

Armenia's Transport Outlook

Transport Sector Master Plan

TRANSPORT AND
COMMUNICATIONS

Armenia

2011

Asian Development Bank



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ABBREVIATIONS

ADB	Asian Development Bank
AMD	dram
ARD	Armenian Roads Directorate
GDP	gross domestic product
MOTC	Ministry of Transport and Communications
PPP	public–private partnerships
SCR	South Caucasus Railway



The government's key role is to establish and enforce economic and technical regulations and ensure the provision of transport infrastructure and services according to international standards and best practices.

Preface

This report was developed through extensive consultations with the Government of Armenia and development partners in 2008 under the Asian Development Bank (ADB)–financed technical assistance that helped prepare Armenia's transport strategy. This report summarizes the transport sector profile, challenges, and the way forward. During the preparation of this report, the government gave the study team extensive support, cooperation, and input, particularly the Ministry of Transport and Communications and the Armenian Roads Directorate.

The Transport and Communications Division of the Central and West Asia Department of ADB was responsible for the report. Juan Miranda, director general of the Central and West Asia Department, gave overall guidance on the work.

I hope that this report will help the government and its development partners understand the transport sector issues and challenges involved in achieving sustainable prosperity for Armenia.

Hong Wang
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Transport and Communications Division
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Armenia seeks to benefit from the improved global economy as major exports such as copper, chemicals, and jewelry, as well as the construction and services industries begin to rebound.

INTRODUCTION

The Need for a National Transport Strategy

Armenia, a landlocked country of about 29,800 square kilometers and with a population of more than 3 million people, is located in the Caucasus Mountain region. After independence in 1991, the country became a member of the Commonwealth of Independent States, a loose association of former Soviet republics. Armenia's principal economic activities are construction; mining; chemicals; jewelry; and food production; followed by the service sector, which accounts for about 44% of the country's economy; and agriculture, which accounts for around 10%.

After gaining independence, Armenia achieved an impressive economic recovery despite many challenges. The country's gross domestic product (GDP) maintained double-digit growth rates during 2002–2007.¹ GDP per capita expressed in US dollars quadrupled from 2001 to 2007, the result of the appreciation of the dram and rapid growth. Support from the Armenian diaspora, especially the large remittances from Armenians working in the energy-rich Russian Federation, was also a key factor. In 2007, however, the value of imported goods and services was double that of exports. The gap widened in 2008, with imports exceeding exports by a factor of 3.8. The global economic downturn, as well as tensions between Georgia and the Russian Federation, put the brakes on Armenia's fast economic growth between 2008 and 2010. Exports, workers' remittances, and private capital flows were hit hard, forcing the country into recession. The Armenia government responded with an aggressive anti-crisis program that maintained financial and external stability, kept inflation in check, and cushioned its population from the worst of the crisis. Armenia seeks to benefit from the improved global economy as major exports such as copper, chemicals, and jewelry, as well as the construction and services industries begin to rebound.

Armenia, where 64% of the population lives in urban areas, has substantially reduced poverty: from 55.0% of the population in 2000 to 17.3% in 2008. The Sustainable Development Program—the country's socioeconomic planning strategy—was approved by the government in October 2008. Extending from 2009 to 2021, the program focuses on reducing poverty, including eliminating extreme poverty; ensuring human development; deepening economic growth; and accelerating the development of the country's least prosperous regions. The program aims to reduce the poverty rate to 6.0% by 2021.

Armenia has experienced a gradual decline in population, which is attributed to factors such as out-migration, notably by the young population; a low birth rate; and an aging population. The increasing population of senior citizens will require public transport systems that cater to them. The concentration of the Armenian population in urban centers, mainly in the capital, Yerevan, will necessitate the construction of an efficient and sustainable urban transport system, not only to meet the increasing demand for mobility and accessibility, but also to support inter-urban economic activities. The social behavior and travel patterns of Armenia's urban population will influence the type of urban transport systems needed.

1 GDP was 13.2% in 2002, 14.0% in 2003, 10.5% in 2004, 14.0% in 2005, 13.4% in 2006, and 13.8% in 2007. Government of Armenia. 2007. *Statistical Yearbook of Armenia 2007*. Yerevan.

Being a landlocked country, Armenia has an economy that depends on transport and cross-border access. However, Armenia's location presents a significant problem for the transport sector. Only two international borders are open: those with Georgia to the north and Iran to the south. The eastern border with Azerbaijan was closed in 1991, and the western border with Turkey in 1993. Another problem is Armenia's severe continental climate, with very low temperatures and heavy snowfall in winter that limit economic activity. These problems result in high transport costs, particularly for traded goods, and expensive infrastructure development and maintenance.

Armenia has a few railway lines and an extensive road network. While car ownership has been growing steadily in recent years, it is still relatively low. Public transport plays a critical role, especially in cities. While the network capacity is adequate for accommodating estimated transport demand up to 2020, the infrastructure has deteriorated rapidly due to lack of funds. In recent years, priority has been given to rehabilitation and reconstruction of infrastructure, with about \$350 million from external sources such as the Asian Development Bank (ADB), the European Bank for Reconstruction and Development, the Lincy Foundation, the Millennium Challenge Corporation, and the World Bank.

Armenia's geographic and economic characteristics require a national transport strategy that will create an efficient and competitive intermodal transport system to support economic growth and enhance international economic cooperation.

Opening the Borders: Why Is It Important?

Closed borders result in substantial increases in transport costs, reduced opportunities for international trade, restricted development of the domestic trucking industry, poor prospects for the logistics sector, and a diminished role for railways. Acquiring access to the Black Sea ports is therefore important. This access would reduce the trade deficit by a third to a half, and would increase GDP by 30%.² Without the trade generated by access to these ports, Armenia will have a relatively modest annual GDP increase of 0.67% in 2011, plus a further increase of only 2.7% by 2015.³ Armenia should seek access to as many ports as possible. Dependence on only one or two outlets to the sea is not a wise option, as it poses the risk of Armenia becoming a "captive shipper."⁴ Aside from the benefits of growing GDP and a decreasing trade deficit for Armenia, the resolution of border issues would also stimulate direct foreign investment in the Caucasus as a whole.

Going toward Green Transport

Another significant consideration in framing a national transport strategy is the global environment. The national strategy should focus on how the country's transport system could affect climate change. For this reason, along with sustainable urban transport strategies, the provision of an efficient low-carbon intermodal transport system should be incorporated into the national transport framework.



Border crossing in Bagrastashen

- 2 E. Polyakov. 2001. Changing Trade Patterns after Conflict Resolution in the South Caucasus. *World Bank Policy Research Working Paper Series No. 2593*. Washington, DC: World Bank.
- 3 Armenian-European Policy and Legal Advice Center. 2005. *Study of the Economic Impact on the Armenian Economy from Re-Opening of the Turkish-Armenian Borders*.
- 4 T. Snow, M. Faye, J. McArthur, and J. Sachs. 2003. Country Case Studies on the Challenges Facing Landlocked Developing Countries. *UNDP Human Development Report Office Occasional Paper*. New York: United Nations Development Programme (UNDP).



