Foundation for Sustainable Development:
Rethinking the Delivery of Infrastructure Services in Mongolia

June 2007
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June 2007
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(exchange rate effective April 17, 2007)

Currency unit: Togrog (MNT)

Tog 1.0 = US$0.0008584
US$1.0 = Tog 1,165.00

UNITS OF MEASURE

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<th>Description</th>
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<tbody>
<tr>
<td>Gcal</td>
<td>giga-calorie</td>
</tr>
<tr>
<td>gce</td>
<td>grams of coal equivalent</td>
</tr>
<tr>
<td>GWh</td>
<td>gigawatt-hour</td>
</tr>
<tr>
<td>kCal</td>
<td>kilo-calories</td>
</tr>
<tr>
<td>km²</td>
<td>square kilometer</td>
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<tr>
<td>kV</td>
<td>kilovolt</td>
</tr>
<tr>
<td>kW</td>
<td>kilowatt</td>
</tr>
<tr>
<td>kWh</td>
<td>kilowatt-hour</td>
</tr>
<tr>
<td>lpdc</td>
<td>liters per capita per day</td>
</tr>
<tr>
<td>m³</td>
<td>cubic meter</td>
</tr>
<tr>
<td>m³d</td>
<td>cubic meters per day</td>
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<tr>
<td>Mcal</td>
<td>mega-calorie</td>
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<tr>
<td>MW</td>
<td>megawatt</td>
</tr>
<tr>
<td>MWe</td>
<td>megawatt-electrical</td>
</tr>
<tr>
<td>MWh</td>
<td>megawatt-hour</td>
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<tr>
<td>MWₜʰ</td>
<td>megawatt-thermal</td>
</tr>
<tr>
<td>NOₓ</td>
<td>nitrogen oxide</td>
</tr>
<tr>
<td>PM 10</td>
<td>particulate matter that is 10 micrometers in diameter</td>
</tr>
<tr>
<td>PM 2.5</td>
<td>particulate matter that is 2.5 micrometers or smaller in diameter</td>
</tr>
<tr>
<td>SO₂</td>
<td>sulfur dioxide</td>
</tr>
<tr>
<td>Tcal</td>
<td>tera-calorie</td>
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<tr>
<td>ton-km</td>
<td>ton-kilometer</td>
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ACRONYMS AND ABBREVIATIONS

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<th>Description</th>
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<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>AMPS</td>
<td>Advanced Mobile Phone Service</td>
</tr>
<tr>
<td>ARPU</td>
<td>Average revenue per user</td>
</tr>
<tr>
<td>BOT</td>
<td>Build-operate-transfer</td>
</tr>
<tr>
<td>CAA</td>
<td>Civil Aviation Authority</td>
</tr>
<tr>
<td>CAL</td>
<td>Civil Aviation Law</td>
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<tr>
<td>Capex</td>
<td>Capital expenditures</td>
</tr>
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<td>CAREC</td>
<td>Central Asia Economic Regional Cooperation</td>
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<td>CAS</td>
<td>Country Assistance Strategy</td>
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<td>CASDP</td>
<td>Civil Aviation Sector Development Project</td>
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<td>CES</td>
<td>Central Electricity System</td>
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<td>CDMA</td>
<td>Code Division Multiple Access</td>
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<td>CHP</td>
<td>Combined heat and power plant</td>
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<td>CHSC</td>
<td>Central heating service company</td>
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<td>CPUSC</td>
<td>Construction and Public</td>
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<td>EBRD</td>
<td>European Bank for Reconstruction and Development</td>
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<td>ECA</td>
<td>Economic Consulting Associates</td>
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<td>EES</td>
<td>Eastern energy system</td>
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<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<td>EIB</td>
<td>European Investment Bank</td>
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<td>EPA</td>
<td>Environmental Protection</td>
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Rethinking the Delivery of Infrastructure Services in Mongolia

April 2007

<table>
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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>ERA</td>
<td>Energy Regulatory Authority</td>
</tr>
<tr>
<td>ERR</td>
<td>Economic Rate of Return</td>
</tr>
<tr>
<td>ESMAP</td>
<td>Energy Sector Management Assistance Program</td>
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<tr>
<td>EU</td>
<td>Tacis European Union Technical Assistance to the Commonwealth of Independent States</td>
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<tr>
<td>EWSD</td>
<td>Electronic Worldwide Switch Digital</td>
</tr>
<tr>
<td>FSU</td>
<td>Former Soviet Union</td>
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<tr>
<td>FTC</td>
<td>Fixed Telecommunication Company</td>
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<tr>
<td>GDP</td>
<td>Gross domestic product generating company</td>
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<tr>
<td>GMPCS</td>
<td>Global Mobile Personal Communication Service</td>
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<tr>
<td>GNI</td>
<td>Gross national income</td>
</tr>
<tr>
<td>GoM</td>
<td>Government of Mongolia</td>
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<tr>
<td>GSM</td>
<td>Global System for Mobile Communications</td>
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<tr>
<td>HOB</td>
<td>Heat-only boiler</td>
</tr>
<tr>
<td>IAS</td>
<td>International Accounting Standards</td>
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<tr>
<td>ICAO</td>
<td>International Civil Aviation Organization</td>
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<td>ICDC</td>
<td>Information and Communication Service</td>
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<td>ICNC</td>
<td>Information and Communications Network Company</td>
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<td>ICT</td>
<td>Information and Communication Technology</td>
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<td>ICTA</td>
<td>Information and Communication Technologies Authority</td>
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<tr>
<td>EBRD</td>
<td>European Bank for Reconstruction and Development</td>
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<td>IFI</td>
<td>International financial institution</td>
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<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
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<td>IRU</td>
<td>International Road Transport Union</td>
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<td>ISP</td>
<td>Internet service providers</td>
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<td>JICA</td>
<td>Japan International Cooperation Agency</td>
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<td>JMP</td>
<td>Joint Monitoring Program</td>
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<tr>
<td>JBIC</td>
<td>Japan Bank for International Cooperation</td>
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<tr>
<td>KIW</td>
<td>Kreditanstalt für Wiederaufbau</td>
</tr>
<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
</tr>
<tr>
<td>JMP</td>
<td>Joint Monitoring Program</td>
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<td>JSDF</td>
<td>Japanese Social Development Fund</td>
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<td>JV</td>
<td>Joint venture</td>
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<td>LPG</td>
<td>liquefied petroleum gas</td>
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<td>LSMS</td>
<td>Living Standards Measurement Study</td>
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<tr>
<td>MAF</td>
<td>Mission Aviation Fellowship</td>
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<td>MCA</td>
<td>Millennium Challenge Account (GoM)</td>
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<td>MCAAA</td>
<td>Mongolian Civil Aviation Authority</td>
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<tr>
<td>MCC</td>
<td>Millennium Challenge Corporation (U.S.)</td>
</tr>
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<td>MDG</td>
<td>Millennium Development Goals</td>
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<tr>
<td>MEGM</td>
<td>Ministry of Geology, Energy and Mining</td>
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<tr>
<td>MH</td>
<td>Ministry of Health</td>
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<tr>
<td>MIAT</td>
<td>The Mongolian airline</td>
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<td>MIPS</td>
<td>Mongolia integrated power system</td>
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<td>MNE</td>
<td>Ministry of Nature and Environment</td>
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<td>MoUB</td>
<td>Municipality of Ulaanbaatar</td>
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<tr>
<td>MOF</td>
<td>Ministry of Fuel and Energy</td>
</tr>
<tr>
<td>MOI</td>
<td>Ministry of Infrastructure</td>
</tr>
<tr>
<td>MP</td>
<td>Member of Parliament</td>
</tr>
<tr>
<td>MRTT</td>
<td>Ministry of Road, Transport, and Tourism</td>
</tr>
<tr>
<td>MT</td>
<td>Mongolian Telecom</td>
</tr>
<tr>
<td>MTZ</td>
<td>Mongolia Railways Company (joint venture with the Russians)</td>
</tr>
<tr>
<td>MUB</td>
<td>Municipality of Ulaanbaatar</td>
</tr>
<tr>
<td>NARTAM</td>
<td>National Road Transport Association in Mongolia</td>
</tr>
<tr>
<td>NDRC</td>
<td>National Dispatch Center</td>
</tr>
<tr>
<td>NGO</td>
<td>Nongovernmental organization</td>
</tr>
<tr>
<td>NTSC</td>
<td>National Transport Safety</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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</tr>
<tr>
<td>NSO</td>
<td>National Statistics Office</td>
</tr>
<tr>
<td>OBA</td>
<td>Output-based aid</td>
</tr>
<tr>
<td>Opex</td>
<td>Operating expenditures</td>
</tr>
<tr>
<td>OSNAAG</td>
<td>Housing and Public Service Company</td>
</tr>
<tr>
<td>PC</td>
<td>Personal computer</td>
</tr>
<tr>
<td>PMU</td>
<td>Project Management Unit for USIP2</td>
</tr>
<tr>
<td>PPP</td>
<td>Public Private Partnership</td>
</tr>
<tr>
<td>PUP</td>
<td>Public sector—public sector partnership</td>
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<tr>
<td>PUSO</td>
<td>Public Urban Services Organization</td>
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<tr>
<td>RAO-UES</td>
<td>Russian utility</td>
</tr>
<tr>
<td>RIC</td>
<td>Railway Infrastructure Company</td>
</tr>
<tr>
<td>RPCD</td>
<td>Road Policy and Coordination Department</td>
</tr>
<tr>
<td>RSRC</td>
<td>Road Supervision and Research Center</td>
</tr>
<tr>
<td>SHS</td>
<td>Solar home system</td>
</tr>
<tr>
<td>SPC</td>
<td>State Property Committee</td>
</tr>
<tr>
<td>T&amp;D</td>
<td>Transmission and distribution</td>
</tr>
<tr>
<td>TSC</td>
<td>Transport Service Center</td>
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<tr>
<td>TI</td>
<td>Transparency International</td>
</tr>
<tr>
<td>UB</td>
<td>Ulaanbaatar</td>
</tr>
<tr>
<td>UBHDN</td>
<td>Ulaanbaatar District Heating Network</td>
</tr>
<tr>
<td>UBDHC</td>
<td>Ulaanbaatar District Heating Company</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>USAG</td>
<td>A water and sewerage company</td>
</tr>
<tr>
<td>USIP1</td>
<td>Ulaanbaatar Services Improvement Project</td>
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<tr>
<td>USIP2</td>
<td>Second Ulaanbaatar Services Improvement Project</td>
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<tr>
<td>USOF</td>
<td>Universal Service Obligation Fund</td>
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<td>USUG</td>
<td>Ulaanbaatar Water and Sewerage Authority</td>
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<tr>
<td>VAT</td>
<td>Value added tax</td>
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<tr>
<td>VSAT</td>
<td>Very small aperture terminal</td>
</tr>
<tr>
<td>WES</td>
<td>Western energy system</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WLL</td>
<td>Wireless local loop</td>
</tr>
<tr>
<td>WSS</td>
<td>Water supply and sanitation</td>
</tr>
<tr>
<td>WTP</td>
<td>Willingness to pay</td>
</tr>
<tr>
<td>WWTP</td>
<td>Wastewater Treatment Plant</td>
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FOREWORD

Mongolia has seen dramatic changes over the last 10 years, and the next 10 years will be no different. From a system of state planning, the country has moved towards a market-based economy—and the next decade will see rapid growth in that economy. From a system of centralized, state-directed infrastructure provision, the country has extended access, reformed state enterprises and gradually introduced private operators. Over the next 10 years, the role for both the private sector and autonomous state-owned enterprises in infrastructure provision will increase further—and the quality and extent of Mongolia's infrastructure will continue to improve. The government has made clear its intention to ensure its citizens access to infrastructure services that will allow for development, poverty reduction, and a better quality of life for all. The government has also made clear that it sees continued sector reform—fairer pricing, improved management and regulation, better planning—as a key part in providing such access to quality services.

