

# ***Transportation in Transition Economies: a Key to Carbon Management***

Meredydd EVANS, Pacific Northwest National Laboratory

## **1 - OVERVIEW**

The transportation sector will play a major role in future greenhouse gas emission trends in Russia, Ukraine, and other transition economies. The former Soviet Union has significantly reduced its greenhouse gas (GHG) emissions through years of economic hardship. Despite these major reductions in total carbon emissions resulting from economic collapse, the transportation sector's emissions decreased at a more moderate rate or remained steady in recent years. Competition will force heavily polluting sectors, like industry, to become more modern and efficient. Transportation, however, threatens to reverse emission trends: Poland and the Czech Republic, for example, have experienced dramatically increased use of cars and trucks since 1990, and large increases in transportation-related greenhouse gas emissions.

At the same time, transportation is one of the few sectors in the former Soviet Union (FSU) experiencing significant capital investment. Improving efficiency and environmental controls in most economic sectors is often difficult in Russia and Ukraine because of the lack of financing and investment. It is also easier to build for efficiency rather than to retrofit with expensive additions, yet if there is no investment, there is no building. While much of this investment in transportation is fueling the rising transportation emissions, well-thought-out policies could have a significant impact in reducing future emissions.

This paper concentrates on Russia, Ukraine, and Poland, while drawing some examples from other countries as well. It is divided into three parts. The first part discusses the link between transportation and greenhouse gas emissions globally. The second part describes the trends, structure, and problems of the transportation sector in selected transition economies. For example, most former Soviet states rely heavily on rail for freight, and public transit in cities. While these services are more energy efficient than other transportation modes, they are often poorly managed by large state structures, which threatens their long-term viability. Finally, the third part outlines policies that could avoid a carbon-intensive transportation future in this region. Current policies often promote car use through subsidies and low-interest loans for highway construction and car manufacturing. More carbon-friendly policies might include better balancing foreign subsidized loans to promote sustainable transportation and expanding municipal transportation planning to incorporate modal comparisons, land use, strict financial analysis, and environmental impacts.

## **2 - THE IMPORTANCE OF TRANSPORTATION**

The transportation sector is a major source of global greenhouse gas emissions. This is particularly true in the West, where cars and trucks are dominant modes of transportation and populations are highly mobile. As table 1 illustrates, the transportation sector accounts for about a third of carbon dioxide emissions in many developed nations. In Central Europe and the FSU, though, the transportation sector has historically been a much smaller contributor to carbon dioxide emissions. The Polish transportation sector accounted for 7% of total Polish carbon dioxide emissions in 1991. Poland has seen 30% growth in transportation-related emissions from 1991 to 1996, reflecting the large increase in car travel.<sup>1</sup> Transportation's proportion in total Russian greenhouse gas emissions has held relatively steady since 1990: growth in car emissions has offset the drop in production and shipping.

Private car emissions in Russia grew from 12 MMT of carbon dioxide in 1990 to 16.7 MMT in 1993, which is remarkable in a country experiencing severe economic decline. Freight emissions have declined with the drop in overall economic output, but as output rebounds, so may emissions. The latest Ukrainian data already show that activity on all freight modes except shipping have grown from 1997 to 1998.<sup>2</sup>

**Table 1. Transportation's Role in National CO<sub>2</sub> Emissions in 1990**

Country	Transportation as % of Total Emissions
France	35
U.S.	33
Italy	27
Japan	18
Russia	10
Ukraine	8
Poland	7
Source: ECMT. <i>CO<sub>2</sub> Emissions from Transport</i> , pp. 135 and 161; Country Study on Climate Change in Ukraine, pp. 5-65 and 5-74; Second Polish National Communication, p. 25.	

Controlling greenhouse gas emissions from the transportation sector has proved challenging in the West, both because of the number and inherent mobility of the emission sources. Policies that promote or subsidize the use of cars and trucks have intensified the problem by focusing transportation sector growth on the systems with the highest energy intensity and, hence, the greatest emissions per unit of transportation. A good example of this is U.S. funding of inter-state highways. In many transition economies, on the other hand, the transportation sector is concentrated in the least energy-intensive modes. For example, Russia's public transportation systems are the largest in the world. This could change, though, as more private citizens buy cars and attempt to drive on the crowded, poorly maintained roads.