North–South Road Corridor,
Ararat Region

THE TRANSPORT SYSTEM

Road Transport



Rural feeder road connected to the
North–South Road Corridor

Infrastructure

Armenia's primary roads total 10,818 kilometers (km), and are divided into interstate (1,686 km), republican (1,747 km), local (4,271 km), and urban (3,114 km) (Table 1). The road network serves as the backbone of the country's economic development, providing connectivity within the country, to neighboring countries, and to mainland Asia and Europe. The Aragatsotn region has the lowest road density disparity (274 meters per square kilometer [m/km^2]) and the Armavir region has the highest (525 m/km^2). The government has improved almost 13% (about 988 km) of total road length (7,704 km), has kept 49% (3,811 km) in fair condition, and is planning to improve the remaining 38% (2,905 km). The government has rehabilitated 15% (253 km) of the 1,686 km highway network; roughly 75% of the highway network is in fair condition and 10% (about 169 km) requires rehabilitation. About 62% (about 1,083 km) of the 1,747 km secondary road system has been improved or is in fair condition, leaving about 1,540 km in need of rehabilitation. Out of about 1,962 km of local roads, about 61% need immediate upgrading.

Table 1: Road Length in Armenia, 2009 (kilometers)

Road Category	Length
Interstate	1,686
Republican	1,747
Local	4,271
Urban	3,114
Total	10,818

Source: Government of Armenia. 2009. *Statistical Yearbook of Armenia 2009*. Yerevan.

Financing

Although budget allocations for capital road repairs have not increased much (Table 2), the government is offsetting the shortfall by borrowing from external sources. During 2008–2010, loans invested in capital road repairs amounted to roughly \$100 billion. Moreover, under the Lifeline Road Network Program prepared in 2004, the government set a target of 784 high-priority feeder roads (secondary and local roads), totaling some 3,000 km, for repairs in order to provide better access to national highways.

Table 2: Road Budget in Armenia, 2006–2011 (AMD billion)

Road Works	2006	2007	2008	2009 ^a	2010 ^a	2011 ^a
Capital repair of roads	12.62	13.80	12.66	16.01	2.00	3.78
Operation and maintenance	5.05	5.99	6.19	6.13	6.29	5.87
Capital repair of structures	0.55	0.65	1.10	0.54	0.43	0.18
Total AMD billion	18.22	20.04	19.95	22.68	8.72	9.83
Total \$ million	43.30	56.13	61.35	77.68	22.57	27.02

AMD = dram.

^a Medium-Term Expenditure Framework 2009–2011.

Source: Ministry of Transport and Communications of Armenia.

Operation and Maintenance

Among the government's improvements to road operation and maintenance are (i) the introduction in 2005 of 3-year performance-based contracts for routine maintenance, (ii) the incorporation of environmental concerns into road construction contracts, (iii) the banning of leaded fuel, (iv) the setting of emission standards for imported vehicles, (v) the installation of automatic traffic counters at 10 locations on interstate routes to measure traffic volume, (vi) the privatization of most freight transport operations, and (vii) the ratification of eight land transport facilitation conventions.

Traffic Safety

The state of traffic safety in Armenia is alarming. The number of traffic accidents and people killed and injured in traffic accidents has been increasing (Table 3). The country's road safety record system is considered poor. In recognition of the high social and economic costs of accidents, the government has developed a strategy to tackle the problem with World Bank assistance. The government adopted the first National Road Safety Strategy for Armenia and Yerevan and a Five Year Action Plan in August 2009.

Table 3: Road Accidents in Armenia, 2001–2008

Accident Type	2001	2002	2003	2004	2005	2006	2007	2008
Number of accidents	1,021	1,002	1,025	1,164	1,312	1,574	1,943	2,202
Deaths	237	235	252	259	310	332	371	407
Injuries	1,258	1,213	1,294	1,492	1,774	2,089	2,720	3,125

Source: Government of Armenia. 2009. *Statistical Yearbook of Armenia 2009*. Yerevan.

The road network serves as the backbone of the country's economic development, providing connectivity within the country, to neighboring countries, and to mainland Asia and Europe.



Railway operations in Vanadzor,
Lori region

Railway Transport

Infrastructure

Armenia's railway network plays a crucial role in providing mobility for people and freight. The network includes the metro system that serves commuters in the capital. The Yerevan metro has limited coverage, however, and has lost some of its market share to minibuses. The introduction of integrated ticketing may be an opportunity to reinvigorate the system, enabling the metro to play a more important role in Yerevan's urban transport network.

Armenian Railways was established in 1991 as a closed joint-stock company. Prior to independence, it was part of the Trans-Caucasus Railway, headquartered in Tbilisi, Georgia, which also included the Azerbaijani and Georgian networks. Most of Armenia Railways was built during the Soviet era. Central planning dictated that rail would be the primary mode of transport, so little emphasis was placed on costs. The system was designed to handle large traffic volumes, and in some cases it served remote areas. Moreover, without the need to consider competition from road transport, the former Soviet Union rarely updated railway technology after the 1960s.

Armenia's network has 23.5-ton axle loads; is wholly electrified; and has a rolling stock of a basic design, with heavy (tare) weight. The infrastructure and fleet of cars are dated, with most of the electric locomotives around 35 years

old and in need of repair or replacement. Track speed is often limited to 30 km per hour, with rehabilitated sections allowing 60 km per hour. Some of the infrastructure was damaged during the 1988–1994 conflict with Azerbaijan and the 1998 earthquake. Due to the terrain, there are numerous bridges and tunnels, and some of the large bridges need major repairs. Several lines are little used because of border closures or loss of traffic. About 370 km of the 732 km network are fully operational: the Yerevan–Georgian border line, the Yerevan–Yeraskh passenger line, and sections of the Yerevan–Azerbaijan/Vardenis lines. Much of the main Yerevan–Gyumri–Airum (Georgian border) line is in poor condition. The World Bank has rehabilitated 72 km of the track, but the remaining 107 km still need work. In addition, 41 bridges (8 of them large) are in need of rehabilitation.

Railway Traffic

The railway system transports more international than domestic freight, as shown in Table 4. Almost 65% of all rail freight is international, of which about 45% consists of imports.

