



ADB

# Mongolia

## Road Sector

### Development to 2016

Asian Development Bank

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ADB

# **Mongolia**

## **Road Sector Development to 2016**

Asian Development Bank

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# Foreword

Mongolia is set to grow at an accelerated pace in the next decade, as its vast mining resources enter into large-scale production. This has greatly improved prospects for prosperity and poverty reduction. However, to realize the full potential, Mongolia will need to achieve a transformation of its society, economy, and governance.

Mongolia's road sector can be an engine for such change, depending on how fast it can adjust to a new context that requires it to perform more, better, and faster. The National Development Strategy (NDS) has assigned ambitious goals for the road sector; in particular, the sector is tasked with developing a modern backbone trunk highway network of about 10,000 kilometers (km) within 10 years.

So far, Mongolia's road sector has served the country well, but it has remained small in scale, and progress in raising performance has been uneven. A large expansion in the network of quality roads is necessary in order to transport Mongolia's mining resources to foreign markets and to connect the country in a way that fosters broad-based economic growth.

Can the current road sector deliver on the country's vision? What is needed to scale up the road industry and the agencies responsible for the sector? How can external stakeholders help create a high-performance road sector? What options are available for building road sector capacity? What is the way forward?

The present study is an attempt to answer these questions. It was undertaken by the Asian Development Bank (ADB) in cooperation with the Ministry of Roads, Transportation, Construction and Urban Development (MRTCUD). The study recognizes that change will not happen overnight. It will require a series of incremental steps to build the domestic road contracting and consulting industry and to modernize government administration. The reestablishment of the Department of Roads (DOR) in 2009 was one such step, but there are many others ahead, and they need to be started soon.

This study looks into the sector's financial dimension, the techniques and processes followed for road maintenance and construction, and the role of human resources management and education. It tries to understand why sector performance improvement has been slow, even though many sector issues and solutions have been considered in the past. Reflecting on lessons from international experience, it outlines a range of policy options for decision makers and proposes an agenda for the next 5 years.

This cooperation between ADB and the MRTCUD has been fruitful. Since the first presentation of a draft of the report, the MRTCUD has mobilized road sector stakeholders—representatives from





road users, the construction and consulting industries, academia, nongovernment organizations, and government agencies—to debate the proposal in the report and propose a policy agenda. The product of those consultations, the Mid-Term Road Sector Capacity Building Program, was approved by the government in August 2011. The government has requested ADB to further assist the MRTCUD in implementing the necessary changes by providing policy advice, technical assistance, and investment support.

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This report was undertaken at the initiative of Tyrrell Duncan, director of the Transport Division of the East Asia Department, concurrently practice leader (Transport) of the Asian Development Bank (ADB). The author of the report was Adrien Véron, transport economist, ADB. Luvsan Badam, consultant and former vice-minister of roads and director general of Mongolia's Department of Roads (DOR), prepared key elements of the assessment and gathered data.

Assistance from the Government of Mongolia, especially the Ministry of Roads, Transportation, Construction, and Urban Development (MRTCUD) and the DOR, is gratefully acknowledged. The DOR provided access to information related to its investment programs and maintenance works and the report was enriched by constructive comments from its management and staff.

The report also benefitted from advice and comments from its external peer reviewers, Jean-Claude Sallier and Philip Salt, as well as from ADB colleagues including Erdene Oyunchimeg, Sarath Lakshman Athurokala, Steven Lewis-Workman, and Manmohan Parkash.

During a technical workshop held in Ulaanbaatar in July 2010, a first draft of the report was presented to the main stakeholders in Mongolia, including the central government, Ulaanbaatar city government, road users, civil society, and representatives of the donor community. This led the MRTCUD to invite sector stakeholders to further discuss the report and, building upon the report, help prepare a capacity building road map. This work was assisted by the facilitation services of consultants Robert Fergerstrom and Zulphkar Sarkhad. Based on the results of this process, the report was revised in February 2011. The output of the consultations, the Mid-Term Road Sector Capacity Building Program, was added as an appendix to the report. The many original ideas, comments, and suggestions provided by the stakeholders are gratefully acknowledged.



# Currency Equivalents

(as of 12 September 2011)

Currency Unit	–	Togrog (MNT)
MNT1.00	–	\$0.00080
\$1.00	–	MNT1,242.50

## Abbreviations

ADB	–	Asian Development Bank
AGETIP	–	Agence d'Exécution des Travaux d'Intérêt Public (Senegal Public Works Agency)
DMC	–	developing member country
DOR	–	Department of Roads
DRT	–	Department of Roads and Transport
ELC	–	equipment leasing company
GDP	–	gross domestic product
ISO	–	International Organization for Standardization
JFPR	–	Japan Fund for Poverty Reduction
km	–	kilometer
m	–	meter
MCC	–	Millennium Challenge Corporation
MOF	–	Ministry of Finance
MRTCUD	–	Ministry of Roads, Transportation, Construction and Urban Development
NAO	–	National Audit Office
NDS	–	National Development Strategy
NGPA	–	nongovernment professional association
PRC	–	People's Republic of China
RMC	–	road maintenance company
RRSC	–	Road Research and Supervision Center
SPC	–	State Property Committee
SPIA	–	State Professional Inspection Agency
TA	–	technical assistance



# Executive Summary

## Overview

Mongolia's gross domestic product (GDP) was \$6.7 billion in 2010. After the award of its first multibillion-dollar mining concession for the Oyu Tolgoi copper and gold deposit, in 2009, Mongolia's GDP may triple in real terms by 2020. The situation of Mongolia in 2011 parallels that of the United Arab Emirates in the 1970s—it is a low-density, moderately poor country endowed with world-class natural resources about to be exploited. Within 20 years, the United Arab Emirates became one of the wealthiest economies in the world. If Mongolia is to follow a similar path, it will need massive infrastructure investments, particularly in the transport sector.

Against this backdrop, **this report discusses how the context of road sector policy and road infrastructure investments will change, and the ways the sector can best prepare to fulfill its new role.** Given Mongolia's road infrastructure needs, the road sector will be expected to implement massive highway investments in a short time and then to consistently maintain the new highways at a high standard. However, it is unlikely that Mongolia's current small-scale road sector will have the capacity to scale up and deliver upon such expectations without undergoing a far-reaching modernization of its financing mechanisms, business processes, organization, and education systems. There are indeed risks that, if the current status quo is maintained, national road construction programs will be much delayed, budget resources will be wasted, and newly created assets will quickly deteriorate. **This report therefore argues that Mongolia's government needs to implement a comprehensive capacity development program for the road sector over a period of about 5 years.**

The Asian Development Bank (ADB) has been a key partner of Mongolia's road sector since its 1990 democratic transition. Due to the shifting country and sector context, ADB has wished to take stock of the sector challenges and identify the conditions that will allow for a scaling up of its engagement in the road sector. To this end, ADB undertook the present study in 2009 and 2010. Since its first draft, the report has served as a platform for discussions between the government and other sector stakeholders, and the preparation by the Ministry of Roads, Transportation, Construction and Urban Development (MRTCUD) of a **Mid-Term Road Sector Capacity Building Program** (see Appendix), which the government approved in August 2011. It is hoped that the report can serve as a reference for stakeholders as they work to build a stronger road sector for Mongolia.

## Main Findings

**Mongolia's road network is underdeveloped but still amounts to a sizable asset for the country.** As of 2010, Mongolia had only 6,738 km of engineered roads, of which 2,830 km are paved and 2,116 km are gravel. There are only two paved road links to the Russian Federation, none to the





People's Republic of China (PRC); as a result, most international trade is carried by railways. However, because Mongolia's population is highly concentrated in the capital city, this paved network still reaches about 60% of the people and 70% of the GDP. Thus, although the network is small relative to the country's area, it is large relative to the country's economic size. The network's asset value at replacement cost is estimated at \$800 million, though it is not formally recognized as a state asset.

Mongolia's plan to quadruple the paved road network would imply a major expansion in the quantity of civil works delivered annually by the sector. Mongolia's National Development Strategy considers road infrastructure to be a key instrument in fostering regional development. It targets the paving of the entire national paved road network (11,250 km) by 2021. Together with Ulaanbaatar's urban development plans, this would require building about 1,000 km of new roads each year, against an average of 100 km per year during the past decade. Periodic maintenance needs for paved roads could rise to 2,000 km per year; none has been performed during the past years. Larger road programs also will require more advanced technologies, human skills, and management processes.

To successfully scale up and deliver upon the National Development Strategy, the sector has to overcome several capacity bottlenecks.

## Road Sector Financing

Current sector financing channels can adequately finance network development but are not appropriate for road maintenance. Network development is financed by the state budget, the development fund, donor loans, and to a small extent, private sector loans. The Road Fund has been the primary financier of road maintenance. Through these channels, Mongolia has spent 1.5%–2% of its GDP for the road sector, a level in line with international benchmarks. However, road maintenance expenditures, only \$7.4 million in 2009, or less than 0.2% of GDP, appear much below other countries' levels—typically 0.4%–1% of GDP. This reflects a large funding gap. This report estimates that maintaining the whole network to good standards would require \$38.8 million each year (\$24.6 million for the national network and \$14.2 million for the local network). To clear the rehabilitation backlog, an additional \$20 million over 6 years would be necessary. Only 21.5% of the national and local road maintenance needs are currently covered—an exceptional situation by international standards. One of the reasons for this situation is the slow progression of the Road Fund's revenues. The Road Fund's fuel and vehicle licensing tax rates have not been revised since 1995 and have even shrunk in real terms because of inflation.

As a result of insufficient maintenance, Mongolia has lost sizable road assets. The expansion of the network will double total maintenance needs by the end of the decade. Based on the present mechanisms for financing maintenance, the share of the maintenance needs covered would decrease from 21.5% to 17%–19% per year. This would result in a major new loss of assets as most of the newly created highways would prematurely deteriorate to a very poor condition, and large shares of the network would become impassable.

## Investment Management

The road sector has made good progress on construction management during the past 15 years. In the early 1990s, the administration was directly managing, implementing, and supervising civil road works, resulting in a confusion of responsibilities. As of 2010, road works are undertaken by



private companies under contracts tendered competitively. The quality of civil works is supervised by the Department of Roads (DOR), and contracts are audited by independent entities.

**However, weaknesses in planning, management, and supervision still hamper the efficiency of investment programs.** For instance, investment planning and project preparation procedures are insufficiently standardized. The administration has developed numerous investment plans, but these lack coherence and hierarchy as well as a reliable technical and economic basis. As a result, these plans do not have a significant effect on decision making. Also, project management responsibility has been distributed among many entities, most of which are understaffed. For instance, works are procured by the MRTCUD but implemented by the DOR. This leads to procurement delays and difficulty in making timely decisions during implementation and has resulted in a weak implementation rate and significant cost increases on contracts in recent years. Finally, civil works supervision, currently performed by individual engineers hired seasonally by the DOR, has a low degree of independence and insufficient budgets. Although the present situation is much better than during the early 2000s, when there was no supervision, the framework remains insufficient to ensure quality.

## Maintenance Management

**Current road maintenance procedure is not adapted to the management of a large, paved road network.** Road maintenance on the national roads is performed by 22 small mechanized maintenance units, 18 of which are state owned. Because the prices used do not allow for all the cost involved, and particularly not the cost of capital, the companies suffer losses and require frequent capital replenishment in the form of new equipment. Works are limited to routine maintenance (e.g., clearing drainage) and some minor repairs (e.g., filling potholes) but do not include preventive maintenance. Budgeting is based on historic budgets. Oversight by the DOR is limited. The DOR has only five officers in charge of maintenance; they often oversee roads located hundreds of kilometers away. As a result, works tend not to get done on time or to the required level of quality.

Such practices will need to be phased out as Mongolia develops a modern paved road network. Typical features that would need to be introduced include periodic maintenance (e.g., resurfacing the roads every 7 to 10 years); planning of works based on observed road condition and traffic; maintenance by contract; systematization of maintenance supervision; and performance monitoring.

## Sector Institutions

**Road sector institutions are small and bureaucratic and lack the capacity to undertake multiple projects in a timely and effective manner.** With three MRTCUD staff responsible for the road sector, the ministry is severely understaffed and does not have the capacity to meet its responsibility to articulate investment plans, coordinate with donors, and oversee civil works procurement. The DOR's human resources—one management staff member for 75 km of roads, against an average of one for 10–20 km internationally—make the administration leaner than the most efficient international road administrations. Yet, the management models followed by the MRTCUD and DOR are not conducive to such efficiency. They are formal and centralized. They involve cumbersome processes involving many external actors. As a result, process execution is slow, operational decisions are reactive, and staff accountability for results is limited.

**Frequent changes in institutions and leadership and the politicization of decision making have reduced the capacity of the road administration to perform its responsibilities effectively.**



Mongolia created the DOR in 1995 as an agency of the Ministry of Transport, in charge of road policy implementation. In 2004, the DOR was replaced by a research and supervision center and the ministry took over most of its powers. In 2004, the government established by decree a Road Board, but discontinued it in 2007. In 2009, the DOR was recreated, but several critical responsibilities (such as procurement) have remained in the MRTCUD. Turnover in leadership and management positions has been high, including four ministers in 5 years. Gradually, many positions have been occupied by political appointees rather than sector specialists. Meanwhile, parliament has taken a larger role in budget allocation and planning. Investment plans prepared by the administration tend to be heavily modified during their approval by the Great Hural, and despite repeated efforts, the DOR has never been able to secure more than 50% of its road maintenance budget requests. The administration's limited technical legitimacy hampers its capacity to carry out long-term investment plans and address long-term issues such as road maintenance.

## Road Industry and Sector Human Resources

The road industry has grown fast, but in an uneven way; its technical capacity will adjust only gradually to the increase in demand. Since its privatization in the late 1990s, the road construction and maintenance industry has grown from 41 companies to 140 in 2008; the equipment pool of the construction companies rose similarly, by a factor of four. However, many of the new companies exist only on paper. Only 42 companies have the staff and equipment to undertake road construction works; just two can build more than 50 km of roads per year; and none has the capacity to participate in international competitive bidding tenders. In 2009, the DOR estimated a combined annual production capacity of 225 km of new construction works. This contrasts with the 1,600 km of contracts that were reported to be under construction that same year, and suggests that the sector faces major tensions. The industry faces constraints in access to capital, foreign technology, and human resources, which prevents it from growing quickly.

The most abiding capacity bottleneck may lie in the sector's human resources. In 2010, the industry employed about 526 engineers and 6,755 skilled workers, and it would require twice as many engineers and 40% more workers to deliver upon the current work demand. However, the current educational facilities can train only 150 skilled workers and 80 engineers per year, and only 20 to 30 actually graduate each year. Given the time necessary to train engineers, it will take a long time to match an increase in demand with an increased supply. Moreover, the sector faces stiff competition for young engineers from other, dynamic industry sectors such as mining and information technology. Companies report difficulties hiring and retaining qualified staff and have tended to employ less-qualified people.

## Main Policy Suggestions

The sector's capacity constraints are obstacles to the realization of the National Development Strategy goals. **This report's main policy suggestion is that the government undertake a capacity development program for the road sector over the coming 5 years.** This program must build the foundation for transforming the current small-scale, inefficient road institutions and industry into a high-performance sector able to deliver large investment programs. Such transformation would require a longer time frame, perhaps 10 years. Indeed, although some constraints (e.g., financing mechanisms, investment, and maintenance management) could be alleviated quickly, provided there is enough political will and adequate technical assistance, other constraints can be relieved only



in the long term. These relate to the sector's human resources, its management culture, and its relationship with the civil society and political order. Delivering such change will require a broad mobilization of the sector and the backing of the government as a whole.

This report formulates policy options that could be implemented over the coming years and identifies international experience with similar issues. The report also outlines potential building blocks of capacity development efforts, closely following the government's Mid-Term Road Sector Capacity Building Program.

## Road Network Development Options

Given the time necessary to scale up the road sector's capacity, this report suggests that the government has two broad alternatives for developing the road sector, and that any practical solution will lie between these.

### *Alternative 1*

**A preferred option is to adopt a gradual approach to road network expansion and sector capacity development.** In the first years of the decade beginning in 2010, the government would invest in building up sector capacity by, for example, developing a strong road construction and consulting industry, introducing modern techniques and processes to construct and maintain the paved network, and modernizing sector institutions and educational systems. The construction of the national road network may be initially slower than outlined in the National Development Strategy, but by the time Mongolia's mining revenues are available, the road sector would have reached the necessary capacity to handle large investment budgets. Network development would pick up in the second half of the decade. There are good arguments for such a stepped approach. For instance, the very low volume of traffic observed on most existing dirt tracks leaves time before it will become economically efficient to replace them with paved roads. Also, this approach focuses on strengthening the current institutional framework and national industry. It presents limited risks and would provide long-lasting benefits to the Mongolian economy.

According to this approach, in the early years of the decade beginning in 2010, a rule of thumb to concentrate new road construction where the demand is the highest: Ulaanbaatar's city trunk and feeder roads (e.g., in the city's *ger* areas), the international transit corridors, and roads serving mining areas, particularly in South Gobi. The government could simultaneously invest in rehabilitation and periodic maintenance of national roads. Finally, to improve road connection in the rural areas, the government could launch a program of spot improvements (e.g., bridges or culverts) on the main national and local unpaved roads. Those low-cost investments would make the roads all-season, improving the reliability of transport for rural communities while also preparing for their potential future paving.

### *Alternative 2*

If the government wished to bypass sector capacity constraints, and quickly and efficiently implement its road network development plans, **an alternative would be to rely on foreign contractors' capacity and to develop a new management organization for network development.** Instead of going through the MRTCUD and DOR and using traditional government procurement and financing



mechanisms, the government could create a network development company or agency managed and partly staffed by international consultants. The company would prepare network development plans, oversee project feasibility studies and detailed design, and act as the owner of the civil works it implements. Once opened, the roads could be transferred to the DOR. Consulting services and civil works would be contracted through international competitive bidding procedures. The company or agency would adopt businesslike management procedures and outsource a large percentage of such tasks as design and supervision. Its hierarchical lines, procurement, and disbursement procedures might differ from normal government processes. The National Highway Authority of India and Senegal's public works management agency, AGETIP, are good examples of such an approach. **This approach involves higher risks, not least in the governance of the new company or agency.**

## Network Development

**Strengthening contract management capacity.** Mongolia needs to develop its capacity to plan and manage civil works. International experience suggests that investment implementation tasks, including procurement, are best concentrated in a single entity, usually the road agency. A short-term priority would be to clearly define the distribution of responsibilities between the MRTCUD and DOR, and preferably to transfer all operational responsibilities to the DOR. At a minimum, the government should allocate more staff for contract procurement and devolve sufficient executive powers to the officers who oversee such contracts. Further, the MRTCUD and DOR, together with the Ministry of Finance (MOF) could set up a project management system to enable efficient planning and monitoring of investment procurement, execution, and disbursements. The DOR also could progressively contract out civil works supervision and request to the MOF or MRTCUD to increase supervision budgets.

**Developing modern investment planning systems.** As the number of investments grows, plan implementation will increasingly depend on the quality of the management processes used. The government could consider (i) formalizing a strict hierarchy of investment plans (e.g., a long-term master plan and a medium-term rolling plan) integrated with the government's public investment plan, (ii) setting up in law or regulation a standard investment cycle, (iii) introducing a central technical approval process for major civil works (e.g., led by the MOF), and (iv) evaluating the economic benefits of new projects.

**Developing road construction techniques adapted to Mongolia.** Mongolia could seek international experience with road techniques in cold climates to lower its construction and maintenance costs. A technology development program objective, to be implemented prior to the largest investments, would aim at identifying road pavement design and surfacing options for sealed and paved roads that would present lower life-cycle costs.

## Road Maintenance

**Creating a framework for sustainable financing of maintenance.** This report makes the case that the government ought to progressively increase road maintenance expenditures from 0.2% of GDP in 2009 to 0.5% by 2015. This would increase the proportion of maintenance needs covered, from 20% to 50%, a level sufficient to maintain the paved road network (but not the local roads). To achieve this in the short term, the government could reallocate budgets from construction to maintenance. In the longer term, the government may consider reforming the national Road Fund and the road user charging system, such as by dedicating the national Road Fund to road



maintenance, earmarking a larger portion of fuel taxes to the state road fund, and transforming the Road Fund fuel tax into an ad valorem tax. Road tolls, which have very high administrative costs, could be discontinued, except at border points, for transit vehicles.

**Developing a periodic maintenance program.** Paved roads should receive some periodic maintenance (e.g., new surfacing) every 7 to 10 years to prevent deterioration and to avoid costly road rehabilitation. The government could make road periodic maintenance a new budgetary program with dedicated financing and performance targets. The program's costs (about MNT15 million–MNT20 million annually) would be part of the maintenance budget, but works could be procured separately.

**Improving the maintenance contracting system.** Even with larger budgets, maintenance quality would not necessarily improve if there is no change in the way maintenance is undertaken. This report suggests that the government could prudently resume its policy of commercializing road maintenance works. A first step would be to develop a more contractual relationship between the DOR and the maintenance companies, such as by reforming road maintenance prices and developing reporting procedures, performance incentives, and supervision mechanisms. Such contracts would be brought in line with normal private sector contracting mechanisms. A second step would be to pilot new forms of contracting out maintenance to the private sector, such as management contracts for the Asian Highway 3 corridor. Subsequently, the government could consider privatizing road maintenance companies (RMCs).

**Developing modern road asset management systems.** The paved road network is one of Mongolia's largest assets and should be managed as such. With ADB support, the government has been developing a pavement management system, based on a geographic information system–enabled road database. This should improve road maintenance planning and monitoring. To consolidate such progress, the government should make available sufficient financing to meet the system's recurrent costs—database maintenance, annual traffic counts, and road condition surveys. Gradually, maintenance spending should mainly be based on the operational priorities identified by the system. In addition, the DOR should seek to institutionalize the use of these systems, such as by reporting regularly on the physical condition and accounting value of the road assets it oversees.

## Sector Institutions

**Building modern institutions.** The reform of the DOR in 2009 provides a good starting point for building the institutions needed to develop Mongolia's future road network. As part of the sector's overall medium-term capacity development plan, **the government could prepare a 5-year development program for the DOR and MRTCUD (2011–2016)**, to guide organizational changes. During that period, the DOR would progressively scale up its human resources and strengthen its contract management, procurement, and planning capacity. The DOR could analyze its past experience with regional offices and evaluate the opportunity to reinstate them. At the same time, the government could seek to apply to the DOR and MRTCUD the performance-based management principles embedded in the 2003 Public Sector Financial Management Law. The DOR could develop its performance monitoring and create an internal audit.

**Increasing transparency and involvement of the civil society.** The prospect of larger investment budgets also will increase the potential threat of cronyism, mismanagement, and corruption. To mitigate such negative developments, the government could draw upon the civil society. There is a case to be made for developing the role of the sector professional associations and delegating



to them some regulatory functions. Furthermore, this report argues that **there is a good case for reinstating a Road Board**. A new board, established by law rather than by decree, could provide the necessary long-term, nonpartisan, technical perspective required to oversee road maintenance and a reformed Road Fund.

## Road Industry

Implementing the government's network development plans will depend upon road contractors' ability to implement the works within a certain time frame and quality. **This report argues that the government could formulate and implement a road industry capacity development program**, to be implemented over the next 5 years. Its objectives would be to increase the total amount of works the domestic contractors can deliver and to raise their technical capacity. By the end of the decade, Mongolia could have about four domestic companies able to participate in international competitive bidding, about six to ten midsize contractors able to deliver any kind of construction and periodic maintenance works, and a wide range of small-scale local contractors able to perform maintenance and small upgrade works.

**Revising procurement and contracting regulations.** The government's procurement and contracting regulations are an important determinant of the forms of competition, a factor which orients industry development. The government could tighten contractor qualification requirements and review contract performance mechanisms, to prevent contractors with insufficient capacity from proposing unrealistic prices and winning contracts. One solution would be to review procurement requirements, in partnership with the industry, while creating a company registration and performance evaluation system.

**Developing sector human resources.** Mongolia would need to invest more in the sector's human resources. There is a critical need to scale up and modernize the country's engineering and vocational training programs. Ideally, sector stakeholders (industry and the DOR) would be involved in education program management, but they also could be involved in education financing. At the same time, the sector associations could work to improve the sector's appeal to young graduates.

**Easing contractors' access to credit and technology.** Even with a reformed regulatory regime and access to more qualified human resources, the credit constraints on private companies in Mongolia would still impede the development of contractors. One possibility would be to create a construction fund and shorten payment delays to reduce contractors' financial intermediary costs. Another option would be to implement a business incubator program for road construction companies. The program would provide cheaper financing but would also support the improvement of contractors' quality mechanisms and technology.

These elements complement this report's suggestions to contract out supervision and road maintenance and to strengthen sector professional associations.

## Suggested Next Steps

In August 2011, after a year of consultations with sector stakeholders, the government approved the Mid-Term Road Sector Capacity Building Program. The program defines 5-year objectives for the road sector. It articulates an ambitious policy reform and capacity development agenda, which



includes many of the propositions made in this report. The program mandates the DOR, under the authority of the MRTAUD, to prepare detailed reform proposals, implement them, and periodically report upon their progress and results, based on clear milestones and targets. Implementation plans will involve a set of legal and regulatory actions that can result in quick wins in the short term, as well as a series of more in-depth capacity development agendas that would be tackled in the medium term with donor support. After 2 to 3 years, the government would need to review what worked and what did not and define new priorities.

To be successful, any plan to build a stronger road sector will need three elements. The first element is a strong and long-lasting political commitment. Although the process can be supported by donor financing, it must keep on being championed by the sector leadership and management. The planned **setup of a high-level steering committee to guide changes in the road sector** would be an important step. Further, the government that will emerge from the 2012 elections could, after reviewing carefully the road map, consider signaling its adherence to its general lines and renewing DOR's mandate to achieve the road map's objectives. The second requirement is sustained involvement of nongovernment stakeholders. They could be associated with monitoring the implementation of the reforms as well as with the preparation of some of those reforms. The third requirement is to maintain a balance between policy reforms and capacity building efforts.

## Ways ADB Can Help

ADB has been helping the government deepen the analysis of sector development options and prepare the Mid-Term Road Sector Capacity Building Program. In the future, ADB could, if requested, provide support to the government in implementing this road map through investment projects or technical assistance, monitor and report to the government upon its implementation, and coordinate among donors. In August 2011, ADB approved a \$2.0 million Road Sector Capacity Development Grant, with support from the Japan Fund for Poverty Reduction (JFPR), which is financed by the Government of Japan.



## Key Policy Options

Theme	Actions Suggested	Suggested Approach	Possible Time Frame	Observations
<b>1. Increasing the Road Sector's Contribution to Development</b>				
	1.1 Undertake a medium-term road sector capacity development plan	Program dimensions to include maintenance financing, maintenance management, investment planning and execution, modernization of institutions and road industry, and human resources development	Preparation: 2010–2011 Implementation: 2011–2016	Some “quick win” measures could be readily implemented.
	1.2 Phase network expansion of sector capacity	In a first phase, prioritize road infrastructure that has a direct effect on growth (e.g., regional corridors or mining); road rehabilitation and periodic maintenance; road construction and rehabilitation in Ulaanbaatar; and spot improvements of important national and local roads.	First phase: 2011–2016 Second phase: 2016–2020	To bypass road sector capacity constraints, the government could instead systematize the use of international contractors and set up a special purpose agency or company in charge of road network development.
<b>2. Financing the Road Sector</b>				
	2.1 Reallocate sector resources for maintenance	Increase road maintenance resources from 0.2% of GDP to 0.5% of GDP over a 5-year period. Finance it through a reallocation of 15%–20% of sector budgets from construction to maintenance. Treat road rehabilitation works as new investments.	Gradual, 2011–2016	To avoid reducing road construction expenditures while still increasing road maintenance resources, Mongolia would have to increase sector budgets by 0.3% of GDP.
	2.2 Maintain but restructure the Road Fund	Review the fuel tax levels and adjustment mechanisms to link them with maintenance needs. The national Road Fund would only finance road maintenance, would have resources separate from the national budget, and would be managed by a renewed Road Board. Management of the local road funds could be centralized.	By 2012	The Road Board initially can be given control rather than full management power. Alternatively, a Road Board could oversee the management of the agencies themselves. In case the Road Fund was abandoned, or was not managed by a Road Board, there would be a need to strengthen the medium-term budget framework.
	2.3 Consider updating the road user charging system	An update would include phasing out the road tolls on itineraries where collection costs are above 15%, increasing the levy on diesel used for transport, adjusting the licensing fees in view of	By 2013	An important effort of communication and user education would be required prior to a revision of road user charges.

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**Key Policy Options** *continued*

Theme	Actions Suggested	Suggested Approach	Possible Time Frame	Observations
		vehicles' usage and damage to the road, and increasing fines for overloading.		
<b>3. Modernizing the Management of the Road Assets</b>				
	3.1 Develop a periodic maintenance program	A program would need to cover about 15%–20% of the paved and gravel national and Ulaanbaatar city network and could amount to MNT15 million to MNT20 million each year.	Starting 2011, full scale by 2013	ADB's Road Database Development Using Geographic Information System technical assistance (TA) is developing the preliminary technical basis for such a program, but there will be a need for further capacity development. Civil works initially could be financed under a donor loan.
	3.2 Scale up maintenance planning, control, and supervision	Further strengthen the DOR's maintenance planning capacity. Maintain the road database and conduct annual road condition surveys. Develop maintenance supervision procedures for the DOR and increase reporting requirements for the RMCs.	Ongoing from 2011	In the short run, given human resources constraints, an option is to integrate the Road Inspectorate further into road maintenance management.
	3.3 Strengthen contractual relationships between the DOR and the road maintenance companies	Review the maintenance pricing system to bring it in line with private sector practices. Introduce performance objectives and incentives in maintenance contracts.	By 2012	This reform is a precondition for the introduction of the private sector into road maintenance.
	3.4 Progressively introduce a mixed public and private environment for road maintenance	Pilot new forms of contracts involving the private sector, such as contracts on newly constructed roads, rehabilitation and maintenance contracts on Asian Highway 3, and small-scale maintenance operations. Develop internal bidding procedures among RMCs.	2011–2014	There also could be an opportunity to introduce new contracting mechanisms on those portions of the network managed by one of the four privatized RMCs.
	3.5 Develop an operational strategy to handle overloading	This could include overloading control programs jointly operated by the DOR, RMCs, Road Inspectorate, traffic police, or customs; controlling overloading at border points; and developing a special	By 2011	A special task force could be constituted to propose an operational strategy.

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Key Policy Options *continued*

Theme	Actions Suggested	Suggested Approach	Possible Time Frame	Observations
		approach for mining-related overloading issues, with cofinancing by mining companies.		
<b>4. Increasing the Value for Money of New Investments</b>				
	4.1 Clearly separate the operational responsibilities of the MRTCUD and DOR	Transfer contract procurement and management responsibilities from the MRTCUD to the DOR.	2011	In the short run, if no solution can be found to this issue, the MRTCUD would need to allocate more staff to road contract procurement to limit delays.
	4.2 Develop a standard investment cycle	A cycle would include a unique long-term plan, a medium-term rolling plan, a central project approval procedure at the feasibility stage, and a portfolio monitoring process.	By 2012	There is a need to identify ways to improve the commitment of sector leadership to implementing such a technical approach.
	4.3 Expand the role of the domestic consulting industry	Contract out civil works supervision on large civil works. Increase supervision budgets. Increase responsibility of design institutes.	2012–2014	
	4.4 Undertake a systematic pilot testing program	The objectives of the program would be to identify new cost-effective road construction technologies adapted to Mongolia's conditions.	2011–2015	Could be financed under a donor loan.
<b>5. Building Modern Institutions</b>				
	5.1 Prepare an institutional development plan for the national DOR and Ulaanbaatar DOR	The plan would aim at modernizing the national DOR and Ulaanbaatar DOR over the 2011–2016 period. It would include some institutional restructuring, an important expansion of human resources, and a revision of processes.	Preparation: 2012 Implementation: 2012–2016	Could be prepared with donor TA support.
	5.2 Develop the basis for results-based management of the sector	Initially a simple monitoring and reporting of performance indicators would be sufficient. Then, a system could include program documents and performance reports and an annual business plan for the DOR.	2012 for the monitoring system, 2013 for the other documents	Better monitoring and reporting of inputs and outputs would be a precondition for more devolution of operational responsibilities to the DOR.
	5.3 Consider reinstating a renewed Road Board	The new Road Board's design should reflect the lessons of the failed attempt to instate one in 2004. The board should be established by law.	Proposal submitted to the Great Hural by 2012	An alternative would rely on performance management and reporting by the DOR, though this offers less

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**Key Policy Options** *continued*

Theme	Actions Suggested	Suggested Approach	Possible Time Frame	Observations
				security. This issue is linked to Road Fund reform.
	5.4 Improve procurement governance	Strengthen procurement governance and increase procurement staff.	By 202	
	5.5 Improve the effects of sector audit	Orient external audits on performance auditing. Develop an internal control capacity in the DOR. Further integrate road inspectors and DOR activities.	2012–2014	Financial audit could be contracted out.
	5.6 Develop operational support schemes for the local network	Create a unit within the DOR or MRTCUD to provide operational support to local governments, possibly up to managing road networks on their behalf.	By 2014	This would not include support for roads in Ulaanbaatar.
<b>6. Fostering the Development of the Road Industry</b>				
	6.1 Update the contracting framework and contractor registration system	Revise procurement requirements and create a contractor registration and performance evaluation system.	By 2012	The definition of such new procedures should preferably closely involve professional associations.
	6.2 Develop sector professional associations	Progressively strengthen and legally recognize the sector professional associations. Delegate to them some regulatory functions currently overseen by the DOR.	2–4 years	The government could either support existing associations or foster the development of new ones, to which it would grant some regulatory functions.
	6.3 Modernize and scale up the technical education and vocational training system	Expand the civil works engineer education programs. Further consolidate vocational training programs. Involve sector stakeholders in education management and, potentially, financing.	2–4 years	Could be supported by donor loan and technical assistance.
	6.4 Enhance credit availability for contractors	Explore options for easing credit availability for contractors, including risk-sharing arrangements or construction funds.	2 years	Could be supported by donor loan or investment.
	6.5 Facilitate domestic contractors' access to foreign technology	Foster formation of international joint ventures. Ease entry procedures for imported equipment.	By 2012	Alternatively, the government could ease entry requirements for foreign contractors.

DOR = Department of Roads; GDP = gross domestic product; MNT = togrog; MRTCUD = Ministry of Roads, Transportation, Construction and Urban Development; RMC = road maintenance company.

# Introduction

## Background

**Mongolia's road network, underdeveloped and dilapidated, has been recognized as a bottleneck in the country's development.** Mongolia's roads connect only a tiny fraction of the country, making travel within the country costly, lengthy, and hazardous. Poor road transport conditions prevent the development of economic activity outside of the capital city and limit the exploitation of Mongolia's mining resources.

**Sector development in the past 20 years has been slow.** At the democratic transition in 1990, Mongolia was bestowed with a very small road network, developed and operated directly by the public administration with a low degree of efficiency. Aware of the need to develop the sector, Mongolia's government has since followed a strategy to scale up the network, privatize the road industry, and increase public administration efficiency. Despite the limited budgets available, and a moderate degree of continuity in sector institutional reforms, these initiatives have yielded some results. The paved road network was progressively increased from 1,250 kilometers (km) in 1992 to 2,830 km in 2010. The road construction industry was fully privatized and as a result has expanded quickly. The public administration adopted civil works management models more in line with common international practices. However, there has been little, if any, progress on many issues, including investment planning, sector governance, or road maintenance financing, and no single private company has achieved the financial capacity to participate in international projects.

**The large-scale exploitation of Mongolia's mining resources in the 2010s will change the context of road sector policy.** Sector budgets are likely to rise quickly, due to the influx of mineral royalties. Mongolia's National Development Strategy includes plans to expand the road network to 11,000 km by 2021. Ulaanbaatar city similarly plans to use the new resources to build an urban trunk highway network, as well as modern public transport infrastructure. Delivering upon those programs would imply building about 1,000 km of roads annually and maintaining a network four times larger than the current one.

**The question can then be asked whether Mongolia's road sector will have the capacity to meet such new demand.** Indeed, although budgets tripled between 2006 and 2009, results were modest. Road sector productivity has remained around 200–250 km of new construction per year. No progress was made on the quality of the existing roads: maintenance works barely expanded and no periodic maintenance has been undertaken. Should the current status quo be maintained, it is likely that the national road construction programs would become much delayed, budget resources would be wasted, and newly created assets would quickly deteriorate.

**In other words, Mongolia's road sector will have to quickly build its capacity to deliver efficiently upon government's objectives.** In the medium term, this might imply changing the ways the sector





is financed and investments are planned, scaling up the road industry, modernizing administration and reforming its governance, privatizing road maintenance, or expanding the vocational training and engineer education programs. Altogether, such changes could amount to a wide-ranging sector capacity development program, which would best be planned and implemented under a coherent framework.

### Study Objectives

ADB has been a key development partner to Mongolia's transport sector since 1992. It has provided about \$250 million in loans or grants and \$8 million in technical assistance. Since the late 1990s, assistance has focused on the road sector, with the objectives of improving the country's regional corridors, consolidating the road maintenance regime, and developing a transport policy framework. In pursuit of these objectives, ADB has assisted the government in the privatization of the road construction industry, contributed to the drafting of Mongolia's Road Act, and supported the setting up of the current administrative framework. ADB's investment projects in Mongolia have been generally successful, but prevailing sector constraints have at times delayed project execution or created a need for supplementary funding during implementation.

**Due to the changing country and sector conditions, ADB has wished to take stock of the sector challenges** in order to rethink the objectives of its interventions, to increase their efficiency and, more generally, to better assist the government in meeting the sector's development challenges. Also, as its economy grows and its borrowing capacity increases in the 2010s, Mongolia will have access to larger ADB lending resources. Therefore, ADB wishes to identify the conditions that would allow for a scaling up of its engagement in the road sector.

**Against this background, ADB undertook the present study, from 2009 to 2010, to identify paths and options for increasing the capacity of Mongolia's road sector in the medium term.** The objective of this study has been to answer the question "How can the road sector meet Mongolia's needs in the near to medium future?" The study broadly covers sector development plans, sector financing, road maintenance and construction management, sector institutions, and the road industry. On each of those topics, the study explores capacity development directions that appear promising and which the government or other stakeholders could study further before implementation. It is hoped that this study ultimately will serve as a reference for discussions between the government, sector stakeholders, and donors during future capacity building efforts.

### Methodology

This study was undertaken directly by an ADB team to build upon the lessons of ADB's long-term engagement in the sector. Its preparation followed a staged approach.

In the first stage, a diagnostic of the current institutional setting, regulations, historic financing trends, and development plans was prepared. The analysis was largely based on readily available data and information produced by sector entities, which were gathered by a local consultant. The analysis also relied on interviews of key stakeholders involved in road sector development, including the Ministry of Finance (MOF); Ministry of Roads, Transportation, Construction and Urban Development (MRTCUD); Department of Roads (DOR); National Audit Office (NAO); State Professional Inspection



Agency (SPIA); State Property Committee (SPC); local road agencies or equivalents; and representatives of the private sector and civil society. Based on this diagnostic, trends in future road construction and maintenance demand were determined. An assessment was made of current operational issues, current resource gaps, and future needs. This led to a prioritization of key sector issues and the evaluation of viable solutions, as seen by sector stakeholders.

