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Review of the Urban Transport Sector in the Russian Federation

Transition to Long-Term Sustainability

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REVIEW OF THE URBAN TRANSPORT
SECTOR IN THE RUSSIAN
FEDERATION: TRANSITION TO
LONG-TERM SUSTAINABILITY

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1 OVERVIEW

Russian cities are undergoing critical economic and social changes that affect the performance and condition of their urban transport systems. While the population of most large cities in Russia (over one million residents) has remained relatively unchanged over the last decade, the average income of the urban dwellers has sharply increased. The number of private cars per capita has increased rapidly, generating a demand for urban mobility which is increasingly difficult to meet.

At the same time, the transition to a market economy has introduced new private sector involvement in urban land development, an area which used to be the sole responsibility of local governments. The traditional static command-and-control type master plan is thus no longer adequate. However, the slow pace at which the traditional approach has been replaced with a comprehensive regulatory framework—one that ensures coordination between urban development and transport planning—has created a vacuum in the public sector's planning capacity. In many cities, this has resulted in a mismatch between demand for and supply of transport infrastructure.

A similar transition has occurred in the provision of public transport services. Private bus operators have entered the market to fill the shortage of service supply left by publicly owned bus companies, which have been plagued with financial difficulties and operational inefficiency. But here again the lack of a comprehensive regulatory framework has undermined the potential of the private sector to provide a well-managed urban public transport system.

This review of the urban transport sector in the Russian Federation (the Review, hereafter) aims to assess the current condition and performance of urban transport systems in medium-to-large size Russian cities and to identify key issues and underlying causes. The Review principally covers software of urban transport in the secondary cities of Russia¹, including institutional arrangements, legal and regulatory issues, operation of public transport systems, traffic management, and parking, and less extensively hardware aspects, such as construction of road network.

¹ The two largest cities in Russia, Moscow and St Petersburg, enjoy special treatment and face somewhat different urban transport challenges. They are of oblast (region) status, subject directly to the Federation, unlike rest of the cities, which are subject to oblast, hence, granted with much less legal and administrative power.

Based on the Review findings, an action plan is laid out that would contribute to sustainable urban living in the long term. The proposed actions include:

- Legal and regulatory reforms that would enhance inter-jurisdictional coordination and market efficiency in public transport services, and enable effective implementation of demand management measures.
- Institutional and technical capacity building that would lead to coherent and coordinated decision-making and planning, strengthen capabilities of planners and practitioners in Russian cities, and retain their skills and knowledge.
- Cost-effective high-priority investments that would address urgent issues in resource-restrained cities.

The Review also recommends phasing and sequencing reforms based on their urgency and factoring in the political economy.

2 INTERVIEWS AND SURVEY OF CITIES

2.1 BASIC CHARACTERISTICS OF THE CITIES

The Review was undertaken in association with an effort by the Ministry of Transport of the Russian Federation (the Ministry, hereafter) to find ways of encouraging the development of sustainable urban transport systems in Russian cities. The Ministry, acting through the regional authorities, invited all Russian cities to participate in the Review. A total of 25 cities completed a questionnaire prepared by the World Bank team, and among them, eight cities² sent delegations - decision-makers and practitioners - to a consultation meeting hosted by the Ministry and the Bank, in Moscow in September 2011. The consultation meeting consisted of a workshop and individual technical sessions, in which city-specific issues were discussed. Following the consultation meetings, the Bank team visited Lipetsk, one of the eight cities that participated in the consultation meeting.

The basic statistical information of the surveyed cities is shown in Table 1. Population has increased modestly in most cities, except Nizhniy Novgorod, Tambov and Kamyshin. Only three cities—Krasnodar, Tyumen and Ussuriysk—have experienced average annual growth rates above 1.5 percent. Most cities have average income per capita below the national average of US\$ 9,900 in 2010.

² Novosibirsk, Nizhniy Novgorod, Tyumen, Tomsk, Lipetsk, Stavropol, Tambov, and Velikiy Novgorod.

TABLE 1: BASIC DATA ON THE INTERVIEWED AND SURVEYED CITIES

City	2010 Population (thousand)	Annual average growth since 2002 (%)	Area (km ²)	Density (pop/km ²)	2010 Average income (US\$/year)
Novosibirsk	1,473	0.36%	507	2,812	
Yekaterinburg	1,387	0.78%	468	2,964	
Nizhniy Novgorod	1,262	-0.42%	411	3,071	
Omsk	1,154	0.19%	567	2,035	6,864
Rostov-on-Don	1,070	0.02%	349	3,070	
Volgograd	1,022	0.12%	859	1,190	6,924*
Krasnodar	786	2.20%	840	936	
Vladivostok	617	0.41%	562	1,099	
Tyumen	615	2.09%	235	2,617	
Tomsk	545	1.24%	294	1,854	6,540
Astrakhan	521	0.36%	209	2,495	8,268
Kemerovo	512	0.61%	295	1,737	8,208
Lipetsk	508	0.04%	330	1,540	8,167*
Cheboksary	463	0.55%	251	1,845	5,976
Ulan-Ude	406	1.36%	377	1,076	8,909*
Stavropol	399	1.31%	277	1,442	
Volzhskiy	314	0.03%	150	2,096	
Tambov	280	-0.51%	153	1,832	
Velikiy Novgorod	219	0.11%	90	2,433	
Ussuriysk	184	1.72%	134	1,377	
Kamyshin	119	-0.80%	38	3,132	4,464
Akhtubinsk	42		43	980	2,256
Znamensk	29		54	537	4,320
Kamyzyak	16		24	667	

Note: (*) indicates average wage (US\$ per year). Wage is the payment received for one's labor and applicable for those that are employed. It does not capture incomes for the self-employed and from other sources such as financial activities (interests from savings, returns on investments) and gifts (inheritances).

The supply of transport infrastructure and services is highly variable across the cities surveyed (Table 2). The road network density, measured by the total length of the road network divided by the area of the city, ranges between 0.65 and 5.83 km/km²; although the gap is smaller among larger cities (population 500,000 and above), ranging between 1.5 and 4.5 km/km². In most cities, autobuses and minibuses are the primary public transport modes, though most still have electric tram and trolleybus networks. Private sector supply already exceeds that of the public sector in many of the cities. Public transport route coverage, measured by the

total length of operating routes divided by population, ranges widely between 1.10 and 9.69 km per thousand inhabitants in the surveyed cities.

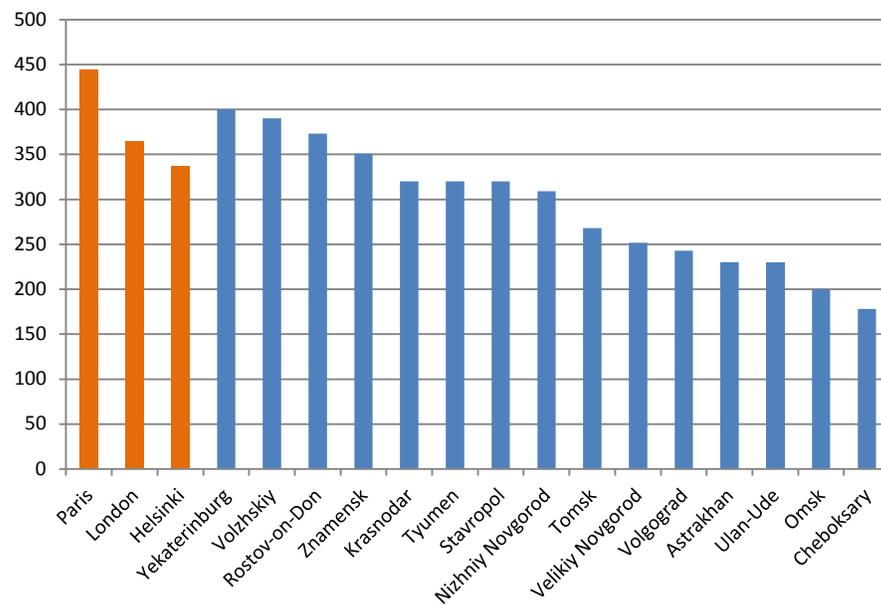
TABLE 2: SUPPLY OF TRANSPORT NETWORK AND SERVICES

City	Road network (km)	Road density (km/km ²)	Public transport route length (km)						Route coverage (km/pop)
			Total	Bus	Suburban bus	Mini-bus	Trolley bus	Tram	
Yekaterinburg	1327	2.84	2203	1601			213	389	1.59
Nizhniy Novgorod			2668	1010		1220	243	195	2.11
Omsk	1404	2.48	5621	1943	1243	2217	155	63	4.87
Rostov-on-Don	1193	3.42	3934	1644		2053	175	63	3.68
Volgograd			4249	773		3198	118	160	4.16
Krasnodar	1651	1.97	3838	1228	2307		179	124	4.88
Vladivostok			1127	1096			26	5	1.83
Tyumen	1112	4.73	3973						6.46
Tomsk			987	822			121	45	1.81
Astrakhan	819	3.92	2939						5.64
Kemerovo	1307	4.43	4960	1007	2731	1069	101	53	9.69
Lipetsk	508	1.54	1282	1113			115	54	2.52
Cheboksary	181	0.72	1430	1018			412		3.09
Ulan-Ude	245	0.65	1456	1400				56	3.59
Stavropol	455	1.64	2141	1955			186		5.37
Velikiy Novgorod	225	2.50	464	428			35		2.12
Ussuriysk	474	3.55	1474						8.01
Kamyshin	222	5.83	242						2.04
Akhtubinsk	135	3.14	247	247					5.86
Znamensk	45	0.83	32						1.10
Kamyzyak	67	2.79	18						1.13

2.2 TRANSPORT PROBLEMS PERCEIVED BY THE CITIES

Congestion. Road traffic congestion is regarded as serious in most cities with population 200,000 or more, and increasing rapidly in some (Table 3). For example, Nizhny Novgorod estimated that the length of its road system that is overloaded would increase from 10 kilometers to over 25 kilometers in the period 2009-2013. The congestion was regarded primarily as the consequence of a very high rate of growth of the private car fleet. Especially, it is alarming that the larger Russian cities now have car ownership rates higher than some Western European cities boasting much higher income levels (Figure 1).