Table 4: Rail Freight Traffic in Armenia, 2005–2009

Year	Import	Export	Local	Total
2005	1,108 (42.40)	426 (16.30)	1,079 (41.29)	2,613 (100.00)
2006	1,274 (46.86)	513 (18.87)	932 (34.28)	2,719 (100.00)
2007	1,537 (51.35)	710 (23.72)	746 (24.92)	2,993 (100.00)
2008	1,374 (49.87)	636 (23.09)	745 (27.04)	2,755 (100.00)
2009	1,350 (44.83)	569 (19.74)	964 (33.44)	2,883 (100.00)

Note: The main groups of goods that were transported included: cement (11.40%), cereals (15.64%), oil and oil products (11.69%), and chemical and mineral fertilizers (1.59%). Percentages may not total 100% because of rounding.

Source: South Caucasian Railway Presentation, 12 March 2010.

The bulk of Armenia's railway freight from 2005 to 2009 consisted of imports or exports, while local freight traffic accounted for just over 35%. As mentioned in the note in Table 4, the principal commodities transported by railways were (in order of decreasing importance) cereals, oil and oil products, cement, and chemical and mineral fertilizers. Total freight transport by railway increased from 2005 to 2007, declined in 2008, and then slightly increased in 2009. The figures indicate that the renovations of Armenia's rail freight system benefited international more than domestic freight traffic. From the viewpoint of logistics, the imbalance in favor of imports over exports implies the need to assess how the operation of the freight railway system, particularly turnarounds, can be optimized.

Armenia relies on its railway system for about 70% of imports and exports, but there used to be a lot more passengers and freight. The railway system has seen its operations shrink 10-fold since independence in 1991, primarily due to the closing of Armenia's borders with Azerbaijan and Turkey. A similar shrinkage has occurred throughout the former Soviet Union. Before 1991, the Soviet Union's railway system carried roughly 30 million tons of freight and 5 million passengers per year. That rate collapsed by 1999 to 1.5 million tons of

Armenia's railway network plays a crucial role in providing mobility for people and freight.



Large trucks are an important part of Armenia's transport network

freight and 1.3 million passengers. The decline in freight reflected the loss of transit traffic, dramatic decline in rail-based industries, improving road network, and strong competition from the trucking industry. An increase in private car ownership and the introduction of minibuses contributed to the passenger decline. By 2009, freight traffic throughout the former Soviet Union had increased to 3 million tons and passenger traffic to 756,000.

The growing mining industry in southern Armenia is emerging as a major market for freight service, as the output needs to be transported to ports on the Black Sea. However, Armenia's closed borders with its neighbors have caused high transport costs that make shipping goods through Armenia nearly impossible. Faced with competing opportunities across the Caucasus for regional transport, Armenia is determined to develop transit routes across its territory that will provide shorter links and faster service. The modernization of the existing railway infrastructure is a key part of this strategy.

Railway Operations

Since June 2008, a subsidiary of Russian Railways—the South Caucasus Railway (SCR), formerly Armenian Railways—has been operating. The railway concession entered into effect just as the global recession took hold. The prospects for traffic development were limited, unless progress with border openings could be achieved. To make matters worse, the SCR faces increasing competition from truck transport. The SCR and Armenia's Ministry of Transport and Communications (MOTC) need to cooperate closely to make the concession a success and to fulfill as much as possible the railway's potential as an asset to the economy. However, the railway system is handling a critical amount of freight traffic, and for that reason it is a key player in Armenia's intermodal logistics network.

Logistics

An intermodal logistics network is key to building an efficient distribution system. Currently, about 30,000 containers (70% of them 40 feet long) are imported annually through Georgia's port of Poti on the Black Sea. Railway transport handles about 30% of them. Potentially, however, 800,000 tons worth of international containers could be imported. Should the Turkish border reopen, there would be new opportunities for freight traffic through Turkey, the rest of Europe, and beyond, since Armenian shipping could go through Mediterranean rather than Black Sea ports. There would be greater competition in the Mediterranean, but also lower tariffs and more frequent service. Turkish railways use the European gauge, so most containers could be hauled by road to Gyumri in northwest Armenia for loading directly onto Turkish trains. Railway containers to and from the border would primarily carry goods whose weights are generally above the highway weight limits, such as copper concentrate. This is another logistical issue for the government to consider. The government sees the need for a large and efficient railway-road intermodal terminal in Yerevan or Gyumri. A German company is currently establishing an intermodal block train from Western Europe to Bulgaria that will connect with the ferry service to Poti. This train-ferry route will strengthen Armenia's intermodal logistics network.

Urban Transport

Armenia's urban transport system faces several problems: the declining use of public transport, a lack of pedestrian safety, traffic congestion, and urban road

deterioration. Since 2002, most bus lines in Yerevan and other major cities have been franchised to private operators on a per route basis under 3–4-year concessions. The demand for public transport has changed dramatically in recent years with the introduction of minibuses and a decline in large bus, trolleybus, and metro services. But little attention has been paid to the effects of this change on traffic management.

Table 5 shows the breakdown of passenger use of various modes of public transport in Armenia, including air and railways. There was a significant decrease in the use of bus, metro, trolleybus, and tram and cable car systems. This validates earlier observations that the use of urban public transport has declined.

Table 5: Public Transport Users—Urban and Interurban in Armenia (million passengers)

Transport Mode	1990 ^a	2001	2002	2003	2004	2005	2006	2007	2008	% share 2008
Bus and minibus	377.4	121.9	128.9	147.5	158.6	174.0	214.0	216.0	207.7	84.0
Taxi	0.0	0.0	0.7	1.2	2.8	7.8	10.0	12.5	14.9	6.0
Rail	3.5	1.2	1.3	1.1	0.8	0.7	0.7	0.6	0.7	0.5
Air	1.8	0.8	0.9	0.9	1.1	1.2	1.2	1.4	1.5	0.5
Metro	49.2	15.3	15.1	16.2	16.6	15.8	15.4	17.3	18.9	7.0
Trolleybus, tram, cable car	39.0	12.7	9.9	7.1	5.7	4.8	4.1	3.6	3.4	1.5
Total	470.9	151.9	156.8	174.0	185.6	204.8	230.7	251.4	247.1	100.0

^a 1991 for metro, trolleybus, and tram.

Note: Percentages may not total 100% because of rounding.

Source: Statistical Yearbook of Armenia, 2009. Yerevan.

Urban public transport networks are not well integrated. They penalize transfers from one mode of transport to another, and do not have efficient fare structures or ticketing systems. This results in inefficiencies in the levels of service. The government needs to establish order and a proper balance between transport budgets and public demand, including adequate provision for private vehicles, although with restrictions where necessary to optimize use of scarce road space. Responsive transport demand management schemes would be a suitable means of achieving this balance, and of addressing such issues as environmental impact, climate change, and energy use.

Since 2007, ADB and the World Bank financed three studies to develop a long-term urban transport plan for Yerevan, which aimed to promote a modern public urban transport network and improve traffic management and parking system.

