AFGHANISTAN TRANSPORT SECTOR MASTER PLAN UPDATE (2017-2036)

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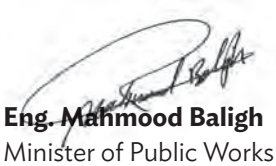
Foreword

In launching this Transport Sector Master Plan Update, we are propagating the government's future vision of Afghanistan's transport sector. Long-term planning needs such a vision. The new vision of transport sector is to foster the capacity of transport infrastructure of Afghanistan at the quality that can serve as transport hub for the region. Regional connectivity, proper operation and maintenance of transport infrastructure and sustainability are the main focus of the transport master plan.

The master plan lays out the future path of transport infrastructure development and maintenance in the country. The unique geographical location of Afghanistan at the connecting point of Middle East–China and Central Asia–South Asia gives the opportunity to become a regional connecting hub for trade, transit and economic development. Expansion of a strong and efficient transport infrastructure is the backbone of the connectivity. The master plan also considers the internal connection for mine industries, agricultural areas, and population centers.

The implementation of this master plan is not an easy task. It requires commitment from government leadership and and the international development partners. To achieve the goals set in this strategy, more money is needed from the donors. It also needs more efforts from the government to bring fundamental reforms as well as capacity developments.

Finally, we believe that economic development, regional integration, and connectivity will bring socioeconomic growth, security, and stability.



Eng. Mahmood Baligh
Minister of Public Works
Afghanistan

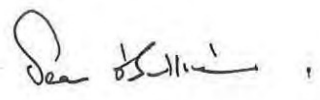
Preface

The *Transport Sector Master Plan Update* sets out an ambitious 20-year strategy for Afghanistan's entire transport sector to improve roads, railways, civil aviation, urban transport, trade logistics, and all institutions concerned with transport infrastructure and operations. The plan is an update of the Asian Development Bank (ADB)-supported Road Sector Master Plan, which helped guide the completion of up to 80% of Afghanistan's priority road projects from 2006 to 2016. The updated Plan recommends several urgently needed actions to help Afghanistan deliver on its wider development goals.

Beginning with a candid assessment of current transport challenges, the plan lays the foundation for a transport strategy and program that is sensitive to Afghanistan's fragile and conflict-affected situation. The Plan recognizes that climate change adaption and climate proofing will be a critical priority for transport sector work to remain sustainable over the long term.

The resources required to achieve the plan's goals are substantial, with an estimated investment of about $26 billion for the 20-year period. We therefore call on the continued support of the government and all development partners to meet the future needs of the transport sector through stable, predictable, and coordinated support. ADB remains committed to supporting the development of Afghanistan's transport sector and is honored to support the government in this important undertaking.

The *Transport Sector Master Plan Update* could not have been completed without the contributions and tireless efforts of a great many individuals, including staff from the Ministry of Public Works and officials from other government agencies, representatives from the donor community, and other stakeholders. All their contributions are gratefully acknowledged.



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Acknowledgments

This report was initiated by David Hill, principal transport specialist, Central and West Asia Department (CWRD), Asian Development Bank (ADB). ADB's transport consultant, Peter C. Darjes, prepared the report. Sean O'Sullivan (Director General, CWRD), Hong Wei (Deputy Director General, CWRD), Tom Panella (Country Director, Afghanistan Resident Mission [AFRM]), and Xiaohong Yang (Director, CWRD Transport and Communications Division [CWTC]) provided guidance and advice. Witoon Tawisook, principal transport specialist (CWTC) and Ko Sakamoto, transport specialist (CWTC) supported finalization of the report. Staff members of the Ministry of Public Works, Ministry of Finance, Ministry of Transport and Civil Aviation, and the Afghanistan Railway Authority provided information and suggestions during preparation of this report. Special thanks go to Prof. Dr.-Ing. Gerhard Hüttig, Programme Coordinator, Organization of Afghan Civil Aviation Safety Oversight, for his valuable contributions to discussions on the civil aviation sector. The study team is grateful for the fruitful interactions with Mohammad Shalaby, consultant and team leader for the World Bank's National Rural Access Program, and Zafran Khan, consultant and Principal Activities Manager of United States Agency for International Development's Road Sector Sustainability Program. Staff from ADB headquarters and the AFRM assisted the consultant in data collection activities and reviewed the draft reports. The support provided by Ma. Corazon Cecilia M. Sison, Anna Silverio, Ma. Cecilia Villanueva, Bashirullah Khpalwan, Shabnam Habibzai, and Pilarcita Sahilan are also acknowledged.

Abbreviations

ACAA	Afghanistan Civil Aviation Authority
ACAI	Afghanistan Civil Aviation Institute
ADB	Asian Development Bank
AFRA	Afghanistan Railway Authority
ANDS	Afghanistan National Development Strategy
BCP	border crossing point
CAREC	Central Asia Regional Economic Cooperation
GDP	gross domestic product
km	kilometer
km^2	square kilometer
MOPW	Ministry of Public Works
MOTCA	Ministry of Transport and Civil Aviation
MRRD	Ministry of Rural Rehabilitation and Development
NRAP	National Rural Access Program
O&M	operation and maintenance
PRC	People's Republic of China
RAMS	road asset management system
WHO	World Health Organization

Executive Summary

The Transport Sector Master Plan Update is a follow-up to the Road Sector Master Plan of 2006. In 2006, Asian Development Bank (ADB) supported the preparation of a Road Sector Master Plan. The plan set out a strategy for the development of the road network, envisaging a 5-year program period. The plan identified about 12,000 kilometers (km) of priority projects, covering regional, national, and provincial roads. As of mid-2016, approximately 80% of the 2006 Road Sector Master Plan was completed.

The Transport Sector Master Plan Update is intended to guide the government and donors in allocating and programming future funds to increase the efficiency of Afghanistan's transport system. The Master Plan Update takes stock of the achievements of the previous road master plan and important sector developments that have emerged during the intervening period. Changes in political and economic conditions have motivated the creation of the update. The government's ambitious plan to develop an extensive railway network has provided an additional rationale. The Master Plan Update will have a 20-year horizon; cover roads, railways, civil aviation, urban transport, and trade logistics; and include all administrative responsibilities concerned with transport infrastructure and operations. In addition to providing a program of prioritized investments, the Master Plan Update recommends urgent capacity-building measures.

Afghanistan's fragile and conflict-affected situation remains the overriding concern in the transport sector. The transport strategy and program must to be sensitive to this situation. Development partners must continue to provide stable and predictable support and adopt a concerted approach to supporting sector reforms in order to create the environment for efficient and sustainable infrastructure and transport operations. The Master Plan Update provides a suitable platform to pursue these aims. A crucial challenge will be to create the conditions for transport sector sustainability. Climate change adaptation and climate proofing have emerged as key priorities. The financial dimension of sustainability has been a lingering concern for a long time. Although resource allocations to the transport sector have steadily increased over the past years, maintenance remains underfunded. Unless the past allocation pattern is reversed, the situation is likely to worsen.

The strategy and the program must address several important transport sector issues. These issues include asset sustainability and its various dimensions, notably operation and maintenance (O&M) of assets, road traffic safety, trade logistics, urban transport, and climate change impact mitigation. The current state of the national road contracting industry is seen as a potential source of countrywide employment, and measures to tap this source are recommended.

Maintaining Afghanistan's roads will require greater funding for maintenance and a road asset management system. In the past, O&M for roads has been neglected. The underlying cause has been a shortage of government resources and the lack of a systematic O&M regime. Given the country's narrow economic base and competing claims on scarce budget resources, Afghanistan will have to rely on donor contributions to finance road maintenance in the foreseeable future. Accordingly, donors should balance their assistance between investments and support for O&M. Increased funding for O&M is a necessary condition, though not a sufficient one, for road asset sustainability. A road asset management system is urgently needed.

Traffic safety on Afghanistan's roads has emerged as a serious problem. Prerequisites for remedial action include a road safety strategy and a program for time-bound action. The proposed strategy will have to align the various, currently scattered, institutional responsibilities. A coordination mechanism among the agencies concerned with road safety will have to be established. As a next step, a road safety audit and identification of road locations prone to accidents should be undertaken. The Ministry of Public Works will be in charge of all activities related to making road infrastructure safer. Capacity development support to this end will be required.

The concern about sustainable transport applies in particular to Afghanistan's existing and proposed railway. Although the current operation lacks the scale and traffic for financial sustainability, other constraints include cumbersome cross-border procedures as well as inefficient logistics facilities. Until the size of the railway network achieves critical mass, continued government support appears unavoidable. Even if railway development can pass the threshold to attain economies of scale, however, cost-efficient operations and minimization of government subsidies will be predicated on the adoption of a suitable business model—a build–operate–transfer concession likely being the most expedient option. In general, appropriate institutional arrangements will be critical for the efficient management and operation of the railway.

Responsibilities for the transport sector are fragmented, and an apex institution for planning and policy would be desirable. Several government ministries are involved in the operation and regulation of the transport sector, and there is a need to streamline transport sector responsibilities. Far-reaching sector reforms are currently under way. Notable in this regard is the proposal for establishing an autonomous road authority and the creation of a dedicated road fund. Nonetheless, the need for an apex agency in charge of policy and planning remains. Although an autonomous rail authority has been created, the regulatory responsibility still needs clarification.

Afghan road contractors should play a greater role in the execution of internationally funded roadworks. Contracts for construction, reconstruction, and periodic maintenance of regional, national, and provincial roads have been a captive market for international contractors. Yet there are national contractors capable of working on larger road contracts. The contract industry survey conducted in conjunction with the Master Plan Update revealed underutilized capacities and capabilities. Afghanistan's fragile and conflict-affected situation and the availability of qualified local contractors suggest that development partners should modify the eligibility criteria applied in their procurement procedures and package contracts to provide national contractors a realistic chance to be awarded a contract. This would essentially mean tendering smaller contracts and lowering the annual cash flow requirements. In addition, challenges related to poor design, insufficient transparency and integrity, delayed release of payments, and affordability of bid and performance bonds require attention.

Sustained implementation of the Central Asia Regional Economic Cooperation program and other regional initiatives will ensure better connectivity and more-efficient trade logistics. Due to its strategic location, Afghanistan has emerged as a focus of many regional plans and initiatives. Among them is the Central Asia Regional Economic Cooperation (CAREC) program, which is putting Afghanistan on the path to full regional integration, thus laying the foundation for sustainable economic growth. The CAREC Transport and Trade Facilitation Strategy 2020, formulated by the 10 CAREC member countries, stresses the importance of extending and completing the 6 strategic multimodal corridors, which are expected to handle the major share of future transport and trade growth in the region. Four of the six CAREC corridors that traverse Afghanistan and will involve major investments in roads, railways, and logistics centers.

Afghanistan needs to improve the performance of transport and trade logistics. The performance of Afghanistan's transport and logistics sector is impeded by cumbersome procedures; weak standards and regulations; slow progress in computerization; and lack of trade finance, cold storage facilities, and insurance. Afghanistan's 12 border crossing points (BCPs) are major choke points for trade because they reduce the speed of negotiating most CAREC corridors by more than half. The underlying causes include poor physical infrastructure and/or inefficient use of infrastructure capacity, low utilization of modern inspection technology and procedures, and inadequate logistics facilities at BCPs. Eliminating some of the bottlenecks will require improved BCP infrastructure and procedures. Although infrastructure constitutes an obstacle to trade facilitation, procedures at BCPs often disrupt trade more severely than BCP facilities and infrastructure. The Master Plan Update recommends an assessment of BCP infrastructure in addition to BCP operations.

Transport in Afghanistan's cities is stifling economic activities in the country as a whole. Kabul, which is among the fastest growing cities in the world, is a key example. Urban sprawl and uneven population distribution at the periphery of Afghanistan's cities have contributed to increased daily travel needs and trip frequencies and the overall high cost of transport. Poor air quality has become an increasing challenge. Weak traffic discipline and enforcement of traffic rules create chaotic situations, not limited to peak hours. The economic cost of Kabul's transport problem likely accounts for more than 1% of the country's gross domestic product. The agenda for urban transport development must address a diverse set of formidable problems, including urban infrastructure and public transport issues, compliance with land use regulations and traffic rules, and mitigation of the social repercussions likely to be caused by restructuring and modernizing public transport services. Such a program merits its top priority due to the high economic returns that investment in urban transport will likely generate.

Afghanistan's transport sector is vulnerable to climate change impacts. Afghanistan will have to face changes in climate variables and in the frequency and intensity of extreme weather events. Although mitigation remains a key objective in avoiding climate change, adaptation to climate change impacts is essential. Building resilient transport infrastructure systems can reduce hazard exposure and vulnerability to climate change. In addition, the impact of a fossil fuel-dependent transport system on the urban environment, specifically on the cost of fuel wasted through traffic congestion; and air quality, and the costs for the Afghan health system could be alleviated relatively easily. To this end, the quality standard for car fuel, which is still based on a Soviet standard from the 1970s, should be updated; the import of obsolete, highly fuel-inefficient secondhand cars should be phased out; and better traffic engineering and regulation in Afghanistan's main cities should be adopted.

The proposed strategy for the transport sector will address the identified sector issues and physical needs and will be implemented through a coherent package of investments and capacity development measures. The indicative investment requirements for the plan period 2017–2036 total $25.9 billion, with the envisaged composition by subsector as follows:

Sector	Amount ($ million)	Share (%)
Railways	11,176	43.1
Roads	13,000	50.2
Urban transport	853	3.3
Airports	568	2.2
Trade facilitation	300	1.2
Total	**25,897**	**100.0**

The overall investment amount of $25.9 billion over 20 years assumes an unconstrained resource scenario; that is, neither financing constraints nor limitations on the government's absorptive capacity have been considered in determining the size of the investment program. Based on the annual investments' share in the projected annual gross domestic product, the resources likely to be available to the government, and the government's record in disbursing development funds, the proposed investment package contains an element of overprogramming. With its emphasis on expanding the tertiary network and O&M—both to be carried out by national contractors—the program will make a contribution toward social and economic stabilization. The program's focus on regional initiatives will enable Afghanistan to benefit from its strategic location and foster trade with its neighbors and the rest of the world. The program for railways is ambitious. Provided that operational and institutional prerequisites can be met, the railway program will enable the country to tap the potential of its rich mineral resources, in addition to the benefits expected from international transit traffic.

The total investment program for the roads subsector is $13 billion. The program for roads and highways consists of essential projects. The Salang Tunnel and its access road, the missing links of the ring road, and connector roads to BCPs are the top priorities of the master plan. Other high, though nonrated, priorities are O&M and the programs for national and tertiary roads. Investments in these three categories will have to be undertaken in equal amounts during all of the 5-year investment periods. The program covers the following components:

- completion of the remaining 474 km of the Ring Road;
- geotechnical surveys and detailed design and construction of the Salang Tunnel and its road corridor;
- expansion of the national and provincial road network by about 3,300 km, including the two north–south corridors, and the east–west corridor;
- construction of about 1,000 km of border roads;
- construction and O&M of 2,500 km of gravel and asphalt roads under the National Rural Access Program; and
- O&M for the core network of regional and national roads.

The $11.2 billion investment program for the railway subsector includes the entire Afghanistan National Railway Plan, covering more than 5,000 line kilometers and multimodal hubs. Railways achieve competitiveness through increased output and large-scale operations, both of which lower a railway's unit cost. High-density bulk traffic over long distances makes railway operations viable. The development of mines will provide such a traffic-generating source. Afghanistan's National Railway Plan marks the beginning of a gradual process of developing a network large enough to become efficient and competitive. Therefore, individual components of the railway plan should be assessed as links in a larger system. On their own, they would have limited economic merit. The first two priorities are short sections already accorded high priority by the Afghanistan Railway Authority (AFRA) because they will feed into the larger system. The line that adds critical mass to the network is the Herat–Kunduz line, which will become the backbone of AFRA's network and is therefore accorded the highest priority.

The cost of the 20-year urban program is estimated at $854 million. The program covers the construction of the Kabul Bypass Road, urban bus rapid transit corridors, public transport, traffic engineering and intelligent transport systems, plans for social mitigation of adverse impacts, and public education campaigns to improve compliance with traffic rules and increase awareness of safety hazards. Implementation of the program will be phased over the four periods. It could be accelerated as soon as the general peace-and-order situation will allow this.

Future investment requirements in the civil aviation subsector include upgrading Hamid Karzai International Airport in Kabul. This intervention is accorded a high priority because Hamid Karzai International Airport, which was completed in 2014, already exceeds its design capacity by a large margin. A more distant project is the replacement of Hamid Karzai International Airport with a new airport located at Logar, outside Kabul. The project may, however, not be a priority during the 20-year investment plan period. Other investments include various essential equipment and periodic maintenance of regional airports. The total cost of the investments in civil aviation is estimated at $568 million.

Projects in trade facilitation and transport logistics are a priority in the Central Asia Regional Economic Cooperation Transport and Trade Facilitation Strategy 2020 and in the Afghanistan National Railway Plan. Such projects include improvements to BCPs and the development of multimodal hubs and logistics centers. Although investments have yet to be specified and their priority determined, it is estimated that the cost of the investment package will be on the order of $300 million.

The investment program will be complemented by capacity development in six areas, including roads, road safety, railways, Kabul urban transport, civil aviation, and BCP operations. This will include:

(i) development of a road asset management system, which will allocate scarce financial resources for O&M of its road assets in an optimal manner and will ensure sustainability of the road assets;

(ii) strategic and operational support to AFRA, proposed to define the most suitable business model for railway operations and to draft terms of reference for a team of experienced railway consultants, who would address key strategic business issues and, on this basis, prepare a concrete action plan for capacity development;

(iii) a master plan for Kabul urban transport, which will address a diverse set of issues, including urban infrastructure and public transport issues, compliance with land use regulations and traffic rules, and mitigation of the social repercussions likely to be caused by restructuring and modernizing public transport services. The proposed master plan will build on the 2009 Kabul Master Plan, whose recommendations have not yet been implemented;

(iv) a civil aviation master plan, which, in addition to identifying infrastructure needs should focus on capacity development requirements, considering that at present air traffic control infrastructure for the entire country is still maintained by military service providers, who will have to be replaced by Afghan personnel. This transfer will go hand in hand with replacement of obsolete equipment;

(v) a road safety strategy, including a safety audit; and

(vi) a review of the performance of BCPs, which will include an assessment of the quality and capacity of equipment and BCP infrastructure.

Because transport in Afghanistan is central to social stability and peacebuilding efforts, the development results generated by the transport master plan will go beyond the boundaries of the transport sector. The proposed package of transport sector interventions requires assessment against the background of the political situation, particularly in the light of the synergies the interventions will create toward socioeconomic and security improvements. Contributing factors will include employment creation through the use of national contractors for all roadworks, improved national connectivity, international integration through improving regional corridors, and access to mineral resources as a prerequisite to harnessing Afghanistan's rich potential in natural resources.

1 Introduction and Background

1. The following assessment is based on a detailed review of the literature and an analysis of secondary data, which were used to identify issues and needs for the development of Afghanistan's transport sector. In contrast to the 2006 Road Master Plan, field surveys and collection of primary data were not within the remit of the Transport Sector Master Plan Update (hereafter referred to as the Master Plan Update). To interpret the results and draw pertinent conclusions, the authors of the Master Plan Update consulted government authorities and donor agencies concerned with transport and logistics in Afghanistan. To this end, the government invited stakeholders to inception and interim workshops. A final workshop was held in October 2016 to reach a consensus with stakeholders on the key findings and recommendations of the Master Plan Update.

2. More than 2 decades of conflict have obliterated Afghanistan's transport infrastructure, depleted the country's stock of human resources, and, in the process, weakened its institutional capacity for managing the transport sector. To restore infrastructure and institutions, the government and its development partners have invested about $4.5 billion in the restoration and improvement of the country's transport infrastructure and institutions since 2002.

3. After 14 years of intense effort toward stabilizing the country, Afghanistan's security situation has started to deteriorate. Worsening security has reinforced the rising trend toward outmigration and created a renewed drain on scarce human resources.[1] As of mid-2016, in the wake of the withdrawal of international troops and a decline in foreign assistance, Afghanistan is again facing major challenges to peace and order. Millions of Afghans need humanitarian assistance, among them children suffering acute malnutrition. In the face of increased violence, the country is spending half of its recurrent budget on national security, thus widening the already-existing resource gap.[2] Widespread corruption and a large narcotics economy present additional risks to the rule of law and stability.

4. The initial emergency and conflict-affected situation in the country determined the priority for the first wave of investments, which was intended to restore basic connectivity and reopen trade routes. Despite these efforts, connectivity continues to be a problem for people in rural areas and for the country's domestic and international trade. Transport infrastructure is in a variable state of repair. While assets have been added, the maintenance of existing assets has been neglected. Although the government and donors have paid increasing attention to preserving investments, the trend of asset deterioration has yet to be arrested. This seems to be a perennial problem. A 1953 prefeasibility study on the construction of the Salang Tunnel mentioned two priorities for Afghanistan's transport sector: the introduction of systematic road maintenance and the need to provide an efficient link between the economic hubs of north and south Afghanistan.[3] The Salang Tunnel was constructed in 1967 and has served ever since as Afghanistan's vital north–south connection. Maintenance has, however, remained a problem, leaving both the road network and the tunnel on a path of steady deterioration.

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1 Sanjay Kumar. 2015 (December 10). "Desperation Rules Afghanistan." *The Diplomat*, http://thediplomat.com/2015/12/desperation-rules-afghanistan

2 M. Ashraf Haidari. 2016 (June). "Afghanistan's Forgotten Humanitarian Crisis." *The Diplomat*, http://thediplomat.com/2016/06/afghanistans-forgotten-humanitarian-crisis

3 Baresel AG. 1953. Verkehrspolitische und technische Überlegungen zum Projekt SALANG STRASSE. Stuttgart. (Concept paper for the construction of the Salang Tunnel.)

5. Meanwhile, Afghanistan's first short railway line, from Uzbekistan to Mazar-e-Sharif, has started operations, and proposals for developing an integrated railway network are at various planning stages, awaiting further scrutiny. Logistics options for the extraction of minerals and the development of associated industries still require determination and evaluation.

6. In 2006, Asian Development Bank (ADB) supported the preparation of the Road Sector Master Plan.[4] The Five-Year Plan was based on the premise that after completion of the national ring road—the country's key transport artery—other major roads were to be rehabilitated or reconstructed. The plan set out a strategy for the development of the road network, envisaging a 5-year program period. The strategy also included policy recommendations relevant to operation and maintenance (O&M). The priority projects covered about 12,000 kilometers (km) of regional, national, and provincial roads (Table 1). Traffic count data, condition surveys, and socioeconomic indicators were used to determine priorities. Although regional highways were specified by their origins and destinations, the program for national and provincial highways was not defined and prioritized in a similar way. The selection of roads was guided by eligibility criteria, notably traffic and pavement conditions. The resources allocated to national and provincial highways since 2007 suggest that, by mid-2015, approximately 80% of the 2006 program had been completed. All regional highways and the targeted scope for national highways were completed. In contrast, completion of the program for provincial highways fell short of its target by about 33%. Moreover, some of the completed roads have fallen into disrepair and are again due for restoration and rehabilitation.

7. The 2008 Afghanistan National Development Strategy (ANDS) and the subsequent 2010 ANDS Priority Implementation Plan have defined the government's strategy over the past 8 years. Their common goal was a safe and integrated transport network that ensures connectivity and enables reliable, low-cost movement of people and goods. High priority was accorded to upgrading and maintaining the ring road and the connector roads to neighboring countries and to improving transport services, regional cooperation, and trade logistics.

8. In 2014, the government decided to review and update its transport sector plans and requested that ADB support the activity with technical assistance.[5] The Master Plan Update responds to this request.

Table 1: Priorities of the 2006 Road Sector Master Plan

Route	Kilometers	Cost ($ million)	Status
Regional Highways			
Kabul–Kandahar	45	27.1	
Kabul–Torkham	188	113.1	
Mazar-e-Sharif–Kabul	48	28.9	
Subtotal	**281**	**169.1**	**Completed**
National Highways			
Unspecified routes	3,835	465.6	Completed
Provincial Highways			
Unspecified routes	7,656	522.5	5,100 km completed
Total 20-Year Program	**11,772**	**1,157.2**	**Total cost unknown**

Source: ADB. 2006. *Technical Assistance to the Islamic Republic of Afghanistan for Preparing the Master Plan for Road Network Improvement Project*. Manila.

[4] ADB. 2006. *Technical Assistance to the Islamic Republic of Afghanistan for Preparing the Master Plan for Road Network Improvement Project*. Manila.
[5] ADB. 2014. *Islamic Republic of Afghanistan: Transport Sector Master Plan Update*. Manila.

"Updating" in this context means taking stock of progress made to date and assessing emerging priorities. Changes in political and economic conditions, notably the uncertainty resulting from political and security transition, and the formation of a new administration, have motivated the proposal for the Master Plan Update. The commencement of railway operations and the government's plan to develop an extensive railway network have provided an additional impetus. The Master Plan Update, which will have a 20-year horizon and cover roads, railways, civil aviation, urban transport, and trade logistics, is a program of prioritized investments and capacity-building measures. In addition to identifying areas in which the sector's physical and institutional capacities require enhancement, the Master Plan Update will guide the government and donors in programming their assistance to achieve optimal development results. Detailed terms of reference for the preparation of the Master Plan Update are presented in Appendix 1.

9. The following transport sector assessment, strategy, and road map, which summarizes the main sector facts, issues, and developments, provides the backdrop against which the proposed investment and capacity-building projects are assessed. A discussion of strategic issues serves as the diagnostic for determining the direction of the strategy. The issues identified include asset sustainability and its various dimensions, O&M financing, trade logistics, urban transport, and climate change impact mitigation. The overriding concern of the strategy is to develop an affordable, manageable, and sustainable assistance program.