FIGURE 1: MOTORIZATION RATE—NUMBER OF REGISTERED CARS PER ONE THOUSAND RESIDENTS—IN SELECT CITIES IN 2011



Source: Survey Data

TABLE 3: REPORTED ASSESSMENT OF TRAFFIC CONGESTION PROBLEMS

City	Self-Assessment of Traffic Congestion in City
Yekaterinburg	Traffic congestion is a serious problem. During peak hours, traffic speeds along main city streets are observed at 8-9 km/h.
Omsk	Road-based public transport operation is often delayed due to traffic congestion, up to 30-40 minutes later than the scheduled time.
Krasnodar	Traffic congestion is a serious problem. During peak hours, traffic speeds along main city streets are observed at 10 km/h.
Tyumen	Traffic congestion during peak hours is a growing and severe problem. When the volume to capacity ratio exceeds 0.7, speeds noticeably decline and vehicles take more time to cross intersections, and the ratio often exceeds 0.9 on various road sections.
Tomsk	Traffic congestion during peak hours along main city streets causes time losses of 40 to 90 minutes per car.
Lipetsk	Traffic congestion is a serious problem. The speed at key choke points does not exceed 5 km/h during peak hours.
Stavropol	The road infrastructure of Stavropol was not designed to support the substantially increased traffic flows; to the road network can theoretically handle private car ownership of 60-100 cars per 1,000 residents, whereas the actual figure is already over 320 cars per 1,000 residents. This has resulted in a deterioration of traffic conditions, congestion and traffic jams, increased fuel consumption, worsening of the environmental situation and a growing number of traffic accidents.
Velikiy Novgorod	The city suffers traffic jams at heavily populated crossroads. It is particularly felt during rush hours, affecting adversely the quality of passenger conveyances. Specifically, public transport fails to follow its own timetables.
Ussuriysk	Traffic congestion during peak hours and road repair works, and force majeure (e.g. inclement weather, natural disaster) is a major problem.
Kamyshin	Traffic congestion has recently become a problem, especially during peak hours and at key junctions including the entrance to the bridge.

Municipal public transport services: Operating deficits and deteriorating fleet.

All cities except three reported operating deficits of municipal bus operations. In the case of Lipetsk, Volzhskiy and Znamensk, the deficits are as high as 183, 210 and 93 percent of operating revenues respectively, i.e., fare revenues cover only between about 30 percent and 50 percent of operating costs (Table 4). While similarly low levels of cost coverage occur in several Western European cities, even those with commercial private sector suppliers, this is usually the result of a conscious policy of subsidised funding of a well-maintained fleet. By contrast, the financial situation of

municipal operators in Russia requires budget-financing for fleet replacement and is usually associated with an aging and deteriorating fleet.

TABLE 4: FINANCIAL PERFORMANCE OF BUS OPERATION AND AVERAGE AGE OF BUS FLEET

City	Operating costs (US\$)	Operating revenues (US\$)	Operating deficits† (US\$)	Operating deficits† (% of revenues)	Average age of autobus fleet
Yekaterinburg	55,642,297	40,424,543	15,217,753	38%	9
Omsk	92,542,057	82,766,450	9,775,607	12%	8.5
Krasnodar	69,753,250	72,877,020	-3,123,770	-4% (operating profits)	5
Tyumen	16,619,987	20,304,713	-3,684,727	-18% (operating profits)	5-27
Tomsk	19,717,867	14,563,800	5,154,067	35%	
Kemerovo	45,630,000	40,050,000	5,580,000	14%	8.4
Lipetsk	34,509,583	12,195,980	22,313,603	183%	8
Cheboksary	28,840,000	26,206,667	2,633,333	10%	6
Ulan-Ude	9,963,333	9,150,000	813,333	9%	Municipal operator: 12 Private operators: 7
Stavropol	9,646,667	7,093,333	2,553,333	36%	6
Volzhskiy	14,562,353	4,690,910	9,871,443	210%	12.4
Velikiy Novgorod	19,732,967	18,781,467	951,500	5%	16.9
Ussuriysk					10-15
Kamyshin					5.2
Akhtubinsk	1,142,670	1,191,473	-48,803	-4% (operating profits)	Municipal operator: 18.5 Private operators: 10
Znamensk	405,407	209,797	195,610	93%	10.4
Kamyzyak					5-6

† Note: Negative values of operating deficits mean that bus operators generated operating profits.

The cities stated that their primary concern with the public transport fleet was on the age and condition of the fleets of the municipal enterprises, though not all gave detailed information. Tyumen quoted the average age of its large bus fleet as 27 years, while Veliky Novgorod estimated the average age of its trolleybus fleet to be 20 years. In contrast, however, the average age of the private large bus fleets was considerably lower, and that of the minibus and shuttle taxi fleets (which have a

shorter physical life) generally ranged from 3 to 5 years. Tender conditions are being used in some cases (e.g., Tyumen) to reduce the average age of the private sector fleet.

Air quality. Air pollution in Russian cities is typically stated either in terms of aggregate weight of pollutants emitted or in terms of an air pollution index (API). API is an index characterizing the input of separate pollutants (suspended matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, nitrogen oxide, phenol, ammonium, formaldehyde, benzo(a)pyrene) to overall atmospheric pollution over a given period for the given area or measurement point. The level of air pollution is considered to be: Extremely high if $API \geq 14$, High if $13 > API > 7$, Moderate if $6 > API > 5$, and Low if $API < 5$.

In most surveyed cities, road traffic is estimated to be the main source of air pollution accounting for over 50% of total emissions. However, source apportionment is not usually evaluated scientifically; the contribution of the transport sector is likely to be regarded as a general impression rather than a well demonstrated fact. While overall air quality appears to be improving moderately in some of the larger cities, and is attributed to improved vehicle fleet standards, parallel changes in industrial heating may also be playing a large part in the improvement. Table 5 summarizes the self-assessment of the cities in the sample.

TABLE 5: REPORTED ASSESSMENT OF AIR QUALITY

City	Self-Assessment of Air Pollution in the City attributed to Transport
Yekaterinburg	The emission of pollutants into the atmosphere is 315,000 tons per year including 252,600 tons p.a. from moving sources.
Omsk	In 2010 the level of air pollution was 11, which is a high level. The main pollutants are formaldehyde and benzo(a)pyrene.
Krasnodar	Transport is the main source of pollution (90%). Exceeding of maximum permissible concentration by 0.3 % in peak hours. Level of NO ₂ is close to maximum permissible concentration (MPC).
Tyumen	Data from air pollution monitoring in Tyumen show that in 2010 atmospheric air quality somewhat improved: the air pollution index was 12, or 14% below the 2009 level and 40% below the maximum over the past five years. Motor transport is the main contributor to air pollution. In 2010 vehicle emissions amounted to 82,245 tons, with the principal pollutants being carbon monoxide, formaldehyde and suspended solids. Overall, over the years the number of atmospheric air samples exceeding the maximum permissible concentrations in Tyumen decreased from 3.6% in 2008 to 0.98% in 2010. Air pollution levels on highways were 7.4% in 2008 and 1.4% in 2010, and in industrial zones 1.6% and 0.45%, respectively. The most efficient measures for reducing the impact on atmospheric air is the operation of motorized transport conforming to the EURO-3 and EURO-4 emission standards and the installation of dust and gas trapping devices at industrial facilities.