In the second stage, the study relied on international experience gathered through internal and external experts' desk review and peer review. When feasible, the sector situation was benchmarked with comparable countries. International experience with sector development programs also helped to identify underlying obstacles to the implementation of the proposed solutions, as well as options for and examples of reforms feasible in the Mongolian context.

The report was presented during a workshop held in July 2010 in Ulaanbaatar. Its findings were then used by road sector stakeholders, under MRTAUD leadership, to prepare the Mid-Term Road Sector Capacity Building Program, from September 2010 to February 2011. This revised version seeks to reflect the contribution of those actors.

# SECTION I

## Increasing the Road Sector's Contribution to Development

### Key Findings and Suggestions

#### Findings

Mongolia enters the new decade beginning in 2010 under very favorable economic conditions. The road sector will potentially play an important role in fostering economic development and spreading its benefits to the poorest.

Mongolia's road network currently is very little developed, due to geographic and historic factors. However, rapid traffic growth has been putting pressure on the existing infrastructure, particularly in the capital city.

The Government of Mongolia has outlined a large investment plan for the road sector, which includes a quintupling of the paved network extension within 10 years.

Although mining royalties are likely to relieve the fiscal constraint on the sector, this still may be insufficient to increase sector contribution to development. The sector presents major capacity bottlenecks, which will likely hamper progress.

#### Suggestions

##### 1.1 Prepare a Medium-Term Road Sector Capacity Development Program

Delivering upon the government's sector objectives will require important institutional strengthening. Capacity development should tackle the financial, management, and human resources constraints to sector development. Those dimensions are analyzed in the following sections.

##### 1.2 Phase Road Network Development

Because it is unlikely that sector constraints can be removed sufficiently quickly, a phased road network development appears preferable. To optimize economic and poverty reduction benefits, the government could prioritize during the first years of the 2010s investments that directly foster national growth, small-scale investments, and maintenance works. Investments would increase in the second half of the decade as sector capacity grows.

A higher-risk alternative would be to task a new administration or company with network development. It would be possible to rely on international consultants and foreign companies to execute the works.



## Findings

### Promises and Risks of Rapid Economic Development

**Mongolia is potentially the next development success story of Asia.** Mongolia is a vast, sparsely populated, landlocked country with a 2010 per capita gross domestic product (GDP) of about \$2,470. Most of the country of 2.7 million inhabitants has a population density below one person per square kilometer (km<sup>2</sup>), with the exception of the capital city, Ulaanbaatar (population 1 million). The population of other cities is below 100,000—the population of the second largest, Erdenet, is 86,700, for example, and the third largest, Darkhan, is 74,500. Although Mongolia was marred by the difficulties of its transition from a communist to a market economy in the 1990s, it experienced rapid development in the 2000s—a 7%–10% per annum growth in GDP since 2004. The economy stagnated in 2009, in the wake of the global financial crisis, but there is a consensus about a sharp rebound from 2010 onward (up to 14%–20% growth is forecast by the middle of the decade), as mining investments will increase. Mongolia's mineral economy has largely contributed to this success and represents the country's best development asset. In 2007, mining accounted for 20% of real GDP, 69% of exports, and 36% of government revenues. The country has an impressive list of world-class mining projects planned, which are about to be put to production. During 2010–2015, total coal, gold, and copper exports are expected to reach \$5.2 billion annually, an amount equal to the country's total 2008 GDP.<sup>1</sup> By then, Mongolia should have become a resource-rich middle-income economy. The National Development Strategy projects a rise in per capita GDP—to \$5,000 by 2015 and to \$12,000 by 2021.<sup>2</sup>

**Nonetheless, Mongolia still must overcome significant development challenges.** Indeed, mining development will require important infrastructure investments, and the positive effect of mining on development remains uncertain. The country faces a risk of “Dutch disease”—an economic state in which non-commodity-related industries face the double disadvantage of exchange rate appreciation and increased competition for local savings to finance investments. Moreover, given a narrow and capital-intensive economic base, development benefits may be shared unequally among the population. In particular, there is a risk that the poorer population in the vast rural areas of Mongolia (with a 42% poverty rate) will be left behind. An increase in public resources might remove the incentive to deliver value-for-money public services while increasing the incentives for mismanagement and corruption.

### Road Sector's Contribution to Development

**The road sector plays an important role in a country's development.** As a landlocked country, the quality of Mongolia's logistics infrastructure will determine the terms of its trade, e.g., the competitiveness of its exports and the costs of its imports. Currently, the country relies on a unique rail corridor from the Russian Federation to the PRC (the Altanbulag–Ulaanbaatar–Zamynn-Uud corridor) for most of its exports. It is in the process of constructing two road corridors, one parallel to the existing one (to be completed in 2013) and another in the western regions (to be completed around 2018), to improve access to markets.

<sup>1</sup> World Bank. 2009. *Southern Mongolia Infrastructure Strategy*. Washington, DC.

<sup>2</sup> Parliament of Mongolia. 2008. *Millennium Development Goals–Based Comprehensive National Development Strategy of Mongolia*. Ulaanbaatar.



Road improvements can accelerate mining and tourism development. The main mines in South Gobi can generate sufficient revenues and traffic for the private sector to finance the construction and maintenance of access roads and rail links. Investors in the smaller scattered mines, however, are unlikely to have the capacity to provide up-front investments to link the mines to the markets. In both cases, the role of the government is central in coordinating development, granting and monitoring the road concessions, or constructing the roads and recovering the costs from the main users. Mongolia also has largely untapped potential for a nature-related tourism industry, which is still a niche market, given the difficult access to the sites.

Roads also contribute to poverty reduction outside of the capital city by increasing the “farm gate” price of products (particularly linked to husbandry), reducing the cost of the inputs consumed, and improving access to services located in the *aimags* (provincial administrative units).

**Despite its potential role, road development has been hampered by comparatively high costs and low benefits.** Providing infrastructure access in Mongolia proves very costly when measured in terms of per capita costs, given the country’s low-density, dispersed population within a large territory. Road construction costs also have been comparatively higher than in other countries because the infrastructure needs to resist extreme weather conditions, including temperatures ranging from  $-40^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ , a dry atmosphere, and strong winds (see Section 4).

At the same time, the benefits of new roads have been more limited than in comparable countries. The dry, flat surfaces make most areas easily passable under relatively acceptable driving conditions. Until the 1990s, Mongolia’s national policy considered building formed roads an unnecessary enterprise. Most of the economy and population also has concentrated in a single economic center, Ulaanbaatar. In 2004, the capital city accounted for 40% of the population and 60% of GDP, whereas the rural population (another 40% of the population) has stagnated or decreased since 1993. This process has been facilitated by Mongolians’ nomadic lifestyle (about 32% of the population were nomadic herders in 1998).

Finally, given the distances involved, roads cannot compete efficiently against rail. The rail network serves the three main cities (Darhan, Erdenet, and Ulaanbaatar) and connects them with the borders of the PRC (at Zamyun-Uud) and the Russian Federation (at Altanbulag), along the main north–south export corridor. Indeed, truck traffic on the existing border point with the Russian Federation at Altanbulag has remained limited (215 trucks per day in 2008).<sup>3</sup> The distance from Ulaanbaatar to the PRC border (about 850 km) also is likely to limit road traffic to niche markets.

### Road Infrastructure Condition

**The road network has been developed only moderately.** In this context, the road network has comprised mainly “natural” tracks. As of 2009, the registered network includes national roads (11,210 km), which connect the *aimag* centers, and local (urban and rural) roads (38,030 km). The network included 2,680 km of paved roads, 2,100 km of gravel roads, and an additional 1,730 km of engineered roads, which include some form of drainage and whose surface is shaped (Table 1 and Figure 1). The rest of the registered network comprises itineraries formed after repeated utilization. These can offer a reasonable riding quality (speeds observed from 15 km/h to 50 km/h) but are prone to closures—during winter or at humid points, for example—and induce high vehicle operating costs. Most of the urban paved roads are located in Ulaanbaatar.

<sup>3</sup> DOR annual traffic counts.



**Table 1 Road Network Extent (1992–2009) (km)**

Road Type	1992	1997	2000	2006	2009
<b>National</b>	<b>11,060</b>	<b>11,060</b>	<b>11,060</b>	<b>11,210</b>	<b>11,210</b>
Paved	1,050	1,280	1,310	1,880	2,180
Gravel	890	1,330	1,370	1,480	1,550
Improved earth	1,430	1,390	1,360	1,360	1,230
Tracks	7,670	7,050	7,010	6,480	6,240
<b>Local</b>	<b>38,180</b>	<b>38,180</b>	<b>38,180</b>	<b>38,030</b>	<b>38,030</b>
Paved	200	390	390	390	500
Gravel	860	490	490	490	550
Improved earth	480	510	510	490	490
Tracks	36,630	36,780	36,780	36,630	36,460
<b>Total</b>	<b>49,240</b>	<b>49,240</b>	<b>49,250</b>	<b>49,250</b>	<b>49,250</b>
Paved	1,250	1,670	1,710	2,270	2,680
Gravel	1,760	1,820	1,860	1,980	2,100
Improved earth	1,920	1,900	1,870	1,860	1,730
Tracks	44,300	43,840	43,790	43,120	42,710

Note: Totals may not always add up due to rounding.

Source: DOR. All figures represent extent as of 1 January.

**Figure 1 Mongolia's National Road Network (2009)**



Paved Road  
 Gravel road  
 Improved Earth and Dirt Track

Source: ADB consultant.

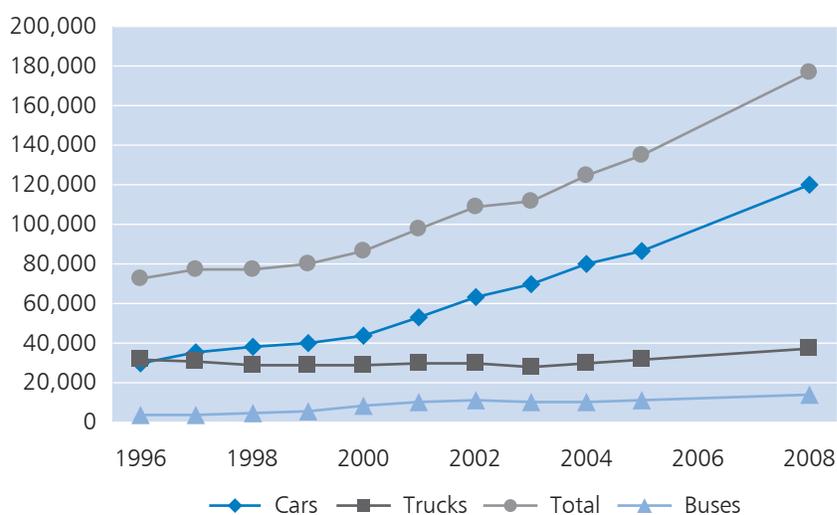
Despite its small size, the road network amounts to a sizable asset of the country. At 2008 replacement costs, the formed network has a value of \$800 million, about 20% of the country's 2008 GDP 2008.<sup>4</sup> However, with the exception of the 900 km of paved roads constructed in the past ten years, the condition of those 6,510 km of formed roads can be considered poor to very poor, due to insufficient maintenance (see Section 3).

## Patterns of the Rising Transport Demand

### Fleet

The vehicle fleet is relatively large and growing. Fueled by the fast-paced economic growth of 2003–2008, the passenger fleet has consistently grown at 12% per annum since the transition (Figure 2). The truck and bus fleet actually decreased during the 1990s, as they proved to be in surplus during the transition, and only recently has started to grow again. The total number of vehicles inspected by the police in 2008 was 176,700, corresponding to 65 vehicles per 1,000 people, relatively high for a lower-income country (compared with, for example, 45 per 1,000 in the PRC and 500–900 per 1,000 in Organisation for Economic Co-operation and Development countries). There is likely to be underreporting, and by some surveys the number was twice as high (326,000 vehicles in 2008). The country relies on a large volume of secondhand imports, notably from Japan, which explains why 38% of the fleet has a right steering wheel and 60% of vehicles' age is above 11 years.

Figure 2 Number of Registered Vehicles in Mongolia (1996–2008)



Source: ADB consultant.

### Traffic

Traffic volume on most national roads remains very low, much below levels commonly expected on a trunk network. In 2006, traffic on 64% of the national network was fewer than 200 vehicles per

<sup>4</sup> Based on the following costs: paved road at \$225,000 per km, gravel road at \$90,000 per km, and improved earth road at \$5,000 per km. Paved road cost in 2010 increased to \$240,000 per km.



**Table 2 Traffic Distribution on the National Network**

Average Daily Traffic (vehicles)	Share of Network (%)
Fewer than 50	17
51–100	30
101–200	17
201–500	15
501–1,000	14
More than 1,000	7

Source: Snowy Mountains Engineering Corporation. 2007. *Road Master Plan – Consultant's Report*. Ulaanbaatar.

day, and only 7% had traffic above 1,000 vehicles a day (Table 2). Only a few segments registered significant traffic, mostly in the Ulaanbaatar–Darkhan–Erdenet economic triangle, on paved roads.<sup>5</sup> On average, traffic comprises 55% cars, jeeps, and four-wheel-drive vehicles; 11% small commercial vehicles; 16% buses (90% of which are small vans); and only 13% medium to heavy trucks—denoting, overall, relatively light traffic.<sup>6</sup>

### Growth

**Traffic growth has been fast on selected itineraries.** The DOR has reported a 10%–13% traffic increase per annum on the network in the past years, and traffic on the Ulaanbaatar–Altanbulag segment was 70% higher in 2008 than in 2001.<sup>7</sup> Traffic elasticity to GDP growth was estimated at 1.3 for passengers and 0.5 to 2 for freight,<sup>8</sup> which suggests that traffic numbers should keep increasing by more than 10% per annum in the medium term.

### Urban Traffic

**Transport demand is mainly concentrated in the capital city.** Two-thirds of the vehicle fleet in 2008 was registered in the capital city. Traffic increase in the 2000s has severely clogged the city's road network, which was designed for much lighter loads. The average travel speed recorded downtown has fallen by 45%, from 24.5 km/h in 1998 to only 13.5 km/h in 2008. The congestion of the city has also affected city crossing on the north–south corridor (Figure 3).

### Safety

**Road accidents have decreased but remain a significant issue on interurban axes.** Road accidents have been responsible for 3,462 deaths in the past 10 years. The fatality rate is twice that of Organisation for Economic Co-operation and Development countries in absolute values (11.5 fatalities per 100,000 population against a 5–6 average) and 5–10 times higher when related to the number of vehicles (18 fatalities per registered vehicle against a 1–2 average).<sup>9</sup> The number of

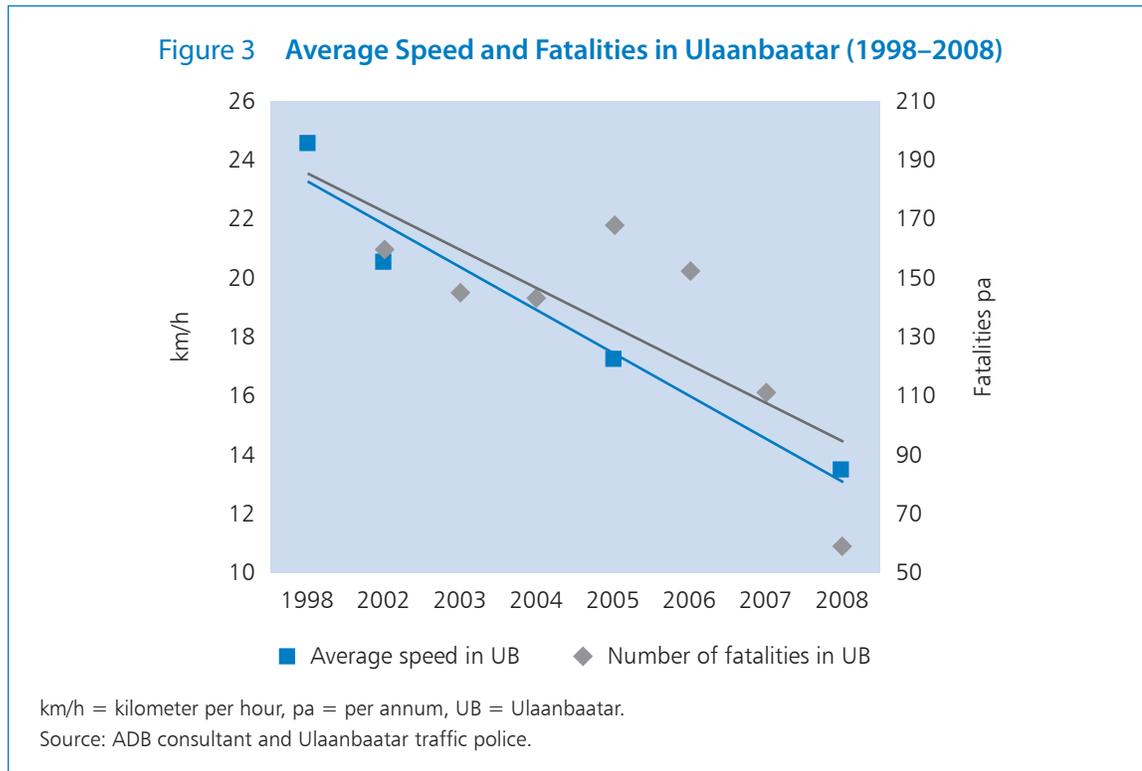
<sup>5</sup> On the Ulaanbaatar–Altanbulag corridor, traffic registered in 2008 was about 3,600 vehicles per day in the vicinity of Ulaanbaatar, and fell to 400–800 on the other sections, for an average of 1,400 vehicles per day.

<sup>6</sup> Government of Mongolia. 2007. *Road Master Plan*.

<sup>7</sup> According to DOR traffic counts, average traffic on the road in 2000 was 833 vehicles per day on average.

<sup>8</sup> Government of Mongolia. 2007. *Road Master Plan*.

<sup>9</sup> Organisation for Economic Co-operation and Development. International Road Traffic and Accident database.



fatalities has decreased in recent years, from close to 400 in 2003 to 313 in 2008 (Figure 4). This may be due to the speed reduction in the capital city. Indeed, fatalities in Ulaanbaatar fell during the same period from 145 to only 59 (Figure 3), while fatalities on the rest of the network remained stable at about 250 annually.

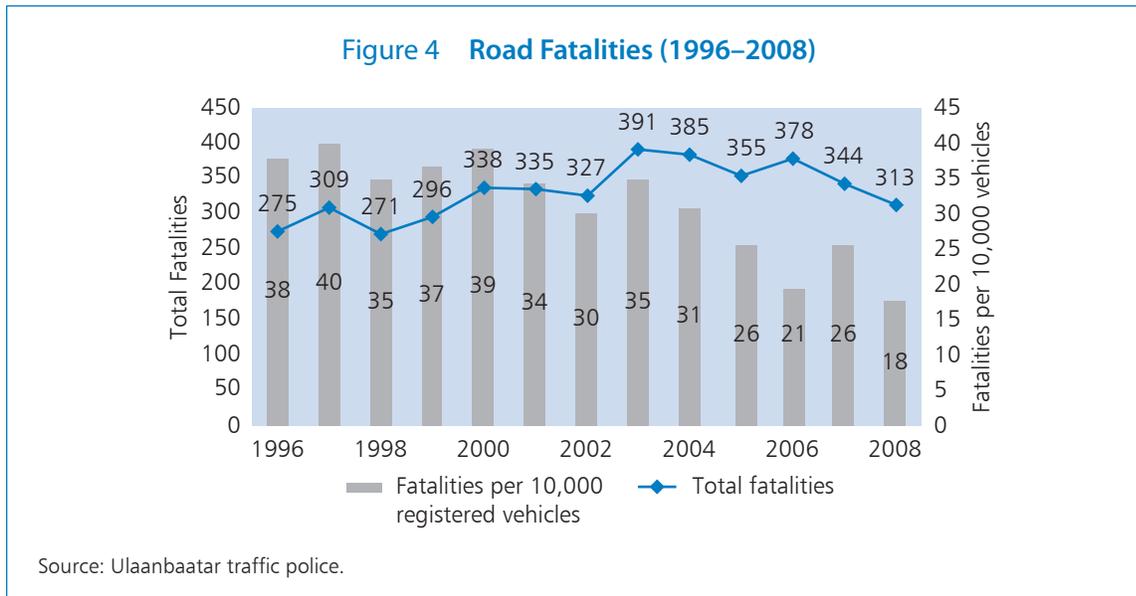
### Government's Ambitions for the Road Sector

Road infrastructure development has been central to Mongolia's regional development strategy. Mongolia's regional development principle is embedded in the country's constitution. It rests on a long-standing concept of "comparatively even" development across self-sufficient regions.<sup>10</sup> Since the transition, the policy has been grounded in a supply-side, central planning approach to development, which emphasizes road infrastructure construction and free trade zone creation as a way to foster the development of specific industries. Its objectives are to cause the living standards in rural and urban areas to converge, to capture value-added benefits by developing a vertically integrated mining industry, and to broaden the base of a technology-intensive, export-oriented economy.

The government has outlined a large infrastructure development plan for the next decade. From its voluntary regional development approach, the government defined in the early 2000s a core network comprising five north–south and one transversal Class III standard highway axes,<sup>11</sup> coinciding in part with the internationally defined Asian Highway Network and Central Asia Regional

<sup>10</sup> Parliament of Mongolia. 1996. *Development Concept of Mongolia*; Parliament of Mongolia. 2001. *Regional Development Concept of Mongolia*.

<sup>11</sup> Two-lane, 7-meter-wide paved highways.



Economic Cooperation (CAREC) corridors. This backbone is to be complemented by paved access roads connecting with all *aimag* (provincial) centers. Overall, the government aims to complete construction of an 11,000 km national network by 2021, for a total estimated cost of \$1.9 billion.<sup>12</sup> An interim target, set in the 2008–2012 government action plan, was to increase the length of the national network from 2,100 km to 6,450 km within 5 years. The program may be delayed as a result of the major fiscal impacts of the 2008–2009 global financial crisis. Indeed, Mongolia ran a fiscal deficit of 5.7% in 2009, and had to cut in its investment expenditures in 2010. Mongolia's declared priorities for network construction are:<sup>13</sup>

- **International corridors:** (i) Completion of the north–south export corridor Altanbulag–Ulaanbaatar–Choyr–Zamyn-Uud (Asian Highway 3/CAREC 4b), the southern section of which is under construction with ADB financing (completion target in 2012); the government has announced its aim to upgrade this corridor to expressway standards in the medium term; and (ii) construction of a western corridor (Asian Highway 4/CAREC 4a); the works for the southern section were initiated in 2011, with ADB financing.
- **Millennium Road:** Several alternative alignments for the horizontal and vertical segments of this highway network have been proposed, at times duplicating existing east–west corridors. The overall status of preparation and phasing of the various projects is unclear (Figure 5).
- **Connection of paved roads linking aimag (provincial) centers:** The government has been progressively paving existing dirt track or gravel itineraries to develop a star-shaped network centered on the capital city (Figure 6).

## Sector Capacity Bottlenecks

**Increased sector budgets may not translate into better outcomes.** Sector budgets are likely to rise quickly, due to the influx of mineral royalties during the next decade. However, it is unknown whether

<sup>12</sup> Government of Mongolia. 2007. *Road Master Plan*.

<sup>13</sup> Parliament of Mongolia. 2008. *Millennium Development Goals–Based Comprehensive National Development Strategy of Mongolia*. Ulaanbaatar.

Figure 5 Millennium Road Project



AH = Asian Highway, CAREC = Central Asia Regional Economic Cooperation.

Source: Snowy Mountains Engineering Corporation. 2007. *Road Master Plan – Consultant's Report*. Ulaanbaatar.

this increase alone will be sufficient to produce better sector outcomes. Indeed, although budgets from 2006 to 2009 increased by a factor of three (from MNT30 billion to MNT94 billion), results have been modest. Indeed, about 1,600 km of new road works were under construction in 2009, but during the same period, road sector productivity remained stable at about 200 km–250 km of new construction completed per year, well below the 1,000 km government targets. Meanwhile, no progress was made on the quality of the national road network, as maintenance works barely expanded, and no periodic maintenance was undertaken.

**Reducing sector efficiency bottlenecks will require a significant institutional strengthening effort.** The next sections show that improvement of sector productivity and efficiency faces key constraints. These lie in the weaknesses of sector management, in the structure of expenses and investment programs, and in the sector's reduced human resources. The government's strategy during the past 10 years has been to work without major changes to the existing framework. For instance, road maintenance is financed, planned, and implemented very much the same today as in the 1990s, despite the obvious shortcomings of the maintenance policy. This report argues that, to get more from the sector, the government should clear the way for a wide-ranging sector capacity development program, which would require an update of sector policy and management principles.

### Government's Road Sector Policy

The government has actually been facing many difficulties in defining a coherent road sector policy that would allow for the necessary capacity buildup.



Figure 6 Road Network Development Targets (2008–2012)



Source: ADB consultant, based on Government of Mongolia. 2008. *Action Plan for 2008–2012*.

There has been little consensus on many fundamental policy principles. The National Development Strategy<sup>14</sup> outlines several principles underlying the government's policy in the road sector, focusing on (i) road network development, to progressively upgrade the national road network to paved road standards; (ii) private sector participation in infrastructure construction; and (iii) road construction and maintenance technology research and equipment modernization. There is, however, an absence of consensus in the sector and in the political environment on key questions, such as the priority to be given to road maintenance,<sup>15</sup> the role of civil society in policy formulation and planning, the use of economic criteria in investment decision making, the division of responsibility within the government between policy making functions and implementation, and the role of the private sector in road maintenance.

The National Transport Strategy has outlined sound policy principles for the road sector but has had little effect on the sector. To respond to open questions, the government prepared a sector strategy between 2004 and 2008, with ADB technical assistance support.<sup>16</sup> The document, finalized in 2008, presents a comprehensive overview of the healthiest road sector policy principles. It brings forward the ideas of economic criteria for decision making, sufficient maintenance funding, results-based public management, private sector financing and involvement, and stakeholder consultations, among others. The document proved, however, excessively donor led. The government's adjustment of the consultant's work was actually minimal and contradicts many of the principles embedded in other sections of the paper.<sup>17</sup> The strategy has not been translated into concrete actions and does not appear to be in use.

<sup>14</sup> Parliament of Mongolia. 2008. *Millennium Development Goals-Based Comprehensive National Development Strategy of Mongolia*. Ulaanbaatar.

<sup>15</sup> For instance, all reference to maintenance funding or periodic maintenance of the roads was removed from the development strategy between the initial technical draft and the version approved by Parliament.

<sup>16</sup> Government of Mongolia. 2008. *National Transport Strategy*.

<sup>17</sup> They mostly introduce specific infrastructure investments.

## Suggestions

### Suggestion 1.1: Implement a Medium-Term Road Sector Capacity Development Program

To deliver on the government's strategy, the existing small-scale, low-capacity road sector will require a thorough transformation. The government's investment plans imply a 400% increase in the length of the national paved road network in 10 years and an equivalent acceleration in road construction and maintenance works. This \$1 billion investment program would correspond to an annual investment of about 5% of GDP, well above past levels (1.5%–2%, see Section 2). As the present review will show, this increase will greatly stress the existing weak sector bases.

**The questions ahead.** To scale up its capacity accordingly, the sector will need to formulate answers to the following questions, analyzed in subsequent sections of this report.

- **How to finance the maintenance of a larger network?** Current maintenance funding covers only 20% of needs. If the financing bases are not greatly revised, newly built roads would quickly deteriorate. (Section 2)
- **How to scale-up the sector's capacity to develop and maintain the road infrastructure?** A basic technical assessment of road maintenance revealed severe weaknesses in works planning, implementation, and supervision. This greatly hampers the efficient use of the limited resources available. (Section 3)
- **How to allocate resources available and develop the network in a cost-efficient manner?** The public sector could much improve its planning and investment management procedures. Observed planning and management weaknesses could lead to major project delays and cost overruns. (Section 4)
- **How to ensure that the institutional frameworks designed for a small network will remain efficient in the future?** Current institutions are relatively weak, and their processes and management are outdated. Modernizing the institutions and improving their governance appears to be a necessary condition for other reforms. (Section 5)
- **How to scale up and modernize private sector capacity to deliver larger volumes of works?** The major shortages in the sector's human resources and equipment base are likely to persist in the medium term. As of 2009, the sector could only complete 225 km of roads per year, well below investment targets. (Section 6)
- **How to prepare and implement a sector capacity development program?** A wide-ranging capacity development program will require a good consensus among stakeholders, building upon current sector weaknesses and their solutions. Given the sector's low absorptive capacity, the program would need to be implemented over a period of about 5 years.

**The risks of delaying capacity development.** If sector capacity is not strengthened, there are high risks that the sector will fail to deliver on time and will fall short of the quality and benefits expected by the government; will waste massive budget resources during network construction and maintenance; and will quickly let created assets deteriorate to an unacceptable level.

### Suggestion 1.2: Phase Road Network Development

Despite government efforts, it is unlikely that the sector will be able to adjust its capacity at the pace required. In this context, the government would need to adjust its investment targets and define



a staged investment strategy. The government could make an objective assessment of the sector's capacity to deliver and maintain new works. Preferably, it should establish, as a policy principle, that network expansion should be matched by a corresponding increase in maintenance funding. On this basis, the government could define an implementable medium-term investment path. In the first years of the decade beginning in 2010, the government would invest in building up the capacity of the sector by, for example, developing a strong industrial base, introducing modern construction and maintenance techniques for the paved network, and modernizing sector institutions and educational systems. By the time Mongolia's mining revenues are available, the road sector would have reached the capacity necessary to handle large investment budgets. Network development would be moderate initially and pick up in the second half of the decade.

Within those fixed budget and capacity constraints, the government would need to prioritize works to optimize impacts on growth and poverty reduction. Based on the results of basic economic analysis (Box 1 and Box 2), this report suggests using the following principles:

- **Prioritize road infrastructure development that fosters growth** (e.g., regional corridors and mining roads) over development that mainly contributes to national integration (e.g., the Millennium Road). The direct economic viability of those works makes them candidates for private sector or donor financing.
- **Prioritize rehabilitation and periodic maintenance of the existing network.** There would be little sense in building a new network while the existing one is deteriorating. The government's plan to rehabilitate the link between Ulaanbaatar and Altanbulag is very positive and should be followed with similar investments (Section 3).
- **Prioritize new construction/rehabilitation works in Ulaanbaatar.** The capital city is concentrating two-thirds of the vehicle fleet and traffic demand but receives only 10%–20% of sector investments (Section 2). The new city master plan, developed with support from the Japan International Cooperation Agency, could provide a basis for an investment program. The government would have to reallocate budgets from the national to the city road network.
- **On national itineraries, implement a large-scale spot improvement program prior to paving.** A program of works aimed at providing all-weather access on natural roads could increase access at a low cost (less than \$10,000 per km). Such a program would comprise mainly bridge and culvert construction and could be associated with an increase in regular maintenance (e.g., periodic grading). Such a program could quickly bring visible improvements to users on most sections of the network while also preparing for future paving works.

### Alternative: Contract Out Program Management

If the government wishes to bypass sector capacity constraints and implement its road network development plans quickly and efficiently, an alternative would be to rely on foreign contractors' capacity and develop a new management organization for network development. Rather than going through the MRTCUD and DOR and using traditional government procurement and financing mechanisms, the government could create a network development company or agency, managed and partly staffed by international consultants. The company would be hired to prepare network development plans, oversee project feasibility studies and detailed design, and manage civil works. Payment would depend on performance. Once opened, the roads would be transferred to the DOR. Consulting services and civil works would be contracted through international competitive bidding procedures, piloted by the company itself. The company would adopt modern management procedures.

## Examples

**Special-purpose road administrations.** The Government of India created the National Highway Authority of India in 1995 to deliver the National Highways Development Project. The Authority originally managed only donor-funded projects, but it progressively took over the management of the national network. In Algeria in the 1950s, the government created a separate road administration to create the infrastructure network required for development of gas and oil exploration in the desert. The factors that permitted rapid development of the network were (i) strong political and economic will; (ii) young professionals trained abroad but relatively inexperienced and new to the administration; (iii) a totally new administration, working only for the new network, with very compressed hierarchies; (iv) high salaries to avoid corruption; (v) a large budget; (vi) no bureaucracy; and (vii) the presence of experienced construction companies working for the mining companies. A similar mechanism was used in Ivory Coast in the 1970s, for both road construction and management. Following the departure of the international consultants in that case, however, the knowledge needed to manage the network had not been sufficiently transferred to the local staff, leading to a quick collapse of the previously efficient system.

**Semiprivate public works agency.** In 1989, the Government of Senegal created a public works and employment agency, AGETIP, which gradually became well known for managing labor-intensive public works with transparent, streamlined procedures and for significantly improving the management of donor finances. AGETIP was granted a special legal status, its own charter and bylaws, and exemption from government procurement and disbursement procedures as well as from staffing and salary policies. AGETIP is a private, nonprofit organization managed by a board and financed on a fee-for-service basis (5% of works costs). It enters into agreements with national and local government agencies to undertake projects in an agency's works program. AGETIP then assumes all the rights and obligations related to the execution of subprojects. After it receives the advance money (10%), AGETIP awards a contract for detailed engineering and then carries out other bidding procedures. In 1996, an audit showed that AGETIP paid contractors' accounts in an average of 3 days, carried out procurement processes in 2 months, and managed 90% of the civil works within the time specified.<sup>18</sup>

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<sup>18</sup> World Bank Independent Evaluation Department. 1996. *Performance Audit Report: Senegal – AGETIP: Public Works and Employment Projects*. Washington, DC.



### Box 1 An Economic Geographer's View of the Road Investment Plans

**A**lthough there is no doubt that Mongolian road infrastructure is poorly developed, the government's investment strategy invites several observations.

**Infrastructure-led regional development is generally an inefficient means of fostering growth and reducing poverty.** In the Mongolian geographic context, the basic choice to prevent rural-to-urban migration by developing regional infrastructure and industry is unlikely to be an optimal economic policy. Indeed, given the scattered population, positive agglomeration effects are felt only in the capital city. The other significant settlements relate to the presence of natural resources and cannot present the same advantages.<sup>a</sup> In economic terms, a strategy to manage growth in the capital city and reduce its congestion is likely to be more efficient. Such a strategy also would show better poverty reduction impacts. Given the high mobility and relative homogeneity of the population, it is easier to let the people migrate to the urban areas than to attempt to locate the jobs closer to the people. Economic geography theory shows that, in this context, investments in education and health are likely to reduce poverty more efficiently than investments in infrastructure.<sup>b</sup>

**Road infrastructure is unlikely to be a good tool for fostering regional development.** Experience in comparable countries shows that reducing the cost of transport is likely to provide incentive for firms to relocate to existing production centers and export products to rural areas. Road construction more often than not increases rather than prevents rural-to-urban migrations. In this context, a market approach to improving the road links when traffic justifies it can be more efficient than a top-down planning approach.

**The economic viability of most planned road construction is dubious.** Road planning for most segments has not been based on the kind of thorough economic analysis that would be expected for investments of this size. The administration did not perform any feasibility analysis of the new links (with the exception of the ones financed by foreign aid), and many—particularly the three vertical links of the Millennium Roads—are still at a very preliminary concept stage. At the same time, the construction cost of new road works in Mongolia (\$220,000–\$265,000 per kilometer) makes it economically justified to pave an itinerary only for traffic above 225 vehicles per day, a level observed on only one-third of the Mongolian network.

<sup>a</sup> For instance, Erdenet, Mongolia's second-largest city, was created in 1975 to exploit a major copper mine.

<sup>b</sup> This is one of the key messages of International Bank for Reconstruction and Development/World Bank. 2009. *World Development Report 2009: Reshaping Economic Geography*. Washington, DC, particularly as elaborated in Chapter 8, "Unity, Not Uniformity: Effective Approaches to Territorial Development."

Source: ADB.

**Box 2 An Economic Evaluation of Road Construction Works in Mongolia**

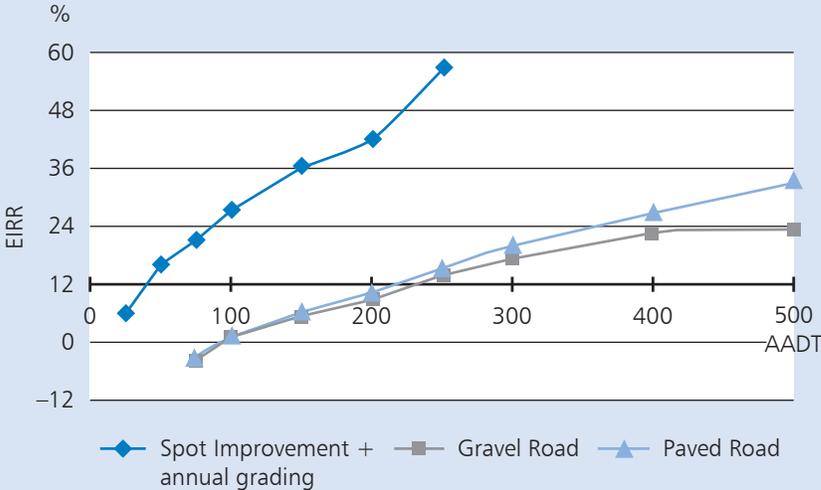
**Investment strategy.** To evaluate the economic viability of Mongolia’s investment strategy in the road sector, an evaluation of three road improvement alternatives was undertaken. Mongolia’s investment strategy has been to construct paved roads immediately, bypassing intermediate levels of road construction (earth and gravel road). This preference for paved roads over gravel roads is based on the road administration’s long experience with both solutions. In Mongolia’s climate conditions, gravel road maintenance is very costly, but the riding condition is barely superior to that of a dirt track.

**Evaluation methodology.** The analysis compared the road construction and maintenance life cycle costs with the economic benefits of improved road conditions, in terms of time savings, reduced vehicle operating costs due to the better road surface, and year-round access. The analysis employed the Road Economic Decision Model (RED)—a standard for evaluating the benefits of low-volume road works – and was based on the typical Mongolian road surface condition, traffic patterns, road construction and maintenance strategies, and costs.

**Alternatives tested.** Three alternatives were tested: (i) an asphalt concrete road, with a \$240,000 per km cost and \$4,500 annualized maintenance cost; (ii) a gravel road, with a \$100,000 per kilometer cost and a \$1,500–\$6,000 maintenance cost, depending on the quantity of traffic and the frequency of grading; and (iii) the spot improvement of the existing dirt track—e.g., the construction of bridges or culverts at critical points to ensure all-weather access, combined with an annual grading to smooth the surface. The existing road was considered to be a flat dirt road, offering a poor riding condition (international roughness index of 15 during dry season and 20 during the wet season).

**Evaluation results.** The viability of each alternative (economic internal rate of return) was compared with a standard 12% rate of return, for traffic ranging from an annualized daily traffic of 5 to 500 vehicles per day (Figure 7). The paved road was always superior to the gravel road alternative, but only viable for traffic above 225 vehicles per day. The spot improvement option was viable for traffic starting at 50 vehicles per day. These estimates may only be used as a rule-of-thumb. A detailed analysis would be needed to evaluate any specific investment.

**Rate of Return on Road Investments in Mongolia as a Function of Traffic**



AADT = annual average daily traffic, EIRR = economic internal rate of return.  
 Source: ADB estimates.

Source: ADB.

