2004 (EURO-4)
Cetane number	45	49	51
Density at 15°C, kg/dm ³	830 - 860	820 - 860	820 - 845
Polyaromatics, wt%	-	11	11
Sulfur, ppm	2000/ 4000/ 5000	2000	50 or 10

Main environmental parameters of motor fuel in Russia

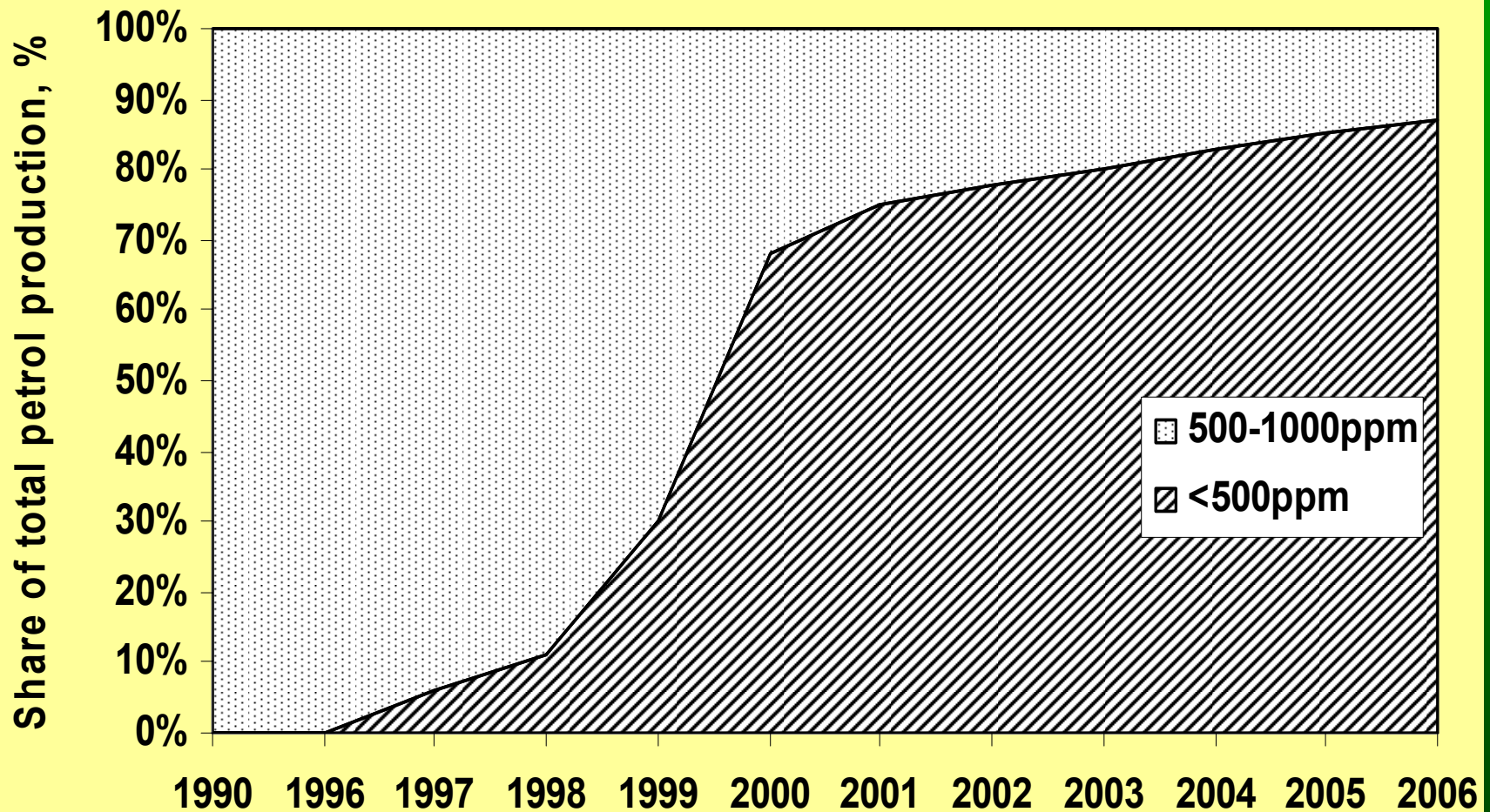
Parameter	Unit	Environmental class and duration of requirements			
		EURO-2 (up to 31.12.2008)	EURO-3 (up to 31.12.2009)	EURO-4 (up to 31.12.2012)	EURO-5 (under discussion)
PETROL					
Maximum sulfur content	ppm	500	150	50	10
Maximum volume fraction of aromatics	%	-	42	35	35
Maximum volume fraction of unsaturated hydrocarbons	%	-	18	18	18
Maximum volume fraction of benzene	%	5	1,0	1,0	1,0
Maximum lead concentration	mg/dm ³	< 5	< 5	< 5	< 5
DIESEL FUEL					
Maximum sulfur content	ppm	500	350	50	10
Minimum cetane number		45	51	51	51
Maximum mass fraction of aromatics	%	-	11	11	11