PHOTO CREDIT: PETER C. DARJES, ADB CONSULTANT

Access to the Salang Tunnel – Afghanistan's vital north-south connection.

2 Sector Assessment: Current Status and Strategic Issues

The Setting

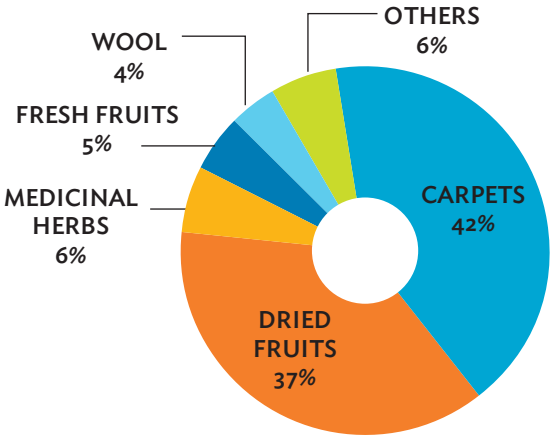
10. **Geography.** Afghanistan is a landlocked country bordered on the north by Turkmenistan, Uzbekistan, and Tajikistan; on the extreme northeast by the People's Republic of China (PRC); on the east and south by Pakistan; and on the west by Iran. Afghanistan's terrain ranges from plains in the northwest and southwest to high mountains in the remainder of the country. The Hindu Kush range divides the country from east to west. With a land area of 652,000 square kilometers (km^2) and an estimated population of about 30 million people in 2015, the population density is 43 people per km^2, among the lowest in Asia.[6]

11. Afghanistan's geography, terrain, and dispersion of population over a large area results in high transport costs and makes internal and external trade dependent on the performance of the transport sector. Afghanistan is struggling to afford a rudimentary transport network that would enable it to harness the country's natural resources and connect scattered rural communities and urban areas. Access to basic facilities remains unsatisfactory, particularly in rural areas. An added challenge is to create the conditions for transport sector sustainability. Although donor funding for road maintenance has increased over recent years, budget allocations do not match needs and a maintenance management system is still not in place.

12. **Economy.** Afghanistan has traditionally been an agricultural and pastoral economy: 76.5% of the population lives in rural areas, and agriculture provides employment for about 41% of the country's labor force,[7] contributing 32% of the country's gross domestic product (GDP).[8] The services sector, accounting for 46% of GDP, dominates economic activities. The manufacturing industry creates jobs for only 7% of the labor force but contributes about 21% to GDP. The few larger-scale manufacturing enterprises are involved mainly in producing cement and textiles. Continuing civil strife, the small size of the domestic market, high transport costs, the low level of both managerial and operational skills, and occasional shortages of raw materials have impeded a more substantial growth in manufacturing.

13. The country's narrow economic base is reflected in the value and composition of Afghanistan's exports

Figure 1: Composition of Exports, 2014–2015



Note: Total export value = $571 million.

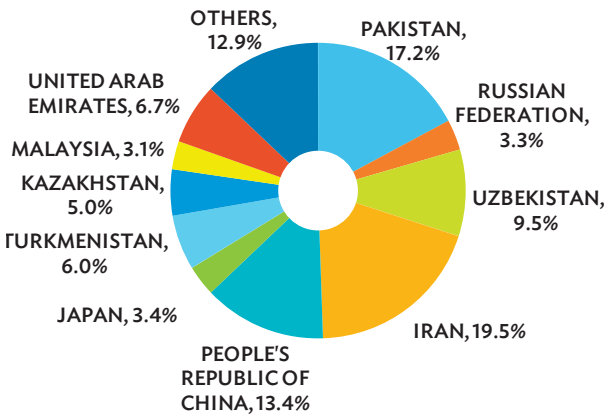
Source: Islamic Republic of Afghanistan, Central Statistics Organization. 2015. *Afghanistan Statistical Yearbook 2014–2015*. Kabul.

[6] Comparative population densities (people per km^2) are Mongolia: 1.9; Kazakhstan: 6.0; Turkmenistan: 11; Iran: 48; Tajikistan: 60; Uzbekistan: 72; Pakistan: 240.
[7] World Bank and Islamic Republic of Afghanistan, Ministry of Economy. 2014. *Afghanistan Provincial Briefs*. Kabul.
[8] ADB. 2014. *Key Indicators for Asia and the Pacific 2014*. Manila.

(Figure 1). Export commodities are exclusively related to agricultural production and associated industries, which are sensitive to climate conditions and market volatility. Exports of carpets, the key foreign exchange earner, are a case in point. Whereas, in 2013 Afghanistan exported about 452,000 tons of rugs and carpets, valued at $212.6 million, more than double that quantity was exported in 2015 but only generated an income of $239 million, reflecting a price plunge of 55% per ton of carpet.[9] Overall, export earnings are grossly insufficient to pay for the country's basic imports, covering only 7.4% of the cost of imports in 2014–2015.

14. Figure 2 shows the countries of origin for Afghanistan's imports in terms of import value. Iran, Pakistan, and the PRC account for more than half of total imports. The bulk of the country's foreign trade passes mainly through border crossing points (BCPs) at Herat (Iran), Jalalabad (Pakistan), Aqina (Turkmenistan), and Mazar-e-Sharif (Uzbekistan). These BCPs together handle almost two-thirds of Afghanistan's foreign trade.

Figure 2: Value of Imports by Country of Origin, 2014–2015 *(%)*



Source: Islamic Republic of Afghanistan, Central Statistics Organization. 2015. *Afghanistan Statistical Yearbook 2014–2015*. Kabul.

15. The government's precarious fiscal position is another consequence of Afghanistan's narrow economic base. During the past 2 years, in the wake of the political and security transition, the fiscal situation has worsened. As of 2014–2015, government revenues covered only 34% of the combined recurrent and capital budgets, with the recurrent budget alone being underfunded by 55%. Bridging the fiscal gap will require broadening the tax base, among other reforms.[10] Afghanistan's heavy reliance on a small number of export commodities renders its economy vulnerable to external shocks and other abrupt variations in economic activity. Diversifying the economy should therefore be a priority of economic policy. Strategies for putting the country's economy on a more balanced footing may bear fruit in the longer run, particularly if the potential of natural resources can be exploited and global commodity prices recover. In July 2016, Afghanistan, by joining the World Trade Organization, took an important step to this end. The Trade Facilitation Agreement reached with the World Trade Organization provides opportunities to reduce trade costs and boost trade as exports are expected to grow while becoming more diversified.

16. Afghanistan's rich endowment in known yet untapped natural resources is expected to provide a major impetus to economic development. The country possesses significant mineral deposits, including copper, iron ore, silver, and gold, among others.[11] In addition, Afghanistan has a semiprecious stone industry, and there are active marble quarries at various locations, including Balkh, Helmand, Herat, Kabul, and Kandahar. Coal, which once was mined in Afghanistan at 180,000 tons per year, could again become significant for energy production, in addition to the country's untapped oil and gas reserves along the borders with Uzbekistan and Tajikistan. As the case of the Mes Aynak copper mine shows (see Box 1), harnessing the natural resources and the development of associated industries will have to go hand in hand with the provision of physical infrastructure and trade logistics to enable access to markets. First, however, the security situation has to improve, to attract investors and allow them undisturbed mining operations.

[9] Islamic Republic of Afghanistan, Central Statistics Organization. 2015. *Afghanistan Statistical Yearbook 2014–2015*. Kabul.

[10] ADB. 2015. *Asian Development Outlook 2015: Financing Asia's Future Growth*. Manila.

[11] According to a US Geological Survey in 2007, known deposits include copper, iron, barite, sulfur, talc, chromium, magnesium, salt, mica, marble, emeralds, lapis lazuli, asbestos, nickel, mercury, gold, silver, lead, zinc, fluorspar, bauxite, beryllium, and lithium. The main copper and iron deposits are located at Mes Aynak, Logar province, and Hajigak, Bamyan province.

Box 1: Mes Aynak Copper Deposit

The case of the Mes Aynak copper mine is exemplary in illustrating the challenges involved in developing Afghanistan's extractive industry and the requisite transport infrastructure.

The government's tender of the copper deposit was initially successful and was therefore considered a milestone in the development of the country's mineral sector. The Mes Aynak copper mine of about 240 million tons, worth $3 billion, is located 40 kilometers southeast of Kabul and is considered to be among the largest mining projects in Afghanistan. In 2007, the development concession and a 30-year lease for the site were awarded to a joint venture from the People's Republic of China. The government expected that the project would create 7,000 jobs and would have a $1.2 billion overall impact on the national economy. The development of the mine was linked to the provision of ancillary infrastructure facilities, which included a 400-megawatt power plant and a water supply system, together with rail options to the north, east, or south, connecting to regional rail systems. Before the start of construction, serious safeguarding issues were to be resolved, because the mining activity would destroy rare stupas and other Silk Road artifacts. More than 500 workers from the Ministry of Culture and the Ministry of Mining were involved in the recovery of such artifacts. Another lingering concern is the mine's location in the proximity of an aquifer, raising the risk of groundwater contamination.

Eight years have elapsed since the signing of the concession. In the meantime, the People's Republic of China joint venture has indicated that it wants to renegotiate major provisions of the concession agreement, including the amount of royalty payments, the construction of the power plant, and the laying of a railway track.

Source: ADB Consultants. http://www.afghan-bios.info/index.php?option=com_afghanbios (accessed on 4 June 2015).

17. **Poverty.** The poverty rate in Afghanistan is high, with almost 36% of the population living below the poverty line. However, some provinces exceed the national average by almost 100%. Ten of Afghanistan's 34 provinces significantly exceed the country's average poverty rate (Table 2). There is a significant correlation between poverty and other social indicators. In terms of calorie deficiency, for example, the 10 poorest provinces exceed the national deficiency rate by 60%. The country's indicators for access to services and infrastructure have improved over the 5-year period 2007/2008–2011/2012, which is also reflected in the indicators of some among the 10 poorest provinces. Nonetheless, access remains a serious problem. Only 45% of Afghanistan's population has access to safe drinking water, a fact that brings the country's infrastructure problem into sharp relief. Access to drinking water is closely linked to transport. Although the Afghanistan Provincial Briefs[12] do not contain an indicator for the percentage of the population with access to all-weather roads, the share is most likely low. This supposition is borne out by Afghanistan's road density, which is estimated at a low 15 km of roads per 100 km^2 of territory.[13]

Sector Performance

18. **General.** The performance of the transport sector must be assessed with due regard to the country context and its political economy. Prolonged and widespread problems with peace and order, in addition to natural disasters, have had repercussions on infrastructure service delivery and project performance. This partly explains why sector issues have persisted for a long time, despite joint efforts of the government and development partners to address them. Other major challenges include depletion of financial resources, disintegration of institutions, weakening of economic activity and trade relationships, and deterioration of infrastructure. Against this backdrop, reconstruction and modernization of the transport system is accorded a high priority on the country's reform agenda.

[12] World Bank and Islamic Republic of Afghanistan, Ministry of Economy. 2014. *Afghanistan Provincial Briefs*. Kabul.

[13] In comparison, the road densities in other countries (km of road per 100 km^2) are Mongolia: 3; Kyrgyz Republic: 9; Pakistan: 33; Sri Lanka: 167; and Bangladesh: 180.

Table 2: Afghanistan's 10 Poorest Provinces: Selected Provincial Indicators

Province	Population Density		Poverty		Calorie Deficiency		Access to Clean Water		Access to Electricity	
	People per km²	Deviation from National Average (%)	Rate (%)	Deviation from National Average (%)	Rate (%)	Deviation from National Average (%)	Rate (%)	Deviation from National Average (%)	Rate (%)	Deviation from National Average (%)
Takhar	75	93	65	81	56	60	61	36	59	-14
Laghman	100	158	64	78	72	106	54	20	71	3
Zabul	18	-55	63	75	82	134	10	-78	22	-68
Badakhshan	20	-47	63	75	82	134	37	-18	57	-17
Sari Pul	31	-81	59	64	56	60	23	-49	84	22
Ghor	17	-57	53	47	22	-37	20	-56	90	30
Jawzjan	45	17	51	42	28	-20	25	-44	60	-13
Samangan	31	-21	48	33	41	17	20	-56	59	-14
Urozgan	27	-30	48	33	61	74	7	-84	7	-90
Ghazni	50	29	46	28	59	69	40	-11	75	9
National average	39	0	36	0	35	0	45	0	69	0
Average deviation		1		56		60		-34		-15

km² = square kilometer.
Source: World Bank and Islamic Republic of Afghanistan, Ministry of Economy. 2014. *Afghanistan Provincial Briefs*. Kabul.

19. Afghanistan's transport system consists of road transport, civil aviation, railways, and inland waterways. In 2014/2015, road transport generated 7,344 million ton-km,[14] while the fledgling railway, with its short 75 km line, produced about 100 million ton-km. The use of inland waterways is limited to the Amu Darya and the Panj River, where Shir Khan Bandar, the only river port, is located. The country has 5 major airports and 39 airfields. The international airports of Kabul and Herat are compliant with the respective standards of the International Civil Aviation Organization, whereas those of Mazar-e-Sharif, Jalalabad, and Kandahar will be upgraded shortly.

20. **Railways.** Completion of the 75 km Hairatan to Mazar-e-Sharif rail link in 2011 marked the beginning of railway operations in Afghanistan. The country's central position in Asia, and its rich mineral resources, may in the future generate traffic of bulk commodities over long distances, which is suitable for efficient railway operations and may warrant developing a more extensive railway network. Until this happens, the short line will not likely become economically or financially viable. Revenue figures of the railway indicate that traffic dropped from about 4 million tons in 2012 to about 2.4 million tons in 2014.[15] The traffic is largely one-directional, relying on imports from Uzbekistan, which consist of bulk goods such as fuel and construction materials. The arrival at Hairatan of the first freight train from the PRC, in September 2016, is an encouraging development. The train originated from Nantong in the eastern PRC's

[14] Based on a freight volume of 25.4 million tons and an average haul distance of 289 km. Islamic Republic of Afghanistan, Central Statistics Organization. 2015. *Afghanistan Statistical Yearbook 2014–2015*. Kabul.

[15] Line item 13285 of the revenue account of the Ministry of Public Works indicates railway revenue of about $30.1 million in 2013 and $0.9 million in 2014. Based on a freight rate of $10 per ton, the revenue figures translate to annual freight traffic of about 3.1 million tons and 0.9 million tons, respectively. Ministry of Finance. 2015. National Budget Document. 1394 Fiscal Year. Kabul.

Jiangsu province, carrying 84 containers equivalent to about 1,200 tons. Traffic permitting, a weekly train service will commence by the end of 2016.[16] This would, however, require that the Uzbekistan authorities allow freight trains to enter the country from Afghanistan.[17]

21. The low capacity utilization of the rail link can be attributed to a variety of factors. Overly bureaucratic management on both sides of the Uzbekistan–Afghanistan border has caused substantial delays for traders, forcing some traders to route their merchandise to Turkmenistan via Aqina. Naibabad Station, which is 24 km west of Mazar-e-Sharif and is the end point of the rail link, lacks a customs office and an authorized bank to collect the railway revenue. The performance of the state-owned enterprise in charge of loading and unloading of wagons leaves much to be desired.

22. The government, through the newly created Afghanistan Railway Authority (AFRA), has recently extended the 5-year operating concession, which in 2012 had been awarded to SE Sogdiana Trans, a subsidiary of Uzbekistan Railways. The concessionaire has exclusive rights to run commercial railway services. However, the government to a large extent protects the concessionaire against the risk posed by falling traffic and rising operation and maintenance (O&M) costs. The cost of O&M is financed by freight revenues, with any potential deficit to be paid by the government. With the recent plunge in traffic, current revenues do not cover all operating costs, so the government has had to subsidize the operation of the railway.

23. **Roads.** Estimates of the size of Afghanistan's road network, which includes regional, national, provincial, rural, and municipal roads, range from 93,000 km to 140,000 km. The exact length of rural roads is a particular factor of uncertainty. An official road classification has yet to be introduced. Significant efforts over the past 50 years have been directed toward expanding and improving Afghanistan's roads. The emphasis was on developing the ring road, a circumferential road extending from Kabul to Kunduz and Mazar-e-Sharif in the north, Herat in the west, Kandahar in the south, and back to Kabul, covering a distance of about 2,300 km. Since the early 1970s, the core network has grown from about 14,000 km to about 23,000 km, in 2015. During the same period, the share of paved roads increased from 15% to about 41% (Table 3). At present, most of the regional and national roads are or have been paved, though rapid deterioration has rendered the pavement on many sections all but invisible. Eighty-five percent of the road network is currently believed to be in poor condition.[18]

24. Table 3 shows the development of the road network and some of its surface characteristics. The figures represent broad estimates. The Ministry of Public Works (MOPW), the government agency concerned with the core road network, has yet to establish a road inventory that keeps the exact location of roads along with their standards, current conditions, and traffic data. Since 2007, donors have supported various activities aimed at establishing a road inventory that would eventually evolve into a road asset management system. Yet, in 2016, knowledge about the basic features of the road network—notably, its length and location, engineering standards, state of repair, and traffic loads—is deficient. Clearly, these constraints limit the effectiveness of ongoing planning efforts for road maintenance and investments, which depend on such information.[19]

25. Although most of the ring road has been reconstructed or is under construction, poor maintenance has reduced the ensuing benefits of better accessibility and mobility. The Salang Pass and the Salang Tunnel, which is located on the pass, are a case in point. The Salang Pass provides an essential means to integrate Afghanistan's economy, as it links the country's two important economic centers of Kabul and northern Afghanistan. The Salang Tunnel is the only pass going in a

[16] "Chinese Freight Train Reaches Hairatan." 2016 (7 September). Railway Gazette, http://www.railwaygazette.com/news/freight/single-view/view/chinese-freight-train-reaches-hairatan.html

[17] The first train had to return to the PRC empty because, due to security concerns, Uzbekistan insisted that goods leave the Afghan border city of Hairatan on ships instead of by rail and cross the Uzbek border via the Amu River, where it could be screened by Uzbek security forces. Only then would the cargo be reloaded onto the PRC–Afghanistan train. Mariam Amini. 2016 (13 October). "China's 'Silk Road' Railway Hits a Snag in Afghanistan." CNBC, http://www.cnbc.com/2016/10/13/chinas-silk-road-railway-disrupted-by-uzbekistan-security.html

[18] ADB. 2014. Strategic Roadmap for Development Partner Support to O&M of Afghanistan Roads. Manila.

[19] Cases in point are the present Transport Master Plan Update project as well as the United States Agency for International Development (USAID)-supported Short-Term Plan for Interim Funding of Road Maintenance.

Table 3: Development of Afghanistan's Core Road Network

Road Description	1971		1979		2015	
	Kilometers	%	Kilometers	%	Kilometers	%
Paved	2,200	15.4	2,504	14.1	9,234	40.6
Gravel	2,900	20.2	3,904	21.9	13,037	57.2
Earth	9,207	64.4	11,380	64.0	492	2.2
Total	14,307	100.0	17,788	100.0	22,763	100.0
Regional	2,291	12.9	3,242	3.1	3,599	3.9
National	3,145	17.7	4,884	4.6	5,640	6.1
Provincial	8,871	49.8	9,656	9.1	13,524	14.5
Core network total	14,307	80.4	17,782	16.8	22,763	24.5
Other	3,481	19.6	87,830	83.2	70,000	75.5
Total	**17,788**	**100.0**	**105,612**	**100.0**	**92,763**	**100.0**

Sources: Government of Afghanistan. 2011. *Infrastructure Development Cluster: National and Regional Resource Corridors Program*. Kabul; and ADB. 1973. *Appraisal of the Helmand Valley Development Road Project in Afghanistan*. Manila.

north–south direction that remains in use throughout the year. Without the tunnel, the current travel time of about 10 hours would increase to about 72 hours. Fifty years of service, conflict-related acts, vehicle accidents, fires, and lack of proper maintenance have collectively contributed to the tunnel falling into a state of severe disrepair. Present conditions within the tunnel are dangerous to users because of inadequate ventilation, poor lighting, and a failing road surface, all of which constrain the flow of about 10,000 vehicles per day.

26. **Civil aviation.** Air transport in Afghanistan is provided by several national and international carriers, with Kabul International Airport being the country's busiest airport. A profile of the civil aviation subsector is provided in Appendix 2.

27. The main challenge faced by Afghanistan's civil aviation has been the transfer of responsibilities and services from the international military coalition to Afghanistan government authorities. Although the transfer is still ongoing, two important steps have been taken since 2012. The government passed a civil aviation law (October 2012), which established the Afghanistan Civil Aviation Authority (ACAA). However, the target for ACAA to achieve full operational capability by October 2014 was not achieved. A significant step in the process toward a self-sustaining aviation sector was the 2015 transfer of airspace and air traffic control to ACAA. However, the key services are still rendered by foreign providers—the difference being that these providers now are remunerated by ACAA, rather than, as previously, by the North Atlantic Treaty Organization.

28. Lingering constraints include inadequate investment in infrastructure and facilities, poor maintenance of existing facilities, and a low level of private sector involvement in areas well suited for the private sector. ACAA has yet to introduce competitive salaries, which would enable it to attract and retain qualified staff. Many of the staff do not meet the qualification standards of the International Civil Aviation Organization. The Afghanistan Civil Aviation Institute (ACAI) was created to facilitate the transition process and develop human resources for ACAA's long-term requirements. ACAI will continue to rely on foreign experts to recruit, train, and certify Afghan aviation employees; maintain International Civil Aviation Organization-compliant practices and procedures; and ensure that the ACAA has adequate oversight capability. Sustaining ACAI over the next 5 years will require securing funding for infrastructure and human resources. A substantial portion of the required funds will come from overflight fees imposed on international carriers that cross Afghanistan-controlled airspace.

29. Investments in infrastructure will center on the expansion of Kabul's international airport, which was completed in 2014 and is already exceeding its design capacity by a large margin. (This applies to the capacity of the terminal rather than the capacity of the runways.) In addition, most technical facilities at airports and for air traffic control are due for replacement, particularly where obsolete North Atlantic Treaty Organization equipment is still in use. Complementary capacity development will have to focus on aviation training.

30. It is important that a comprehensive approach be adopted to address these issues. The most effective method would be the preparation of a civil aviation master plan. The key objective of such a plan would be to ensure that Afghanistan's airports can be served reliably by national and foreign airlines. In addition to identifying infrastructure needs, the master plan should focus on capacity development requirements. At present, air traffic control infrastructure for the entire country is still maintained by military service providers, who will have to be replaced by Afghan personnel. Replacement of obsolete equipment will go hand in hand with this transfer, and the development of a national training facility will be indispensable in this context.

Strategic Issues

31. **Overview.** Afghanistan's fragile and conflict-affected situation remains the overriding constraint on the transport sector. In addition to being vulnerable to climate change and natural disasters, the country continues to suffer from weak institutions and poor governance, economic and social disruption, and insecurity. Additional challenges include the country's geography; its small, dispersed population; and the vastness of the area to be serviced by transport. Afghanistan's vulnerability to natural disasters aggravates the situation. Since 1998, about 7 million Afghans have been affected by disasters and extreme weather events, such as drought, earthquakes, disease epidemics, sandstorms, and harsh winters. In addition, climate change is predicted to cause an increase in mean annual temperatures, a decrease in mean annual rainfall, and an increase in the intensity of rainfall, despite the expected overall decrease in precipitation.[20]

32. Providing a basic transport network is both an economic and a social need for any country. The difficulty for Afghanistan is to develop and maintain such a network in a cost-efficient way, given the country's scarce resources, its need to spur economic growth, and its traffic volumes, which often are too low to meet the viability criteria of conventional investment analysis. At the same time, Afghanistan is confronted with a growing demand for regional access and trade, as it is strategically located to serve the transit needs of its neighbors. These concerns are relevant to all modes of transport, but they are taking on a special importance for the railway subsector, in view of the envisaged large-scale investment in railways.

33. Another critical challenge is to create the conditions for transport sector sustainability. Climate change adaptation and climate proofing have emerged as key priorities, given that Afghanistan's transport infrastructure is highly vulnerable to climate change impacts. In addition, the financial dimension of sustainability has been a perennial issue. Although resource allocations to the transport sector have steadily increased over the past years, maintenance continues to be grossly underfunded. Unless the past allocation pattern is reversed, the situation is likely to worsen as new assets are added to the network. To a large extent, the current sustainability issues point to a lack of proper sector governance, including financing mechanisms, institutions, and sector planning.