# SECTION 2

## Financing the Road Sector

### Key Findings and Suggestions

#### Findings

Mongolia's expenditures in the road sector, at 1.5%–2% of GDP, are in line with what should be expected for a country at this stage of development. However, maintenance expenditures are abnormally low (0.17% of GDP). Overall, these expenditures barely cover 20% of needs, which has led to the creation of a large backlog of roads in very poor condition, requiring costly rehabilitation.

Although the Road Fund is a valuable mechanism, it has had only a limited influence on the sector and would not be adequate to future needs, in its current form.

#### Suggestion: Create a Sustainable Financing Framework for Maintenance

##### 2.1 Reallocate Sector Resources for Maintenance

Bringing maintenance expenditures to 0.5% of GDP could be a reasonable medium-term target. This would not require increasing taxes, because current user charges cover 150% of total sector expenditures. At constant budgets, a 15%–20% reallocation of sector resources from construction to maintenance would be sufficient.

##### 2.2 Maintain But Restructure the Road Fund

Only a restructured Road Fund appears likely to finance road maintenance in a sustainable manner. A revived road fund normally would be expected to receive an increased share of sector revenues, would be dedicated to maintenance, and would have a more commercial management.

##### 2.3 Consider Updating the Road User Charging System

A review of the charging system could lead to removal of road tolls, given their abnormally high administrative costs (80%); alignment of levies on gasoline and diesel, while compensating non-road consumers of diesel; and an increase in the annual vehicle tax on heavy-duty vehicles.

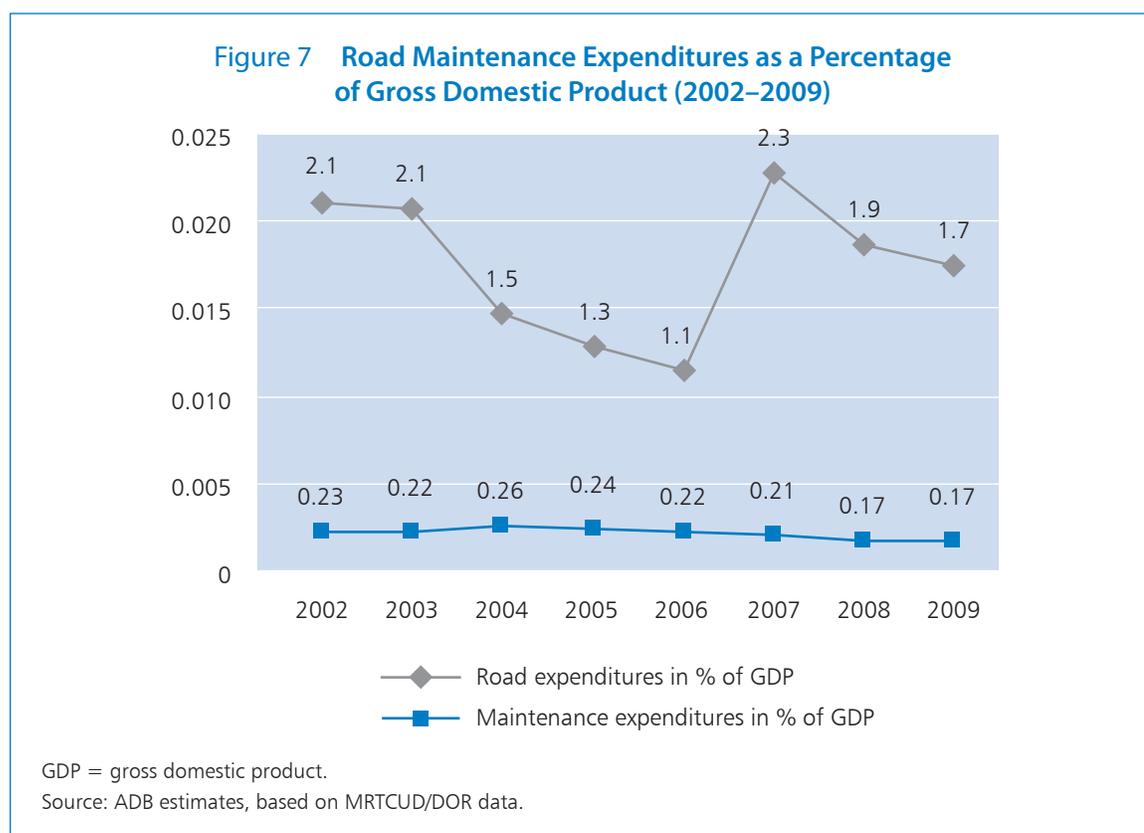


## Findings

### Sector Expenditures

Mongolia's road sector expenditures are in line with that of other developing countries at a comparable stage of development. A country initiating a transition into middle-income status typically would spend about 3% of its GDP on its transport infrastructure, a large share of which would be dedicated to the road sector. Mongolia's investments have been well within that range, around 2% of GDP, since the beginning of the decade (Figure 7). Investments dropped relatively between 2004 and 2006 but caught up during the mining boom of 2007–2008. This was followed by a pause in 2009, due to the global financial crisis.

Maintenance expenditures have been historically low, around 0.2% of GDP, against 0.3%–1% in other developing countries.<sup>19</sup> This partly reflects Mongolia's low maintenance burden: the country has only 1 km of formed road per million dollars of GDP, no more than twice that of a developed country.<sup>20</sup> As this review shows, it is also the sign of a critical maintenance underfunding problem. Maintenance represents only 10% of total sector expenditures (Figure 8), whereas average levels observed in developing countries are close to 50%.<sup>21</sup>



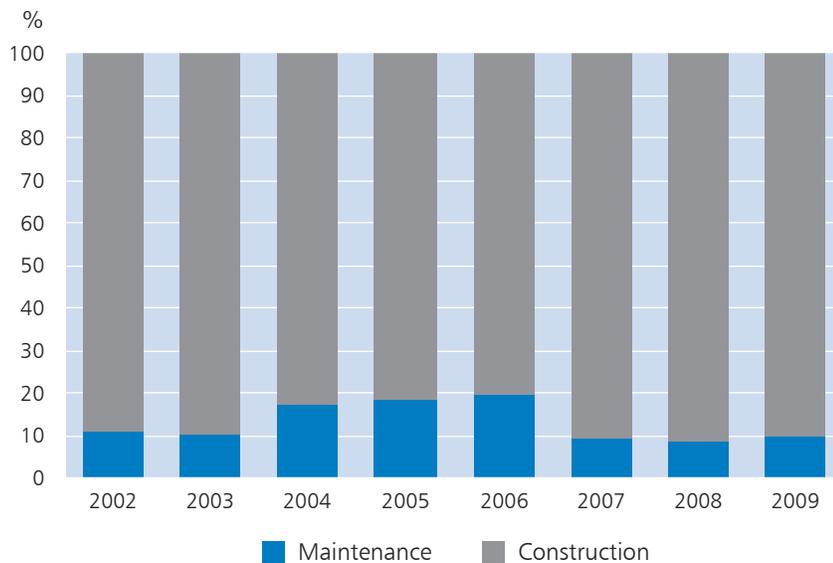
<sup>19</sup> World Bank. 1999. *Taming the Tyrannies of Distance and Isolation: A Transport Strategy for Mongolia*. Washington, DC.

<sup>20</sup> See World Bank. 1998. *Road Deterioration in Developing Countries*. Washington, DC. Developed countries have ratios below 0.5, whereas typical developing countries frequently have ratios around 3 to 7, and as high as 15.

<sup>21</sup> World Bank. 1998. *Road Deterioration in Developing Countries*. Washington, DC.



**Figure 8 Distribution of Sector Expenditures for Maintenance and Construction**



Source: ADB estimates, based on MRTCUD/DOR data.

The bulk of road investments are undertaken by the central government. Although there is no reliable data on local expenditures, it is likely that local governments' road investments have represented less than one-third of total sector investments, and frequently no more than 10%. After the central government, Ulaanbaatar has been by far the main investor in the sector; capital city expenditures have concentrated probably as much as 90% of local government expenditures on roads.

Overall, road expenditures have more than doubled in value during the past 5 years. Whereas Mongolia was dedicating about MNT50 billion–MNT60 billion annually to the sector in 2002–2006 (in constant 2009 MNT, or \$35 million–\$43 million), it invested an average of MNT125 billion (\$89 million) annually in 2007–2009. Maintenance expenditures initially increased in similar proportion during 2002–2007, from MNT6.4 billion (\$4.6 million) to MNT13.3 billion (\$9.5 million), expenditures thereafter fell in nominal terms, to MNT10.4 billion (\$7.4 million) in 2009. Tables 3 and 4 summarize the sector financing sources and expenditures in nominal and constant terms.

## The National Road Fund

The national Road Fund was established as the backbone of sector financing in the 1990s. The fund was first established through a 1991 government decree and was made into law in 1995 to help stabilize the funding available to the road sector.<sup>22</sup> In 1998, the Road Act distinguished between a state road fund and local road funds and clarified the main features of each.<sup>23</sup>

<sup>22</sup> Law of Taxation on Auto Gasoline and Diesel (June 1995).

<sup>23</sup> Law on Roads (1998).

**Table 3 Road Sector Financing Sources and Expenditures**  
(Current MNT million)

Sector Financing Sources	2002	2003	2004	2005	2006	2007	2008	2009
<b>Central government</b>								
– State budget	12,100	15,300	11,300	13,800	21,100	21,500	44,100	60,400
– Development fund	0	0	0	0	0	27,100	30,400	0
– Road Fund	4,800	5,700	6,100	7,800	6,900	7,100	9,000	10,500
– Road tolls	0	0	0	0	410	780	860	n/a
– Foreign investment*	10,400	10,400	10,400	10,400	8,600	23,300	17,200	30,900
<b>Total central government</b>	<b>27,300</b>	<b>31,500</b>	<b>27,900</b>	<b>32,100</b>	<b>37,200</b>	<b>80,000</b>	<b>101,700</b>	<b>101,800</b>
<b>Local governments</b>								
– Local road fund (estimates 2002)	3,100	3,800	4,700	4,700	4,600	6,300	7,700	7,700
– including UB road* Fund (estimates 2002–2004)	1,800	2,200	2,800	2,800	3,000	3,500	4,800	5,300
– Aimag road funds*	1,200	1,500	1,900	1,900	1,500	2,700	2,900	2,400
– Other sources of investment (UB)* (estimates 2002–2005)	1,000	1,400	2,000	2,000	3,600	20,900	9,300	2,800
<b>Total local government</b>	<b>7,400</b>	<b>9,100</b>	<b>11,500</b>	<b>11,600</b>	<b>12,900</b>	<b>33,500</b>	<b>24,900</b>	<b>18,300</b>
<b>Total sector financing</b>	<b>31,600</b>	<b>36,800</b>	<b>34,700</b>	<b>38,900</b>	<b>45,500</b>	<b>107,300</b>	<b>118,900</b>	<b>112,400</b>
<b>Sector Financing Sources</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Central government</b>								
– Maintenance	2,100	2,400	4,300	5,400	6,900	6,600	7,000	7,400
– Construction	25,200	29,000	23,600	26,600	30,200	73,300	94,700	94,400
– Toll collection costs	0	0	0	0	310	700	630	n/a
<b>Local governments</b>								
– Maintenance (UB)	800	800	800	800	900	2,400	2,500	2,500
– Other areas (estimates)	200	300	300	300	300	500	500	400
– Construction (estimates)	1,300	1,700	2,400	2,400	3,900	21,500	9,900	3,200
<b>Total construction</b>	<b>26,500</b>	<b>30,800</b>	<b>26,000</b>	<b>29,000</b>	<b>34,200</b>	<b>94,900</b>	<b>104,700</b>	<b>97,700</b>
<b>Total maintenance</b>	<b>3,200</b>	<b>3,500</b>	<b>5,500</b>	<b>6,600</b>	<b>8,200</b>	<b>9,600</b>	<b>10,100</b>	<b>10,400</b>
<b>Total investments</b>	<b>29,700</b>	<b>34,400</b>	<b>31,500</b>	<b>35,700</b>	<b>42,400</b>	<b>104,500</b>	<b>114,800</b>	<b>108,200</b>

n/a = not applicable, UB = Ulaanbaatar.

\* Estimates 2002–2004.

Source: ADB estimates, based on MRTCUD/DOR data.

**Table 4 Road Sector Financing Sources and Investments**  
(Constant 2009 MNT million)

	2002	2003	2004	2005	2006	2007	2008	2009
<b>Sector financing sources</b>								
Central government	54,300	59,500	48,800	49,900	55,400	110,100	110,400	101,800
Local governments	8,400	10,000	11,800	10,600	12,300	37,500	18,500	10,500
<b>Total financing sources</b>	<b>62,700</b>	<b>69,500</b>	<b>60,700</b>	<b>60,500</b>	<b>67,700</b>	<b>147,600</b>	<b>129,000</b>	<b>112,400</b>
<b>Sector investments</b>								
Total construction	52,700	58,200	45,500	45,200	50,900	130,500	113,600	97,700
Total maintenance	6,400	6,700	9,600	10,300	12,200	13,300	10,900	10,400
<b>Total investments</b>	<b>59,100</b>	<b>65,000</b>	<b>55,100</b>	<b>55,500</b>	<b>63,100</b>	<b>143,900</b>	<b>124,600</b>	<b>108,200</b>

Note: Totals may not always add up due to rounding.

Source: ADB estimates, based on MRTCUD/DOR data.



- **The state road fund** was designed as a multipurpose fund, potentially financing all sector capital expenditures. Most of the fund revenues come from a Road Fund fuel tax, which constitutes only a fraction of taxes levied on gasoline and diesel. This fraction was initially set at 13% of total import cost in 1991,<sup>24</sup> but this was translated into a fixed tax rate per volume, which has not changed since 1995.<sup>25</sup> In addition, it was planned that the state road fund could receive other revenues, including road toll revenues, a percentage of the vehicle licensing tax, and state budget financing, as well as loans. The state road fund was initially managed by the MOF and DOR. In 2000, the government enacted its transfer to a Road Board, which was to be created.<sup>26</sup>
- **Local road funds** were created to channel the proceeds of the vehicle tax—an annual licensing fee—collected by each aimag and by the capital city. The tax rates are set by national law and are 10%–15% higher in urban areas.<sup>27</sup> Although the law gives the Ministry of Roads, Transport, Construction and Urban Development the power to determine the proportion of the vehicle tax that should be received by the local road funds and the share that should accrue to the state road fund, the local administration actually has retained all the tax revenues. Several control procedures were set but are no longer in use, including preparation of an investment plan, to be determined with the MOF and DOR, and minimum requirements for managing, contracting, supervising, and paying for works.<sup>28</sup> In practice, all tax revenues have been spent largely independently by the local government (see Section 7).

**Gradually, the state road fund fuel tax lost of its importance in sector financing.** By design, the tax base of the state road fund has nominally progressed at the same speed as fuel sales, which increased by 70% from 2002 to 2009. However, because the tax rate was not revised, it fell in real terms by about the same proportion during the same period. Overall, Road Fund fuel tax revenues have not significantly changed in constant terms. What has changed is the proportion of sector revenues that go to the state road fund: the proportion in 2007–2009 was only half of what it was in 2002 (Table 5 and Figure 9).

**At the same time, road tolls have failed to become a credible alternative financing source.** The principle of tolling was inscribed in the Road Act and was enforced in 2002 by the DOR. Since then, the DOR has collected a fee of MNT500 (cars) and MNT800–MNT1,500 (other vehicles) at the entrances and exits of the main urban areas. However, tolls still represent less than 1% of sector resources—tolls collected in 2008 amounted only to MNT830 million. Net revenues are even lower. Toll collection has proved a very inefficient way to raise resources for the sector—collection costs have represented on average 80% of toll revenues. This level is exceptionally high: toll collection costs for standard expressways are normally about 10%, whereas a centralized government tax would cost not more than 1.5% of its revenues.<sup>29</sup>

**The state road fund has been limited to routine maintenance expenditures.** Because earmarked resources were stagnating while road maintenance needs were growing, the government, in

<sup>24</sup> Government of Mongolia. 1991. *Road and Road Transport Policy Statement*. Ulaanbaatar.

<sup>25</sup> Tax rates are as follows: gasoline of up to 90 octane = MNT20,350 per ton, gasoline of more than 90 octane = MNT25,700 per ton, and diesel = MNT2,140 per ton.

<sup>26</sup> Law on the Road Fund and Road Board (2000).

<sup>27</sup> Vehicle and Transport Facilities Tax Law (1997).

<sup>28</sup> Order No. 47/81 of the Infrastructure Development and Finance Ministers, dated 15 March 2000.

<sup>29</sup> Organisation for Economic Co-operation and Development. 2006. *Tax administration in OECD and selected non-OECD countries: Comparative Information Series*. Paris.

**Table 5 Sector Taxes and Road Fund Revenues**  
(MNT million)

	2002	2003	2004	2005	2006	2007	2008	2009
<b>Non-earmarked sector revenues (excluding value-added tax)</b>								
Special excise tax on fuel and gasoline	18,266	21,254	24,809	25,166	26,208	29,304	27,502	58,566
Special excise tax on vehicles	6,028	10,550	14,733	16,704	26,141	38,939	64,291	33,564
Customs duty on fuel*	4,122	8,247	11,365	16,313	19,935	22,935	25,935	28,935
Customs duty on cars and parts*	3,094	4,207	5,295	5,930	7,031	9,735	16,073	8,391
<b>Subtotal</b>	<b>31,510</b>	<b>44,258</b>	<b>56,202</b>	<b>64,113</b>	<b>79,314</b>	<b>100,913</b>	<b>133,800</b>	<b>129,456</b>
<b>National Road Fund</b>								
Road Fund fuel tax	4,850	5,703	6,107	5,940	6,037	6,666	9,014	9,202
Annual vehicle tax	3,300	3,984	4,826	5,060	5,270	6,302	7,784	7,784
Net revenue of road tolls	n/a	n/a	n/a	n/a	103	80	227	n/a
<b>Subtotal</b>	<b>8,150</b>	<b>9,687</b>	<b>10,933</b>	<b>10,999</b>	<b>11,409</b>	<b>13,048</b>	<b>17,025</b>	<b>16,986</b>
<b>Total sector revenues (excluding value-added tax)</b>	<b>39,660</b>	<b>53,945</b>	<b>67,136</b>	<b>75,113</b>	<b>90,723</b>	<b>113,960</b>	<b>150,825</b>	<b>146,442</b>

n/a = data not available.

\* Estimates 2007–2009.

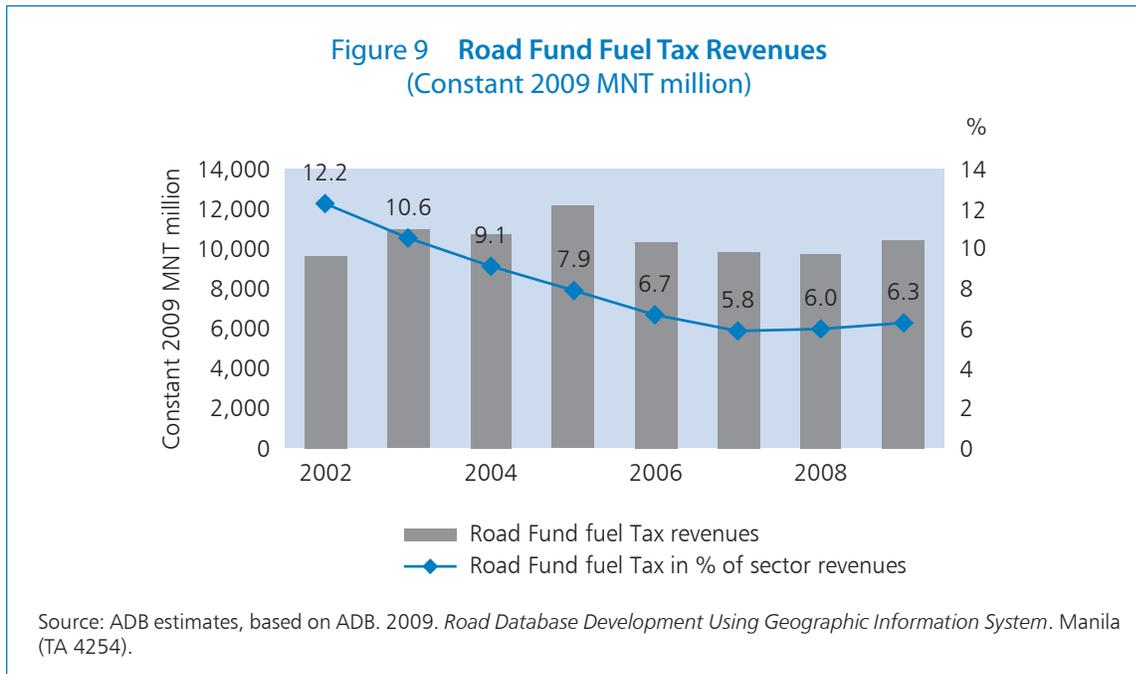
Note: Totals may not always add up due to rounding.

Source: ADB estimates, based on ADB. 2009. *Road Database Development Using Geographic Information System*. Manila (TA 4254).

practice, allocated a larger share of the state road fund to routine maintenance (Figure 10). Likewise, although the state road fund had initially been receiving state budget grants and financed all sector expenditures, beginning in the 2000s, the government chose to finance construction investments directly through the state budget and the development fund (Figure 11). In 2009, the state road fund barely covered routine maintenance and maintenance equipment allocations, all other capital and administrative expenditures being funded by the state budget.

**Overall, the effect of the state road fund on the sector has probably been limited.** In 2004, the government created the Road Board to strengthen the governance of the sector and particularly to control state road fund expenditures. However, the Road Board was never fully effective and ceased operations in 2007 (see Section 4). Generally, the state road fund has been recognized by stakeholders as a good way to provide stable funding for road maintenance. In 2008, the parliament explicitly decided to retain the state road fund, at a time when it was abolishing other revenue earmarking. However, in 2009, the government opted not to mention the state road fund in its budget law, for the first time since 1991, leaving the sector wondering whether the fund was still operational. However, this did not prevent maintenance expenditures from rising. Looking back, the fund's presence was neither responsible for the gradual nominal increase in maintenance expenditures during the past decade nor had an influence on the massive chronic underfinancing.

**In its current form, the state road fund would soon prove poorly adapted to finance even routine maintenance.** Since 2002, in real terms, routine maintenance allocations have progressed at 8% annually, compared to 1% for state road fund proceeds. Because the government has not funded maintenance through normal budget sources, it is likely that the state road fund structure has actually capped maintenance expenditures rather than supporting them; since 2007, routine



maintenance has decreased in real terms and no periodic maintenance has been undertaken. This limitation should prove more constricting as maintenance needs grow.

## Road Asset Maintenance Needs

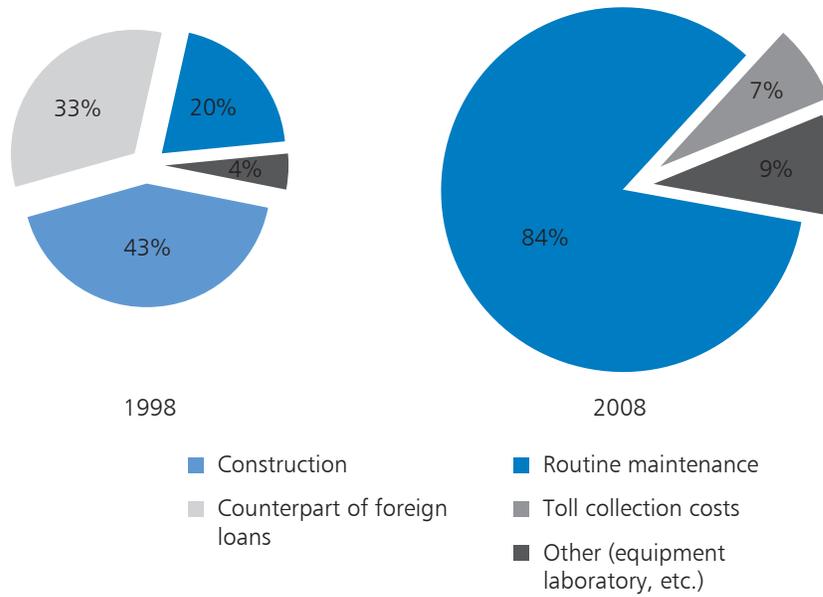
**Which network to maintain?** In the case of Mongolia, the formal network—paved roads, gravel roads, and improved earth roads that feature some sort of drainage and shaping—had a total length of 6,738.8 km in 2010. Those roads require routine and periodic maintenance and, when maintenance has been delayed too long, rehabilitation or reconstruction. To this number, it is necessary to add a network of natural tracks, corresponding to less than half of the national registered roads (4,251 km) and to 96% of the local network (36,637 km). Such natural tracks currently receive almost no maintenance, despite being an important asset to the country. For the purpose of this estimation, it is assumed that the natural earth roads part of the national network can be routinely maintained at one-third of the cost of the formed network, and that local roads of this type should receive a minimal allocation of \$50 per kilometer annually to cover occasional clearing and emergency works.

### How much is necessary?

- Routine maintenance.** Two estimates were undertaken for this study. First, based on typical maintenance costs observed in similar countries, routine maintenance needs are estimated at \$10.6 million (MNT14.8 billion) for the national network and \$4.2 million (MNT5.8 billion) for the local network. Second, based on the government's maintenance norm,<sup>30</sup> routine maintenance needs are estimated at \$17.2 million (MNT24.1 billion) for the national network and \$7.6 million (MNT10.7 billion) for the local network (Table 6).

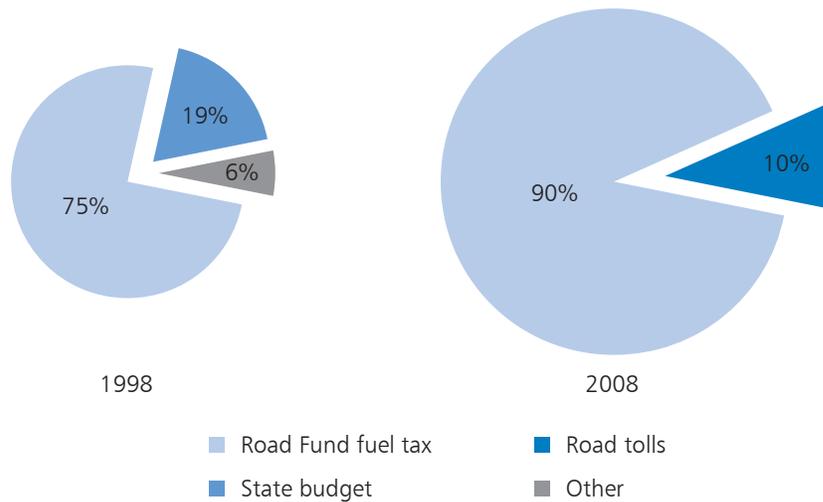
<sup>30</sup> Ministry of Infrastructure Development. 2000. *Basic Cost Normatives for Road and Bridge Repair and Maintenance Works*. Ulaanbaatar. This 2000 norm defines the annual routine maintenance costs per km for budgetary purposes. MNT 2000 were converted to MNT 2009 using the Mongolian Consumer Price Index.

Figure 10 State Road Fund Expenditures (1998 and 2008)



Source: ADB estimates.

Figure 11 State Road Fund Revenues (1998 and 2008)



Source: ADB estimates.



Table 6 Routine and Periodic Maintenance Needs

	Length (km)	Typical Cost (\$ per km)		Necessary Budget (\$ million)		Total (\$ million)
		Routine	Periodic	Routine	Periodic	
National Roads						
Paved roads	2,181	1,500	2,875	3.3	6.27	9.54
Gravel/improved roads	2,790	1,500	2,500	4.18	6.97	11.15
Natural roads	6,248	500	150	3.12	0.94	4.06
<b>Subtotal</b>	<b>11,219</b>			<b>10.58</b>	<b>14.18</b>	<b>24.76</b>
Local Roads						
Paved roads	509	1,500	2,875	0.76	1.46	2.22
Gravel/improved roads	1,055	1,500	2,500	1.58	2.93	4.51
Natural roads	36,468	50	150	1.82	5.47	7.29
<b>Subtotal</b>	<b>38,031</b>			<b>4.17</b>	<b>9.86</b>	<b>14.03</b>
<b>Total</b>	<b>49,250</b>			<b>14.75</b>	<b>24.05</b>	<b>38.80</b>

km = kilometer.

Note: Totals may not always add up due to rounding.

Source: ADB estimates, based on ADB. 2009. *Road Database Development Using Geographic Information System*. Manila (TA 4254).

- **Periodic maintenance.** A proper estimate of periodic maintenance needs should be based on the actual age and condition of the roads. This information will only be available after the completion of an ongoing ADB TA.<sup>31</sup> Based on standard costs and a normal schedule between periodic maintenance works for the levels of traffic observed, periodic maintenance costs were estimated at \$14.2 million (MNT19.9 billion) for the national network and \$9.9 million (MNT13.8 billion) for the local network (Table 6).
- **Rehabilitation.** Some roads that have not received appropriate periodic maintenance are now in need of heavier rehabilitation works. In 2007, it was estimated that 183 km of national roads would need full rehabilitation during 2008–2012, at a cost of \$42.1 million, and that another 352 km would need a combination of rehabilitation and upgrade works (lane widening from 6 m to 7 m), at a cost of \$80.8 million.<sup>32</sup>

## Current and Future Financing Gaps

Current maintenance budgets cover only 20% of routine and periodic maintenance needs. In 2009, it is estimated that Mongolia spent MNT10.4 billion (\$7.4 million) on road maintenance. Overall, it is estimated that routine and periodic maintenance of the current national network to appropriate standards would require an average \$38.8 million (MNT54.3 billion), \$24.6 million provided by the central government and \$14.2 million provided by the local governments. If the current practice of not maintaining the natural tracks were continued, \$27.4 million would still be necessary (\$20.7 million to be shouldered by central government and \$6.7 million by local governments). To clear the rehabilitation

<sup>31</sup> ADB. 2009. *Road Database Development Using Geographic Information System*. Manila (TA 4254).

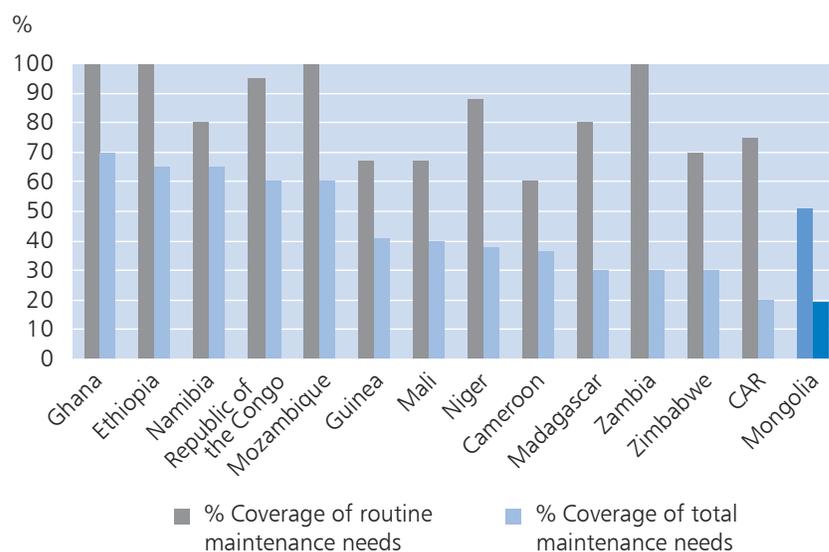
<sup>32</sup> Government of Mongolia. 2007. *Road Master Plan*. Ministry of Roads, Transport and Telecommunications, with World Bank funding.

backlog, an additional \$20 million would be needed over 6 years. The degree of underfinancing observed in Mongolia is exceptional by global standards (Figure 12).

**Where are the financing gaps?** In practice, the government has prioritized the routine maintenance of the paved network, which is a reasonable strategy (Table 7). Total budgets provide for about 80% of such routine maintenance needs. However, other maintenance needs have been totally disregarded. The main challenge is to allocate new resources for periodic maintenance and for basic maintenance of the most trafficked parts of the natural network.

**How will the situation evolve in the future?** The situation has actually improved since the end of the 1990s, when only 10% of maintenance needs were covered by budget allocations, but has declined since the middle of the 2000s, because of rapid inflation and network expansion. In the future, the development of the network and the growing volume of traffic will further increase maintenance needs. If the government's investment goals are to be achieved, maintenance needs would increase by 50% by 2012 and would double by 2021. If the current financing framework remains as it is, the maintenance coverage ratio for the national network would likely degrade from 21.5% in 2009 to 17%–19% (Figure 13).

**Figure 12 Coverage of Maintenance Needs, Compared with Selected African Countries**



CAR = Central African Republic.

Source: ADB estimates and World Bank. 2006. RMF Matrix 2006. Washington, DC.

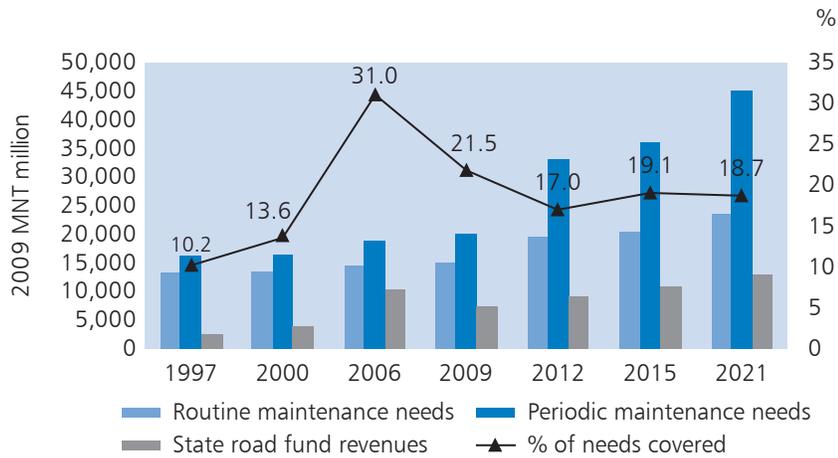
**Table 7 Percentage of Maintenance Needs Covered by Budgets (2009)**

	Routine Maintenance		Periodic Maintenance	Total Needs
	National Network	Local Network		
Formed network	71.4	92.5	0	27.3
Natural network	0	0	0	0
Whole Network	50.3	52.0	0	19.3

Source: ADB estimates.



Figure 13 Maintenance Needs Forecast through 2021



Source: ADB estimates.

## Costs of Insufficient Road Maintenance

It is very likely that insufficient road maintenance has led to an important asset loss, constraining national economic development, national integration, and poverty reduction.

- Insufficient maintenance has been costly to the government.** Because rehabilitation costs in Mongolia can be five to ten times higher than the cost of periodic maintenance, no road should be allowed to deteriorate to a level of poor condition, unless there has been a decision to abandon such a road. Under the rough assumption that all paved roads in poor condition (about 40% in 2006) would ultimately require rehabilitation (at an estimated cost of \$300 million) instead of simple resurfacing/regraveling (at a cost of \$40 million), the total loss of asset value to the government for this part of the network would amount to \$260 million (MNT364 billion).<sup>33</sup>
- Insufficient maintenance has been costly to society.** Because the cost of operating vehicles rises as the roads deteriorate, inaction likely has translated into higher transport costs. In turn, this has contributed to the very poor quality of access to the distant regions and to the high costs of basic commodities, particularly outside the capital city. In classic transport economics, \$1 unspent on road maintenance translates into about \$4 of loss to the society, most of which is felt long afterwards. Box 3 shows typical effects of maintenance neglect in other countries.

## Case for Action

**A reform of maintenance financing is necessary.** The current financing framework has consistently provided insufficient resources for maintenance, translating into poorer than expected transport conditions. With large investment plans ahead, the current maintenance framework will be increasingly irrelevant and would likely lead to a major loss of assets in the medium term.

<sup>33</sup> Based on a cost of \$220,000 for paved road reconstruction and \$100,000 for gravel road reconstruction.

It is possible to allocate sufficient resources to maintenance in a sustainable manner. There have been many calls to increase maintenance resources during the past 15 years, with only moderate results so far.<sup>34</sup> Although resources have increased, so have needs, leaving the financing gap as wide as before. Still, there are no fundamental obstacles to improving the financing framework. First, because sector resources are largely sufficient to cover all needs, the challenge is to channel more of those resources toward actual road maintenance, particularly periodic maintenance. Second, because the existing framework of a Road Fund provides a healthy way to finance maintenance without the need for far-reaching institutional reform, the challenge is to undertake technical adjustments that will enable the fund's resources to be commensurate with and grow at the same pace as the expenditures it should finance.

### Box 3 The Consequences of Road Neglect

#### The Case of Ghana (1980s)

Road deterioration can make an economic crisis worse. In Ghana, a good road network was built before 1970, but it later suffered from serious neglect. By 1984, about 60% of the main paved roads were in a state of moderate to severe deterioration. Important sections had become almost impassable, and access to some interior areas had been severely curtailed. Transporters refused to use some roads because they did not want their vehicles to break down.

By the middle of the 1980s, transport costs had increased in real terms by about 50% on main roads and more than 100% on rural roads, which had suffered even greater neglect. In many areas, the market rate for transporting fertilizer was as high as \$1 per ton-mile. These high costs cut deeply into farm returns, particularly for poor farmers in areas away from main roads; some villagers could no longer move their cocoa stocks to regional depots. During the 1982–1983 famine, poor roads prevented the transport of food from areas with a surplus to areas facing starvation. The high cost of transport also hit the timber industry. Logs moving from the Kumasi area for export through Takoradi Port were trucked over a 500-kilometer (km) route because the direct road, which is about half as long, was broken down. The detour added \$15 to \$20 for each ton of logs exported.

Source: Adapted from World Bank. 1988. *Road Deterioration in Developing Countries*. Washington, DC.

#### The Case of Brazil (2000s)

Decentralization of 11,500 km of Brazil's federal network was initiated in 1997. Since then, the process has suffered various delays as federal and state authorities disagreed about management and maintenance responsibility. As a direct consequence, the condition of the roads concerned has been severely deteriorating, due to a 10-year absence of minimum care for this infrastructure. In 2008, the actual cost of the network was compared with a hypothetical situation in which the roads had been appropriately maintained. It was estimated that the neglect had already cost Brazilian society \$2.4 billion and would cost nearly \$1 billion in the future. Total net cost of insufficient maintenance was estimated at about \$3 billion.

Source: Adapted from World Bank. 2009. *Brazil: Public Management in the Road Sector: Towards Higher Efficiency*. Working paper. Washington, DC.

<sup>34</sup> Indeed, poor maintenance and insufficient funding was identified as the main sector problem. ADB. 1995. *Report and Recommendation of the President, Proposed Loan and Technical Assistance Grant, Roads Development Project (Mongolia)*. Manila.