In the early part of this century up until World War II, small, private trolley systems were the major means of urban transportation in the United States. Most of these systems went bankrupt when highways were subsidized and people shifted to cars for transportation. It has taken decades for U.S. cities to rebuild their mass transit systems, often at great expense to taxpayers. The Russian, Polish, and Ukrainian transportation sectors are in a critical transition period. Funding for mass transit and railways has dropped, forcing these systems to cut service, which in turn encourages more people to use the roads and other less environmentally-friendly means of transportation. Many mass transit systems in Russia are technically insolvent, though they continue to operate. In short, Russia, Poland, and Ukraine have well-developed public transportation and rail networks that could decay if they are neglected in favor of more energy intensive modes of transport.

At the same time, transportation is one of the only sectors in the FSU attracting major capital investments. Severe economic decline and the risky investment environment have contributed to low capital investments in other sectors. Transportation investments can be divided into two categories: purchases of cars, trucks, and airplanes, and investments into the transportation infrastructure (new or improved roads for the most part). Reducing

pollution and energy waste in the FSU is made more difficult by the lack of capital invested to finance improvements. The transportation sector, thus, may afford some unique opportunities to direct investment toward cleaner, more energy efficient technologies. Targeting growth sectors through innovative policies could have a major impact on future emissions in the FSU because the growth sectors, transportation included, represent the nexus of emission increases and new investment.

### **3 - STATUS OF THE TRANSPORTATION SYSTEM**

#### **3.1. Urban Transport**

Russia has one of the most comprehensive public transit systems in the world. Ridership on the Moscow subway system, with 3.1 billion passengers annually, is the largest in the world and larger than that of all subway systems in the U.S. combined.<sup>3</sup> Most Russians rely heavily on public transit for their mobility. Yet as the Russian economy becomes more market-oriented, Russian transit systems are slowly crumbling. Substituting highways for public transit can be extraordinarily expensive, given high real estate values and lack of free space in most larger cities.

The situation in Ukraine is similar. Kiev and Kharkiv have subway systems; over 50 cities and towns in all have public transportation. Bus systems in particular have been hard hit by the economic decline and have experienced service cutbacks. Rather than consolidating routes, though, most Ukrainian cities reduce the number of diesel and electric buses that run on each line, making passengers wait for long periods even at rush hour. This has encouraged more passengers to abandon the public transit system in favor of cars.

Polish cities have rather extensive networks of buses and trams; Warsaw also has a small subway system. Use of mass transit in Poland has dropped significantly since the fall of the Iron Curtain: in 1989, coaches, buses and trolley buses saw a transportation volume of 58,062 million passenger kilometers, while by 1994, this figure had dropped to 46,687. Only 38% of passenger journeys in Poland in 1995 were by public transportation, compared to 53% by car. Bulgaria, Hungary, Latvia, Lithuania, and Slovenia all saw the passenger-kilometer volumes on diesel and electric buses cut approximately in half from 1989 to 1994. In Budapest, the public transit's share of passenger travel has fallen from 80% in 1985 to 60% in 1995.<sup>4</sup>

Mass transit systems face tremendous financial pressures. In 1990, Soviet tram systems had total deficits of over \$690 million and diesel and electric bus systems lost over \$954 million, according to the official exchange rate of the time.<sup>5</sup> These financial problems arise from several factors:

- High percentage of fare evaders, particularly on bus and tram routes that use the honor system;
- Large number of riders who are eligible for free transportation coupled with inadequate government compensation to the transit organizations for this service;
- Lack of financial planning and well-trained management.

Outdated and inefficient equipment often further exacerbates the problem by driving costs up and customers away. Buses and subway trains manufactured in the former Soviet Union have lower fuel efficiency than their Western counterparts. (In the case of trains, this is primarily because of their greater weight.) As a result, domestic bus sales are down, though some domestic manufacturers, such as Lviv Bus Works (LAZ) are making a comeback with smaller buses and well-targeted marketing.<sup>6</sup> Poland has no major domestic bus manufacturers. Ikarus, the large Hungarian bus producer, has seen its sales plummet as demand in the former Soviet Union has dropped and Western competitors have made inroads in the rest of the former East Bloc.

Public transportation systems often have limited marketing, finance, and management capabilities. They are typically slow to react to changing conditions. For example, it would likely be much less expensive in the long run to require all riders to pay upon entering the transit system, rather than to use the honor system, which has been tested and has failed in the former Soviet Union. Low-income riders could be provided with targeted subsidies,

which would be less expensive than subsidizing all fare evaders. Decisions on routes and equipment are made based on rigid central planning techniques, and not based on customer needs and financial results. While public transportation is a public service, this does not mean that rigorous financial accounting is irrelevant; rather, it is particularly pertinent in order to meet the public service and financial goals of the organization.