The first study⁵ recommends a complete reorganization of the bus system into a hierarchy, including a bus rapid transit system that would eventually have a network with 3 main routes, 23 express routes, and 29 feeder routes. This plan would require developing intermodal connections, and a thorough and common smart card ticketing system encompassing the metro and other services.

The traffic management and parking study⁶ developed a program that includes intersection improvements at a cost of \$13.6 million for 200 intersections; traffic management measures costing \$3.0 million; and on-street parking meters

5 Advanced Logistics Group. 2008. *Assistance to Yerevan Municipality for Passenger Transport—Final Executive Summary Report*. Yerevan.

6 WYG International Limited and the Government of Armenia. 2008. *Assistance to Yerevan Municipality for Traffic Management Project—Draft Final Report*. Yerevan.

The government has successfully devolved most functions in the transport sector through privatization or the granting of franchises and concessions.

at an initial cost of \$5.6 million, with an annual operating cost of \$2.0 million. The Yerevan municipal government has developed the passenger transport and traffic management plans. Construction of underground car parks, with associated on-street parking facilities, was completed at four sites in central Yerevan in 2010.

In 2009, ADB provided a grant to help prepare a holistic and integrated urban transport road map for 2020 in Yerevan.⁷ It proposed a hierarchical and multimodal network combining metro, trolleybus, bus, micro bus, and traffic management. It also focused on nonmotorized transport and quality of life with the introduction of green areas, calming zones, and pedestrian walkways.

This road map also includes institutional reforms on the urban transport organization and financing. Strengthening of monitoring and planning capacities is suggested, particularly building a comprehensive database (along with demand forecasts) based on travel statistics, household, and origin–destination surveys. These will create the foundation to be able to design, forecast, and test all new projects; measure the benefits and impacts of each improvement; and set targets for future modal splits.⁸

Air Transport

Infrastructure and Air Traffic Demand

Armenia has three main airports: Zvartnots, Shirak, and Erebuni. Zvartnots (or Yerevan) International Airport is the principal gateway to the country. Armenian International Airports manages and maintains the airports in Zvartnots and Shirak under a 30-year concession. Table 6 summarizes air traffic during 2005–2008. At the outset, there was an increase in the quantity of passengers and freight handled by Armenia's air transport system. However, the increase was not significant, indicating that the levels of service in air transport may still need improvement, particularly at airports. This is especially true if Armenia is to realize its potential as a tourist destination. A lively tourism industry would boost the economy and enhance international economic cooperation.

Air transport is crucial for the development of tourism in Armenia. Upgrading and modernizing infrastructure, tourism facilities, and related services (such as shuttles and public transport to and from the three airports) are critical in this regard. This is true for the passenger terminals of the three airports, particularly those of Zvartnots.

Table 6: Air Traffic in Armenia, 2005–2008

Traffic Category	2005	2006	2007	2008
Passengers ('000)	1,158	1,172	1,406	1,507
Flights (kilometers)	7,397	7,104	8,119	8,791
Freight and mail (tons)	9,268	9,294	10,010	10,839
Overflights ^a (kilometers)	25,937	26,741	29,155	32,282

^aOverflights are flights over Armenian territory.

Source: General Department of Civil Aviation of Armenia.

⁷ ADB. 2010. *Yerevan Sustainable Urban Transport Investment Program*. Yerevan.

⁸ Modal splits are the proportions of various modes of transportation that can be used at any one time.



Zvartnots International Airport

Public–Private Partnerships in Airport Operations

The government has engaged extensively in public–private partnerships (PPPs) to create opportunities for the private sector to improve service at the airports. Following the first successful private sector investment in the airport industry, a new private sector infrastructure investment of \$173 million will build a two-storey terminal building at Zvartnots Airport that will supplement an existing concourse to help the airport increase the number of destinations it serves and boost the frequency of flights. When the terminal is operational in 2012, the airport should be able to handle about 3.2 million passengers a year, up from the current 1.8 million, and it should be able to accommodate the ever-growing demand until 2030. The government will be able to realize the benefits of PPPs even more by improving regulatory and commercial practices. Air services operate under an investment agreement with Armavia, a private Armenian carrier that has exclusive rights for 10 years to all domestic and international routes.

Institutions

MOTC is the main national government agency responsible for formulating transport programs, projects, and regulatory measures and planning transport systems. The Armenian Roads Directorate (ARD) is the national government agency responsible for maintaining the highways and roads—particularly those making up the country's arterial road system. Because funding is limited, however, ARD does not fully carry out its function of road maintenance. MOTC sets the fare structure of the public transport systems and the regulations ensuring fair competition, safety, and efficiency in those systems. Although the private sector operates public transport through the franchise system, MOTC defines the regulations when it issues the franchises. The government has successfully devolved most functions in the transport sector through privatization or the granting of franchises and concessions. It is reengaging with the transport sector, principally through strengthened supervision and monitoring, but also through a greater understanding of

Budgeting and investment planning must carefully consider possible future price levels and fluctuations in exchange rates, and develop an appropriate contingency plan.

relevant issues. The government will nevertheless need to acquire a clear strategic focus on resource use to solve complicated problems, especially regarding air transport. In this respect, the strategic use of information technology could enhance the role of the government. In any case, the air transport sector needs to function more efficiently and safely, and its further development should be environmentally and socially sustainable, preferably done through the strengthening of partnerships with relevant government offices and private development partners.

KEY CHALLENGES

Economic Challenges

Although Armenia's economy recovered rapidly and surpassed its pre-independence real GDP level in 2004, vulnerabilities remain. This is because (i) the country imports all its fuels, (ii) external assistance and remittances from the diaspora (mainly in the Russian Federation and the United States) remain important drivers of growth, and (iii) investment has focused on the property sector. ADB forecasted the economy to grow by 3% in 2011.⁹

As is the case with other countries, Armenia's economic vulnerability is expected to be greater over the next 10 years. It is likely that remittances, inward investment, and tourism will all suffer from the worldwide recession. Slower growth will affect transport demand (especially in Yerevan), with a particularly strong impact on the vehicle fleet. Armenia will face additional social demands on the national budget, which will also be strained by a decrease in tax revenues. As a result, there will be less funding available for the transport sector.

Inflation and changes in oil prices will hurt infrastructure investment and maintenance. Inflation is expected to increase in the short term, mainly because of the recent rise in the prices of oil and other commodities. However, transport infrastructure investment and service costs will continue to depend on changes in the price of oil, with the future rate of inflation as an additional risk factor. Budgeting and investment planning must carefully consider possible future price levels and fluctuations in exchange rates, and develop an appropriate contingency plan.