The World Bank has been a proud partner in Mongolia’s development, and has played an active role in support of infrastructure access and reform. The Bank will continue its involvement going forward, and remains committed to support further infrastructure rollout under strengthened sectoral institutions.

At the same time, as Mongolia’s economy and institutions continue to develop, the World Bank’s partnership role—as well as that of other donors—will change. Not least, donors will cease to be the most significant source of infrastructure financing, and their decisions about which projects to fund will play a smaller role in determining what is built. The government will develop stronger capacity to plan, evaluate and finance infrastructure development, civil society, and the private sector will find a larger role in oversight and operation.

This report is a step in the direction of that changing relationship. It is intended to be an input into the process of formulation of a National Development Strategy and focuses on improving the capacity of the country's institutions to manage, finance and extend quality infrastructure. Fitting clearly within the policy priorities laid out by the government in its National Development Strategy, it suggests a program of reform that will allow the government and people of Mongolia to achieve for themselves the goal of making infrastructure a bridge to domestic and global markets and a platform for development.

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MONGOLIA

POPULATION GROWTH RATE BY REGIONS, AIMAGS, AND THE CAPITAL

POPULATION GROWTH RATE PERCENTAGE, 1995-2005:

- GREATER THAN 35.6
- 25.5 TO 35.6
- 10.5 TO 25.5
- 0 TO 10.4
- LESS THAN 0

- AIMAG PROVINCE CAPITALS
- NATIONAL CAPITAL
- AIMAG PROVINCE BOUNDARIES
- INTERNATIONAL BOUNDARIES

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Key Messages: Mongolia has seen significant economic development over the past 10 years, accompanied by a considerable expansion in infrastructure services. Looking forward the country is poised for rapid growth, underpinned by mining, trade and continued urbanization. But in order to achieve this growth, further improvements in the planning, quality, and extent of infrastructure provision are vital. Today, prices of networked services do not meet their costs—favoring wealthy urban apartment dwellers with heating and water connections at the cost of unconnected rural and ger households. The sector is excessively regulated by overlapping institutions with weak capacity, and state-owned providers are poorly managed. Planning for infrastructure investments involves little economic analysis or pro-poor prioritization. The three key elements of a strategy for improved infrastructure involve (a) pricing that meets the costs of service provision with targeted subsidies to help the poor, (b) enterprise and regulatory reform to improve performance incentives and encourage competition and (c) a system of prioritization for infrastructure projects to ensure a sustainable level of public investment targeted where it is needed the most.

EXECUTIVE SUMMARY

Over the past 10 years, Mongolia has shifted from a plan-based state economy to one in which private sector competition drives significant growth. Within infrastructure, considerable progress in rollout has been supported by a sector investment rate as high as 10 percent of GDP. As a result, the country has moved from a situation of isolation and limited utility access to spreading the benefits and quality of network connectivity.

Looking forward, urbanization, focused around Ulaanbaatar and mining areas, the exploitation of new mines, and continued growth in Russia-China trade all provide hope for rapid economic advance. For example, Russia-China trade transiting Mongolia has increased by 250 percent over the period 2000–05, and such growth can be expected to continue. The Government of Mongolia (GoM) predicts 7–10 percent annual GDP growth rates in the coming 10 years.

Infrastructure is key to unlocking these prospects. Experience around the world has shown that a viable infrastructure sector is a condition to support continued economic growth. Experience has also shown that lack of infrastructure—or its unreliable and costly supply—hampers development. Infrastructure is vital to connect countries to global markets and strengthen domestic trade. It also plays a central role in developing stocks of human capital—improving health and education outcomes.

Mongolia is no exception. Indeed, Mongolia’s geographic and climatic features make efficient and environmentally sustainable provision of quality infrastructure services even more vital than in other countries. For example, the country’s cold climate means that an average school in Mongolia uses 16 percent of its operating budget on energy—compared to 1 percent on books.

Efficient provision of infrastructure services will also contribute to proper mitigation of air, water, and soil pollution, particularly in Ulaanbaatar. This is an area not covered in this report, although it deserves urgent attention.
CURRENT STATUS AND INFRASTRUCTURE CHALLENGES

Mongolia has an extensive infrastructure stock given the country’s level of economic development. Access rates to roads, electricity, and the mobile phone footprint have expanded rapidly and are higher than might be expected given the country’s income and geography. For example, there were only 889 mobile users in 1996 compared to 766,052 ten years later.

Nonetheless, considerable infrastructure gaps remain to be filled, especially in water and sanitation and specifically in informal and rural settlements. Only 30 percent of households in the country have adequate access to water supplies and only a little over half of rural Mongolians have access to electricity. A recent survey of ger (traditional Mongolian felt and canvas tent) area residents found that 100 percent of respondents complained about insect and rodent infestations linked to poor sanitation and waste collection. The majority of wastewater treatment plants in aimag (province) centers treat none of their throughput. Furthermore, there are concerns regarding the quality of provision. Less than 30 percent of the paved road network more than 10 years old is estimated to be in good condition, many electrical connections provide enough current for only one light bulb, commercial losses in electricity equal about 25 percent of energy distributed in 35 KV and unaccounted for water accounts for 29 percent of supply in Ulaanbaatar.

At the same time, high technical standards required by equipment that can operate in Mongolia’s environmental extremes, the short construction season, and distance from international markets all make the construction and maintenance of infrastructure very expensive by global standards. For example, freezing temperatures complicate the extension of water networks as water pipes need to be laid some three meters below ground level. Despite growing incomes, Mongolia remains a country with limited resources for investment—about 36 percent of the population lives below the poverty line. In this context, careful prioritization and efficient use of resources is, and will remain, critical.

The current long list of proposed new infrastructure investments at the sectoral level adds up to US$7.3–7.7 billion over the next 10 years, not accounting for any subsidies or transfers to cover operations and maintenance or losses. It is perhaps worth comparing this number to current GDP of around US$2 billion. Although government finances look healthy this year on the back of historically unprecedented copper prices and the windfall tax on copper mines, it is unlikely that revenues will remain so high. The mismatch between likely resources and proposed investments suggests that plans will have to be considerably scaled back and combined with pricing reform and a greater role for private sector investment even if tax revenues devoted to infrastructure significantly increase.

The three major challenges to ensure that infrastructure plays a catalytic role in Mongolia’s development are more closely aligning prices with costs, improving efficiency and governance, and planning better. Without pricing reform, regressive subsidies will continue to suck resources from maintenance and expansion. Without improved efficiency and governance, the quality of service provision will continue to decline, resources for investment will be wasted, and new sources of financing will not...
emerge. Without better planning, the investment resources that are available will be misallocated, garnering low economic returns and lower poverty reduction.

**BETTER ALIGNING PRICES WITH COSTS**

Any strategy to ensure sustainable infrastructure provision in Mongolia will have to have at its core a readjustment of prices to ensure financial sustainability and maintenance of capital stocks for both state-owned and private providers. Regardless of private or public ownership, financing for operation and expansion of infrastructure can only come from two ultimate sources—tariffs paid by customers and/or resources provided by taxpayers. As a result, low tariffs not only encourage wasteful use of infrastructure, but put heavy demands on government resources which could be better used rolling out services to the unconnected (at the moment, 90 percent of infrastructure investment is financed by donors).

The capacity to cover costs varies considerably across sectors and companies within sectors. The Civil Aviation Authority (CAA), the railway, and the Fixed Telecommunication Company (FTC) all make consistent profits. At the other end of the scale, direct road transport charging is effectively nonexistent. In urban transport, neither public nor private large bus operators can be financially viable at current fares, which are set by the government. At internationally competitive levels, tariffs would have to be close to US$0.35 per trip—the current level is US$0.18.

Analysis of typical electricity customers in Ulaanbaatar suggests that increases of up to 80 percent for residential customers and 10–30 percent for industrial and commercial customers are necessary to cover costs. Ulaanbaatar’s piped water tariff is about half of the level charged in Manila and Bangkok. This pricing regime is highly regressive. It is overwhelmingly the wealthy who are connected to networked electricity, water and heat, and these services would be cheaper than non-networked provision even if charged at cost. But they are not—prices are subsidized. Meanwhile, poor households in ger areas have to rely on poor-quality, but unsubsidized “dirty fuels,” such as low-quality coal. They consume a little more than one half of the electricity of city center residents, and pay two and a half times as much per liter of water.

International experience suggests the political complexity of pricing adjustments, echoing Mongolia’s recent experience in urban transport tariff reform (where public protest forced a reversal in tariff increases). But lessons of international experience also provide some guidance on reducing political costs and increasing overall benefits of the reform effort. In both energy and water, the need for price increases will be significantly reduced if efficiency is improved—not least through reduced supply losses. Related to this, price rises will be more acceptable if they are linked to quality improvements. Stakeholder participation in the design of broad reform programs will allow for a discussion of the tradeoffs between types of price reform and other options. A discussion of tradeoffs will also allow for an explicit linkage between price increases and improvements in the quality or extent of service provision. To make linkages more transparent, consumer surveys can be introduced which measure satisfaction with quality of delivery. The regulator might be empowered to use such evidence, along with measures such as distribution losses, to penalize firms (perhaps through fines) which fail to meet transparent and objective threshold standards. Remaining general price
subsidies for infrastructure should be financed through government transfers rather than cross-subsidy mechanisms.

Output-based aid (OBA) can be a useful tool to deliver targeted subsidies. OBA involves paying suppliers on the basis of services delivered to particular consumers at an agreed price rather than in the form of general subsidies or investment support for new infrastructure, and is being piloted in Mongolia’s telecommunications sector, where an expected subsidy of US$10–16 million in the Universal Service Obligation Fund (USOF) should provide about 700,000 people with access to telecommunications.

**IMPROVING EFFICIENCY AND GOVERNANCE**

Efficiency improvements will require a broader institutional reform effort. The system of national, urban, and aimag road funds does not prioritize maintenance and the funds spend 75 percent of their (limited) resources on new road construction rather than maintenance. The Central Electricity System (CES) is made up of 18 separate state owned companies that have high costs due to high technical losses, poor meter reading, partial billing, and theft. This combined with tariff levels below the economic cost of supply for both electricity and heating results in a pattern of persistent financial losses, and that the exact size of these losses is unknown is a sign of the weak accounting systems in place in the sector. The size of price rises needed to meet costs of provision would drop by 40 percent if electricity sector efficiency could be improved. In water and sanitation, there has been a widespread introduction of management contracts, but they are not drafted or managed to best effect, and Governors effectively make all significant management decisions. Bill collection rates at the kantors\(^1\) bear no relation to staffing levels, and range between only 50 and 80 percent of amounts owed. More broadly, there is a perception that governance weaknesses linked to corruption in the country may be an increasing threat. Transparency International (TI)’s Corruption Perception Index has fallen from 4.3 in 1999 to 3.0 in 2004 (suggesting a worsening corruption problem). Between 2001 and 2004, the proportion of Mongolian firms who ranked corruption as a major obstacle to business increased from 44 to 56 percent.