## Suggestions

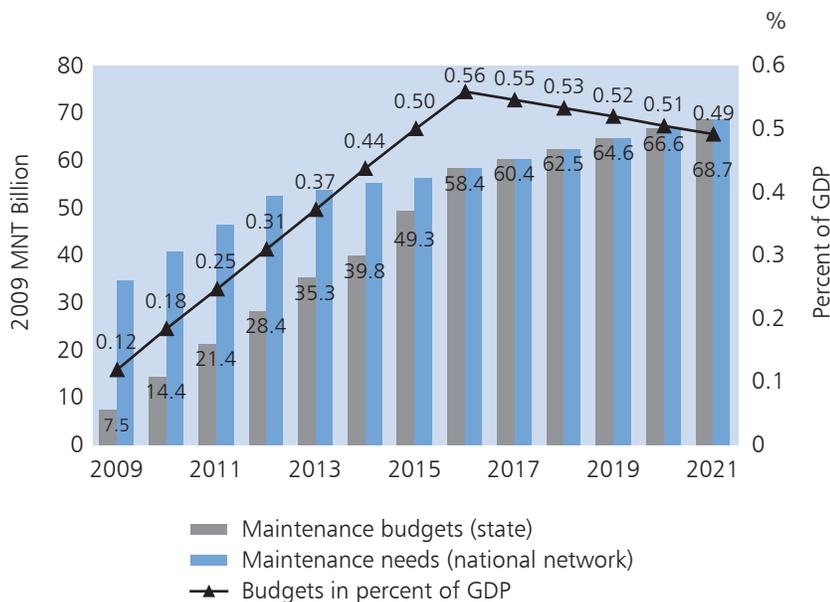
### Suggestion 2.1: Reallocate Sector Resources for Road Maintenance

Progressively increase maintenance budgets to reach 0.5% of GDP. There should be sufficient resources for road maintenance by 2015, when a large share of the network will be completed and when the earliest-build sections will require periodic maintenance. To cover most maintenance needs of the national network, the government would need to allocate 0.5% of GDP per annum to periodic and routine maintenance, compared with the 0.12% of GDP currently allocated. Bridging this gap would require allocating an additional MNT6 billion–MNT7 billion (in constant 2009 MNT) to maintenance each year. By 2015, state maintenance budgets would then reach about MNT50 billion, compared with MNT7.5 billion currently. This budget would cover 90% of needs (Figure 14).

Clear the maintenance backlog in the medium term. Increasing maintenance financing would maintain in good condition the roads recently built. In tandem, it would be necessary to bring the currently most degraded road sections back into the “maintainable network.” Based on the Road Master Plan figures, rehabilitation costs would amount to \$20 million per annum if spread over a period of 6 years (2010–2015) and would correspond to an additional 0.20%–0.25% of GDP. Civil works normally would be included in the government’s capital investment program. Rehabilitation works could be financed partially by loans from development agencies.

Reallocate sector resources from construction to maintenance. To meet maintenance needs, the government could either increase sector resources or reallocate current investment budgets for maintenance purposes. Should road sector budgets remain constant at their current level (2%),

Figure 14 Proposed Maintenance Budget Trajectory on the State Network



GDP = gross domestic product.

Source: ADB estimates, based on an 8% GDP growth hypothesis.

the government would need to allocate 25%–30% of sector resources to maintenance—above the current levels of 10%, but still moderate in comparison with levels observed in comparable countries.

**Define a medium-term maintenance strategy.** The DOR’s practical strategy has been to spread its small resources across the entire network, giving priority to those road sections that are in the worst condition and to routine maintenance over periodic maintenance. This is unlikely to be the most cost-efficient strategy. A more cost-efficient course might be to define a maintainable network that would be kept in good condition while the rest of the network received only minor routine maintenance and waited for rehabilitation. The newer sections of this core network should then receive appropriate periodic maintenance. To define its strategy, the DOR could propose target levels of service by categories of road and traffic volumes, and evaluate the maintenance requirements. Road asset management systems can efficiently support such strategic analysis (see Section 4).

### Suggestion 2.2: Maintain But Restructure the State Road Fund

**Carefully assess the value of the state road fund.** To channel resources to road maintenance, Mongolia can either rely on normal budget processes or increase the resources earmarked to the road sector. Although there are arguments supporting both solutions, international experience shows the value of earmarked resources for road maintenance (see Box 4). Maintaining the existing earmarking appears preferable in the case of Mongolia. The country has the advantage of already possessing all the elements necessary to manage road maintenance efficiently, such as adequate institutions (the Road Fund and the Road Board); sufficient sector revenues (e.g., fuel tax and vehicle licensing tax); and a de facto maintenance focus for the earmarked revenues. What matters is to update the financing and management mechanisms of the Road Fund rather than creating something entirely new.

### Ways to Sustainably Increase Maintenance Resources

The government could consider modifying the resource base and the level of the Road Fund fuel tax to provide sustainable, sufficient resources for maintenance. The following considerations could guide the decisions:

#### Box 4 To Earmark or Not to Earmark?

“**W**hen pressed to adopt earmarking, DMCs [developing member countries] often resist, promising to do better within the government’s existing budget processes. Such promises give lenders little reason for optimism. A government’s pledge to provide adequate funds does not commit succeeding governments, and the many pressing calls on government general revenues make it a difficult pledge to keep. The evidence is that, without earmarking, there is only a small chance of DMCs’ consistently allocating sufficient revenues to meet road maintenance needs. In spite of the evidence, a DMC is likely to argue that *it* is different and that *it* will succeed where others have failed. Unfortunately, a DMC that takes time to test alternatives to user charges is likely to rediscover that alternatives do not work. Time will have been wasted and roads may have deteriorated further.”

Source: ADB. 2003. *Road Funds and Road Maintenance: An Asian Perspective*, p. 13. Manila.



- Resources should ideally evolve with maintenance needs. The determinants of maintenance needs are the unit costs of maintenance works, which move with general inflation and the cost of main inputs (e.g., bitumen or fuel gravel); and the quantity of works necessary, which increases with the size of the network and the quantity of traffic.
- The political costs of tax rate adjustments should be minimized. It would be preferable to make rate adjustment an essentially mechanical process rather than a (more costly) political decision.
- No mechanism can be perfect. It will still be necessary to periodically adjust rates. In addition, the government should retain the capacity to top off fund resources.

### Option 1

**Use an ad valorem levy on fuel.** Under these principles, the simplest mechanism would be to transform the existing Road Fund fuel tax, currently labeled as a tax per volume of fuel sold, into an ad valorem levy on fuel, expressed as a percentage of the sales cost of fuel. Revenues would automatically progress with fuel sales, at the same pace as fuel prices and closely linked to civil works material input costs. However, revenues would be subject to the same variability as fuel costs. To meet all routine and periodic maintenance needs on the state network in 2009, the tax rate should be equal to 8.5% of the fuel import price (based on 2009 prices and sales volumes). Assuming a 10% growth in fuel sales, the rate should be equal to 8% to cover all maintenance needs in 2015.

### Option 2

**Link the levy with the consumer price index.** Another possibility would be to revise the Road Fund fuel tax amount and to specify by law that it changes annually at the same rate as the consumer price index. The government would need to revise the amount of the tax each year, but this would remain a simple administrative act, based on readily available statistics. The legal feasibility of this option would need to be confirmed. Under the same assumptions used previously, the tax should be equal to MNT85 per liter of gasoline (in constant 2009 prices) to cover all maintenance needs.

**The increase of the Road Fund fuel tax rate could be compensated by a decrease in other sector taxes to maintain user fuel prices.** Indeed, revenues from specific sector taxes reached about MNT145 billion in 2009, excluding value-added tax (Table 5), well above the amount required for maintenance. At most, funding 100% of maintenance needs would require only half of this amount. MNT74 billion would cover routine and periodic maintenance needs of MNT54 billion and rehabilitation needs of MNT20 billion for 6 years. The reform of sector financing would amount to a reallocation of government revenues and would not affect users.

## Conditions for a Renewed State Road Fund

**Straightforward earmarking would be inefficient.** As noted, the existing state road fund is valued by sector stakeholders, but its impact has so far been marginal. Increasing the fund's resources should not be a means to escape fiscal discipline. Rather, it should be part of a broader agenda to manage the roads like a business and to finance them with user charges rather than earmarked taxes.

International experience suggests applying the following principles:

- **Dedicate the state road fund to maintenance.** The Road Fund should only finance maintenance expenditure and not construction. Normal revenues should primarily cover



routine and periodic maintenance. The fund would preferably not finance rehabilitation expenditures—which are bulky and punctual—through its normal revenues.

- **Separate the fund’s resources from the government budget.** Rather than a tax, the fund’s resources should be considered a levy, based on the user-pays principle. There should be a clean break between fund resources and the general budget. When necessary, additional financing should come primarily from the user rather than the taxpayer.
- **Strengthen the fund’s management and governance.** The fund will remain a simple earmarking if its resources are still managed under standard budget procedures. The Road Fund should be managed by a strong and independently managed Road Board, free from vested interest groups. A secretariat should handle the fund’s operational management, using commercial accounting systems and performance targets. Fund management should be audited by an independent consultant on a yearly basis. Road Board management is analyzed further in Section 5.

## Improving the Management of the Local Road Funds

**Similar principles could apply to local road funds.** The local road funds and the state road fund present common features. Road fund revenues do not cover all maintenance needs, and revenues do not progress at the same speed as needs. Resources are often spent outside the sector or on construction rather than on maintenance (see Section 5). To be efficient, local road funds should prioritize road maintenance. Their resources also should progress with time; increasing the annual vehicle tax each year to keep pace with inflation would be a positive evolution.

**Consider centralizing Road Fund management, but not necessarily resource allocation.** The Road Board was originally designed to manage both the state and local road funds and to determine the allocation of resources between the national and local networks. Indeed, given the weak capacity of most local governments, there is no clear rationale for maintaining 23 local road fund administrations. There would be economies of scope in having a reinstated Road Board also support local road fund management. The case for pooling resources among funds appears less convincing. In practice, local road funds have been managed independently. Local governments have collected the local annual vehicle tax revenues and spent it on local expenditures. This automatic allocation of sector taxes to the local governments is healthy. It eliminates the need to decide who gets what and guarantees an effective decentralization of responsibilities. If necessary, the revenue sharing rule could be revised. There is no clear rationale for having national roads financed by the fuel tax and local roads financed by the annual vehicle tax. Ideally, the fuel tax should cover variable costs and the annual vehicle tax should cover fixed costs. The government could formulate alternative formulas to distribute fairly road resources between local and national funds, in function of actual needs, following the examples of New Zealand and the United States.

## Examples

**Centrally managed fund (New Zealand).** In 1996, New Zealand established Transfund New Zealand to collect the proceeds of the gasoline excise, a weight–distance charge, and the motor vehicle registration fee and then allocate these revenues among the various central and local transport agencies. The agency then developed a series of funding procedures and guideline documentation to assist local authorities in preparing expenditure programs and funding requests. It defined cost-sharing ratios, which are inversely proportional to the resources of the local government.



**Formulas for distributing resources (United States).** The United States federal-aid highway program distributes funds according to a series of simple formulas combining population, road mileage, and traffic density. For interstate highway maintenance, the average allocation per state is about 2% of total maintenance allocations, with each state receiving a minimum allocation of 0.5%.

### Suggestion 2.3: Update the Road User Charging System

The outlined reforms can be implemented without changing road usage costs. For greater economic efficiency, the government also could consider updating the user price system itself (e.g., total fuel tax levels, vehicle tax, and road tolls). According to common international practice, road user charges should be regularly adjusted to ensure that total charges are sufficient to cover road costs; that charges are allocated fairly among users, reflecting the intensity of a particular user's road usage and damage; and that the fee collection system itself is cost-efficient. This section proposes adjustments that are not critical to the essential functioning of the charging system but that would improve its efficiency.

- **Replace road tolls with more efficient revenue sources.** It is unlikely that road tolls will be viable in Mongolia. A rule of thumb is that toll collection is usually inefficient if traffic is below 5,000 vehicles a day. Given Mongolia's traffic volumes, reducing administrative costs would require a massive increase in toll levels. For example, to reach a 15% administrative cost (down from the current 80%), tolls should be multiplied by five. This could be politically costly and would only marginally increase sector resources (by 4%).
- **Increase the road user charges on diesel.** There is no reason that diesel and gasoline used by vehicles should not be taxed similarly. In 2009, the tax was MNT20,350–MNT25,700 per ton for gasoline and MNT2,140 per ton for diesel. A system of reimbursement or tax exemption can be worked out for non-road consumers of diesel, such as power plants. Alternatively, a weight–distance charge could be specifically levied on diesel trucks (as in New Zealand).
- **Adjust licensing fees as a function of vehicles' usage and damage to the network.** As recommended in several previous studies, the annual vehicle tax for heavy vehicles could be increased to reflect the much higher damage they impose on roads.

### Examples

**Road user charge evaluation tool.** The Road Network Evaluation Tools, developed by the Sub-Saharan Africa Transport Policy Program, provides simple models that help practitioners determine optimal road user charges, estimate revenues, and model network performance under various budget scenarios. A study of road user charges could be undertaken by the DOR, with temporary support from an international consultant.

**Weight–distance charge.** The principle of this levy, used in New Zealand and Iceland, is that all diesel vehicles must buy a license. In New Zealand, these are issued in multiples of 1,000 km. The charge is relatively lower for vehicles with multiple axes and increases with gross vehicle weight.

## SECTION 3

# Modernizing the Management of Road Assets

### Key Findings and Suggestions

#### Findings

There has been a significant aging of Mongolia's roads because no periodic maintenance is undertaken. This could quickly compromise the sustainability of the current asphalt roads.

A basic technical assessment of road maintenance revealed severe weaknesses in the way works are planned, implemented, and supervised and an absence of control of overloading. These factors reduce the efficiency of the limited resources available.

The road maintenance industry has not yet completed its transition from an administered economy to a market economy. The state-owned road maintenance companies (RMCs) receive conflicting incentives and are not financially sustainable.

#### Suggestion: Restructure Road Maintenance Programs and Management

##### 3.1 Develop a Periodic Maintenance Program

A periodic maintenance program would need to cover 20% of the formed network each year and could amount to MNT20 million per annum. An ADB TA has been developing the technical bases of the program, but there remains a need to create operational procedures.

##### 3.2 Scale Up Maintenance Planning, Control, and Supervision

The DOR would need to increase its maintenance planning and supervision staff to adequately handle the increase in maintenance expenditures. This would come with improved self-control procedures on the part of the RMCs.

##### 3.3 Consider Strengthening Contractual Relationships between the Department of Roads and the Road Maintenance Companies

The government could progressively bring the maintenance industry in line with private management by restructuring the maintenance pricing system and developing performance measures and incentives.

##### 3.4 Consider Progressively Introducing a Mixed Public/Private Environment

Increased maintenance needs provide an opportunity to introduce maintenance by contract. The government could pilot performance-based contracts on new roads while using competitive bidding within the RMCs for periodic maintenance.

##### 3.5 Develop an Operational Strategy to Address Overloading

The government could increase administrations' cooperation to tackle overloading.



## Findings

### Road Maintenance Activities

#### Activities

Road maintenance includes all activities necessary to keep a road in operating condition. Routine maintenance includes the general upkeep of the roads, such as restoring drainage, filling potholes and cracks, controlling vegetation, maintaining edges, cleaning road furniture (road signs, barriers, etc.), and grading. It is often combined with emergency works and road operation such as winter maintenance, removing obstacles, and managing traffic. Periodic or preventive maintenance (called, in Mongolia, medium maintenance) rejuvenates the road surface and prevents degradation. Its typical activities—resealing or surface treating the paved roads, and reshaping and regravelling the gravel roads—are commonly undertaken every 4 to 8 years. After a prolonged period of insufficient routine or periodic maintenance, a road reaches a point at which its structure is compromised, making it degrade quickly. A costlier rehabilitation is then needed, which remedies defects by applying thicker surface overlays and/or reconstructing the road's base.

#### Budgets

Mongolia dedicates 0.17% of its GDP, or about MNT10 million annually, to road maintenance. However, this covers only 20% of maintenance needs.

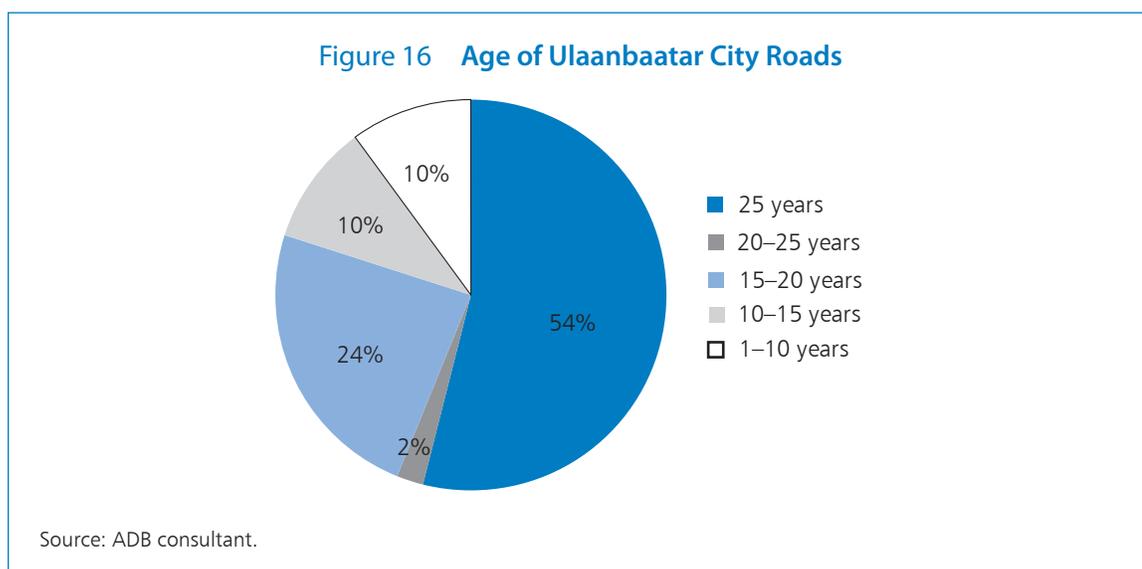
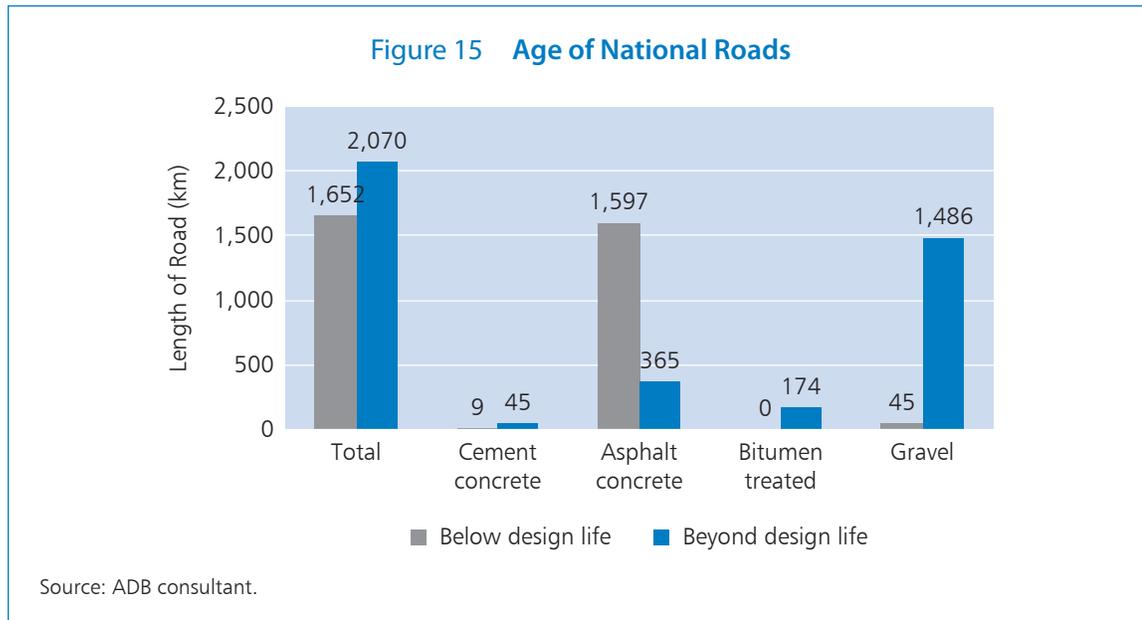
#### Management

The current system in Mongolia ensures that most of the primary network receives routine maintenance. On national roads, the DOR manages maintenance activities under the MRTAUD. Works are contracted to 18 state-owned companies and 4 private, *aimag*-level companies. These conduct routine maintenance of all roads and ensure winter maintenance. The RMCs also undertake local road maintenance under the guidance of the *aimag* governments. During the winter, they form 36 maintenance brigades, continuously fielded, which ensure that snow formation does not block traffic on the main roads for more than a few hours to one day. Ulaanbaatar is an exception to this system; the Roads Department of the capital city contracts out maintenance activities to various contractors.

The maintenance system, however, does not ensure long-term sustainability of the roads. There has been close to no periodic maintenance on the national roads in the past 10 years.<sup>35</sup> The concept of periodic maintenance was actually dropped in 2000 and merged with rehabilitation. Road repairs and patching have been limited to the sections in the most critical condition. Because works are scheduled on a yearly basis, defects can wait for a year before being attended. An abandoned gravel road expected to be paved in the future also was observed. Maintenance of earth roads has been limited to the bare minimum. As a result, 56% of the national surfaced roads are past their design life but did not receive any rehabilitation (Figure 15).<sup>36</sup> Asphalt roads are still young, but most gravel roads are no longer maintainable. Roads in Ulaanbaatar are much older on average; more than half are older than 25 years and only 10% are newer than 10 years (Figure 16).

<sup>35</sup> Surface dressing on 139 km of the Ulaanbaatar–Darkhan–Altanbulag road in 1996–2000 and 84.7 km on the Erdenesant–Arvaikheer road in 2003.

<sup>36</sup> Design life based on Mongolian norms: cement concrete = 23 years, asphalt concrete = 13 years, bitumen treated = 8 years, and gravel = 4 years.



## Weather

Maintenance is particularly challenging in Mongolia due to the frequently poor construction quality (see Section 4) and the extreme weather conditions. Gravel roads can quickly get bumpy because of the dry air and strong winds (10 m/s–20 m/s), which loosen and blow materials. Due to extreme temperature difference (ranging from  $-40^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ ), asphalt concrete roads quickly lose elasticity. They get crocodile patterns during the winter and larger breaks during the spring, when frozen subbase and accumulated moisture in the cracks expand. Bitumen-treated roads form ruts and swells under heavy truck tires as temperature on pavement reaches  $50^{\circ}\text{C}$ . Road signs frequently bend, fall down, or become faded. Drains and culverts can get quickly blocked due to snow or sandstorms.

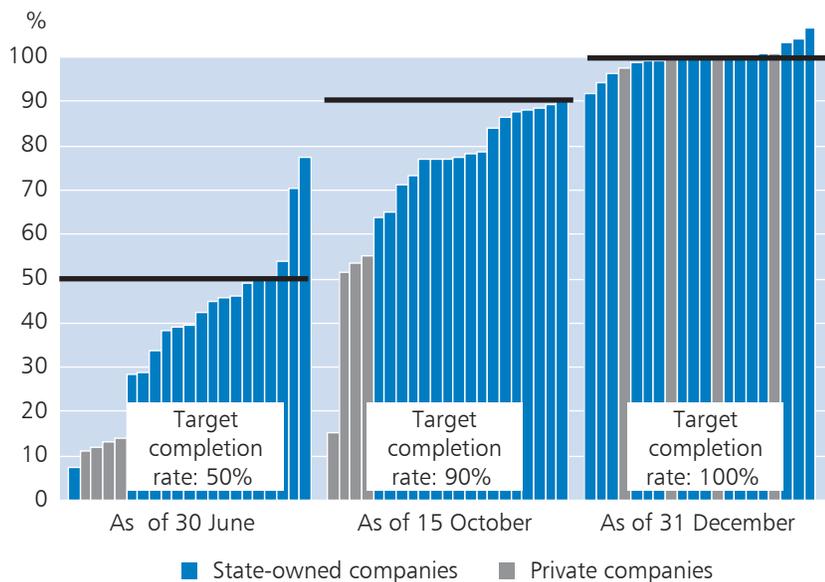


## Technical Issues for Maintenance

Nonetheless, weather in itself is a factor that can be managed, if the right maintenance activities are undertaken. For the purpose of this report, an ADB staff consultant undertook a basic assessment of maintenance activities. Beyond the insufficient resources and the absence of periodic maintenance already mentioned, the assessment revealed the following deficiencies.

- **Works not done on time.** The cleaning and maintenance of shoulders, ditches and drainage, for example, are not sufficiently made before snow melting, and pavement cracks are not sealed before the rainy season. Most companies complete works far behind their contractual schedule (Figure 17). Private maintenance companies appear to be among the slowest performers.
- **Some works are not performed to appropriate technical standards.** Gravel roads receive irregular maintenance and regravelling works are not accompanied by appropriate compaction and humidification. As a result, the benefits disappear quickly. Road furniture is poorly maintained and is frequently in poor condition.
- **Invoices include major arithmetical errors** and are submitted much after works completion, with incorrect supporting documents.
- **Poor control over works.** Companies do not prepare progress reports on input use and works performed. This leads to unrealistic claims. For instance, several RMCs reported important maintenance works done after 15 October, at a time when the winter season normally prevents any important work from being done (Figure 17). Another company even reported that it had performed 85% of its work plan at the end of the year.
- **Infrequent monitoring of the condition of road and road structures,** including bridges and drainage. The condition survey of a road section is undertaken only after construction is

**Figure 17 Expenditures Realized in 2008 by the 21 Road Maintenance Companies as a Percentage of Their Annual Work Plan Targets**



Source: ADB consultant, based on DOR data.

completed, as a way to accept the works, rather than as a way to monitor performance. As a result, the road database is out of date for most of the network.

- **No record is made of critical sections, which are most prone to obstruction** by snow or to deterioration. As a result, no preventive or protective works are undertaken to remedy flood or water damage.
- **No control of overloading.** In practice, no public institution has the equipment, incentives, or power necessary to prevent excessive axle loading. Truck overloading appears to be severe and frequent, by international standards.<sup>37</sup> This is a leading cause of the rapid degradation of the roads, particularly roads on international corridors or close to mining areas.

In many ways, these technical issues reflect managerial problems that constrain the efficiency of the works.

## Road Maintenance Management

Road maintenance management remains halfway between force account and maintenance by contract.

### *Budgeting*

The DOR formulates budget requests based on historical costs. Budgets include maintenance companies' operational costs and equipment purchases. In recent years, budgets have been limited by the MOF to state road fund revenues, covering 50% of the DOR's requests. Budget allocation by *aimag* does not take into account road condition or traffic. Operational planning is based on the demands of the companies in charge of the roads. In April each year, before the beginning of the work season, the five DOR officers overseeing road maintenance make field trips to prioritize works and define their scheduling. Field trip frequency is limited by the distance and the travel costs.

### *Contracting*

The DOR enters into two very basic contracts with companies. The first establishes the company's responsibility to maintain the road (private companies do not take this responsibility). It requires the firm to be available for winter maintenance and emergency works. A second contract defines the works to be undertaken and their timing during the year. It includes aspects of a business plan, such as staff salaries and performance incentives.

### *Prices*

Prices are based on the DOR's unit norm system. This system differs from a standard unit cost system in that it is set by type of technical solution and does not relate to actual quantities. It insufficiently assesses the cost of equipment, which holds prices below the long-run cost of providing services.

### *Supervision*

DOR supervision is mostly done remotely, although the contracts include a provision for monthly supervision. The company attaches to its invoices three pictures of the road: before, during, and

<sup>37</sup> Under a 2-day survey, World Bank consultants measured an average 41 equivalent standard axles per truck.



after the works. There is no regular road condition or input use reporting. On the ground, the road inspectors exert a loose control over the validity of the contracts and the conformity of their execution. Local maintenance companies are in theory also monitored by the *aimag* administrations, but it remains unclear to what degree this function is carried out.

The road maintenance companies have not become financially sustainable.

### Industry

The road maintenance industry formally comprises 22 companies, 18 state-owned and four private, and employs about 500 people (Table 8). The state-owned enterprises are overseen by the SPC. The structure of the industry has changed in the past 20 years under the government's policy to privatize and commercialize the sector. The main evolutions were (i) the formation of the Mongolian Road Company from the original DOR in 1992–1993, under direct administration control; (ii) its separation into 21 stand-alone maintenance companies; (iii) the partial and then full privatization of four of these; and (iv) an attempt to form several holding companies in the early 2000s, abandoned thereafter. With donor support, the government attempted to attract newcomers to the sector by tendering small packages of maintenance works (up to 40 km). The experience was partly successful but only attracted small enterprises. It was abandoned after 2004, when the sector was restructured.

**Table 8 Road Maintenance Company Staff**

Road workers	211
Drivers, operators	195
Superintendent	74
Highway engineer	34
<b>Total staff</b>	<b>514</b>

Source: ADB consultant.

### Management

Companies are staffed with about 30–50 people each, including 10%–15% engineers. They produce audited accounts, business plans, and investments plans. These are approved by the SPC on a yearly basis and are rather rigidly applied. Management staff is appointed by the SPC, through representative management committees composed of civil servants.<sup>38</sup>

### Profitability

The companies are relatively small and do not generate profits from maintenance activities. The typical turnover of a RMC is MNT100 million–MNT300 million (\$65,000–\$200,000). Cost accounting is weak because there is confusion between the unit norm system of the DOR and actual unit costs. Because RMCs do not appropriately compute provisions for the utilization of equipment, they have generally been able to report minimal profits. Those actually refer to bonus given to staff rather than to return on investment. Real profitability is probably negative. As a consequence, equipment is insufficiently maintained and cannot be renewed by the companies. To compensate, the state-owned

<sup>38</sup> Representative management committees have nine members. They reportedly collect MNT5 million per annum from each company as a management fee, which is then distributed to the members on a monthly basis.

companies periodically receive some maintenance equipment from the Road Fund or from donors. Despite efforts, the RMC's equipment pool has dwindled with time, although it remains significant (Table 9). Low profitability also has created a difficulty in retaining qualified staff. It is significant that the companies have fewer operators and drivers (195) than pieces of equipment (362). To generate additional revenues, some RMCs have been involved in the more profitable construction works, which in practice creates conflicts for equipment and staff utilization.

**Table 9 Road Maintenance Company Equipment**

	1996	2008
Grader	60	44
Dump truck	171	120
Roller	61	46
Loader	23	30
Water tanker	16	26
Workshop	3	7
Trailer	17	7
Asphalt paver	10	5
Bulldozer	47	26
Excavator	59	31
Asphalt plant	15	13
Scraper	8	0
Crusher	0	7
<b>Total</b>	<b>490</b>	<b>362</b>

Source: ADB consultant.

## Underlying Sector Issues

**Insufficient resources.** No maintenance system can work efficiently with too few resources. Insufficient funding limits the possibility of measuring works performance. Insufficient funding to the degree observed in Mongolia (see Section 2) also is bound to reveal and reinforce any managerial deficiency. However, because the funding issue has existed for more than 15 years, more resources would not suddenly make maintenance efficient, and other issues also need to be addressed.

**Inefficiently allocated resources.** In the context of tight budgets, it is necessary to ensure that resources are spent where they produce the greatest effect. The DOR's strategy has been to spread resources over the formed network and to address first those sections in the worst condition. This strategy is inefficient, as international experience has shown that it is preferable to first safeguard assets that are in good condition, before they deteriorate, rather than waiting until they need repair, which is more costly; and to prioritize the sections with the most traffic or that form key links in the network.

By and large, the planning process for maintenance is ad hoc and insufficiently relies on technical bases. Several guidance documents, processes, and systems to support maintenance planning and implementation have been put in place during the past 10 years, often with donor support. Seven years after the last interventions, however, only the most basic of these have been put to practical use (Table 10), despite DOR technicians' heroic attempts to maintain the equipment and update the basic data.



Table 10 Technical Basis of Asset Maintenance

	Items	Status	Current condition
Guidance documents	– Routine maintenance manual (World Bank 2000)	Existing	The manual correctly covers maintenance but focuses on processes rather than outputs. It could need an update.
	– Road Maintenance Plan (World Bank 2004)	Not used	This periodic maintenance plan has not been applied.
	– Road works technical specifications and norm prices	In use	Updated regularly by the Department of Roads (DOR) and used in contract management.
Processes	– Annual traffic count program	Operational	Traffic counts are part of maintenance contracts. Counts are done manually every 72 hours at about 20 locations four times during the year and are used in construction planning.
	– Annual pavement condition survey	Operational	The Road Condition Survey team has three staff and employs four temporary staff. Pavement condition is recorded progressively on the existing network and after completion of construction/rehabilitation works.
Systems	– Road database and inventory*	Existing and used, but few applications	This Excel database was produced 5 years ago. It includes a linear profile of the roads, detailed data about the pavement and equipment, and pictures of the main equipment.
	– Road maintenance works archive	In use	Paper files with pictures of the road works are maintained by the maintenance division and used in planning.
	– Software for periodic maintenance planning and project evaluation purposes (Highway Development and Management System [HDM]) <sup>a</sup>	Used for project evaluation	ADB and the World Bank provided training and implemented HDM. DOR has used the software to test the viability of several key investments. However, one key staff member was transferred to another department in 2004, limiting DOR's capacity to use the software for maintenance planning purposes.
	– Routine maintenance planning system	Basic system in use	An Excel spreadsheet is used for recording historic maintenance costs and budgeting.
Equipment	– Road condition survey equipment <sup>a</sup>	Discontinued	Equipment procured under donor loans is no longer in working condition, with the exception of the most basic road condition survey instruments. <sup>b</sup>

<sup>a</sup> Currently upgraded through ADB technical assistance.

<sup>b</sup> There also is confusion between data needed for planning and that needed for project design purposes: formal survey plans include measurement of 18 items, whereas about two (roughness and superficial condition) would be sufficient.

Source: ADB estimates.

**Insufficient technical controls and supervision.** The road maintenance system presently relies on too little supervision and control to produce any visible effect. It is unrealistic to pretend that five maintenance officers located in Ulaanbaatar can cover a country the size of Mongolia. Typically, supervision should range from one visit per month to a full-time site presence, depending on the type and frequency of the works. Inspections should be documented in log sheets and compared with companies' reports. In many countries, supervision is done at two levels: by controllers located on-site or close to the site, and at a central level, where the controllers are themselves audited by maintenance inspectors.

**A business that is not financially sustainable.** Road maintenance has not yet been transformed into a normal industry. Despite the use of companies, and their profit-oriented management by the SPC, road maintenance is still an administered sector in its contracting, pricing, and supervision practices. The insufficient profitability negatively affects works quality, performance incentives, and equipment sustainability. Meanwhile, it prevents any further privatization or private sector involvement.

**An environment not conducive to efficiency.** The sector faces multiple managerial issues. Decision-making lines and payment procedures are long and involve many understaffed entities—the DOR, MRTCUD (both Finance and Transport departments), and Treasury department in the MOF. The RMCs have no performance objectives. Their reporting lines are multiple—to the DOR, SPC, and the *aimag* governments. The DOR also has no leeway to reallocate contingencies from one *aimag* to another, as this is decided politically. Nationally, the DOR and SPC both seek to shift responsibility for road asset ownership to the other. Locally, assets are not even recorded. Overall, accountability for the quality of the roads is critically diluted.

## Case for Action

**The sector will need to change to maintain the future paved network effectively.** Ensuring that the benefits of the roads built today will last is clearly a responsibility of the government. Effectively maintaining the enlarged network in good condition means that the sector will not be able to work on its current ad hoc basis. Paved road network management refers largely to treating the problems before they happen, through routine and, particularly, periodic maintenance. Because repair works are costlier and the consequences of insufficient care only appear later, it requires intensive technical planning and particular quality assurance. Altogether, maintaining a paved road network is managerial rather than just an operational task.

**There is a large body of international experience to guide Mongolia in strengthening its road maintenance management.** Road maintenance in Mongolia has not significantly changed in the past 15 years. In many ways, this part of the road sector has not finished its transition to a market economy. Meanwhile, the rest of the sector has progressed well. Now Mongolia has a vibrant construction industry and well-established contracting practices. The choices made, benefits obtained, and lessons learned by countries that went through the same process can be valuable to Mongolia.

## Example

**Under what conditions could the private sector deliver more cost-efficient services?** International experience shows that the transfer of maintenance to private contractors is unlikely to be a panacea in the short term, although the private sector can provide cost-effective services within a competitive framework, an effective supervision system, and good contractual incentives and terms. A first step could be to build a performance-driven environment within the state-owned enterprises. The MRTCUD and DOR could establish operating regulations equivalent to contractual obligations, competitive financing terms, sanctions and incentives, and a system of reporting and supervision. Upon this basis, they could contract out existing road sections located in the most densely populated areas, or newly built roads. In remote *aimags*, local economies cannot support multiple contractors, and the system of state-owned enterprises will still be needed in the medium-term.



## Suggestions

### Suggestion 3.1: Develop a Periodic Maintenance Program

The first priority is to preserve the paved network that is in good condition, to prevent asset loss. This will require developing periodic and preventive maintenance activities as a standard process of the DOR.

Periodic maintenance could be framed as a new government program for the sector, with clear objectives, accountability mechanisms, and standard operating procedures. Those activities should receive a stable annual budget, which is separate from routine maintenance or capital expenditures. As discussed in Section 2, periodic maintenance should receive about MNT20 billion per annum on the national network, in addition to routine maintenance expenditures. The content of the program could be formulated in a policy document and translated into an operational tool kit. The program would have the following elements:

#### Objectives

One program objective could be to maintain in good to fair condition and at a low cost the portion of the paved network that is defined as maintainable without the need for rehabilitation. Outcome indicators could refer to the quality of the network, maintenance cost per kilometer (compared with annualized rehabilitation costs), and the sustainability of the interventions. Process indicators would refer to the outputs (kilometers and percentage of the network covered by interventions), their timeliness (percentage done within adequate time frame), and the inputs (budgets). A medium-term target would be to cover 20% of the maintainable network in a given year (400 km initially, progressing up to 1,000 km), so that the entire network is covered in 5 years.

#### Scope

The program should clearly define activities covered under periodic and preventive maintenance. There should also be guidelines on the network to be maintained and its priorities; the typical length of interventions, keeping in mind the need for homogeneity and contractor/supervision capacity; the type of activities to be included in a single contract—preferably separating bridge and signalization maintenance from pavement and drainage maintenance; and the appropriate timing or sequencing of the interventions.

#### Programming

At the program level, it would be preferable to request government and parliamentary approval on the strategy and objectives rather than on each contract. To keep programming technical, guidelines should cover road inventory and traffic survey updates, intervention logs, standardized condition and needs assessment, and a matrix of the standard technical solutions to be used, depending on road condition and traffic or, when available, on the basis of a software program (currently being developed with ADB support). Projects for the heavier works normally would be contracted out. To minimize costs and introduce homogeneity, project designers should follow similar guidelines. Preparation times would be minimized if designers could directly use condition surveys and needs assessments prepared by the local RMCs.

### Implementing

The DOR should assess the respective advantages of undertaking the program through the RMCs or to contract it out. A middle way would be to develop mixed contracting procedures in which both RMCs and private sector companies could bid. Whichever solution is selected, the program should be implemented through specific contracts and should have separate reporting and supervision procedures. Within the DOR, there should be staff specifically in charge of planning and implementation, with one person accountable for overall coordination.

### Monitoring

The program's progress should be evaluated at year-end in a short report prepared by the DOR, to be presented jointly with the following year's budget proposal.

### Suggestion 3.2: Scale Up Maintenance Planning, Control, and Supervision

**Strengthen planning.** At present, there is no capacity within the DOR to produce an adequate level of technical planning. The current traffic surveys are a welcome exception and should be maintained. An ADB TA should improve some of the technical bases for maintenance (Box 5). To efficiently manage a larger network, the planning unit of the DOR will need to perform traffic analysis and forecasts, surveys, database management, economic analysis and programming, and technical designs. DOR and MRTAUD management should maintain their commitment to asset management by making available survey budgets and additional qualified staff. Initially, there should be resources for contracting out the most technical tasks, such as analysis using the Highway Development and Management System .