Globalization presents both challenges and opportunities. The challenges include an increasing demand for complex logistics and more timely transport services and the need to reduce transport costs, particularly in international and air transport. Other major challenges for the transport sector are

- (i) completing road network rehabilitation;
- (ii) upgrading international railway and road infrastructure;
- (iii) overcoming urban transport problems, particularly achieving a sustainable balance between private and public transport;
- (iv) successfully implementing the railway concession;
- (v) further developing air services;
- (vi) reducing the negative impact of increased transport demand; and
- (vii) achieving long-term sustainability in transport asset management, particularly in the road network.¹⁰

⁹ ADB. 2010. *Asian Development Outlook*. Manila.

¹⁰ World Bank. 2008. *Republic of Armenia Transport Sector Policy Note*. Washington, DC.

Reducing Transport Costs

The Global Competitiveness Index 2010 ranked Armenia's infrastructure at 90 out of 139 countries, with the score of 3.5 in a range of 1 (very bad-quality infrastructure) to 7 (very good-quality infrastructure). Among the components evaluated, Armenia's roads ranked 87, its railway infrastructure ranked 79, and its air transport infrastructure ranked 100.

Improving service and cutting transport costs stimulates trade and economic growth. Transport infrastructure asset management and operating performance can be strengthened by (i) modernizing the vehicle fleet by scrapping obsolescent vehicles, improving performance, and reducing fuel consumption and accidents; (ii) improving logistics and distribution; (iii) applying better road maintenance techniques; (iv) developing strong institutions and policy coordination; (v) improving planning and resourcing; (vi) achieving greater stakeholder involvement; and (vii) improving the regulation of concessions and franchises to ensure that they serve the national interest.

Maintaining Road Assets

The present road network coverage and capacity are sufficient. The main road network has been largely rehabilitated, although without any upgrading of its standards. Nevertheless, there remains the major challenge of maintaining the capacity and efficiency of the international road corridors, which are considered lifelines of the economy. Many secondary and local roads feeding into international road corridors and major economic centers require rehabilitation or reconstruction. In the past, there has only been limited preventive and periodic maintenance. As a result, the roads are deteriorating and require expensive reconstruction. This approach to road maintenance requires greater resources over the long term. Shifting from reconstruction to more timely preventive and periodic maintenance will give the government an important opportunity to use its limited budget more efficiently, and to reap high economic returns quickly. To do this, MOTC should undertake an asset management and life-cycle analysis.

There is ample scope for improving the performance of maintenance operations. The short-term emphasis should be on stabilizing road network conditions to avoid further deterioration. In this way, routine maintenance costs could be reduced, thus freeing up funds for more expensive periodic maintenance. In addition, road standards should be revised and less costly technical solutions found for low-volume roads. Stable and secure funding is necessary and could be achieved through the "user pays" principle combined with the introduction of a flexible road fund.

Expanding the Railway Network

Construction of new railway lines should be subject to strict economic and financial appraisal. When it is not possible to appraise all new lines, appraisals should be made only for lines that are essential to national security. New lines can be a strategic issue for the government. Project implementation depends largely on the availability of external financing, though the government should keep its external borrowing at prudent levels. The railway subsector needs to strengthen its skill base and management resources in marketing so that it can develop new rail traffic demand. It should also adopt an innovative approach to improving the railway system's levels of service and logistics.



Road maintenance in Vanadzor, Lori region



The Yerevan–Gyumri highway, part of the North–South Road Corridor

Financing

The government has secured cost-effective and sustainable financing for investment projects while maintaining prudent management of its fiscal and external borrowing. In recent years, transport projects have been financed from the national budget and international finance institutions, with significant private sector participation and grants from the diaspora. Mobilizing financing from the private sector and developing innovative financing mechanisms will become more important for transport projects. Given its commitments to the International Monetary Fund, the government needs to keep its external borrowing prudent by maintaining its non-concessional borrowing at a sustainable level. Transport funding will be increasingly challenging, and will require the government's early recognition of necessary institutional and policy reforms. There will be a hardening of loan terms and fewer grants. Non-concessional loans must be used effectively, given that Armenia's external borrowing reached 35% of GDP in 2009. External support should generate improved services and cost-effective and safe transport, skillful asset management to sustain networks, and cost-effective infrastructure development.

The government emphasizes the need for (i) a clear outlook in the transport sector; (ii) development and implementation of road standards, including compulsory fiber-optic cabling; (iii) adjustments in the public investment appraisal process; and (iv) suggestions regarding mechanisms and options for PPPs and international best practices. The government is serious about venturing into PPPs for transport infrastructure and services. As the private sector is expected to play a greater role in the future, the government must strengthen its private sector participation and PPP capacity to manage the efficient provision of transport infrastructure and services in an environmentally and socially sound manner. The government needs to introduce a road map to help develop a procedural system for determining the appropriate private sector participation and PPP models for the transport sector. Through this procedural system, the ground rules for risk sharing and management could be clearly delineated for the government and the private partners.

The main benefits of private sector participation and PPP are enhanced efficiency and innovation in transport infrastructure development and services. Market incentives and the rational sharing of project risks between the government and private firms are vital. Armenia has had PPP experiences in its transport sector in recent years. While they were mainly positive, the full potential of government–private sector cooperation has yet to be realized. Apart from a task force for PPPs, there should be a road map to guide the creation of a PPP framework for transport infrastructure development to identify potential PPP projects. The framework could also detail the method of defining a PPP project, the associated risks, and how the government and the likely partner would share the risks associated with a project under PPP. The road map should include the following steps:

- (i) Conduct a prefeasibility study to determine the viability of a PPP project that would include technical and economic appraisal, financial analysis, and risk assessment.

- (ii) Ascertain which option from the menu of PPP modes (build–operate–transfer, build–lease–transfer, build–own–operate, etc.) would be suitable for a particular transport infrastructure project, and decide if there is a need for a government subsidy to address a viability gap.
- (iii) Determine the institutional and legal aspects of the PPP project, from inception to documentation and approval.
- (iv) Formulate transaction design and project management plans to detail the procedures from design to implementation, including the scope and contents of the contractual arrangements and implementing arrangements.
- (v) Test the market for the acceptability of the PPP project, and draw conclusions to ensure the success of the PPP project. These steps will require capacitating MOTC and related infrastructure agencies regarding PPP, especially regarding development strategies.

Information Technology

The last decade has seen significant development in information technology. This trend will continue, giving Armenia opportunities to enhance its transport sector management and improve logistics. A strengthened planning and management capability would require disseminating accurate and comprehensive data to users through information technology and facilities. There should be close cooperation between data providers and users, with data made more widely available.

Information technology plays a significant role in improving the levels of service in intermodal transport systems. It is essential that transport data are accurate and comprehensive, and are harmonized with international standards, especially in view of the growing demand for paperless documentation relating to customs, immigration, quarantine, and security, and the requirements of globalization. Moreover, information technology is crucial for (i) development of highways, especially toll roads; (ii) development of seamless intermodal transport systems through subregional cooperation; (iii) transport sector management; and (iv) vehicle fleet maintenance. The application of an appropriate intelligent transport system will be important for Armenia's highway network. A comprehensive and widely accessible transport database will be essential for improvement in the government's transport sector management.