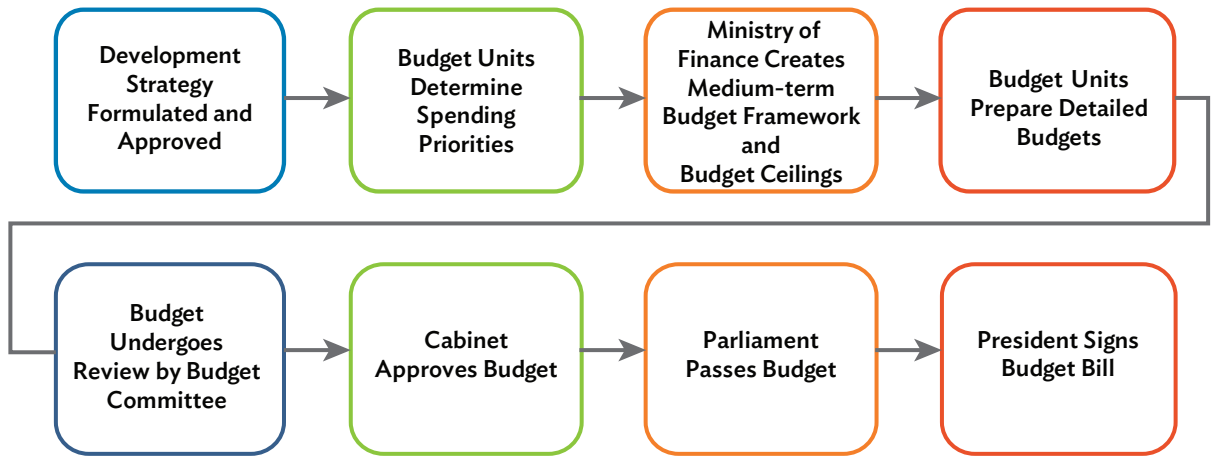
34. **Transport planning and policy.** Planning in the public domain tends to be complicated. Coordination and consensus building are required when formulating a vision and a set of related objectives; agreeing on policies; and designing strategies, actions, and projects to implement plans. This can be time consuming, typically involving an iterative process, which does not always ensure that the expected outcomes are achieved. International experience suggests that, during the planning process, planners' technical recommendations tend to be

[20] United Nations Environment Programme. 2012 (11 October). "Afghanistan, UNEP Launch $6 Million Initiative to Help Communities Adapt to Effects of Climate Change." http://www.unep.org/newscentre/Default.aspx?DocumentID=2697&ArticleID=9300&l=en

overruled by politically connected stakeholders.[21] This has eroded the notion that planning is straightforward and rational. Against these cautionary observations, Afghanistan's transport planning and decision-making process is well structured, though scattered sector responsibilities impede implementation of coherent plans. In addition, donor concerns tend to prevail in the planning process. This is not surprising, given that 48% of public investments bypass the government's budget process and are implemented "off budget." Clearly, coherent planning becomes challenging in such a situation.[22]

35. Current planning practice in Afghanistan follows a bottom-up approach. The provincial authorities determine projects based on their needs and submit them to the central government for further consideration. Specifically, the provincial development council (*shura*) identifies projects and forwards them to the provincial line ministry for vetting. In the central government, the Ministry of Finance and the Ministry of Economy play key roles. The Ministry of Economy, through its aid coordination department, sets national priorities and prepares a national priority program, which translates an indicative resource envelope into projects. The activities of ministries and agencies ("budget units") are grouped into subprograms, which are then consolidated into programs. The programs show the link to government policy, enabling the government to convey to Parliament and the public what services are being delivered with the funds provided. The national priority program has eight clusters, one being infrastructure. The Ministry of Economy screens proposed projects in light of their consistency with national plans and priorities to ensure that the national budget and the budgets of each ministry are linked to the Afghanistan National Development Strategy. The Ministry of Finance, through its budget committee, reviews the clusters and determines the associated resource requirements, which are documented in Budget Circular 1. Budget Circular 2 subsequently translates the resource envelopes into specific project proposals. Budget planning in Afghanistan follows a medium-term (3-year) budget framework, which means that priority proposals that cannot be accommodated in a given year are carried forward to the subsequent budget. Figure 3 schematically illustrates the steps involved in the

Figure 3: Process of Determining the Development Budget



Source: Government of Afghanistan. 2011. *On-Budget Financing: Guidelines for Development Partners*. 1st ed. Kabul.

[21] C. Lindblom. 1959. "The Science of Muddling Through." *Public Administration Review* 19: 79–88; and Lindblom. 1979. "Still Muddling, Not Yet Through." *Public Administration Review* 39: 517–526.

[22] In contrast, on-budget assistance passes through the government's public financial management system (i.e., budget, treasury, audit, and procurement), which makes it easier to allocate resources to strategic priorities. Government of Afghanistan. 2011. *On-Budget Financing: Guidelines for Development Partners*. 1st ed. Kabul.

budget process. In reality, the process may encompass several iterations, although all steps have to be completed within 1 year.

36. The budget process determines which projects will be selected. The key players in this process are the budget department of the Ministry of Finance, specifically the Budget Committee, which is chaired by the Ministry of Finance and consists of representatives of the Ministry of Economy, the Ministry of Foreign Affairs, and the Administrative Affairs Ministry. The budget committee releases indicative budgets, called budget statements. They first go to the Senate, the upper house of Parliament. The senate—not being accountable to constituencies—usually passes the budget statements expeditiously. In contrast, the approval process in the lower house, which is answerable to its electorate, is less smooth. However, the lower house cannot control off-budget projects. In the absence of a formula that would determine how much is allocated to each province, planning—rather than focusing on needs and priorities—is to some extent a political bargaining process.

37. A prerequisite for better planning in the transport sector would be coordination through a linchpin organization and a set of policies that this organization would issue and enforce. The proposed new Ministry of Transport should assume this function and become the apex transport planning and policy formulation agency in Afghanistan.

38. **Fragmentation of the institutional landscape.** Several government ministries are involved in the operation and regulation of the transport sector, including the Ministry of Public Works (MOPW), the Ministry of Transport and Civil Aviation (MOTCA), the Ministry of Urban Development, the Ministry of Rural Rehabilitation and Development (MRRD), the Ministry of the Interior, and provincial authorities.

39. The MOPW has been responsible for develpoment and O&M of regional, national, and provincial road networks. MOPW is a large organization with staff stationed in every major provincial capital. Over the years of conflict, MOPW lost many of its trained staff. Currently, MOPW employs about 3,200 people, 1,000 of whom are engineers and administrative staff and 2,000 of whom are laborers at the regional maintenance centers and provinces. MOPW's main focus is on managing donor-financed projects and executing budget-financed minor O&M works. MOPW staff require substantial skills enhancement to perform their current duties as project managers. In addition, a restructuring of the organization and a business plan are needed to upgrade the MOPW commensurate with the envisaged sector governance role.

40. MRRD is responsible for development of rural infrastructure, including rural roads. The Ministry of Urban Development and other local municipal authorities are responsible for the construction and maintenance of urban roads. MOTCA is charged with regulating the private sector transport industry, civil aviation, and the operation of airports. MOTCA's primary function is to coordinate agreements between private sector and international transporters and establish offices in neighboring countries to facilitate international trade. MOTCA's private sector department sets technical standards for private commercial vehicles and inspects them for compliance during the licensing and renewal process. MOTCA is also charged with collecting fees from private trucks and interprovincial private buses at national or provincial borders or on the outskirts of major cities, and it provides some passenger and freight transport services, using state-owned vehicles.

41. In addition to the need to streamline transport sector responsibilities, institutional capacity should be developed to manage large civil works contracts. Although—as noted in the Afghanistan National Development Strategy's (ANDS) completion report—significant improvements were achieved, due to lack of capacity only 43.5% of the budget available for infrastructure development has been spent.[23]

42. Far-reaching sector reforms aimed at restructuring institutions and authorities are at the design stage. The United States Agency for International Development (USAID)-funded Road Sector Sustainability Program supports a phased capacity development program focused on MOPW. Notable in this regard is the proposal for establishing an autonomous road authority, which will be empowered to attract and retain competent staff. In addition, the creation of a dedicated road fund

[23] Government of Afghanistan. 2014. *Afghanistan National Development Strategy (2008–2013): Completion Report*. Kabul.

is envisaged. Following the completion of the Hairatan–Mazar-e-Sharif rail link and the creation of a rail authority, the legal basis (a railway act) has been introduced. The responsibility for the civil aviation sector has been transferred to the autonomous ACAA.

43. **Maintenance management of road assets.** Two decades of conflict have inflicted heavy damage to roads and road structures. By 1994, around 80% of the network was in a poor state of repair, with road conditions deteriorating further until 2002, when major reconstruction programs started.[24] At that time, the government's efforts were geared toward restoring the serviceability of the existing infrastructure. This meant reconstructing roads damaged or destroyed during the years of conflict as well as rehabilitating those roads that had fallen into disrepair due to prolonged lack of maintenance.

44. Table 4 shows the composition of road expenditures for the past 5 years in terms of the recurrent budget. The latter predominantly comes from the government's own resources and is used to finance routine maintenance, while the development budget is financed by donors. Irrespective of the cause of prevailing road conditions—whether war-inflicted damage or neglected maintenance—donor interventions since 2002 have aimed to rebuild infrastructure to pre-conflict conditions. In doing so, donors have gradually enabled the government to replace regular preventive maintenance with capital-intensive rehabilitation and reconstruction, which, in turn, has allowed a build–neglect–rebuild cycle to set in.[25]

45. During the 5-year period shown in Table 4, the government has, on average, spent around $23 million per year for routine (preventive) maintenance.[26] This accounts for only 5% of the total resources allocated to roads. Moreover, at $822 per km, the amount was grossly inadequate.[27] Expenditures for construction, reconstruction, and rehabilitation accounted for the lion's share of total resources, which in part reflects the need to reduce the sizeable maintenance backlog but, at the same time, supports the build–neglect–rebuild

Table 4: Development of Maintenance Expenditures and Total Road Investments ($ million)

Investment	Expenditure	2010	2011	2012	2013	2014[a]	Annual Average
	Government's own resources						
	Routine maintenance	14.1	20.8	13.9	26.9	17.5	18.7
	Salang Tunnel operation and maintenance	4.3	5.2	2.1	5.4	3.5	4.1
A	Subtotal	18.4	26.0	16.0	32.3	21.0	22.8
	Donor financing						
B	Reconstruction and rehabilitation	909.0	381.0	416.0	325.0	634.0	533.0
A + B	Total expenditure	927.4	407.0	432.0	357.3	655.0	555.8
A / (A + B)	Share of operation and maintenance in total expenditure	2.0%	6.4%	3.7%	9.0%	3.2%	4.9%

[a] The 2014 maintenance budget does not reflect a $29 million contribution to operation and maintenance by the Afghanistan Reconstruction Trust Fund.

Source: Ministry of Finance. 2015. National Budget Document. 1994 Fiscal Year. Kabul.

[24] Afghanistan Construction and Logistics Unit and United States Agency for International Development. 1994. Afghanistan Road Condition Survey (ARCS) database, 1991–1994. Kabul.

[25] This practice is frequently referred to as the "build–neglect–rebuild" paradigm. It is estimated that for every $1.00 spent on preventive maintenance, up to $3.00 can be saved on future reconstruction. ADB. 2014. *Strategic Roadmap for Development Partner Support to O&M of Afghanistan Roads*. Manila.

[26] Routine maintenance is an annual activity and is intended to keep roads in serviceable condition or prevent them from falling into disrepair prematurely. Typically, routine maintenance includes pothole repairs, edge patching, crack sealing and filling, shoulder repairs, and drainage cleaning.

[27] International benchmarks for routine maintenance range from $1,500 to $3,000 per km, depending on the road surface, terrain, and topography. In Afghanistan, an adequate allocation should be closer to $3,000.

hypothesis. This pattern is a serious waste of resources, as the savings gained by skipping routine maintenance are dwarfed by the additional capital cost involved in periodic rehabilitation or reconstruction. The government has repeatedly expressed frustration about its continued reliance on international support for road maintenance, noting that Afghanistan has become addicted to help from the international community, which has made the cost of development unnecessarily high.[28]

46. The budget process involved in obtaining funds for O&M starts with a needs assessment at the provincial level. MOPW, in turn, reviews and consolidates the submissions of the 34 provinces into one plan, which is then forwarded to the Ministry of Finance and the Ministry of the Economy. After conducting a budget hearing, the Ministry of Finance determines the annual O&M allocation for MOPW in light of budget claims from all line ministries.

47. The government and donors have consistently emphasized the need for a rational and systematic O&M regime for the road sector that would create and maintain transport infrastructure in a cost-effective manner. Because such a regime is still not in place, an asset management system that will provide a rigorous framework for maintenance is urgently needed.[29] The creation of a road inventory that stores information about the key features of the road network—notably its length and location, engineering standards, state of repair, and traffic loads—is the starting point in establishing such a framework. Box 2 summarizes the various, but thus far unsuccessful, attempts toward the creation of a road inventory and better road asset management.

48. A number of activities are underway that intend to provide ingredients of a road asset management system, including a road inventory and road condition information. The provision of available donor funding for maintenance is predicated on systematic road data and may be forgone unless such data is collected and analyzed expeditiously. The government should therefore accord priority to the completion of the road inventory, followed by activities to establish a comprehensive asset management system.

49. The size, condition, and traffic load of the existing network determine the scope of road maintenance and the associated financing needs. Future maintenance requirements will therefore depend not only on existing road conditions but also on the growth in traffic and the network. The current predominance of investment over O&M means that each incremental growth in asset value will entail an increase in the financing requirements for maintenance. The issue, therefore, is to establish a balance between the need for new roads and the level of maintenance funding. Achieving an optimal balance is the remit of the proposed road asset management system (see Appendix 3 for details).

50. **Sustainable asset financing.** This issue is related both to railways and to roads. With regard to railways, current operations lack the scale and traffic to be financially sustainable. Government support is thus unavoidable. As to roads, the volume of financial resources that can be mobilized for maintenance is essentially a function of the country's economic base, which is narrow. Another aspect is the pricing policy that is pursued in connection with the mobilization of resources. As a matter of economic principle, the taxes that the government imposes on the use of the infrastructure should reflect the costs involved in providing and maintaining that infrastructure. The user-pays (cost recovery) principle should, therefore, apply, which means that users should be charged in accordance with the wear and tear they inflict on the roads.[30]

51. In Afghanistan, the government collects revenues from road users through a variety of taxes, duties, and fees. In 2014/2015, the revenue totaled $69.5 million. This amount would be adequate to cover annual routine

[28] Islamic Republic of Afghanistan. 2014. *Realizing Self-Reliance: Commitments to Reforms and Renewed Partnership*. London Conference on Afghanistan, December 2014. Kabul.

[29] An asset management system combines engineering principles with sound business standards and economic rationales and provides the tools to allocate scarce resources in a rationale manner. County Surveyors' Society. 2004. *Framework for Highway Asset Management*. United Kingdom. (In 2009, the County Surveyors' Society was subsumed by the Association of Directors of Environment, Economy, Planning and Transport, United Kingdom).

[30] The rationale of the principle is to ensure an optimal allocation of resources, which are ensured by cost-based prices and taxes. For a multimodal transport system, the principle would ensure that transport users will, following their own self-interest, choose the most beneficial mode in terms of cost and quality of service. The tariff to be charged to users should reflect the direct cost involved in providing and maintaining the assets as well as the cost shouldered by the general public in the form of negative side effects (externalities) such as pollution and noise.

Box 2: The Long, Winding Road to Systematic Operation and Maintenance

In 2008, the United States Agency for International Development (USAID) launched the Road Operations and Maintenance and Capacity Building Program (Task Order 14). The program required the creation of a road inventory and condition surveys as basis for an operation and maintenance program. Evaluation of the project in 2012 determined that the capacity building measures did not take root due to a serious lack of Ministry of Public Works (MOPW) involvement in the project.[1]

To monitor USAID-funded infrastructure projects, USAID in 2009 created the Afghanistan Information Data Centre and, as part of this project, developed an inventory of the core road network using high-resolution aerial mapping maintained in the ArcGIS system. In 2010, this inventory was incorporated into the USAID Engineering Quality Assurance and Logistical Support (EQUALS) program. EQUALS provided MOPW with a fully equipped data center, recruited and trained staff, and provided technical support for the use of hardware and software. By 2014, MOPW took over the data center and assumed responsibility for its functioning and running costs. In September 2015, MOPW GIS team was to publish in GeoServer the GIS data inherited from the EQUALS project, which was expected to give users access to the data and provide the ability to generate maps. MOPW cautioned, however, that it had not yet verified the data and that the data represented project information provided by donors.

In 2011, the United Kingdom's Department for International Development (DFID) started the Road Rehabilitation and Maintenance Programme. Among the outputs of the program was the creation of a national and provincial road maintenance and management framework. By 2013, progress of the component had been slow, and the DFID observed that MOPW lacked basic knowledge of its existing assets.[2] To accelerate implementation, the DFID appointed the United Nations Office of Project Services to continue the activity under the Keep Afghans Connected (KAC) project. KAC's baseline assessment in 2013 was that the complexity of past and ongoing donor activities had grossly overstretched MOPW's capacity. As part of the DFID assignment, KAC in 2014 developed a pilot approach for the collection of road inventory data in two provinces. The data were to be stored in MOPW's ArcGIS data center. KAC was to scale up the pilot results to undertake a full inventory and condition survey of all roads under the purview of MOPW. As of mid-2015, the data collected for the two pilot provinces were still subject to testing and validation and therefore were not available to stakeholders. The condition survey that KAC had started separately from the inventory data collection is expected to be completed by the end of 2016.

To improve mobility in rural areas, the World Bank in 2003 launched the National Rural Access Program (NRAP). NRAP created its own ArcGIS capability within MOPW. This initially was limited to rural roads but later was expanded to cover the entire Afghanistan road network. Although the initial focus was on secondary roads, MOPW also had to develop a comprehensive database and the mapping capability of the full core network. NRAP, in consultation with the KAC team, used the KAC template and software for its survey, so that data from both surveys could be saved in the same format. NRAP has set to complete its survey in 2016.[3] However, the merger of the two sets of survey data by a computer firm in Nepal has reportedly encountered problems.

Sources:

1 United States Agency for International Development. 2012. *Final Report: Task Order # 14 Road Operation & Maintenance Capacity & Building Program—Final Performance Evaluation*. Kabul.

2 Department for International Development. 2013. *Annual Review of the Road Rehabilitation and Maintenance Programme (RRMP)*. Kabul.

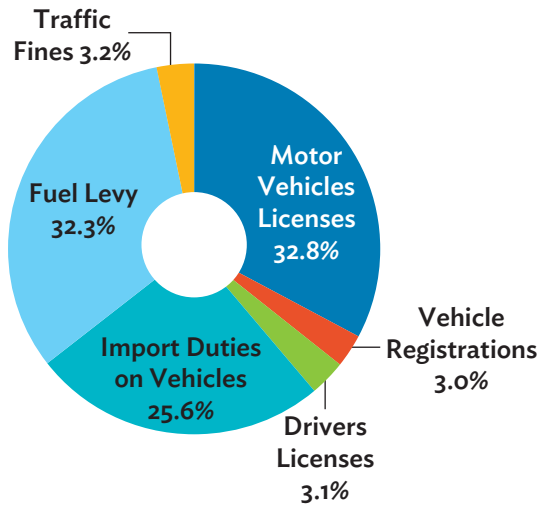
3 United States Agency for International Development. 2015. *Short-Term Plan for Interim Funding of Road Maintenance.* Kabul: Afghanistan Ministry of Public Works.

maintenance for the entire network under the purview of MOPW.[31] However, in the same fiscal year, the Ministry of Finance allocated only about $21 million to MOPW, which is roughly in line with the revenue collected from the fuel levy. In general, revenues from road users, rather than being earmarked for road financing, are part of the general budget.

52. The composition of the revenues, in terms of their source, is shown in Figure 4. The revenues are a mix of fiscal instruments, fines, fees, and charges that are more or less related to road usage and the wear and tear vehicles inflict on pavements. The more indirect the relationship between the transport asset subject to charges and the users of the asset, the more the user

[31] Based on the size of the core network of 22,700 km, the amount would translate to $3,060 per kilometer, which would be sufficient for routine maintenance.

Figure 4: Composition of Government Revenues from Road Users, 2014



Source: Government of Afghanistan. 2015. *Object Revenue Data 2014*. Kabul.

charge functions as a "tax" rather than a price. The fuel levy most directly reflects the cost incidence caused by road users and, from the perspective of a sound pricing policy, should be the main financing source for road maintenance. However, the proceeds from that source are currently insufficient to meet the annual maintenance needs of the core network, not to mention the removal of the existing maintenance backlog.

53. In addition to relying on charges that serve as quasi prices, a mechanism is needed to ensure that maintenance financing is made available when it is needed. Earmarked taxes, which the finance ministry commits to road maintenance, may meet this requirement. However, earmarking of taxes reduces fiscal flexibility. For Afghanistan, which has limited potential to raise taxes to meet the financing needs of other sectors, this is a valid concern. The concern also applies to establishing a road fund, into which revenues collected from road users would be paid directly.[32] On the other hand, given that current tax revenues cover only a small portion of the budget, with donors picking up the balance, a road fund in Afghanistan has merits. In 2008, the Afghanistan National Development Strategy recommended the establishment of a road fund.[33] The USAID-funded Road Sector Sustainability Program has specified institutional solutions in this regard, which are being considered by the government.[34] Donor contributions could finance the fund during an interim period, until the economy has gathered strength and the fiscal situation of the country has improved. The arrangement of ring-fencing donor contributions to maintenance through a road fund would also be compatible with Afghanistan's constitution. The constitution requires that taxes and other government revenues must be channeled through the budget and therefore does not allow extrabudgetary concepts, which would link earmarked taxes to a road fund.

54. The remaining critical issue is the amount of financing needed to maintain the core network of roads in serviceable condition. The absence of a road inventory with condition data and traffic information precludes an accurate estimate. However, the Master Plan Update, using simple assumptions and realistic unit cost figures, has estimated the total annual maintenance requirement at $251 million.[35] The USAID-funded Short-Term Plan for Interim Funding of Road Maintenance has arrived at a similar figure, estimating the annual funding requirement for the next 5 years at $255.2 million.[36]

55. **Road traffic safety.** Traffic safety on Afghanistan's roads has emerged as a serious problem. With almost 800 fatalities in 2013, Afghanistan has one of the worst road traffic safety records among Asian countries (Figure 5). Prerequisites for remedial

[32] A road fund is managed by a road board, whose membership consists of key transport stakeholders, including government, representatives of the road hauling industry, and other road users. The road board often also determines the level of charges and the allocation of funds based on a road asset management system.

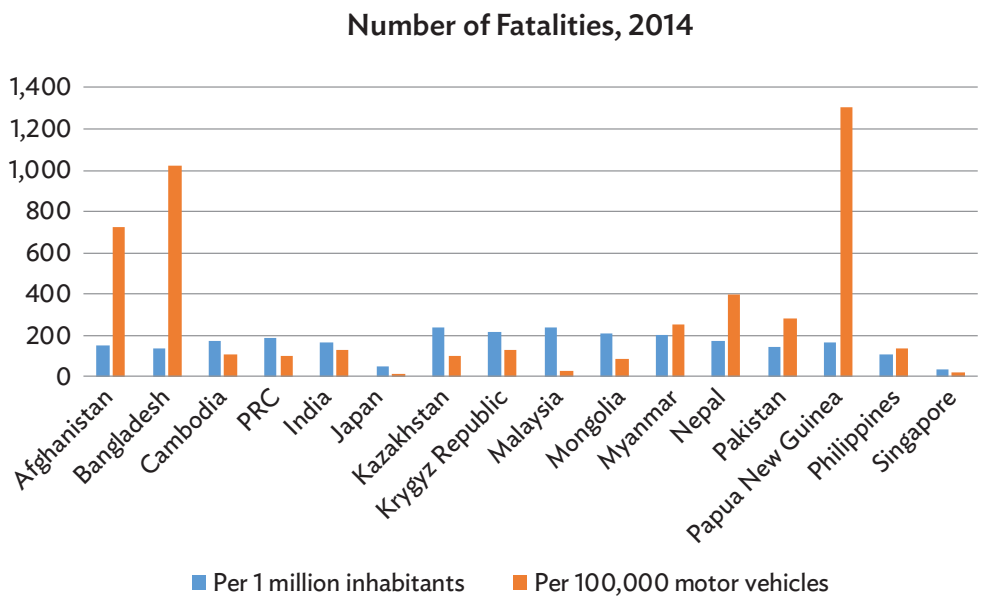
[33] Islamic Republic of Afghanistan. 2008. *Afghanistan National Development Strategy: Transport Sector Strategy*. Kabul.

[34] United States Agency for International Development. 2015 (August). Technical Assistance Provided to the Ministry of Public Works (TA MOPW) under the Road Sector Sustainability Program (RSSP): Project Briefing. Kabul.

[35] The estimate is based on the core network of 23,000 km and consists of annual expenditures of $68 million for routine maintenance and $182 million for periodic maintenance. The amount for periodic maintenance is the annualized cost for routine maintenance carried out at 10-year intervals.

[36] The estimated amount is for an optimal scenario created with the road evaluation software Road Network Evaluation Tool (RONET). United States Agency for International Development. 2015. *Short-Term Plan for Interim Funding of Road Maintenance.* Kabul: Afghanistan Ministry of Public Works.

Figure 5: International Comparison of Road Accident Data



PRC = People's Republic of China.
Source: World Health Organization. 2015. *WHO Report 2015: Data Tables.* Geneva.

action are a road safety strategy and a program for time-bound action. As a member of the Central Asia Regional Economic Cooperation (CAREC) program, Afghanistan has participated in the process of forging a CAREC regional strategy for road safety. The government will have to adapt this regional strategy for specific application in Afghanistan.

56. As a condition for a coherent road safety program, the envisaged national strategy will have to align various, currently scattered institutional responsibilities. MOTCA, as the apex transport sector institution, should be in charge of road safety policies. The Ministry of the Interior, through its traffic police directorate, should enforce traffic rules and regulate traffic, while safety issues emanating from road infrastructure should be a concern of MOPW.[37] Most of these functions are currently only partly exercised.

57. The CAREC regional strategy for road safety rests on five pillars: (i) management of road safety, (ii) safer roads, (iii) safer vehicles, (iv) safer road users, and (v) post-crash response. The activities under pillar 1 envisage the establishment of a coordination mechanism between agencies concerned with road safety. In this context, an accident database should be developed to collect and analyze accident data, which should be shared among the agencies. Pillar 2, which deals with road infrastructure, envisages a road safety audit and identification of road locations prone to accidents. Road contractors also will participate in the program, as unsafe construction sites are a frequent cause of road accidents. MOPW will be in charge of all activities related to making road infrastructure safer.

58. **Execution of road maintenance.** The responsibility for Afghanistan's road network is divided between MOPW, MRRD, and the Ministry of Urban Development. MOPW is responsible for planning, construction, and O&M of regional, national, and provincial roads, while MRRD is tasked with the management of all secondary and rural roads. Under the National Rural Access Program

[37] Other ministerial functions include education, traffic safety awareness, and health, to respond to accidents and manage health-care facilities.