*) – The appropriate Technical Regulation was adopted by the Government in February 2008, and will come into force after six months.

Structure of petrol production in Russia, %

Petrol / Year	1990	1995	2000	2005	2006
Total petrol production, million tons	40,6	27,4	27,2	29,5	34,4
А-72	5,7	0,2	-	-	-
А-76(АИ-80)- EURO-1,2	78,3	76,3	55,3	39,6	31,3
АИ-93(АИ-91,92)- EURO-2	15,4	22,2	38,3	47,5	55
АИ-95 (АИ-96)- EURO-2,3	0,4	1,1	6,2	12,6	13,3
АИ-98 - EURO-2,3	0,2	0,2	0,2	0,3	0,4
Share of leaded petrol, %	61,3	53,1	2,3	-	-
Share of unleaded petrol, %	38,7	46,9	97,7	100	100

Structure of Russian petrol production by sulfur content



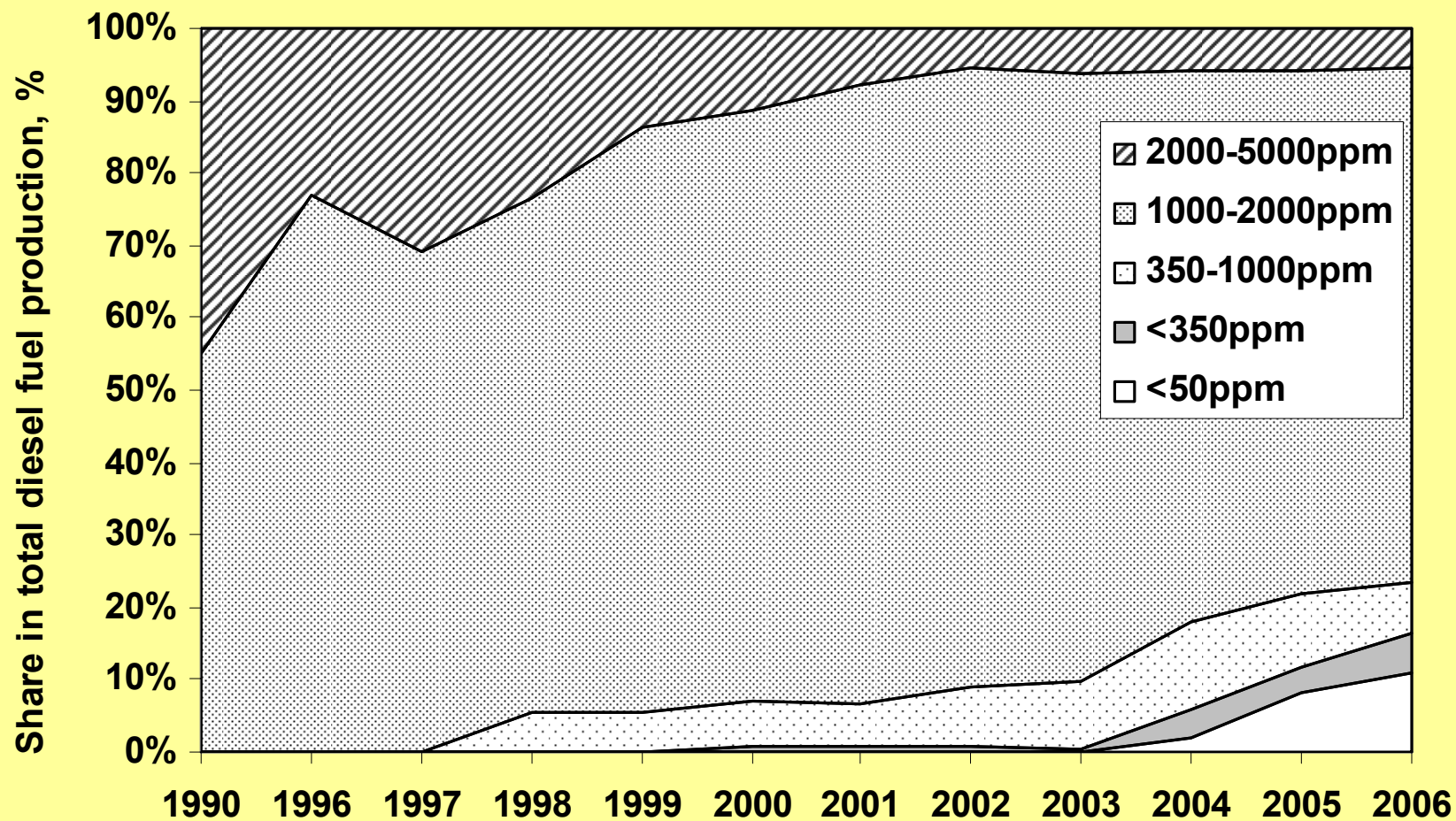
Structure of Russian diesel fuel production (by sulfur content, %*)

Maximum sulfur content, ppm	2000	2001	2002	2003	2004	2005	2006
10(Евро-5)**)	-	-	-	-	-	0,8	1,7
50(Евро-4)**)	-	-	-	-	-	7,5	9,1
350(Евро-3)**)	-	-	-	3,5	5,3	3,5	5,7
500	9,8	11,7	12,2	11,3	1,6	7,8	4,4
1000	6,3	3,9	3,1	-	1,4	2,4	2,6
2000	72,3	77,1	78,1	79,2	75,5	72,3	70,9