Traffic Safety

As noted earlier, Armenia's road safety record is poor. The government has identified measures to improve road safety, which include (i) prioritizing funding for a road safety program, (ii) setting appropriate speed limits and ensuring their enforcement, (iii) improving road signage comprehensively, and (iv) improving safety inspections of natural gas vehicles and facilities. In addition, the government should consider how to conform to international traffic safety standards, taking these standards into account even when roads are still at the design stage.

Information technology plays a significant role in improving the levels of service in intermodal transport systems.



The Yerevan–Gyumri highway, part of the North–South Road Corridor

Trade Facilitation

Cross-border procedures are crucial to logistics. The government has made substantial progress in reforming customs procedures, minimizing interactions between importers and customs personnel, and shifting to risk management-based methods in place of excessive physical controls and interventions. Yet, substantial challenges remain. The World Customs Organization plans to conduct a diagnostic review of the customs areas of Armenia's airports. The potential for increased transit through Armenia, which could have been realized with open borders, is being eroded by the development of railway and road routes bypassing the country to the north and east.

Since independence, deindustrialization and import substitution, both encouraged by border closures and high transport costs, have limited the volume of trade. Although trade value has increased, this was largely due to the import and reexport (after polishing) of diamonds. Most freight has been carried by railway to the port of Poti, from where it was taken by train ferry to Ukraine. In 2009, imports by rail totaled 1.33 million tons (31% grain and 23% oil) and exports totaled 0.35 million tons (48% cement for Georgia). Imports and exports combined accounted for three-quarters of Armenia's railway traffic, but trade development prospects remain limited.



MOVING AHEAD

Guiding Principles of Redefining Armenia's Transport System

The government has been committed to focusing on the following guiding principles:

- (i) resource generation and allocation in the transport sector;
- (ii) establishment of planning criteria for transport development of plans and corresponding programs and projects for all modes of transport, including intermodal systems;
- (iii) cost recovery and subsidies in the transport sector and among its subsectors to ensure equity in harmony with the principle of “users pay”;
- (iv) regulation of public transport services, notably in urban areas, through prior consultation and coordination that is transparent and takes into account relevant technical and economic issues;
- (v) prioritizing urban public transport over private vehicles to guarantee accessibility, better levels of service, convenience, safety, security, etc., and a hierarchy of urban public transport services based on priority;
- (vi) transport logistics supporting the country's economy through the provision of a seamless intermodal transport network linking production hubs, distribution centers, and markets, thereby

A well-conceived national transport strategy is the key to meeting the country's economic goals and achieving international cooperation, not only with Armenia's neighbors, but also with the rest of the world.

- (vii) use of information technology to complement and support transport initiatives and facilitate trade and documentation through a single window for cross-border procedures, thereby reducing regulatory obstacles and associated costs; and
- (viii) governance that will be effective in formulating regulations, encouraging a greater role for the private sector in the development and provision of transport infrastructure and services, and in ensuring the sustainability of technically capable human resources through enhanced capacity building that promotes international standards and best practices.

The government's strategy provides a new outlook for the transport system, enabling it to be more responsive to the country's economic goals. The strategy will promote an efficient and sustainable intermodal transport system that will include transport services, logistics, infrastructure, and institutional mechanisms to ensure economic growth and the country's close cooperation with its neighbors.

Apart from supporting economic growth and international cooperation, Armenia's improved transport system will offer efficient mass transit for the people, especially in urban areas. Moreover, the government will be able to encourage the private sector to develop mass transit systems that are not only appropriate for Armenia's urban population but also sustainable and environmentally friendly. Mass transit systems that account for environmental concerns will meet the requirements of Armenia's rehabilitated public transport system. Using low carbon fuels for public transport is another policy worth considering.

A well-conceived national transport strategy is the key to meeting the country's economic goals and achieving international cooperation, not only with Armenia's neighbors, but also with the rest of the world. The essential ingredients for Armenia's transport system are at hand and can contribute to the economic sustainability, including the development of its industries such as mining, chemicals, services, and tourism.

External Financing

The government has received grant support for transport development with a total amount of about \$350 million from the diaspora and from the international community (bilateral and multilateral). Armenia is expected to become a middle-income country by 2020, after which there will be a consequent hardening of loan terms and fewer grants. The hard loans and external support Armenia receives at that point should be used effectively, particularly to encourage improved services, cost-effective and safe transport, asset management that sustains networks, and cost-effective infrastructure development.

Private Sector Participation

The private sector in Armenia plays a significant role in developing the economy. Once the necessary mechanisms and strategies for private sector participation are in place, the government and the private sector will be partners in the development of the country's transport system. Private sector

participation and public–private partnership (PPP) will expand in the transport sector. The government can undertake a case study for the establishment of private sector participation and request technical assistance from international financial institutions. The government could develop a bus rapid transport system, or build a logistics center or a limited-access highway. The intention would be to establish technical and institutional procedures for determining the appropriate private sector participation or PPP modality, identifying risks, and allocating risks to all key players in the PPP project.

Improving the Government's Role

The government's key role is to establish and enforce economic and technical regulations and ensure the provision of transport infrastructure and services according to international standards and best practices. The government should also determine the procedures through which the private sector could become active in providing transport infrastructure and services under the concepts of private sector participation and PPP. Consequently, the government must ensure that transport projects are implemented with transparency and accountability. This can be achieved through the establishment of transparency programs in which the private sector, civil society, and the government work together. The government should also grant some autonomy to the *marzes* (provinces) and local governments to undertake their own transport planning, but such planning must be consistent with the national transport strategy. The highest sector management priority is to strengthen the capability of the Ministry of Transport and Communication (MOTC) by redefining the relationship between MOTC and the Armenian Roads Directorate (ARD). This would mean transferring some of MOTC's responsibilities to ARD.

As Armenia is an earthquake-prone country, the government is aware of the importance of disaster preparedness. The area around Yerevan, where economic and political activities are concentrated, has the highest earthquake risk in the country. A 2006 analysis estimated that there would be up to 300,000 fatalities in the event of a magnitude-7 earthquake. Transport is an essential component in disaster recovery. Two disaster recovery transport centers should be established, one in Yerevan and the other a safe distance away (e.g., in Dilijan). The operation of the centers might be coordinated with that of the road safety task groups.