Tomsk	The amount of air pollutants in 2010 was 123,000 tons, 6.9% up from 2009, including 86,800 tons (70%) emitted by transport (5% up from 2009)
Kemerovo	According to the Office of Natural Supervision of the Kemerovo City, the level of emissions amounted to 55.35 tons. The set maximum permissible level was 51.44 tons, thus emissions exceeded the maximum permissible level by 7%. Emissions increased by 2.31 tons as compared to the previous year. The contribution of transport to total emissions amounted to 55.57%, including: carbon oxide - 87.7%; NO - 43.7%; volatile organic compounds - 89.4%.
Lipetsk	Air pollution index is 7.5 (standard is 4-7). Lipetsk is one of the five most polluted cities in Russia. In the past years, air pollution, caused by growing number of vehicles, has become a pressing issue: the share of air pollution caused by vehicles is 28%.
Cheboksary	Tendencies over the 2006-2010 period –: There is a tendency for levels of formaldehydes to grow, while level of sulfur dioxide, carbon monoxide, nitrogen oxide, and phenol decreased. The level of suspended solids, soluble sulfates, and nitrogen dioxide remained stable. The comprehensive indicator of air pollution (API - air pollution index), calculated based on five basic contaminants, was 11.0 in 2010. The basic contaminants include the following: formaldehyde API - 6.98, benzo(a)pyrene API - 2.41 suspended solids API - 0.98, nitrogen dioxide API - 0.64, carbon monoxide API - 0.42.
Ulan-Ude	Total emissions (from stationary sources and vehicles) in 2010 amounted to 54,315 kilotons, including: solids - 14,564 kilotons, sulfur dioxide - 7,736 kilotons, carbon monoxide - 23,438 kilotons, oxides of nitrogen - 5,415 kilotons, VOC - 2,834 kilotons. The contribution of transport to total emissions amounted to 40.88%, including: carbon monoxide - 32.36%, nitrogen oxide - 4.43%, VOC - 4.03%. Emissions from vehicles in 2010 decreased by 24,478 t as compared to 2009, but this was caused by changes in methodology for estimating emissions from mobile sources (road and rail transport). Level of air pollution (LAP) has decreased over the past five years (LAP was 13.8 in 2006, 14.6 in 2007, 14.6 in 2008, and 13.6 in 2009) and remained at high level (12) in 2010. The following indicators were taken into account: suspended materials, sulfur dioxide, carbon monoxide, nitrogen dioxide, nitric oxide, phenol, formaldehyde, benzo(a)pyrene, metals (chromium, lead, manganese, nickel, zinc, copper, iron, cadmium, and magnesium).
Velikiy Novgorod	Gross atmospheric emissions 2010 total 44,632 kilotons, including: 11,471 kilotons from stationary sources, 33,161 kilotons from vehicular transport (74%). Atmospheric pollution index (API) is in decreasing trend, except an increase in 2009: 6.8 (2007), 5.0 (2008), 5.5 (2009), and 4.4 (2010).

Underlying these symptoms—congestion, large operating deficits and growing air pollution—are various institutional and technical causes. The following two sections examine them in detail.

3 DIAGNOSTIC REVIEW: INSTITUTIONS

3.1 LEGAL DEFINITIONS OF URBAN TRANSPORT

In the Russian legal system, urban transportation is not specifically identified as a distinct, integrated and comprehensive strategy area.³ Instead, different laws define some modes and fragmented elements of urban transport in terms that are often technically inadequate. Government Decree 1090 (October 1993), “On the Rules of the Road” defines the basic rights and responsibilities of drivers, passengers and pedestrians. Federal Law No. 257-FZ (November 8, 2007), “On the Roads and Road Traffic in the Russian Federation and on Introducing Amendments to Certain Legislative Acts of the Russian Federation” defines road transport and city ground electrical transport (trams and trolleybuses but not metro). Federal Law No. 184-FZ (October, 2003), “On General Principles of Local Government in the Russian Federation”, assigns the responsibility of public transport operations to municipalities. Federal Law No. 196-FZ (December 10, 1995), “On Road Safety”, loosely defines traffic management in relation to road safety but the definition does not adequately capture modern, sophisticated traffic management instruments, algorithms and technologies. Logically, responsibilities for things that are not legally and technically well-defined cannot be granted to a legal entity. This deficit is well recognized by the Federal Ministry of Transport, which is working to develop a more comprehensive legal framework (discussed in further detail in Section V.A).

The fundamental institutional problem was once characterized as “consideration of transport safety and environmental sustainability as independent, purely technical problems without their relation to the general tasks of transport management”.⁴ The absence of a formal legal definition might be a reflection of this thinking. In fact, according to the current legislation, some urban transport functions are assumed by the regions, while others are assumed by municipalities. For example, traffic management is a function shared between federal and regional governments, and a lot of traffic management equipment, regarded as safety-related, is funded through the Ministry of the Interior. As the municipality cannot contract works on federal facilities, this inhibits the development of integrated traffic signal programs. On the other hand, road provision and maintenance is shared between regional and rayon administrations, while public transport provision is delegated to the lower level of settlements. Other functions related to urban transport, for example taxi regulation, are also exercised at the regional, rather than municipal, level. The federal responsibility for protection

³ The term “urban transport” in the Russian language is commonly interpreted as referring exclusively to public passenger transport.

⁴ Donchenko, V. (2005), “Problems of Achieving Sustainable Urban Transport in Russia and Other CIS Countries,” Conference on Implementing Sustainable Urban Transport Policies, Moscow, the Russian Federation

of the environment might be interpreted as giving the federation powers whenever urban transport could be deemed to have any adverse environmental impacts.

This current legal basis makes it difficult, if not impossible, to respond to metropolitan scale urban transport challenges in many cities that are the center of a larger, metropolitan, catchment area. Several cities claimed to have difficulties organizing transportation beyond their municipal boundaries as a consequence of the absence of appropriate arrangements for metropolitan-level institution. As the law does not provide for metropolitan level organizations, problems are addressed on an ad hoc basis. Novosibirsk has established interurban bus terminals near its boundaries to ensure that cross-boundary traffic is transferred to the services operated within municipal boundaries and that interurban buses do not operate in the city. Veliky Novgorod has a draft agreement with the adjacent rayon giving the municipality the right to plan services for the whole network. The delegation from Tomsk explained its plan to develop an interurban high speed train, which was conceived by an inter-municipal working group. In these circumstances most cities believe that it would be more efficient if their municipal transport services could be extended through the entire catchment area and protected from being undermined by services that are allowed by the region to operate into the city.

3.2 TRANSPORT PLANNING AND STRATEGY

First, the planning of spatial activities that generate transport demand is not well integrated with the subsequent planning of transport systems. This highlights weaknesses in the City Planning Code. On the one hand, the Planning Code does not make adequate provision for ensuring that the transport links—particularly the road links—provided for are adequate in quantity and structure to handle the traffic generated. On the other hand, the planning norms in respect of parking provisions appear to be based on an implicit policy of providing for unrestricted motorization. This contrasts with transport policies in many countries that have increasingly recognized that this is neither sustainable nor achievable, and that strategic use of parking control is an effective instrument to achieve a balanced and sustainable system.

Organizational silo both at federal and municipal levels contributes to these planning challenges. At the federal level, inter-ministerial collaboration is weak between the Ministry of Transport and the Ministry of Regional Development, the latter being responsible for enforcing the City Planning Code. At the municipal level, traditional land-use and development control remain the responsibility of the City Architecture Department, or its equivalent, responsible for physical planning. Typically the General Plan determines the allocation of activities as well as the space available for road infrastructure, which is a very traditional arrangement. There is no formal requirement for traffic impact assessment associated with new development permissions. In Stavropol and Tambov, the transport professionals found this arrangement unsatisfactory in that it resulted from an excessively narrow interpretation of the urban development code, not recognizing the new realities of

motorized transport demand. In Nizhny Novgorod and Novosibirsk, it was argued that parking standards should be determined essentially by transport policy, and that the standards currently applied were inappropriate.

Second, within the municipality, functions and responsibilities in the transport sector are often split among different committees and departments, hampering a strategic and comprehensive approach to transport planning.

Part of the traffic management function lies with the police, road construction is usually in an infrastructure department, and municipally run public transport services are planned and managed by a separate department. And even when various functions are pulled together in a single department, the departments are generally poorly staffed to perform a strategic planning function. In Tomsk, Tambov, Novosibirsk and Veliky Novgorod the transportation units have a staff of only four to five people responsible for road safety and public transport. Nizhny Novgorod, a city of 1.25 million inhabitants, is richly endowed with a transport staff of 15. Given those administrative arrangements, it is not surprising that none of these cities have a proper strategic plan for the urban transport sector. Tyumen is a rare exception in the study cities, with a transport department staff of 45-50 staff including a strategic planning unit of 10 people. It does have a transport strategy plan, produced in 2006 and last updated in 2011.

Under these circumstances, urban transport planning is limited in scope. The comprehensive urban development plans are primarily concerned with physical structure, nothing more. For instance, as far as urban transport is concerned, these plans often identify major infrastructure investment requirements, but stop short of dealing with crucial issues of system management. Even in respect of physical investments, the general plan often does not fully reflect the current objectives of city officials and citizens, and is typically not adjusted to take into consideration the city's estimated financial capability. The fact that municipalities do not control all aspects of urban transport makes it even more difficult for cities to prepare and implement long-term strategies. Clearer specifications of municipal and oblast responsibilities are thus a pre-requisite for the establishment of improved practical implementation of strategic urban transport plans. To overcome these defects, municipalities need to develop more comprehensive urban transport strategies that take into account city objectives and financial realism.