In transport, maintenance and investment funding could be channeled through a consolidated system within the ministry, with additional technical support to ensure the quality and sustainability of the road stock as well as provide economic analysis of new transport proposals. To improve the governance of state-owned businesses, the government could legislate and regulate to separate the commercial and noncommercial functions of government-owned infrastructure service providers. The commercial functions could be transferred to new government-owned enterprises with commercial objectives and business-like boards which have high levels of autonomy and transparency, and operate under appropriate incentives. In electricity and water, performance measures and targets should be introduced under the existing basic contract arrangements. This will provide the basis for comparative performance. Amalgamation should be encouraged, so that economies of scale in management, engineering supervision, and customer service systems can be made.

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\(^1\) Kantors are financially autonomous housing and communal services units.
In order to improve transparency, the flow of government funds, the rationale behind investment decisions, choices of supplier, and implementation of investment projects should all be subject to greater public oversight. The implementation of public expenditure tracking surveys, which follow the flow of funds through levels of government (to see what percentage of budgeted funds reaches service providers), can uncover significant leakage. State-Owned Enterprise annual accounts and business plans should be published. At the same time, there is little reason to withhold from the public the contents of licenses and contracts to provide infrastructure services, or the procedures and results of policymaking and regulatory bodies in infrastructure. Combined with increased use of physical and financial audits and customer scorecards (based on surveys of customer satisfaction with services), greater transparency will improve the incentives for efficient performance.

To date, the record of private investment in Mongolia has been mixed. In telecommunications, the rapid rollout of privately operated services over the last five years is a success. At the same time, there have been failures. Water management at the Kantor level is in private hands, for example, but performance has been weak. In the energy sector, the GoM has made progress in the development of a legal framework to encourage greater commercialization of energy services, nonetheless, deficiencies in the market structure and technical inefficiencies impede investment. Overall, private investment in infrastructure remains limited, estimated at around US$7 million/year 1995–2004.

In order to attract sustainable private investment and involvement, there is an urgent need for policy, regulatory and pricing reform to ensure a level playing field for private providers underpinned by cost-based tariffs and the confidence that such a regime will extend into the long term. There is also a need to ensure that private provision delivers on its promise through oversight of quality and delivery targets. There is a significant need for improved information and regulation regarding the rules for private (including nonprofit) sector provision as well as the interface between public and private networks. The OBA model can be a useful method to extend access to (and improve the quality of) public services through a public-private partnership.

There has been a considerable amount of progress in the regulatory environment in Mongolia over the last 10 years. Not least, the country has one of the most independent and active energy regulatory entities in Asia. Nonetheless, some regulatory functions are duplicated by aimags, the capital city, soums (administrative subdivisions of an aimag, or province), and districts. In total, Mongolia has more than 20 separate governmental entities with price-control powers. By comparison, New Zealand, with an economy 40 times larger than Mongolia’s, has one regulatory body overseeing prices. There is excessive regulation in a number of areas including spectrum management, licensing of electricity generation, air transport pricing, and urban infrastructure services provision. There is a need for regulatory consolidation under bodies with legal autonomy from related ministries and enforcement of a pricing regime which links prices to costs. More generally, it should be noted that the recent investment-climate assessment of Mongolia identifies many ways it could improve the environment for the private sector by, for example, by making it easier for firms to borrow.
PLANNING BETTER

To date, Mongolia’s investment plans have tended to resemble a wish list, aimed at donors who finance the great majority of infrastructure investment. Going forward, as the government and state enterprises play an increasing role in investment financing, planning will have to improve. The urgency of a planning exercise is underscored by the fact that, even assuming 10 percent annual GDP growth over the next 10 years, current investment proposals amount to 48 percent of GDP per year. Reduced programs outlined in the transport and water annexes bring annual investment expenditures over the decade towards 22 percent of GDP, still an unsustainable level without international precedent.

Further magnifying the importance of planning, mistargeting appears to be a growing problem in infrastructure financing. Overall expenditure on capital maintenance across infrastructure sectors has dropped from 0.6 to 0.2 percent of GDP over the 2000–06 period. The 2004–05 budget for national road maintenance in particular, at US$4 million, represented almost a threefold increase over figures for 2000. At the same time, the budget was still half of that requested by the transport ministry and one fifth the estimated requirement based on international norms for a network of Mongolia’s size.

Mongolia’s current transport strategy emphasizes expenditure on an extensive network of new roads, many of which appear to lack any economic justification. The Millennium Road is one such example. The traffic forecasts used to justify construction appear markedly optimistic, and there is a high risk that road will attract insufficient traffic to justify its costs. Subsequently, the Millennium Road Program was expanded to include five new north–south routes. No prefeasibility or feasibility studies have as yet been conducted on these routes. Similarly, in rail transport, in anticipation of the output of mines, mostly destined for China, thought is being given to the construction of new railways within Mongolia to the existing line into China, and a parallel line along the Russia-China track. However, there have been no studies of the capacity of the existing infrastructure or how that capacity can increase cost-effectively. Upgrading the existing North–South line would cost 1/10 the amount of building a new line and would be adequate to reduce congestion in the short to medium term.

In water and sanitation, existing investment plans suggest that 88 percent of investment financing 2005–15 will go to the improvement and extension of service provision in apartments and other formal areas, leaving only 12 percent for ger areas where investment returns are likely to be higher and more equitable. In electricity, planning has been too shortsighted rather than excessively elaborate, and there is an urgent need to begin construction of new capacity while upgrading distribution.

In addition to mistargeted spending, existing infrastructure plans lack adequate attention to the sources of financing and management of new infrastructure stocks. A number of investments with high social and economic returns will be financially unattractive and will struggle to find private financing—for example, water, sewage, and local roads. At the same time, there are a number of proposed investments where the gap between financial and economic rates of return are likely to be small, suggesting that private financing may be available and limited public financing could be diverted to cases where the social return to investment is considerably higher than (inadequate) private returns. The most clear-cut case is that of infrastructure required to exploit new...
mining opportunities. The focus of a regional strategy connected to large mines should be to leverage what the private sector can (and should be expected to) do alone in order to maximize the development impact of such investments. For example, mines require electricity, water, transportation, and ICT services for their own operation; these assets could be leveraged to meet the local needs of citizens.

A government infrastructure investment plan should be produced, based on a consistent and rigorous application of social and economic assessment criteria, to include an assessment of priorities for government financing that takes account of the limited resources likely to be available and the potential for private investment. A prioritization would involve more than an ordering of existing plans, but evaluation of “second best” or alternate options where appropriate. If the Ulaanbaatar monorail proves too expensive, for example, the government may want to consider dedicated bus lanes as a cheaper alternative. If meeting the water and sanitation Millennium Development Goals (MDGs) will take more resources than are likely to be available, the government may wish to use what resources are available to improve kiosk services and existing pit latrines.

Pro-poor planning is likely to involve a significantly greater focus on ger areas. Environmentally friendly, financially plausible solutions to low quality energy and water services in ger areas would include the provision of efficient stoves which could reduce average household coal consumption from 5 to 3 tons during the winter season, self-activated insulated water hydrants rather than manned kiosks, connection of remaining water kiosks to the network, and low cost improvements to upgrading estimated 72,000 pit latrines with improved ventilation and lining.

Mongolia’s current regional development plan emphasizes five economic regions created out of the 21 provinces. In three of these five regions, the government proposes tax and other incentives to lure investment to non-mining locations away from Ulaanbaatar. In addition, the current focus on regional development includes the construction of a considerably expanded transport network. Yet, looking at regional dynamics, given the limited critical mass of population needed to benefit from agglomeration affects, it seems unlikely that all eight urban centers designated as regional pillar centers in the regional strategy will be able to catalyze economic growth. Cross-country experience suggests that fiscal incentives yield a modest effect in influencing relocation decisions of firms from large agglomerations to lagging areas or small cities. Interregional infrastructure investments sometimes have a significant impact on productivity, but a limited role in inducing development in lagging areas.

Most of the successful examples of regional development are not based on infrastructure at all, but instead human capital development. Non-infrastructure investments may make more sense because they are more transferable if regional development efforts are not successful. In rural areas, improved access to quality education might have particularly high returns. To this end, it would be useful to reassess the per-pupil funding formula and provide for those sparsely populated soums that are at a disadvantage from the budget allocation.

Since 2003, there has been a significant centralization of fiscal powers in government. Local governments are not involved in revenue collection and are responsible for limited
service delivery. Clearer local government responsibilities and associated local funding instruments may lead to better decisions on the best provisions of local public goods.

Prescriptive urban plans such as the Master plans developed in Mongolia under the Urban Development Law 1998 may unnecessarily constrain alternative suppliers of water, transport, and energy. Simultaneously, new ger districts are developing with too little intervention by planning agencies, so not only are there inadequate water supply and drainage services, but also a lack of a road network that allows access to public transport and to vehicles delivering utility services. Plans should not usually aim to “pick winners” by permitting only specific economic activity in certain locations or by proscribing economic activities, but the layout of roads and the direction of urban expansion are partial exceptions, since the government must decide where roads will be built, and remains responsible for provision of other basic services.

PRIORITIZATION

This report proposes a comprehensive list of recommendations covering pricing, planning, and institutional change both within and across sectors and levels of government. Even were none of the recommendations likely to be politically contentious, simultaneous implementation would be technically very complex. This suggests the need to prioritize reforms, but with the recognition that their likely success is interlinked.

Current pricing structures are ill designed to support required investments and quality improvements. They are regressive and drain resources from both maintenance and new infrastructure investment. Pricing should be introduced in road transport and raised through gasoline taxes. In air transport, energy, water, and telecommunications cost-based tariffs overseen by independent regulation will be important for reassuring private investors that they can make a return. At the same time, tariff increases are likely to be politically sustainable only if they are accompanied by reforms which increase participation and transparency as well as service quality. Remaining subsidies should be transparently implemented through central government support.

The key institutional reforms related to pricing and investments are independent and clarified regulation and expanded metering to ensure that a credible pricing regime can be implemented. In order to deliver on the promise of improved quality for increased price, further institutional reform of state provision will also be required—not least through improved governance of state-owned enterprises and performance-based contracting with private firms managing water and heating.

Three sets of investments are required to ensure that, over the near term, infrastructure does not become a constraint to economic performance: (a) investments required to maintain the existing stock of infrastructure; (b) those required to exploit the potential of recent mining discoveries; and (c) investments in capacity to avoid national electricity shortages and to upgrade of distribution facilities. How these investments are made will depend in part on a broader process of reform and prioritization. In particular, approaches that ease self-provision of infrastructure by mining firms should be rapidly evaluated. Given pricing and regulatory reform, electricity production capacity and distribution could be provided by the private sector.
A process of review and reformation of proposed investment plans should be undertaken to whittle down potential projects to a plausible level, and focus on those with the maximum potential return in terms of economic growth and poverty reduction—including the upgrading of existing infrastructure in ger areas. At the same time, approaches that maximize the role for private sector and civil society participation should be introduced.