**Enhance control and self-control.** The DOR should tighten the control procedures for the RMCs. Simple monitoring mechanisms could be introduced. A primary check would involve self-recording of inputs used by the companies (including materials, and time sheets for machines and labor). This should be complemented by regular reporting of road conditions and works needs. The procedures for performing basic visual road condition assessments are currently developed under the ADB TA. Finally, the works performed should be recorded within the same database to improve budgeting capacity. This would amount to a monthly report and would greatly enhance supervision capacity.

#### Box 5 ADB Technical Assistance: Road Database Development Using Geographic Information Systems

This \$500,000 grant from the Government of the Republic of Korea supports the Department of Roads (DOR) effort to improve road maintenance management by developing procedures for and implementing road condition surveys, upgrading the outdated road inventory database into a geographic information system-based road asset management system, and producing a periodic maintenance and rehabilitation works program. Information from the road database also will be made available to the public to serve as a basis for the development of intelligent transport systems applications by private operators. Through the technical assistance (TA), the DOR also will receive road survey equipment. The TA was initiated in 2009 and will be completed in 2011. To foster knowledge transfer, the TA is implemented through a local consultancy firm with support from international consultants in road maintenance and intelligent transport systems.

Source: ADB. 2009. *Technical Assistance for Road Database Development Using Geographic Information System*. Manila.



**Develop maintenance supervision.** The five road supervisors for Mongolia are insufficient to manage efficiently the current maintenance program; therefore, that unit would require reinforcement. Needs would be higher if the maintenance program is expanded to include periodic and routine maintenance of a larger network, as this report recommends. Supervision of basic works could include a visual confirmation of the reports, conducted from a vehicle. Supervision of more complex works such as repairs or periodic maintenance needs to be done in the field (Box 6). Daily road management (e.g., operations or emergency works) needs to be close to the roads. There are several options for scaling up supervision:

### Option 1

In the short term, the priority would be to increase road supervisors' travel budgets. The DOR could pilot closer supervision of *aimags* located near Ulaanbaatar and progressively hire more staff. Supervision of periodic maintenance could be contracted out but would need to be audited by DOR officers.

### Option 2

In the medium term, the DOR could seek to open field offices. Prior to this, the DOR would need to evaluate its past experience with field offices and the reasons for their closure in 2004 (see Section 5). Decentralization of the DOR will be necessary in the medium term if the network expands.

#### Box 6 Supervision Needs for Maintenance Works by Unit Price Contracts

**Basic routine maintenance:** Grass control, debris removal, cleaning of drainage system and road furniture. Those labor-based tasks require little equipment or know-how, can be supervised through periodic monthly inspection after works have been completed, and can be specified under short (two-page) contracts.

**Drainage maintenance:** Maintenance and repair of the drainage system can cover a wide range of tasks and prices, which should be specified based on standard drawings. Works can be checked after completion.

**Pothole patching:** These works are particularly easy to check after completion on paved roads—simply compare the number of potholes before and after. For unpaved roads, it is preferable to have a unit price per quantity because it will be impossible to check the exact size after completion. For paved roads, payment can be by the square meter.

**Regrading of gravel roads:** These works, if applied to large sections of roads with low compaction quality requirements, may need only light supervision (once per week) and may be specified with a short bill of quantities, by square meter or by kilometer if the road width is constant. With higher compaction standards, or for heavy regrading, permanent on-site supervision is necessary.

**Regraveling:** This technical work requires close supervision. The supply of material can be paid for based on quantities measured on the trucks, except if the supervisor has the capacity to measure quantities in place.

**Resealing, asphalt overlay:** These works need thorough supervision and established contracting practices. They normally are contracted separately.

**Emergency works:** By definition, emergency works cannot be planned. The established practice is to include them as a contingency in contracts and to pay them on a cost-plus basis.

Source: Adapted from World Bank. 1994. *Contracts for Road Maintenance Works*. Washington, DC.

### Option 3

At the same time, the government could make better use of about 20 road inspectors, part of the SPIA, which are located in the *aimags*. The inspectors could perform some of the tasks required for the supervision of the RMCs, such as certifying monthly progress reports based on visual inspections or recommending contractual bonuses or penalties. The inspectors would need some training, proper guidelines, and adequate vehicles and travel budgets. It would require an agreement between the DOR and the SPIA. This matter is discussed further in Section 5.

### Suggestion 3.3: Strengthen Contractual Relationships between the Department of Roads and the Road Maintenance Companies

The current system in which the DOR is a client of the RMCs, which are under the control of the SPC, is relatively healthy. The SPC treats the RMCs as profit-driven entities and requires a return on capital. However, incentives are misaligned, given the deficiencies of the pricing system and the practical absence of hierarchical control or contractual recourse by the DOR over the state-owned RMCs. This report does not propose to transfer the management of the RMCs from the SPC to the DOR but rather to improve the contractual mechanisms.

**Develop a true unit price cost system.** The DOR would need to include in its price system the costs of equipment depreciation, reasonable returns on capital (perhaps 10%) to enable investments, and transport costs. A pricing reform should involve the MOF, as it will require higher maintenance budgets. Profits would have to be retained within the companies to help them invest independently in new equipment. The government would recover the costs from the RMCs through decreased capital contributions and dividends.

**Introduce performance objectives.** Many of the routine activities performed are standard and can be priced on a kilometric basis, provided the width of the road is the same. The pricing system could be partly based on performance objectives for routine activities (initially based on historic costs) and partly on unit prices for those activities in which quantities cannot be controlled. Performance objectives should remain simple, realistic, and verifiable. There would be two documents regulating DOR's relations with the RMCs: the existing—but modified—contract and a performance agreement.

**Develop performance incentives.** Based on the results of the basic road condition assessments, the DOR could develop simple financial rewards. Performance results should be publicized in a report prepared by the DOR to create emulation between the RMCs. Comparison of performance and costs between years and among companies would improve the DOR's leverage over the companies.

### Example

**Performance incentives.** The National Highway Authority of Pakistan uses a document that merges monthly certificates with contractors' performance assessments. The supervisor writes his opinion, the contractor is invited to comment, and the regional highway manager adds his own conclusion. Finally, the general manager gives the contractor a mark from A to E. The marks are the basis for the yearly updating of the registry of licensed contractors. The marks also are used to designate the best contractor of the year, who is given an honorific award by the minister.<sup>39</sup>

<sup>39</sup> Adapted from World Bank. 1994. *Contracts for Maintenance Road Works*. Washington, DC.



**Simple performance contracting method.** In Seychelles, pothole patching on paved roads is contracted out on a lump-sum basis. Under this type of contract, contractors have an incentive to intervene early and to patch emerging potholes before they grow bigger.<sup>40</sup>

### **Suggestion 3.4: Prudently Increase Private Sector Involvement in Road Maintenance**

If the pricing and supervision issues can be tackled, the increased market for road maintenance works opens a window for introducing private sector maintenance. In parallel, the management of the state-owned companies should be progressively aligned with private sector practices. In the medium term, the government would effectively create a mixed public–private environment for road maintenance.

**Pilot new forms of contracts involving the private sector.** Private sector maintenance could be introduced in various ways, initially as pilots:

- **Maintenance of newly constructed roads.** Instead of transferring new roads to the local state-owned RMC, they could be contracted out through multiyear contracts. Typically, this would be a 2- to 3-year contract, automatically renewed in cases of good performance.
- **Combining a rehabilitation and maintenance contract on Asian Highway.** The government currently is paving the southern part of the north–south corridor to the PRC border, with ADB support,<sup>41</sup> and plans to rehabilitate and widen the northern section from Ulaanbaatar to the border with the Russian Federation. There would be advantages to unifying maintenance of this corridor in two or three contracts and ensuring that rehabilitation works are followed by consistent maintenance. A consultant could support the government in preparing the contract and adapting international standard bidding documents.<sup>42</sup> Latin America provides a good example of experience with such combined contracts (Box 7).
- **Develop small maintenance operators as subcontractors on larger contracts.** Smaller type of works and maintenance of unpaved roads could be contracted out by the RMCs, under guidance from the DOR, and potentially the Equipment Leasing Company (Box 8). This base of small contractors also would benefit the management of local road networks.

**Develop internal bidding procedures between RMCs.** Rather than contracting out periodic maintenance, the DOR could hold limited bidding among RMCs on a geographic basis. This would result in lower costs and prepare companies for a more private style of management. Such procedures are used in the PRC.<sup>43</sup>

**Ultimately, the government could prepare an exit strategy for the RMCs.** A first step would be to consolidate the smallest RMCs. Several RMCs have turnover below \$100,000. This generates inefficiencies through overhead costs and insufficient use of equipment. In addition, state-owned RMCs located in areas with the most private sector activity could be privatized in the medium term. Developing this strategy would be a joint effort of the SPC, MRTAUD, and DOR. It would need to be prepared alongside other sector development activities, as outlined.

<sup>40</sup> Ibid.

<sup>41</sup> ADB. 2004. *Report and Recommendation of the President: Regional Roads Development Project*. Manila.

<sup>42</sup> World Bank. 2006. *Sample Bidding Documents for Procurement of Works and Services under Output- and Performance-Based Road Contracts and Sample Specifications*. Washington, DC.

<sup>43</sup> ADB. 2009. *Report and Recommendation of the President: Anhui Integrated Transport Development Project*. Manila.

### Box 7 Brazil's Experience with Performance-Based Contracts

**B**razil has developed performance-based rehabilitation and maintenance contracts (CREMA contracts) since the early 2000s. In a context where the roads had been severely deteriorating, the objectives were to improve operational efficiency and contractor accountability and to reduce the impacts of budgetary uncertainty. The contracts typically cover 400–600 km and last for 5 years.

During the first years, the contractors recover the functionality of the roads to ensure traffic safety, undertake periodic maintenance on sections that are still maintainable, and rehabilitate the sections in the poorest conditions (about 30% of the extension), following simplified designs. Thereafter, they ensure routine maintenance and complete the surveys necessary to prepare subsequent contracts.

The contractors bid on the combined sum of the monthly installments paid for maintenance recovery (6 to 12 months) and routine maintenance (48 to 54 months), and on the lump-sum price of the heavy maintenance works, paid directly after their completion. Heavier works are paid on the basis of the extension completed (global prices). Routine maintenance payments are paid based on performance, with penalties imposed for noncompliance with targets.

The experience demonstrated lower contractual costs, especially because there were fewer contract amendments; the feasibility of lighter technical solutions for rehabilitation than under standard procedures, while improving road quality; and improved resilience to budgetary uncertainty.

Source: World Bank. 2009. *Performance Based Contracts in the Road Sector: Towards Improved Efficiency in the Management of Maintenance and Rehabilitation. Brazil's Experience*. Washington, DC.

### Suggestion 3.5: Develop an Operational Strategy to Address Overloading

In addition to improving maintenance contracting practices, the government should make overloading control a priority. Overloading generally makes sense at a national level. Heavier trucks generate substantial savings for transport companies, which would compensate for the costs of stronger roads. However, governments rarely have the financial capacity to invest sufficient resources and would have to slow down road network extension. Several options can be considered:

**Develop joint overloading programs.** The DOR officers do not have the legal capacity to impose fines or hold overloaded trucks. The DOR could enter into agreements with the road inspectorate, the traffic police, or the customs authority for that purpose. Fines should be raised to have a meaningful effect on client companies (e.g., mining companies).

**Control overloading at border points.** In most cases, trucks in Mongolia can avoid a control point simply by driving alongside the road. Scales need to be positioned at places of mandatory passage, such as border points or town entries. Checking at the border would protect the export corridor and control commodity exports.

**Develop agreements with mining companies.** Where there is important mining traffic, it is much more efficient to build roads with stronger structures than to control overloading. Mining companies would have an interest in financing the increased capital costs, if this comes with increased authorized loads. The DOR could systematically coordinate road planning with the ministries in charge of mining development, to develop the technical specifications for the roads created and to introduce road maintenance requirements in mining concession agreements.



## Box 8 An Evaluation of the Experience of the Equipment Leasing Company

**Background.** At the end of the 1990s, the Government of Mongolia was in the process of trying to privatize its road construction companies. At that time, 90% of the equipment was older than 11 years and was much outdated in terms of technology. To facilitate the development of the private construction sector, the Equipment Leasing Company (ELC) was founded in 2000 with technical assistance support from the Asian Development Bank (ADB). The company received ADB-financed equipment in two installments, as well as equipment from the World Bank. It was intended that the ELC would lease this high-quality equipment to private companies and use the revenues to maintain and purchase new capital.

**Main issues.** The company very quickly ran into problems regarding fees. High-cost equipment required higher charges than equipment on the private leasing market, although the difference in quality was not immediately perceived by users. To become competitive, the ELC had to cut its prices. In 2004, a World Bank study showed that ELC prices were about 40% higher than market prices, even while remaining below break-even levels. Gradually, the ELC developed a set of regular clients, attracted by the good skill of its operators, but for structural reasons its business never became profitable. Although it was thought that the private leasing market was too small to support several leasing companies, many private companies actually purchased equipment and started leasing it when they did not win contracts. Because the capital costs of their equipment could be amortized with the profitable construction contracts, leasing became a side business for construction companies, priced below full cost recovery. Thus, while a construction company with two graders made an average MNT2 billion–MNT3 billion a year with construction contracts in 2009, the ELC, with five graders, was making only MNT500 million with leasing contracts.

**Lessons learned.** The ELC's business problems have been exacerbated by three factors. The first is the government's requirement that the ELC progressively repay its equipment costs according to a predetermined schedule. Given its low revenues, the ELC retained only about MNT5 million per year for new investments, less than the cost of spare parts. The second factor is the quick aging of the equipment. The ADB- and World Bank–procured equipment raised several issues: the quality of the equipment was reportedly below Mongolian norms, there was an absence of maintenance manuals, procuring spare parts was difficult, and some equipment even failed right away and could not be used. After 6 to 9 years, half of the equipment is in very poor condition, and the ELC estimates that it will run out of equipment within 5 years. The third and most significant factor in the ELC's business problems is the unanticipated rise of competition in the leasing market. Whereas a grader could be leased at MNT8 million per month in 2003, it only commanded MNT6 million in 2009, despite inflation. With rising costs and decreasing revenues, the company has been facing repayment problems.

**Development alternatives.** Overall, the ELC business model does not appear to be adapted to the Mongolian road construction industry environment. As a pure leasing company, it does not bring much value and could actually be slightly distorting the private leasing market. Given the absence of clear economic rationale for maintaining a state-owned leasing company, the government could seek to maximize the value of the company. Four outcomes can be imagined: (i) let the company deplete its capital and close down; (ii) renew the company's equipment stock through a state grant or donor-funded project; (iii) allow the company to retain its earnings and invest in new equipment, potentially with a capital replenishment; or (iv) let the company diversify its business toward construction, potentially leading to a privatization. This last option is suggested by ELC management, but it would require waivers of the related ADB and World Bank loan agreement covenants.

Overall, the ELC's experience calls for governments and donors to create equipment leasing companies only after a thorough market analysis. They are likely to be temporary solutions and appropriate only while the sector is restructuring, so that exit strategies must be anticipated.

Source: ADB.

## SECTION 4

# Increasing the Value for Money of New Investments

### Key Findings and Suggestions

#### Findings

The road construction sector has made sizable advances in the past 15 years, as seen in the increased works productivity, the full privatization of the industry, the common use of competitive tendering, and works supervision.

The public sector, however, could much further improve its planning and management procedures. Management weaknesses have led to major project delays and cost overruns.

As the government plans to scale up its paved network in the near future, investments in quality assurance and technology transfer could generate substantial savings.

#### Suggestion: Develop the Bases for Increased Investment Performance

##### 4.1 Clearly Separate the Operational Responsibilities of the Ministry of Roads, Transportation, Construction and Urban Development and the Department of Roads

The government would need to decide rapidly whether to transfer contract procurement and management responsibilities from the MRTCUD to the DOR or to scale up MRTCUD staff significantly.

##### 4.2 Consider Developing a Standard Investment Cycle

The current ad hoc investment planning and preparation procedures would prove inefficient for managing the future investment program. It is recommended that the number of sector plans be reduced and that an investment cycle and approval procedure be developed for larger projects.

##### 4.3 Further Rely on the Consulting Industry

The DOR could contract out the supervision of the main civil works rather than hiring additional staff. Supervision budgets would need to be increased to improve service quality. To reduce design changes during implementation, the DOR could develop designers' responsibility.

##### 4.4 Undertake a Systematic Pilot Testing Program on Road Pavement

This program's objective would be to identify road pavement design and surfacing options for sealed and paved roads that would present lower life-cycle costs.





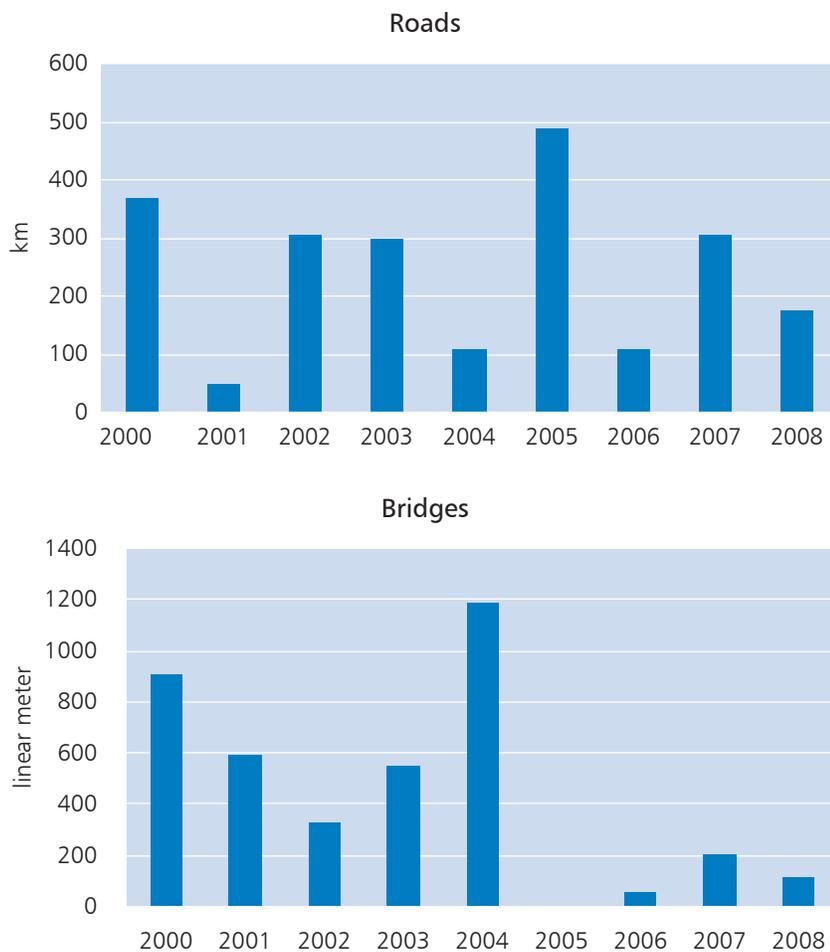
## Findings

### Road Construction Overview

#### Activities

Between 2000 and 2008, the sector completed the construction or rehabilitation of 1,750 km of paved roads, 450 km of gravel roads, and 3,900 m of linear bridge—a 250 km per annum productivity Figure 18. In 2008, civil works were ongoing on 1,640 km of paved roads, 45 km of gravel roads, and about 2,000 m of linear bridges, but only 10%–15% were completed during the year. The road construction work season in Mongolia lasts 6 months, from mid-April to mid-October. This can be shortened because of the late start of contracts or early ground freezes in mid-September.

**Figure 18 Volume of Construction and Rehabilitation Works (2000–2008)**



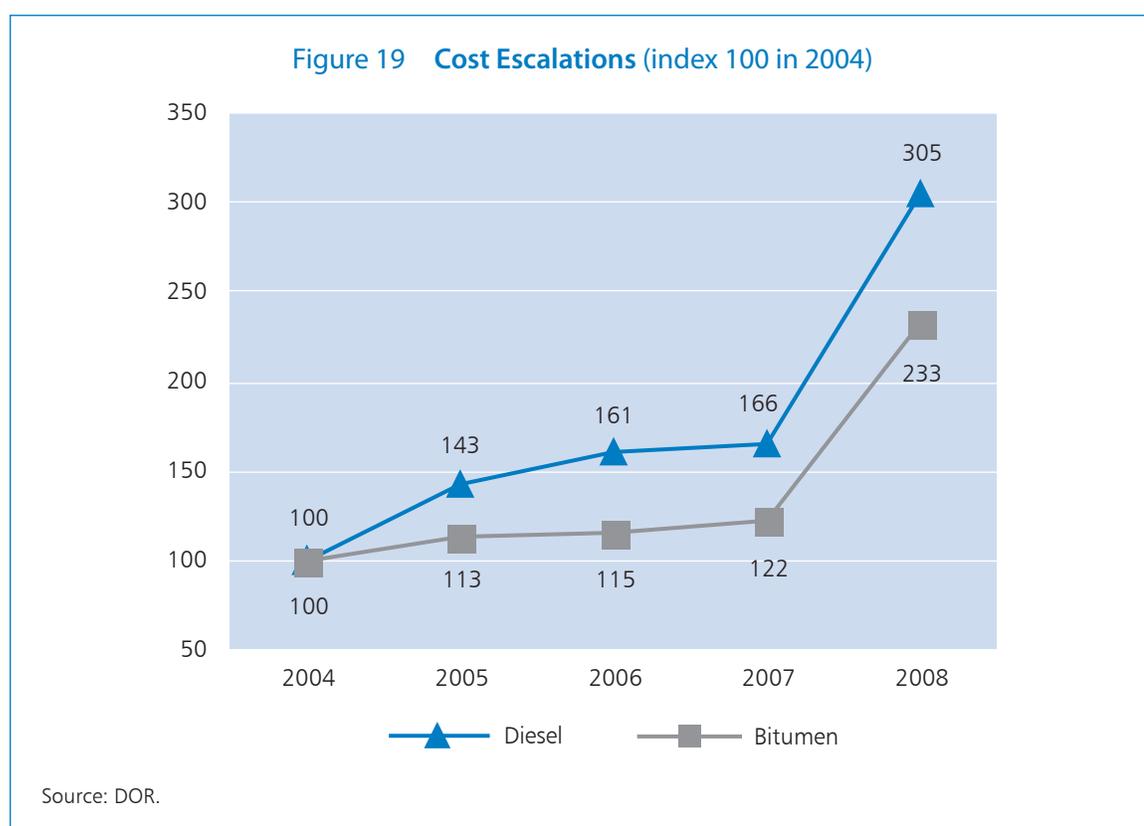
Source: DOR.

## Budgets

As analyzed in Section 2, Mongolia dedicates 1.5%–2% of its GDP, or about MNT100 million per annum, to road construction. This budget has increased four times in nominal terms since 2002. The increase is less important in real terms, given the 100% cumulated consumer price inflation between 2003 and 2008 and the even more rapid inflation of several major input prices (Figure 19). Between 2007 and 2009, the normative cost per kilometer of construction increased by 50%, from MNT204 million to MNT309 million.<sup>44</sup> Road construction is funded by the government budget, the development fund, and foreign donors. The most active donors are ADB and the PRC, and to a lesser extent Germany, Japan, Republic of Korea, Kuwait, Turkey, and the United States, through the Millennium Challenge Corporation (MCC).

## Management

The MRTCUD oversees road construction, partly directly (through tender and planning) and partly through the Department of Roads. The DOR contracts out or makes project designs in house. It supervises government-funded works by force account, with staff hired on a seasonal basis.



<sup>44</sup> Of 6-meter-wide, 5 cm asphalt concrete surfacing in rolling terrain. This corresponds to \$220,000 per km.

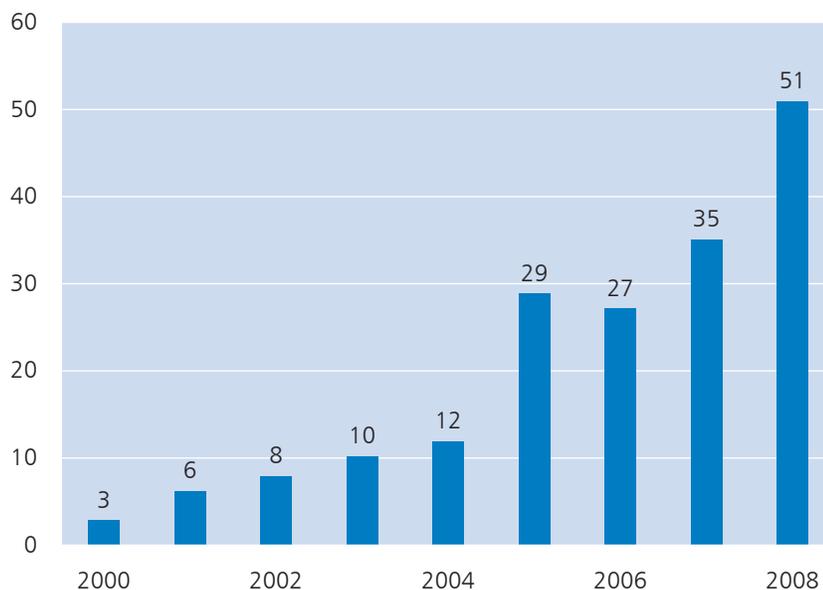


## Advances of the Past 15 Years

In contrast to the road maintenance industry, road construction in Mongolia has progressed greatly during the past 15 years. Although it was fully government-controlled in the early 1990s, the sector was progressively brought to market-oriented contractual and management practices, in line with international practices. Indeed, the government presided over the following changes:

- **Privatization of the road industry.** In two waves (1991–1994 and 1998–2000), the government privatized the works units that were initially part of the DOR and of three independent municipalities. Construction activities were separated from maintenance and transferred to staff through management buyouts and voucher exchange programs. An equipment leasing company was set up to support the creation of the industry. Maintenance companies were kept in the public sector. Today, the government maintains a stake in only one construction company, Erdene Zam, which had received Japanese aid equipment.
- **Use of competitive procurement.** In 1997, the DOR made a decision of principle to award new construction works through competitive bidding. After initial hesitation, this has been widely applied. International competitive bidding is applied in donor projects.
- **Supervision of works.** Since the early 2000s, the government has been contracting individual supervisors for budget-funded construction works. The DOR now employs more than 50 supervisors (Figure 20). It also developed an approval procedure for civil works, under SPIA control.
- **Use of planning documents.** Mongolia's Road Master Plan was developed with support from the Russian Federation and then ADB support in the early 1990s. It was updated in 2007. It has been complemented by an array of special projects (e.g., the Millennium Road) and a medium-term rolling plan (2008).

Figure 20 Supervisory Engineers in the Department of Roads



Source: DOR.

- **Limited standardization of project procedures.** To a limited extent, large civil works preparation procedures have been standardized. According to the public procurement law, the larger civil works contracts have minimal feasibility study requirements. Bidding documents are approved by a central procurement committee, which ensures coherence.

## Areas for Future Progress

For the purpose of this study, an ADB staff consultant undertook a consultation with stakeholders about the main issues in the implementation of road construction works (Box 9). This discussion revealed important planning, management, and supervision weaknesses.

**Weak Technical Planning.** Despite receiving several technical assists, road investment planning and prioritization has not much improved.

- **The multiple investment plans do not have hierarchy and are not prioritized.** There is no correspondence between the long-term government strategy, the Road Master Plan, the medium-term rolling plan, and the budget plans. Long-term strategies, embedded in an array of policy documents, are probably overly ambitious<sup>45</sup> or do not take into account the sector's capacity to deliver.<sup>46</sup> The 2007 update of the Road Master Plan has not yet been endorsed by the government and does not serve as a basis for drawing up medium-term plans. Government officers refer to nine plans, which are often conflicting.<sup>47</sup> Out of the 54 road links referred in the plans, 34 appear in more than six plans. In practice, they are prioritized by government officers. Overall, the plans do not have a strong effect on budgets and their implementation rate is low.
- **Approved plans are often bypassed to introduce unprepared projects.** The annual budgets for road construction include a long list of investments that do not have apparent coherence. During budget preparation and parliament review, small investments unrelated to previous plans appear. Many investments are for small road segments that lack network connectivity, have very low traffic, or duplicate existing road connections.
- **Budget and investment programming does not have sufficient technical basis.** Under government funding, the internationally standard feasibility study stage is omitted and projects begin with a detailed design. Budgets for road or bridge construction are then defined on the basis of normative prices and standard planning, which takes into account neither specific conditions nor price evolutions. However, careful planning of bidding and implementation is necessary to ensure that works can be completed within the 6-month work season. These deficiencies lead to frequent bidding and implementation delays.
- **Economic benefits of government-funded projects are not evaluated.** As in many countries, there is a common understanding that, given Mongolia's specific features, economic analysis should not go against political decisions. Although this might be justified in choosing the projects, the absence of economic analysis reduces the capacity to prioritize projects within budget constraints or the capacity of the industry.

<sup>45</sup> World Bank. 2007. *Mongolia Infrastructure Strategy*. Washington, DC. The total investment plans for 2008–2015 are equivalent to an annual 9.8% of GDP per annum, much beyond the financial and implementing capacity of Mongolia.

<sup>46</sup> The government strategy for 2008–2012 includes 5,000 km of new roads in 5 years, 5–10 times the current production rate.

<sup>47</sup> *Mid-Term Master Plan for Development of Road Network* (1994), *Sustainable Development Program XXI for Mongolia* (1999), "Millennium Road Project" or *New Strategy for Development of Road Network in Mongolia* (2001), *Road Master Plan for Development of Road Network of Mongolia up to 2025* (2000), *Regional Development Policy of Mongolia and Road and Road Transport Development Strategy* (2001), *The Road Links of Mongolia for the Asian Highway Network* (2005), *Millennium Development Goals (MDGs)-based Comprehensive National Development Policy* (2007), *Action Plan of the Government of Mongolia for 2008–2012* (2008), and *Medium-Term Rolling Plan* (2008).



## Box 9 Sector Perception of the Main Construction Works Management Issues

### Donor-Funded Projects

#### Employers' side (Ministry of Finance and Ministry of Roads, Transportation, Construction and Urban Development)

- Unrealistic bidding and implementation schedules
- Delayed bid announcement and evaluation
- Lowest bidder cannot complete the road works within a realistic time frame
- Interim payments during construction period are not released on time
- No provision for price increase
- Too many steps in making decisions on the problems and issues submitted from contractors and the consulting company. Project implementing unit does not have standard International Federation of Consulting Engineers rights and entitlement.

#### Design consultant and supervision consultants' side

- Poor choice of road alignment, which does not take into consideration the natural conditions of Mongolia
- Road pavement structure does not consider the climate and the trucks' actual axle loads

### Government-Funded Projects

#### Employers' side

- Slow bidding process
- Too many steps involved in processing payment applications; contractual obligations on payment times are not followed
- Onerous requirements for contractors (e.g., bank guarantees and works completion times)
- Employers' responsibilities, such as provision of permits on border passes, customs approval, land acquisition, environment, and land use, are not implemented on time

#### Contractors' side

- Insufficient equipment capacity
- Insufficient engineering, technical staff, and skilled workers, or engineering, staff, and worker qualifications and experience are too low
- No working experience and weak management in carrying out the works
- Capacity is already employed on other contracts
- Weak capacity to organize works realistically by estimating the materials required, prices and rates, climatic and geological conditions, and risks

#### Design issues

- Design of roads and bridges is typical and therefore does not fit to local terrain
- Engineering geology investigation and geodesy survey are of poor quality, notably because the ground is frozen or covered with snow during the investigation period. No cross-checking by employer
- Design mistakes found during construction work are compounded by the administration's slow reaction times in redesigning, approving additional financing, and rescheduling (contractor side)

Source: ADB consultant.

### Insufficient Management

- **Responsibility for project management is distributed among too many actors.** Since 2004, the Road and Transport Department of the MRTCUD has had full responsibility for the procurement of civil works. The preparation of budgets and projects is, in practice, a shared responsibility of the MRTCUD and the DOR. Supervision of works has been a responsibility of the DOR. The SPIA approves completed works, with DOR operational support. Payments involve the supervisors, DOR, MRTCUD (Finance and Administration Department, Department of Roads and Transport [DRT], and the state secretary), and MOF (Budget, Coordination and Policy Department, and the state treasury). Contract amendments involve the same actors, at a more political level. At all levels, there is little delegation of responsibility; the process within the DOR itself can be cumbersome.<sup>48</sup>
- **MRTCUD is critically understaffed.** Notably, only three staff members within MRTCUD's Department of Roads and Transport are in charge of the road sector. They do not have the capacity to cover all of their mandated responsibilities, such as policy making, planning, coordination with donors, and procurement.
- **This leads to procurement delays and difficulty making decisions during implementation.** This combination of a number of weakly staffed actors with veto powers but no accountability has critically diluted responsibility for good delivery of the projects. Because the administrations only reluctantly coordinate, important decisions and processes are repeatedly delayed.
- **This has resulted in implementation delays and, along with the input price rise, has led to major cost increases.** The capacity to make quick decisions is particularly important because a few months' delay can postpone works by a year, given Mongolia's short construction season. Delays lead to dramatic cost increases, in the context of inflation and global input price increases. On one ADB project, for example, weak management led to a 4-year delay and an 80% cost increase (Box 10). Likewise, three large government-funded projects in 2008 suffered from 5 months of procurement delays, during which some input prices rose by 66% (Table 11).

**The performance of project implementation units is contrasted.** There currently are five project implementation units for donor-funded projects: three for ADB-led projects, one under the Kuwait Fund, and one under KfW Entwicklungsbank (Germany). Staffing is financed by the projects and comes from various administrations: project managers are nominated by the MRTCUD, project accountants by the MOF, and others by the DOR. Until mid-2009, these were under the direct control of the MRTCUD. Although this arrangement should have fostered close communication among the various administrations, it actually contributed to the dilution of project ownership, without making much headway in terms of coordination. Acknowledging this, the MRTCUD recently decided to transfer the project implementation units to the DOR.

**There is a need to improve quality.** Several major implementation defects were reported on some of the roads recently completed, with pavement wearing out shortly after completion. Issues range from noncompliance with technical specifications to poor control of quality on-site.

- **Supervision has insufficient budgets and lacks independence.** The DOR normally budgets 2% of construction costs to hire supervision teams of one to three engineers. It is reported

<sup>48</sup> One anecdote observed during an ADB mission: the organization of a field trip for a DOR staff member required director approval and the signatures of five division chiefs, accountants, and cashiers.



Table 11 Procurement Delays on Main Government-Funded Projects (2008)

Projects	Date of Bid	Date of Contract Award	Bid Duration (days)	Price Increase of Fuel from Bid Announcement to Contract Award (%)
102 km of paved road in Murun–Khatgal	24 Feb 2008	29 Sep 2008	218	66
50 km of paved road in Undurkhaan–Sumber	20 Feb 2008	29 Sep 2008	222	66
27 km of paved road in Bayankhongor–Arvaikheer	13 Feb 2008	25 Aug 2008	194	66
100 km of paved road in Khalzanburgedei–Solongot Pass	30 Apr 2008	18 Jul 2008	79	11
Pave 46.8 km of gravel roads in Kharkhorin–Tsetserleg	15 Apr 2008	19 Jun 2008	65	0
50 km of paved road in Bayankhongor–Nariinteel	4 Feb 2008	11 Apr 2008	67	15
15 km of paved road in Ulaangom–Teel	24 Jan 2008	4 Apr 2008	71	15

Source: DOR.

### Box 10 Weak Management: A Case Study on the Regional Roads Development Project

**P**rocurement preparation. This project includes the construction of a 428 km paved road to connect the capital city with the border to the People’s Republic of China. The procurement of the civil works contract was undertaken in three packages: Package A, funded by the Republic of Korea, and packages B1 and B2, funded partly by ADB.

**Initial procurement delays.** The procurement was initiated in the third quarter of 2005. All bids were substantially above the feasibility study estimates, mainly because of input price increases. A new financing decision was reached in the fourth quarter of 2006. Packages A and B1 were contracted out in 2007, but a financial shortfall had appeared on B2, which was split in two contracts (NP1 and NP2). After a year of procurement, a contract for NP1 was signed in April 2008. Because the government did not have the cash available to finance NP2, it launched a procurement process based on a delayed payment mechanism. However, negotiations with a contractor failed in March 2008.

**Implementation delays.** Other delays and issues appeared during implementation: (i) the contractor for Package A stopped all works after only 8% was executed in 2008; and the project had to be rebid; (ii) the contractors under B2 and NP1, which had suffered from input price escalation in 2008, slowed down execution and requested compensation—despite compensations, one of the two contractors did not resume works; and (iii) contractors suffered from 5 months of delays in 2008 before they were authorized to import equipment and foreign workers.

**Cost overrun and resolution.** In 2009, the government agreed on new financial terms with donors, which resumed the project. Overall, a 4-year delay is expected. As input prices increased substantially during the long financing discussions and procurement processes, project cost also was adjusted, from \$78 million to about \$140 million. Additional financing was secured from the Millennium Challenge Corporation and ADB, while the financing from the Republic of Korea was dropped.

Source: ADB. 2009. *Report and Recommendation of the President: Supplementary Financing Assistance for the Regional Roads Development Project*. Manila.

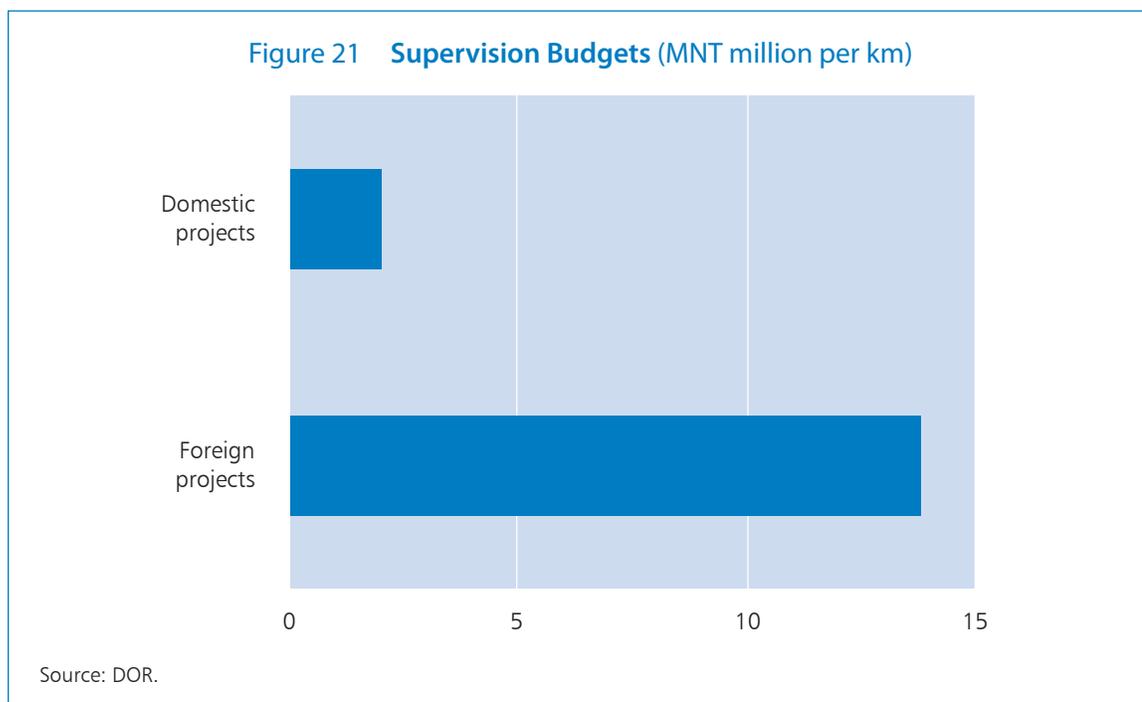
that, at times, supervision budgets have been cut by the MOF. Overall, supervision budgets cover only salaries and allowances, and supervisors must rely on contractors for transport, accommodation, and laboratories. This creates a situation of dependence and reduces the supervisors' operational ability to inspect works, because distances can be up to 100 km. By comparison, supervision budgets under foreign-funded contracts are seven times higher (Figure 21).