3.3 FISCAL AND FINANCIAL CAPABILITY

Weak financial capability of municipalities undermines their ability to develop medium-term investment programs or to allocate adequate funds for maintenance of infrastructure assets. This is attributed to the limited taxing power of municipalities and unpredictability of intergovernmental transfers between regional authorities and municipalities. According to Article 104 of the Constitution, any new taxes may be introduced only by the federal government upon approval by the State Duma. While Article 132 assigns to local self-government bodies "right to introduce local taxes and dues", the only taxes that may be collected and administered by regional or municipal governments are those stipulated in the

tax legislation (Tax Code) as regional or municipal taxes. The right assigned to regional or municipal governments under Article 132 is thus to adopt such taxes at a rate that is equal to or lower than the stipulated rate in the Tax Code.

The consequence of the weak taxing powers of municipalities is that they are dependent on transfers from higher jurisdictions. It is claimed that cities rely on transfers for approximately 70 percent of their revenues; only about 30 percent of the municipal budget comes from the city's own sources, such as land tax, part of personal income tax, and municipal trading revenues. At present, the Federal Government directly transfers funds to its subjects, i.e., regions (oblasts), which then transfer funds to their subjects, i.e., municipalities and other rayons. Where some funds are earmarked for specific projects, as in some federal targeted programs, the regions pass them through automatically to the relevant subsidiary agency or jurisdiction. However, all other allocations to municipalities by regional authorities, especially those for capital investments, appear to be on an annual request-and-negotiation basis. This makes it difficult for municipalities to do meaningful long-term strategic planning, or to make sure that their allocation of resources is consistent with a long-term strategy.

The financial insecurity cascades down through the system. Municipal transport companies rely on the city to finance vehicle replacement, while the city obtains money for this purpose either through its annual request to the region or on the even less regular and reliable source of federal targeted programs (i.e., sporadic grants allocation). The consequence of this is that the quality of municipal public transport suffers. The challenge facing Russia is thus to develop a more secure and predictable funding arrangement for municipalities on the basis of which they can plan more strategically and implement their plans with greater consistency.

4 DIAGNOSTIC REVIEW: FUNCTIONS

4.1 ROAD NETWORK DEVELOPMENT AND MANAGEMENT

The urban street system is an extensive and costly fixed investment whose maintenance requires substantial resources, and many cities are struggling to meet maintenance needs adequately. The rapid increase in motor vehicle ownership in most cities is placing substantial additional challenges upon them in terms of maintaining their road system, upgrading the traffic carrying capacity of existing road links, and providing extensions to the road system.⁵ This means cities need not only to maintain the existing road network, but also to upgrade existing road links in a selective way and to make investments in new streets in response to increased traffic and new land developments. In reality many municipalities have under-invested in road maintenance, which resulted in deterioration of these networks. In the long run, failure to maintain the road network in a timely manner leads to even more costly road rehabilitation or complete reconstruction.

These poor road conditions have been exacerbated by the current fiscal arrangements under which municipalities need to negotiate for road funds from oblast authorities on a yearly basis. This has made it difficult to commit to longer-term road maintenance and investment plans. Many municipalities do not have adequate data on road conditions and traffic in place, and most have no computerized analysis of available data that would allow them to take into account vehicle operating costs, unit costs of road works, and pavement strength and condition over the entire road network directly. Consequently, most municipalities are not able to develop an optimum road network maintenance strategy, i.e., the set of interventions (and related budget) that would minimize the total road maintenance and rehabilitation expenditures in the city.

Fragmentation of responsibility between different classes of roads accentuates the problem. Within municipal boundaries, there are road links that are under the ownership of the federal or regional authorities, hence outside the responsibility of municipalities to maintain or improve. Transfers of ownership is handled differently by region and municipality, but the general rule is that in cases where federal roads are constructed bypassing a city boundary, then the original section of the federal road that goes through a city is then transferred to the municipal authority. As a result, in some cities, such as Volgograd, all roads within the city boundary are the property of the city; in other cities, responsibility to maintain the road network is split among three levels of authorities—the federal

⁵ Between 1993 and 2007 the Russian passenger car vehicle fleet increased from 11.5 million vehicles to 29.4 million, an increase of 155% or about 7% annually over this 14 year period. Most of this growth has occurred in urban areas.

road agency (RosAvtdor), the regional government and the municipality. Typically, road links that are of federal or regional importance are also often critical elements of the municipal road network; hence, it is important to ensure that these three levels of government are well-coordinated in order to maintain and enhance the overall urban road network.

4.2 TRAFFIC MANAGEMENT

Legally, the Federal Government is in the process of redefining traffic management as the main element of a comprehensive urban transport strategy; in practice, the traffic management function is narrowly defined and weak in many cities. Currently, until the current Draft Law on traffic management is enacted, there is no adequate and comprehensive legal definition of traffic management. The provisions relating to traffic management are scattered between a range of measures including Resolution 1090 (October 23, 1993), “On traffic Regulations”, Federal Law No. 196-FZ (December 10, 1995), “On Road Traffic Safety”, Federal Law No. 257-FZ (November 8, 2007), “On Motor Roads and Road traffic Operations in the Russian Federation”, and Federal Law No. 3-FZ (February 7, 2011), “On Police”. The emphasis of these acts is primarily on road safety and enforcement of traffic rules rather than the broader objective of efficient performance of road traffic. Traffic signal systems in many cities need improvements; they have limited timing plans and are uncoordinated.⁶ A few cities, including Moscow and St Petersburg, have made important progress in deploying Intelligent Transport Systems (ITS) such as motorist/passenger information systems, bus management systems, incident management systems, and traffic enforcement systems; but most cities are still at the very early stage of ITS deployment.

Traffic management responsibility is split between jurisdictions and entities due to administrative setup, and often, to limited skills within the public administration. The existing Russian legislation, including the recent amendments to Law No. 257-FZ (introduced by Law No. 69-FZ, April 21, 2011), allocates responsibility for traffic management of a road to the specific level of jurisdiction that owns the respective road. This implies that, as discussed in Section IV.A, there can be up to three—federal, regional and municipal—different traffic management authorities within an urban area. Moreover, traffic management has historically been viewed primarily as a police function related to safety. Coordination and sharing of responsibilities between the police and the traffic management unit in a city varies, depending on the capacity of the traffic management unit and practical arrangements for collaboration with the police. This division of responsibilities and functions is likely to undermine sensibly coordinated policy implementation of traffic management and parking policy arrangements (see Section IV.C below). Moscow and St Petersburg, enjoying their status as subjects to the Federation, have developed more comprehensive traffic management functions at the city level. Among cities of the next tier, which are subject to their respective regional

⁶ From interview with cities

authorities, only a few have established a traffic management system that can be deemed sufficiently strong.

Despite those institutional difficulties and lack of human resources, some Russian cities have already demonstrated the benefits of improved traffic management. Since the creation of a Road Traffic Management Unit in Novosibirsk in 2006, the unit has been responsible for coordinating various actions concerned with traffic management. They include legal and technical measures, analysis of the causes of traffic accidents, and promotion of measures to improve road safety. It has introduced an automated road traffic management system and achieved an increase of average travel speeds of 15-20 percent while at the same time re-organizing speed limits and speed controls. Accidents involving fatalities or serious injuries are estimated to have fallen by 18-20 percent in a two-year period.

4.3 PARKING AND DEMAND MANAGEMENT

Most Russian cities have not yet adopted the concept of demand management as part of their transport strategies. On the one hand, this is often a matter of philosophy—many cities are committed to accommodating rising demand for car traffic, whose rapid increase is fueled by growing income and motorization rates. On the other hand, this is also attributed to the absence of comprehensive transport planning exercise, which could show, through transport modeling, what the likely outcome of different investment options and policy instruments would be. For instance, most European medium and large cities have based their policy-making and investment decisions on such analyses and modeling results. They showed that it is neither physically nor financially feasible to accommodate unrestrained demand for car traffic without serious road congestion and its attendant environmental impacts. In Russia, St Petersburg is one of the first cities that adopted the notion of demand management in their 15-year urban transport strategy. The strategy, while including some important road investments, recognizes the need for a shift from private to public transport for journeys to the central area, particularly during peak hours. It also acknowledges that a policy to achieve such a shift needs to include both supply- and demand-side measures: the improvement of public transport and the management of private transport demand.

Municipalities lack appropriate instruments—development control, regulatory framework, and pricing measures—to develop a comprehensive city-wide parking strategy. Parking policy, which is the main instrument for demand management in better-performing cities, is severely hampered in Russia by the current legal provisions—the Urban Development Code, the Federal Law, or the Traffic Rules—in various ways. First, the minimum requirements for off-street parking spaces to be provided by developers, particularly in residential areas, are out of date and do not match the current levels of motorization. Second, none of the current legislation is concerned with limits on the total amount of available parking spaces in congested city centers or allowable duration of parking, which are crucial elements of a comprehensive city-wide parking strategy in most European cities.