(NRAP), MRDD maintains a project implementation unit within MOPW. A similar unit for rural roads is located in MRRD. The Independent Directorate of Local Governance is in charge of urban roads in principle cities, whereas roads in Kabul are under the purview of the Kabul city administration.

59. Until 2001, MOPW carried out road maintenance using its own labor force. Currently, such force account practices are limited to emergency repairs and winter maintenance. MOPW intends to strengthen its workforce approach for emergency interventions by creating a public work corps. Due to the strategic importance of the Salang Corridor and its tunnel, maintenance work here is carried out jointly by the MOPW force account, private contractors, and the Afghan National Army. Periodic maintenance on regional and national roads, as well as all construction or rehabilitation works, is performed by private sector contractors, while provincial councils are responsible for organizing the maintenance of provincial roads. O&M in villages relies on local labor.

60. **Road contracting industry.** Since 2002, contracts for construction, reconstruction, and periodic maintenance of regional, national, and provincial roads have been a captive market for international contractors.[38] Nonetheless, Afghan contractors have played an important role as subcontractors and, in some instances, have performed better than their foreign counterparts. Moreover, some international contractors have "sold" their contracts to local contractors—in the guise of subcontracts—delegating all contractual obligations to the local contractors. The Government of Afghanistan accords high priority to the development of the local contracting industry and is keen that national contractors gain a greater share of the roadworks performed in Afghanistan. The promotion of domestic contractors is a legitimate economic concern, which is shared by many countries.

61. There are an estimated 300–500 local contractors in Afghanistan. The structure of the industry is diverse in terms of contracting capacities, experience, competence, and availability of equipment. In the context of the Master Plan Update, the study team conducted a survey of the local contracting industry, focusing on contractors' capabilities in contract management, plant and equipment capacity, and relevant experience. In addition to establishing a hierarchy of local contractors and a differentiated capability profile of the industry, the survey also aims to assess the challenges currently faced by contractors in Afghanistan.

62. Preliminary survey results indicate that about 30% of the firms are rated as highly satisfactory on most criteria and thus capable to work on larger road contracts (Figure 6). These firms have a professional company organization and good design teams. They own the required machinery and equipment.[39] Their main problems are financial. Transparency in the selection and awarding process is a key concern. Other problems point to MOPW's weak project design and management capacity, which typically cascades to poor specifications, unrealistic quantities, and inaccurate cost estimates. Financial problems dominate: after MOPW accepts a bid and a bid bond is deposited, MOPW's review and approval process takes an inordinately long time, which results in extra costs to the contractor.[40]

63. Most contractors want a level playing field in the procurement process. This would essentially mean tendering smaller contracts, coupled with the prospect of engaging several contractors for one project.

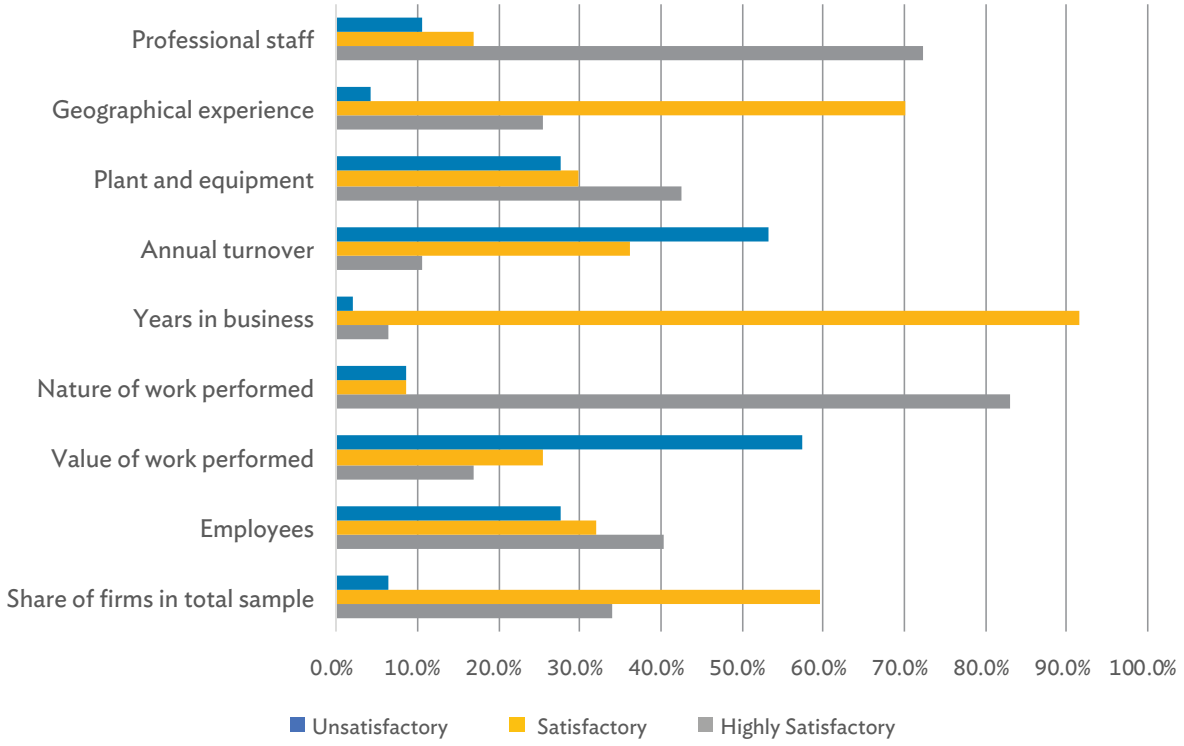
64.There are, however, other challenges that prevent national contractors from participating in Afghanistan roadworks. Issues include insufficient transparency and integrity of the bidding process, delayed release of payments, affordability of bid and performance bonds, and issues related to the relationship between main contractors and subcontractors.

[38] The procurement systems of donors, in most cases, require international competitive bidding and, for perceived efficiency considerations, tend to prefer large-size contracts. These factors combine to crowd out local contractors.

[39] The larger companies surveyed typically own machinery such as asphalt plants, crushers, and concrete plants as well as dozers, trucks, graders, loaders, and rollers.

[40] Local banks charge 14% per year to provide the bid and performance bond bank guarantees, payable as quarterly charges.

Figure 6: Results of the Road Contracting Industry Survey



Source: ADB. 2016. *Survey of the Road Contracting Industry in Afghanistan.* Manila.

Cross-Sector Issues

65. **Trade logistics.** Geography has shaped Afghanistan's history and identity, with distance and isolation presenting formidable barriers to international trade. As a landlocked country, Afghanistan relies on its neighbors for access to ports and seaborne trade. Regional integration is in the early stages, and there is much room for improvement and growth in trade.[41] The performance of Afghanistan's transport and logistics sector is impeded by cumbersome import and customs clearance procedures, weak standards and regulations, and lax implementation of existing trade agreements, such as the Afghanistan–Pakistan Transit Trade Agreement. The high cost of transport logistics reduces the country's trade competitiveness. The World Bank's 2016 Logistics Performance Index ranks Afghanistan 150th of 160 countries (Table 5).

66. Most of the country's external trade takes place via the BCPs at Aqina, Herat, Jalalabad, Mazar-e-Sharif, and Spin Boldak. Several issues usually combine to cause operational delays in transiting through the borders. Some of the bottlenecks relate to infrastructure outside the actual border control zone. Examples of this are narrow or poor roads and bridges on the approaches to the BCP or between posts passing through the zero points, lack of adequate parking areas and support facilities, and lack of trade and transport support offices. Other constraints emanate from the border terminals in the vicinity of the BCP. These may be inland container depots, dry ports, or land ports; Transports Internationaux Routiers depots; or merely a designated parking area acting as a "buffer" facility, feeding traffic into the BCP. To determine the specific choke points at BCPs, it will be necessary to analyze the functionality of such facilities to determine their trade logistics benefits and identify which processes

[41] United States Agency for International Development. 2014. *Analysis of Afghanistan Pakistan Transit Trade Agreement (APTTA).* Pakistan.

Table 5: Logistics Performance Index, 2016

		Overall LPI	Customs		Infrastructure		International Shipments		Logistics Competence		Tracking and Tracing		Timeliness	
Rank	Country	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
12	Japan	3.97	11	3.85	11	4.10	13	3.69	12	3.99	13	4.03	15	4.21
24	Korea, Rep. of	3.72	26	3.45	20	3.79	27	3.58	25	3.69	24	3.78	23	4.03
27	PRC	3.66	31	3.32	23	3.75	12	3.70	27	3.62	28	3.68	31	3.90
77	Kazakhstan	2.75	86	2.52	65	2.76	82	2.75	92	2.57	71	2.86	92	3.06
108	Mongolia	2.51	100	2.39	140	2.05	129	2.37	129	2.31	108	2.47	65	3.40
118	Uzbekistan	2.40	114	2.32	91	2.45	130	2.36	116	2.39	143	2.05	114	2.83
140	Turkmenistan	2.21	143	2.00	103	2.34	127	2.37	145	2.09	154	1.84	142	2.59
146	Kyrgyz Republic	2.16	156	1.80	150	1.96	152	2.1	151	1.96	115	2.39	126	2.72
150	Afghanistan	2.14	138	2.01	154	1.84	156	1.99	125	2.38	139	2.15	137	2.61
153	Tajikistan	2.06	159	1.93	130	2.13	128	2.42	151	2.12	144	2.04	159	2.04

LPI = Logistics Performance Index, PRC = People's Republic of China.

Note: A score of 5 for a criterion and overall LPI indicates the best performance.

Source: World Bank. 2016. *Connecting to Compete: Trade Logistics in the Global Economy—The Logistics Performance Index and its Indicators.* Washington, DC.

are undertaken there and which are within the BCP. It is proposed that a team of trade logistics experts review BCP operations and assess the available infrastructure and equipment, with a view to developing proposals to optimize the flows.

67. Afghanistan's strategic location has nourished the vision of reviving the routes and networks of the ancient Silk Road, thus restoring the pivotal role that Afghanistan played some centuries ago.[42] In the process, Afghanistan has emerged as a focus of many plans and initiatives (see Box 3).

68. Afghanistan benefited from its location throughout its ancient history. With trade routes from all directions converging in Afghanistan, the country became known as the "Central Asia roundabout." However, whether its unique location will be instrumental in reestablishing the country as an international and regional transport and trade hub does not depend only on geographic factors. Afghanistan's economy has a narrow industrial base and, with its present specialization in low-value goods, does not yet possess the conditions for integration into global value chains. Moreover, long-distance land transport, on which the prevailing Silk Road visions are premised, generally does not have a comparative advantage over other modes of transport, particularly for the movement of low-value goods.

69. Membership in the Central Asia Regional Economic Cooperation (CAREC) program is putting Afghanistan on the path to full integration into a prosperous region, with infrastructure laying the foundation for sustainable economic growth. Economic integration with its CAREC neighbors will enable Afghanistan to maximize the value of its natural resources, build human capacity, create jobs, and pay for services. The CAREC Transport and Trade Facilitation Strategy 2020 stresses the importance of extending and completing the six strategic multimodal corridors, which are expected to handle the major share of future transport and trade growth in the region.[43] Due to the country's central location, four of six CAREC

[42] S. Frederick Starr and Andrew C. Kuchins, with Stephen Benson, Elie Krakowski, Johannes Linn, and Thomas Sanderson. 2010. *The Key to Success in Afghanistan: A Modern Silk Road Strategy*. Washington, DC: Central Asia-Caucasus Institute & Silk Road Studies Program in Cooperation with the Center for Strategic & International Studies.

[43] ADB. 2013. *CAREC Transport and Trade Facilitation Strategy 2020*. Manila.

Box 3: Afghanistan: A Focus of Many Regional Plans

Afghanistan's strategic location has given rise to a plethora of initiatives and strategies aimed at reviving the ancient Silk Road. Boosting economic growth and removing impediments to the free flow of goods and people are shared themes of the initiatives. Most of them overlap, sometimes reflecting the competing geopolitical ambitions of their sponsors.

The **New Silk Road Initiative** is supported by the United States and focuses on Afghanistan as a main hub for economic integration and transportation. The vision of the New Silk Road Initiative envisions an Afghanistan firmly embedded in the economic life of the region, enabling the country to attract investment, benefit from its resource potential, and provide increasing economic opportunities for its people. Modernized infrastructure and effective cross-border trade are to make the vision become reality.

Turkey's **Modern Silk Road Initiative** was launched in 2008 and focuses on the simplification of border crossing procedures among 17 Silk Road countries and several international organizations, such as the World Customs Organization, the United Nations Economic Commission for Europe, the European Organization for Forwarding and Logistics, and the International Road Transport Union. The Turkish initiative is confined to the acceleration and standardization of customs procedures and border crossing facilitation.

The **One Belt, One Road Initiative** is supported by the People's Republic of China (PRC) and focuses on regional connectivity and cooperation, primarily between the PRC and the rest of Eurasia. The initiative consists of two components, the land-based Silk Road Economic Belt and the Maritime Silk Road. The "belt" includes countries located on the original Silk Road passing through Central and West Asia, the Middle East, and Europe. The initiative calls for integrating the region into a cohesive economic area through building infrastructure, increasing cultural exchanges, and broadening trade.

The **Transport Corridor Europe–Caucasus–Asia** (TRACECA) was initiated by the European Union. Since 2009, the 14 member countries are responsible for the implementation and financing of the initiative. TRACECA covers five areas, including maritime transport, civil aviation, roads and rails, transport infrastructure, and transport security. The Silk Wind Initiative, a subprogram of TRACECA, aims to develop new high-speed multimodal container transit routes, along with advanced border crossing technology and procedures.

The **Afghanistan–India–Iran Initiative** centers on developing Iran's Chabahar Port. Chabahar provides Iran with direct access to the Indian Ocean, as it is strategically located southeast of the Strait of Hormuz and 76 kilometers west of Pakistan's Gwadar Port. Afghanistan has historically been dependent on Pakistani territory for access to maritime trade, for which the transit corridor to Chabahar Port would provide an alternative. For India, Chabahar Port can become a gateway to Central Asia, as transit through Pakistan is not a dependable alternative. Moreover, India has an interest in the Hajigak mines in Afghanistan and needs a reliable and efficient corridor to export the iron ore extracted from the mines. India has been instrumental in the development of infrastructure that improves the connectivity of Chabahar Port.

Sources: Ussal Sahbaz. 2014. *The Modern Silk Road: One Way or Another?* On Wider Europe Series. German Marshall Fund. Washington, D.C.; Vladimir Fedorenko. 2013. *The New Silk Road Initiatives in Central Asia*. Rethink Institute Washington DC.

corridors traverse Afghanistan and will involve major investment projects in the roads, railways, and logistics subsectors. Appendix 4 describes the CAREC corridors. The Transport and Trade Facilitation Strategy 2020 emphasizes policy and institutional reforms to maximize the impact of both past and future investments. This includes the harmonization of regulations, procedures, and standards for cross-border movement of goods and people, in addition to implementing an enhanced approach to more-efficient border management.

70. **Urban transport.** Kabul is among the fastest-growing cities in the world and has become the pivot for economic activities in Afghanistan. Its population, which has grown by nearly 3.5% annually over the past 15 years, stood at 3.7 million people in 2015.[44] The layout of the city is determined by mountains, which surround the city,

[44] Geohive. *Afghanistan: Administrative Units,* Extended. http://www.geohive.com/cntry/afghanistan_ext.aspx (accessed October 2015).

divide it into east and west, and also limit the number of roads leading into and out of the city.[45] Table 6 provides key information about Kabul.

71. Lack of infrastructure investment and noncompliance with land use regulations have resulted in uncoordinated development, limited space for public facilities, traffic congestion, poor access to social services, and insecure neighborhoods. Poor air quality has become an increasing challenge. Weak traffic discipline and enforcement of traffic rules create chaotic situations, not limited to peak hours. During winter, households living in informal settlements resort to burning raw coal, generating toxic emissions that, in combination with emissions from motor vehicles, make Kabul one of most polluted cities in the world.[46] According to the Afghanistan National Development Strategy, other challenges and constraints include

- low coverage of basic services and inadequate public resources to meet growing needs;
- widespread urban poverty and limited access to productive employment;
- lack of capacity and coordination among urban sector institutions;
- limited scale of private sector investment in urban enterprises, facilities, or services;
- land security and titling issues, including absence of a proper land registration system, land grabbing, and inadequate legal instruments and institutions; and
- lack of funds due to donors' limited interest in the urban sector.[47]

72. Returning refugees and rural–urban migrants have caused urban sprawl and growth of informal settlements and increased Kabul's population density, which is among the highest in Asia (Table 7). As a result of sprawl, Kabul's population densities are higher in the periphery than in the inner city, where most of the businesses are located.

Table 6: Kabul City: Key Indicators, 2015

Total population (million)	3.7
Total land area (square kilometers [km^2])	300
Registered vehicle fleet	520,000
Share in total land area	0.05%
Share in total population	12.3%
Share in gross domestic product	25.0%
Share in vehicle fleet	0.0%
Population density (people per km^2)	12,333
Country population density (people per km^2)	46.0
People per Kabul vehicle fleet	7.1

Source: Geohive. Afghanistan: Administrative Units, Extended. http://www.geohive.com/cntry/afghanistan_ext.aspx (accessed October 2015).

73. Urban sprawl and an uneven population distribution also have contributed to increased daily travel needs and trip frequencies. Heavy congestion and lack of bypass roads led to a ban of private trucks during the key hours of the day, from 5 a.m. to 9:30 p.m. The absence of bypass roads means that trucks passing through Kabul on the way to other destinations suffer delays of up to 14 hours daily.

74. On average, Kabul registers more than 1 million individual trips per day.[48] Public transport is available on fixed routes. However, urban transport demand exceeds the available capacity. Buses typically operate far above their allowed occupancy rates.[49] The use of Kabul's road capacity is skewed toward private car transport. The share of travelers using public transport is about 71% of total

[45] Abdullah Habibzai, Shabnam Habibzai, and Carlos C. Sun. 2010. *Overview of Transportation in Kabul City*, Afghanistan. Columbia: University of Missouri Department of Civil and Environmental Engineering.

[46] A recent World Bank study ranks Kabul the 10th most polluted of 50 cities. World Bank. 2015. *Clean Air and Healthy Lungs: Enhancing the World Bank's Approach to Air Quality Management*. Environment and Natural Resources Global Practice Discussion Paper #03. Washington, DC.

[47] Islamic Republic of Afghanistan. 2010. Afghanistan National Development Strategy (2008–2013): A Strategy for Security, Governance, Economic Growth & Poverty Reduction, 102. Kabul.

[48] Japan International Cooperation Agency. 2009. *The Study for the Development of the Master Plan for the Kabul Metropolitan Area in the Islamic Republic of Afghanistan*. Kabul.

[49] Abdullah Habibzai, Shabnam Habibzai, and Carlos C. Sun. 2010. *Overview of Transportation in Kabul City, Afghanistan. Columbia: University of Missouri Department of Civil and Environmental Engineering*. Unpublished.

Table 7: Population Density in Selected Asian Cities

City	Country	Population ('000)	Land Area (km^2)	Density (people per km^2)
Mumbai	India	14,350	484	29,649
Kolkata	India	12,700	531	23,917
Karachi	Pakistan	9,800	518	18,919
Shanghai	People's Republic of China	10,000	746	13,405
Kabul	Afghanistan	3,700	300	12,333
Beijing	People's Republic of China	8,614	748	11,516
Manila	Philippines	14,750	1,399	10,543
Jakarta	Indonesia	14,250	1,360	10,478
Tianjin	People's Republic of China	4,750	453	10,486
Singapore	Singapore	4,000	479	8,351
Bangkok	Thailand	6,500	1,010	6,436

km^2 = square kilometer
Source: City Mayors Statistics. The Largest Cities in the World by Land Area, Population, and Density. http://www.citymayors.com/statistics/largest-cities-density-125.html (accessed 25 October 2016).

city traffic, though the respective buses use only about 23% of the available road capacity. In contrast, travelers using their own cars account for 29% in the movement of daily travelers while occupying 67% of the road capacity. The average speed of about 12 km per hour, which prevails on the city's main arteries, reflects heavy congestion. Based on the current average daily traffic in Kabul and the current level of congestion, the economic cost of Kabul's traffic problem exceeds $100 million per year.[50] This amount does not include the economic cost related to air pollution.

75. This assessment illustrates that an urban strategy to improve land use in Kabul must go hand in hand with the development of public transport, which in turn relies on the provision of adequate infrastructure. In 2009, the Ministry of Urban Development, supported by consultants, conducted a master plan study for the development of Kabul's metropolitan area. The recommendations to introduce a new zoning system, along with proposals for city transport and traffic engineering, have yet to be implemented.

76. **Climate change.** The effects of climate change are already visible in Afghanistan, although the country is not a major contributor to the underlying causes of such change. In common with other Central Asia countries, Afghanistan has the second-highest rate of rising temperatures and is expected to suffer a net loss of annual precipitation. Because of climate change, it is anticipated that the incidence of extreme weather events, including heat waves, floods, and droughts, will increase. Afghanistan's mean annual temperature is projected to increase by 1.4°C to 4.0°C over the next 45 years. Unless this trend is arrested and reversed, large parts of the country's agricultural economy will become marginal by 2060.[51]

77. The threat of the expected changes in climate, therefore, hovers over the country's economy, stability, and food security. Even if Afghanistan had peace and a stable government, it still would face the daunting task of having to adapt to the effects of climate change. Afghanistan's contribution to greenhouse gas emissions, which are thought to cause the change in climate,

[50] This amount is based on the cost savings that could be realized if the average operating speed in the city increased to 20 km per hour.
[51] National Environmental Protection Agency. 2009. *Afghanistan Initial National Communication to the United Nations Framework Convention on Climate Change*. Kabul.

is marginal. As of 2011, the country recorded an estimated two tons per capita of greenhouse gas emissions, which compares to 24 tons per capita in the United States and about 12 tons in Germany. Its current low levels of greenhouse gas emissions notwithstanding, Afghanistan has an urgent need to address its extensive climate adaptation requirements (see Box 4).[52]

78. As of 2005, Afghanistan's greenhouse gas emissions originated from agriculture (52.5%), land use change and forestry (32.8%), and energy (7.3%). The transport sector ranks fourth, accounting for 5.8% of total greenhouse gas emissions (Table 8). It should be noted, however, that current transport sector emissions are likely to be much higher. Although agriculture and the shift in land use have grown moderately over the past 10 years, the fleet of registered motor vehicles has grown rapidly, at an

Box 4: Impacts of Environmental Degradation, Land Scarcity, Population Growth, and Climate Change

In Afghanistan, the impacts of climate change have exacerbated the results of other adverse events. In April 2014, severe flooding hit 123 districts in 27 of Afghanistan's 34 provinces. The rainfalls that caused the floods were 2–3 times higher than normal annual averages for the area. The flood, which people called a 100-year flood, washed away roads and crops, killed more than 160 people, destroyed 6,800 homes, displaced 16,000 people, and affected a total of about 125,000 people. Among the most affected was the population of a village in Badakhshan's Argo district. In May 2014, following the flooding, a strong earthquake caused a massive landslide, burying a newly built part of the village and many of its inhabitants. The landslide was not the first in the area, but the previous flooding had rendered the village more susceptible to landslides. Moreover, for want of better and more secure settlement sites, the destroyed part of the village was built on hill slopes. The slopes had been prone to landslides because plowing had damaged the topsoil. The main road, over which emergency relief should have reached the village, had been destroyed by the 100-year flood.

Source: Thomas Ruttig and Ryskeldi Satke. 2015 (30 November). *Before the Paris Conference: The State of Afghanistan's Climate and its Adaption Capability*. Afghanistan Analysts Network. https://www.afghanistan-analysts.org/before-the-paris-conference-the-state-of-afghanistans-climate-and-its-adaption-capability

Table 8: Aggregate Greenhouse Gas Emissions in Afghanistan, 2005

Sector	Tons CO_2 Equivalent				Aggregate (%)
	CO_2	CH_4	N_2O	Aggregated	
Agriculture		9,296	5,813	15,109	52.6
Land use change and forestry	9,341	81	9	9,431	32.8
Energy	1,239	736	130	2,104	7.3
Transport	1,671	0.5	0.03	1,672	5.8
Other	313	130		443	1.5
Total	**12,564**	**~10,244**	**~5,952**	**28,759**	**100.0**

CH_4 = methane, CO_2 = carbon dioxide, N_2O = nitrous oxide.

Source: Islamic Republic of Afghanistan. 2015 (21 September). *Intended Nationally Determined Contribution: Submission to the United Nations Framework Convention on Climate Change*. Kabul.

[52] Islamic Republic of Afghanistan. 2015 (21 September). *Intended Nationally Determined Contribution: Submission to the United Nations Framework Convention on Climate Change*. Kabul.

average annual rate of 17% during the period since 2005, so that greenhouse gas emissions may have increased accordingly.

79. Afghanistan's transport sector is vulnerable to changes in climate variables and expected changes in the frequency and intensity of extreme weather events. Although mitigation remains a key objective to avoid climate change, adaptation to climate change impacts is essential. Building resilient transport infrastructure systems will significantly reduce hazard exposure and vulnerability to climate change. In addition, the impact of greenhouse gas emissions on the urban environment, aggravated by traffic congestion in cities, and on the air quality and the costs for the Afghan health system, could be alleviated relatively easily. To this end, the quality standard for car fuel, which is still based on a Soviet standard from the 1970s, should be updated; the import of obsolete, highly fuel-inefficient secondhand cars should be discouraged; and better traffic engineering and regulation in Afghanistan's main cities should be adopted.