Institutional Restructuring and Strengthening

Despite its limited resources, MOTC has introduced many significant reforms and carried out important development projects. MOTC's structure includes appropriate areas of responsibility, but the ministry has developed in a reactive manner, rather than as a result of specific policy objectives. For this reason, there remain some core problems: incomplete MOTC coverage of civil aviation and urban transport; incomplete (to a lesser extent) liaisons with the traffic police; and the existence of adjunct bodies outside direct MOTC authority, which compromises policy cohesion and consistency. These problems have direct implications for the integration of transport sector planning, policy implementation, and regulatory procedures.

Transport sector management has sector-wide cases (railways, civil aviation, and some aspects of road passenger transport), in which regulatory and service delivery responsibilities are combined in the same authority. Regulation and



The Yerevan–Gyumri highway, part of the North–South Road Corridor



New drainage along the
Zoravan–Aragiugh road

service delivery should be separated to ensure good governance. Moreover, the information technology systems used by MOTC and many of its subordinate agencies have been developed piecemeal and are stand-alone systems. If MOTC were to introduce an integrated transport sector database, it could improve its management capability and enable it to enhance its analytical capacity (regarding planning and oversight) and reduce duplication in its routine activities.

MOTC will be able to improve governance through a range of improvements in its systematic procedures and application methodologies. The quality of MOTC's governance depends on the key traits of accountability, predictability, openness to participation, and transparency, all of which MOTC needs to improve. Good governance requires policies and procedures that guarantee effective interaction between government and civil society.

Improving Regulatory and Oversight Capacities

The application of private sector participation and PPP policies in the transport sector is fragmented, with responsibilities being shared by various agencies within and beyond MOTC's responsibility. The government needs to streamline private sector participation and PPP policy applications and ensure their consistency. It also needs to review how transport services are delivered, in particular monitoring and evaluating the process through which concessions are granted. At present, there is little consistency in this process. MOTC staff are generally proficient in carrying out traditional responsibilities within the public sector and budgetary arrangements. But the emergence of commercially based concessionary arrangements and other private sector participation structures requires that MOTC strengthen its capacity for monitoring and evaluating projects involving the private sector.

Improving Urban Transport

Given the increasing volume of passenger traffic, the need to improve public transport in urban areas is obvious. Moreover, if the government is to succeed in its goal of introducing low-carbon public transport systems, those systems must be well integrated. The proposed integrated and multimodal system is a step in this direction. Developing urban mass transit system will contribute to increasing participation of the private sector and new forms of PPP. Another issue worth considering is the appropriateness of economic measures such as congestion pricing.

Systematic Investment Prioritization Mechanisms

Although MOTC has introduced a growing number of private sector participation and PPP projects in recent years, it mainly secures the financing of investment projects from government budget and donor sources. As a result, MOTC has tended to specialize in one-off financing schemes to meet specific project needs. The situation worsened when such financing schemes were combined with inconsistent or piecemeal policy application. MOTC needs to apply well-defined, consistent policies and procedures for evaluating investment projects. For example, a national civil aviation development plan has yet to be elaborated, so infrastructure requirements, priorities, and associated costs remain unclear.

DEVELOPMENT NEEDS

The recommended actions, summarized in the Appendix, include details of proposed policy reforms and investment and technical assistance projects for the short term (2011–2012), medium term (2013–2016), and long term (2017–2020). These reforms and projects target infrastructure development, technology upgrade, policy reform, and capacity development. The funding needs for these development projects are given in Table 7. They include 58 investment projects estimated at about \$2 billion, of which about \$1.3 billion is for 49 new projects and \$0.7 billion for 10 ongoing projects. The 14 technical assistance projects, at an estimated cost of \$36.8 million, include feasibility studies for potential projects, advisory support for planning, technical knowledge transfer, and institutional capacity development.

Of the \$2.02 billion needed for the investment program during 2011–2020, external aid agencies have offered a total of about \$1.1 billion, including \$272 million from the South Caucasus Railway under a railway concession agreement. The government is expected to allocate at least \$400 million (in a low-economic-growth scenario) for high-priority projects, leaving a financing gap of about \$0.52 billion. This gap is expected to be closed by the government and external financiers from the private sector in the medium and long terms (Table 8).

The government needs to streamline private sector participation and public–private partnership policy applications and ensure their consistency.

Table 7: Development Funding Needs in Armenia, 2011–2020
(\$ million)

Transport Mode	Investment	Technical Assistance
Roads and road transport	1,244	24.1
Railways	343	6.9
Urban transport	341	0.0
Civil aviation	95	5.8
Total	2,024	36.8

Source: ADB. 2008. Armenia Transport Sector Development Strategy. Final Report. Manila.

Table 8: Financing Plan for Investments in Armenia
(\$ billion)

Source	Amount
Government	0.40
Development partners	1.10
Funding gap	0.52
Total	2.02

Source: ADB. 2008. Armenia Transport Sector Development Strategy. Final Report. Manila.

APPENDIX: RECOMMENDED TRANSPORT SECTOR ACTIONS

Roads and Road Transport	Roads	Funding (i) Plan and fund the road network as a single entity, irrespective of implementation responsibilities, including strategic and through routes in Yerevan and other urban areas, as well as roads under Ministry of Transport and Communications (MOTC) jurisdiction. (ii) Sustain increases in budgetary funding in real terms until 2020. (iii) Mobilize additional resources through the introduction of a road fund, with the initial aim of funding a periodic maintenance program. (iv) Agree with donors on a medium-to-long-term network development program. Maintenance (i) Shift the focus from reconstruction and rehabilitation to preventive maintenance and asset management. (ii) Improve the cost-effectiveness of maintenance programs through good governance. (iii) Develop a periodic corrective maintenance program. (iv) Program strategic road maintenance to ensure long-term network sustainability. (v) Investigate the structural condition of bridges and develop a bridge asset management program. (vi) Set up permanent weight scales on major routes. Priority Rehabilitation and New Construction (i) Complete the Lifeline Roads Network Program, emphasizing priority feeder roads. (ii) Focus the interstate program on upgrading the north-south corridor. (iii) Give priority to missing links, bypasses, and other new construction projects of potentially high economic benefit. Design Standards (i) Introduce international design standards, particularly for geometry and pavement design. Safety (i) Prioritize and adequately fund a road safety program. (ii) Set appropriate speed limits and enforce them rigorously. (iii) Improve MOTC relations with traffic police. (iv) Build safer u-turn points or eliminate them altogether. (v) Provide run-offs on long descents and improve warning signage. (vi) Improve road signage comprehensively, route by route. (vii) Widen shoulders through towns and in rural areas to protect pedestrians. (viii) Improve procedures for safety inspections of natural gas vehicles and facilities. Database (i) Develop a road asset management system, including a maintenance database, using information technology for budgeting and management (including prioritization).
	Road Transport	(i) Provide incentives to owners to modernize their vehicles. (ii) Make vehicle inspections more rigorous to encourage the replacement of faulty vehicles and improve safety and performance. (iii) Consolidate the operation of inter-marz (province) bus services. (iv) Expand international bus services. (v) Develop the potential for increased traffic.