5000	11,6	7,3	6,6	6,0	6,2	5,7	5,6
Итого	100	100	100	100	100	100	100

*) - Excluding oil refineries owned by JSC Gazprom and MINI-NPZ

***) - EN-590

Structure of Russian diesel fuel production by sulfur content



Euro IV diesel fuel retail by Lukoil



“ЕСТО” petrol retail by Lukoil



Main environmental parameters of Russian EURO-3 and EURO-4 petrols produced by some Russian companies

Parameter	Requi- rements	Petrols					
	EURO-3 / EURO-4	Surgut oil refinery (owned by JSC "Gazprom")		JSC «JANOS»	JSC «NU NPZ»	JSC «NK NPZ»	
		"Regular- 92"	"Premium- 95"	"Premium- 95"	"Regular- 92"	"Regular- 92"	"Premium- 95"
Maximum lead content, mg/dm ³	5	< 5	< 5	< 5	< 5	< 5	< 5
Maximum volume fraction of hydrocarbons, % , including:							
▪ Unsaturated hydrocarbons	18	0	0,2	2,2	1,8	1,1	0,4
▪ Aromatics	42/35	35	41	32	36	32,5	37,8
▪ Benzene	1,0	0,7	0,8	0,4	0,7	0,7	0,8
Maximum sulfur content, ppm	150/50	50	50	140	140	50	40
Maximum oxygen comtent, %	2,7	1,5	2,4	2,0	0,5	1,8	2,5