There is the potential for significant development progress in Mongolia over the next 10 years. Absent reform and prioritization, infrastructure might become a bottleneck to that progress. However, if the government takes the initiative to improve sector governance and pricing, and combines this with an investment program focused on poverty reduction and high economic returns, the infrastructure sector can become an additional catalyst for growth and broad-based development. Figure ES-1 outlines the path to improving infrastructure service delivery in Mongolia.
**Figure ES-1: A Cross-Sectoral Perspective: The Way Forward**

### Improved Infrastructure Service Delivery in Mongolia

**Better Aligning Pricing with Costs**

#### Energy, and Water Supply and Sanitation
- **Priority 1.** Increase independence of regulatory bodies and consolidate functions, introduce yardstick competition.
- **Priority 2.** Involve stakeholders in pricing/efficiency reform—scorecards, community discussion of tradeoffs.
- **Priority 3.** Introduce electricity wholesale market based on bilateral contracts among market participants.

#### Transport
- **Priority 3.** Remove price regulation on domestic air transport, replace with direct subsidy on a per capita basis if required.
- **Priority 4.** Increase tariff collection in urban transport, examine cost recovery for parking.

#### Telecoms
- **Priority 5.** Move towards cost-based tariffs and interconnection charges. Undertake tariff rebalancing for fixed and leased line tariffs.

### Improving Efficiency and Governance

#### Energy, and Water Supply and Sanitation
- **Priority 1.** Increase independence of regulatory bodies and consolidate functions, introduce yardstick competition.
- **Priority 2.** Involve stakeholders in pricing/efficiency reform—scorecards, community discussion of tradeoffs.
- **Priority 3.** Introduce electricity wholesale market based on bilateral contracts among market participants.

#### All Sectors
- **Priority 4.** Increase transparency: publish licenses, contracts accounts of state owned enterprises.

#### Transport
- **Priority 5.** Replace road funds, introduce user representation on boards, secure resources for maintenance.

#### Water Supply and Sanitation
- **Priority 6.** Improve governance through consolidation of retail water provision services, and creation of state owned enterprises with independent boards of directors, use of performance measures in contracts.

#### Telecoms
- **Priority 7.** Complete transition to independent, minimally (price, license) regulated telecommunications regime.

#### Transport
- **Priority 8.** Improve traffic management system in Ulaanbaatar to reduce accidents and improve traffic flow.

### Planning Better

#### All Sectors
- **Priority 1.** Review existing sector investment plans for economic and poverty reducing efficiency.
- **Priority 2.** Match investment priorities with potential funding sources, maximizing private sector participation.
- **Priority 3.** In consultation with potential bidders, develop priority list of infrastructure investments required for new mines, incorporate permissions, licenses and necessary use of eminent domain as part of a bid package for cases of mine company led infrastructure investments, and incorporate shared cost of infrastructure construction in bid documents for small mines.

#### Energy
- **Priority 4.** Begin construction of new power capacity to avoid shortages post-2009, including an evaluation of public and private financing and operational options.

#### Transport
- **Priority 5.** Increase transport maintenance budget.

#### Energy
- **Priority 6.** Introduce subsidy/incentive package for provision of improved stoves in ger areas.

#### Telecoms
- **Priority 7.** Implement nationwide output-based access regime for telecommunications.

#### Water Supply and Sanitation
- **Priority 8.** Introduce output-based mechanisms for improved pit-latrine installation, delivery of solid waste collection services.

#### All Sectors
- **Priority 9.** Revise regional development plans to focus on human capital over infrastructure and tax incentives.
CHAPTER I:
AN INTRODUCTION

Mongolia has made considerable progress over the last 10 years, moving from a plan-based state economy to one in which private sector competition predominates. Within infrastructure, the country has moved from a situation of frequent blackouts and limited utility access to spreading the benefits and quality of network connectivity, supported by a sector investment rate as high as 10 percent of GDP. In part this has been due to an active reform program, most advanced in telecommunications, which has brought private participation and competition under regulatory institutions. At the same time, considerable challenges remain.

Looking forward, the opportunities presented by growing neighbors and considerable mineral reserves suggest strong economic prospects. Urbanization, focused around Ulaanbaatar and mining areas, the exploitation of new mines, and continued growth in Russia-China trade all provide hope for economic expansion, but also demand infrastructure rollout and improvement.

Indeed, Mongolia’s features make efficient provision of quality infrastructure services even more vital than in other countries. It is large, landlocked and poor, with one of the world’s lowest population densities and some of its coldest temperatures. Without strong transport and communications services, there is threat of immiserating isolation from national and global markets. For households, access to quality energy and sanitation services is a matter of life and death. More generally, energy for heat is a vital input to every economic and social service in the country. The average school in Mongolia uses 16 percent of its operating budget on energy—compared to one percent on books.

The infrastructure sector presents a number of challenges. The country’s isolation, scale and weather also complicate the provision of infrastructure services. Many people remain without access to quality infrastructure—especially those living in ger and rural areas. The introduction of private participation is far from a panacea, and experience in Mongolia is mixed. To improve both public and private provision of services, further reform covering policy, regulation, and pricing is vital, and limited investment resources will have to be channeled to where they will have the greatest impact. A long list of potential infrastructure investments to catalyze growth opportunities has been developed. That list will have to be reviewed in the light of limited government financing resources. Questions to order investment priorities include: What investments are urgent to relieve bottlenecks to growth and poverty reduction? Which investments can be supported by private actors? Which investments are of lower priority? And what alternate investments might garner higher returns?

The Government of Mongolia recognizes these challenges. Its 2004-08 Action Plan discusses greater efficiency and equity of provision, cost recovery and greater private sector participation across sectors. This sets a basis for an agenda of sector reform. Similarly, the government’s National Transport Strategy contains positive language regarding ensuring adequate funding for maintenance as a priority, project selection based on thorough technical and economic analysis, deregulating transport services to
allow greater private involvement and cost-based pricing under independent regulation. The proposals and recommendations put forward in this report fit squarely within the policy directions highlighted by the government, suggesting ways to realize the goals outlined in the strategies while emphasizing tradeoffs and choices to be made.

Maximizing the development impact of infrastructure expenditures while meeting the challenges of urbanization, regional development, and mines is the focus of the rest of this report. Chapter II looks at the country’s current infrastructure capacity, noting extensive networks but declining quality, growing environmental issues and significant remaining gaps—not least in rural areas, and in water and sanitation. Current investment plans contain important proposals for improving this situation, but the chapter notes that existing plans suggest an unsustainably large increase in investment financing. Given that existing sources of investment financing are unlikely to increase, the chapter highlights the urgent need for greater efficiency in provision, pricing reform, and a move towards new sources of financing. Improved planning will also be vital to ensure the maximum returns to available investment financing, and hard choices will have to be made amongst proposals for extending infrastructure provision.

Chapter III outlines the role for price increases to reverse regressive subsidy of wealthy consumers living in households connected to network services while providing additional resources to improve service quality and finance new investments for the benefits of all consumers. It also discusses the political economy of such increases suggesting that, not least, they need to be introduced alongside service quality and efficiency improvements. Efficiency will involve an increased role for the private sector, active use of competition as a tool for controlling prices, and increasing quality and an improved regulatory environment. This is discussed in Chapter IV.

Chapter V discusses improved planning, which will be vital to ensure infrastructure does not become a bottleneck to growth. Increased operations and maintenance expenditures will be part of this process, as will reviewing current investment plans. There are numerous cases where spending might be directed towards activities with both a higher impact on poverty and a higher general economic return. For example, cost-reflective tariffs for piped water and district heating will free up resources to subsidize provision of improved stoves and extension of water kiosks in ger areas. At the same time, there are likely to be tradeoffs, and these should be managed not just within but across sectors. Finally, Chapter VI discusses the prioritization of reforms to relieve infrastructure bottlenecks in a manner that may help to limit the political complexity of reform.
CHAPTER II:  
MONGOLIA’S INFRASTRUCTURE AND FUTURE DEVELOPMENT:  
TAKING STOCK

Key Messages: Mongolia’s future growth will be based around urbanization, mining, and regional development. The country faces high costs for infrastructure provision to be met with limited resources. While infrastructure rollout has been impressive over the last 10 years, there are gaps in access and quality. At the same time, the current list of proposed infrastructure investments is considerably larger than the country can support. Pricing, efficiency, and planning reforms emerge as priorities to address these issues.

CHALLENGES AND OPPORTUNITIES

Mongolia’s average per capita income at the official exchange rate is US$750, and one in three people live below the national poverty line. The country is large and sparsely populated: about 2.5 million people live in an area bigger than Britain, France, Germany, and Italy combined. As a result, the country has the lowest economic density, or gross national income (GNI) per square kilometer, in the World. The country produces around US$1,100 per square kilometer, compared to US$1,900 for second-ranked Mauritania and a global average of US$900,000 per square kilometer. Outside Ulaanbaatar, Mongolia’s economic density is under US$500 per square kilometer (see Figure 1). Low economic density greatly complicates the provision of networked infrastructure. Per connection costs of provision are low when connections are close together, and become far more expensive as connections are far apart. This is why networked infrastructure provision is lower in countries with limited GNI per square kilometer, as we shall see.

Figure 1: Mongolia’s Economic Density in International Perspective

![Graph showing economic density comparison between Mongolia and other countries.](source: Calculated from World Bank 2006d.)

At the same time, Mongolia is landlocked and distant from international markets. Even the capital cities of its two neighbors, Beijing and Moscow, are 1,000 and 2,900 miles away, respectively. Combined with the high technical standards required by equipment that can operate in Mongolia’s environmental extremes (winter temperatures which
reach as low as -42°C) and the short construction season this makes the construction of new infrastructure very expensive by international standards.

Mongolia’s geographic location does provide some advantages, however—not least that it sits astride the shortest land route between the capitals of two fast growing and large economies—Russia and China. Expanded trade between the two helps to account for a tripling of the Mongolia Railways Company (MTZ) profits over the last five years. Between 2000 and 2005, total Russia-China trade increased by 200 percent, climbing to over US$18 billion, while the volume of rail transit traffic through Mongolia increased 250 percent. Nonetheless, some caution is needed in thinking about the size of this opportunity. Transit traffic provides little in the way of spillover benefits to the economy as a whole and while it is quite likely that Russia-China trade through Mongolia will continue to grow at high rates, backed by oil exports from new finds in Eastern Siberia, it is also possible that these new finds may take a considerable time to exploit, or that the resulting oil may be transported by a new pipeline that skirts Mongolian territory. 

Within Mongolia, as people move from the country to the city, a nomadic and agricultural economy is giving way to an urban, service-based one (see Figure 2 and Figure 3). Ulaanbaatar now accounts for half of economic activity. Mining accounts for half of industrial output and 43 percent of export earnings, and is expected to expand rapidly on the basis of new discoveries. In 2004, the World Bank projected that the mining sector would approximately double in size 2002-08, increasing from about 9 to 11 percent of growing GDP. Mining revenues to government in 2008 were predicted to be double their level in 2002, suggesting they will stay about the same percentage of GDP—around 2.0 percent. It is worth noting that the more considerable increases in output and government revenue expected from recent finds will take some time to materialize. Nonetheless, in part based on increased mining output, overall predictions for the country’s growth are positive—ranging as high as 7 or 8 percent per year over the next 10 years.