Third, while recent changes in Federal legislation⁷ do give more freedom to municipalities to manage the use of transport lands for parking, municipalities can develop a parking policy only for municipal roads, not for regional or federal roads. Fourth, restrictions remain on the application of penalties for infractions and on the use of civilian officers to enforce parking regulations.

4.4 PLANNING AND SUPPLY OF PUBLIC TRANSPORT SERVICES

Most medium and large Russian cities have multiple public transport modes, including conventional large buses, minibus or shuttle taxi services, electric public transport such as trams and trolley buses, and metro in the case of larger cities. Planning, provision and management of public transport systems pose several important challenges in these cities.

The first challenge is to develop a “backbone” of public transport system—high-speed and high-capacity mass transit—for which investment is economically and financial feasible. Under the former Soviet system, there was a policy of providing metro systems for all cities with a population exceeding one million; and according to this policy metro systems were constructed in eight cities, including several short ones—Novosibirsk (16 km), Nizhny Novgorod (15.5 km), Samara (11.4 km), Kazan (10.3 km), and Yekaterinburg (8.5 km). These systems were often built to connect primarily residential areas to industrial zones during the Soviet era and are typically poorly integrated with the rest of the transport system. Failing to perform the high-speed trunk movement function, several of these systems now carry only a small share of total public transport trips: 16 percent of total public transport trips in Novosibirsk are made by metro, 12 percent in Yekaterinburg, and only 2.5 percent in Nizhny Novgorod. The existing eight metro systems and further six under construction or being planned are, and will be, operated by municipally owned companies and receiving direct subsidies from the municipal budget. Underutilization and heavy subsidies for some metro systems are outcomes of the absence of a coherent transport strategy (see Section III.C) and alternative analysis that explores various technology options in addition to just metro rail.

A second challenge is to make decisions on existing tram systems, which are all publicly owned and incur operating deficits funded through city budget, either through replacement with other modes or upgrading to modern rail systems. The majority of medium and large Russian cities have conventional tram systems which are in poor condition and offer a low quality of service. In some cases where traditional bus services have collapsed and are being replaced or

⁷ Sub-clause 21 Article 1 of the Urban Development Code defines “parking” as a specifically designated, developed, and equipped part of a road intended for organized parking of vehicles on a paid/unpaid basis. Federal Law No. 257-FZ, “On Automobile Roads and Road Activity” (August 8, 2007), amended by Federal Law No. 69-FZ, “On Amendments to Certain Legislative Acts of the Russian Federation” (April 21, 2011), allows for provision and use of parking spaces on a paid or unpaid basis by respective sub-national authorities. Regional authorities can issue parking resolutions on regional and inter-municipal roads; and municipal authorities on municipal roads. This power is limited by the Traffic Rules approved by the Government Resolution No.1090 (October, 1993), which specifies a list of places where stops for vehicles are prohibited on the basis of traffic safety and efficiency of movement.

supplemented by commercial services provided by the private sector, trams continue as the main carrier of concessionary fare passengers, often at a high average cost per passenger. In other words, most tram systems receive operating subsidies. Central guidance and assistance could help cities reach a sensible outcome, either completely phasing out the operation to substitute it with other modes, or reviving its role through modernization, such as conversion to LRT or Bus Rapid Transit (BRT) systems. In either case, the decision should be based on a comprehensive transport strategy.

A third challenge is to integrate suburban railways as part of a metropolitan transport system, especially in growing cities with sprawling catchment areas.

The potential role of suburban railways is not being adequately considered in cities including St Petersburg, though the situation is better in Moscow. This problem is accentuated by the lack of interest of the commercialized national railways in providing passenger services, as they focus their business on the more profitable freight services and high-speed long-distance intercity passenger services. Given the sprawling nature of suburbs in many cities, it is necessary to explore the opportunity to transform the suburban rails into modern mass transit systems that can efficiently connect suburban residents to the city center.

A final challenge, which underlies all of the above, is to develop an integrated and coordinated urban transport system within which mass transit performs the desired function.

There is no provision in Russian law requiring the preparation of a strategic public transport plan at the municipal level, with the result that cities mostly respond in an ad hoc and inconsistent way to changing transport circumstances. This situation calls for coordination both in planning and operation. Urban transport systems need to be planned for all modes, not separately by mode-based departments and units in municipal authorities, and to support a trunk-and-feeder structure. This might be combined with various operational and managerial measures: restructuring of bus services, including those run by private operators, restraints on central area car parking, development of peripheral park-and-ride facilities, coordinated scheduling and multi-modal ticketing systems without additional charges for transfer between modes.

4.5 PUBLIC TRANSPORT REGULATIONS

The current municipal unitary enterprises have not been very successful in sustaining the vehicle and service quality. Most Russian cities started with a large public supplier, offering affordable services for all, and reduced fares for a wide range of categories of citizens. Since the introduction of Federal Law No. 161-FZ (2002), the publicly owned fleets are mostly operated by unitary municipal enterprises. The enterprises are formally independent, but do not own the asset (i.e., vehicles), and are obliged to give their profits to their owner authority. The unitary municipal transport enterprises thus rely on uncertain municipal funds for vehicle replacement, and the fleets of unitary municipal enterprises were reported to be typically older than those operated by the private sector. Ironically, the history of the sporadic cash support from the federal targeted programs, and the possibility

that money may be made available again in the future, undermines the sustainability of these services. Many municipalities are not committed to a more sustainable, cost-efficient, and commercially-oriented approach, under which vehicle depreciation and replacement reserve procedure would ensure proper maintenance and timely replacement of the vehicle fleet.

Operating deficits of trams and trolleybuses have increased consistently and the vehicle fleet requires large capital investment as the vehicle condition fast deteriorates. Many cities own tram and/or trolleybus fleets as well as their bus fleets. These are now more expensive to operate than standard internal combustion engine buses due to the high cost of electricity, which they now have to purchase at the market price. Except where trams are operated on segregated tracks in areas where there is road congestion they are slower than buses. The budgetary burden they impose is increasing while the share of the electric modes is declining in most cities. Vehicle replacement may be particularly difficult to justify in these circumstances. Their advantages—no local air pollution—and disadvantages—increasing operating deficits and large capital investment needs—should be carefully weighed. In many cases, replacing them with regular buses might be a more sustainable solution.

Private operators play an increasingly important role in supplying bus services, but their services are generally disintegrated from municipal buses and their performances are uneven. Bus services provided by private operators now account for up to 90 percent of the operating bus and shuttle taxi fleet in some cities, though their share of the total patronage is usually smaller due to the smaller average vehicle size of private fleets. They are responsible for their own vehicle provision and replacement, which may include leasing arrangements. In most cases the private operators should obtain permits that are competitively tendered.⁸ The details of the tender competition, and the criteria for the choice of the winning bidder, are usually set by the municipal authority under the terms of a local law or resolution. Common contracting procedures permit very small operators to bid, either for individual slots on routes (in some cities) or at least to act as sub-contractors to a principal who has bid for a route contract. They are usually subject to monitoring by the municipality using automatic vehicle location systems enabled by GPS. From the municipalities' point of view, the main problems posed by private operators are that they do not carry concessionary fare passengers, and that the company size is considered to be too small.

To ensure greater system integration and improve service quality, the current way private bus services are procured needs to be improved. The unequal treatment of municipal and private operators is part of a social policy to provide affordable bus services for lower-income citizens and vulnerable social groups. While affordability is one of the important characteristics of good public transport systems, this artificial separation of what are essentially similar services creates inefficiency. In most cases only potentially profitable services are competitively

⁸ Federal Law No. 94 requires that a competitive tender be held for any public service for which money is paid to a private supplier. Hence wherever there is a direct payment to the private sector operator, which is very rare, or where the contract involves an obligation on private suppliers to carry reduced fare passengers for which they receive compensation, a competitive tender is mandatory. Some cities, such as Lipetsk, avoid the obligation to tender by excluding the private operators from the obligation to carry concessionary passengers.

tendered so that municipalities can avoid providing operating subsidies to private operators. The effect of this is the creation of a two-tier public transport system with a higher frequency of service available to the users who pay the full fare than to those who pay concessionary fares (mainly students and pensioners). Apart from any perceived inequity associated with this separation of services, it has other undesirable side effects. It results in an inefficient use of the total amount of capacity supplied on a route, as some passengers are unable to board vehicles on which there is space. It can also result in unnecessary overcrowding of municipal buses and trams that provide social services.

More modern approaches to competitive tendering, such as gross-cost tendering, price-based tendering, and system-wide concessioning, should be explored in Russian cities. These approaches have been employed in several European cities as part of a transport strategic plan. In Russian cities, in the absence of those, municipal enterprises are increasingly concentrated on a diminishing supply of social services with increasing deficits burdening the public budget. Where municipal funds are scarce, this tends to have the effect of precluding adequate programs of vehicle replacement, and thus, the quality of service is also declining. In particular, by limiting the private sector to profitable routes, municipalities forgo the possibility of mobilizing the private sector to provide unprofitable services, which it could supply at a lower cost to the city budget than a municipal enterprise.