Conclusion

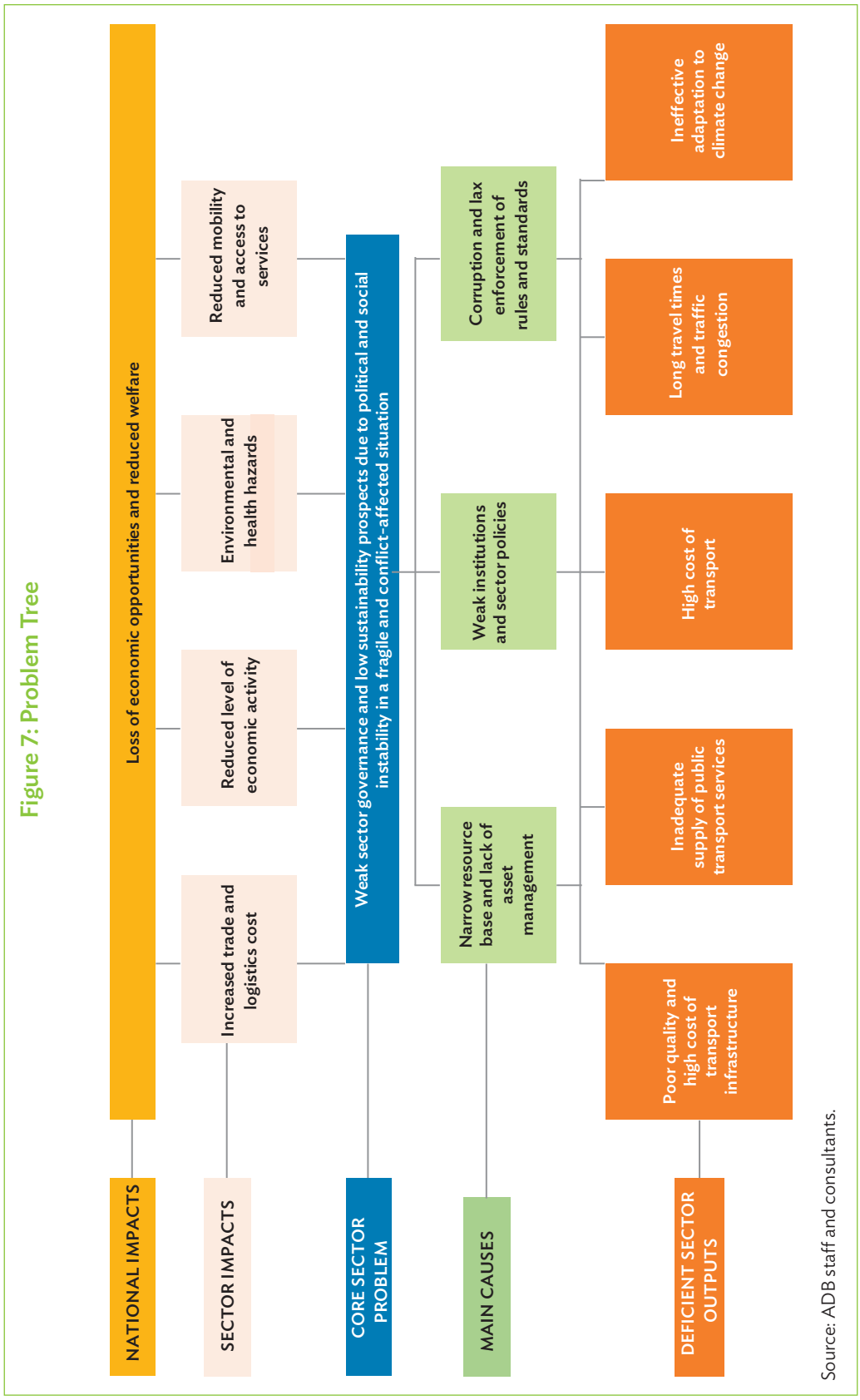
80. A problem tree attempts to present the issues of and constraints on the transport sector in a plausible cause-and-effect relationship (Figure 7). The identified root cause is Afghanistan's prevailing fragile and conflict-affected situation, characterized by thus far unsuccessful efforts to develop peaceful, mutually constructive, and reinforcing relations within the society.[53] As discussed here, Afghanistan exhibits most of the characteristics that define fragile and conflict-affected countries, including

- weak governance, institutions, and policies;
- limited resources and infrastructure;
- a narrow economic base relying on small and inefficient markets;
- deficient delivery of basic services; and
- vulnerability to climate change and natural disasters.[54]

81. What is considered a root cause here may well have deeper sociological, cultural, and historical causes. Exploring such causes would, however, exceed the scope and thematic context of this paper. The linear chain of causes and effects portrayed by the problem tree also could be perceived as a circular problem, in which the problem at the root cascades to a series of subproblems and outcomes that eventually create the baseline condition. In this regard, the widespread poverty in Afghanistan may well be regarded as both a cause and an effect of the country's current distress.

[53] Organisation for Economic Co-operation and Development. 2007. *Principles for Fragile States and Situations*. Paris.
[54] ADB. 2012. *Working Differently in Fragile and Conflict-Affected Situations: The ADB Experience*. Manila.

Figure 7: Problem Tree



Source: ADB staff and consultants.

3 Current Sector Strategies

Government Sector Strategy

82. At the London Conference on Afghanistan in December 2014, the government announced its vision for reform in a policy document entitled Realizing Self-Reliance. The conference also provided an opportunity for the international community to reaffirm its commitment to supporting Afghanistan in its reform endeavors.[55] At the conference, the government presented the essence of its program for the "transformation decade" (2015–2024).[56] The program aims to reduce aid dependency, improve security and political stability, eliminate the root causes of corruption, restore fiscal sustainability, and streamline development planning and management. The drivers for achieving greater self-reliance are inclusive growth, regional integration, private sector development, and increased government efficiency. Economic growth will be export led, relying on a transport sector with enhanced connectivity and improved infrastructure, effective logistics management, and rational tariffs. A national infrastructure development plan, which will combine physical investments with improvements to the current institutional setting and maintenance regime, will provide the platform for the implementation of the strategy.

83. The London Conference reflected many of the elements developed in connection with the government's Afghanistan National Development Strategy (ANDS). ANDS, which covered the 5-year period from 2008 to 2013, was the country's first poverty reduction strategy based on the Millennium Development Goals. The strategy rested on three pillars—security; governance, rule of law, and human rights; and social and economic development—which, in turn, were divided into 8 sectors, 17 subsectors, and 6 clusters.[57]

84. The goal of ANDS for the transport sector was to have a safe, integrated transport network that ensures connectivity and enables low-cost and reliable movement of people and goods domestically as well as to and from foreign destinations.[58] ANDS accorded high priority to the rehabilitation of the transport system. This included completion of a fully upgraded and maintained Ring Road and connector roads to neighboring countries, improved transport services as well as regional cooperation and trade logistics. An average of 66% of the outcomes targeted in ANDS were achieved.[59]

85. At the Kabul conference of 2010, donors committed to aligning 80% of their programs with Afghanistan's national priority programs. The priority programs comprised a set of 22 thematic plans based on ANDS, intended to prioritize and align government and donor activities across six clusters: governance, agriculture and rural development, the private sector, infrastructure, human resources, and security. The commitment to align donor programs with Afghan priorities was intended to ensure greater country ownership in development planning and plan implementation.

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55 The London Conference on Afghanistan was the 12th major conference on Afghanistan since the 2001 conference in Bonn. At the same time, it was the first event to provide an opportunity for the newly elected government to present its strategic vision to the international community. Representatives of 50 countries and 24 international organizations participated in the conference.

56 Government of Afghanistan. 2014. *Realizing Self-Reliance: Commitments to Reform and Renewed Partnership*. London.

57 Islamic Republic of Afghanistan. 2008. *Afghanistan National Development Strategy: Transport Sector Strategy*. Kabul.

58 Islamic Republic of Afghanistan. 2008. *Transport and Civil Aviation Strategy 1387–1391 (2007/08–2012/13): Pillar III, Infrastructure, Afghanistan National Development Strategy*. Kabul.

59 Government of Afghanistan. 2014. *Afghanistan National Development Strategy (2008–2013): Completion Report*. Kabul.

86. In 2010, ANDS was refined and updated with a more specific list of priority programs and projects.[60] Among the various components of the economic and infrastructure development cluster was the National-Regional Resources Corridor Initiative. Its main objective is to create the conditions for tapping Afghanistan's mineral resources.[61] Development of the mineral sector has been identified as the single most important lever to diversify the economy, create employment, and raise government revenues. Because the development potential of the mineral and hydrocarbon sector is greater than that of any other sector in Afghanistan's economy, locations with known mineral deposits will be connected to transport infrastructure as a matter of priority. This could be rail and/or road infrastructure. The initiative rests on the economic corridor concept, which will use the mining sector and associated investments in infrastructure as drivers for implementation.[62] As part of its institutional reform package, the initiative also provided a blueprint for railway sector development.

87. ANDS and the associated prioritized implementation plan, as endorsed at the Kabul conference, provided a strategic road map for transport sector reforms. Because most of the goals have yet to be achieved, they are included in the government's current list of priorities.[63] Specifically, the government intends to

- carry out sustainable institutional reforms;
- expand the national and provincial road network;
- support an intensive operation and maintenance (O&M) plan and develop asset management tools and capacity;
- develop a 5-year budget to prioritize investment in periodic maintenance;
- adopt a workforce approach for O&M emergency interventions;
- develop an innovative financing approach and public–private partnerships;
- streamline and rationalize the mandates and responsibilities of transport sector institutions; and
- establish a road authority, a road fund, and a transport institute under the purview of a restructured Ministry of Public Works (MOPW).

88. The future organization and status of the current MOPW is still unclear. One option could be to dissolve the ministry and consolidate all policy and planning functions for the entire transport sector in a new Ministry of Transport. Subsector responsibilities would be assigned to autonomous authorities, such as the proposed road authority and the already existing Afghanistan Railway Authority. Figure 8, which shows the reform process, is premised on the continued existence of MOPW, albeit in a leaner shape and empowered to recruit and retain proficient staff.

89. The government's strategy for the railway subsector focuses on the development of two major rail lines, including

- a southern, mineral freight–focused line, which will support transport of bulk mineral ore to seaports in Pakistan and/or Iran for shipment to global markets ; and
- a northern, commercial freight–focused line, which will expand the existing 75 km line running between Hairatan and Mazar-e-Sharif and connect the Central Asian republics with Iran via Afghanistan.

90. The railway will be owned and operated by the government and/or private entities, depending on the market to be serviced. This hybrid ownership model would be consistent with the purpose of the southern rail line, which is primarily focused on supporting mineral-extractive industries and may be attractive enough for private sector participation, whereas the northern rail

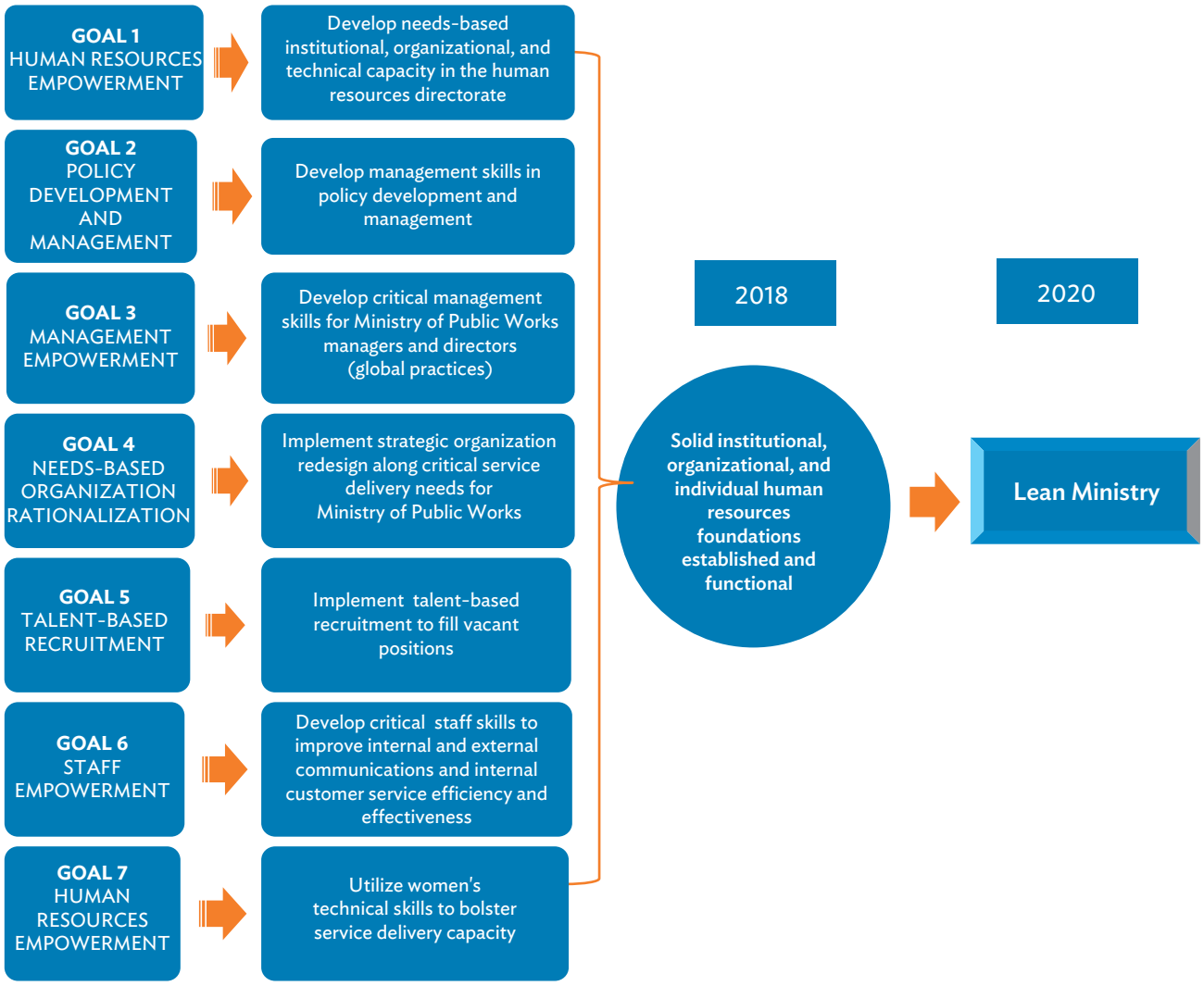
60 Islamic Republic of Afghanistan. 2010. *Afghanistan National Development Strategy: Prioritization and Implementation Plan Mid-2010–Mid-2013*. Vols. 1 and 2. Kabul.

61 Ministry of Public Works. 2014. *Framework Document for National Infrastructure Plan 2015–20*. Kabul.

62 The concept of economic corridors is predicated on integrated economic development within a geographic area. Such a corridor can extend the benefits of improved transport links to remote locations within the geographic area. An economic corridor may consist of one or more routes of different transport modes that connect centers of economic activity. These routes can run on different alignments, but they have common transfer points and are connected to the same end points.

63 Government of Afghanistan. 2015. *Ministry of Public Works' Priority Projects and Programs*. Kabul.

Figure 8: Institutional Reforms Envisaged for the Ministry of Public Works



Source: Government of Afghanistan. 2015. *Ministry of Public Works' Priority Projects and Programs*. Kabul.

line will predominantly cater to commercial transit traffic and regional trade and may therefore be better suited for public ownership. The option would not, however, exclude delegation of railway operations to private contractors.

91. Although the government strategy has a clear focus on roads and railways, with substrategies and concrete programs for these subsectors, coherent strategies for civil aviation and urban transport are not discernible. There are, however, concrete project proposals for civil aviation and urban transport. These proposals will be discussed in Chapter 4, which assesses individual projects and determines their priority.

ADB Strategy, Support, and Experience

92. Since ADB resumed its Afghanistan operations in 2002, the main goal of country strategies has been to assist the government in the reconstruction and rehabilitation of the country and to ensure a seamless transition from humanitarian to reconstruction and development assistance (see Appendix 5 and Appendix 6 for ADB's past and ongoing operational programs). With regard to the transport sector, the various strategies showed the following features:

- ADB's initial strategy (2002–2004) accorded high priority to rehabilitating the core highway network. ADB assistance for rehabilitating roads also was to focus on capacity building. ADB's approach to road planning and design was to take into account the subregional links, which demanded a higher standard than would roads for the use of Afghanistan alone. Other elements of ADB strategy involved promoting sustainable sector financing and cost recovery; and absorbing returnee refugees, ex-combatants, and women in road construction and maintenance.
- The Country Partnership Strategy Update (2004–2006) followed a three-pronged approach to support Afghanistan's reconstruction: building capacity, establishing an appropriate policy and institutional framework, and rehabilitating essential infrastructure, including infrastructure for civil aviation.
- The Country Strategy and Program Update (2006–2008) stayed the course of the previous strategies and focused on road sections that were identified in the ADB-financed master plan study.
- The Country Partnership Strategy (2009–2013) continued to focus on a limited number of priority projects, including road improvements and construction of a railway system.
- ADB's Interim Country Partnership Strategy: Afghanistan (2014–2015) bridged the gap between a full-fledged country partnership strategy for the period 2016–2020 and the Country Partnership Strategy (2009–2013). The Interim Country Partnership Strategy (2014–2015) was deemed necessary because the government was in a state of transition after the election in 2014 and the drawdown of international security forces. The Interim Country Partnership Strategy extends the validity of the Country Partnership Strategy (2009–2013) for two more years and continues ADB's previous strategic focus on the transport sector.[64]
- ADB also manages the Afghanistan Infrastructure Trust Fund, which was established in 2010 and focuses on infrastructure investments and O&M. The fund was created following the realization that Afghanistan's infrastructure requirements would likely exceed $1 billion per year—far more than any single funding source can provide. The Government of Japan, USAID, and the Department for International Development have contributed to the fund. The fund's committed capital in 2015 totaled $650.5 million, of which $460.5 million was paid in. Among the fund's priorities is the development of stronger transport links.

93. In addition to the country-specific strategies, ADB pursued goals defined by its corporate strategies, notably the Long-Term Strategic Framework 2008–2020 (Strategy 2020), the Central Asia Regional Economic Cooperation (CAREC) Transport Sector Strategy (2008–2018), the CAREC Transport and Trade Facilitation Strategy 2020, and the Sustainable Transport Initiative Operational Plan.

- Strategy 2020 focuses on, among other key areas, regional cooperation and private sector development. Transport will to be a major part of future ADB operations in infrastructure—one of its five core areas of operational focus.

[64] ADB. 2014. Interim Country Partnership Strategy: Afghanistan, 2014–2015. Manila.

Transport is also integral to the five drivers of change of Strategy 2020: private sector development and private sector operations, good governance and capacity development, gender equity, knowledge solutions, and partnerships. To spur market-led growth, ADB invests in infrastructure and provides advice on the development of an enabling business-friendly environment, including reliable rules, regulations, and policies that do not disadvantage private sector enterprise.

- The CAREC Transport Sector Strategy (2008–2018) has three overarching goals: to establish competitive transport corridors across the CAREC region; to facilitate efficient movement of people and goods across borders; and to develop safe, people-friendly, environmentally friendly transport systems. The strategy also identified six strategic corridors for full completion by 2018. A priority railway network under CAREC is in Afghanistan.
- The CAREC Transport and Trade Facilitation Strategy 2020 refines the original CAREC strategy while retaining its original three goals.[65] New elements are the development of a multimodal corridor network and the focus on improved trade and border crossing services. The initial phase of the strategy focused on the development of road infrastructure in the six CAREC corridors and on the reduction of barriers to cross-border movement of goods and people. This effort is ongoing, and the refined strategy will continue to improve and complete the road corridors. Railway development is a cornerstone of Transport and Trade Facilitation Strategy 2020, with particular relevance to Afghanistan. The refined strategy also attaches a high priority to supporting the efficient transfer of cargo between transport modes. To this end, intermodal yards will be designed as logistics hubs. The refined strategy will help ensure harmonized management of BCPs and selectively expand their physical capacity.
- The Sustainable Transport Initiative Operational Plan pursues the development of transport infrastructure and operations that are economically, socially, and environmentally sustainable. Toward this end, sustainable transport involves giving attention to all the elements of transport and finding the best balance between them to develop transport systems that are accessible, affordable, safe, and environmentally friendly.

94. The experience of donors with the delivery of projects in Afghanistan has been varied. With regard to ADB, its experience was largely positive during the country partnership strategy period 2009–2013, despite the implementation challenges presented by the conflict-affected environment.[66] In recent years, however, the performance of projects has deteriorated, which is reflected in cost overruns and implementation delays. International contractors were, at times, less than qualified to cope with the challenges posed by the scale and complexity of most ADB road projects. National contractors were selected based on inadequate information about their capabilities and contracting capacities, obscuring the potential of national contractors to assume an increased share in civil works for roads. MOPW, acting as employer for most road projects, has often demonstrated limited understanding of the conditions of civil work contracts.

95. The approach to procurement, with its reliance on large design–build contracts, has caused additional problems. The objective of using the design–build concept has been to shorten preconstruction activities and hasten overall project completion.[67] In practice, however, rather than shortening implementation periods and realizing such savings, the use of design–build has been a cause for delays and cost overruns. As discussed in Appendix 7, the design–build modality has not worked well in Afghanistan. The modality should be replaced by the traditional civil works procurement approach, in which an employer prepares engineering and design specifications that prospective contractors can use to formulate their bids.

[65] ADB. 2013. *CAREC Transport and Trade Facilitation Strategy 2020*. Manila.
[66] ADB. 2014. *Interim Country Partnership Strategy: Afghanistan, 2014–2015*. Manila.
[67] The design–build approach combines in one procurement process the tasks of preparing detailed designs and construction, so that the time otherwise spent for separately recruiting design engineers and contractors can be reduced.

Other Development Partner Support

96. ADB, USAID, and the World Bank have been the major donors in the transport sector. Development partners established a mechanism that institutionalized coordination and joint decisions. A sector road map helped in the planning of complementary support by different partners. While ADB focused on road construction projects, USAID concentrated on capacity development under its Road Sector Sustainability Program. The World Bank has focused on rehabilitating and building rural roads and developing a road inventory.

97. **World Bank National Rural Access Program.** The National Rural Access Program (NRAP) is a high-priority government program aimed at nationwide rehabilitation, reconstruction, and maintenance of rural access infrastructure, using appropriate labor-based approaches and thereby creating employment opportunities for the rural poor. NRAP has thus far rehabilitated more than 12,300 km of rural roads, in addition to ancillary infrastructure such as bridges, culverts, and retaining walls. To date, around $300 million has been spent for the program. Given that the size of the rural road network is estimated at 30,000 km, NRAP will remain a top priority for the government in future years—particularly because O&M of the network is part of the program.

98. **Afghanistan Reconstruction Trust Fund.** The Afghanistan Reconstruction Trust Fund was established in 2002 as a source of emergency financing and has since evolved into a comprehensive development instrument, providing a coordinated mechanism for the government's budget and priority projects. The fund is the largest source of on-budget financing, delivering development results in key sectors, in addition to providing substantial recurrent financing in support of fiscal sustainability.[68] The fund is supported by 34 donors and administered by the World Bank. The fund's current financing strategy covers the 3-year period from fiscal year 2015 to fiscal year 2017 and is to provide financing for about $1 billion per year.

99. **United States Agency for International Development Road Sector Sustainability Program.** The USAID-funded Road Sector Sustainability Program supports a phased capacity development program focused on MOPW and road maintenance. The cost of the total program is $106 million, of which a technical assistance in the amount of $21.4 million is earmarked to create three new Afghan government agencies: a road authority, a road fund, and a transport institute. Through the sustainability program, USAID and MOPW are developing institutional capacity and generating revenue to finance maintenance and new road construction.

100. **Department for International Development.** The program of the United Kingdom's Department for International Development focuses on three areas: supporting peace, security, and political stability; promoting economic stability, growth, and jobs; and helping the state deliver improved services. Around two-thirds of the program is channeled through multi-donor trust funds—the Afghanistan Reconstruction Trust Fund, the Afghanistan Infrastructure Trust Fund, and the Common Humanitarian Fund. In 2011, the Department for International Development launched the Road Rehabilitation and Maintenance Program, which subsequently became the Keep Afghans Connected Project. Under this project, the department currently supports MOPW in developing capacity to sustainably operate and maintain Afghanistan's road network.

Proposed Forward Strategy and Program

101. The forward strategy and program must be sensitive to Afghanistan's fragile and conflict-affected situation. This means accepting that the security situation may remain vulnerable and volatile. Development partners must continue to provide stable and predictable support. A concerted donor approach will be needed to support policy reforms and sector restructuring to create the environment for efficient and sustainable infrastructure and transport operations. It will be necessary to mobilize domestic relations for future infrastructure development

[68] In 2014, the O&M Directorate of the Ministry of Public Works received $28.8 million to undertake periodic maintenance on a wide range of specific priority routes.

and use public–private partnership arrangements for financially viable transport infrastructure development. The strategic agenda for the transport sector ensues from the assessment of the prevailing key sector issues and constraints. Specific policy changes with respect to making investment sustainable should be pursued; as a first step, adequate cost recovery levels should be adopted. A summary of the issues and required responses is presented in Table 9.