- **Pavement technologies adapted to Mongolian conditions have not yet been found.** Mongolian road standards and typical pavement designs were initially based on Russian specifications and then evolved based on trial and error. Common road designs mainly used to aim to protect the road from freezing and thawing through the use of various nonfrost material and insulation layers. As a result, pavement designs now appear conservative and costly (Box 11). For the same low traffic in similar countries, 250–300 mm pavement, associated with a 20% cheaper double bituminous surfacing treatment, would be sufficient. Although several trials have been implemented with donor support (Box 12), the experiences have not yet been rigorously monitored and evaluated.

## Case for Action

The resolution of the division of responsibilities between the DOR and the MRTCUD has been much delayed. This issue represents a major bottleneck in sector efficiency and should be solved quickly.

There is much room to strengthen sector capacity to deliver upon the government's national development goals. Several institutional strengthening measures could significantly improve planning and management capacity, resulting in lower costs and better implementation time frames. An emphasis on supervision and technological research appears timely, because the government





plans to quickly expand the paved road network. This would increase the sustainability of the works and generate savings.

## Suggestions

### Suggestion 4.1: Clearly Separate the Operational Responsibilities of the Ministry of Roads, Transportation, Construction and Urban Development and the Department of Roads

Particularly in view of its small staff, the MRTCUD would need to concentrate on its main policy-making function and delegate to the DOR operational roles in the road sector. This would solidify the DOR's responsibility as project manager, develop its accountability, and greatly benefit the sector. If the MRTCUD wishes to keep its oversight of procurement, it would require a much larger staff to function efficiently. This issue was much debated between the DOR and the MRTCUD in 2009, but no agreement was found. The proposition put forward by the DOR (Table 12) appears a reasonable basis for discussion.

#### Box 11 Road Construction Costs in Mongolia

**Road works costs.** Typical pavements in use in Mongolia have a 500–600 mm thickness and include a 5 cm asphalt concrete surfacing (50 mm of asphalt concrete pavement, 150–250 mm of crushed stone base, and 200–400 mm of nonfrost subbase). Their costs are \$190,000 to \$220,000 per kilometer for a 6-meter-wide road (Class IV) and \$220,000 to \$265,000 per kilometer for a 7-meter-wide road. According to the road administration, the average cost distribution in 2007 was 2.5% for workers' salaries, 19% for transport of materials, 45% for purchase of materials (two-thirds for bitumen), and 33.5% for equipment use. The costs are dominated by materials and transport, given the distances involved and the poor quality of materials generally found on-site for the constitution of the road base.

**Cost increases.** Road works costs increased sharply from 2003 to 2009 under the double effect of increased global commodities prices and the overheating of the Mongolian economy, which led to double-digit inflation and real exchange rate increase. The dollar value of the civil works per kilometer increased by 80%–100% from 2004 to 2008. This led to massive cost overruns and delays on construction projects, as the government was forced to negotiate price adjustments with the companies.

#### Macroeconomic Context (2004–2008)

	2004	2005	2006	2007	2008
Mongolian Consumer Price Index <sup>a</sup>	10.9%	9.6%	5.9%	14.1%	23.2%
US Consumer Price Index <sup>b</sup>	2.7%	3.4%	3.2%	2.9%	3.8%
MNT/\$ exchange rate <sup>a</sup>	1,209	1,221	1,165	1,170	1,268
Diesel price in MNT <sup>c</sup> (index 100 in 2004)	100	143	161	166	305
Bitumen price in MNT <sup>c</sup> (index 100 in 2004)	100	113	115	122	233
Cement price in MNT <sup>c</sup> (index 100 in 2004)	100	133	167	225	242

<sup>a</sup> World Bank. 2009 (April). Mongolia Monthly Economic Update. Washington, DC.

<sup>b</sup> International Monetary Fund economic database ([www.imf.org/external/data.htm](http://www.imf.org/external/data.htm)).

<sup>c</sup> ADB consultant.

Source: DOR and ADB estimates.

### Box 12 New Solutions for Low-Cost Pavements in Mongolia

Under a Japan Fund for Poverty Reduction (JFPR) grant of \$2 million, the Asian Development Bank is helping Mongolia to improve about 33.5 km of local-access and *soum*-center roads in 10 locations and to establish a community-based system for rural-access and *soum*-center road maintenance. The new sealed roads will replace the existing dirt roads, increasing ride quality and reducing travel times and dust generation. The roads will be macadam/cement concrete with a width of 5–6 m and a 1 m shoulder on each side, bringing the total width to 7–8 m. The subbase of the roads will be an embankment 30 cm deep and composed of ordinary fill. This will be covered by the base course of penetration macadam with a depth of 10–15 cm, composed of crushed aggregate. In the case of cement concrete, the pavement thickness will be 10–12 cm. The type of pavement used will depend on the terrain and soil conditions in a given area. The local-access/*soum*-center roads will be constructed primarily by hand and with light equipment.

The program brings the average kilometeric cost of the road to about \$60,000, including consulting services for design and supervision, which is particularly well adapted for low-volume rural roads (100 vehicles per day and 5 years of design life). This compares with \$200,000–\$280,000 per kilometer for a 7 m asphalt concrete road.

Source: ADB. 2008. *Proposed Grant Assistance to Mongolia for the Community-Based Local Road Upgrading and Maintenance in the Western Region of Mongolia*. Manila. (Financed by the Japan Fund for Poverty Reduction)

### Suggestion 4.2: Develop Investment Planning and Implementation Cycles

**Institutionalize planning.** A more institutionalized planning process would be based on a core set of documents approved at a high level and prepared, revised, and monitored by a single technical unit. There probably should be only two multiyear plans. The Road Master Plan would represent the long-term vision of the sector. The rolling investment plan would be its medium-term expenditure framework and would relate projected revenues with investments. Budgets would be structured around large, coherent multiyear budget programs (for smaller investments) and projects (for the largest, but not beyond 400–500 km). The programs would have clearly defined objectives, funding sources, time frames, responsibilities, contractual instruments, and performance indicators. Such structure should probably be defined in a legal or government document, while plans could simply be approved by the MRTUD and MOF.

**Develop a formal investment cycle.** The need for standardized processes has increased with the number of projects undertaken by the sector. After it is included in the sector rolling master plan, a project should follow a predefined cycle. Given Mongolia's flat terrain, there usually is no need for feasibility studies. For new construction, the cycle could consist of a prefeasibility study, a detailed design, procurement and implementation, and evaluation. For smaller investments, prefeasibility and evaluation would occur at the program level. To improve planning coherence, investments introduced during budget discussion that are not part of an approved program would necessarily require prefeasibility studies.

**Evaluate economic benefits of projects.** Rather than confirming the viability of projects, economic analysis could be used as a tool for budget programming and execution. Projects with high returns could be safeguarded from budget freezes and cuts. Simple economic evaluations could be based on standard costs and existing traffic counts and would be updated after detailed design and prior to procurement.



**Table 12 Potential Division of Responsibilities between the Department of Roads and the Ministry of Roads, Transport, Construction and Urban Development**

	Department of Roads' Role	Ministry of Roads, Transport, Construction and Urban Development's Role
<b>Planning and Budgeting</b>	<ul style="list-style-type: none"> <li>– Preparation of long-term and medium-term plans</li> <li>– Preparation of annual plans</li> <li>– Management of plan implementation and reporting</li> </ul>	<ul style="list-style-type: none"> <li>– Plan approval</li> <li>– Plan monitoring</li> </ul>
<b>Contracting and Implementation</b>	<ul style="list-style-type: none"> <li>– Organization of procurement process and preparation of technical evaluation reports</li> <li>– Preparation of contracts</li> <li>– Management of contracts</li> <li>– Supervision</li> <li>– Reporting on execution</li> </ul>	<ul style="list-style-type: none"> <li>– Approval of guidelines for procurement</li> <li>– Designation of procurement committee members</li> <li>– Approval of procurement committees' proposal and issuance of Letter of Acceptance</li> <li>– Review and ratification of contracts</li> <li>– Contract monitoring</li> <li>– Approval of procedures for supervision</li> </ul>

Source: ADB consultant, based on discussions with the Department of Roads.

**Introduce a central technical approval process for major civil works.** This new process could be introduced either after prefeasibility or prior to procurement, for investments above a given threshold (e.g., MNT5 billion). A small working group or committee composed of technicians from the MRTCUD and MOF would review and approve projects on a quarterly basis. Projects would then proceed to the next stage of the investment cycle. Checklists could be prepared to guide discussions.

**Factor in realistic schedules for planning and disbursement.** The MRTCUD and DOR could assess past experience to compute the observed average project preparation, procurement, implementation, and payment time frames. Those indicators would serve as inputs in medium-term planning, project preparation, and disbursement projections. They also could be used to monitor management performance.

### Example

In Brazil, transport investment projects above \$5 million are approved by the federal ministries of finance and planning based on feasibility studies. The Treasury Department developed an investment monitoring and evaluation information technology tool to support management and plan disbursements. It is applied to the government's priority programs, a subset of annual investment that receives preferential budgetary treatment.<sup>49</sup>

### Suggestion 4.3: Expand the Role of the Domestic Consulting Industry

**Contract out supervision of major civil works within increased budgets.** To face the increase in works quantity and to improve quality, the DOR could progressively contract out to consulting companies the supervision of the larger works. Prior to this, the DOR would need to reevaluate the necessary supervision costs and submit a proposal to the MRTCUD and MOF. Several sector participants contacted for this study mentioned raising budgets from 2% to 4% of works value. During

<sup>49</sup> World Bank. 2005. *Project Appraisal Document for the Brazil Road Transport Project*. Washington, DC.

the transition, there might be a need for training on standard contract supervision procedures,<sup>50</sup> but it is expected that the industry could quickly catch up to this new demand. At the same time, the DOR would need to maintain a capacity to inspect works and certify contractors' laboratories.

**Develop design consultants' responsibility.** To increase the incentives for quality design, the DOR could either hold designers contractually liable for faulty designs or keep designers on retainer during implementation so that necessary adjustments can be made quickly.

### Suggestion 4.4: Undertake a Systematic Pilot Testing Program on Road Pavement

**A trial program could be undertaken under donor funding.** The 2007 Road Master Plan proposes the components of a \$2 million–\$3 million technical assistance program (Table 13). As the program is not yet initiated, the government could contact donors and seek grant or loan funding. The program would include an evaluation of the lessons of the various trials already undertaken in Mongolia (see Box 12), a review of experiences in comparable cold/dry climate countries, identification of potential road sealing and pavement design options, preparation and implementation of systematic pilot tests, and monitoring and evaluation.

#### Example

In 2003, Viet Nam pilot tested 16 pavement designs in four regions, with support from the Department for International Development of the United Kingdom and the World Bank. Criteria for selection of options included initial cost, maintenance burden, resistance to weather, durability under characteristic traffic, use of local labor and skills, and availability of material. Trials involved testing on 100–200 m sections, where about 13 options were tested, together with a control section. Monitoring and evaluation were based on detailed protocol, which included guidelines for road maintenance. Based on the results, Viet Nam selected three sealing techniques that presented lower cost and better durability than gravel.<sup>51</sup>

**Table 13 Pavement Design and Surfacing Pilot Testing Plan**

Items	Cost Estimate
<b>Pavement design and testing</b>	
– Review of pavement design methods in similar extreme-climate countries	\$2 million
– Validation of model predictions through an accelerated loading test using a dedicated test ring	
<b>Pavement surfacing study</b>	
– Review of potential savings, taking into account available sealing materials, investments for new equipment, training, and life cycle costs	\$1 million or less if undertaken with the other study
– Study tour to regions with similar climatic conditions where sprayed surfacing is used (Alaska, Iceland, Norway, and Siberia)	
– Trial of sprayed seal application under international field practitioners guidance	

Source: Snowy Mountains Engineering Corporation (SMEC). 2007. *Road Master Plan – Consultant's Report*. Ulaanbaatar.

<sup>50</sup> International Federation of Consulting Engineers.

<sup>51</sup> A discussion of low-cost sealing options and of the Viet Nam case study can be found in World Bank. 2005. *Surfacing Alternatives for Unsealed Rural Roads*. Washington, DC.

# SECTION 5

## Building Modern Institutions

### Key Findings and Suggestions

#### Findings

The road sector in Mongolia underwent sweeping organizational changes over the past 15 years. Following reforms in early 2009, there are again prospects for improved institutional arrangements in the road sector.

Current road institutions are too weak to deliver efficiently on the government's medium-term objectives; thus, institutional strengthening should rank high on the government's agenda. Strengthening efforts should focus on consolidating what already exists rather than on building the institutions anew.

Technical measures alone would not have the desired effect on performance if underlying issues are not considered at the same time. Those issues include the centralized nature of operations, the costs of control, weak accountability, a shortage of human resources, and the limits to the efficiency of political intervention in the sector.

#### **Suggestion: Build the Performance-Oriented Institutions Necessary to Deliver on National Plans**

##### **5.1 Prepare a Medium-Term Road Map for the Department of Roads**

This document would give a perspective on DOR institutional development, potentially up to 2016. The DOR could consider several structural adjustments: creating regional offices, contracting out supervision, phasing out toll operation, and developing an audit capacity.

##### **5.2 Develop the Bases for Results-Based Management of the Sector**

Results-based management can be gradually introduced in the sector through a greater use of policy documents, the stabilization of management, and the development of performance indicators and incentives.

##### **5.3 Consider Reinstating a Renewed Road Board**

A properly functioning Road Board overseeing the Road Fund could greatly improve sector governance. Learning from the past, the board would be focused on maintenance and would hold executive powers; users would make up a majority.

##### **5.4 Improve Governance and Increase Stakeholder Involvement**

To mitigate governance risks, the unit in charge of procurement should be staffed sufficiently and transparency should be increased. To develop stakeholder involvement, some regulatory powers could be transferred to nongovernment professional associations (NGPAs).

##### **5.5 Improve the Effect of Sector Audits**

Sector governance could be strengthened if the DOR developed an internal audit capacity and the National Audit Office undertook performance audits.

##### **5.6 Develop Operational Support Schemes for Local Networks**

Aimag governments are unlikely to have sufficient capacity to manage local networks. Creating a local roads support unit in the DOR, and transferring local road fund financial management to the Road Board, would create economies of scale.



## Findings

### A Frequently Evolving Environment

The road sector in Mongolia has undergone sweeping organizational changes over the past 15 years. These were due to internal factors linked to the transition from a communist-era centralized public works department to a more market-oriented structure, and to external factors, as the sector was affected by a series of administration-wide institutional reforms. There have been repeated changes within the government in the division of responsibilities for defining, approving, and implementing road sector policies. In the late 1990s, the country's road sector institutions seemed to be on a promising path toward developing improved capacity, but they were weakened by frequent changes in the 2000s. Following reforms in early 2009, there again are prospects for improved institutional arrangements in the road sector, and there is an associated need to strengthen institutional capacity.

**The first Department of Roads was established and gradually strengthened by donors in the 1990s.** In 1995, a restructuring of the sector put the state-owned Mongolian Road Company under the management of the DOR, within the Ministry of Infrastructure Development. The DOR became a multipurpose agency in charge of policy formulation and implementation as well as supervision of force-account road maintenance and construction. Two years later, in 1997, a new restructuring occurred. As part of wider changes in government portfolio responsibilities, the oversight of the construction and maintenance units was transferred to the SPC, which then initiated the progressive privatization of the construction units and the corporatization of the maintenance units. At the same time, responsibility for sector policy making was given to a newly created Department of Roads and Transport, under the direct control of the Ministry of Infrastructure Development. The DOR became an implementing agency overseeing operational issues. ADB supported this change through a TA, which helped prepare the organizational structure as well as a human resources development plan.<sup>52</sup> Between 1997 and 2004, the DOR launched important sector initiatives, often with donor support. These included establishing a first engineer training program at the Mongolian University of Science and Technology, inviting bids for construction contracts for the first time, awarding pilot contracts for maintenance, creating an equipment leasing company, pilot testing of new technical maintenance solutions, and introducing new economic planning tools. The role of the Department of Roads and Transport's road unit, which had only a very small staff, was more modest, but it did succeed in establishing the Road Board and in raising maintenance budgets.

**The situation started to deteriorate in the early 2000s.** Political and commercial interest in the sector increased with the size of the budgets and contracts. The development of a competitive private sector improved efficiency but also created incentives for corruption. Although nominations for managerial positions had commonly been influenced by political factors, the required high standard of educational background (a master's or doctorate degree in engineering) ensured strong technical competency within the DOR. In 2001, this changed when the government began appointing managers who were not familiar with the road sector. This led to reduced emphasis on adherence to technical standards and put further strain on the DOR's institutional capacity.

**In 2004, after new elections, the government implemented a large administrative restructuring** to reduce wage overhead. The Ministry of Infrastructure Development gave way to a Ministry of Transport and Tourism and its structure was streamlined. A Roads Department was created within

<sup>52</sup> ADB. 1995. *Institutional Strengthening in the Road Sector*. Manila (TA 2380).



the ministry to take over the most critical activities of the sector: investment planning, construction project management (including design, tendering, and contract management), and sector funding. The DOR was reduced to a Road Research and Supervision Center (RRSC), losing its agency status and associated regulatory powers.<sup>53</sup> The Roads Department, a minimal structure of five officers, was unable to handle all its new functions, and in practice it concentrated on tendering and contract management issues. It became an unresponsive bureaucratic layer above the RRSC. Frequent changes in ministry leadership—four ministers in 4 years—made it difficult to follow up on initiatives, and many were simply abandoned. Although the sector budget doubled from 2004 to 2008, planning became less technical and more political. Shortcomings reported during the period included a lack of prioritization among corridor development proposals, construction of paved segments that benefited only local constituencies, reduced focus on quality of works, and politicization of procurement.

**As the new institutional structure proved dysfunctional, the government reestablished the Department of Roads in 2009.** From 2007, discontent among staff was transmitted up the hierarchy, was progressively shared by officials of the RRSC and the ministry, and ultimately was reported to political levels. At the same time, various sector NGPAs were created, filling institutional gaps and lobbying for better sector efficiency. In 2008, after parliamentary elections, the new government decided to reestablish a road implementing agency, patterned after the former DOR. The RRSC was converted back to the DOR and was delegated some ministry functions. The charter of the new entity and the appointment of its management were made official in early March 2009. The Ministry of Infrastructure Development was enlarged into the MRTCUD. The devolution of responsibilities was however incomplete, as technical support for tendering and contract administration was not transferred back to the new DOR.

## Current Profile of the Road Institutions

### MRTCUD

In the new structure, the MRTCUD has two departments with road functions. The DRT is responsible for defining, approving, and coordinating sector policy and investment plans. The Department of Monitoring and Evaluation is responsible for monitoring and evaluating the performance of road sector expenditures. Both departments have limited capacity: three staff members for the road sector in the DRT and one staff member in the Department of Monitoring and Evaluation. In addition to the two departments, the ministry oversees various implementing agencies, including the DOR. In the new setting, there is also a vice-minister in charge of roads.

**Department of Roads and Transport.** In view of its small staffing, the DRT must concentrate on its main functions. In 2004–2008, the DRT maintained inefficient bureaucratic control over many of the activities that now are undertaken by the DOR, and this led to duplication of effort. Management and technical analysis of tender processes are still undertaken by the DRT, and so is oversight of technical matters brought forward by the project implementation units. Because the DRT lacked capacity to perform such roles, it was only able to focus on immediate, short-term issues, and policy-making capacity in the sector virtually disappeared. Previous policy initiatives in the sector, such as the Road Board, were neglected or effectively abandoned.

<sup>53</sup> Current types of administrations in Mongolia include ministerial departments, in charge of policy making; autonomous regulatory or control agencies; semi-autonomous implementing agencies, which hold responsibility for investments as well as some regulatory powers; and other institutions, without regulatory powers. Despite its name, the DOR is an implementing agency.



**Department of Monitoring and Evaluation.** The Department of Monitoring and Evaluation was created by merging two small units that existed in the former ministries. The department generally focuses on compliance rather than on quality enhancement. In the road sector, its role is to review the main projects undertaken by the ministry (but not the programs or processes) on an ex ante basis, to verify consistency with existing planning documents, and on an ex post basis, to validate conformity of implementation. In the former role, it informs the ministry's decision-making process. In the latter role, it conducts investigations jointly with the National Audit Office. In other sectors, the unit monitors some project outcome indicators, such as trip time or number of passengers for public transportation projects.

The challenges are for the DRT to concentrate on its core policy-making function, avoiding replication of DOR efforts, and for the Department of Monitoring and Evaluation to undertake more value-adding roles in the road sector, such as program evaluation, economic feasibility assessments, and basic outcome monitoring for the road sector.

## **DOR**

**Functions and structure.** The two main responsibilities of the DOR are network management and network development. In the past, the DOR's responsibilities were broader than this and included the development of a body of standards and guidance documents, implementation of a sector human resource policy, provision of support for the management of local roads, and control over the use of road fund proceeds. During 2004–2008, however, there was a deterioration in some DOR roles. Quality control became less effective, with reduced coordination between the supervision engineers and the central laboratory. In addition, investment planning was undertaken outside of the DOR and subsequently suffered from a lack of technical inputs and coordination.

The DOR has a central office and a laboratory in Ulaanbaatar (66 staff, including 35 engineers) as well as field staff for construction supervision (48 staff, including 45 engineers) and toll fee collection (91 staff). Its former organization structure included a field office in the country's western region, which was discontinued in 2004. According to officers, the present structure of DOR is generally in line with the proposals developed by the ADB TA in 1998, because it includes a road maintenance division, linked to the road maintenance companies; a road construction division, overseeing the supervision of field engineers; a research and planning division; and an administrative services division.

**Governance.** The DOR is a small entity that naturally relies more on personal relationships and flexible arrangements than on formal frameworks. Improving organizational efficiency would entail examination of the degree of independence and accountability relative to external stakeholders, the quality of leadership, and the forms of internal control. Table 14 outlines some of the department's current weaknesses and possible solutions. Partial solutions could be implemented through the Road Board or through the development of guidance documents and internal audit capacity. Further gains would require management to change the organizational culture.

**Human resources.** Human resource management is of central importance to the DOR. Its strong technical culture and the prestige attached to public service are major assets for the department, enabling it to hire, motivate, and deploy a pool of qualified staff. The changes during 2004–2008 placed these assets at risk. Unlike the rest of the sector, the DOR reportedly does not face constraints in hiring qualified professionals. Central government salaries are at only one-half to one-third of private sector levels (Table 15). However, the DOR has maintained its hiring competitiveness by providing



**Table 14 Governance Agenda in the Department of Roads**

	Current Situation	Possible Solutions
<b>Independence</b>	Weak. Many processes in the normal scope of activity of the Department of Roads (DOR) are currently undertaken or replicated by the Ministry of Roads, Transportation, Construction and Urban Development and the Ministry of Finance.	<ul style="list-style-type: none"> <li>– Better define the scope of responsibilities of the DOR and the ministries</li> </ul>
<b>Accountability</b>	Weak. The perception among the general public is that the department is inefficient in its expenditures and lacks transparency.	<ul style="list-style-type: none"> <li>– Disseminate business plans and performance reports</li> <li>– Increase transparency of contract procurement (e.g., through web publishing) and management decisions</li> </ul>
<b>Leadership</b>	Weak. High management turnover. A number of nonsector staff have been appointed to specialist or mid-management positions.	<ul style="list-style-type: none"> <li>– Reduce management turnover</li> <li>– Emphasize technical requirements for appointments</li> <li>– Develop collegial decision-making processes</li> </ul>
<b>Internal control</b>	Formal and bureaucratic. Centralized control by senior management has increased, reducing flexibility and decreasing the accountability of middle management and staff. There has been a proliferation of cumbersome, lower-level bureaucratic control	<ul style="list-style-type: none"> <li>– Develop guidance documents</li> <li>– Increase the responsibility of middle managers</li> <li>– Develop an internal audit capacity</li> </ul>

Source: ADB.

**Table 15 Engineer Salaries in the Public and Private Sectors (as of 2009)**

	Public	Private
Entry level	MNT250,000	MNT300,000
Experienced staff	MNT300,000 + MNT60,000 in long-term bonuses + benefits	MNT500,000 to MNT1,000,000 + benefits
Middle manager (Division chief)	MNT315,000 + MNT63,000 in long-term bonuses + benefits	
Senior manager (Director)	MNT368,000 + MNT73,600 in long-term bonuses + benefits	n/a
Supervision engineer	MNT500,000 during the work season; MNT108,000 during the winter	MNT500,000 + benefits

n/a = data not available.

Source: ADB, based on Department of Roads estimates.

various in-kind benefits, such as vehicle, housing, and hiring bonuses. It also has maintained a capacity to motivate its staff through a combination of prestige distinctions (e.g., medals), monetary bonuses, and overseas training. However, career paths were discontinued after 2004.

**Hiring policy** could be tightened. Although the DOR's staff size is controlled by the MRTCUD, it has relative freedom over its hiring policy. Officers entering the DOR are usually experienced professionals and are only dismissed for severe professional misconduct. Staff positions are advertised and

candidates are officially selected by the director's council (comprising senior management and division chiefs) on a competitive basis, according to degree and work experience. However, this process is reported to have become more formal than substantial in the past years. DOR management, up to the division chief level, is appointed directly by the ministry. Until 2000, managers were required to hold a graduate diploma in a subject relevant to the position, but this condition apparently has been dropped. Overall, some of the changes since 2000 appear to have reduced leadership credibility, increased the politicization of decisions, and reduced staff motivation.

**Training.** The DOR's staff is considered generally capable and experienced, but its knowledge is often too specialized and out of date. Until 2004, the DOR was conducting continuous training programs aimed at deepening, updating, and broadening the skills of its officers. From 2004 to 2008, however, the RRSC could not maintain its training program for engineers and focused only on worker and technician training.

### Road Board

**Origins.** The concept of a Road Board emerged from an ADB TA in 1998. Its implementation was facilitated by a second TA in 2000.<sup>54</sup> The principle of a road board was finally approved in 2002 and its future chairman was nominated.<sup>55</sup> The Road Board was formally established by cabinet order in 2003 and its charter was approved in early 2004.<sup>56</sup> The other members of the board, mentioned by name in the 2003 order, included representatives from the national and Ulaanbaatar city governments, representatives from industry (state-owned enterprises), and user representatives.<sup>57</sup> Board functions were limited to reviewing road fund allocations, operations, and use of funds; making recommendations to the government on planning the development of the network; and conveying the user viewpoints to the government.

**Structure.** In practice, the Road Board that was established fell short of the original design. Originally, it had been planned that the board would benefit from a wide transfer of responsibilities (e.g., defining new road pricing instruments or approving maintenance and construction plans); would have six professional staff; would be responsible for the formulation or approval of a series of strategic documents (performance agreements, business plans, procedure agreement, and certified accounts); and would benefit from a relative budgetary independence. In practice, the board was created with only one permanent staff member, held only half-hour meetings on a quarterly basis, and was not involved in the formal sector planning and budgeting cycles. Its annual office-running budget was set at MNT5 million (about \$4,000) and was provided by the DOR.<sup>58</sup>

**Impacts on the sector.** The board was not active on the Road Fund and maintenance issues because its chairman focused more on the road network development plans. Sector administrations perceived the Road Board to be trying to take over their traditional responsibilities, and they blocked its efforts. The Road Board piloted some initiatives, including a road-user perception survey. Overall, the Road

<sup>54</sup> ADB. 1997. *Second Roads Development Project*. Manila (PPTA 2827); and ADB. 1999. *Policy Support in the Road Sector*. Manila (TA 3268).

<sup>55</sup> These were covenants of ADB's Second Roads Development loan.

<sup>56</sup> Government Order No. 220 (27 October 2003) and Order No. 16 (27 January 2004).

<sup>57</sup> Apart from the chairman, the members were the director of the division in charge of road financing in the MOF, the deputy director of the Department of Roads, the director of a transport company, the director of a road maintenance company, the director of Ulaanbaatar City Transport Department, the chairman of the consumers' association, and the chairman of the Association of Transport Operators.

<sup>58</sup> This included office running costs as well as the chairman's salary.



Board played a role as a user forum but did not have the intended effect on sector funding and planning. During the 2004 sector reorganization, many of the board members lost their official positions. Priorities had changed in the Ministry of Transport and no new people were nominated to the board. The board met for the last time in early 2005, and its budget was canceled from 2007 onward. The Road Board is no longer active. While the chairman remains in office, his work is limited to maintaining the archives.

To date, all sector stakeholders and officials consulted agree that the concept of a Road Board should not be abandoned. A Road Board could play a very positive role in the sector by giving users a say in budget allocations and by pushing for improvement of the quality of expenditures. However, adjustments to the framework built in 2002 are deemed necessary; the division of responsibility between actors was unclear and did not give sufficient consideration to the government's practical responsibilities.

### ***Ulaanbaatar DOR***

Ulaanbaatar city road funds amount to 50%–60% of total local and urban road fund resources. This is in line with the number of cars registered in the city. Ulaanbaatar reportedly has about 1 million inhabitants, 200,000 vehicles, and a paved road network of 427 km.<sup>59</sup> Urban Fund revenues were estimated at MNT5 billion in 2009, but only MNT1.9 billion appears to have been used for maintenance.<sup>60</sup> Ulaanbaatar also receives significant capital grants from the state, depending on the condition of the economy: MNT19 billion in 2007, MNT7 billion in 2008, but nothing in 2009.

The municipal road network is managed by the capital city's department of roads, Ulaanbaatar DOR, a unit that compares in size with DOR headquarters, having 45 engineers and about as many workers. Functions and structures are similar, except that Ulaanbaatar DOR also oversees traffic management and urban drainage infrastructure. As an organization, Ulaanbaatar DOR is also more focused on alleviating congestion and improving road safety. Issues faced by Ulaanbaatar DOR and the DOR are similar. Maintenance works are planned on a historical basis and do not follow technical criteria, investment planning is weak and frequently is changed by external actors, approved budgets for maintenance are far below needs, and the technical capacity of contractors is limited. Formally, the DOR is supposed to oversee and provide guidance to Ulaanbaatar DOR. In practice, the role is more of an indirect leadership: although the two organizations communicate little and develop their processes separately, it seems generally understood that successful central government initiatives could be replicated by Ulaanbaatar DOR.

### ***Aimags Administrations***

Given their small size, *aimag* administrations do not necessarily have a staff specialized in the road sector. They heavily rely on the local road maintenance company to propose and execute works, and on the local road inspector to verify conformity of works with existing norms. Local roads and road assets are not normally registered. A case study on the Tuv *Aimags* identifies some typical issues faced by local road management (Box 13). These include common cost recovery issues and funding constraints on road maintenance. Specific problems are linked to the very low management capacity and to confusion with the central government about responsibility for road maintenance and construction.

<sup>59</sup> This number, reported by Ulaanbaatar DOR, would imply a very high vehicle equipment rate for households.

<sup>60</sup> The data reported by officials was unclear and will be checked at a later stage.



*Aimags*, with an average population of 100,000 inhabitants, will face difficulties in efficiently managing their paved or gravel roads in the long run. Engineered tracks could be dealt with at the local level, with proper technical guidance by the central government. However, given the sector's human resources shortages, centralizing all technical functions in the DOR could bring good economies of scale and improve efficiency. The role of the *aimag* appears clearer in the allocation of resources for maintenance and construction, rather than for road management itself.

### Control Entities

**The National Audit Office** is the external controller of the central administration. The agency directly reports to the prime minister. It certifies the annual accounts of entities and projects and investigates the performance of government undertakings on a case-by-case basis. To correct irregularities, the agency issues orders, which must be complied with within a defined time frame. The Industry, Agriculture, and Infrastructure Division oversees the road sector. The division has four auditors, one of whom covers the road sector. Their duties include controlling the conformity of project preparation; tendering and contracting, with appropriate regulations; and project execution with contract provisions. The office conducted one performance audit in the road sector in 2004, on the Millennium Road Project, and its action improved the planning of the project. Given its objective to audit the accounts of all projects on a yearly basis with its limited staffing, the agency cannot mobilize resources for performance control of programs, processes, or policies. It could free resources for those higher-value-adding activities if it were to undertake project audits only on a random basis. However, this change would require a significant improvement of the DOR and the MRTAUD's internal management capacity, including a stronger internal audit function and better reporting procedures.

**The State Professional Inspection Agency** is a law enforcement investigator. It was reestablished in 2002 after uniting 11 inspection units at the ministerial level. The agency has one road inspector per *aimag*, whose duty is to enforce the Road Transport Act.<sup>61</sup> Its notable role in the field is to ensure that maintenance and construction works contracts follow sector practices and standards; to control the quality of execution, including materials used; to control bills; to control the collection and execution of local road funds; and to investigate the causes of road emergencies. Nine years after their reform, the institutional positioning of the inspectors in the sector is unclear. Despite the good quality of the staff, inspectors generally lack engineering backgrounds, which makes their control more formal than substantial. Due to human resource constraints, their coverage of the sector remains partial, despite their stated objectives to control all works. Also, because a road inspector controls both state and local activities, it remains an external actor, which replaces neither an internal controller nor a local manager. Its activity partly replicates control by the DOR itself. Overall, the road inspectors amount to a sizable human resource that could be employed more efficiently within the sector.

### SPC

**The State Property Committee** plays some of the roles usually tasked to a treasury department: it keeps the registry of public property and manages the holdings to maximize value and returns, taking into account sociopolitical considerations. SPC officers are civil servants with specialization in accounting and management. In the road sector, the SPC oversees 20 state-owned enterprises: 18 road maintenance companies, an equipment leasing company, and a construction company (Erdene Zam), which is bound for privatization. The SPC holds powers to approve the yearly

<sup>61</sup> Government of Mongolia. 1998. *Road Act*.



### Box 13 Case Study: Road Management in the Tuv Aimag

**Aimag profile.** The Tuv Aimag has a population of about 88,000 in an area of 74,000 km<sup>2</sup>, for a density of 1.2 inhabitants per km<sup>2</sup>. It is located around the capital city, Ulaanbaatar. Its economy is mostly agricultural, and the Aimag is the main food provider to the capital city. In 2008, local government revenues were about MNT5.5 billion. In addition, the state government provided MNT1.5 billion for capital investments. Such national subsidies fluctuate widely from one year to another; they were close to zero in 2009, in the context of financial crisis. The local government comprises a central administration (47 officers) as well as various small implementing agencies.

**Road assets.** The Tuv Aimag is crossed by all the main state roads, which prove essential to its economy. The Aimag formally manages about 2,000 km of local roads, including 100 km of paved roads and some earth roads. The paved road stretch was transferred to the Aimag in 1990. The local road equipment (bridges, culverts, and signaling panels) is valued at MNT5.6 billion (about \$4 million). There is no good estimate of the value of the local roads themselves; replacement value could reach MNT40 billion (about \$30 million). With this base, a rule-of-thumb 2.5% yearly maintenance expenditure implies a maintenance need of MNT1 billion per year, two-thirds of which would cover paved road maintenance.

**Financing.** In 2008, the Tuv Aimag Road Fund collected MNT180 million—two-thirds from vehicle registration fees and one-third from local toll gates. The proceeds were used to maintain the local roads; they cover less than 20% of needs, as estimated above. In addition, the Tuv Aimag received a MNT340 million grant from the state government in 2008, to cover the costs of a new 2 km paved road stretch (as did all other Aimags that year). There was some concern in the administration because the built stretch was apparently not a priority.

**Road management.** Until 2008, the local roads were managed by one officer within the Development Policy Division of the local administration. The officer left in 2008 and was not replaced as of March 2009. Local bus transportation was then managed jointly by a branch office of the Department of Roads and Transport of the Ministry of Roads, Transportation, Construction and Urban Development and by a small local transport agency. In 2009, the state parliament enacted a law that required local governments to create local road and transport agencies. Given the lack of qualified staff, the head of the branch office of the Department of Roads and Transport also was appointed head of the new local agency. This officer oversees the same transport services under his two functions but now has two different hierarchical lines. He manages equipment partly owned by the state, partly by the Aimag.

Aimag maintenance works are contracted out by public tender. In practice, all road contracts are awarded to the regional road maintenance company, a state-owned enterprise. The Tuv Aimag does not have the capacity to monitor the works done, but the regional state road inspector sometimes undertakes some control on its behalf.

Source: ADB.

business plans and investment plans of the companies as well as the nominations and salaries of their management. The SPC played a very positive role in the sector during the privatization of the construction industry. Since then, however, its role has been criticized by sector actors on the following grounds: (i) oversight is leaving companies with insufficient flexibility and independence, (ii) there is an absence of a medium-term strategy on the maintenance management issue, and (iii) there is an absence of an asset management vision for the road assets themselves.

### NGPAs

Various sector nongovernment professional associations appeared in 2008–2009. These include the Road Federation, affiliated with the World Road Association, representing the interests of about 100 construction companies; the Road Workers Union; the Mongolian Road Engineers

Association (about 300 members), whose stated objective is to foster technology development; the Road Engineers Elders Committee, which represents about 500 retirees; and the Female Road Workers Association, which represents the 20% female staff in the sector. These associations lobbied heavily for the reinstatement of the DOR in 2008. Although it is still in an early stage, the rise of these associations is a sign of the sector's vitality and institutional memory. Given the right form of recognition and support by the government, they could make an excellent contribution to sector's capacity in the long term.

## Underlying Factors That Limit Sector Efficiency

Over the years, the government has undertaken several reforms to increase the performance of the road sector. The assessment undertaken to prepare this report, reflected in the previous sections, shows that the sector's problems are mainly related to operations and staff rather than to structure. Structural adjustments at various levels are proposed in this report, but these would not have the desired effect on performance if underlying issues are not considered at the same time. These issues include the centralized nature of operations, the costs of control, weak accountability, a shortage of human resources, and the limits on the efficiency of political intervention.

**Centralized nature of operations.** Although administrative structures in Mongolia are relatively small in size, they tend to be heavy in processes, given the degree of centralization they involve. This does not always have a positive effect on efficiency.

- **Centralization increases the number of actors involved in processes.** Centralization is omnipresent in the system of government. The MOF has approval authority over the procurement and financial decisions of the MRTAUD. Within the MRTAUD, all decisions relative to finance and procurement must be approved by the two departments, and many reach the state secretary, the vice-minister for roads, or the minister himself. Organization within the DOR follows the same model of centralized decision making. Any process involves several hierarchical layers and many third-party actors who often do not have a stake in the success of the project.
- **Centralization slows process execution.** Decision-making authority is vested within a small number of officials, who are overburdened as they centralize all transactions. They tend to maintain a backlog of approvals, which delays projects. By the time a procurement process is complete, market prices have increased and the original estimates no longer apply (see Section 4). This requires amendments through a further round of approvals.
- **Operation decisions are slow and reactive.** The system's inertia causes most officials to adopt a reactive stance. This is probably a rational approach in the circumstances, because a disproportionate effort would be needed from officers to deliver results.