The current arrangement for public transport operations control provides a good basis for cities to introduce a reform of public transport tendering. All of the cities have inherited and developed a sophisticated and effective system of monitoring public transport supply, typically performed by a transport dispatching department. Most cities operate an automatic vehicle location system, using Glonass (equivalent to GPS), to undertake real-time monitoring of vehicle operations of not only municipal operators but also private ones. Moreover, these units are technically efficient and very strongly staffed compared with the policy units. For example, the dispatch center in Lipetsk has a staff of 86, Tyumen 96, Tambov 60, and Veliky Novgorod 25.⁹ This sufficient capacity would be an important basis to implement a reformed system—service procurement and contractual arrangements—in which private sector suppliers are competitively selected and operate under contract to the city.

4.6 ENVIRONMENTAL MANAGEMENT

National fuel standards have been tightened and resulted in significant improvement in emissions per vehicle. Adoption of Special Technical Regulations on Requirements to Harmful Pollutant Emissions from Vehicles Operating in Russia encouraged the use of higher quality vehicle fuel. Government Resolution No. 1076 (December 30, 2008), amended Fuel Regulations on Requirements to Automotive

⁹ The staff involved in this function is typically about 5% of the level of staff involved in operations, and as much as ten times the staff involved in the more strategic activities of network planning and service procurement. It may be questioned whether this focus is an efficient use of resources at the moment, especially where there is a predominance of private operations not subject to real-time management by the central dispatch service, and while the vehicle stock is so deficient.

and Aviation Gasoline, Diesel and Marine Fuel, Jet Fuel and Fuel Oil, pursuant to which EURO-2 automotive gasoline (sulfur weight content up to 500 mg/kg) could only be produced until December 31, 2010, and diesel fuel with a similar sulfur content could only be produced until December 31, 2011. Production of EURO-3 automotive gasoline (sulfur weight content up to 150 mg/kg) and diesel fuel with sulfur weight content up to 350 mg/kg was permitted until December 31, 2011, and that of EURO-4 gasoline (sulfur weight content up to 50 mg/kg) until December 31, 2014.¹⁰

At the regional level, authorities have the power to establish quality requirements for fuel sold in their territories, as this was done in Moscow, and there is some evidence that the previous deterioration of air quality in Moscow has now been stabilized (Table 6). At the municipal level most of the medium and large cities undertake regular measurement of the total amount of pollutants emitted into the air, and also estimate the proportion that is coming from mobile sources (usually between 60 and 80 percent), though it is not clear how accurate the source attribution procedure is.

TABLE 6: MEAN CONCENTRATIONS OF MAJOR POLLUTANTS (MG/M3) IN DIFFERENT PARTS OF MOSCOW, 2007–2009

Parameter	For the city as a whole			Near city thoroughfares			Central area			Residential areas		
	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
CO	0.7	0.57	0.60	1.0	0.71	0.83	0.8	0.59	0.60	0.6	0.51	0.51
NO ₂	0.042	0.036	0.035	0.051	0.044	0.038	0.044	0.035	0.035	0.039	0.031	0.03
NO	0.046	0.038	0.038	0.057	0.053	0.050	0.054	0.035	0.037	0.041	0.026	0.027
SO ₂	0.006	0.003	0.004	0.007	0.004	0.005	0.006	0.004	0.004	0.007	0.002	0.003
PM [*]	0.035	0.037	0.033	0.048	0.046	–	0.035	0.039	0.036	0.032	0.038	0.031
O ₃	0.032	0.032	0.03	0.039	0.037	0.029	0.031	0.030	0.029	0.028	0.032	0.03
AQI5	6.3	6.2	5.8	7.1	7.0	6.3	6.5	6.3	5.8	6.1	6.0	5.0

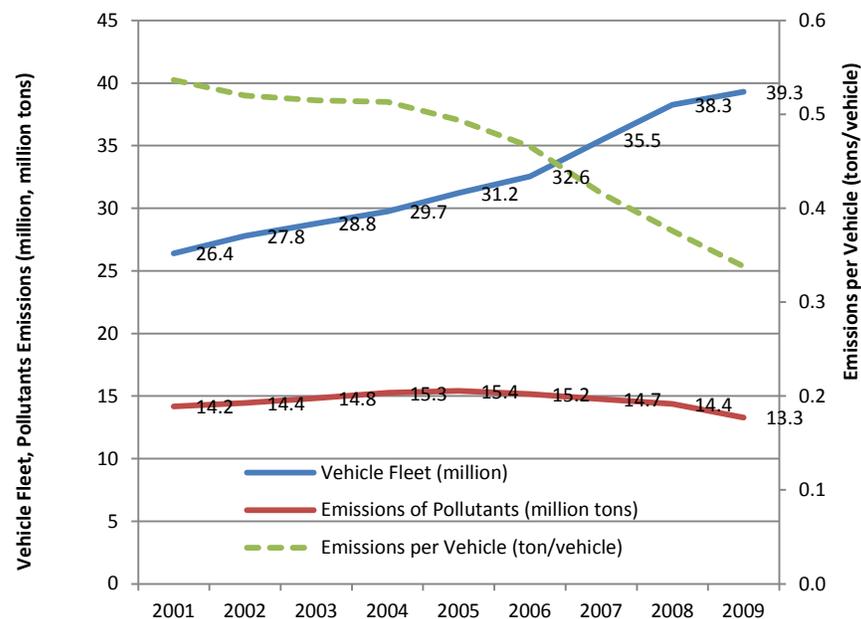
Note:* suspended particulate matter, PM10 (particle size ≤ 10 μm)
(Source: NIIAT)

Vehicle standards have also been progressively tightened at the national level. The lag in the introduction of EU vehicle emission standards in the Russian Federation has diminished from about 15 years for the introduction of EURO 1 and EURO 2, to six years for the planned introduction of EURO 5. Controls and taxes on the import of second-hand vehicles are also being used to support the improvement of the average standard of the fleet. The overall impact of these policy measures appears to have been very favorable: emissions of pollutants per vehicle have decreased quickly, and thus, despite a very rapid increase in the fleet size, total emissions have now begun to fall (Figure 2). However, policy issues concerning environmental management remain.

¹⁰ These data are from NIIAT, Scientific and Research Institute of Motor Transport.

First, the failure of fuel quality to keep pace with the proposed tightening of emission standards has led to the postponement of the enforcement of EURO 4 standards. The problem is more with the current enforcement system of ensuring the quality of locally sold fuel and the lack of desire on the part of authorities to address this complex issue. In those circumstances, the emphasis of many cities is on encouraging a shift from diesel to gas (CNG or LPG) powered vehicles. Some (like Tomsk) may commit themselves to electrically powered public transport—particularly the maintenance of their tram and trolleybus enterprises—without adequately looking at the costs of that commitment or the possibility that there might be more cost-effective policies available through the restraint of private car traffic. The review did not find any regular and systematic analysis of the cost efficiency of different measures in air pollution reduction.

FIGURE 2: EMISSIONS PER VEHICLE



Source: NIAT (2010)

Second, policy impact is weak at the city level. While cities may wish to take action to minimize the impact of urban transport on local air quality, they feel that they have relatively few instruments at their disposal. Vehicle and fuel standards are determined federally. Cities cannot restrain private vehicle traffic; nor can they institute green zones, banning entry to commercial vehicles.

Noise pollution is also a problem, and policy levers are weak, especially in large cities. Responsibilities for the development of strategies to reduce noise pollution are split among various entities as was the case for traffic management and public transport operations. However, most of the more effective powers, such as vehicle standards, and infrastructure investments are either federal or regional responsibilities. For the municipalities what remains is predominantly in the field of traffic management, which at present is a shared responsibility with the police.

5 ROADMAP FOR REFORMS AND INSTITUTIONAL DEVELOPMENT

5.1 PROPOSAL 1: LEGAL AND REGULATORY REFORMS

During this Review, the government has taken important steps to improve the legal framework, in form of the Draft Law on Traffic Management and Federal Law No. 69. Law 69 has already made some significant changes in respect of on-street parking and taxi regulation. Further, the Draft Law on Road Traffic Management prepared by the Ministry of Transport covers many of the issues addressed in the present paper, particularly on traffic management and parking. As far as traffic management and parking are concerned, the general philosophy expressed in the Draft Law generally coincides with what is suggested in Section V.A. In several areas, however, Law 69 and the Draft Law do not seem very clear, are not consistent with a sustainable urban transport strategy, or require additional content. The main issues are as follows:

- Strategy context. The introduction of a new comprehensive law on traffic management and parking is an excellent opportunity to encourage both regions and municipalities to develop comprehensive strategies. One possible way of doing this would be to make the grant of new powers to the municipalities contingent on the preparation of an acceptable strategic plan or policy framework statement.
- Relationship with land-use planning. The law should define a clear strategy for parking norms, rather than mechanically requiring minimum parking spaces. In this case, municipalities would be able to set not only minimum, but also maximum standards for parking in congested areas, in accordance with the strategy.
- Integrated institutional responsibility for traffic management. The Draft Law should make it clear that the whole of traffic management policy and its implementation should be the responsibility of a single agency—normally the municipality (i.e., all roads within the municipal boundaries). Where the ownership of roads means that higher-level jurisdictions must be engaged in works on the portion of the road system that they own, they should have the obligation to coordinate with the unitary traffic management authority. An alternative way of achieving the same objective of integrated traffic management would be to transfer ownership of all roads within municipal areas to municipalities, with the provision that funding would still be

available from higher-level jurisdictions for improvements or maintenance of higher-level roads in agreement with municipalities.