An interesting new transportation phenomenon is occurring throughout Russia, Poland, Ukraine and other countries: entrepreneurs are setting up minivan service along existing bus and commuter train routes to compensate for the lack of bus and train service. This is evidence that mass transit is feasible and profitable, even under the harsh economic conditions prevalent in the former Soviet Union. If more roads are funded and built, though, car transportation may reduce the competitiveness of these private services. More congestion on the roads means that private van services will provide a slower, less convenient service; van costs will rise with commuting times; and subsidized cars and roads will make driving a less costly alternative. Van services are not subsidized. Despite this, state mass transit officials often feel threatened by van services because they are taking away the few, prized paying customers. Ironically, state transportation companies have not tried to emulate the success of these services by improving fare collection rates and offering more comfortable and regular service for the market sector willing to pay. Instead, the state transportation companies, which hold monopoly licenses, are attempting to run these services out of business in Kiev by petitioning the Anti-Monopoly Committee to enforce these licenses.<sup>7</sup>

As public transportation systems become less functional, the number of cars on Russian, Polish, and Ukrainian streets is growing. Even in relatively-affluent Moscow, though, private cars provide under 10% of local trips, so the majority of passengers rely on public transit for their mobility despite the system's condition. Car ownership in Russia has grown from 87 million cars in 1990 to 137 million cars in 1995, and per capita ownership has increased even more rapidly. Because roads are poor, these cars significantly contribute to congestion and pollution. Russian greenhouse gas emissions from cars, for example, have grown steadily since 1990. In fact, if current trends continue, growth in emissions from cars could overshadow much of the emission reduction caused by the shrinking Russian economy.<sup>8</sup> The situation in Poland is similar. When Communism fell in 1989, Poland had 193 cars per 1,000 inhabitants, but in 1998, this number had more than doubled to 411. While Poland's total carbon dioxide emissions decreased from 478 million tonnes in 1988 to 373 million tonnes in 1996, its transportation-related carbon dioxide emissions rose significantly from 28 million tonnes 36 million tons over the same period. Polish carbon dioxide emissions from automobiles have gone up even faster than transport emissions as a whole. In the Czech Republic, transportation accounted for 4.8% of carbon dioxide emissions in 1990 and 7.5% in 1996. By comparison, U.S. transportation-sector greenhouse gas emissions grew by about 9% from 1990 to 1996<sup>9</sup>

Car sales have also grown rapidly in recent years. According to the U.S. Commerce Department, Russian car sales in 1996 totaled 850,000, or double those of 1985. Poland has experienced the highest car sales growth in Europe: sales grew by 42% in 1996 and have increased steadily since. Globally, car registrations grew by 7% from 1990 to 1995. Many new car factories have been built in Poland to satisfy this demand; there is the risk that ultimately this production growth will outpace the demand, resulting in layoffs, like those now facing the Polish coal industry.<sup>10</sup> Daewoo is now the largest foreign investor in Ukraine, primarily because of its investments in car manufacturing. Ukraine made major tax concessions to attract Daewoo; these concessions constitute an implicit subsidy for drivers. Russia has also granted foreign car manufacturers numerous incentives and discounts for investing in Russia. Most of these incentives are not offered to companies wanting to invest in more climate-friendly industries producing energy efficiency equipment, environmental controls or trains, for example. The U.S. Commerce Department writes that "naturally, Russia is viewed as one of the most attractive markets for the foreign car manufacturers," yet Russia still feels the need to subsidize foreign investment in this sector. The Moscow and St. Petersburg governments have further subsidized the car industry in Russia both through direct subsidies and by requiring that all government cars be purchased from certain domestic producers. Despite the subsidies, domestic car production has plummeted in recent years in the former Soviet Union. In Ukraine, for example, car production in 1997 was just 3.3% of the 1990 volume. Interestingly, bus production has remained relatively steady in Russia, though it has dropped considerably in Ukraine.<sup>11</sup>

The Russian, Polish and Ukrainian governments pay for road construction as well. Russian federal expenditures on roads and bridges in 1993 were approximately \$1 billion, which is not a lot for all of Russia, but it is a subsidy nonetheless. This does not include regional or municipal expenditures for roads or expenses for equipment and miscellaneous items.<sup>12</sup> Intercity highway travel in Russia and Ukraine actually has decreased in recent years because of the drop in truck travel. Poland has planned to construct 2,600 km of new toll roads in which the Polish Government would pay for planning and land and guarantees loans for half of the construction costs. The total cost of these new roads would be about \$8 billion.<sup>13</sup> Originally, the Polish Government had hoped to attract private financing for these roads, but since no private financiers have stepped forward, the Government is considering providing greater subsidies and financing. These subsidies for the highways provide travelers and shippers a financial incentive in favor of road travel.