**Costs of control.** The sector has inherited an archaic form of internal and external control. It is focused on compliance rather than performance. It works by complete control rather than by a combination of implementation guidelines and in-depth audits on a sample basis. To be successful, such a level of control would require a wide range of skills, a large staff, and ample resources, and it still would reduce the flexibility of the administrations. Given scarce human resources, this model of control cannot achieve its objectives and actually results in inefficient duplication of works. This is not specific to the sector. The Draft Law on Public Management and Finance, inspired by the New Zealand model of public administration, is intended to improve the general performance environment.



**Weak accountability.** The concentration of authority at the political level implies a weak degree of accountability at all levels of the administration. This translates into a general atmosphere of lack of urgency and weak ownership of assets and processes. The general mismanagement of the road assets, and the opposing views of the SPC and the DOR about who maintains their registration, are external signs of this issue. However, some progress has been made. The sector perceived the restoration of the DOR as a demonstration of accountability to the civil society. Improving public administration performance requires implementing matched pairs of instruments for delegating authority and accountability for results. Notably, further progress in the road sector would depend on political support and leadership's willingness to decentralize authority and accountability for results.

**A shortage of human resources.** The review revealed a severe shortage of resources in the MRTCUD and, to a lesser extent, in the DOR. Common issues created by low staffing include many one-person units; units not fulfilling their prescribed mandated responsibilities (such as the preparation of guidance documents); and insufficient and remote supervision of maintenance.

- **MRTCUD.** The three staff members of the road unit of the MRTCUD's Department of Road and Transport might eventually be sufficient if their role was strictly limited to policy making and planning. It would prove too few if they also oversaw coordination with donors. They would need to receive substantial support to handle procurement efficiently.
- **DOR.** The DOR is, by international standards, understaffed in proportion to the network it manages. The DOR has 66 core staff involved in road management, not counting temporary supervisors and toll operators. As the national formed network is 5,000 km, this gives a ratio of one staff member per 75 km of roads. A common benchmark for a modern road organization is one staff member per 10–20 km of roads.<sup>62</sup> Road administrations in the PRC, which have management models similar to that of the DOR, employ one management staff member per 2–10 km of roads. An evaluation of the efficient size of a road administration was recently undertaken in Botswana, a country that has geographic and demographic characteristics similar to Mongolia. The optimal size was evaluated at 170 staff for a network of 8,700 km, or about one staff member per 50 km or road—a high ratio but still lower than in Mongolia.<sup>63</sup>

Understaffing is a common issue in all Mongolian administration. In our view, although much staffing pressure could be relieved by using the right combination of decentralization of authority and division of responsibilities, the country would still need to allocate additional staff to the sector to build and manage its desired future road network.

**The limits of the efficiency of political intervention in the sector.** Although political intervention is the central element of a functioning democracy, the way in which it has been exercised in Mongolia has led to inefficiencies. This has particularly affected the transport sector with respect to credibility of leadership, the effect of reforms, and the efficiency of internal planning and processes.

The road sector has suffered from the frequent changes in its institutional organization (three ministry structures in 5 years) and management (four ministers in 5 years). This has led to repeated stop-and-go on initiatives such as the devolution of road maintenance to the private sector. Leadership changes also have permeated the lower levels of administration, given the number of politically

<sup>62</sup> For instance, the 1,300 staff of Land Transport New Zealand manage a network of 10,894 km, a ratio of one employee per 10 km of road.

<sup>63</sup> Ministry of Works and Transport of Botswana. 2007. *Organization and Methods Review*. Consultant report. Gaborone.



oriented appointments. This has reduced institutional memory, including an effect on some of the main thrusts of TAs. The impact of approved reforms has frequently been limited, as shown by the aborted experience of the Road Board. In addition, because a good case for the value of technical planning has not yet been presented to decision makers, sector planning has essentially remained a subjective exercise dominated by higher ministry officials and the parliament. At times, investments that were not part of the broader sector perspective have been introduced, reducing the coherence of sector investments to some extent (see Section 4).

## Case for Action

Mongolia has great ambition for its road sector: to create, in a short span of time, a high-performance road network that connects the country and unlocks its growth potential. Meeting this ambition is likely to present a great challenge to the road institutions if they remain at their current level of efficiency. In the search for performing institutions, the government has several times reformed the sector's organization. However, those reforms were mostly intended to resolve short-term issues rather than address longer-term issues. The National Development Strategy now provides a clear vision about what the sector should deliver in the next 5 and 10 years, though the institutions necessary to meet those expectations are yet to be built.

Looking back, government initiatives in the road sector often have generated mixed results. For instance, the large increase of budgets in 2007–2008 has had a lower than expected impact in terms of the construction of new, good-quality roads. During this period, there also were many indicators that the condition of the existing network remained insufficient or had worsened. The other sections of this report show how this relates to weaknesses in the structure of sector expenses (Section 2), to the way in which programs are conceived and implemented (Sections 3 and 4), and to the sector's human and physical capacity limits (Section 6). Although many technical improvements could improve sector efficiency, these alone would not produce the expected effects if the general environment does not foster better performance.

Many of the opportunities to increase sector efficiency lie in areas that are not restricted to sector investment programs. They lie in the political, fiscal, institutional, and cultural areas and are common to a number of other public expenditure sectors in the government. Some of those opportunities can be addressed by the sector entities, but many would require coordinated government action. There appear to be some steps that could be taken to strengthen the DOR, develop the bases for results-based management (Box 14), improve sector governance and transparency, and improve audit efficiency.

## Suggestions

### **Suggestion 5.1: Prepare a Medium-Term Institutional Development Plan for the Department of Roads and Ulaanbaatar DOR**

In the years since its rebirth, the DOR still must define its business model. The DOR has released a mission statement that defines its higher-level strategic and operational objectives. This document now needs to be operationalized. Rather than attempting to recreate the former patterns, the new context actually provides an opportunity to think anew and to develop the modern processes and structure necessary to meet the medium-term sector objectives.



A medium-term road map up to 2015 for the DOR and Ulaanbaatar DOR could cover:

- The **basic principles of action** (e.g., management by contract, transparency, technical planning, results-based management, and staff accountability) to be used to achieve high-level objectives.
- The **division of responsibilities** with the rest of the government. For example, there could be a phased approach to transferring procurement and financial management of the road fund from the MRTCUD to the DOR, after putting in place the necessary controls.
- A **target structure, staffing, and human resources policy**. The DOR could specifically consider creating a decentralized structure (Box 14); phasing out toll operations (Section 2); strengthening its planning division (Section 3); focusing its construction division on contract management, progressively contracting out supervision (Section 4); and expanding its staff base, particularly focusing on staff with skills in contract management, financial management, audits, economic evaluation, and information technology. Human resources training programs for engineers could be resumed, with appropriate incentives for staff to acquire new qualifications.
- The **instruments, processes, and systems** to be used to implement this vision (e.g., the types of contracts used, maintenance monitoring processes, road database and survey programs, project management systems, guidance documents, staff performance evaluations, and internal audits).
- The **performance indicators** of the institution.

### **Suggestion 5.2: Develop the Bases for a Result-Based Management of the Sector**

Orienting institutions toward performance is intended to make the administrations accountable for achieving certain targets, notably by rewarding or penalizing their leadership and staff based on the results achieved. It implies some decentralization of authority and stabilization of management, to provide sufficient power and time to achieve results. It relies heavily on management tools such as monitoring indicators or retrospective evaluations. It seeks to foster a sense of ownership, urgency, and accountability while making individual performance more visible. Although the move toward results-based management (Box 15) generally involves the whole government, many elements could be introduced at the sector level. Looking ahead, the following actions could be implemented, on a pilot basis:

- **Develop high-level program and performance documents (MRTCUD and DOR)**. Policy notes could be prepared for the largest of the road sector programs (e.g., the Millennium Road or maintenance). A simple evaluation of achievements during the previous year would be joined to the budget request for those programs.
- **Prepare a business plan (DOR)**. Such a plan would be a spin-off of the medium-term development plan. If it includes performance targets, it would be a first step toward a full-blown performance agreement, cosigned with the MRTCUD and possibly the MOF.
- **Stabilize and increase accountability of management**. Although this could be achieved largely through self-regulation, several countries have resolved to give fixed-term positions to the management. Their performance objectives include corresponding bonus/penalties. This model could apply to the DOR.
- **Develop a simple set of performance indicators for the DOR**. Indicators would normally need to cover the effectiveness and efficiency of public expenditures and the performance

### Box 14 A Decentralized Structure for the Department of Roads?

There are serious weaknesses in the regional capacity of the Department of Roads (DOR), which affects the efficiency of maintenance and construction.

**Maintenance.** Historically, maintenance companies were part of the administration. They fulfilled many functions usually undertaken by a government institution, such as budget preparation, operational planning, or quality control. When the companies' oversight was given to the State Property Committee, the companies were encouraged to act as profit-generating units. As their link with the DOR became contractual instead of hierarchical, the role of the DOR would have been expected to grow. However, no institutional adjustments were made. The DOR kept its small central structure of five maintenance officers located at headquarters, far from the roads they manage (up to 1,000 km), and most of the knowledge about the roads lies with the companies. Officers have a limited effect on yearly planning and budgets, but they cannot sufficiently control the quality or effectiveness of works. To be effective in managing maintenance, the DOR would probably require more officers, stationed closer to the roads.

**Construction.** Distance also makes construction supervision more difficult. Currently, the DOR supervises works by force account, hiring temporary officers who are dispatched to each construction site. This model has limited efficiency, given the low budgets available for site supervision (Section 4). It also creates an unclear division of responsibility between DOR officers and the supervision engineers. In the traditional International Federation of Consulting Engineers model, the supervisory and the employer functions are separated. In this context, and given the satisfactory capacity of the private sector, outsourcing the supervision of large works would likely bring efficiency gains. As a necessary condition, the DOR would need to develop a local capacity to identify, monitor, and approve works.

Overall, the DOR could consider adopting a more decentralized structure through the staffing of regional offices. Local representatives would manage maintenance and construction works. Such a structure is common internationally. To evaluate the likely benefits of this model, the DOR would need to evaluate works needs for the next 5 years and take stock of its brief experience with a regional office in the early 2000s. Meanwhile, the local road inspectors could take over operational responsibilities, on behalf of the DOR, for road maintenance and construction supervision and management.

Source: ADB.

of the DOR's processes. Such indicators should be relatively easy to monitor. The balance scorecard developed by the Brazilian road administration for its road maintenance program provides a good example of a comprehensive assessment (Table 16).

- **Develop the incentive system.** The DOR's human resources management could review the staff incentive system and align it with the agency's performance system, which might otherwise remain a formal exercise.

## Examples

Brazil is an example of a developing country in which administration is transitioning from a compliance culture toward results-based management. Since 2002, the state of Minas Gerais has developed its State for Results program around the theme of efficient public management. It has clarified policy objectives, producing a set of outcomes, outputs, process improvements, and input usage targets. The government progressively has aligned administration with these objectives. Autonomy of the secretariats was partially increased through guaranteed budget resources for priority programs as well as higher flexibility in staff redeployment. Accountability was improved through the introduction of a system of results agreements at the administrative level, linked with a new system of evaluation for



### Box 15 What Is Results-Based Management? Views from New Zealand

**A definition of results-based management.** Results-based management aims to provide “a government that works better and costs less.” The transition toward a results-based management system involves several major steps: (i) question the role and the size of the state and define the services that should be publicly provided; (ii) seek to provide services and meet objectives at lower cost in a more efficient way; (iii) define objectives at the government level, through strategic planning, and translate this into action at the lower levels; and (iv) set clear priorities for the allocation of resources, from the highest to the lowest level of the administration. Results-based management systems are based on a culture of accountability rather than a traditional culture of compliance. General accountability means that a large share of the administration can be held accountable for what it has achieved, given its goals, priorities, and means. Increased accountability should be sought through (i) delegation of responsibilities (managerial, financial, and technical) within clear responsibility chain—for instance, politicians may pull back from direct program management while higher levels of administration pull back from micromanagement; (ii) monitoring of performance of governments, administrations, and individuals, generally through the development of information systems; (iii) feedback of performance measurements into budgeting systems and/or strategic auditing systems; (iv) an increase in the number of people that can be publicly held to account; and (v) development of scrutiny processes and of sanctions/bonuses.

**Results-based management implementation.** At the macro/strategic level, the necessity to keep on meeting ambitious social goals while being constrained at the macro and fiscal levels is a primary motivation to switch toward results-based management systems. The subsequent redefinition of the government can involve a reduction of the role of the central state in the economy through the privatization of publicly owned companies and transfers to local governments; a redefinition of ministries to avoid conflicts of interest and superposition of powers; and a change from an input-based budget system toward a service/outputs-based system, generally through a change of the public finance act, to identify service costs and expected outcomes within a fixed budget. At the micro/sector level, results-based management principles can be applied to obtain better value for money by motivating institutions on policy outcomes (for instance, road safety) rather than just on outputs. However, this does not systematically translate into an outcome-oriented budget system; rather than a penalization of poorly performing programs, the launch of central strategic audits is more widespread. At the bottom level, the results-based management approach gradually leads to defined service goals and monitoring systems, in a way that directly involves the citizens who receive the services.

Source: Adapted from a presentation by Graham Scott, former Treasury Secretary of New Zealand, delivered in Brazil on 27 March 2007. Conference proceedings.

staff. Program managers’ pay became directly linked with the achievement of their own performance targets. Meanwhile, a robust central system of monitoring and evaluation was structured, including a quarterly review of results, a regular program evaluation, and a series of policy or program design reviews.<sup>64</sup>

### Suggestion 5.3: Consider Reinstating a Renewed Road Board

**Analyze why the Road Board did not take off.** The Road Board established in 2004 was an advisory board. Its functions proceeded from a simple cabinet order and its powers were only to review and to make recommendations. This was originally thought to be an interim structure.<sup>65</sup> It was supposed to be quickly replaced by a permanent Road Board, holding executive powers, to be established through new legislation. Indeed, this board never obtained sufficient powers to contribute much

<sup>64</sup> World Bank 2008. *Second Minas Gerais Development Partnership Project*. Project Appraisal Document. Washington, DC.

<sup>65</sup> ADB. 2000. *Technical Assistance for a Policy Support in the Road Sector*. Consultant final report. Manila.

to sector performance. Its scope of action also was probably too broad; the board was supposed to make recommendations on all network development and maintenance policies, plans, budgets, and expenditures. Moreover, because most of its members came from the administration, board meetings practically replicated the decision-making processes of the government. With its narrow independence, it could not be held accountable to users.

**Evaluate the potential benefits of a functioning board.** Even in its imperfect design, the board already has increased users' ownership of the network. International experience shows that road funds, when managed commercially, can create in the sector a sense of the customer–supplier relationship found in other utilities. A renewed Road Board could improve sector governance by strengthening stakeholder support and developing transparency; by clearly dividing responsibilities between a financier road board and a provider DOR, fostering accountability; by ensuring sufficient financing—a natural function of a road board being to review the user charge system; and by introducing sound business practices (e.g., efficient management, sound budgeting and accounting, asset management, commercial costing, and information systems). Eventually, a road board could bring much to the sector.

**Consider evolutions of the board design.** The new structure would need to take into account past experience.

- **Status.** The new Road Board should be a government organization, with a management board, established by a special law. It should have executive powers to control the execution of the state road fund. It also could manage the local road funds on behalf of the local governments (see Section 2).
- **Scope.** The board should mainly cover road maintenance. It would finance routine and periodic maintenance from the Road Fund. Rehabilitation would be financed under budget grants, to maintain the road user charges on a pay-as-you-go basis. No construction would be financed under the state road fund, but this could possibly be financed under the local road funds if maintenance needs have been met.
- **Functions/powers.** The Road Board could define annual and long-term financial plans for road maintenance and recommend rehabilitation investments; propose a road user charge sufficient to maintain the network; control the utilization of the Road Fund; recommend procedures for the collection of user charges and control of revenues; approve the allocation of road funds for programs and projects; approve technical instructions and standards prepared by the DOR, relative to road maintenance, and communicate with the public about network condition and maintenance policies. Initially, the Road Board's powers could be limited to control and policy advice.
- **Secretariat.** The Policy Support in the Road Sector TA<sup>66</sup> recommended a small structure of six people: a chief executive, an accountant, an engineer, a policy analyst, an administrative officer, and a secretary. This structure appears to be appropriate and is recommended. Secretariat operations should be financed by a management fee from the Road Fund rather than through the DOR.
- **Members.** The same TA report argued for the following membership: one senior official from the MOF and one from the MRTCUD, a representative from the Commerce and Industry Chamber, and four representatives from road unions. The board created was dominated by the public and included representatives from the DOR, Ulaanbaatar city, and the road companies. This composition creates double reporting lines and is prone to

<sup>66</sup> ADB. 1999. *Policy Support in the Road Sector*. Manila (TA 3268).





conflicts of interest because direct beneficiaries of the fund's monies are board members. It could be revised along the original design, seeking to maintain a majority of civil society representatives in the board.

- **Members' nominations.** The previous board practically disappeared when its members lost their positions and were not replaced by the MRTCUD. One way to overcome this would be to have representative board members nominated by the bodies they represent. However, this is not recommended because board members' competence needs to be ensured, because not all bodies can be represented at the board, and because the board cannot work against the MRTCUD. Instead, the members could be nominated by the MRTCUD, in consultation with the MOF. To ensure continuity, members would be nominated as individuals, not as representatives of an association, and would have alternates. The legislation would define the appointment and removal mechanism.

The Road Board's recreation would be technically simpler than its creation 10 years ago. Indeed, many of the materials developed previously could easily be adjusted to the new context.<sup>67</sup> An international consultant could guide the board secretariat and members on an intermittent basis during the first years of operation.

#### **Suggestion 5.4: Improve Governance and Increase Stakeholder Involvement**

**Improve procurement governance.** With mining revenues relieving fiscal constraints in the medium term, road sector budgets could increase fast. However, this also would increase the risks of collusion or corruption, if sector governance is not strengthened at the same time. Having procurement processes handled by an understaffed unit in the MRTCUD, as is currently the case, could create an environment prone to poor governance. Assigning sufficient staff to the unit, or transferring its functions to a better-staffed DOR, is a priority. Furthermore, several measures could be introduced to deter corruption in civil works contracts awards, including strictly enforcing bid validity and contract negotiation periods; using a third-party observer (a "probity auditor") to review the procurement plans and processes—either an auditor or someone from the sector with a good reputation and independence from special interests; registering and publicizing complaints received and the administration's answers; and making available online procurement information, as is the case in Brazil.<sup>68</sup>

#### **Example**

Brazil's DNIT makes available on its website information about its procurement (e.g., date of tender and documents related to tendering processes, stage of the process, complaints, evaluation reports, and contract award notices) and its payment system (e.g., date of payments, contract, and contractor). Contracting companies closely monitor the information to ensure their competitors are treated similarly.

**Consolidate sector nongovernment professional associations and consider transferring to them some regulatory functions.** In Western countries, NGPAs make an important contribution to sector management, technology transfer, and training. The government could support their consolidation by officially recognizing them and initially cofunding some of their activities, such as worker training (see Section 6).

<sup>67</sup> For example, the outline board structure, the proposed amendments to the Road Act, the outline business plan, the outline performance agreement with the DOR, and the Procedures Agreement for Funding between the Road Board and the DOR.

<sup>68</sup> See, for instance, the numerous references compiled in World Bank. 2009. *Deterring Corruption and Improving Governance in Road Construction and Maintenance*. Transport Papers No. 27. Washington, DC.



## Suggestion 5.5: Improve the Effect of Sector Audits

**Focus on performance audits.** The National Audit Office has mainly undertaken financial and compliance auditing. Given the scarce human resources of the administration, the audits of the Road Fund and the DOR could be contracted out.<sup>69</sup> The National Audit Office could still approve the reports. With these resources freed, the National Audit Office could expand its multiyear performance audit program in the sector. Performance auditing covers a broader scope than financial audits and is a critical element in the effort to encourage results-based management (Box 16). The first audits could target the road maintenance program (probably in association with the road inspectors) and the Millennium Road Project.

### Box 16 What Is Performance Auditing?

“**P**erformance auditing is an independent examination of the efficiency and effectiveness of government undertakings, programs, or organizations, with due regard to economy and the aim of leading to improvements.”

Source: International Organization of Supreme Audit Institutions. 2004. *Implementation Guidelines for Performance Auditing*

“Performance audit refers to an examination of a program, function, or operation, or the management systems and procedures, of a governmental or nonprofit entity to assess whether the entity is achieving economy, efficiency, and effectiveness in the employment of available resources. The examination is objective and systematic, generally using structured and professionally adopted methodologies. Results and findings are stated in terms of yardsticks derived from the entity’s mission, vision, values, or goals, or on metrics based on these.”

Source: ADB. 2007. *Technical Assistance for People’s Republic of China: Enhancement of the Performance Audit Capacity of the China National Audit Office*. Manila.

Develop an internal control capacity within the DOR. As mentioned, neither state inspectors nor state auditors can replace internal control of the DOR. Internal audit is “a management tool used to provide reasonable assurance that management objectives are being achieved.”<sup>70</sup> An internal audit would be a responsibility of the DOR. It would provide assurance that the organization adheres to legislation and regulations, including those related to procurement; promotes economic use of resources, through audit of operations and by advising management and evaluating processes and information systems; safeguards against fraud, waste, abuse, and mismanagement, including by recommending improvements to control systems; and maintains and discloses financial and management information in a timely manner. While functioning within the DOR structure, the internal auditor would need to be independent from its management. It could be nominated by the MRTAUD or by the National Audit Office.

**Integrate further road inspectors’ and DOR activities.** Road inspectors in Mongolia play an uncommon role in the sector by international standards. They could contribute more to the sector if they were staffed mainly with engineers and they undertook some tasks on the DOR’s behalf,

<sup>69</sup> Under ADB’s Second Roads Development Project, there was a covenant on the outsourced auditing of Road Fund accounts.

<sup>70</sup> International Organization of Supreme Audit Institutions. 2001. *Internal Control: Providing a Foundation for Accountability in Government*. Brussels. p. 6.

such as road maintenance supervision, road asset condition reporting, and overloading control. This could be formalized in a work agreement between the SPIA and DOR. Notably, it would specify the procedures to be followed by the inspectors. In the context of scarce human resources, another solution suggested by stakeholders is to fully integrate the road inspectors into the MRTCUD or, preferably, the DOR.

### Suggestion 5.6: Develop Operational Support Schemes for Local Networks

In 2000, the consultant under the Institutional Strengthening in the Road Sector TA, argued, “Local roads management is to be the responsibility of the *aimag* administrations. However in a small population like Mongolia, duplicating services is wasteful. Given scarce resources, there is no reason why local road management and implementation should not be contracted back [by the] DOR, on the clear understanding that policies, planning, and guidance material as to construction standards, etc., are established by the *aimag* administrations, and an acceptable cost sharing arrangement is to be reached.”<sup>71</sup> This report sees no reason to depart from this proposal. In fact, it proposes that financial management of the local road funds also be transferred to the Road Board, as was initially suggested (see Section 2). An exception could be made for Ulaanbaatar, whose road fund could be managed separately, given its size.

Supporting the operational management of local roads would require different skills and operational procedures than management of national roads. There would be a need for frequent discussions with the local governments, to prepare network management and development plans, register their road assets, prepare designs and standards, etc. It would be handled by a new unit to be created within the DOR, which would coordinate the works of other divisions and maintain contact with the *aimags*. In exchange, the DOR could withhold a management fee from the local funds. In the medium term, this scheme could be transformed into a fee-for-service arrangement, with the *aimag* governments able to choose to manage the networks themselves through the DOR or through a consulting company. Similar schemes exist in France and in Western Africa.<sup>72</sup>

Local roads management also would be facilitated by the development of a small contractor base. These contractors could be initially subcontracted by the road maintenance companies, but this would require some form of operational support by the DOR (Section 3).

<sup>71</sup> International Organization of Supreme Audit Institutions. 2001. *Internal Control: Providing a Foundation for Accountability in Government*. Brussels.

<sup>72</sup> A good discussion of management options for local roads can be found in World Bank. 1997. *Options for Managing and Financing Rural Transport Infrastructure*. Technical Paper No. 411. Washington, DC.

## SECTION 6

# Fostering the Development of the Road Industry

### Key Findings and Suggestions

#### Findings

The domestic road construction industry has quadrupled in size during the past 10 years, while the maintenance industry has scaled down. However, this growth has been uneven, with two-thirds of the companies existing only on paper and only a handful reaching midsize. Their total production capacity is below 250 km of new construction per year.

To grow sufficiently to meet the government's investment targets, the sector will have to address its key human resources and financial constraints. Human resources shortages stand at 50% and domestic companies' access to credit is poor.

#### Suggestion: Develop an Industrial Policy to Develop the Domestic Road Contractors

##### 6.1 Update the Contracting Framework and Contractor Registration System

As part of an update of the contracting framework, the government could review and revise several procurement requirements while creating a company registration and performance evaluation system.

##### 6.2 Develop the Sector Professional Associations

The government could initiate discussions with the existing nongovernment professional associations to create legally recognized associations for road construction and road engineering, which would take over some regulatory functions.

##### 6.3 Modernize and Scale Up the Technical Education and Vocational Training System

A reform of the existing system should aim at increasing the volumes and quality of the sector's human resources. It should lead to sector stakeholders' increased involvement in education management.

##### 6.4 Enhance Credit Availability

The government could ease the financial constraints by decreasing payment delays and reducing its bond requirements. The government also could shelter part of the financing risks through an agreement with banks or a special purpose fund.

##### 6.5 Facilitate Domestic Contractors' Access to Foreign Technology

The government could foster the creation of joint ventures with foreign companies to improve technology transfer. The government also could ease the entry procedures for imported equipment.



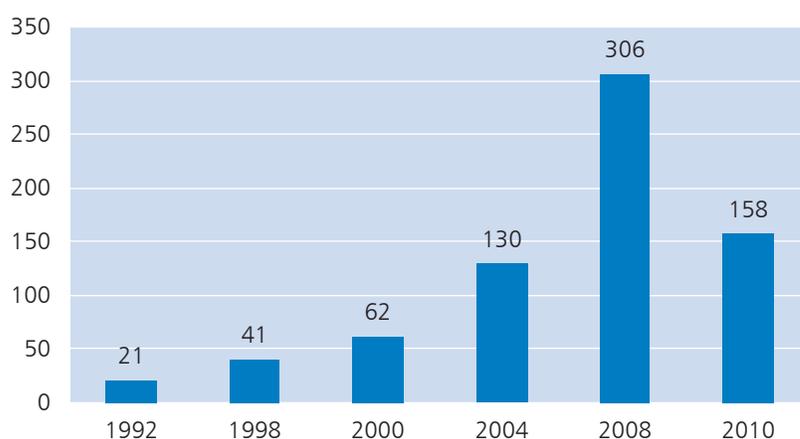
## Findings

### Current Industry Capacity

**A dynamic industry.** Mongolia's road industry profile has changed greatly since 1992. During the communist era, the industry comprised 21 road construction and maintenance "companies" located in Mongolia's 18 rural *aimags* and three cities (Darkhan, Erdenet, and Ulaanbaatar). After 1992, the government restructured the companies by separating the maintenance and construction units and progressively privatized the construction units. As road budgets shrank, there was overcapacity in the sector, which constrained its development. At the end of the 1990s, the sector totaled 41 companies, but only four were newcomers. In the 2000s, the road construction market expanded and the number of registered private companies increased by 600% by 2009 (Figure 22). As of 2008, there were 20 state-owned companies,<sup>73</sup> 271 national private companies, and 15 foreign-invested companies. The equipment pool of the construction companies expanded at nearly the same pace, from 310 units in 1996 to close to 1,200 in 2008 (Table 17). Meanwhile, the size of the maintenance companies scaled down, with their equipment falling from 490 to 362 units (Section 3).

**Uneven growth.** Industry dynamism has responded to construction market expansion, from about \$5 million (MNT6 billion) per annum in the mid-1990s to \$70 million–\$80 million (MNT100 billion) in 2007–2009. However, this reflects a very lax company registration ("special permission") policy. Many of the newly created companies have been established by people with no sector experience or management qualifications and do not have stable offices, staff, or equipment. The strategy of these newcomers has been to attend civil works biddings based on such paper qualifications and then to subcontract the works. According to the DOR, only 102 active companies in the sector have a capacity to undertake works, and only 42 of these can undertake road construction works.<sup>74</sup> In 2010, the DOR removed inactive companies from its registry, bringing the number of road sector companies down to 158.

**Figure 22 Number of Registered Road Companies (1992–2008)**



Source: ADB consultant, based on DOR data.

<sup>73</sup> Eighteen maintenance companies as well as one construction company and one equipment leasing company, both of which had received donor equipment.

<sup>74</sup> With some overlaps, the DOR recorded 102 active companies in the sector in 2008: 42 in road construction, 15 in bridge construction, 22 in maintenance, and 37 in furnishing works.



**Table 17 Construction Companies' Equipment**

	1996	2008
Grader	18	91
Trucks	167	474
Roller	18	126
Loader		49
Water tanker	13	54
Workshop		7
Trailer	12	64
Asphalt paver	4	5
Bulldozer	27	70
Excavator	24	111
Asphalt finisher		25
Bituminous sprayer	4	26
Bitumen tank	3	68
Others	27	14
<b>Total</b>	<b>310</b>	<b>1,158</b>

Source: ADB consultant and ADB. 1997. *Institutional Strengthening in the Road Sector TA*. Manila.

**Binding productivity limits.** Real industry expansion has actually been concentrated on a small number of companies. Only five companies have reached a size that enables them to be fully versatile in terms of works. As of 2009, only two companies have a capacity to undertake 50 km road works and six others have capacity for 30–50 km works. In 2008, the largest company had a turnover of about \$14 million (MNT20 billion). This represents about 20% of the market and is approximately the size of a 70 km road construction contract. Based on the sector's overall equipment and staff pool, the DOR estimates that it can theoretically deliver 225 km of new construction works of satisfactory quality per year.<sup>75</sup> This is in contrast to the 1,600 km of works reportedly under construction in 2009.

**Access to donor-financed works.** The small financial scale of Mongolia's road companies does not allow them to compete directly for large multilateral aid works (mostly provided by ADB). Typical contract size has been \$15 million–\$25 million, beyond the capacity of the largest national contractors. At the same time, some donors (e.g., Japan, the Republic of Korea, and the PRC) only contract with their own national contractors. This situation has created tensions between the government, donors, and selected contractors, and with the exception of the World Bank's punctual use of local competitive bidding procedures in the early 2000s, little progress has been made.

## Human Resources Constraint

**Limited human resources is a major constraint to sector development.** Mongolia faces a severe shortage of engineers and qualified workers. The sector employs about 400 engineers and 5,000 skilled workers, and all private companies have reported recruitment problems in recent years. The maintenance companies, design companies, and companies located in remote areas have been particularly affected. The problem appears to be transitional, as volumes of works doubled between

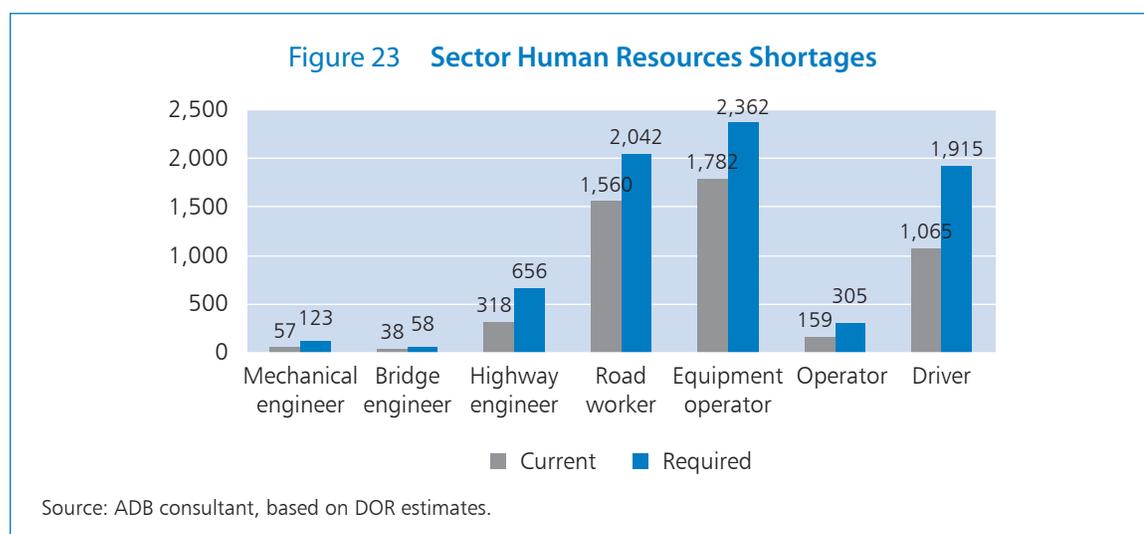
<sup>75</sup> ADB consultant, based on DOR estimates.

2006 and 2009. It is also structural, because the sector's capacity to attract and retain staff is low—it is estimated that half of the trained engineers have left the sector—and because the capacity of training facilities is limited.

The gap between sector capacity and the high sector demand has created tensions, which has translated into extended implementation time frames, poor works quality, intense competition for new staff and frequent staff turnover, and higher project costs. To deliver the large government investment program, the DOR estimates that sector capacity should increase by 40%. There is an estimated shortage of 400 engineers and 2,100 skilled workers (Figure 23).

**Mongolia has not yet developed a reliable approach to generating qualified human resources for the sector.** Until the transition in the 1990s, only technicians were trained in Mongolia, whereas working engineers were either trained abroad or were foreigners; for example, there were about 60 Russian engineers employed on a regular basis until 1991. Mongolia's first engineering program was established in 1997. There are now two institutions providing diplomas: the Mongolian University of Science and Technology<sup>76</sup>, and the College of Techniques and Technology.<sup>77</sup> Each can accommodate about 30–40 undergraduate students per year, with poor equipment and staffing conditions. In total, 600 people have initiated bachelor studies since the transition. Programs have two funding sources: student fees cover operating costs, equipment, and professor salaries, and facilities are provided by the university. The programs are the responsibility of the Ministry of Education. The MRTCAD, DOR, and the private sector are not involved in program design, management, or financing.

The expansion of work in the sector has increased demand for road engineers. Given the shortage of qualified engineers, companies have been competing to hire students before they complete their studies. In this context, opportunity costs of additional years of studies have exceeded the perceived benefits to students.<sup>78</sup> As a consequence, graduation rates at the Mongolian University of Science and Technology have reportedly dropped to 25%. There were fewer than 10 graduates in 2006 and 2007, before the situation improved and 24 graduated in 2008. Program capacity was not expanded



<sup>76</sup> The staff includes two professors with PhDs and three assistant professors with MS degrees. Most have a Russian technical background.

<sup>77</sup> The training program is of lower quality, with only one teacher with highway engineering background (but no MS degree).

<sup>78</sup> Training fees are in the range of the salary of an unskilled worker.



to compensate for needs because of constraints imposed by the size of the university facilities. Only the Mongolian University of Science and Technology offers graduate programs, but demand is low.<sup>79</sup>

The DOR has adopted a central role in skilled worker vocational training. The DOR undertakes regular, short-term training for laboratory assistants, road workers, and equipment operators, who subsequently are awarded professional certificates. However, only 100–150 people can benefit from the program each year.

**The DOR historically played a positive role in the management of the sector's human resources,** a legacy of the former command economy environment. Until 2004, the DOR was responsible for centralizing companies' staff resource needs; directing allocations of human resources, particularly during the 4 years following a student's graduation; ensuring that workers in the sector hold engineer certification, as well as specialized degrees for certain types of work; overseeing the worker and operator training programs; requiring its managers to hold graduate diplomas; maintaining sector staff records; and granting distinction awards.

The RRSC did not undertake most of these activities during the 2004–2008 period, with the exception of maintaining sector records and granting distinctions. It is hoped that the DOR can recover its positive role. In the new context, some human resources management responsibilities could be formally transferred to the recently created sector professional associations. These associations could promote codes of ethics and practices among their members, discipline infractions, maintain worker records, relay to the government the issues faced by the profession, and be involved in the management of training programs. The associations already have taken up some of these roles informally, but without some form of government support they would face resource constraints on their assumption of wider responsibilities (Section 5).

## Financial Constraints

**Access to financing is a problem for any private company in Mongolia,** and the road sector is no exception. Available credit is limited, rates are high, products are short term, and bank staffs do not have a good understanding of the road sector. This situation worsened in 2009, as local banks reduced their lending to companies.

**Financial constraints have affected the sector in three main ways.** First, it has limited sector evolution. Banks have tended to favor the largest players over newcomers, and still did not allow the formers to grow significantly. Second, financial constraints often delay works commencement. Because road sector companies generally do not have the necessary cash on hand to start works, the government's policy has been to offer a 30% advance payment in exchange for a performance guarantee. Even under those terms, the DOR has reported that companies frequently cannot start works because they cannot bear the interest costs or finance the retention accounts that banks require before issuing a guarantee. In 2009, for instance, many works that were supposed to commence in April still had not been initiated two months later. Finally, financial constraint has created slow implementation. During contract implementation, long payment delays by the government (commonly around 90 days) require companies to maintain high working capital levels. Delayed payments frequently lead to slower execution. It also is likely that performance bonds and high cash requirements increase the cost of works.

<sup>79</sup> Since creation in 1997, the programs have awarded 12 MS degrees and 9 PhDs. Seven students were preparing for a PhD in 2009.

In the context of implementation time frames that frequently extend over 2 years, and of companies' poor access to financing, the government's practice of not using price escalation clauses in civil works contracts has proven costly. In 2009, for example, the government was obliged to renegotiate large price adjustments with domestic and international contractors, which had stopped all works after running out of cash due to 2008 price increases.

## Suggestions

The government could develop an industrial development policy for the sector, which would set the conditions for its growth. Given its large investment program, the government has a direct interest in fostering the healthy development of the road industry. Clearly, the sector's industrial structure, human resources concerns, and access to financing are not typical concerns of sector ministries. Indeed, in advanced countries with large and well-established industrial bases, these are left to market self-regulation. However, as the main purchaser of road works in Mongolia and the sole provider of its human resources, the central government has kept control of many of the levers that affect industry development. A sector development strategy should cover industrial structure (e.g., the number of large and medium-sized firms), quality policy, human resources development for skilled workers and engineers, financial conditions, and technological development.

### Suggestion 6.1: Update the Contracting Framework

The lessons of the past years could lead the government to introduce several evolutions of its contractual environment, including company registration frameworks, procurement plans, procurement methods and bidding documents, and evaluation rules.

- **Update bidding procedures based on recent lessons learned:** (i) limit the proportion of works that can be subcontracted; (ii) increase technical and financial requirements (e.g., require experience with similar contracts, availability of equipment and staff, and cash flow), potentially through a prequalification procedure for large contracts; and (iii) introduce a price adjustment clause in contracts. Such a clause would apply to contracts on which the effective duration is longer than 1 year. The government might feel the need to define a composite sector price index and publish it regularly.
- **Regulate contractors through a registration system.** Contractors could be classified according to their financial and technical capability. Such systems typically rank the firms according to their proven capacity and prequalify them according to the type and size of the contract. This is combined with a performance feedback system, such as blacklists of contractors and individuals and/or performance evaluations that lead to upgrades or downgrades. While revising bidding rules and documents, the government should carefully ensure that the measures increase the quality of competition and do not prevent market entry.