- Parking law and responsibilities. The Draft Law should grant municipalities power over (i) planning norms for parking in different locations; (ii) the rate of parking charges, both for on-street and off street parking; and (iii) fines to be imposed for parking infringements.
- Parking Enforcement. Civilian officers should be granted the power to enforce on-street parking both in illegal parking areas and in areas where parking is allowed but where there are restrictions on duration of parking and where charges for parking are in effect.

Second, it is necessary to enact a comprehensive law on passenger public transport. This law would codify and consolidate all matters relating to the efficient procurement, regulation and supply of all modes of urban public transport. It would clarify the responsibilities of municipalities in procuring service through comprehensive competitive tendering of franchises and define the rights and duties of municipalities in respect of determining network structure, frequency and fares of all public transport modes, including commuter rail service. It would also provide for restructuring of traditional unitary municipal or state enterprises consistent with the system of competitive tendering. It would specify both the powers of authorities to mandate fare concessions for selected categories of passenger and the associated provisions for compensation for any such mandated concessions. The new law on public transport would also encourage establishment of some intermediate form of metropolitan authorities, similar to coordination committees established in Moscow and St Petersburg metropolitan areas, but with a stronger technical basis and steady funding support. Integration of public transport operation—route planning, fare systems and scheduling—should be pursued by a metropolitan authority.

Specifically on the institutionalization and implementation of a competitive tendering process for bus services, the law should provide a basis on which suppliers are selected through the “lowest price conforming” method and provide specified vehicles of acceptable standards as part of the service contract. The competitive tendering in cities should cover all aspects of autobus service operation, not just some segments of it. In practice, this reform would require several steps as follows:

- 1) Appropriate amendment of regional or local regulations on competitive tendering of bus services and criteria for selection of suppliers,
- 2) Commercialization or privatization of municipal enterprises and removal of any budget support (including replacement of vehicles on the public budget) other than through revenues obtained in successful tender bids,
- 3) Integration of all system operators into a single fare and service system,
- 4) Implementation of gross cost contracting as part of the tendering arrangement,

- 5) Provisions for setting fares, adjusting payments for inflation, enforcing contract performance,
- 6) Provision of a financial plan showing the forecast budget requirements of the new system and legal commitments to making contract payments for the duration of the contract.

Third, in the medium-term, these two laws—the Draft Law on Traffic Management and the proposed law on passenger public transport—may be integrated and extended into a Law on Municipal and Metropolitan Urban Transport. This law would define urban transport in a comprehensive way and assign responsibility for it to municipalities or metropolitan associations, together with establishing the basis for sustainable finance of urban transport. It would oblige the responsible authorities to establish comprehensive urban transport strategies as the basis for financial support from the federal and regional governments. The municipal strategic transport plan would be given precedence in defining the objectives for other aspects of the comprehensive policy development such as traffic management, demand management and urban public transport laws and procedures. In the medium-term, the formation of a metropolitan authority, which would have been a recommended practice under the above passenger public transport law, would now become a mandatory practice or conditionality if cities want to receive federal assistance on technical capacity building and/or financial support.

5.2 PROPOSAL 2: INSTITUTIONAL AND TECHNICAL CAPACITY BUILDING

Part of the problem in developing the sustainability of urban transport in Russia is the lack of some professional skills in medium-sized cities, particularly in urban transport planning and traffic management. There are two aspects to this:

First, while the technical aspects of urban transport appear to be well provided for in the state educational standards for university curricula, the management and market regulation aspects do not seem to be so well covered. Federal state education standards are adopted separately for each professional training area as listed by Order No. 201 of the Ministry of Education and Science of the Russian Federation (February 17, 2011). The standards were last amended in May 2011. Training-related management appears in professional training area 190000 “Land transport and logistics complexes,” which includes specialty 190100 “Land transport systems”; professional training area 190600 “Operation of transport technological vehicles and complexes”; professional training area 190700 “Technology of transport processes,” which includes specialty 190702 “Organization of traffic and traffic safety”. Traffic management is not recognized in these standards as an important area in its own right and public transport service procurement does not appear to be included at all.

It is necessary to include these areas in the formal curricula of university programs. This might be done through the procedure for adoption and amendment

of standards by the Ministry of Education, established by Resolution No.142 of the Government of the Russian Federation (February 24, 2009). While federal educational standards are routinely reviewed at least once every 10 years, in practice they are amended on a regular basis at the initiative of interested parties. It is recommended that such a review be initiated in association with the enactment of the new law on traffic management.

A second challenge is that existing skills do not appear to be very mobile. One contributing factor to this is the lack of any system of post-experience professional certification of urban transportation professionals. Many of the European countries with well-developed urban transport planning capabilities have strong systems of certification in the areas of traffic engineering, urban transport planning, and public transport regulation and procurement. These systems often combine initial training in the academic institutions, certified through a nationally recognized university degree system, and further practical training, organized and accredited by national professional organizations. Russia has some strong traditional academic training, and it could be extended to a national system of post-experience professional accreditation.

Post-experience training and certification procedures are weak in the urban transport sector. Currently, there exist special mandatory qualification procedures for certain specialists (attorneys, notaries, judges, bankruptcy managers, appraisers, etc.). The requirements for mandatory qualification of such specialists are established by the relevant laws regulating their professional activities and, depending on the profession, may include:

- passing a special qualification exam held by a qualification board;
- receiving a special license from a licensing authority; and
- becoming a member of a self-regulating organization and meeting membership requirements established by the organization.

Priority areas for institutional and technical capacity building include the following:

- Development of municipal transportation institutions, including transport planning authorities, traffic management authorities, and public transport planning and management authorities;
- Preparation of urban transport strategies and investment programs;
- Improvement or establishment of road asset management systems;
- Introduction of innovative road contracts, such as performance-based contracts;
- Assessment of road traffic safety and development of traffic safety improvement plans;
- Development of support plans for non-motorized transport; and
- Assessment of environmental impacts of transport and development of green transport measures.

5.3 PROPOSAL 3: COST-EFFECTIVE HIGH-PRIORITY INVESTMENTS

There are several relatively low-cost investments in the areas of traffic management, public transport, parking, and non-motorized transport facilities that can be very effective in solving urban transport problems in medium-to-large sized Russian cities. These include the following:

Traffic signal system improvements. These investments may include (a) expansion of existing traffic signal systems to more intersections or locations, (b) appropriate upgrading of existing traffic signal installations, and (c) creating traffic control centers.

Low-cost street infrastructure improvements. Low-cost street infrastructure improvement measures can be effective in improving traffic flow and enhancing traffic safety. These investments would include: (a) geometric improvements such as at grade pedestrian crossings¹¹, traffic channelization, including modest geometric realignment of the roadway, and left turn bays, (b) measures to enhance passenger transport services such as bus lanes, (c) medians barrier, (d) one-way street provisions, and (e) street signing and marking.

Traffic enforcement and surveillance systems. These intelligent transport system (ITS) elements include, inter alia, systems that will enhance traffic enforcement and safety such as speed and red light cameras as well as vehicle detection systems that will assist in general traffic operations. A clear legal basis would be required for the introduction of such developments in enforcement.

System integration. Cities that boast some of the elements of a comprehensive intelligent transportation system (ITS) listed above may consider a system integration program that would consolidate separate systems into one coordinated system. Such programs may include designing of integrated system architecture, investments in servers, communication technologies, equipment, software packages, and development of a consolidated traffic management center.

Infrastructure investments in support of passenger transport. A range of modest cost infrastructure measures to enhance passenger transport operations are recommended. These include, inter alia, (i) bus lanes, (ii) physically segregated bus, trolley bus, or tram lanes (if costs are modest), and (iii) transport priority measures at intersections (including through geometric improvements and electronics).

Integrated passenger transport ticketing systems in conjunction with traveler information systems. Integrated ticketing systems that cover different operators for a same mode or between modes (including autobus, trolleybus, tram, or metro operations) would greatly improve user convenience, possibly leading to greater use of public transport. Implementation of such systems requires investments in equipment, establishment of contracts with system operators, a financial clearing

¹¹ In addition to at grade pedestrian crossings, considerably more expensive pedestrian overpasses and underpasses could be considered as special exceptions but only after a convincing case that the requested proposed pedestrian crossing could not be reasonably attained at grade with traffic signal control.

house and other arrangements that would be needed to implement these ticketing systems.