Table 9: Policy Issues and Reform Action

Reform	Required Action	Status	Planned
Good governance and accountability	Delineate policy and planning responsibilities from operations Promote private participation in the financing, construction, and maintenance of road infrastructure Introduce competition into the road maintenance market Strengthen procurement system for road works	Reform measures are being designed by consultants under United States Agency for International Development assistance Small number of national private contractors with only a limited role in operation and maintenance Maintenance to be carried out by private contractors, with the exception of emergency work Current system is not transparent	Create a road authority and a road fund Create an apex transport ministry would be desirable Create a level playing field for local firms and promote capacity development for the public–private partnership concept Update register of prequalified local contractors based on objective criteria Introduce transparent prequalification and bidding system
Sustainable road sector	Develop a road asset management system (RAMS) and provide a stable, secure, and sustainable source of financing for the road network Introduce emission controls and other environmental protection measures	Systematic condition survey and life cycle cost assessments started under the National Rural Access Program No action taken yet	Use up-to-date computer technologies to enable better decisions to be made on investment and maintenance Adopt rational maintenance and management strategies that seek to minimize costs over the life cycle of a road Consider organizational implications for RAMS and determine an institution to act as guardian and location of RAMS

continued on next page

Table 9 *continued*

Reform	Required Action	Status	Planned
Cost recovery	Enforce "user pays" principle to ensure that roads are priced to improve economic efficiency and that all road users progressively contribute the full costs of maintaining the network, while promoting equity among different categories of road users Select sources of financing suitable for generating income consistent with the development of traffic	Cost recovery and road user charge study completed Road works are financed from the general budget	Practical options for the financing of road works include taxes on vehicle fuel, vehicle licenses (usually in the form of annual fees), and tolls Technical assistance is proposed to develop a suitable solution
Transport logistics	Develop a seamless, intermodal network to ensure high quality and efficient logistics chains and unimpeded flows of goods and people Introduce a single access point for administrative procedures to promote simplification of freight-related information Encourage foreign vehicle transit through adequate transit fees	The corridor concept will improve transport logistics if complemented by relevant documentary procedures (e.g., Transports Internationaux Routiers carnets for international forwarders) Despite substantial investment in trade facilitation and customs cooperation programs, further improvements will be required Fees for foreign forwarders must be competitive compared to alternative corridors	Continuation of the Transit Transport and Trade Facilitation measures under the Central Asia Regional Cooperation (CAREC) program
Sustainable urban transport	Reduce greenhouse gas emissions and urban congestion by taking a comprehensive approach to urban transport planning	Master plan for Kabul city completed but not implemented Heavy reliance on private car transport causing urban congestion	Construction of a ring road around Kabul A new master plan would be desirable
Regional economic integration	Continue implementing CAREC Transport and Trade Facilitation Strategy 2020	Development of the six CAREC corridors ongoing	Development of multimodal corridors complementing road corridors by rail links

Source: ADB staff and consultants.

4 Transport Sector Road Map and Results Framework

Indicative Areas for Intervention

102. In view of the issues and constraints noted here, priority areas crucial to the achievement of expected sector outcomes would include:

- **Completion of strategic road and rail links**. These links include the still incomplete sections of the Ring Road, the Salang Tunnel and road corridor, expansion of the national and provincial road network, and gradual buildup of a railway network.
- **Support for operation and maintenance**. Because operation and maintenance (O&M) for roads continues to be underfunded and the prospects for reversing the past allocation pattern is less than promising in the medium term, donor funding for O&M is a high priority.
- **Road asset management**. Institutional capacity and available financial resources have not kept step with increases in the rehabilitated road network. Moreover, the network was allowed to expand without consideration of the implications for recurrent maintenance obligations. The introduction of a road asset management system (RAMS) would address this problem. An autonomous road authority, coupled with a road fund and a broadened revenue base, is a necessary condition for the effectiveness of such a system. The introduction of RAMS will entail a series of activities that would require technical assistance. A realistic and long-term horizon for the implementation of RAMS and proposed technical assistance should be adopted.
- **Regional initiatives**. The high cost of transport logistics reduces the country's trade competitiveness, making Afghanistan one of the worst performers among landlocked Asian countries. The underlying causes include poor physical infrastructure, low utilization of technology, and inadequate logistics facilities at border crossing points (BCP). Sustained implementation of the Central Asia Regional Economic Cooperation (CAREC) program and other regional initiatives will ensure better connectivity and more-efficient trade logistics. Emphasis should be placed on improvements of BCP infrastructure, trade logistics support services, and introduction of modern inspection methods and procedures.
- **Urban transport**. Kabul transport is beset by a multitude of interrelated problems. The major constraints are the city's layout, inefficient use of road capacity, inadequate public transport, poor traffic engineering, and noncompliance with land use and traffic regulations. There is a need for a long-term integrated urban plan consisting of zonal plans covering public space and transport infrastructure, public transport, and dedicated infrastructure (the Ring Road and urban bus rapid transit corridors). The urban agenda thus must deal with a diverse set of formidable problems, including urban infrastructure and public transport issues, compliance with land use regulations and traffic rules, and mitigation of the social repercussions likely to be caused by restructuring and modernizing public bus transport. Tackling these issues will be challenging because of the need for institutional and policy reforms.
- **Tertiary roads**. Rehabilitation, reconstruction, and maintenance of the tertiary road network

using labor-based techniques will remain a priority for the government for the next 2 decades, given the scope of work yet to be completed and considering that O&M of the tertiary network is part of the program.

- **Public–private partnerships**. The scope for full-fledged public–private partnerships in Afghanistan is narrow, and the best prospects are related to primary roads with high traffic and railways that connect mines. To widen the range of public–private partnerships, arrangements must be adapted to address viability gaps. Such arrangements should provide incentives, which the public sector would have to provide to private investors.

Indicative Investment Requirements for the Transport Master Plan, 2017–2036

103. The study team for the Master Plan Update has determined the sector's likely investment requirements for the next 20 years. The requirements are based on the priorities set by the respective government authorities or, when such priorities were not readily available, on the estimates of the study team. The results are shown in Table 10.[69]

Table 10: Twenty-Year Investment Needs in the Transport Sector

Sector	$ million	Share
Railways	11,176	43.1%
Roads	13,000	50.2%
Urban transport	853	3.3%
Airports	568	2.2%
Trade facilitation	300	1.2%
Total	**25,897**	**100.0%**

Note: Figures under an unconstrained resource scenario.
Source: ADB staff and consultants.

The composition of the 20-year investment program, by subsector, is discussed here.

104. **Roads.** The total investment program for the roads subsector amounts to $13 billion. Details of the road program are provided in Appendix 8. The program covers the following components:

- completion of the 474 km remaining sections of the Ring Road;
- geotechnical surveys, detailed design, and construction of the Salang Tunnel and road corridor;
- expansion of the national and provincial road network by about 3,300 km;
- construction of about 1,000 km of border roads;
- construction and O&M of 2,500 km of gravel and asphalt road under the National Rural Access Program (NRAP); and
- O&M for the core network of regional and national roads.

105. **Railways.** The investment program for the railway subsector includes the entire Afghanistan National Railway Plan, covering more than 5,000 line km and multimodal hubs. The plan shows the geographic location of priority routes. The total cost is estimated at $11.2 billion. A breakdown of the investments is provided in Appendix 9.

106. **Urban transport.** The cost of the 20-year urban program is estimated at $854 million, including contingencies. A breakdown of the cost of the urban program by its components is shown in Appendix 10, Table A10.1. The program covers the construction of the Kabul Ring Road, urban bus rapid transit corridors, public transport, traffic engineering and intelligent transport systems, plans for social mitigation of adverse impacts, and public education campaigns to improve compliance with traffic rules and awareness of safety hazards.

107. **Airports.** Future investment requirements in the civil aviation subsector include foremost upgrading Hamid Karzai International Airport in Kabul, which

[69] The investment needs displayed in Table 10 consist of existing government plans and needs identified by the Master Plan Update.

already has exceeded its design capacity by a wide margin.[70] Other investments may include periodic maintenance of regional airports. The total cost of the investments in civil aviation is estimated at $568 million (see Appendix 10, Table A10.2).

108. **Trade facilitation and logistics.** Projects in trade facilitation and transport logistics are a priority in the CAREC Transport and Trade Facilitation Strategy 2020 and the Afghanistan National Railway Plan. Such projects include improvements to BCPs and the development of multimodal hubs and logistics centers. Although specific investments have yet to be specified and their priority determined, it is estimated that the cost of the investment package will be on the order of $300 million.

Assessment of Investment Priorities

109. **Methodology.** The overall investment amount of $25.9 billion reflects an unconstrained resource scenario. This means that neither financing constraints nor limitations of the government's absorptive capacity have been considered in determining the size of the investment program. In the absence of norms for the adequacy of investment plans, a country's gross domestic product (GDP) is usually taken as a benchmark, according to which transport sector investments should be around 3% of GDP. The annual resource requirement of the envisaged investment program as determined here accounts for 6.2% of GDP, assuming a GDP growth of 3% per year in real terms over the entire 20-year plan period. As shown in Table 11, a more optimistic scenario of GDP growth rates between 4% and 5% per year would bring the assessed investment requirements close to what the country likely can afford. The investment program of $25.9 billion is therefore considered to be broadly realistic. In terms of what the authorities likely will be able to absorb and manage, the proposed investment package is optimistic. As the government has in the past consistently fallen short of its annual disbursement targets, the proposed resource envelope of $25.9 billion may only be achieved if a substantial share of the envelope is implemented off-budget.

110. The remaining task is to prioritize the projects. This will be done for each subsector rather than creating a single priority ranking for the overall program. To this end, the terms of reference for the master plan study require the use of multicriteria framework analysis, through which the long list of investments will be screened, prioritized, and reduced to a refined short list. Investments were prioritized based on plans and programs rather than defined projects. This means that, in view of their size, some of the programs will have to be broken down into manageable projects. AFRA's proposed Northern Line is a case in point. Its total cost is about $2.1 billion, so dividing it into several packages or projects will likely be required.

111. The choice of criteria is limited by the early planning stage of most investment proposals. The vast majority of the projects have yet to undergo prefeasibility or full-fledged feasibility studies. Other proposals, notably those in the trade logistics subsector, have yet to be conceptualized and defined. As a result, data and information to establish the viability of projects is not available. Therefore, the Master Plan Update prioritizes projects based on indicators that reflect their prima facie

Table 11: Resource Scenarios ($ million)

Gross Domestic Product Growth	Unconstrained Resource Scenarios	Constrained Resource Scenarios	Unconstrained Minus Constrained Scenarios
3%	25,697	17,636	8,061
4%	25,697	23,515	2,182
5%	25,897	29,393	(3,496)

( ) = negative.
Source: ADB staff and consultants.

[70] This information was obtained in a meeting with the Afghanistan Civil Aviation Authority on 13 April 2016. A formal list of priority investments, which the master plan team requested, does not seem to exist.

viability rather than using cost–benefit ratios or rates of return, which at this stage cannot be computed. The criteria used to determine the priorities recognize the government's priorities and follow from the transport policy framework and proposed actions outlined in Table 9. The criteria are

- projects are included in the government's priority programs;
- projects are included in the CAREC Transport and Trade Facilitation Strategy 2020;
- projects are part of the National-Regional Resources Corridor Initiative and connect locations with known mineral deposits;
- projects are prima facie economically feasible, based on known traffic figures and strategic location in the transport network;
- projects are needed to improve transport sector performance (e.g., modernization or low-cost construction); and
- projects support important social requirements (e.g., safety and rural accessibility).

112. The criteria are weighted according to their significance. Based on this, the projects are rated. The higher the project's score, the higher the project's priority and the earlier it is proposed for implementation. The criteria to be applied, their respective weights, and the scores are shown in Appendix 11.

113. **Priorities for roads and highways.** The screening process has yielded a cluster of projects that do not differ significantly in their order of priority. The program for roads and highways, which the Master Plan Update has assessed, invariably contains high-priority road sections and corridors. The task of making a strategic choice between, say, road sections linking BCPs and corridors traversing the country is challenging. Of course, such a choice must be made, because the entire investment volume exceeds Afghanistan's time-bound finance and implementation capacity. The investment volume of $13 billion, therefore, has to be stretched over a long period.

114. The Salang Tunnel and its access road, the missing links of the Ring Road, and connector roads to BCPs are the least ambiguous top priorities of the master plan. Other high priorities—though nonrated—are O&M and the programs for national and tertiary roads. Investments in these three categories will have to be undertaken in equal amounts during all of the 5-year investment periods. The list of projects, sequenced in accordance with their indicative priorities, is shown in Table 12.

Table 12: Investment Priorities for Roads and Highways

Rank	Projects	Project Cost ($ million)	Comments
1	Salang Tunnel	1,115	High economic returns, owing to the tunnel's strategic location
2	Ring Road missing links	711	Likely high economic viability, due to proximity to Ring Road
3	Herat–Islam Qala	189	High significance for regional integration
4	Herat–Turghundee	168	High significance for regional integration
5	Andkhoy–Aqina	54	High significance for regional integration
6	Sherkan Bandar–Kunduz	95	High significance for regional integration
7	Torkham–Jalalabad	114	High significance for regional integration
8	Spin Boldak–Kandahar	156	High significance for regional integration
9	Hairaton–Mazar-e-Sharif	120	High significance for regional integration
10	North–South corridor 1: Dar-i-Suf–Bamyan–Daykundi–Kandahar	801	Increased network efficiency
11	Awlang–Pul e Doshakh	32	Strategic location on the North–South link

continued on next page

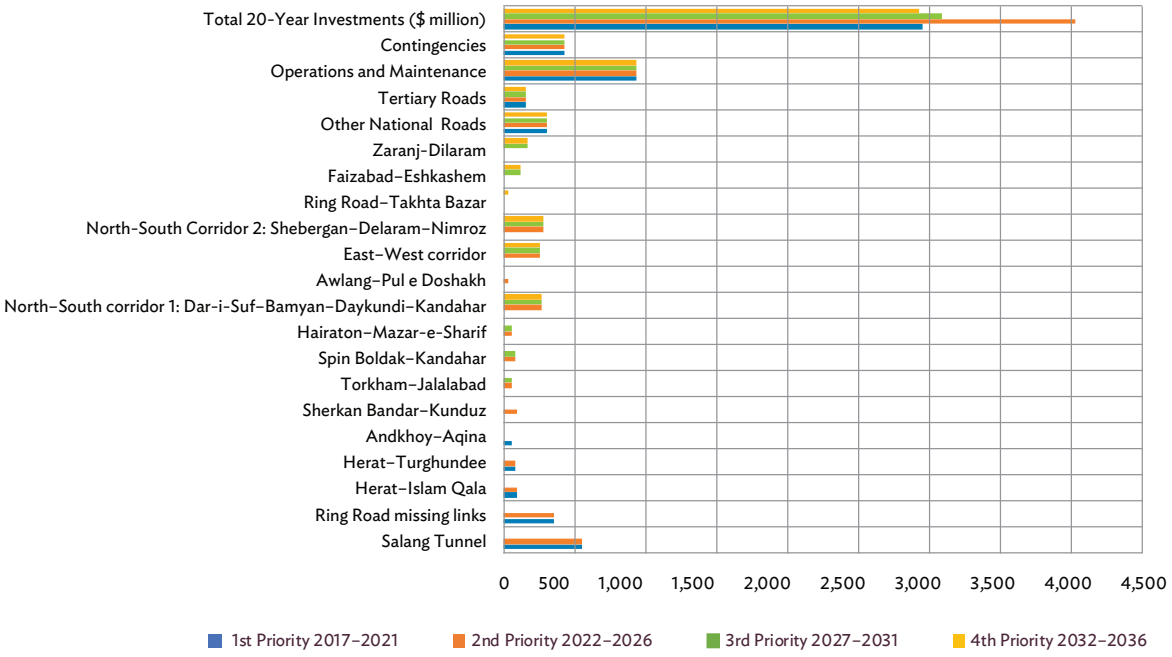
Table 12 *continued*

Rank	Projects	Project Cost ($ million)	Comments
12	East–West corridor	777	Increased network efficiency; significant for National Resources Corridor Initiative
13	North–South corridor 2: Shebergan–Delaram–Nimroz	831	Increased network efficiency; significant for National Resources Corridor Initiative
14	Ring Road–Takhta Bazar	32	High significance for regional integration
15	Faizabad–Eshkashem	234	High significance for regional integration
16	Zaranj–Dilaram	329	Mineral resources; regional integration; link to Chabahar Port
	Other national roads	1,209	Program significant; projects yet to be specified
	Tertiary roads	600	Highly significant to enhance social stability
	Operations and maintenance	3,750	Highly significant to ensure network sustainability
	Contingencies	1,689	
	Total Investments	**13,006**	

Source: ADB staff and consultants.

115. Figure 9 illustrates the time profile of the investment allocations for road and highway projects. Investments are expected to peak during the second period (2022–2026) as a result of the large investments having been commenced in the previous period, with implementation continued during the second period. The Salang Tunnel project, which is the largest single project, is an example.

Figure 9: Time Profile of Investment Allocations for Roads and Highways ($ million)



Note: The color of a bar represents an investment period. A project having more than one bar stretches over more than one investment period.
Source: ADB staff and consultants.

116. **Priorities for Railways.** Efficient railway operations require economies of scale. Because of the lumpiness of railway investments, railways progressively achieve competitiveness with increasing output and large-scale operations, both of which lower the initial cost of capital. The Afghanistan National Railway Plan marks the beginning of a gradual process of developing a network large enough to become competitive. The elements of the railway plan should therefore be assessed as links in a larger system. The key question is to what extent individual sections of the system—which, when taken on their own, would have limited economic merits—add value to the system. The evaluation shown in Table 13 should be seen in this light. The first two priorities are short sections that are accorded high priority by the Afghanistan Railway Authority (AFRA) because they will feed into the larger system. The line that adds critical mass to the network is the Herat–Kunduz line, which will become the backbone of AFRA's Northern Line, connecting the country's northwest region with that of the northeast over a distance of more than 1,000 km. The extension of that line farther to the east and to the border with the PRC (the Kunduz–Badakhshan–Wakhan line) may add value to the larger system only in the longer run, when transit through the Badakhshan Valley will be possible.

117. The evaluation of the railway links is presented in Appendix 12. Figure 10 shows the time profile of the proposed investment allocations for railways.

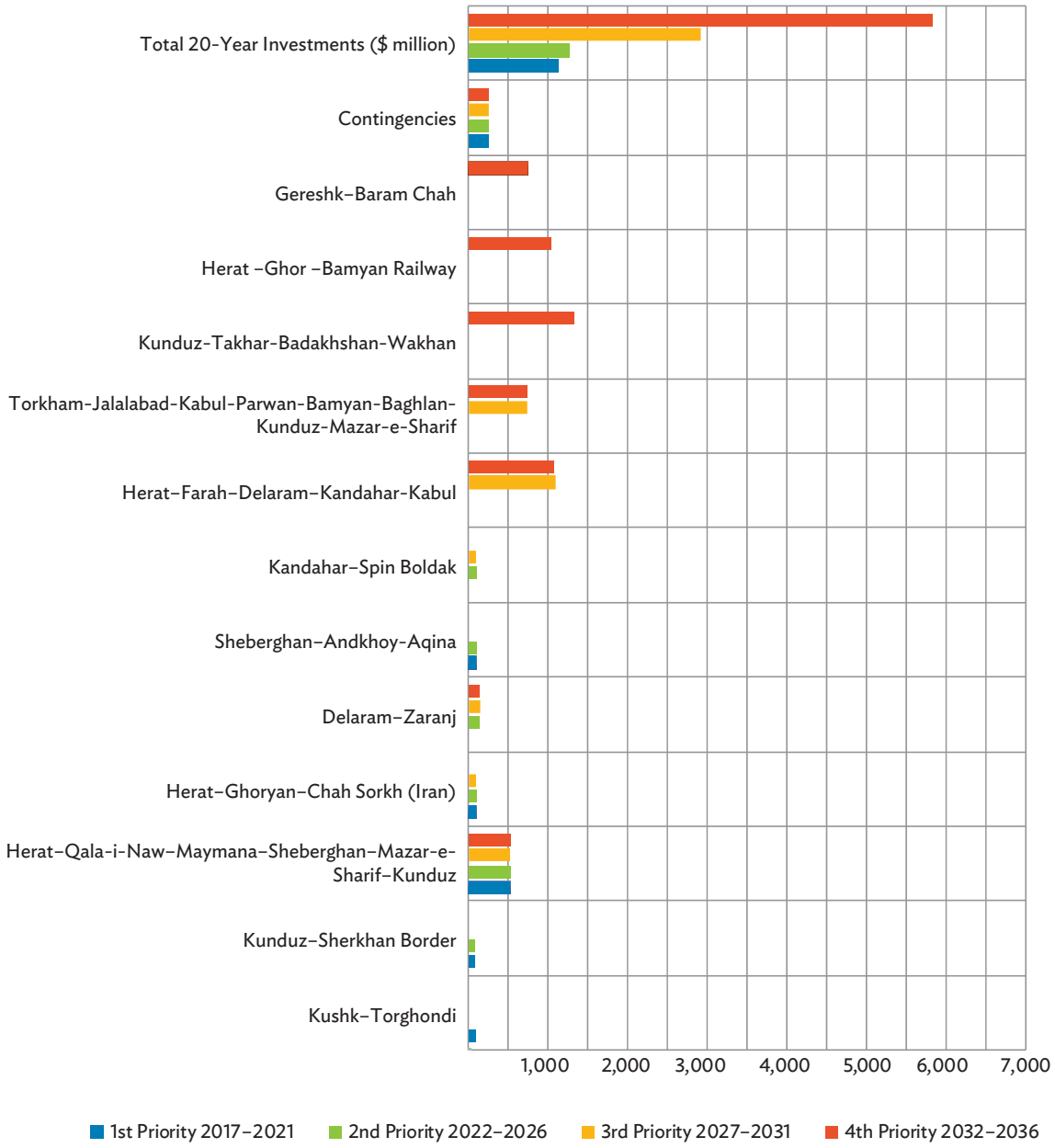
118. **Priorities for urban transport.** The proposed 20-year investment program for urban transport will cost less than the railway investments scheduled for only the first 5-year period, though this alone would not justify giving high priority to urban transport projects. The program accrues its top priority from the high economic returns that investment in Kabul urban transport is likely to generate. The implementation of the program will have to be phased over the four periods. It could be accelerated as soon as the general peace-and-order situation will allow this.

Table 13: Investment Priorities for Railways

Rank	Projects	Project Cost ($ million)	Comments
1	Kushk–Torghondi	89	Vital border connector
2	Kunduz–Sherkhan border	167	Vital border connector
3	Herat–Qala i Naw–Maymana–Sheberghan–Mazar-e-Sharif–Kunduz	2,100	High-priority Northern Line with best prospects for viability
4	Herat–Ghoryan–Chah Sorkh (Iran)	283	Vital border connector
5	Delaram–Zaranj	422	Mineral resources; regional integration; link to Chabahar Port
6	Sheberghan–Andkhoy–Aqina	190	Important border connector
7	Kandahar–Spin Boldak	182	Important border connector
8	Herat–Farah–Delaram–Kandahar–Kabul	2,168	Important southwest section of the rail ring with access to border crossing points
9	Torkham–Jalalabad–Kabul–Parwan–Bamyan–Baghlan–Kunduz–Mazar-e-Sharif	1,467	Western ring section of dubious viability; low Afghanistan Railway Authority (AFRA) priority
10	Kunduz–Takhar–Badakhshan–Wakhan	1,330	Potentially important link to the People's Republic of China; dubious viability; low AFRA priority
11	Herat–Ghor–Bamyan Railway	1,045	Link not essential and unlikely viable; low priority also accorded by AFRA
12	Gereshk–Baram Chah	732	Parallel north–south link
	Contingencies	1,001	
	Total	**11,176**	

Source: ADB staff and consultants.

Figure 10: Time Profile of Investment Allocations for Railways ($ million)



Note: The color of a bar represents an investment period. A project having more than one bar stretches over more than one investment period.

Source: ADB staff and consultants.

119. **Priorities for airports and trade facilitation and logistics.** Although there is no formal investment program for either of these subsectors, priorities in trade facilitation and logistics will likely focus on improvements in infrastructure and procedures at BCPs. In the absence of numeric details, the Master Plan Update has estimated likely investment needs and has phased them equally over the four investments periods, without ascribing priorities to them.[71] The existing Kabul airport will have to be upgraded, both in terms of capacity and operational effectiveness. With that, the airport will be able to cope with rising traffic for the next 20 years.

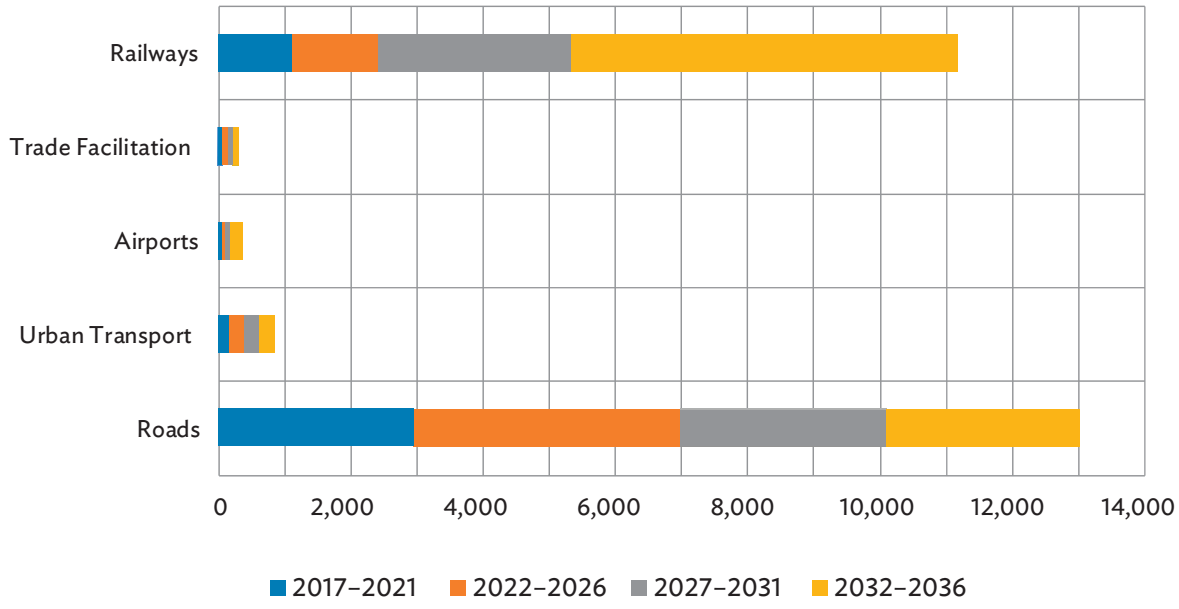
120. A summary of consolidated investments for all five subsectors and 5-year investment periods is shown in Figure 11.