### Example

As analyzed in the World Bank's Transport Note No. 11: "Many countries have set up a national system that classifies contractors according to financial and technical capability. Zambia and Malawi register contractors through their construction councils. Care needs to be taken that such systems do not become rent-seeking exercises where contractors just pay for the classification they want, so



inspection and verification of contractors' resources is essential. Registration systems may be more effective at provincial level where the logistics of verification are much easier."<sup>80</sup>

- **Announce rolling investment and procurement plans.** This simple measure enables contractors to prepare for works in advance and to make proposals under better conditions.

**How could donors support the industry?** Given the impossibility that local industry can compete for large donor-funded contracts, the government often has requested that donors make an effort to adjust their procurement methods. Notably, the use of international contractors actually lowers tensions existing on the local construction market. The industry's absorptive capacity is still below the level necessary to build the large-scale corridors financed by donors. Indeed, this report argues that, in the medium term, the government actually should foster foreign contractor participation. In that context, donors preferably should support the industry by implementing human resources or financing activities aimed at reducing the constraints on industry development.

Donors still would benefit from a wider competition for road works. Donors could open competition to local companies in several ways. First, they may lower the procurement requirements, such as minimum turnover, cash flows, etc. In doing so, it should be remembered that such thresholds are there to ensure that the works can be completed on time—a major issue in Mongolia. Second, donors may split contracts. Large works could be bid simultaneously in small contracts, with the potential that both large international contractors and local companies will bid for several contracts at the same time. This would, however, need to be evaluated on a case-by-case basis, because long transport distances and high mobilization costs imply a need for economies of scale. Third, donors might use up the 10% local preference allowance (offered in standard international bidding documents). This would not be very efficient on its own because the companies still would not meet requirements. However, if applied to works implemented by local contractors, it could provide incentives for international companies to team up with Mongolian companies. This also would foster technology transfer.

## **Suggestion 6.2: Develop the Sector's Nongovernment Professional Associations**

Sector NGPAs could become valuable relays for the government, as outlined in Section 5. After being strengthened, NGPAs would become the natural partners with whom the government could discuss the issues outlined in this section.

The government could orient the role and management of the Road Federation and give it legal status. It could seek to replicate some features of Malawi's experience. In Malawi, the Malawi Act No. 19 of 1996 created a National Construction Industry Council as a public–private partnership, with specific reference to contractor registration and training. Council functions include promotion and development of the construction industry, especially for local firms; promotion of research and technology; promotion of safety standards; prescription of categories for contractor registration; conduct and coordination of training; publishing of technical evaluations; review of the contract award process; exercise of disciplinary control; standardization of quality control and contract/procurement documentation; monitoring of construction costs; assessment of the performance of contractors; and records maintenance.<sup>81</sup>

<sup>80</sup> World Bank. 2006. *How a Road Agency Can Transform Force Account Road Maintenance to Contracting*. Transport Paper No. 11. Washington, DC. p. 5.

<sup>81</sup> Sub-Saharan Transport Policy Program. 2005. *Construction Industry Development and the Road Sector*. Africa Transport Technical Note 38. Washington, DC.

Likewise, the government could officially transfer from the DOR to an NGPA the responsibility for managing the road engineering profession. Professional engineering associations have a role in protecting the consumers of engineering services (such as works management, works design, or supervision) and policing the profession. Functions that could be transferred include maintaining a code of practice for professional road engineers, maintaining the records of professional engineers and the services they have performed, disciplining infractions and awarding nonofficial distinctions, disseminating information on international best practices, and organizing education and training. The transfer of such functions to an NGPA—potentially the Road Engineers Association—would require aligning the NGPA's status, funding base, and management with international best practices.

### **Suggestion 6.3: Modernize and Scale Up the Technical Education and Vocational Training System**

A consolidation of the educational system is necessary to address the human resources constraint in a sustainable manner. The existing systems have so far failed to adjust to the new environment. A development program could include expansion of the engineer education training system, with an expansion of its capacity, a review of its programs (to make them directly practical and therefore to retain students), and a strengthening of its equipment and teaching staff. The program also might undertake further consolidation of the vocational training system, already initiated by the government and the DOR. A key aspect of the development program would be to further involve sector stakeholders in education and vocational training management. Indeed, the road administrations, the professional sector, and the unions could be involved in defining training goals and curricula and could participate in their delivery through public–private partnership approaches. It would foster coordination among the various elements of the education system. Stakeholders could then commit to employing mainly certified people.

### **Suggestion 6.4: Enhance Credit Availability**

To improve access to financing, the government might review the rationale for the government-imposed constraints during procurement, such as the type of guarantees required, while seeking to improve payment delays, and ease access to credit.

#### ***Option 1***

This could be done through government sharing of a part of the risk that the banks usually bear. The government could seek to subsidize interest rates or could provide partial or total guarantees on contractor advances and bonds. These actions could depend upon the contractor being duly registered and qualified. If it is difficult to partner with local banks, a special-purpose fund could be set up (Box 17).

#### ***Option 2***

Alternatively, the government could select about 10 small to medium-sized contractors and provide direct financial assistance (e.g., loans or equity) to foster their growth and technology upgrades. The contractors involved in such program would have to produce business plans, improve quality standards (such as by acquiring International Organization for Standardization [ISO] certification), and submit to regular technical and financial audits. The selection process for such contractors would have to be firmed up by the DOR, MOF, or SPC. Such a contractor development program has been implemented in both the Republic of Korea and Japan.



### Box 17 Tanzania's Experience with Contractor Funds

**C**onstruction Industry Development Fund. Tanzania's Construction Industry Development Fund was set up in 2003 by the National Construction Council with the aim of providing funds to firms on easier terms than those offered by traditional banks; acting as a guarantor for loans; providing loans for equipment and tools; providing training in business development; fostering alliances among local firms and between local and foreign firms; and managing a construction warranty scheme.

The fund's management and board of directors come from contractors, consultants, and suppliers. Sources of funds include membership fees, equity contributions from members, donations, grants, loans, and commissions on loans and guarantees.

A Contractors Assistance Fund also was set up by the Contractors Registration Board, purely to guarantee advances and bonds for small-scale contractors. Of the 400 companies assisted since 2002, only one has defaulted to date.

Source: World Bank. 2006. *How a Road Agency Can Transform Force Account Road Maintenance to Contracting*. Transport Paper No. 11. Washington, DC.

### Suggestion 6.5: Facilitate Domestic Contractors' Access to Foreign Technology

To increase the technological capacity of the domestic industry, the government could orient **foreign contractors' involvement in the sector**. The government could provide incentives for the creation of joint ventures, with the objective of fostering technology transfer to the domestic industry. Some degree of foreign contractor participation could also incidentally reduce some of the sector's capacity bottlenecks. A key requirement for such a policy would be to facilitate the entry of imported equipment and foreign contractors. In the past, the lack of coordination among ministries has been the cause of project start-up delays. An interministerial committee could be set up to coordinate the Ministry of Labor, the customs authority, MRTCAD, and MOF.

# SECTION 7

## Implementing a Capacity Development Program

### Key Findings and Suggestions

#### Findings

The road sector appears ready to embark on a capacity development program. After extensive consultation with sector stakeholders, the government approved the Mid-Term Road Sector Capacity Building Program, which seeks to address some of the deficiencies highlighted by the report.

This section outlines a possible change process that would take place from 2011 to 2016. The approval of the Mid-Term Road Sector Capacity Building Program by government in August 2011 and the creation of a high-level steering committee at the political level will increase its chances of success. ADB will support this capacity development program through a medium-term partnership in the sector with the government, including technical assistance and loan financing.

### Preparing for Change

A strengthening of road network management and a modernization of road sector institutions is a necessary task if the government intends to realize its high ambitions for the sector or, at minimum, wishes to protect its assets and ensure the value-for-money of sector budgets. This section provides suggestions on the general conditions for successful sector capacity development, summarizes the preparation of works undertaken since the presentation of the first draft of the report to government, and proposes a structured medium-term approach to capacity development.<sup>82</sup>

### Conditions for the Sector's Capacity Development

Embarking on a large-scale development program in the road sector requires clarity and relative consensus on three points. First, there must be agreement on the need for change. In 2008, there was broad consensus on sector deficiencies, relayed by sector associations and road users. Although

<sup>82</sup> A good general discussion of road sector reform can be found in United Nations Economic Commission for Latin America and the Caribbean. 2004. *Road Network Management*. Santiago de Chile, particularly in Chapter 8.





this led to the reinstatement of the DOR, this positive step alone will not solve most sector issues. Second, there must be agreement on the objectives of the change. Strengthening efforts can aim at providing the means to achieve Mongolia's national development objectives for the sector and keeping public agencies accountable for their performance. Third, there must be agreement about the elements and conditions that need to be changed. This report has identified important weaknesses in the sector's financing framework (Section 2), in the way it conducts road maintenance and road construction (Section 3 and Section 4), in the governance and performance orientation of its institutions (Section 5), and in private sector environment (Section 6). It also has sought to identify some of the underlying factors that have led to deadlocks.

If successful, sector development is bound to change existing equilibrium in the sector. Any change can cause unrest among those who are affected, and public employees are usually particularly conservative about change. The chances of success will be increased by the active and sustained involvement of key sector stakeholders. This category includes the administration—the DOR, the MRTCUD, and the other ministries, particularly the MOF and the SPC, the National Audit Office and the SPIA, and the Ulaanbaatar administration; user representatives; professional contractors from private and state-owned companies and their employees; and, very importantly, politicians from the government, the parliament, and Ulaanbaatar.

Finally, it will be important to remain realistic about the pace of sector change, given the small number of people that can manage change. Most of the solutions proposed in this review rely on the gradual transformation of existing structures, which would simplify implementation. Some measures, however, would require legal changes. Overall, a medium-term time frame of 5 years covering the 2011–2016 period appears reasonable.

## The Reform Preparation Process to Date

After the first presentation of this report to the MRTCUD in May 2010, the government quickly set about preparing a capacity development program for the sector, quickly named the Mid-Term Road Sector Capacity Building Program. Three basic principles were followed during its preparation: (i) the program should originate from stakeholder, government, and civil society representatives meeting on an equal basis; (ii) the objectives should enable the road sector to meet the government's high-level medium-term objectives in the road sector, as described in the National Development Strategy (i.e., to lead the road sector to a new level of modernity and development); and (iii) the measures selected should receive broad support from stakeholders, should be concrete, and should produce quantifiable results.

**Stakeholder consultations.** Following a brief phase of awareness raising by ADB, the MRTCUD organized a large and well-publicized stakeholder workshop to share its assessment of sector's challenges and needs and to propose a structured process leading to reform.

**Preparation process.** The consultations were set to involve four phases: a first phase of debate and technical work to prepare propositions, a phase of consultations and policy drafting, a third phase to present to decision makers, and an implementation phase. The propositions were prepared by three stakeholder working groups:

- **Group 1, "Modernizing the governance framework of the road sector at the national and local levels,"** worked on the sector's financing and management mechanisms, the



interaction between national and local administrations, and the relationships between the parliament, the administrations, and civil society.

- **Group 2, “Developing a highly performing road industry,”** worked on the sector’s industrial, technological, and human development policies, and on road works procurement, supervision, and transparency.
- **Group 3, “Creating the institutions needed to manage tomorrow’s road network,”** worked on the management models and development plans of the road administrations, the division of responsibility among administrations, and the way road maintenance is planned, budgeted, and implemented.

Each working group comprised four groups of participants: government road sector agencies; other government stakeholders; contractors and nongovernment professional associations; and civil society representatives. Their works were facilitated by an international and a Mongolian consultant.

### *Initial expectations*

The working groups were tasked with preparing a series of propositions that ultimately would be presented to the joint forum (comprising all working groups). For each measure, the working groups were to identify the rationale; the expected objective and quantifiable target; the costs; the potential legal, social, financial, or technical obstacles to their implementation and the ways to solve them; and the activities necessary to implement the recommendations (e.g., legal drafting or specific study), including implementation mechanisms (e.g., technical assistance) and schedule. Importantly, working group members were nominated for their own qualifications; they did not represent any entity, thereby avoiding institutional posturing. Working group recommendations were to be approved unanimously, and if the working group could not reach a consensus, the report was to reflect the points of disagreement.

### *...and results*

This working group proved to be an excellent format for allowing free discussions among people from antagonistic institutions and with widely different backgrounds. A key element was the organization of several weekend retreats for working group members. Two issues on the process quickly appeared. It initially had been proposed that the working group presidents should be external from the administration, whereas their rapporteurs would be civil servants. However, in the end the MRTCUD preferred to have both selected from its staff. This was to ensure that the MRTCUD’s views would be reflected in policy propositions that it would ultimately have to promote to other ministries, but also simply to ensure their availability. The second issue concerned the role of the international facilitator. Although it was initially expected that the facilitator would intervene only as an honest broker, working group members quickly asked the consultant to take a more hands-on approach, given its perceived independence and technical expertise. In the end, the facilitator directly drafted proposals that the working groups debated. Although this ensured the coherence of the approach, it also slowed down the process, given translation needs. In the end, a reduced team of five people prepared the final program during a weeklong retreat in February 2011, 6 months after the beginning of consultations.

**The road map.** The Mid-Term Road Sector Capacity Building Program (see Appendix) establishes medium- and long-term performance objectives for the road sector’s capacity to plan and deliver investment projects, maintain roads in good condition, develop human resources, and transfer technology. This road map proposes, among other things, to:



- place responsibility for policy implementation in the hands of more efficient, sufficiently staffed, autonomous, and performance-oriented organizations—the DOR and the Ulaanbaatar DOR;
- establish a fair, sufficient, and stable maintenance funding source by aligning user charges with costs attributable to road users and by increasing the amount earmarked for maintenance through the Road Fund—part of the proceeds would be used to fund a periodic road maintenance program;
- increase transparency and stakeholder participation by recreating an independent body with stakeholder representation (a road board) to oversee the use of Road Fund proceeds;
- gradually change from force-account maintenance to contracted-out, performance-based maintenance;
- mandate the use of plan-based, priority-setting, and decision-making procedures in allocating funds;
- increase incentives for contractors to produce quality works, and have stricter supervision; and
- implement a range of activities to scale up vocational and engineering training programs and to facilitate contractors' access to credit.

## Managing Change

Mongolia's government approved the Mid-Term Road Sector Capacity Building Program in August 2011. If these general objectives and policy directions can be implemented successfully, Mongolia's road sector capacity would take a major qualitative and quantitative step. Still, the road map only sets general directions; important decisions remain about the ways to implement the changes, and the momentum for change easily could be lost. Independently of the actual procedure followed, several key factors would raise chances of success.

**Quick and visible results.** Given past failed reform attempts, people's expectations can quickly wane. The MRTCUD will need to quickly give substance to the Mid-Term Road Sector Capacity Building Program, such as by passing the "quick win" regulations. In the medium term, commitment also will depend on effective results on matters of concern to the outside stakeholders: projects implemented on time, better road conditions, and improved material conditions for road workers. The sooner visible results are demonstrated, the more likely it is that change will be sustained.

**Balance between reform and capacity building.** A risky strategy would focus all efforts on reforming policies and institutions. Although some reform is warranted, early successes could be easily reversed in case of political or macroeconomic changes. In contrast, capacity building in the form of formal or on-the-job training, scientific research, better human resources management, modernization of training institutions, and raising awareness can have longer-term and more sustainable effects.

**High-level leadership.** The development process will need a reform champion, preferably a person endowed with sufficient charisma and influence and granted clear responsibility and authority. There also is a need for a system to facilitate quick outreach and decision making at the political level.

**Creating relays of reforms.** The administration's current understaffing could quickly make impossible the task of delivering this comprehensive program. In this context, a well-identified permanent reform team is necessary for coordination and facilitation. Nonetheless, program



success ultimately will depend on its ownership by the people who can implement the changes. The more people feel involved, the more they will act as independent drivers of the change. Likewise, the continuous involvement of road-user representatives, contractors, and NGPAs can create useful advocacy relays.

**Communication and outreach to the public.** Sustaining the political commitment to reform also will benefit from regularly monitoring, evaluating, and communicating the results to decision makers and stakeholders, political actors (such as through a yearly report to the parliament), and the general public.<sup>83</sup>

## Making Change Happen

### Possible Reform Implementation Phases

A workable change process could involve three phases. A first task would be to set up the implementation mechanisms—nominating and tasking the committees, working groups, and consultants who will carry out change. After this is achieved, these participants could concentrate on preparing implementation plans for priority capacity development activities and the reforms defined by the Mid-Term Road Sector Capacity Building Program. The issues with construction management, maintenance financing, periodic maintenance, and agencies' staffing could receive a high priority.

The implementation plans could include (i) a development plan for road sector institutions (including the Road Board), covering organization, division of responsibilities, performance management frameworks, and human resource development plans; (ii) proposals for restructuring the Road Fund, including legal amendments; (iii) an outline of guidelines for newly introduced institutional processes and systems (e.g., supervision, project cycle, and performance contracts); (iv) a strategy for scaling up education, training, and scientific research programs; (v) a medium-term research program; and (vi) a training plan. During this phase, consultants could support change through policy advice, coordination, and facilitation.

A second phase would involve enacting those changes, through sector reengineering and new processes, and gradually raising institutional and staff capacity through research programs, training systems, and strengthening of key services. During this phase, international consultants still could provide policy advice—but on more than a “just-in-time” basis. They also could help create the systems, manuals, or training materials. Finally, they could provide guidance and on-the-job training to road agencies and local research institutes as they deliver the investment plans, training, and research works that the sector will need to produce independently in the long term.

Toward the end of this second phase, debate could begin on follow-up reforms and changes initially considered a lower priority. After a formal evaluation of the progress and impacts of the first round of reforms (i.e., after about 2 years), an update of the road map could be prepared, leading to a third phase of change and consolidation.

<sup>83</sup> See, for instance, Sub-Saharan African Transport Policy Program. 1997. *Media Dissemination of Road Sector Reforms*. African Transport Technical Notes No. 4. Washington, DC.



## How ADB Can Help

ADB support could be framed as a medium-term partnership to support change. At the government's request, ADB is supporting the capacity development program in various ways. ADB has prepared this study with its administrative budget; it has provided a small-scale technical assistance to help stakeholders prepare the Mid-Term Road Sector Capacity Building Program; and it approved in August 2011 a large technical assistance to help implement the first 2 years of this road map, with support from the Japan Fund for Poverty Reduction, financed by the Government of Japan. The option of a large technical assistance presents the advantage of dedicating people full-time to preparing the program, implementing international best practices, and providing "honest brokers" services during stakeholder discussions. The scope of work under this technical assistance combines support for specific advisory and capacity building activities, as defined in the Mid-Term Road Sector Capacity Building Program, as well as medium-term support for program coordination and monitoring for a period of at least 2 years. In addition, ADB could provide loan financing for the preparation and implementation of investments required by the program for periodic maintenance works, equipment purchase, staff retrenchment costs, and other purposes. It also could help coordinate the technical assistance of donors active in the road sector, through the existing donor coordination group (Transport Working Group), which ADB co-chairs with the MRTAUD.

## APPENDIX

# Mid-Term Road Sector Capacity Building Program

## Background

The most extensive long-term strategies for road network development have been proposed in government programs such as the Millennium Road, the National Development Strategy, and the Road Network Development 2020 master plan.

The New Development Medium Term target program has been approved by parliament and the Government of Mongolia and has created a set of objectives, such as the upgrading of 5,572 km of paved roads and 990 km of highways in 2011–2016 to connect the *aimags* (provinces) to the capital city, Ulaanbaatar, and the neighboring border checkpoints.

Several strategies for road network development have been proposed, including legislative action, building human resources capacity, introducing new road techniques and technology, upgrading road conditions, increasing return on investment, and strengthening the capacity of government road organizations and national private road companies.

Presently, national road companies still have insufficient capacity to implement such strategies, especially in capacity building. There is a dearth of engineers and professional workers in road construction; thus, there is a need to increase the number of road engineers and professional workers to cope with the growing demand of the sector.

Moreover, comprehensive, sophisticated, sustainable investment policy has been challenged due to improper projection and planning of investment in the road sector and inadequate implementation of policies and return on investment.

Currently, only about 30% of road maintenance work is being performed on the highest-priority projects, due to lack of financing. Therefore, collection of duties for the Road Fund needs to be more sophisticated and must be increased to finance road maintenance. The capacity of personnel and their administrative capability remains insufficient to provide effective management of government road organizations, particularly in the areas of road construction and maintenance. Moreover, there is a tendency toward declining rates of return on investment, time delays, and poor performance of road construction and maintenance work, due to poor planning, inadequate bidding, involvement of too many stakeholders, unclear obligations and responsibility, and weak accountability.

Given these factors, there is a need to develop the capacity of the road sector by implementing the Mid-Term Road Sector Capacity Building Program.





## Program Goal

The concept of this program is the effective implementation of projects and programs for efficient development of the road network in Mongolia and the creation of a road system with favorable, safe, and secure road conditions equal to international quality standards.

## Program Objective

The program has the following objectives:

- Strengthen industrial capability of road sector and develop a skilled human resources pool
- Ensure safe and secure road conditions across the network
- Intensify return of investment for the road sector
- Strengthen the capacity building ability of road sector organizations

## Program Implementation Phases

**First phase (starting period of program implementation):** Ensure preparatory work of program implementation within 2011.

**Second phase (period of achieving short-term program objectives):** Implementation period is January 2012–June 2013. The Government of Mongolia will make an assessment of the implementation of short-term program objectives in 2013.

**Third phase (period of achieving medium-term program objectives):** All goals and objectives will be fully completed by 2016.

## Administrative and Management Structure of Program

A national board will be formed for program administration and management. The council will be headed by the Ministry of Roads, Transportation, Construction and Urban Development and would include the state secretary of a related ministry and adequate officers, representatives of nongovernment professional associations, and road-user representatives.

A permanent team for the implementation of the program should be set up in the Department of Roads, the government's implementation agency. A working committee to perform certain specific tasks, involving relevant stakeholder participants, may be appointed.

The Asian Development Bank will support the program by providing technical assistance. International and national consultants will develop detailed project implementation plans and manuals and will provide assistance to the implementing agency to ensure smooth project implementation.



## Program Financing

The following financial sources will be used for the implementation of the program:

- state budget allocations and the Road Fund;
- local budget allocations;
- technical assistance, a soft loan from donor countries and international organizations;
- individual investors, national companies, and international companies;
- grants and donations; and
- other funding sources.

## Implementation Activities for Program Objectives

The following activities will be implemented to achieve the proposed program objectives.

### ***OBJECTIVE 1: Strengthen road sector industrial capability and develop skilled human resources***

#### **1.1 Strengthening road sector industrial capability**

- 1.1.1 Step up the capacity of the national road construction industry and create national road construction companies with the ability to carry out international competitive bidding.
- 1.1.2 Upgrade registration and qualification criteria for national companies. Build a national road construction contractors' association that could ensure road construction standards.
- 1.1.3 Identify a tax policy approach to supporting the national road construction companies. Set up a proper legal environment to exempt companies from customs tariffs and value-added taxes on imported equipment with advanced technology.
- 1.1.4 Create various opportunities for national road construction companies to develop their businesses by taking out loans with minimum interest rates. Support the merger of national contracting companies, to increase their financial, equipment and human resources capacity.
- 1.1.5 Enable national consulting firms to supervise road design and construction in order to gain experience and bring their performance in these areas to international levels.

#### **1.2 Strengthening the sector's human resources capacity**

The following action plan aims to increase the number of engineers and professional workers in the near future.

- 1.2.1 Demand for study and training will be identified, planned, and implemented. Identify the number of engineers and professional workers needed in the road sector, and develop and implement training programs for engineers and professional workers with different professional backgrounds. Furthermore, identify a number of trainees for upgraded professional qualifications and retraining.
- 1.2.2 Preserve professional human resources. Upgrade the curriculum and study programs of university, colleges, and professional training faculty to meet the demand for professionals to implement middle- and long-term programs in the road sector.



Strengthen the capacity of trainers and engineering professionals. The target is no fewer than 80 trained engineers and 350 trained professional workers every year.

- 1.2.3 Upgrade and retrain professionals. Prepare skilled teachers and trainers and upgrade the curriculum for retraining and postgraduate training. Increase the number of trained professionals to about 150 engineers and technical workers every year.
- 1.2.4 Strengthen the study and training environment and its resources by providing textbooks, equipment, and on-the-job training.

## **OBJECTIVE 2: *Provide a high-quality road network***

### **2.1 Upgrade road maintenance management**

- 2.1.1 Develop and implement a road maintenance plan for government roads and capital city roads. Obtain sources of funding for overall road maintenance and its facilities. Research current road conditions, which is required to develop and implement a plan of periodic maintenance and reconstruction. Get accustomed to periodic maintenance or reconstruction of capital city paved roads every year in accordance with the plan.
- 2.1.2 Introduce contracts that base financing on road condition and establish cost norms for road maintenance work. Introduce international practice so that financing is predicated on road condition and quality, rather than on just a background of completed work, and on the basis of established normative cost per kilometer of routine maintenance work.
- 2.1.3 Perform road maintenance work using road asset management systems. Identify required investment for road maintenance and plan it in keeping with the road asset management database established by the DOR, taking into consideration road length, specific location features, and current road condition, with assistance from ADB consultants.
- 2.1.4 Upgrade and develop a legal environment and procedures for the Road Fund and its disbursement. At present, the Road Fund's legal environment and disbursement procedures are unclear and not optimal. Funding from Road Fund should be exclusively dedicated to routine and periodic maintenance, planned on the basis of the road asset management system. The road maintenance budget will be no less than MNT40 billion per year by 2016.
- 2.1.5 Establish a new road maintenance company for every 100–200 km of roads, in keeping with the increasing volume of paved road construction.
- 2.1.6 Clarify the duties and obligations of the road maintenance companies, and improve companies' management structure and contract administration. Address ambiguous situations and duplication of duties and streamline the responsibilities of organizations such as the DOR, SPC, and state-owned road maintenance companies.
- 2.1.7 Upgrade the current management structure and methodology for routine maintenance of Ulaanbaatar roads. An organization specifically in charge of road maintenance should take over the related duties currently assumed by the current comprehensive city road maintenance contractor.

### **2.2 Ensure competitive participation of the public and private sectors in the implementation of road maintenance work**

- 2.2.1 Develop a favorable legal environment and conduct research on public–private participation in routine and periodic maintenance of roads and facilities.



- 2.2.2 Provide an opportunity for the private sector to execute some routine road maintenance on the basis of good accountability. Evaluate the performance of the private sector during execution of routine maintenance.
- 2.2.3 Ensure competitive participation of the public and private sectors in implementation of periodic road maintenance. In selecting a road maintenance company for periodic maintenance, priority should be given to human resources qualifications, appropriate machinery and equipment, work experience, and capability.

### **2.3 Assess the current axle loads of road users and develop strategies to prevent overloading on roads**

One cause of road deterioration is the overloading of heavy vehicles. Therefore, it is necessary to study and develop measures to prevent overloaded trucks from running on roads.

- 2.3.1 Develop an action plan to prohibit overloaded traffic from running on state paved roads. Set up proper devices to measure load capacity at main points on state paved roads, forcing users to follow proper standards. Address overloading issues incrementally and ultimately stop it.
- 2.3.2 Study the possibility of increasing the load capacity of roads. Conduct field experiments in two locations traveled by heavily loaded vehicles within 2012. Install devices to measure load capacity, observe pavement deterioration, and recommend measures to improve pavement design.

## ***OBJECTIVE 3: Increase return on investment for the road sector***

### **3.1 Plan investment in road construction based on prioritization of socioeconomic significance and return on investment**

The public investment objectives in the road sector are described in the draft Road Master Plan, the Millennium Road Project, the Comprehensive National Development Policy, and New Development Medium Term Program.

- 3.1.1 Update the Road Master Plan to be consistent with the policy of regional development, mining, and tourism. A master plan on road network development in harmony with state policy on regional development, mining, and tourism is needed.
- 3.1.2 Elaborate midterm and yearly investment plans within the context of state development policy and strategy. Eliminate decreasing returns on investment and disruption of plans due to unexpected projects and activities not reflected in the approved policy and strategy but reflected in midterm and yearly plans.

### **3.2 Encourage private investment in the road sector**

- 3.2.1 Formulate a favorable legal environment and proper procedures to encourage private investment in the road sector.
- 3.2.2 Improve the regulations on contracting procedures for concessions and evaluate and track contract achievements. Develop standard contracts for concession and craft regulations for bidding. Develop qualification criteria for contract evaluation, to be followed by the road sector in accordance with the Concession Law in Mongolia.
- 3.2.3 Develop, endorse, and improve state policy documents about road sector-related transportation of mining products. A comprehensive government policy and coordination is needed for the biggest projects and programs in the mining sector



and for the transportation of these mining products, given the initiation of road construction by private companies.

### 3.3 Improve contract administration and procurement procedures

- 3.3.1 Improve documents related to procurement procedures. Study the bidding documents of countries with internationally recognized bidding experience and customize these to Mongolian conditions. Upgrade and follow regulations for bidding.
- 3.3.2 Reflect more specific feature of the road sector and increase the involvement of professional organizations. Make the procurement procedures more efficient and simple.
- 3.3.3 Develop and follow rules and regulations for supervisory consultants in road construction and design.
- 3.3.4 Study and introduce international best practices for quality assurance in road construction contracts.
- 3.3.5 Develop and implement consulting service agreements for road construction on the basis of International Federation of Consulting Engineers standard contracts and consistent with Mongolian conditions. Current road construction contracts are insufficient for present requirements.
- 3.3.6 Study and implement proper cost estimation procedures for road design, construction, and maintenance, and their enhancement. Apply real market costs in calculating estimates for road design and construction.
- 3.3.7 Apply equal fees for consulting services in road construction and maintenance by increasing consulting service fees independently of contractors' fees. Increase the supervision fee for road construction consulting services to not less than 4% of total construction cost (up from the existing 2%). Such fees should be projected separately and spent independently from contractor fees.

### 3.4 Strengthen sector capacity for scientific research and laboratory testing

- 3.4.1 Establish a road research institute and provide related human resources, equipment, tools, and laboratory space. Present scientific research and survey of new techniques, technology, materials, and sophisticated design is outdated due to lack of a special independent research institute.
- 3.4.2 Study and introduce advanced international technology, experience, and management of design, construction, and maintenance of roads and facilities. Research and define new pavement technologies that can withstand Mongolia's harsh climatic conditions.

## **OBJECTIVE 4: *Strengthening road sector institutional capacity***

- 4.1 Update, clarify, and strengthen the objectives, obligations, and legal environment of the Department of Roads and provide skilled human resources for the implementation of their public responsibility.
  - 4.1.1 Update and clarify the duties and responsibilities of government organizations connected with roads, supported by technical assistance from consultants to strengthen capacity.
  - 4.1.2 Elaborate and implement an organizational structure for the road sector to ensure a stable management structure, right of independent decision making, transparency, and accountability.



- 4.1.3 Clarify the duties and obligations of Department of Roads, the government's implementing agency for the road asset management system. The duties and responsibilities of the Department of Roads include preparing the investment plan for the road network, organizing procurement, ensuring contract administration, ensuring road condition quality, and housing the road asset management system.
- 4.1.4 Study the possibility of establishing a regional implementation unit to supervise proper road conditions and road maintenance. Change and upgrade the existing structure of road maintenance activity for international and state road maintenance companies and its supervision, located in Ulaanbaatar.
- 4.1.5 Identify the human resources necessary to implement the enhanced duties and obligations of the state road organization and develop a plan for retraining and specialization of personnel. Develop and implement a training plan for personnel to strengthen the road sector until 2012, and encourage its personnel to undergo further graduate and postgraduate studies and other certified training.

#### **4.2 Upgrade output-based management**

- 4.2.1 Upgrade the output-based management system in the state road organization and clarify performance and evaluation criteria.
- 4.2.2 Evaluate the performance of the state road organization on the basis of the following:
  - creation of the midterm investment plan and its achievement;
  - creation of the annual investment plan and its achievement (by activity and through contractor);
  - road condition; and
  - contractual management.
- 4.2.3 Craft regulation for evaluating performance.

#### **4.3 Upgrade the qualification criteria and evaluation and performance supervision procedures to strengthen the implementation of results-based management**

- 4.3.1 Support and strengthen the capacity of public nongovernment organizations.
- 4.3.2 Study and identify the involvement of public nongovernment organizations in sector activities, supported by technical assistance consultants.
- 4.3.3 Some government assignments and tasks will be transferred to public nongovernment organizations. Expand the cooperation between public organizations and professional nongovernment organizations and formulate a favorable legal environment for cooperation on any road sector activity.

#### **4.4 Reorganize the Road Board and intensify its activity**

Improve the legal environment of the existing Road Board and restore its composition. Ensure more deliberation of and concern for road users interests in Road Board activity.

- 4.4.1 Upgrade the legal environment of the Road Board and reorganize its management structure. Reorganize the composition of the Road Board with representatives of public, private, and civil society in 2012. Rights and duties will be regulated in accordance with the Road Act.
- 4.4.2 The Road Board will support and collaborate with state road organizations. Its main activities are to give recommendations for projection of the investment plan and to collaborate with government organizations to reflect Road Board strategy on road



construction supervision and maintenance, marketing the road sector's achievements to the public, and including road users' interests in road sector policies.

#### 4.5 Upgrade the road sector information system

Develop a program to upgrade the road sector's information system and implement it within the Department of Roads in 2013.

4.5.1 Formulate proper capacity building to upgrade the road information system. Identify the necessary software, hardware, equipment, tools, human resources, and funding. The following information will be included in the road information system:

- a database on the state road network;
- midterm and long-term plans to develop the road network;
- information about procurement status;
- progress of project and program implementation;
- reports from the Department of Roads, Ulaanbaatar DOR, and the Road Board;
- information from contractors and consulting firms;
- information about road conditions; and
- road user assessments.

#### 4.6 Support and assist the local administrative units of *aimags* in developing an aimag-level road network plan

There is a lack of professional administration and management methodology for local administrative units to follow in developing an *aimag* road network.

4.6.1 Each *aimag* should identify and endorse a local road network, create a road information database, and elaborate and implement midterm and annual plans to develop the local road network. Support and assist in the creation of an administration and management methodology for local administrative units to follow in developing the local road network.



## Program Output and Qualification Criteria

The following table illustrates criteria for program implementation by objective.

Strategic Objective	Program's Output, Qualification Criteria	
	2011–2013	2013–2016
1. Increase industrial products of road sector, strengthen human resources capacity	<ul style="list-style-type: none"> <li>• Increase national road construction contractor capacity by not less than 60%</li> <li>• At least 80 professional engineers and technicians and 450 professional workers will be trained annually in the home country</li> <li>• 700 professional engineers and 6,300 technicians and professional workers will work in the road sector</li> <li>• At least two national contractors can compete with international bidders using international competitive bidding</li> </ul>	<ul style="list-style-type: none"> <li>• Double the capacity of national road construction contractors, who will have capacity to perform all road construction projects in the country</li> <li>• At least 100 professional engineers and technicians will prepare annually in the home country</li> <li>• 1,000 professional engineers and 8,000 technicians and professional workers will work in the road sector</li> <li>• At least four national contractors can compete with international bidders using international competitive bidding</li> <li>• Five national contractors and consulting firms will achieve International Organization for Standardization (ISO) certification</li> </ul>
2. Meet good road condition requirements	<ul style="list-style-type: none"> <li>• Formulate a favorable legal environment for the Road Fund, enabling stable financial resources and effective disbursement</li> <li>• Paved road ensured by all standards will increase by 100%</li> <li>• Budget for road maintenance work will be not less than MNT20 billion</li> <li>• Periodic road maintenance will be performed for not less than 200 km road on the basis of a road asset management system</li> <li>• Update normative costs and implement financial disbursement based on actual output performance (i.e., based on road condition)</li> <li>• Increase the number of road maintenance companies</li> <li>• Increase private sector involvement in road maintenance operations and generate competition</li> <li>• Put overload majoring device at no fewer than two points and supervise traffic overloading</li> </ul>	<ul style="list-style-type: none"> <li>• Most paved road will meet standards and requirements for road condition</li> <li>• Financing of road maintenance work will be based fully on normative cost; budget will be no less than MNT40 billion</li> <li>• 90% of periodic road maintenance in a given year will be committed on the basis of a road asset management system</li> <li>• Maintenance works will be paid based on meeting contractual performance targets</li> <li>• Create road maintenance companies and units in charge of all routine and other road maintenance for every 200 km of paved road</li> <li>• Cease overloading completely</li> </ul>

*continued on next page*



Table continued

Strategic Objective	Program's Output, Qualification Criteria	
	2011–2013	2013–2016
3. Increase return on investment in the road sector	<ul style="list-style-type: none"> <li>Establish appropriate procedures for the administration and management of road construction projects, which is reflected in the investment plan</li> <li>Enforce quality assurance for road construction projects</li> <li>Supervision of the largest road construction projects will be executed by an independent consulting firm</li> <li>Establish a road research institute and provide necessary human resources and equipment</li> </ul>	<ul style="list-style-type: none"> <li>Road construction projects will be completed within the given year of the investment plan, on time, and with high quality</li> <li>Enforce quality assurance for all road construction projects</li> <li>Supervision of all road construction projects will be executed by independent consulting firms</li> <li>Research and introduce advanced techniques and technology from developed countries and adapt these for Mongolian road construction technology, materials, and design</li> </ul>
4. Strengthen institutional capacity building in the road sector	<ul style="list-style-type: none"> <li>Government organizations in charge of the road sector will have the human resources capacity to implement the biggest projects and programs efficiently</li> <li>Commit to establishing regional branches and units in charge of supervising maintenance of roads and facilities and ensuring road condition</li> <li>The Road Board, with representatives of the road users, will be reestablished, monitor the Road Fund investment plan, and disburse the Road Fund</li> <li>Identify some road sector responsibilities that could be implemented by private nongovernment organizations and transfer these to relieve government obligations</li> <li>Identify software, hardware, equipment, and human and financial resources to update the information system and formulate capacity building</li> </ul>	<ul style="list-style-type: none"> <li>A road sector government organization will ensure transparency and conduct performance-based evaluations.</li> <li>Commit to establishing regional branches and units in charge of supervising maintenance for every 100–200 km of road</li> <li>The operation of information technology in the road sector will be stabilized and necessary sources will be ensured</li> </ul>

## Mongolia: Road Sector Development to 2016

Mongolia's growth is set to accelerate in the next decade, as its vast mining resources start to be put into large-scale production. This has greatly improved its prospects for prosperity and poverty reduction. However, to realize its full potential, Mongolia will need to transform its society, economy, and administration.

This report discusses how the context of road sector policy and road infrastructure investments will change, and the ways the sector can best prepare to fulfill its new role. Given the country's road infrastructure needs, the road sector will be expected to implement massive highway investments in a short time and then to consistently maintain the new highways at a high standard. However, Mongolia's current small-scale road sector will unlikely have the capacity to scale up and deliver upon such expectations without extensively modernizing its financing mechanisms, business processes, organization, and education systems. This report therefore argues that Mongolia's government needs to implement a comprehensive capacity development program for the road sector for about 5 years.

This study looks into the sector's financial dimension, the techniques and processes followed for road maintenance and construction, and the role of human resources management and education. It tries to understand why sector performance improvement has been slow, even though many sector issues and apparent solutions have been considered in the past. Reflecting on lessons from international experience, it outlines a range of policy options for decision makers and proposes an agenda until 2016.

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

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