### 3.2. Long-Distance Passenger Travel

Unlike in North America and Western Europe, roads have not been a major mode of long-distance passenger travel in the FSU. Cars account for less than 10% of total passenger travel in Russia, as opposed to more than 80% in most of Western Europe and the U.S.<sup>14</sup> In Russia, distances are often too great, and in both Ukraine and Russia, roads are not very developed by Western standards. Russian and Ukrainian highways are usually two-lane roads with limited shoulders, markings and lighting. Many Russians and Ukrainians prefer to travel by rail to nearby cities. This preference may change as more roads are built, particularly if modernization of the rail networks does not receive as much attention as the roads, allowing the railways to slowly decay. In Poland, the shift from rail to roads has already begun to occur, and likely will increase in the future when new highways come on line. Distances are also smaller in Poland, making intercity car travel more feasible. Table 2 below shows the modal split between transportation sector emissions from several countries in transition.

**Table 2. Base Year Transportation Emissions of Carbon Dioxide**

Country	Total Emissions (MMT)	Transportation Emissions by Sector (thousand metric tons)				Transport Emissions (MMT)	Percent Transport
		Road	Rail	Shipping	Air		
Czech Republic	168.6	6,840	738	54	294	7.9	4.7
Hungary	75.1	8,132	495	27	532	10.3	13.8
Latvia	23.6	3,826	881	955	168	5.6	24.0
Lithuania	36.6	3,681	242	133	442	4.5	12.3
Poland	372.3	20,016	7,328	588	566	28.5	7.7
Russian Fed.	2,443.7	146,900	1,840	18,100	52,100	234.6	9.6
Slovak Republic	53	4,501	377	143	276	5.3	10.0

Source: *CO<sub>2</sub> Emissions from Transport*, p. 135; *Second Polish National Communication*, p. 23. Notes: Base year means base year under the Framework Convention for Climate Change; it varies by country. Polish data are for 1995, except total emissions (1994). Numbers may not add up due to omission of "other" category and rounding. Ukrainian data were not available.

Air travel is convenient in Russia for long hauls and essential for cities and towns with no road or rail access. For example, Petropavlovsk-Kamchatsky and Yuzhno-Sakhalinsk, major cities in the Russian far east, are accessible from the mainland only by plane or boat. Likewise, planes provide the only year-round access to most regional centers in northern Siberia. Consequently, air transportation represents a high proportion of intercity travel.<sup>15</sup> Airfares, however, have gone up sharply in recent years as airlines have been privatized and subsidies removed. As a result, more passengers are using trains, even for long distance travel. Ukraine is a smaller country with a

more concentrated rail network. Major cities and many smaller towns are served by rail. In Poland, air travel accounts for less than 2% of transportation sector carbon dioxide emissions; in Russia this figure is over 22%.<sup>16</sup>

Ship travel is not a major form of passenger travel in Russia, Ukraine, or Poland. Ukrainian ship travel is concentrated primarily on the Dnieper and Danube rivers and in the Black Sea. Russia relies even less on waterways because much of the country is land-locked and distances are great. River travel is, however, the major means of transportation in some remote areas of Siberia. (The shipping emissions listed in table 2 are primarily from freight shipping).

### 3.3. Freight Transport

Freight transportation in Russia and Ukraine has dropped dramatically since 1990. This decline mirrors the decrease in economic output. Freight tonnage in Russia dropped by 37% from 1990 to 1997. In Ukraine, freight turnover has experienced significant declines since independence. Polish freight volume has also seen fluctuations in recent years: in 1985, total freight except for sea shipping was 176 billion tonne-kilometers; by 1992, this figure had dropped to 112 billion, though it rebounded to 126 billion in 1994. Shipping is the least energy-intensive mode of freight transport, followed closely by rail. Trucks are several times more energy intensive, which means they also emit several times more GHG emissions per tonne-kilometer of freight activity.<sup>17</sup>