121. The overall program is ambitious yet likely affordable and coherent. With its emphasis on expanding the tertiary network and O&M—both to be carried out by national contractors—the program will make a contribution toward social and economic stabilization. The program's focus on regional initiatives will enable Afghanistan to benefit from its strategic location and to foster trade with its neighbors and the rest of the world. The program for railways is ambitious. Provided the operational and institutional prerequisites can be met, the railway program will enable the country to tap the potential of its rich mineral resources.

Capacity Building

122. **Development of a road asset management system.** The government needs an asset management system that aims to achieve an optimal allocation of scarce financial resources for O&M of its road assets. The system is to meet the short- and long-term needs of current and future stakeholders.

Figure 11: Summary of Investments per Subsector and Investment Period ($ million)



Note: The color of a bar represents an investment period. A project having more than one bar stretches over more than one investment period.
Source: ADB staff and consultants.

[71] A notable exception is the proposed international airport at Logar, which is unlikely to become relevant during the 20-year investment period, if at all.

123. A road asset inventory is a prerequisite for any rational O&M regime. The inventory provides essential information and data about the exact location of roads, when and to which engineering standards they were built, their current physical condition, and what axle loads they must carry. A comprehensive road inventory does not exist in Afghanistan. In its absence, condition surveys can only be done on an ad hoc basis (i.e., wherever roads are known to exist). The inventory data are baseline data that determine current maintenance and funding needs. RAMS will process the data to determine future network-wide maintenance needs, intervention schedules, and funding requirements (see also Appendix 3). RAMS will enable identification of the most efficient allocation of funds for an agreed-upon level of service for the road network.

124. The most time-consuming activity in the process of developing a RAMS is the creation of an effective road asset inventory. Several methods can be deployed quickly to achieve a detailed road surface assessment in a relatively short time. These include satellite imagery, use of unmanned aerial vehicles, ground-based methods that rely on either static imagery or video, and more traditional manual or semi-automated data collection approaches using data loggers or forms. These approaches and methods can be used in combination, depending on the specific geographic location.

125. The government will soon make a decision on a new mandate and organizational setting for the Ministry of Public Works (MOPW). The greater autonomy that is likely to emerge from the process calls for a suitable and realistic method of asset management. MOPW will therefore have to start with a set of core activities toward the adoption of a RAMS. The recommended steps include

- adopting a suitable decision model and reviewing the data requirements;[72]
- electing MOPW headquarters and field division staff for training in the use of devices deployed to establish a road inventory and the software to be selected as a decision model. It is proposed that staff from field divisions and from MOPW headquarters be assigned to the training;
- requesting ADB to support such training under the next technical assistance project; and
- finalizing and submitting the list of required equipment to ADB for approval.

126. The development of a RAMS is time consuming and training intensive. It may therefore be advisable to start the project with an area slice or a limited strategic component.

127. **Strategic and operational support to the Afghanistan Railway Authority.** Railways require scale economies for efficient operations. The downside is that railway investments tend to be too big to be managed efficiently by the organization entrusted with the operations. Indeed, as worldwide experience suggests, it is precisely the size of railway organizations that has rendered many of them unwieldy and unresponsive to market forces, which can cascade to huge financial losses and high government subsidies. To preclude such an outcome, AFRA will define the most suitable business model through a clear mission statement.

128. AFRA is likely to assume the role of policy maker and regulator. This could imply that the government owns all "below rail" assets, including the land and infrastructure, while a private entity owns and operates all "above rail" assets, including the rolling stock, equipment, and other facilities. AFRA will need expert support in defining future roles and responsibilities—and whether they would be expressed through management contracts, leases, or concessions. External expertise also will be needed in developing public–private partnership concepts, such as a build–operate–own concession, to finance and operate the railway.

129. AFRA is still at a very early stage of its development. It would therefore appear prudent to start the process by determining future capacity development needs consistent with the business model to be pursued. The more time is allowed to elapse without addressing the key issues, the greater will be the risk that AFRA will develop

[72] If HDM-4 computer software is found suitable for Afghanistan's conditions, data requirements for the different levels of HDM application will need to be require review. Because the strategic level would be consistent with road asset management, the database for the strategic level should be built up over time.

on a wrong and irreversible track. The Master Plan Update is therefore proposing the following course of action:

- Draft terms of reference for a team of experienced railway consultants, who would address key strategic business issues, and on this basis prepare a concrete action plan for capacity development.
- ADB financing should be processed in tandem with the fielding of capacity development consultants. The consideration here is that the prospect of funding for the Northern Line will help in the adoption of a rational concept for AFRA's future organizational shape and operations.

130. **Master plan for Kabul urban transport.** The agenda for urban transport development will have to address a diverse set of formidable problems, including urban infrastructure and public transport issues, compliance with land use regulations and traffic rules, and mitigation of the social repercussions likely to be caused by restructuring and modernizing public transport services. Because the challenges are diverse, the response must be accordingly diverse and must be administered in an integrated and sustained manner.

131. The urban transport agenda will involve institutional and policy reforms, which likely will meet with resistance from industry organizations and politically connected stakeholders who benefit from the current situation. Publicity campaigns will be needed to overcome such resistance and to educate the public about the goals of the reforms. Media-based awareness campaigns may involve short videos broadcast by popular television channels.

132. The capacity development proposal for Kabul urban transport will include the following components:

- review and update the Ministry of Urban Development's urban master plan study for the development of Kabul's metropolitan area, with a view to introducing a new zoning system and identifying corridors for rapid bus transport;
- develop proposals for urban public transport;
- develop proposals for introducing an intelligent transport system;
- prepare social mitigation plans; and
- design and carry out publicity and public awareness campaigns.

133. **Afghanistan Civil Aviation Authority.** A civil aviation master plan will be needed, which—in addition to identifying infrastructure needs—should focus on capacity development requirements. At present, air traffic control infrastructure for the entire country is still maintained by military service providers, who will have to be replaced by Afghan personnel. The replacement of obsolete equipment will go hand in hand with this transfer. The Afghanistan Civil Aviation Institute (ACAI) has been created to facilitate the transition process and to develop human resources for ACAA's long-term requirements. ACAI will continue to rely on foreign experts to recruit, train, and certify Afghan aviation employees; maintain International Civil Aviation Organization–compliant practices and procedures; and ensure that ACAA has adequate oversight capability. Sustaining ACAI over the next 5 years will require funding for continued capacity building.

134. **National road safety strategy.** Road safety in Afghanistan has emerged as a serious problem, with injuries and fatalities incurred through accidents already placing a huge economic burden on the country. The government should therefore address the host of complex road safety issues in a comprehensive manner and should launch a national road safety strategy and action plan. The strategy should follow the approach of the CAREC regional strategy, which Afghanistan is helping to implement. Several other countries in CAREC are adapting the regional strategy and making it their own national strategy. The proposed strategy will have to align various, currently scattered, institutional responsibilities. A coordination mechanism will have to be established among the agencies concerned with road safety. As a next step, a road safety audit and identification of road locations prone to accidents should be undertaken. Capacity development support to this end will be required.

135. **Improvement of trade logistics.** Border crossings are choke points for efficient external trade. Several constraints combine to cause delays in transiting through the borders. Some of the bottlenecks relate to infrastructure, whereas other constraints emanate from

operational inefficiencies. It will be necessary to assess the quality of infrastructure facilities and equipment, along with a review of BCP operations, to determine the specific impediments. It is proposed that a team of trade logistics experts review BCP operations and assess the available infrastructure and equipment with a view to developing proposals to optimize the trade flows.

Results Framework

136. Table 14 shows the outcomes and outputs that the package of investments and capacity development interventions is expected to deliver. The outcomes represent development results in the transport sector attributable to envisaged ADB interventions. However, the results will go beyond sector boundaries. Transport infrastructure is both an end product affecting the welfare of society and an intermediate input to economic production, thus indirectly contributing to economic growth and welfare. The proposed package of transport sector interventions needs to be assessed against the background of the political situation in Afghanistan, particularly in light of the synergies the interventions will create toward socioeconomic and security improvements. Contributing factors include employment creation through the use of national contractors for all roadworks, improved national connectivity, international integration through improved regional corridors, and access to mineral resources as a prerequisite to harnessing their potential.

Table 14: Transport Sector Results Framework

Country Sector Outcomes		Country Sector Outputs		ADB Sector Outputs	
Outcomes with ADB contribution	Targets with indicators and baselines	Outputs with ADB contribution	Indicators with incremental targets	Proposed and ongoing ADB operations	Main outputs expected from ADB interventions
Road and rail network efficiency improved; regional integration and trade advanced	Afghanistan's ranking on the Logistics Performance Index for quality of infrastructure to improve from 154 in 2016 to 140 in 2025.	400 km of major roads on CAREC corridors rehabilitated; 500 km of major roads maintained; road asset management system introduced	By 2020: 150 km of major roads improved and 180 km of roads maintained; by 2025, additional 150 km improved and 180 km maintained	Road asset management project and capacity development; completion of missing Ring Road links	Road maintenance; road asset management system
Transport network scope and efficiency improved	Ton-km transferred by railway increased from 100 million ton-km in 2015 to 200 million ton- in 2025	500 line km added to the railway network	200 line km of railway added by 2020	Proposed projects for the Northern Line	Capacity development of Afghanistan Railway Authority; railway track and multimodal terminals

ADB = Asian Development Bank, CAREC = Central Asia Regional Economic Cooperation, km = kilometer.

Source: ADB staff and consultants.

APPENDIX 1

Outline Terms of Reference for the Preparation of the Master Plan Update

The technical assistance for the preparation of the master plan update will deliver the following outputs.

Output 1: Completion of transport sector assessment and road map

An assessment of the existing policy and regulatory framework and a road map for future policy direction will be undertaken. The assessment will cover all transport subsectors, with a focus on the land transport subsector, associated road and rail modalities, and intermodal connectivity. Due consideration will be given to institutional gaps and authorities, the need for consistent standards and potential regulatory interventions, cost recovery measures, and asset management.

Output 2: Completion of the national transport master plan

The 20-year investment plan will focus on land and air transport infrastructure and intermodal links. A multicriteria framework will assist in the prioritization of infrastructure investments in conjunction with assessments of economic feasibility, potential financial viability, government priorities, and previously identified interventions for which funding has been committed. The plan will analyze the existing shortfall in maintenance funding, focusing on determining an estimate of future maintenance funding requirements over the planning horizon, given existing, ongoing, and planned infrastructure investments. The plan will consider how Afghanistan's national priorities fit within the broader regional context, as presented by the Central Asia Regional Economic Cooperation Transport and Trade Facilitation Strategy 2020.

A review will be undertaken of the 2008 Afghanistan National Development Strategy and the subsequent 2010 prioritization and implementation plan; the previous transport sector assessments and reviews of development partners (ADB and the World Bank); the 2006 Road Sector Master Plan; the two ADB-financed multitranche financing facilities; and other relevant transport policies, plans, and strategies. Based on the sector assessment, recommendations for future policy and regulatory directions will be prepared, with the aim of increasing governance and sustainability.

Based on the existing inventory of transport infrastructure and multicriteria framework analysis, a 20-year investment plan for new capital investment, upgrading, and recurrent maintenance will be developed, in consultation with the government. The plan will focus on the land transport subsector and road and rail modalities, which collectively foster Afghanistan's potential role as a regional transit hub and support the government's efforts to develop domestic extractive industries. In consultation with other development partners, financing modalities will outlined, including areas for enhancing private sector participation and addressing sustainable maintenance funding through user fees, including taxes on fuel, registration fees, and fines for regulatory violations such as truck overloading. Indicative interventions for ADB financing will be identified.[1]

[1] ADB. 2014. *Islamic Republic of Afghanistan: Transport Sector Master Plan Update.* Manila.

APPENDIX 2

Afghanistan Civil Aviation Sector

The Afghanistan Civil Aviation Authority was established as an independent authority to manage all civil aviation activities in the country. Creation of the Afghanistan Civil Aviation Authority (ACAA) is founded on the Civil Aviation Law, which was passed by Parliament in 2012. ACAA is responsible for all airports in Afghanistan, including their operations and development. The authority has policy and regulatory responsibilities with respect to the operations of the air transport agencies and the providers of air transport services. ACAA can amend, renew, suspend, or cancel Air Operator Certificates, in addition to issuing operation specifications and airworthiness certificates.

Airports. The design standards of airports follow the standards prescribed by the International Civil Aviation Organization to ensure the safety and efficiency of air transport and airport facilities. These standards and recommended practices have been adopted as the basis for airport planning in Afghanistan. Afghanistan airports are classified as international, regional, domestic, or access airfields.

- **International airports** handle major commercial passengers and cargo operators, which will boost inward investment, tourism, and other economic activities.
- **Regional airports** will handle domestic and short-haul international flights. They will stimulate regional integration and boost economic growth by providing a vital communication link to regional destinations and to the capital.
- **Domestic airports** are designed to provide a relatively low-cost and rapid response to the isolation of provincial centers due to inadequate land transport linkages.
- **Access airfields** and domestic airports are central to the integration of remote regions into Afghanistan's economic core, and they would allow humanitarian aid to move more rapidly to target areas.

Over the past decade, most international and regional airports have undergone major rehabilitation and modernization works.

- **Mazar-e-Sharif International Airport** was upgraded with financial support from Germany and the United Arab Emirates. The project, which involved construction of new passenger and cargo terminals, was completed in 2013. The new airport has the capacity to handle around 400,000 passengers per year.
- **Herat International Airport** was upgraded with financial support from Italy. The work was implemented in two phases and completed in 2013.
- **Kabul International Airport** underwent major rehabilitation and modernization between 2005 and 2014, with financial support from Japan totaling around $100 million.
- **Kandahar International Airport** has been used by the international coalition forces for military operations since 2006. Currently, parts of the airfield are used for civil aviation purposes.
- **Regional airports** have been rehabilitated with support from ADB and Japan. These airports include Chaghcharan, Faizabad, Maimana, Qala i Naw, and Bamyan.

Table A2: List of Airports

No.	City Served	Airport	Province	ICAO Airport Code	IATA Airport Code
International Airports					
1	Kabul	Hamid Karzai International Airport	Kabul	OAKB	KBL
2	Mazar-i-Sharif	Mazar-e-Sharif International Airport	Balkh	OAMS	MZR
3	Kandahar	Kandahar International Airport	Kandahar	OAKN	KDH
4	Herat	Herat International Airport	Herat	OAHR	HEA
Major Domestic Airports					
1	Ghazni	Ghazni Airport	Ghazni	OAGN	GZI
2	Jalalabad	Jalalabad Airport	Nangarhar	OAJL	JAA
3	Kunduz	Kunduz Airport	Kunduz	OAUZ	UND
Regional Domestic Airports					
1	Bamyan	Bamyan Airport	Bamyan	OABN	BIN
2	Lashkar Gah (Bost)	Bost Airport	Helmand	OABT	BST
3	Chaghcharan	Chaghcharan Airport	Ghor	OACC	CCN
4	Darwaz	Darwaz Airport	Badakhshan	OADZ	DAZ
5	Farah	Farah Airport	Farah	OAFR	FAH
6	Khost	Khost Airfield	Khost	OAKS	KHT
7	Fayzabad	Fayzabad Airport	Badakhshan	OAFZ	FBD
8	Khwahan	Khwahan Airport	Badakhshan	OAHN	KWH
9	Koran va Monjan	Razer Airport	Badakhshan	OARZ	KUR
10	Maymana	Maymana Airport	Faryab	OAMN	MMZ
11	Nili	Nili Airport	Daykundi	OANL	
12	Qala i Naw	Qala i Naw Airport	Badghis	OAQN	LQN
13	Sheberghan	Sheberghan Airfield	Jowzjan	OASG	
14	Sheghnan	Sheghnan Airport	Badakhshan	OASN	SGA
15	Taloqan	Taloqan Airport	Takhar	OATQ	TQN
16	Tarin Kowt	Tarin Kowt Airport	Urozgan	OATN	TII
17	Zaranj	Zaranj Airport	Nimruz	OAZJ	ZAJ
18	Sardeh Band	Sardeh Band Airport	Ghazni	OADS	SBF
Military Airports					
1	Bagram	Bagram Air Base	Parwan	OAIX	OAI
2	Shindand	Shindand Air Base	Herat	OASD	OAH
3	Bastion	Camp Bastion	Helmand	OAZI	OAZ

continued on next page

Table A2 *continued*

No.	City Served	Airport	Province	ICAO Airport Code	IATA Airport Code
Small Local Airports					
1	Eshkashem	Eshkashem Airport	Badakhshan	OAEM	
2	Ghaziabad	Ghaziabad Airport	Nangarhar	OAGA	
3	Gardez	Gardez Airport	Paktya	OAGZ	GRG
4	Muqur	Muqur Airport	Ghazni	OAMK	
5	Panjab	Panjab Airport	Bamyan	OAPJ	
6	Sharana	Sharana Airstrip	Paktika	OASA	OAS
7	Taywara	Taywara Airport	Ghor	OATW	
8	Yangi Qaleh	Yangi Qaleh Airport	Takhar	OAYQ	
9	Yawan	Yawan Airport	Badakhshan	OAYW	
10	Gardez	Forward Operating Base Shank	Paktya	OAA	OASH
11	Tapa	Tapa Airport	Kabul		
12	Sherber Too	Sherber Too Airport			
13	Sarhawdza	Aarhawdza Airport			
14	Qara Tepa	Qara Tepa Airport			
15	Kotubkhel	Kotubkhel Airport			
16	Dehdadi	Dehdadi Airport	Balkh, Mazar-e-Sharif		
17	Delaram	Delaram Airport	Farah, Delaram District		
18	Dostmohammadkhan Kelay	Dostmohammadkhan Kelay Airport			
19	Charikar	Charikar Airport			
20	Ajrestan	Ajrestan Airport			

IATA = International Air Transport Association; ICAO = International Civil Aviation Organization.
Source: ADB staff and consultants.

APPENDIX 3

Building Blocks of a Road Asset Management System

What Is Road Asset Management?

Asset management aims at an optimal allocation of resources for the management, operation, preservation, and enhancement of the road infrastructure to meet the needs of current and future users. Road asset management system (RAMS), in the form practiced internationally, has a well-defined meaning. It is the systematic process of maintaining, upgrading, and operating assets. RAMS combines engineering principles with sound business standards and economic rationale, and provides tools to facilitate an organized and flexible approach to allocating resources necessary to meet the public's expectations.

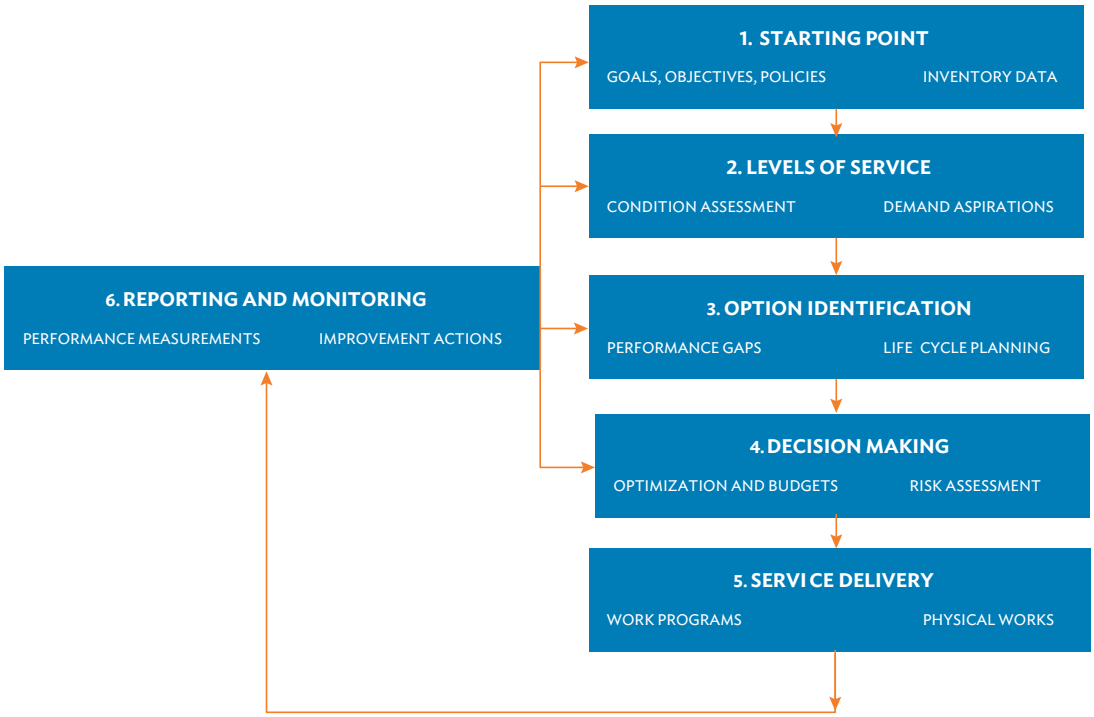
The traditional pavement maintenance management system, also known "asset management," shares some elements with a RAMS. Commonalities include the need for a road inventory, regular condition surveys, inventory updating, and a decision model to investigate investment options. The value added by a RAMS lies in its wider scope, covering all road assets and not just road pavements; asset valuation as a contribution to a whole-of-government accounting framework; interaction with stakeholders; and defined service levels that promote accountability and provide a more objective basis for resource allocation.

Table A3: Key Attributes of a Road Asset Management System

Strategic approach	A systematic process that takes a long-term view of road development and management
Whole life	The whole life or life cycle of an asset is considered
Optimization	Maximizing benefits by considering relevant options and balancing competing demands Understanding the rate of asset deterioration and when to intervene
Resource allocation	Development of funding models to optimize road user costs Allocation of resources based on assessed needs
Customer User focus and accountability	Explicit consideration of user expectations through defined levels of service
Scope	A highway network comprising all assets, including pavements, bridges, culverts, gabions, retaining walls, footways, earthworks, drains, and other structures

Source: ADB. 2010. Building Blocks of a Road Asset Management System. Presentation by Peter C. Darjes at the 2010 Transport Forum, Manila.

Figure A3: Steps in an Asset Management System



Source: ADB staff and consultants.

Benefits of Road Asset Management

- Reduced life-cycle costs
- Defined levels of service as a statement of the targeted performance of the asset
- Ability to track performance
- Transparency in decision making
- Objective basis for making claims on financial resources, and the ability to predict the consequences of funding decisions

Key Components

- A road inventory with road conditions serving as an asset register
- Levels of service
- Asset valuation
- Decision model predicting intervention schedules and levels driven by traffic

Sustainability

- Staff training at all levels
- Decision model—training intensive
- Ownership
- Organizational setting of the road sector
- Autonomous road authority is a must
- Existence of a road fund is desirable

APPENDIX 4

Central Asia Regional Economic Cooperation Transport Corridors

Table A4: Central Asia Regional Economic Cooperation Corridors

Corridor	Route
CAREC 1	Europe–East Asia (KAZ, KGZ, and XUAR)
CAREC 2	Mediterranean–East Asia (AFG, AZE, KAZ, KGZ, TAJ, TKM, UZB, and XUAR)
CAREC 3	Russian Federation–Middle East and South Asia (AFG, KAZ, KGZ, TAJ, TKM, and UZB)
CAREC 4	Russian Federation–East Asia (MON, IMAR, and XUAR)
CAREC 5	East Asia–Middle East and South Asia (AFG, KGZ, PAK, TAJ, and XUAR)
CAREC 6	Europe–Middle East and South Asia (AFG, KAZ, PAK, TAJ, TKM, and UZB)

AFG = Afghanistan; AZE = Azerbaijan; CAREC = Central Asia Regional Economic Cooperation; IMAR = Inner Mongolia Autonomous Region of the People's Republic of China (PRC); KAZ = Kazakhstan; KGZ = Kyrgyz Republic; MON = Mongolia; PAK = Pakistan; TAJ = Tajikistan; TKM = Turkmenistan; UZB = Uzbekistan; XUAR = Xinjiang Uygur Autonomous Region of the PRC.
Source: CAREC Secretariat.

Corridor 1: Europe–East Asia. Corridor 1 has no direct link with Afghanistan. It runs from the People's Republic of China (PRC) westward to Europe. From Turpan (PRC), it bifurcates and the northern branch bifurcates again before reaching the Kazakhstan border. All branches eventually go north into the Russian Federation.

Corridor 2: Mediterranean–East Asia. Corridor 2 connects the Caucasus and the Mediterranean to East Asia, covering Afghanistan, Azerbaijan, Kazakhstan, the Kyrgyz Republic, the PRC, Tajikistan, Turkmenistan, and Uzbekistan. Corridor 2 is the most extensive corridor. Although its eastern end point is in Turpan (PRC) and its western end point is in Baku, multiple branches pass through 7 of the 10 Central Asia Regional Economic Cooperation (CAREC) member countries. The extended network includes new railway links. Three Afghanistan projects—AFG IP 11.1, AFG IP 12, and AFG IP 101—are included in the implementation action plan associated with the refined strategy.

Corridor 3: Russian Federation–Middle East and South Asia. Corridor 3 connects the Russian Federation with the Middle East and South Asia, running through Afghanistan, Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan. Corridor 3 is the only corridor in which most of the investments in the implementation action plan are allocated to the railway sector. The majority of the projects will be in Afghanistan, completing the rail link between Andkhoy and Shir Khan Bandar, which will connect Tajikistan with Turkmenistan through Afghanistan. Railway extensions will link Afghanistan with Turkmenistan. The last section of Afghanistan's national Ring Road, between Qaisar and Laman, is also located in Corridor 3.