Figure 2: Mongolia’s Urban and Rural Populations

![Figure 2: Mongolia’s Urban and Rural Populations](image)


Figure 3. Mongolia’s GDP by Source and Location

![Figure 3. Mongolia’s GDP by Source and Location](image)


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2 Estimated from international trade data and Annex 3, Transport.
3 ADB 2005.
4 World Bank 2005d.
Expanded access to quality infrastructure will remain key to this growth. Experience in other countries has shown that lack of infrastructure—or its unreliable and costly supply—hampers development of local and foreign private sector investment. Infrastructure is vital to connect countries to global markets and strengthen domestic trade. It also plays a central role in developing stocks of human capital—improving health and education outcomes. Mongolia is no exception.

New infrastructure will be required to service the growth poles of an urban, service-based economy, new mining development and the potential opportunities presented by the China-Russia trade corridor. Mongolia’s fastest growing urban area is Ulaanbaatar (see Figure 4). Mining areas, including Erdenet, are also seeing rapid urban expansion and they will need additional infrastructure to service new mines. At the same time, there is a desire to extend the benefits of wealth to regional growth poles within the country. For areas away from the capital and mining centers, while the challenge of service provision will be improving access to existing populations rather than extending access to growing cities, it is worth noting that this challenge will be exacerbated by the small size of population centers. Utilities benefit from economies of scale which towns of 10,000–20,000 will find it hard to garner. And despite growing incomes, Mongolia remains a poor country with limited resources for investment facing high costs for infrastructure rollout.

**Figure 4: Mongolia’s Urbanization Challenge**

(size of circle represents current population)

*Note*: Harhorin, Zuunharaa, Zamyn-Ud, Nalaikh and Baganuur excluded from figure for lack of GDP per capita data.

*Source*: Urban background report, Velev.

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5 Brenneman and Kerf 2002.
The future economic landscape of the country will determine which infrastructure investments will garner the highest returns, and how such investments can be financed. Economic growth will be constrained without, and catalyzed by, a growing stock and improved quality of infrastructure. (see Box 1). How such infrastructure is financed and operated, however, may vary both by sector and location.

Mining and international transit trade are both activities that should garner high financial returns. Indeed, it is their direct financial impact that will dominate the economic contribution that they make. Given this, both activities should be “self-financing” to the greatest extent possible—this would include financing for the provision of necessary infrastructure for their expansion. Conversely, urban and regional development are activities where broader spillover benefits to the economy as a whole are a significant part of the rationale for investment. Here, the role for direct government support is far greater.

**CURRENT STATUS OF INFRASTRUCTURE PROVISION**

Mongolia’s infrastructure networks have grown in the last 10 years, on the back of considerable investment. At the same time, gaps remain and maintenance of the existing capital stock is an increasingly pressing concern. The quantity and quality of provision is particularly low in rural and informal areas, and water and sanitation networks are notably lagging. Problem areas are unlikely to improve given the current regressive pricing structure which favors wealthier consumers while absorbing resources which could otherwise be used on service expansion. Pricing and efficiency issues also help to explain the country’s almost complete reliance on donor funding for infrastructure investment.

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**Box 1: Mining Sector Growth and Infrastructure**

In 2005, the Mongolian mining sector directly accounted for 18 percent of GDP and almost 76 percent of export earnings. Mining sector output is projected to double or even treble from 2003 levels by 2010 provided large projects get development approvals and are successfully commissioned. Between 2006 and 2010 copper exports are projected to almost treble pushing the contribution of copper to GDP to over 25 percent.

The continued growth of the mining sector depends heavily on the successful commissioning of new mining projects whose capital costs are in turn impacted heavily by their proximity to existing road, railway, and power infrastructure. Geological prospects that would be normally viable become uneconomic if the costs of providing the necessary infrastructure are too high. Almost all medium- and large-mine developments likely to occur in Mongolia will require significant new power, water, and transportation infrastructure.
EXTENT OF NETWORKS

Over the last 10 years, Mongolia has seen a considerable rollout of infrastructure supported by a sector investment rate as high as 10 percent of GDP. This has led to an extensive network of infrastructure given the country’s level of economic development. As can be seen from Figure 5, Mongolia (highlighted in red), despite having one of the least dense road networks in the World, already has a more extensive road network that would be expected given its income density. Given the cross-country relationship, we might expect Mongolia to have a road density of 0.002 roads per 1,000 km² rather than its actual density of 0.009 roads per 1,000 km². Similarly, while Mongolia has a low density of paved roads, it is again higher than might be expected given income density (see Figure 6). Despite constraints, some progress in improving road infrastructure has been made. For example, a road from Ulaanbaatar to the Russian border has been rebuilt and construction of a road south toward the Chinese border is well on the way to being completed.

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6 A regression analysis suggests that Ln(road density) = -11 + 0.70*ln(income density) with constant and coefficient both entering significant at one percent and an R-squared of 0.77.
The MTZ rail network comprises 1,815 kilometers of broad-gauge track, of which 1,110 kilometers are on the main line linking Russia to China, 238 kilometers are on a separate network in Eastern Mongolia that has its own link to the Russian railway, and 477 kilometers are branches from the main line. While international traffic has been growing, especially freight transit, which expanded from 1.5 to 5.4 million tons during 2000–05, it is worth noting that the majority of traffic units remain domestic rather than international (see Figure 7).

Current traffic volumes (measured in traffic unit kilometers per kilometer of track) are 4.16 million TU/km, around the World average.7 World Bank estimates suggest that railway freight traffic will increase from 15.6 million tons to 25.3 million tons over the 2006–15 period. This suggests an approximate increase to 6.75 million TU/km, compared to current levels of 34.9 TU/km in China, 13.8 in India, or 21.2 in Russia, for example. To meet the increasing rail traffic demand, MTZ has recently opened four new passing loops and lengthened existing ones.

Mongolia’s scheduled domestic aviation market serves locals, tourists, and employees of the mining industry. 1,500 flights carried 114,000 passengers on domestic routes in 2005, with a load factor of 74 percent. Over the last few years, a new runway and passenger

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7 ADB and World Bank 2006.
terminal have been built at the Chingis Khan airport in Ulaanbaatar, and five regional airports now have paved runways with lighting.

Turning to utilities, Figure 8 presents data on household access to electricity in Mongolia. As with the road network, after recent growth the electricity network is extensive for a country of Mongolia’s income and low-population density. Compared to its income peers, Mongolia’s 67–75 percent access rate is impressive. Per capita consumption rates, at 1,300 kWh, are also higher than might be expected; although this is driven by energy use in the mining sector, and many connections provide enough current for only one light bulb, leaving nothing for heating or cooking. Furthermore, we will see that, going forward, there is some risk of supply disruptions as demand outstrips available domestic capacity and distribution grids in Ulaanbaatar are overloaded.

Figure 8: Household Access to Electricity: Mongolia in International Perspective

In telecommunications, Figure 9 presents data on mobile phone coverage in Mongolia. There were only 889 mobile users in 1996 compared to 766,052 (including WLL lines) 10 years later. Once more, the phone network is extensive for a country of Mongolia’s income and low-population density. There are two mobile providers, two fixed providers, multiple VSAT, Internet, and other value-added service providers. Foreigners have invested significantly, and the sector has grown as much as 25 percent a year in the last three years. Total fixed and mobile teledensity is around 25 percent.

Water and sanitation is an exception to the general pattern of extensive networks. Because of economies of scale in water provision, the cost of servicing a small market is considerably higher on a per capita basis than the costs of supplying a large market. Figure 10 ranks Mongolia’s 10 largest urban centers by population. Based on cross-country data, the figure estimates the relative cost per head of water supply across urban areas of different sizes. The figure suggests that even efficient operators in Mongolia’s smaller urban areas would face per capita costs as much as double those faced by a consolidated water utility in Ulaanbaatar.\(^8\) (This challenge is also faced by small energy providers, but reduced for urban areas where they are connected to the grid).

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\(^8\) The figure uses weighted average results from Table 2 of Tynan and Kingdom (2005). The table presents data on increase in costs when utilities double in size in terms of population served. Two hundred and fifty thousand customers are taken as the benchmark size based on information in the text.
However, this greater complexity of provision in small urban areas provides little explanation for overall weak performance in water and sanitation even in Ulaanbaatar—a city large enough to face considerably lower costs. Figure 11 looks at Mongolia’s performance in international perspective in terms of provision of clean water. It indicates two estimates: one based on WHO data and other based on the Water and Sanitation Chapter’s estimate that 30 percent of households are “adequately served.” Using this latter estimate, Mongolia is a laggard even compared to considerably poorer countries. Even using the more generous WHO estimate, in which “improved water” includes water from public standpipes (in Mongolia mostly at kiosks) and “improved sanitation” includes the low-quality pit latrines used by many ger residents, the country is a below average performer.
URBAN-RURAL AND FORMAL-INFORMAL DIVIDES

Although the rural-urban infrastructure gap has declined notably in both electricity and water and sanitation since 1998, significant access inequality remains (see Figure 12). Only 54 percent of rural households report electricity access compared with 98 percent of urban households, and the water access gap is even larger. Similarly, rural teledensity is only around 1 percent, 1/25 of the national average. Within ger areas of Ulaanbaatar, there are only 103 km of roads, mostly earth tracks, for a population in excess of 400,000. Compare this to 361 km of paved roads for the rest of the city (with a population of around 450,000 people). Similarly, very few people in ger areas have a household water connection or access to the central heating network.

QUALITY AND EFFICIENCY OF PROVISION

At the same time, the quality and efficiency of networks is low. The quality of the road network is both low and declining. Less than 30 percent of the paved road network more than 10 years old is estimated to be in good condition. And because of what is already quite a dense road network given income density, traffic volumes on the great majority
of the country’s roads are very low compared to international norms. Nearly 80 percent of the network carries fewer than 10 vehicles an hour on average. Only five percent of Mongolia’s state road network carries more than 1,000 vehicles/day. In comparison, Wyoming, a US state with a population density of 2 per square kilometer, sees average traffic volumes on state roads of above 1,000 vehicles/day on 85 percent of the network.\(^9\)

High traffic volumes are concentrated in Ulaanbaatar. The city’s road network has remained largely unchanged in length for two decades, during which time the vehicle fleet has more than doubled. There were 41,000 vehicles in the city in 2000, this increased to 67,000 vehicles in 2004 and is likely to reach 110,000 vehicles by 2015. This growing traffic fleet is leading to congestion, as well as an increasing issue with safety. Seventy percent of Mongolia’s traffic accidents occur in Ulaanbaatar and 80 percent of victims are pedestrians.\(^{10}\) The city’s dire traffic safety record is largely responsible for placing Mongolia very high in world rankings of traffic deaths per vehicle (see Figure 13).