Rail is the primary freight mode in Russia, Ukraine, and Poland. Rail accounts for over half of domestic freight activity in Russia. (Pipelines account for another 25%). While rail's modal share remains large, it dropped from 65% to 53% between 1970 and 1992; overall freight activity in Russia increased during this period.<sup>18</sup> Rail also plays a major role in Poland where it accounted for 52% of freight activity in 1994. In Western Europe, trucks dominate the freight market and railroads are having difficulty sustaining themselves. North America is similar to Russia in that rail garners the largest share of freight traffic. This is particularly true in Canada with its vast, often unpopulated expanses comparable to those in Russia. Several policy analysts and policy makers have argued that Russia, as a European nation, should follow the path of Western Europe in encouraging a large modal freight share for trucks. A 1993 World Bank report entitled *Transport Strategies for the Russian Federation* is a prime example of this. Such analyses fail to take into consideration both the geographic dissimilarities between Russia and Western Europe, and the tremendous capital and environmental costs of extensive trucking. Almost all Russian and Ukrainian factories, for example, have invested heavily in rail infrastructure to ship their goods. Retooling this infrastructure for trucking would be an enormous burden at a time when most industrial plants lack capital even for basic production upgrades.

This is not to say that Russian, Ukrainian, and Polish railways are without flaws. They are inefficient, but powerful state monopolies. Ukrainians, Poles, and Russians often call their railway companies "states within a state" to emphasize the amount of power they have accumulated. Railways are not always the most flexible means of transporting goods either, since routes are not easily changed and door-to-door service is available only for the largest customers. Railways need to adapt to the new market conditions in order to survive. The railway system needs more competition on its lines, so that, for example, different railway companies could compete directly with one another in a given service territory. Competition will force these railway companies to improve their service and efficiency, and as such, may be key to their survival. The flaws in the Russian, Ukrainian and Polish railway systems, however, do not by themselves justify significantly reducing the systems, and doing so is not very realistic because of the huge cost this would entail. A new reform package in Russia is introducing competition and privatizing the railway companies; this package was approved in February 1998, so it will some take time to see the results.<sup>19</sup>

The Russian trucking industry is dominated by trucks owned by individual enterprises or industries, as opposed to "for-hire" trucks. This is typical of the vertical integration of Soviet-style industry. Rosavtotrans oversees most contract trucking in Russia, and it does most of its business hauling construction materials. Recently, Russia has imposed large tolls on foreign truckers to help protect the domestic trucking market and generate revenue for road

construction and repairs. While road tolls can be an effective means of recovering part of the cost of roads, they are not very effective if only one limited class of users needs to pay.<sup>20</sup>

Pipelines, in fact, account for a larger portion of freight than roads in Russia, and pipelines' modal share has grown since 1970, in part because the market for oil and gas in Europe is strong compared to the market for domestic goods in Russia and Ukraine. In 1992, pipelines accounted for 25% of Russia's freight activity, or 1,070 billion tonne-kilometers. While Ukraine is not a large oil or gas producer, Russia's major pipelines run through Ukraine to Central and Western Europe; these pipelines are very energy intensive. Ukrainian pipelines accounted for over 50% of total Ukrainian freight activity in the first half of 1998. Polish pipelines accounted for 11% of freight activity. (For comparison, pipelines accounted for 17% of freight activity in the U.S. in 1994 and 6% in Western Europe.)<sup>21</sup> While pipelines tend to be carbon-friendly compared to other freight modes, the pipelines in the former Soviet Union could become significantly more energy efficient with compressor upgrades and improved maintenance.

Ship and air account for a relatively small and, for the most part, decreasing proportion of freight activity in Russia, Poland and Ukraine. In Ukraine, sea shipping has been dropping sharply for several years, with annual decreases of over 40% in most years. Ukrainian river freight, on the other hand, has grown since 1996. Polish freight on inland waterways has dropped from 1,413 million tonne-kilometers in 1985 to 793 million in 1994. Shipping and air freight have decreased in Russia. Air freight is primarily used for long-distance hauls of specialized goods, or in shuttle trading.

### 3.4. Traffic Safety and Local Environmental Concerns

Planning transportation systems for sustainability involves more than considering the climate impacts of transportation. In many cases, designing a transportation system to minimize local air pollution or maximize safety will also lead planners to low-carbon policies. Mass transit, for example, has a much lower accident fatality rate than car travel. Rail shipments also generally result in lower lead, particulate and sulphur dioxide emissions than truck shipments. In most countries in transition, automobile accident fatality rates are very high compared to the U.S. and Western Europe, and accidents are rising with car ownership. Likewise, most formerly Communist countries use a relatively high proportion of leaded gasoline. Table 3 below presents statistics on these externalities for selected countries.