Corridor 4: Russian Federation–East Asia. This corridor, which has no direct link with Afghanistan, crosses Mongolia, linking the Russian Federation, to the north, with the PRC, to the south and east. The northern section connects with Corridor 1 in Urumqi and with Corridor 2 and Corridor 5 via Urumqi in Turpan (PRC).

Corridor 5: East Asia–Middle East and South Asia. Corridor 5 connects East Asia with the Middle East and South Asia, running through the PRC, the Kyrgyz Republic, Tajikistan, Pakistan, and Afghanistan. The most far-reaching changes to the corridor network will affect Corridor 5, which links the PRC with South Asia and the Middle East. With Pakistan's accession to the CAREC

program, it is now possible to continue the corridor to the Arabian Sea. This will be achieved with three extensions totaling 4,526 km, including

(i) an extension of the road corridor in Pakistan from Torkham to Peshawar and then south to the ports of Karachi and Qasim via the M1–M4 (i.e., M1, M2, M3, and M4), N-55, and other components of the north–south national corridor on the west side of the Indus River;

(ii) an extension south from Kashi (PRC) to Hasanabdal (near Islamabad, Pakistan) via the Karakoram Highway. Construction of a new section of this road is under way, with PRC funding; and

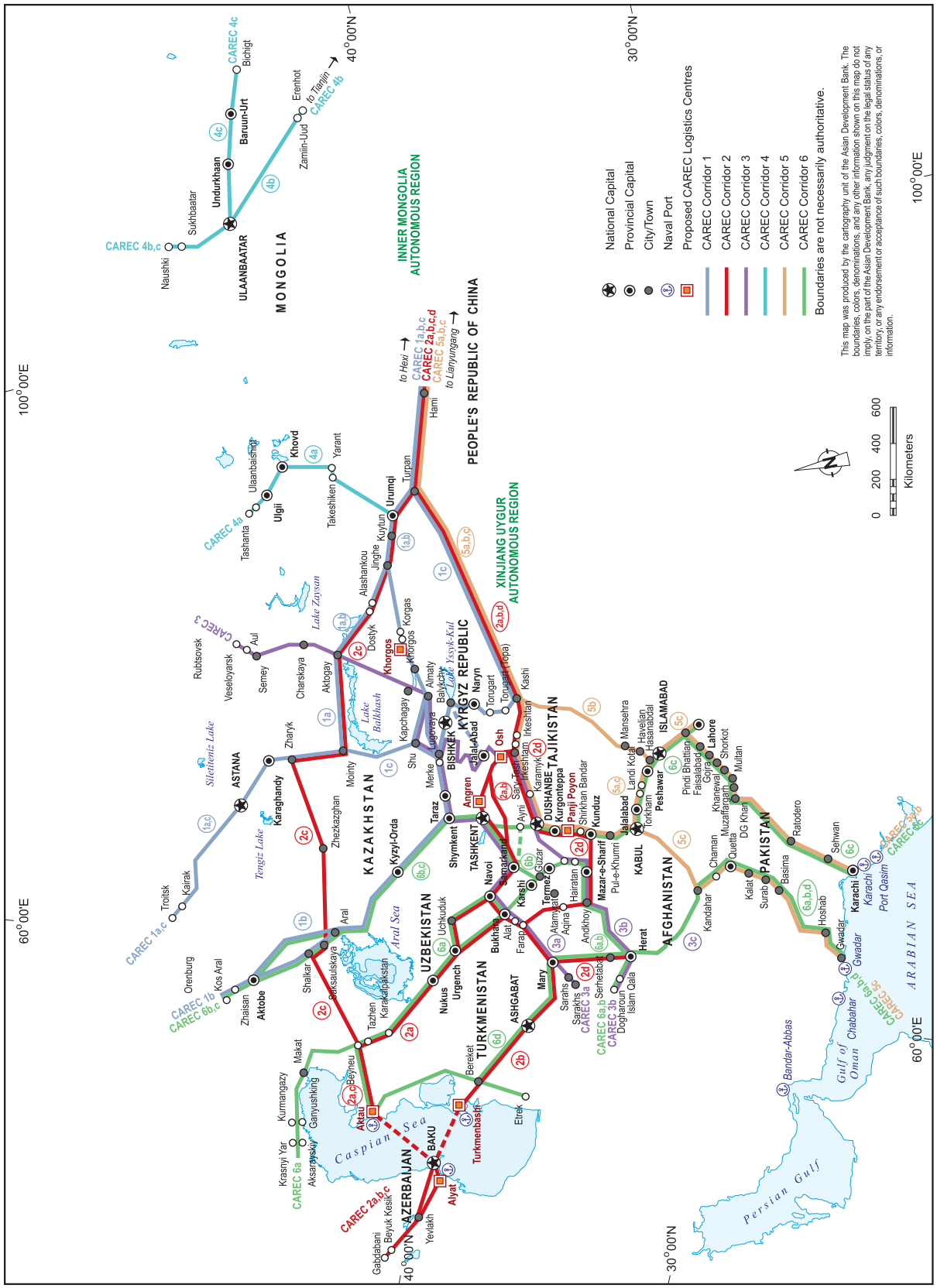
(iii) an extension southwest from Kabul on the Ring Road through Kandahar to the border crossing point (BCP) at Chaman (Afghanistan), on to Quetta (Pakistan), through reconstructed sections of road in Balochistan province of Pakistan, and then to the port of Gwadar in Pakistan.

Four projects under the new implementation action plan have been identified to rehabilitate and upgrade the road from Torkham to Karachi, at a total estimated cost of $1.2 billion. The United States Agency for International Development is funding the Peshawar–Torkham section, while ADB is funding the Faisalabad–Gojra section (M4). On the Afghanistan side of the border, the Kabul–Jalalabad road is already being reconstructed with ADB support, and the roads to and through Kandahar have been reconstructed. An additional project will expand and upgrade the BCPs at Torkham, Wagah, and Chaman.

Corridor 6: Europe–Middle East and South Asia. Corridor 6 connects Europe and the Russian Federation to the Middle East and South Asia, with three routes to the Arabian Sea port of Karachi, and to Gwadar, Chabahar, and Bandar Abbas in the Persian Gulf. For almost the whole of its length, Corridor 6 is conjoined to other corridors (Corridors 1, 2, 3, and 5), so the main projects affecting Corridor 6 have already been mentioned above. The most significant changes to Corridor 6 will include railway projects in northern Afghanistan and road projects in Pakistan, providing connectivity to Arabian Sea ports.

The new railway line is being built with some ADB support for one section and with Islamic Development Bank support for another section. It will run 800 km, from Aktau Port (Kazakhstan) to Etrek (Turkmenistan) on the Turkmenistan–Iran border, and will intersect with the Turkmen railway network in Bereket. From Bereket, the new corridor will extend through Ashgabat and then pass through Mary, overlapping Corridor 2. It will next proceed south, crossing into Afghanistan and continuing to overlap Corridor 2 along the Ring Road to Herat. From Herat, the corridor will follow Afghanistan's Ring Road to Kandahar, reaching the BCP at Chaman, entering Pakistan, and eventually ending in Gwadar, on the Arabian Sea. To complete the extension of Corridor 6 in Pakistan, a number of road projects are planned for implementation between 2014 and 2020.

Figure A4: Map of Central Asia Regional Economic Cooperation Corridors



APPENDIX 5

ADB Grant and Loan Projects and Strategies in the Transport Sector

Table A5: ADB Grant and Loan Projects, and Strategies in the Transport Sector

Year	Project Title and Number	($ million)	Government Strategy	ADB Strategy
2002, 2003, 2007	G9024-AFG, G076-AFG: Road Employment Project for Settlement and Integration of Returning Refugees and Displaced Persons (including two supplementary loans)	15.0 15.0 12.8	NDF	CSP (2002–2004)
2002	L1954-AFG: Postconflict Multisector Program	133.7	NDF	Initial CSP (2002–2004)
2003	G1997-AFG: Emergency Infrastructure Rehabilitation and Reconstruction	150.0	NDF	Initial CSP (2002–2004)
2003	G9037-AFG: Emergency Road Rehabilitation	20.0	NDF	Initial CSP (2002–2004) and CSPU (2003–2004)
2004	G2105-AFG: Regional Airports Rehabilitation Project Phase I	30.0	Securing Afghanistan's Future	Initial CSP (2002–2004) and CSPU (2004–2006)
2004	G2140-AFG: Andkhoy–Qaisar Road	80.0	Securing Afghanistan's Future	Initial CSP (2002–2004) and CSPU (2004–2006)
2005	G0012-AFG: Qaisar–Bala Murghab Road	55.0	Initial ANDS	Initial CSP (2002–2004) and CSPU (2004–2006)
2006	L2257-AFG, G0054-AFG, G9097-AFG: North–South Corridor Project	78.2 40.0 20.0	Initial ANDS	CSPU (2006–2008)
2007	G0081-AFG: Road Network Development 1	180.0	Initial ANDS	CSPU (2006–2008)
2008	G0135-AFG: Road Network Development Investment Program (Tranche 1)	60.0	ANDS (2008–2013)	CPS (2009–2013)
2009	G0161-AFG: Hairatan to Mazar-e-Sharif Railway	165.0	ANDS (2008–2013)	CPS (2009–2013)
2010	G0244-AFG: Road Network Development Investment Program (Tranche 2)	340.0	ANDS (2008–2013)	CPS (2009–2013)
2011	G0261-AFG, G0262-AFG: Transport Network Development Investment Program (Tranche 1)	232.0	ANDS (2008–2013)	CPS (2009–2013)

ADB = Asian Development Bank; AFG = Afghanistan; ANDS = Afghanistan National Development Strategy; CSP = Country Strategy and Program; CSPU = Country Strategy and Program Update; NDF = National Development Framework
Source: ADB staff and consultants.

APPENDIX 6

ADB Technical Assistance Projects and Strategies in the Transport Sector

Table A6: ADB Technical Assistance Projects and Strategies in the Transport Sector

Year	Project Title and Number	Amount ($ million)	Government Strategy	ADB Strategy
2002	Reconstruction and Development	14.50	NDF	Initial CSP (2002–2004)
2004	4371-AFG: Preparing the Master Plan for Road Network Improvement Project	2.36	NDF	Initial CSP (2002–2004)
2004	4415-AFG: Kabul Air Quality Management	0.45	NDF	Initial CSP (2002–2004)
2005	4594-AFG: Capacity Strengthening of the Civil Aviation Sector	0.54	Initial ANDS	Initial CSP (2002–2004) and CSPU (2004–2006)
2006	4675-AFG: Capacity Building for Road Sector Institutions	1.00	ANDS (2008–2013)	CSPU (2006–2008)
2007	4536-AFG: Cross-Border Trade and Transport Facilitation	0.55	ANDS (2008–2013)	CSPU (2006–2008)
2009	7259-AFG: Railway Development Study	19.0	ANDS (2008–2013)	CPS (2009–2013)

ADB = Asian Development Bank; AFG = Afghanistan; ANDS = Afghanistan National Development Strategy; CSP = Country Strategy and Program; CSPU = Country Strategy and Program Update; NDF = National Development Framework
Source: ADB staff and consultants.

APPENDIX 7

Design–Build Contracts in Roadworks

Because the design–build approach combines in a single procurement process the tasks of recruiting a design engineer and a contractor, the time spent for separately recruiting design engineers and contractors can be reduced. In theory, construction can start on any section that is fully designed. In practice, the provision that construction can start only upon completion of safeguard activities frequently prevents this advantage from materializing.

Overall, design–build contracts have not worked well in Afghanistan. Rather than shortening implementation periods and realizing the envisaged savings, the use of design–build has caused delays and cost overruns. The underlying reason is that international finance institutions have used the design–build modality in a way that differs significantly from its original concept. The design–build contract used by international finance institutions is covered by the International Federation of Consulting Engineers (FIDIC) Pink Book and is a hybrid of the contract for construction and engineering works designed by the employer and the contract for such works designed by the contractor.[1]

The "genuine" design–build contract (governed by the FIDIC Yellow Book) is essentially a lump sum contract, in which the contractor carries out engineering and assumes the engineering risk, precluding to a large extent contract variations. In contrast, the ADB "hybrid" contract is based on unit costs estimated by the employer and on quantities measured by the contractor. In short, the design–build contract employed by ADB in Afghanistan is a measurement contract based on financial unit rates, with measurements to be carried out by the contractor as construction proceeds. Under this approach, contractors compete and bid on the basis of unit costs estimated by the employer. The quantities bid for are only preliminary quantities based on preliminary designs in feasibility studies, which have been weak in Afghanistan. The fluctuation of quantities during implementation is principally anticipated and does not require a contract variation.

The "traditional" concept assigns responsibility for detailed design to the employer and responsibility for construction to the contractor. The clear delineation of responsibilities provides checks and balances, whereby the designer and the contractor each act as a restraint on the powers of the other. Under both concepts, the employer and the contractor agree on a contract that consists of quantities and prices. The significant difference between the concepts is that, under the hybrid design–build contract, the contractor—by controlling the quantities—essentially determines the contract value and thus the cost of a project. Poor cost and quantity estimates on the part of the employer frequently have resulted in disputes and have added an element of opacity to contract execution. This is not unique to Afghanistan, though the situation in Afghanistan is aggravated by the limited engineering skills of the Ministry of Public Works, which affects the initial cost and quantity estimates but also weakens the ministry's ability to assess the plausibility of quantities submitted by the contractor.

[1] ADB-financed civil works contracts for roads are compliant with the FIDIC *Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer* (the MDB Harmonised Edition, or "Pink Book"). In contrast, the design–build contract falls under the FIDIC *Conditions of Contract for Plant and Design–Build for Electrical and Mechanical Plant and for Building and Engineering Works Designed by the Contractor: The Plant and Design–Build Contract* (the "Yellow Book"). For further details see International Federation of Consulting Engineers. 1999. FIDIC *Conditions of Contract for Plant and Design-Build Contract First Edition*, 1999. Geneva.

For these reasons, the design–build modality should be replaced by the traditional civil works procurement approach, under which engineering and design specifications are carried out by the employer based on which prospective contractors can formulate their bids. To achieve better project readiness for loan approval and implementation, ADB may want to consider starting project processing when the engineering is substantially completed. This arrangement also would remove frictions between safeguard and construction activities.

APPENDIX 8

Roads Investment Program, 2017–2036

Table A8: Roads Investment Program, 2017–2036

	Kilometers	$ million
NATIONAL ROADS		
Awlang area to Pul e Doshakh	29	32
East–West Corridor	705	776
North–South Corridor 1	728	801
North–South Corridor 2	755	831
Other national roads	1,099	1,209
Subtotal	**3,316**	**3,649**
REGIONAL ROADS		
Salang Tunnel	3	1,080
Salang Galleries	23	35
Ring Road	474	711
Border connectors	992	1,488
Subtotal	**1,492**	**3,314**
Tertiary and rural roads	2,500	600
Operation and maintenance for all roads	25,000	3,750
Contingencies (15%)		1,689
Subtotal	**27,500**	**6,039**
Total	**32,308**	**13,002**

Source: ADB staff and consultants' estimates.

APPENDIX 9

Afghanistan National Railway Plan Investment Program, 2017–2036

Table A9: Afghanistan National Railway Plan Investment Program, 2017–2036

Railway	Kilometers	Cost per Kilometer ($ million)	Total Cost ($ million)
Herat–Qala i Naw–Maymana–Sheberghan–Mazar-e-Sharif–Kunduz	1,105	1.9	2,100
Torkham–Jalalabad–Kabul–Parwan–Bamyan–Baghlan–Kunduz–Mazar-e-Sharif	772	1.9	1,467
Kunduz–Sherkhan border	88	1.9	167
Sheberghan–Andkhoy–Aqina	100	1.9	190
Kushk–Torghondi	47	1.9	89
Herat–Ghoryan–Chah Sorkh	149	1.9	283
Kunduz–Takhar–Badakhshan–Wakhan	700	1.9	1,330
Herat–Ghor–Bamyan Railway	550	1.9	1,045
Herat–Farah–Delaram–Kandahar–Kabul	1,141	1.9	2,168
Kandahar–Spin Boldak	96	1.9	182
Delaram–Zarang	222	1.9	422
Gereshk–Baram Chah	385	1.9	732
Contingencies (15%)			1,001
TOTAL	**5,355**		**11,176**

Source: AFRA 2016. *Afghanistan National Railway Plan*. Kabul.

APPENDIX 10

Urban Transport and Civil Aviation Investments

Table A10.1: Urban Transport Investments, 2017–2036

Investment	Kilometers	Cost per Kilometer ($ million)	Total Cost ($ million)
Kabul Ring Road	95	1.5	142.5
Urban bus rapid transit corridors	100	3.5	350.0
Public transport	150	0.5	75.0
Traffic engineering	100	0.2	75.0
Intelligent transport			50.0
Social mitigation plans			30.0
Campaigns			20.0
Contingencies (15%)			111.0
Total			**853.5**

Source: ADB staff and consultants' estimates.

Table A10.2: Airport Projects, 2017–2036

Airport Project	$ million
Equipment replacements	200.0
Kabul Airport	130.0
Major domestic	95.0
Regional domestic	55.0
Local airports	38.0
Contingencies	50.0
Total	**568.0**

Source: ADB staff and consultants' estimates.

APPENDIX 11

Rating of Road Projects

Table A11: Rating of Road Projects

Projects/ Criteria		Included in government's short-term plans	Included in CAREC TTFS 2020	Part of the NRCI[a]	Likely to be economically feasible	Needed to improve transport sector performance[b]	Support important social requirements[c]	Total
	Weight	**0.25**	**0.10**	**0.10**	**0.25**	**0.10**	**0.20**	**1.00**
Salang Tunnel	Score	9.00	9.00	6.00	9.00	9.00	6.00	
	Weighted Score	2.25	0.90	0.60	2.25	0.90	1.20	8.10
Herat–Islam Qala	Score	9.00	9.00	0.00	9.00	6.00	3.00	
	Weighted Score	2.25	0.90	0.00	2.25	0.60	0.60	6.60
Torkham–Jalalabad	Score	9.00	9.00	0.00	9.00	6.00	3.00	
	Weighted Score	2.25	0.90	0.00	2.25	0.60	0.60	6.60
Herat–Turghundee	Score	9.00	9.00	6.00	6.00	6.00	3.00	
	Weighted Score	2.25	0.90	0.60	1.50	0.60	0.60	6.45
Ring Road Missing Links	Score	9.00	6.00	3.00	9.00	3.00	3.00	
	Weighted Score	2.25	0.60	0.30	2.25	0.30	0.60	6.30
Sherkan Bandar–Kunduz	Score	9.00	9.00	3.00	6.00	6.00	3.00	
	Weighted Score	2.25	0.90	0.30	1.50	0.60	0.60	6.15
Andkhoy–Aqina	Score	9.00	9.00	3.00	6.00	6.00	3.00	
	Weighted Score	2.25	0.90	0.30	1.50	0.60	0.60	6.15
Spin Boldak–Kandahar	Score	9.00	9.00	0.00	6.00	6.00	3.00	
	Weighted Score	2.25	0.90	0.00	1.50	0.60	0.60	5.85
Hairaton–Mazar-e-Sharif	Score	9.00	9.00	0.00	6.00	6.00	3.00	
	Weighted Score	2.25	0.90	0.00	1.50	0.60	0.60	5.85

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Table A11 *continued*

Projects/ Criteria		Included in government's short-term plans	Included in CAREC TTFS 2020	Part of the NRCI[a]	Likely to be economically feasible	Needed to improve transport sector performance[b]	Support important social requirements[c]	Total
North–South Corridor 1	Score	6.00	3.00	6.00	6.00	6.00	6.00	
	Weighted Score	1.50	0.30	0.60	1.50	0.60	1.20	5.70
Awlang–Pul e Doshakh	Score	9.00	6.00	3.00	6.00	3.00	3.00	
	Weighted Score	2.25	0.60	0.30	1.50	0.30	0.60	5.55
Ring Road-Takhta Bazar	Score	6.00	3.00	3.00	6.00	6.00	6.00	
	Weighted Score	1.50	0.30	0.30	1.50	0.60	1.20	5.40
East–West Corridor	Score	6.00	3.00	6.00	3.00	6.00	6.00	
	Weighted Score	1.50	0.30	0.60	0.75	0.60	1.20	4.95
North–South Corridor 2	Score	6.00	3.00	6.00	3.00	3.00	6.00	
	Weighted Score	1.50	0.30	0.60	0.75	0.30	1.20	4.65
Other National Roads	Score	3.00	3.00	3.00	3.00	3.00	6.00	
	Weighted Score	0.75	0.30	0.30	0.75	0.30	1.20	3.60
Zaranj-Delaram	Score	6.00	0.00	9.00	3.00	3.00	0.00	
	Weighted Score	1.50	0.00	0.90	0.75	0.30	0.00	3.45
Faizabad-Eshkashem	Score	6.00	3.00	0.00	3.00	3.00	3.00	
	Weighted Score	1.50	0.30	0.00	0.75	0.30	0.60	3.45

CAREC = Central Asia and Regional Economic Cooperation, NRCI = National Resources Corridor Initiative, TTFS = Transport and Trade Facilitation Strategy.

[a] Connect locations with know mineral deposits.

[b] e.g., modernization, low cost.

[c] e.g., safety rural accessibility.

The projects were ranked by applying scores to the evaluation criteria. The scores range from 0 to 9 as follows: 0 = no relevance to the criterion; 3 = insignificant relevance; 6 = significant relevance; and 9 = highly significant relevance.

Source: ADB staff and consultants.

APPENDIX 12

Rating of Railway Projects

Table A12: Rating of Railway Projects

Projects/ Criteria		Included in government's short-term plans	Included in CAREC TTFS 2020	Part of the NRCI[a]	Likely to be economically feasible	Needed to improve transport sector performance[b]	Support important social requirements[c]	Total
	Weight	**0.25**	**0.10**	**0.10**	**0.25**	**0.10**	**0.20**	**1.00**
Kushk–Torghondi	Score	9.00	9.00	6.00	6.00	6.00	3.00	
	Weighted Score	2.25	0.90	0.60	1.50	0.60	0.60	6.45
Kunduz – Sherkhan Border	Score	9.00	9.00	3.00	6.00	3.00	3.00	
	Weighted Score	2.25	0.90	0.30	1.50	0.30	0.60	5.85
Herat-Qala-i-Naw-Maymana-Sheberghan-Mazar-e- Sharif-Kunduz	Score	9.00	9.00	6.00	3.00	6.00	3.00	
	Weighted Score	2.25	0.90	0.60	0.75	0.60	0.60	5.70
Herat – Ghoryan – Chah Sorkh	Score	9.00	9.00	6.00	3.00	6.00	3.00	
	Weighted Score	2.25	0.90	0.60	0.75	0.60	0.60	5.70
Sheberghan – Andkhoy–Aqina	Score	9.00	9.00	3.00	3.00	6.00	3.00	
	Weighted Score	2.25	0.90	0.30	0.75	0.60	0.60	5.40
Delaram–Zaranj	Score	9.00	3.00	9.00	3.00	6.00	3.00	
	Weighted Score	2.25	0.30	0.90	0.75	0.60	0.60	5.40
Kandahar–Spin Boldak	Score	9.00	6.00	3.00	3.00	3.00	3.00	
	Weighted Score	2.25	0.60	0.30	0.75	0.30	0.60	4.80

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Table A12 *continued*

Projects/ Criteria		Included in government's short-term plans	Included in CAREC TTFS 2020	Part of the NRCI[a]	Likely to be economically feasible	Needed to improve transport sector performance[b]	Support important social requirements[c]	Total
Torkham-Jalalabad-Kabul-Parwan-Bamyan-Baghlan-Kunduz-Mazar e Sharif	Score	6.00	3.00	6.00	3.00	6.00	3.00	
	Weighted Score	1.50	0.30	0.60	0.75	0.60	0.60	4.35
Herat–Farah–Delaram–Kandahar- Kabul	Score	6.00	3.00	6.00	3.00	6.00	3.00	
	Weighted Score	1.50	0.30	0.60	0.75	0.60	0.60	4.35
Kunduz – Takhar – Badakhshan–Wakhan	Score	3.00	3.00	3.00	3.00	3.00	3.00	
	Weighted Score	0.75	0.30	0.30	0.75	0.30	0.60	3.00
Herat – Ghor – Bamyan Railway	Score	3.00	0.00	6.00	3.00	3.00	3.00	
	Weighted Score	0.75	0.00	0.60	0.75	0.30	0.60	3.00
Gereshk–Baram Chah	Score	3.00	0.00	3.00	0.00	3.00	6.00	
	Weighted Score	0.75	0.00	0.30	0.00	0.30	1.20	2.55

CAREC = Central Asia and Regional Economic Cooperation, NRCI = National Resources Corridor Initiative, TTFS = Transport and Trade Facilitation Strategy

[a] Connect locations with known mineral deposits.

[b] e.g., modernization, low cost.

[c] e.g., safety, rural accessibility.

The projects were ranked by applying scores to the evaluation criteria. The scores range from 0 to 9 as follows: 0 = no relevance to the criterion; 3 = insignificant relevance; 6 = significant relevance; and 9 = highly significant relevance.

Source: ADB staff and consultants.

Afghanistan Transport Sector Master Plan Update (2017–2036)

The Transport Sector Master Plan Update is a guide for the government and donors in allocating and programming future funds to raise the efficiency of Afghanistan's transport system. It takes stock of achievements of the previous Road Master Plan and important sector developments that have emerged during the intervening period. The Master Plan Update covers roads, railways, civil aviation, urban transport, and trade logistics, and administrative responsibilities concerned with transport infrastructure and operations. It provides a program of prioritized investments, and recommends urgent capacity-building measures. As transportation in Afghanistan is central to social stability and peace-building efforts, the development results generated by the master plan will extend beyond the boundaries of the transport sector.

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