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Railways Transport	Concessions	(i)	Ensure the success of concessions through government support.
		(ii)	Monitor concessions effectively, including their performance on safety.
		(iii)	Establish a railway monitoring agency within MOTC.
		(iv)	Provide training for agency staff.
		(v)	Develop marketing skills and promote traffic development.
	Network Development	(i)	Undertake feasibility studies and prioritize non-concession projects.
		(ii)	Develop and support industries that use rail transport.
	Intermodal and Logistics	(i)	Develop intermodal terminals in Yerevan or Gyumri.
		(ii)	Expand intermodal operations and containerization.
		(iii)	Introduce necessary legislation to promote the development of freight forwarding.

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Urban Transport	Road Network	(i) Use network capacity effectively with a better balance among public transport, private transport, and pedestrian use. (ii) Promote sustainable development by aligning infrastructure development with land use planning. (iii) Introduce transit-oriented development so that residential and commercial centers are planned so as to maximize access to public transport and infrastructure for nonmotorized transport. (iv) Remove thoroughfare traffic from city centers by providing bypasses. (v) Overcome natural topographic barriers that limit connectivity between districts, and address unbalanced network distribution. (vi) Develop infrastructure to accommodate large buses and bus interchanges. (vii) Remove bottlenecks by improving intersections, including grade separations. (viii) Improve road surface conditions through adequate maintenance.
	Public Transport Infrastructure	(i) Implement high-quality public transport services for new commercial and residential developments, especially in city centers. (ii) Give priority to segregated bus services to encourage a shift from private vehicle use. (iii) Develop infrastructure that encourages intermodal transfers at bus and metro stations, interchanges, and park and ride facilities.
	Road Safety	(i) Improve road safety and reduce casualties by separating vehicles from pedestrians. (ii) Give priority to pedestrians and nonmotorized transport by providing adequate sidewalk space; more pedestrian zones in city centers; and more lighting, pedestrian crossings, and bicycle facilities. (iii) Provide facilities for the disabled, such as access ramps.
	Public Transport Services	(i) Rationalize bus networks, with medium-sized and/or large buses and trolleybuses serving high-density corridors, and minibuses serving lower-density corridors and feeder roads. (ii) Implement bus-operating contracts through a gross-cost contractual system based on minimum vehicle kilometer and service quality indexes, with penalties and bonus incentives. (iii) Consolidate bus operators into a small number of concessions, each of sufficient duration to encourage investment in larger buses. (iv) Develop light rail and bus rapid transit on strategic routes, where economically viable. (v) Require bus services to assist socially disadvantaged groups. (vi) Expand trolleybus service.
	Yerevan Metro	(i) Improve service quality by refurbishing stations and trains. (ii) Introduce electronic ticketing and enforcement. (iii) Improve technical, management, and commercial capability of staff through comprehensive training programs. (iv) Improve access to stations and interchanges with additional modes. (v) Extend networks in conjunction with commercial and residential developments.

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	Fare Integration	(i) Ensure that passenger transport is accessible to all socioeconomic groups. (ii) Establish the institutional framework for integrated ticketing. (iii) Introduce an integrated ticketing system to facilitate interchange with thoroughfares.
	Traffic Management	(i) Improve and modernize traffic signals to accommodate increasing demand and to improve safety. (ii) Make institutional improvements and modernize equipment to increase the municipalities' capacity to implement and regulate public transport services, manage traffic, and collect data. (iii) Establish a unified metropolitan transport authority and an urban transport fund.
	Parking	(i) Introduce paid on- and off-street parking to control car use. (ii) Implement graded parking fees using electronic metering to reflect land value and to limit the availability of long-term parking, particularly at destinations served by public transport. (iii) Establish an access-to-parking hierarchy: physically disadvantaged; residents; short-term visitors, including business travelers; and long-term users, such as commuters. (iv) Utilize revenues from parking fees and fines to invest in urban transport improvements. (v) Mobilize effective enforcement of parking regulations to ensure compliance. (vi) Encourage private sector investment and management of parking facilities by developing public-private partnership. (vii) Draft regulations that obligate developers to provide off-street parking.

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Civil Aviation	National Aviation System Plan	The main concerns of a national aviation system plan should be (i) infrastructure requirements, priorities, and associated costs; (ii) Zvartnots' development requirements and associated infrastructure, including a new runway; (iii) new passenger terminal at Shirak; (iv) feasibility of reopening airports; (v) prospects for domestic passenger service development; and (vi) possibility of a new Armenian carrier (for either domestic service or both domestic and international service).
	ARMATS (closed joint-stock company, Zvartnot Airport)	(i) Identify reequipment needs that are required in about 5 years.

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Cross-Sector Issues	Institutional and Governance	(i) Consolidate the responsibilities of MOTC. (ii) Hire a transport advisor with international experience to spend at least 2 years in MOTC supporting the development and implementation of a 5-year program of institutional and human resource development. (iii) Separate regulatory and procurement responsibilities from service delivery. (iv) Ensure the independence of regulators. (v) Develop private sector participation and public-private partnership units. (vi) Foster good governance. (vii) Review organization of civil aviation. (viii) Clarify organization of urban transport systems.
	Legislation and Conventions	(i) Adhere to international and regional transport conventions and agreements.
	Disaster Mitigation	(i) Establish transport disaster recovery centers, one in Yerevan and one in a provincial city.
	Tourism	(i) Implement a tourism promotion strategy, including an infrastructure investment program, service improvements, and cross-border facilitation. (ii) Eliminate transport impediments to tourism development.
	Environmental and Social Policies	(i) Mitigate the environmental and social impact of the transport sector through stringent environmental and social due diligence, monitoring, and coordination with external agencies, including the Joint United Nations Programme on HIV/AIDS for transport-related HIV/AIDS issues and the United Nations Development Programme for transport-related human trafficking issues. (ii) Increase transport access for the poor and vulnerable, with measures such as a pro-poor pricing policy.

Source: ADB. 2008. *Transport Sector Development Strategy*. Consultant's report. Manila (TA 4937-ARM).

Photographs from the Asian Development Bank.

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Armenia's Transport Outlook: Transport Sector Master Plan

Landlocked Armenia depends on transport and cross-border access, but only two international borders are open and its climate is severe. The result is high transport costs, particularly for traded goods, and expensive infrastructure development and maintenance. The government's key role in improving transport is to ensure that transport infrastructure and services follow international standards and best practices; encourage the private sector to provide transport infrastructure and services; establish transparency programs in which the private sector, civil society, and the government work together; and allow local governments to plan their own transport systems.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries substantially reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.8 billion people who live on less than \$2 a day, with 903 million struggling on less than \$1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

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