**Table 3. Automobile Externalities: Road Fatalities and Unleaded Gasoline**

Country/Region	Road Accident Fatalities per 10,000 Vehicles	Market Share of Unleaded Gasoline (%)
Russia	19.1	50
Ukraine	23.0	84
Kazakhstan	36.5	80
Poland	6.3	48
Czech Republic	4.2	55
Romania	7.9	5
European Union	3.8	68
United States	2.1	100

Source: *Infrastructure Sector Strategy. Living by Serving. New Directions for the Transition Economies.* Washington: World Bank, 1998, p. 35.

By incorporating externalities such as accidents, local air pollution, and noise pollution into their decision making, policy makers may be able to address several local problems while reducing greenhouse gas emissions.

### 3.5. Foreign Investment Trends

Most private foreign investment in the transportation sector supports modernization of automotive factories. Ford, Daewoo, GM, Renault, Fiat, and Kia have projects or facilities to manufacture vehicles in the former Soviet Union; many of these projects involve hundreds of millions of dollars. Poland has actually become a regional center for car production because of the large volume of foreign investment it has attracted. Numerous other foreign car manufacturers have distribution networks in Russia, Poland, and Ukraine to tap the growing demand for cars.

Export finance institutions have also played a role in promoting transportation investments in countries in transition. The U.S. Export-Import Bank (ExIm), for example, has recently approved a \$334 million guarantee for Boeing to sell aircraft to Aeroflot. ExIm has also financed other airline industry exports, such as an IBM airline reservation system (\$90 million) and United Technology aircraft engines (\$20 million). Additional transport-related ExIm investments include over \$105 million for car factory paint lines and a small guarantee for tour buses and police cars. The U.S. Overseas Private Investment Corporation has little involvement in the transportation sector.

Both the World Bank and the European Bank for Reconstruction and Development have made sizeable loans in the Russian and Ukrainian transportation sectors.

Table 4 below describes many of these investments, the overwhelming majority of which support roads and the automotive sector. Sixty percent of the World Bank and EBRD investments listed go toward these two purposes, both of which effectively promote the use of cars and trucks. Shipping accounts for most of the remaining investments, particularly on the part of EBRD. Only 9% of the planned transportation investments are for public transportation, and neither the World Bank nor EBRD has made any investments in public transportation in Ukraine. Only two World Bank projects in Russia deal with public transport, and neither of these projects has been implemented yet: one project was only recently approved and the other is still under development.

Poland has also received financing from EBRD and the World Bank for transportation sector projects. EBRD has invested in three projects: a 920 million ECU joint venture between Fiat and a Polish car manufacturer; a 487 million ECU railway modernization project and an 82.6 million ECU motorway development project. EBRD is also considering lending 45 million ECU project to the City of Cracow for fast trams. The World Bank is implementing three transportation projects in Poland: two for roads (\$350 million total) and one for port development (\$67 million).

**Table 4. World Bank and EBRD Transportation Investment in Russia and Ukraine**

Project Title	Bank	Year Approved	Sector	Project Cost (million \$)
<i>Russia</i>				
Fiat-GAZ Joint Venture	EBRD	1998	Automotive	854
Siberia and Far East Highway	WB	under develop.	Roads/bridges	500
Bridge Rehabilitation	WB	1996	Roads/bridges	466
Urban Transport	WB	1998	Public transport	391
Kamaz Stabilization Refinancing	EBRD	1995	Automotive	333
Novorossisk Shipping Company	EBRD	1995	Shipping	318
Moscow Urban Transport	WB	under develop.	Roads/bridges	307
GAZ-Volga	EBRD	1996	Automotive	228
PRISCO	EBRD	1994	Shipping	206

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Project Title	Bank	Year Approved	Sector	Project Cost (million \$)
Russian Railways Modernization	EBRD	1996	Railways	154
Volgotanker Vessel Acquisition	EBRD	1996	Shipping	133
Far-East Air Navigation Systems	EBRD	under develop.	Air	76
Sakhalin Shipping Company	EBRD	1996	Shipping	71
SFAT (Environmentally-Friendly Rail)	EBRD	1996	Railways	62
North West Shipping Company	EBRD	1994	Shipping	56
FESCO	EBRD	1994	Shipping	47
GAZ Corporate Loan	EBRD	1995	Automotive	33
Tolmachevo Airport Upgrade	EBRD	1998	Air	16
<i>Ukraine</i>				
Ukraine Highway	WB	under develop.	Roads/bridges	304
Yuzhny Oil Terminal	EBRD	under develop.	Shipping	216
Railway Commercialization and Track	EBRD	under develop.	Railways	94
Iveco-Kraz	EBRD	1995	Automotive	60
Ukrshipping	EBRD	1995	Shipping	33
Refurbishment of Borispol Airport	EBRD	1993	Air	15
Yuzhny Fertilizer Terminal	EBRD	1995	Shipping	5
Sources: World Bank and EBRD on-line project databases. Notes: Data do not include pipeline investments. No data were available on total project costs for the Yuzhny Fertilizer Terminal; the data provided are for EBRD's portion only.				