**Figure 13: Mongolia’s Road Safety in International Perspective**

![Figure 13: Mongolia’s Road Safety in International Perspective](image)

*Source: World Bank 2006d and World Bank 2007. The fatality rates refer to various years and use different definitions.*

Regarding the electricity network, the Central Energy System (CES) suffers technical and commercial losses equal to about 25 percent of energy distributed in 35 KV and lower voltages, the losses having risen from 21 percent in 1999. As can be seen in Figure 14, this performance is comparatively weak compared to international best practice (where losses drop below 5 percent) or even for income comparators (where best practice losses

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\(^9\) ADB 2005 and U.S. DOT 2006. The Wyoming calculation covers major arterial roads, but excludes the interstate system. Including interstates, the percentage of roads carrying less than 1,000 vehicles would drop to below 10 percent.

\(^{10}\) ADB 2005.
are around 10 percent). Added to this is excessively high consumption by the plants themselves—about 20 percent of gross generation. With better maintenance, improved management of the system and of billing, generation, commercial and technical losses might be reduced by half—equal to approximately 15 percent of gross generation.

Figure 14: Mongolia’s Electricity Transmission and Distribution Losses in International Perspective

![Figure 14: Mongolia’s Electricity Transmission and Distribution Losses in International Perspective](image)


Domestic water consumption in ger areas averages between one- or two-fifths of the WHO recommended minimum. Limited water use is not due to price: expenditures amounted to one percent of income compared to a rule-of-thumb maximum of 4 percent of income. Residents expressed willingness to pay more for water if quality and reliability improved—these factors may be the more considerable bottleneck. Only about 60 percent of households in ger areas are within 300m of a kiosk, and queuing times can be as long as two hours. At the same time, unmetered consumption in apartment households is four times developed world equivalents, and as with electricity, there is significant leakage. Unaccounted for water accounts for 29 percent of Water and Sewerage Authority (USUG)'s supply. The centralized systems' infrastructure has deteriorated significantly, and there is a need for rehabilitation to improve efficiency and to ensure regular supplies.

ENVIRONMENTAL CONCERNS

To cope in the winter without sufficient electricity and heat from a utility, poor households in ger areas rely on poor-quality coal and other cheap fuels, burned in 120,000 inefficient stoves in the capital. Each household consumes approximately 5 tons of poor quality lignite and 4.7 m³ of wood per year for heating and cooking. The stoves are not only highly inefficient but also produce large amounts of indoor air

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pollution, especially fine particulate such as PM$_{2.5}$ and PM$_{10}$. The Mongolian standard for 24-hour suspended particle concentration is 150-200 micrograms per cubic meter; in houses with heat stoves, concentrations of 750 micrograms per cubic meter have been found.

The centralized sewage treatment plants are in many cases completely dilapidated and raw sewage simply bypasses them to open areas beyond. The majority of waste water treatment plants in aimag centers treat none of their throughput. Collection networks too are in many cases in poor condition and raw sewage sometimes leaks to ground level and to water supply lines. Ger area sanitation overwhelmingly consists of simple pit latrines (there are approximately 72,000 in Ulaanbaatar), and in some of the longer-established compounds, space for latrines is exhausted. 59 percent of ger pit latrines surveyed in 2003 did not meet State Professional Inspection Agency standards.

According to a recent survey of 200 ger households, over 50 percent of households did not receive or were not willing to pay for a solid waste collection service. As a result of poor sanitation services, 100 percent of ger residents identified problems with insects and rodents, 38 percent identified a problem of ground and surface water contamination, 63 percent blockage of drainage canals and 12 percent links to diarrhea. There are over 6,000 cases of diarrhea every year in Ulaanbaatar, a situation that is likely to worsen as poor ger area sanitation causes increased groundwater contamination.

Overall, in the case of water and sanitation, it is clear that Mongolia’s performance is below the average for its income group, with both the quality and extent of water and sanitation lagging significantly. This stands in contrast to the country’s performance in terms of transport, electricity, and telecommunications, where demand and supply appear more closely aligned at the present time. Nonetheless, in energy, there is significant evidence that investment is urgently needed to keep up with demand and to improve the quality of supply in ger areas to reduce the health and environmental costs of heating. And in transport, it appears that there is a need to improve both the safety and the maintenance of the existing transport stock.

Given the status of and requirements for infrastructure in Mongolia suggested by the last two chapters, a “business as usual” scenario for the country’s infrastructure providers is not sustainable. Such a scenario would imply a continuing decline in the quality of existing stocks, with increasing environmental and economic costs (pollution and related disease burdens, blackouts and brownouts, traffic problems in the capital city). It would also suggest a considerable slowdown in the rollout of new infrastructure. This would leave a growing number of poor people facing expensive, low quality nonnetworked provision of energy, water and sanitation needs. It would also imperil economic growth driven by mining in the South and services in Ulanbaatar.

**MONGOLIA’S INVESTMENT PLANS VERSUS FINANCING REALITIES**

Considerable financing will be needed to improve the extent and quality of access while reducing environmental costs. We will see in the next chapter that the current pricing

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12 The number of public bath houses fell from 740 in 1990 to 134 in 2000 following privatization, and has only recently recovered to 349 houses. Coverage is still inadequate—Darkhan, with a population of 50,000 lacking piped hot water, does not have a single bath house.
regime is a disincentive to private investment and a drain on public resources that might be used for investment. Prices for electricity are 10–30 percent below costs for commercial users and up to 80 percent below costs for residential users, for example. This helps to account for the almost complete reliance of donor financing for infrastructure investment over the last 10 years. Out of the investment in infrastructure totaling 10 percent of GDP, 8.9 percentage points came from loans and grants (see Figure 15).

We will see that it is unlikely the absolute level of donor financing for infrastructure will increase, suggesting a declining share relative to GDP over the next 10 years. All of this suggests the need for a robust process of government planning and prioritization for infrastructure investment.

The GoM has made good progress in setting expenditure levels by establishing a medium-term budgetary framework. Yet a systematic assessment of expenditure priorities and a medium-term investment program is still lacking. This has encouraged serious inefficiencies in the management of public investment, including cuts in maintenance capital expenditures for the sake of overall budget balance, and a proliferation of investment plans which appear to be implausible given budget constraints. Mongolia is already using a considerable percentage of national income to finance infrastructure investment—higher than most comparator countries (Figure 16). It is implausible to imagine investment rates as a percentage of GDP climbing too much higher, and yet existing plans suggest as much as a fivefold increase in this ratio.
Existing plans for infrastructure investments over the next years are extensive. In transport, the four largest single investments in the government’s investment plan are a new rail line linking Russia to China (estimated to cost about US$330 million), new East-West railways in the south of Mongolia (estimated to cost about US$150 million), a new international airport (estimated at about US$300 million), and a new North-South road in Western Mongolia linking Russia to China (estimated to cost about US$160 million). Other significant proposed investments include four additional new North-South roads, completion of the Millennium Road, new mining railways, completion of the road from Ulaanbaatar to the Chinese border and upgrading domestic airports. A long list of proposed transport investments over the next 10 years totals US$4.2 billion.

In electricity and heating, rough estimates suggest that required investment in generation, transmission, and distribution—in the central system and off-grid areas—over the next 10 years is about US$1.7 billion, of which about 87 percent is for new generation. Figure 17 lays out existing investment levels in water and sanitation and projections of costs needed to ensure the percentage of households covered remains the same between 2005 and 2015 (30 percent of households with water access and 17 percent with access to sanitation) as well as the investment needed to meet the government’s MDG targets (70 and 50 percent, respectively). The figure provides two estimates for the costs of water provision—one based on using kiosks and the other on using individual connections.
Continuing the current level of investment would be more than sufficient to ensure that the percentage of households served remained the same, especially if resources were focused on water kiosks rather than individual connections (this would total US$3.7 million annually in investments). But in order to meet the MDG targets even using kiosks, investment would have to increase from US$9.8 million to US$43 million each year for the next 10 years. Sewer connection costs to meet Millennium targets might amount to US$358 million. Adding in upgrading and renovation of existing capacity and other proposed investments, water and sanitation plans involve between US$1.4 billion and US$1.8 billion. The total annual cost amounts to perhaps 12–15 percent of GDP. It is highly likely that such resources will not be available. As a result, services are likely to fall short of both government policy and the MDGs. In telecommunications, one estimate of total required investment cost from government until 2010 is about US$120 million, with the bulk of resources going to an upgrade of the national backbone network.

Adding together this list of investments suggests proposed infrastructure capital expenditures of US$7.3–7.7 billion over the next 10 years. This does not account for any subsidies or transfers to cover operations and maintenance or losses. It is perhaps worth comparing this number to current GDP of around US$1.2 billion. Figure 18 expresses capital expenditure plans in infrastructure over the past and next 10 years as a percentage of actual and forecast GDP over those time periods, the forecast assuming an average GDP growth rate of around 6.3 percent. Over the last 10 years, Mongolia has managed an impressive investment performance in infrastructure, equal to a little over 10 percent of GDP. Looking forward,

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13 The GDP forecast figures are from ADB 2005.
the proposed investments would consume above 48 percent of GDP. Proposed annual road transport investments over the next 10 years amount to an eightfold absolute increase over previous levels, for example.\textsuperscript{14} Even pruning back transport investments to a shortlist outlined in the Transport Chapter of this report as well as a water investment program which emphasizes kiosks over individual connections still suggests an investment wish list equal to 26 percent of forecast GDP. Assuming the more limited transport investment program and a 10 percent annual GDP growth 2006–15 still suggests infrastructure investment as a percentage of GDP expenditure of 22 percent over that period.

Over 1995–2004, loans, grants, private investment and GoM investments in infrastructure have averaged US$128 million per year. Of this, grants account for US$26 million per year and loans for US$88 million per year, with government and private resources each providing in the region of US$7 million per year. A reduced list of proposed investments (scaling back transport and water) going forward in infrastructure averages US$427 million per year. Assuming no change in existing financing sources this leaves a gap of US$300 million per year (see Figure 19).

On the supply side, what are likely financing resources? Outstanding debt is high, at above 90 percent of GDP.\textsuperscript{15} While most of it is concessional and additional borrowing will be possible, it is likely that there will not be a considerable increase due to supply constraints on such financing. Excluding a spike around the construction of new power plants, there is no particular sign of an upward trend from available annual data on grants and loans (presented in Figure 20). This is a significant issue give that loans and grants have formed the great bulk of financing for infrastructure investment in the past, as we have seen.

\textsuperscript{14} Calculated from Ministry of Road, Transport and Tourism (2006).
\textsuperscript{15} IMF 2005.
Increased contributions from the government’s central revenues may be a possibility as the economy grows. At the same time, these funds will likely be limited. The last 12 months have seen considerable accrual of additional tax revenues from the windfall tax on mines (as much as US$170 million over seven months), but the history of commodity prices, illustrated in Figure 21, suggests that it would be optimistic to assume that the tax will continue to generate this level of revenue. Copper prices are far above any historical precedent, and the precedent suggests that prices are volatile. The World Bank predicts nominal prices will more than halve between 2006 and 2015.
Overall, the government’s tax take is about 30 percent of GDP, which is high compared to countries of similar incomes. Furthermore, the Ministry of Finance budget principle is that government expenditure will not increase more rapidly than GDP. Excluding extra revenues from the windfall tax, assuming the 6.3 percent growth rate mentioned above, incremental additional tax revenues will amount to about 9 percent of 2006–15 GDP (averaging around US$137 million per year). If all of the additional tax revenues were spent on infrastructure investment and grants and loans to the sector continued to average US$75 million per year, this would total 12.7 percent of GDP 2006–15, still less than half of the requirements for the more conservative of the investment strategies outlined above. There is a considerable issue of fiscal space for infrastructure expansion (see Box 2).