Light rail transit and bus rapid transit. Upgrading of the current road-based electric public transport modes (e.g., trams) to higher-speed and higher-capacity modes would be very effective, especially in larger Russian cities where traffic volumes would justify these investments. Specifically, modern technologies such as light rail transit (LRT) and bus rapid transit (BRT) should be considered. Important prerequisites for such investments include (i) making sure the candidate route or routes are already physically segregated¹² from the general traffic stream or could be segregated at modest cost, and (ii) considering measures that could be undertaken to permit transit priority at intersections. Concession agreements could be envisaged with competing companies proposing to supply the required vehicles for the proposed LRT or BRT as well as committing to operate these systems for a specified number of years. The responsibility of providing for or upgrading the physical infrastructure needed to accommodate these services would be the responsibility of the municipality under a public-private-partnership (PPP) arrangement.¹³

Development of a city-wide on-street parking plan. Regional governments have legislative authority to establish their own laws on on-street parking regulations (e.g., spatial and temporal restrictions, and maximum time limits for parking), enforcement, and parking charges. What is generally missing is a well-developed conceptual and policy framework within which to exercise these powers. This can be implemented through the following steps: (i) establishment of regional or municipal laws on on-street parking regulations and charging; (ii) development of a city-wide parking plan in conjunction with a transport plan, which may include assessment of required parking spaces, detailed planning of parking areas, appropriate charges, and enforcement measures; (iii) possible concession agreements with private developers and operators for parking facility construction and management; and (iv) installation of equipment and minor civil works in support of parking provided by municipal governments.

Sidewalk system improvements. Sidewalk system improvements that would (i) extend the continuity of the existing sidewalk system of the municipality (ii) provide mobility enhancements on existing sidewalks such as adding ramps at street and driveway crossings and/or remove sidewalk obstructions, or (iii) provide features to assist those with visual impairments.

¹² The term “physically segregated lane” used here means that there is a physical barrier or intervening land use separating the lane from general traffic, unlike a bus lane which may only be designated by pavement marking.

¹³ There are several ways to structure a PPP arrangement between the private sector and the public sector, ranging from the private sector providing only the rolling stock or only the provision of service to a maximum of providing the entire package of rolling stock, services, and infrastructure. All of these options could be considered for federal assistance. The option described here, however, is the most likely one to be implemented.

5.4 ROADMAP: PHASING AND SEQUENCING HIGH-PRIORITY ACTIONS

Using international best practices as benchmarks, this Review proposes a rich agenda of potential actions as discussed in the above sections. They are summarized in Table 7 under four categories: (i) legal and regulatory changes at the federal level, (ii) legal and regulatory changes at regional and municipal levels, (iii) technical and institutional capacity development, and (iv) fiscal and financial arrangements.

TABLE 7: LIST OF RECOMMENDED ACTIONS FOR SUSTAINABLE URBAN TRANSPORT SYSTEMS IN RUSSIA

Areas	Recommended Actions
<i>Legal and regulatory changes – Federal level</i>	<ol style="list-style-type: none"> 1) Clarification and consolidation of legal responsibilities, powers and financial provisions to municipalities in urban transport, including the transfer of ownership of all urban roads to the cities. 2) Development of legal arrangements that allow for metropolitan level urban transport planning and service provision. 3) Revision of the legal basis for traffic management and parking control, allowing municipalities to develop and implement comprehensive traffic management schemes and parking policies. 4) Reform of the unitary municipal transport enterprises to put them on a stronger commercial footing. 5) Assignment of responsibility for control of vehicle access and movement in urban areas for environmental reasons to municipalities.
<i>Legal and regulatory changes – regional and municipal level</i>	<ol style="list-style-type: none"> 1) Requiring that all cross-boundary public transport services have permits from both regional and municipal authorities. 2) Establishment of laws on parking to permit charges and time limits for on-street and off-street parking, backed by allowable civilian parking administration and a clear provision for the enforcement of penalties for non-compliance. 3) Revision of the criteria for competitive tendering of bus services. 4) Reform of public transport service permits to disallow sub-contracting.
<i>Technical and institutional capacity development</i>	<ol style="list-style-type: none"> 1) Creation of a strategic planning function within cities, including the development of a long-term city transport strategy that is fiscally constrained. 2) Creation of strategic urban passenger transport planning functions and processes, including the development of demand forecasting procedures. 3) Creation of strong traffic management units with an appropriate range of responsibilities and capabilities.

	<p>4) Improvement of road maintenance and asset management arrangements.</p> <p>5) Improvement of public transport procurement mechanisms, including introduction of alternative structures for competitive tendering.</p>
<i>Financial and fiscal arrangements</i>	<p>1) Refinement of the current arrangements for intergovernmental transfers, in order to minimize discretionary allocations between government, particularly from regions to municipalities, either by formula¹⁴ or by agreement on counterpart funding of an approved medium term development plan.</p> <p>2) Assignment of revenues from parking or road pricing charges to the municipalities as municipal trading revenues, allowing earmarking for transport.</p> <p>3) Budget support or fiscal incentives for municipalities to carry out strategic planning and organization in the municipalities.</p>

The package of reforms proposed in this Review so far has a logical integrity. For optimal results, the reforms should be organized at the metropolitan level whenever possible. From an organizational perspective, it is desirable to have a core planning unit in charge of integrating functions. Functionally, traffic management, parking management and public transport management all require adequate human and financial resources. Ideally, these institutional requirements should be met first as the basis for efficient policy implementation.

In practice political reasons may dictate a more pragmatic, piecemeal, approach. Fortunately, some of the recommended elements of reform have values in their own right as freestanding elements. New legislation on parking also makes good sense so long as it is based on a strategic view of parking as an essential element in a sustainable urban transport policy and not just as a matter of providing enough parking to accommodate unrestrained demand for private vehicle movement. Investment in mass transit is also generally consistent with a sustainability agenda so long as it does not expend resources wastefully (e.g. heavy rail development where demand is not sufficient to justify it). Similarly, actions to integrate urban public transport physically (through investment in interchange facilities) or commercially (through investment in electronic ticketing systems) may well make sense even without reforms in service procurement. All of these reforms are of high priority and can be introduced even before the desired institutional reforms are implemented.

¹⁴ Under a formula-based allocation regime, lower level governments would receive a share of tax revenues collected by higher level governments, based on a predetermined formula, and typically retain the right to allocate the funds to specific expenditure items of their choice. A typical formula includes parameters that reflect the size of economic activities, the contribution to tax revenues, or the spending needs of a recipient, such as the size of population, income level, volume of infrastructure, etc. As a result, once a formula is developed and agreed upon, lower level governments would receive a relatively stable and predictable amount of funds each year. On the contrary, discretionary allocations are made by higher level governments, specifically targeting certain programs or projects to be implemented by lower level governments; therefore, they are less predictable and more susceptible to political influences. Justifications for discretionary allocations are made on a project-by-project basis.

The sequencing of policy for reforms of road-based passenger transport poses more difficult problems. Mobilizing the private sector to supply social as well as commercial services, which is desirable to counter the observed decline in the availability of service to concessionary fare passengers in many cities, would require all service contracts to be put to competitive tender. So would a shift to gross-cost franchise tendering. But competitive tendering of all services would not be effective unless the public sector suppliers—the unitary municipal enterprises—were reformed to operate on the same basis, including financing their own vehicle replacements from revenues, as the private sector. In this area it will be necessary to proceed simultaneously with a mutually consistent set of reforms. The relationship between these issues and the recommended short-term priority actions is shown below in Table 8.

TABLE 8: SHORT-TERM HIGH-PRIORITY ACTIONS

Areas	Legal change	Advisory needs	Finance
Institutional			
<i>Legal Definitions and Jurisdictional Responsibilities</i>	Adoption of new law on traffic management	Advice on alternative approaches to metropolitan organization	
<i>Transport Planning and Strategy</i>	Change urban planning code for consistency with city transport strategy	Advice on the range of functions and possibilities for organization at the municipal level	
<i>Fiscal and Financial Capability</i>	Shift to a formula-based financial allocation process	Advice on the preparation of municipal transport strategy documents	
Functional			
<i>Road Network Development and Management</i>	Amend planning code to enforce adequate developer contributions	Condition surveying; Asset management systems; Road design guidelines	Computer-based asset management systems in pilot cities
<i>Traffic Management</i>	New law on traffic management to broaden the scope and clarify responsibilities	Dissemination of best practices on traffic management organization and implementation	Selected traffic management technology Set-up costs of modern traffic management units
<i>Parking and Demand Management</i>	Clarify and extend municipal power over parking policy and its enforcement.	Dissemination of best practices on comprehensive parking strategy formulation	
<i>Planning and Supply of Public Transport Services</i>		Advice on appraisal methods and warrants for technology choice. Advice on fare structures	Targeted pilot programs in BRT or LRT. Targeted support for electronic ticket systems
<i>Public Transport Regulations</i>	Revised laws on competitive tendering (at the regional level). Legal reform of unitary municipal bus enterprises	Advice on alternative tendering systems. Draft contract documents	Assistance with capital costs of new procurement and planning systems