Both EBRD and the World Bank feel that public transportation is an important priority for Poland, Ukraine, and Russia, despite their lack of action in this area. The World Bank writes about urban transportation that “action is needed to avoid a socially and environmentally unsustainable modal split.”<sup>22</sup> EBRD’s most recent *Transport Operations Policy* states that:

Rapidly increasing motorisation is one of the biggest environmental challenges facing the region. Poor performance by public transport encourages private car ownership and use, which leads to increased road traffic congestion that delays public transport vehicles, and so reinforces the well-known downward spiral. This phenomenon aggravates urban air pollution problems, which have been identified by Ministries of Environment as one of the main environmental issues in Europe.<sup>23</sup>

EBRD acknowledges that it has made few investments in public transport, but blames this on the lack of creditworthiness of public transportation institutions.

Public transportation organizations face great financial pressure because of social subsidies and fare evasion (or what are called non-payments in other sectors). Yet non-payments and social subsidies affect many sectors in which EBRD invests. Energy is a prime example: most district heating and power companies have tremendous non-payments problems and they often provide a subsidized service. Energy sector arrears are difficult to resolve both because poor billing practices have allowed the problem to expand and because energy users often cannot be disconnected individually without shutting off all the other users on a particular line. EBRD and the World Bank recognize these problems in the energy sector and make improved billing and collections a condition for project approval; they have also required improved financial accounting and reduced subsidies as loan conditions. The same could happen in public transportation. Another option for international financial institutions (IFIs) is to help

private mass transit van services expand; these organizations usually have excellent fare collection records. The alternative--continuing to favor roads and cars--is creating an unhealthy subsidy that could exacerbate the urban transportation problems these banks have correctly identified.

#### 4 - RECOMMENDATIONS

Countries in transition have significant potential to affect global greenhouse gas emissions through their transportation sectors. Effective policies can help control the growth of emissions while helping the region transition to a market economy. Currently, however, transportation policy has mixed objectives with little coordination or reflection on the ultimate implications of the package of policy measures. National and local governments and IFIs all face this problem. A coordinated transportation policy should incorporate full capital and operating costs, as well as external costs such as pollution and accidents. Table 5 below describes policies that could promote transportation, while minimizing transportation emissions.<sup>24</sup>

These recommendations fall under three basic themes: transportation planning, market-based incentives for reducing transport's impact on the environment, and balanced investment strategies. These themes are described in more detail below.

Transportation planning is a basic building block of good transportation policy. While countries in transition have a long history of transportation planning, most of this planning has focused on transportation supply, without consideration of actual demand, customer needs or alternative transportation modes. The current rush to build new highways is reflective of this supply-side mentality. The volume of highway traffic in most cases does not demand new roads; in fact, traffic volumes have decreased in recent years. Transportation planning should include several important elements:

- Integration and comparison of full costs and benefits of various transportation modes in supply and demand assessments;
- Adequate consideration of environmental and other external factors;
- Strategy for financial viability;
- Assessment of size and impact of direct and indirect subsidies in transportation sector;
- Acknowledgment and use of strong transit and railway design skills in the region (Russia has the most extensive and heavily-used subway system of any nation on Earth);
- Consideration of specific geographic and demographic features of the planning region.

Transportation planning should incorporate all externalities, not just environmental ones. In fact, transportation planners are often more willing to consider policies that protect the environment if these policies simultaneously provide other benefits, such as reduced accident fatality rates.

**Table 5. Environmentally-Friendly Transportation Policy Recommendations**

<i>Urban Transport</i>
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- Expand municipal and regional transportation planning to cover modal comparisons, strict financial and cost analysis, environmental impacts and other externalities, such as safety.
- Train public transit officials in finance, business planning and marketing.
- Help public transit systems develop realistic strategies for improving collections and rationalizing subsidies.
- Improve the energy efficiency of public transit systems with more efficient trains and buses.
- Introduce automobile tariffs that reflect the total cost of the car to society, whereby larger or less efficient cars will accrue higher tariffs.
- Enact CAFE-like standards to ensure that the average vehicle mix is more efficient and less polluting over time.<sup>1</sup>
- Encourage IFIs to focus more on financing environmentally-friendly transport, such as public transit.
- Decrease generic subsidies to car manufacturers.