At the same time, with plans to move to a 12-year system of basic education, increase spending on health and the environment and raise civil servant salaries while maintaining or reducing tax rates, infrastructure faces a number of competitors for increased investment resources. The universal child allowance and lump-sum awards to newlyweds and newborns were behind a doubling of spending on social assistance in 2005. Already, the social security and social assistance funds consume Tog 174 billion compared to Tog 16 billion for energy and public transport, capital repairs, and road fund financing combined.

It appears highly unlikely that all additional tax revenues over the next 10 years will accrue to infrastructure investment, then. While we will have to await the finalization of the National Development Strategy to find out how much it is expected that the government will invest in infrastructure, proposed investments are so significantly out

### Box 2: Creating Fiscal Space for Investment

Fiscal space is created when budgetary room is made available to allow a government to allocate resources for a desired purpose without putting at risk the sustainability of its financial position. In creating fiscal space, additional resources are made available for some form of meritorious government spending, for example, infrastructure projects that create productive assets that pay for themselves in the long term. Governments can create fiscal space in a number of ways:

- Additional revenues can be raised through tax measures or by strengthening tax administration.
- Lower-priority expenditures can be cut in order to make room for more desirable ones.
- Resources can be borrowed, either from domestic or external sources.
- Governments can use their power of seignorage (that is, having the central bank print money in order to lend it to the government).
- Governments may also benefit from any fiscal space arising from the receipt of grants from external sources.

Linking fiscal space to fiscal sustainability has implications for the chosen approach, however. Creation of fiscal space requires that both short and long-term expenditures can be financed from current and future revenues. If activities are debt-financed, for example, fiscal sustainability demands that expenditures should be assessed in terms of their impact on growth and capacity to generate net revenues (after recurrent costs) to service that debt. Again, expenditures should be assessed as part of a medium term expenditure framework that links overall spending priorities with abilities to sustain those expenditures.


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16 According to the MoF, overall government capital expenditures are forecast to remain at their traditional level of around 12 percent of GDP out to 2010, suggesting a recovery from 8 percent in 2005. This does suggest that the government is expecting to spend a considerable portion of additional revenues on capital.

17 World Bank 2005a.
of line with previous expenditure, they suggest an urgent need to find alternate sources of financing including retained earnings and private investment as well as to prioritize and adjust investment plans to fit plausible estimates of government investment capacity in infrastructure.

In order to increase investment funding, internal resources from the infrastructure sector itself will have to play a larger role. This means both efficiency gains and price increases. Price reform will also increase the potential for private sector investment to flow into the sector, and wherever possible, that investment should be encouraged. But it should be noted that the first requirement for additional financing (prior to new investment) will be to clear a backlog of repair and ensure future financing for operations and maintenance is adequate. Looking solely at the existing capital stock, additional spending equal to approximately two to three percent of GDP will be required for this purpose going forward.

Efficiency and price reforms will not fill the investment gap alone, however. Even assuming a loss reduction project that significantly reduces distribution losses (by about two-thirds) in the next seven years, a 5 percent real price increase followed by prices keeping in line with inflation, a US$50 million investment in heating efficiency and demand being met with increased electricity imports, the CES would be unable to service onlent debts or fund investments. A full reform program, including a 25 percent real price increase introduced over the next four years, higher efficiency gains as part of a system of price caps, and debt restructuring would allow the sector to provide some investment funding, perhaps averaging US$54 million per year over the next 10 years. Nonetheless, this would still leave a gap of US$64 million per year between plans and identified nonbudgetary resources for energy alone.

Across sectors, identified scaling back of investment plans, growing private investment, greatly increased efficiency, and significant (early) pricing reform may reduce the financing gap to US$189 million per year (see Figure 22). If all additional government revenues for the next 10 years accrued to infrastructure, the infrastructure investment gap would fall to US$50 million per year. But even under this most rosy of scenarios for infrastructure, further hard choices will be necessary. A number of proposed investments have not been evaluated for their potential development impact; furthermore there are a number of lower-cost alternative investments that are likely to

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**Figure 22: Mongolia’s Annual Investment Plans Allowing for Reform**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Loans and GoM</th>
<th>Grants</th>
<th>Private Investment</th>
<th>Subsidy elimination and tariff increases</th>
<th>Unidentified</th>
</tr>
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<td>Water</td>
<td>109</td>
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**Source:** World Bank staff estimates.
generate higher returns in terms of poverty reduction and economic growth. A significant exercise to evaluate investment plans is an important priority.

CONCLUSION

Mongolia faces significant opportunities from new mining operations, continued growth of the urban economy and expanded regional trade. Infrastructure can be a catalyst for such opportunities, but at the same time it will be a constraint if gaps in the quality and extent of provision are not addressed. Without resources for the sustainable operation of existing infrastructure stocks, and the efficient utilization of such resources, road, energy, and water networks in particular face the threat of rapid decline. Without improved planning and new sources of finance for infrastructure expansion, the country’s opportunities for new sources of growth cannot be grasped. Given the very high cost of infrastructure provision, especially on a per capita basis, in a large, sparsely populated cold climate with a short construction season, choices regarding pricing, efficiency, and new investments will have to be very carefully made. The next sections of the report lay out options and tradeoffs in these areas.
CHAPTER III:
ALIGNING PRICING AND COSTS

Key Messages: The ability to price services at cost varies across and within sectors in Mongolia. Telecommunications, air and rail transport see cost-based pricing while road transport, particularly in Ulaanbaatar, is significantly under-priced. Utility prices are low compared to other countries, in part because utilities charge prices below recurrent (let alone long run) costs. This creates a problem for financing maintenance and network expansion, and amounts to a regressive subsidy as most poor households are not connected to utility networks. Price increases for gasoline, urban transport, energy, and water are required to sustain and extend services, to increase efficiency and to ease the introduction of private investment. At the same time, price increases are politically painful, suggesting the need for careful design of pricing reform. Subsidy mechanisms should be revisited to ensure (a) a focus on poor people; and (b) transparency—output-based aid provides one mechanism to achieve this. The political palatability of price rises will be reduced if they are introduced as part of a broader package of reform and in close consultation with users.

THE NEED FOR PRICING REFORM

The great majority of those fortunate enough to have household access to electricity, heat, water and/or sanitation pay tariffs insufficient to cover recurrent costs, let alone investment costs. This makes the private sector uninterested in investing in service provision, and diverts government resources to covering utility losses. In turn, the cost of new investment is almost completely born by donors—over the last 10 years, loans and grants have accounted for around 90 percent of infrastructure investment.

The losers from this arrangement are those not connected to networked provision who pay far more for energy and water than those (largely wealthy) city residents lucky enough to live in connected households and have little hope of rapid network expansion. Any strategy to ensure sustainable infrastructure provision in Mongolia will have to have at its core a readjustment of prices to ensure financial sustainability and maintenance of capital stocks for both state-owned and private providers. Such a readjustment should also be part of a policy of replacing pro-rich subsidies with pro-poor infrastructure rollout.

The capacity to cover costs varies considerably across sectors and companies within sectors. The CAA, the railway, and the FTC all make consistent profits that have been growing in recent years, with 2001-05 profits totaling Tog 21.2 billion, 10.1 billion, and 14.0 billion, respectively. The CAA may be charging far beyond costs (it should be noted that this may be in contravention of the government’s treaty obligations under the Chicago Convention governing international aviation). Telecoms and Rail benefit from being joint ventures with comparative freedom in pricing, with telecommunications perhaps the only networked service which charges prices sufficient to recoup both costs of capital and operation.
At the other end of the scale, direct road transport charging is effectively nonexistent. About 20 toll booths have been established, 3 of them on the periphery of Ulaanbaatar. Many people drive around the booths, however, and the tolls barely cover the costs of collection. Furthermore, petrol pricing is also low. Out of the 142 countries for which we have data, Mongolia's gasoline prices are the 32nd cheapest (see Figure 23). Given that the great majority of countries with cheaper gasoline are major oil producers, Mongolia's low prices appear unsustainable from both an environmental and economic perspective.

In urban transport, neither public nor private large bus operators can be financially viable at current fares. At current levels of efficiency, viable tariffs are US$0.50 per trip. Even at internationally competitive levels, tariffs would have to be close to US$0.35 per trip—but the current level is US$0.18 cents. This is due to regulated low fares, the high proportion of passengers that do not pay the fare (either through simple evasion or because they have been given a right to free or discounted travel), the lack of operator compensation for free travel requirements, and because the small scale of operations does not allow companies to realize economies of scale of urban bus operation.

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18 The countries with cheaper prices, in order of price are Venezuela, Iran, Saudi Arabia, Kuwait, Indonesia, United Arab Emirates, Oman, Algeria, Uzbekistan, Trinidad and Tobago, Malaysia, Nigeria, Angola, Azerbaijan, Syrian Arab Republic, Sudan, Kyrgyz Republic, Vietnam, China, Ghana, Philippines, Kazakhstan, Lao PDR, Bolivia, Ecuador, Panama, Thailand, United States, Ukraine, Russian Federation, Bangladesh, Mexico, and Ethiopia.

19 Mongolian Airlines (MIAT) tariffs are de jure monitored and de facto regulated by the government. The regulated tariff on longer-domestic routes is low by international standards, but expensive for a Mongolian on an average income. Aero Mongolia's tariffs are not regulated by law, but the airline feels pressure to keep tariffs low and in line with MIAT's. The Mongolian CAA, for example, sent a letter seeking an explanation of a recent proposed 5 percent tariff increase. MIAT reports that profitability would require fares to increase by over 60 percent. Aero Mongolia, on the other hand, plans to bring an additional Fokker 100 into the market in May 2006, suggesting expansion is profitable. And two new entrants are planning to begin services.
Turning to utilities, Figure 24 suggests that Mongolia’s electricity prices are low in international perspective, especially given that some of the countries with lower tariffs include those with significant fuel reserves including Russia, China, and Indonesia. As we have seen, low prices have left energy companies loss-making, requiring government subventions. The government’s proposed strategy of delaying moves toward cost recovery in the sector until 2008-10 may not be sustainable given the shortage of investment resources and the urgent need for additional generating capacity and distribution expansion. Analysis of typical customers in Ulaanbaatar suggests that increases of up to 80 percent for residential customers and 10–30 percent for industrial and commercial customers are necessary to cover costs.²⁰

![Figure 24: Mongolia’s Electricity Prices in International Perspective](source: World Bank 2006d.)

In early 2005, in an effort to bring tariffs closer to costs, the energy regulator approved an increase in electricity tariffs from Tog 47/ kWh to Tog 51/ kWh (8.5 percent). But these prices are still below those current in 1997 in real terms (see Figure 25). Furthermore, to mitigate the impact of the price rise, the Energy Regulatory Authority (ERA) also introduced a lifeline tariff. Households in Ulaanbaatar’s city center receive a high portion of the lifeline subsidy, and most of the poor live in periurban ger areas, so most of the lifeline subsidy’s benefits (85 percent) go to non-poor households.²¹ As a result of the subsidy and overall low tariff, the CES in aggregate currently operates at a loss somewhere between US$8 million and US$34 million. Furthermore, direct subsidies are provided

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²⁰ ECA 2005.
²¹ ESMAP 2005a.
to diesel utilities in aimags of approximately Tog 5.5 billion (US$4.6 million), although these are being phased out (see Figure 26). Again, most of these government resources benefit wealthy consumers.