Use of CNG as a motor fuel in CIS countries

- Russia: about 70 000 motor vehicles are operated on CNG (during Soviet time – about 200 000);
- Ukraine: 100 000 motor vehicles (1.5% of the fleet) are operated on CNG;
- Moldova: about 5 000 motor vehicles are CNG-fueled;
- Belarus: there is a national programme of gasification of the country's vehicle fleet;
- Tajikistan: there are 10 600 motor vehicles operated on CNG;
- Kyrgyzstan: CNG-fuelled motor vehicles numbered about 6 000 in 2007;
- Georgia: Ministry of Environment reported about 1.7% of motor vehicles using CNG (2005);
- Armenia: 1 394 vehicles are fueled by CNG (2007).

Production of bio-fuels in CIS countries

- Russia: a National Programme for production of bio-fuels is currently being developed. In accordance with it in 5 years annual production of bio-fuels will reach 2 million tons;
- Ukraine: in February 2007 the Government has adopted a plan to introduce ethanol for public transport in cities with over 500 000 population before 2010. There are many other projects under consideration. In 2007 3 biodiesel plants were put into operation (mainly working for export);
- Moldova: In 2007 the plans to build an ethanol plant processing grain, and a bio-fuel plant converting cellulose-based biomass into biogas, ethanol and synthetic diesel fuel. All produced bio-fuel will be exported;
- Belarus: Since 01.02.2007 there is a new diesel specification, allowing use of fatty acid methyl ether (FAME) in automotive diesels;
- Kazakhstan: Since September 2006 ethanol fuel is produced at one plant, and 3 more plants are scheduled for construction. All produced fuel is meant for export.

Recommendations of the Conference on Cleaner Fuels and Vehicles for Eastern Europe, Caucasus and Central Asia

- Monitoring fuel quality at fuel stations with responsibility of specific government and involvement of independent auditors;
- Carrying out of periodic vehicle emission inspections in centralised facilities under governmental oversight and withdrawal of failed vehicles from operation;
- Imported vehicles have to have a functioning catalytic converter. This have to be assured by importer;
- Vehicles over 12 years old have to be inspected at least every six months;
- Fuel and vehicle requirements have to be introduced together as a corresponding system;
- Fuels at retail points have to be clearly labeled to indicate their compliance with “EURO” standards;
- Taxation policies and incentives serve to stimulate production, import and consumption of cleaner fuels;
- Use of sustainable alternative fuels in addition to conventional petrol and diesel fuels have to be considered and supported to reduce emissions;
- Countries have to strengthen the systems for enforcement of and compliance with the above suggestions.

Steps recommended by the Conference on Cleaner Fuels and Vehicles

For countries:

- Consider putting in place a Programme of Actions (“roadmap”) on implementation of cleaner fuels and vehicles;
- Consider possibility of leapfrogging from early “EURO” standards right to EURO-4 or EURO-5;
- Consider possibility to introduce incentives to encourage early implementation of cleaner fuels and vehicles;

For participants and organizers (REC Caucasus, PCFV):

- Actively assist in organization of information and data exchange on cleaner fuels and vehicles;
- Report on the progress of implementation of cleaner fuels and vehicles in EECCA region on a regular basis;
- Develop an informal network to include Conference participants and other interested parties;
- Assist countries to disseminate outcomes of the meeting and routinely update EECCA information on the PCFV website (www.unep.org/pcfV);
- Assist (in co-operation with other international forums) in leveraging additional international support for realization of the Conference’s recommendations;
- Assist in collection and dissemination of national level information on liquid biofuels.

Thanks for your attention!