#### ***Long-Distance Passenger Transport***

- Increase highway tolls to more fully reflect internal and external costs.
- Encourage privatization and competition on passenger railways.
- Promote better understanding of the linkages between climate protection, improvement of local air quality and passenger safety.

#### ***Freight Transport***

- Encourage privatization and competition among freight rail and trucking companies.
- Publish and distribute statistics on speed, accuracy and efficiency of competing freight companies.
- Ensure that foreign and domestic trucks pay full cost of road use through taxes or fees.

Bilateral assistance organizations could, for example, work with one or more municipalities to develop a transportation plan and then help the city or cities identify financing for specific elements of the plan. This work could also involve concentrated training and assistance to public transportation authorities to help them learn business planning and marketing skills. These skills could help public transit entities increase fare revenues, customer satisfaction, and ridership. Such a program would also better enable these public transportation organizations to qualify for financing from development banks by putting them on the path to financial viability and creditworthiness.

The second theme is instituting market incentives for environmentally-friendly transportation. Reducing subsidies for polluting technologies is an important step in this direction. Other steps include structuring car and road taxes and fees to account for the environmental costs of road transport. These fees could be imposed when a car is purchased, based on the fuel efficiency or weight of the car. (Several European nations have had success in devising such creative fees to account for environmental and safety costs.) The fees should also, however, be related to vehicle use. Russia, Poland and Ukraine already have gasoline taxes and use part of these taxes to pay for roads. Another example is an annual registration fee that takes into consideration both the efficiency of the car and car use (mileage on the odometer). A variation on this theme could involve CAFE-like standards. Russia, Poland and Ukraine could implement fuel efficiency standards for the overall mix of cars each manufacturer sells, but with a market-based twist: if a vehicle exceeds the CAFE standards, fees and taxes would go down proportionally. Part of those fees and taxes collected could be used to set up a fund to promote advance vehicle research and manufacturing, so that CAFE standards would not give an unfair advantage to foreign manufacturers. The rest of the fees and taxes could be used to cover the cost of roads.

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<sup>1</sup>CAFE stands for Corporate Average Fuel Economy. The U.S. CAFE standards requires all automobile makers to meet sales-weighted minimum fuel economy standards on cars and other light-duty vehicles. The standards went into effect in 1978 and several studies have shown that the standards have both improved fuel efficiency of cars in the U.S. and reduced the growth in car emissions.

Balanced investment strategies are the third theme. Publicly-funded banks, such as development and export finance banks, should not skew their investments toward transportation paths that will result in greater GHG emissions in future. It is understandably difficult to find good investments in the public transit sector. Publicly-funded banks, however, were not created to finance the easy projects that the private sector has an interest in anyway. They were created to tackle difficult problems by creating new approaches that can be replicated by others. Public transit's financial problems are tractable, though complex. Partnerships with donor organizations could help address some of the financial management issues that currently stand in the way of investment.

In addition to solid and balanced transportation planning, transportation policy should also rely on measurable objectives for reducing externalities such as carbon emissions. In fact, few nations have undertaken monitoring and measurement of the the real-world impacts of specific policies and measures on carbon emissions. The European Conference of Ministers of Transport has published a volume on carbon dioxide emissions from transport with an extensive listing of national policies to reduce emissions, yet few countries provided a quantitative impact assessment of their policies.<sup>25</sup> Thus, an important recommendation for all countries is to design measurable goals and monitoring programs into their transportation policies and plans. It is complicated to measure the results of transportation policies on carbon emissions because of the large number of emission sources and transportation modes to cover. Better monitoring, though, will help policy makers the world over make more informed transportation policy decisions.

Countries in transition present a unique opportunity because their economies are not yet heavily based on the car and its incumbent pollution. They have passenger travel trends somewhat like Western Europe, with public transit and pedestrian travel accounting for the overwhelming majority of urban trips. Freight transport, on the other hand, is more similar to the North American model, relying on the least energy-intensive modes: rail and ship. These trends are changing though, and policies and public investments since 1990 are fueling the changes, without necessarily considering the full consequences. The decrease in GHG emissions, brought about by years of economic hardship, could be reversed eventually by imprudent transportation policies. Wise transportation planning, consideration of the full costs of transportation and subsidy reductions could play a significant role in reducing or stabilizing emissions in countries in transition.

## 5 - ENDNOTES

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