In particular, subsidies for electricity and district heating miss those relying on coal for the majority of their heating needs, and these tend to be poorer people. Figure 27 compares current tariffs for energy services to cost-recovery tariffs. Those who use electricity for much of their energy needs and are also attached to the district heating grid receive considerably subsidized energy—with prices approximately half of those required for cost recovery. Compare that to poor households in ger areas, who have to rely on poor-quality but unsubsidized “dirty fuels” such as low-quality coal and consume a little more than one-half of the electricity of city center residents. In winter months, city center households spend between 4.1 percent of income on heating in the lowest quintile to 2.1 percent in the highest income quintile. This compares to 18.7 to 7.7 percent in ger areas (see Figure 28).

Figure 25: Mongolia’s Real Electricity Price over Time

Figure 26: Budget Expenditures on Subsidies


Figure 27: The Energy Bills of Wealthy Consumers Are Subsidized


Source: Annex 1, Energy.
As with electricity, piped water prices in Mongolia are low by international standards. Ulaanbaatar’s piped water tariff is about half of the level charged in Manila and Bangkok (see Figure 29). As a result of low prices, utilities resort to unconventional activities such as animal husbandry, hairdressing, and beauty parlors to subsidize core functions and there are no resources for network expansion or hiring key staff. Higher income households living in apartment buildings consume more than four times the average water for households in wealthy countries, while poorer households face relatively high charges with unconnected gers facing the highest cost and lowest quality services and very low consumption patterns, as we have seen. Indeed, poor consumers pay considerably more for water from kiosks than wealthy ones do from the tap (see Figure 30). 22 USUG-served apartments in Ulaanbaatar pay only Tog 189/m$^3$ compared to Tog 500/m$^3$ at ger area water kiosks in the city and as much as Tog 2,000/m$^3$ in water kiosks in ger areas in other cities.

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22 In telecoms, there is a need to continue rebalancing between national and international calling to bring tariffs in line with costs, the second part of this process was due to commence in 2006, and is likely to be comparatively uncontroversial.
It is worth repeating here that the current price and subsidy system in water and energy in particular is considerably skewed in favor of the wealthy. It is overwhelmingly the wealthy who are connected to networked electricity, water and heat, and these services would be cheaper than nonnetworked provision even if charged at cost. But they are not—prices, especially for energy, are subsidized. Resources from within the utilities that could be used to extend networks, as well as tax resources that could be used for a range of pro-poor services, are instead used to subsidize energy and water consumption by a small and overwhelmingly wealthy minority of Mongolia’s citizens (see Box 3). Average percentage household expenditures for water and energy services are not high by international standards (see Figure 31)—but amongst the poor and unconnected, these figures are considerably higher. Public policy should focus on raising (somewhat) average prices in part to meet costs and in part to ensure considerably lower prices, through improved network connectivity, for poor people.

**Figure 30: Who Pays Most for Water? Costs per Cubic Meter**

![Graph showing costs per cubic meter for different types of water source in Ulaanbaatar and outside UB](image)

*Source: Annex 4, Water Supply and Sanitation.*

**Figure 31: Water and Energy Expenditure as a Percentage of Household Expenditure: Mongolia in International Perspective**

![Bar chart showing water and energy expenditure as a percentage of household expenditure for Cambodia, China, Mongolia, and Vietnam](image)

*Source: ADB, World Bank, and JBIC 2005.*
MANAGING THE POLITICAL ECONOMY OF REFORM

This may be a comparatively straightforward time to raise infrastructure prices, given that wages and salaries for all workers combined increased by about 42 percent in current terms 2001–04 and unemployment has dipped below 4 percent. Nonetheless, price rises are sure to be controversial. In December 2005, in response to requests from bus operators for a sustainable tariff, the municipality of Ulaanbaatar implemented a substantial fare increase, only to have to withdraw it several days later after sustained and at times violent protests. Similarly, throughout the country, politically sensitive water tariff increases are limited by provincial Governors. As noted in Box 3, at least in the case of energy and water, price reform will have comparatively limited impact on the poorest in Mongolia, but the political impact of price rises felt most significantly by middle- and upper-income citizens leads to concerns for the sustainability of reform.

International experience echoes the complexity of pricing reform. Worldwide, price rises have frequently sparked protests, and are often delayed or abandoned even in the face of legal commitments to suppliers. In Colombia, which is a relatively successful case, it took 10 years to raise reference water tariffs by 50 percent so that they reached cost-recovery levels, and 80 percent of customers still benefit from cross-subsidies.23

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23 Foster and Yepes 2006.
At the same time, international experience does suggest some lessons regarding more successful price reform attempts. These lessons suggest that it is important to mitigate the impact on poor consumers through transitional subsidy or transfer mechanisms (see Box 4). Successful international experience also suggests that integrating price rises into a broader process of reform covering service quality, transparency of operations and greater stakeholder participation can help to ameliorate the political costs, while increasing the overall benefits, of the reform effort. For example, the Phnom Penh Water Supply Authority combined price increases with metering and improved billing, restructuring, improved management, service rollout, and public outreach over the period 1993–2003. Nonrevenue water fell from 72 to 17 percent, service quality improved, coverage increased from 27 thousand to 106 thousand customers and the company became financially self-sufficient.24

Methods that allow stakeholder groups to see the size and nature of cross-subsidies and transfer subsidies in infrastructure, particularly regarding who gains the most from subsidies, will help to clarify costs and the distribution of benefits. Stakeholder participation in the design of broad reform programs (in which pricing changes should be only one element) will also allow for a discussion of the tradeoffs between types of price reform and other options (see Box 5). A discussion of tradeoffs will also allow for an explicit linkage between price increases and improvements in the quality or extent of service provision, discussed below. For example, consumers should be provided with evidence that pricing reform will be part of a process to increase the reliability of electricity supplies in coming years, and then that reliability should be delivered.

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**Box 4: Political Economy of Infrastructure Reform: Fuel Subsidies in Indonesia**

Historically, Indonesia has controlled the domestic price of fuels. Price adjustments were politically sensitive, and have contributed to the collapse of administrations. But in the first half of 2005, as world oil prices increased, the share of the fuel subsidy as a percentage of total government expenditures was projected to reach 33 percent, and price increases became inevitable.

In order to increase the political and social palatability of the price rise, the government of Indonesia rolled out a cash transfer scheme covering 15.5 million poor and near-poor households (some 28 percent of the population). The quarterly transfers of US$30 per household were to be continued for one year. The scheme was widely publicized—through newspapers, village notice boards, television talk shows, and pamphlets.

For poor recipients, the cash transfers more than compensated for the fuel price increase. There was moderate mistraining—with cash benefits distributed to the poorest 40 percent rather than the targeted 28 percent—but the government responded rapidly to reports of mistraining and abuse, commissioning an early assessment of the program. The assessment pointed to reasonable results overall, with transfers on time and beneficiaries expressing satisfaction.

Fuel prices were increased in October 2005 without significant public protest. Furthermore, subsidy savings were reallocated in 2005 to fund programs that benefit the poor: Operational Aid for School (US$650 million), Basic Health Care and Health Insurance for the Poor (US$400 million), and a Rural Infrastructure Program (US$350 million).

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*Source: Bacon and Kojima 2006; ESMAP 2006.*
Box 5: Community Participation in Price Increases

The local water company in Banjar in South Kalimantan, Indonesia faced water losses of 40 percent, provided water for only 12 hours a day and suffered considerable revenue shortfalls. As part of a restructuring plan to improve the quality and sustainability of provision, the water company proposed price increases which were initially rejected by the local government. The company took the plan to its customers, and entered into a contract with the community promising better customer service in return for higher tariffs. With community support, the local council passed the tariff increase, and water quality and supply (along with customer service) have increased markedly in the period since then.


Regarding tradeoffs, as a rule, alternatives to across the board price rises are likely to be more acceptable. Not least, in transport, energy and water, a number of consumers do not pay for services at all. Combining increased fare collection with cuts in services that are little used or uneconomic and improvements in the efficiency of operation, it may be possible to avoid across-the-board rises at least in the case of public transport in the capital. The transport chapter suggests an alternate approach to sustainability in Ulaanbaatar’s public transport whereby:

- The trolleybus service is discontinued;
- The number of minibuses is reduced to 1,750 (to reduce congestion and increase productivity of all large buses and remaining minibuses); and
- All basic bus fares remained at their present level, but 25 percent of passengers received free travel, and all other passengers pay the full fare.

Given such changes, the required transfer to cover the subsidized fares would be about US$2.5 million per year. This cost could be recovered from a parking charge or an annual charge on all vehicles registered in the municipality. Regarding the national highway network, the introduction of tolling on roads where much of the traffic will be international will be an important tool to ensure that the country reaps the benefits of construction (having born the costs). Tolling will also provide revenues to sustain the quality of the network.

In water, an important first step will be to extend metering, to allow for usage charges covering household water. Metering will also allow for the potential introduction of better-targeted lifeline tariff subsidies to poor consumers. As noted, such a tariff already exists for electricity, but is poorly designed (because electricity usage rates are similar for poor and non-poor households) and is not explicitly subsidized by the government.

In both energy and water we have seen that the need for price increases will be significantly reduced if efficiency is increased—not least through controlling supply losses (see Figure 14). Related to this, price rises will be more acceptable if they are linked to quality improvements. We have seen, for example, that ger area residents appear willing to pay more for water if the quality of provision is increased. As part of a process of community participation in the price reform process, a clear linkage can be made between price and quality increases. To make linkages more transparent, consumer surveys can be introduced which measure satisfaction with quality of delivery. The regulator can be empowered to use such evidence, along with measures
such as distribution losses, to penalize firms which fail to meet clear and objective threshold standards (perhaps through fines).

A direct linkage between greater private participation and price rises may undermine the political sustainability of both activities. One interim model to partially delink the two is used in a number of West African water concessions. Prices paid to operators are set by the regulator at cost-recovery levels, but prices paid by consumers are set by the government, which subsidizes providers for the gap between consumer prices and cost-recovery tariffs. In a transparent system, where both cost recovery and consumer tariffs, as well as the subsidy, are advertised, the costs and benefits of low tariffs will be clear to consumers, operators, and taxpayers alike.

Finally, it appears that one-time dramatic increases are more likely to be reversed (or never implemented) than staggered increases, although this only applies if the political will behind price increases remains. This provides one more reason for independent price regulation guided by transparent, economic, pricing principles, in that a regulator is likely to have more credibility in implementing a multiyear series of increases (rather than a one-off adjustment) while limiting the possibility of backsliding on political grounds. Regulatory reform is discussed in the next chapter.

Output-based payments provide a transparent and targeted way to ensure affordable services for poor people. This involves paying suppliers on the basis of services delivered rather than for infrastructure built, and is being piloted in Mongolia's telecommunications sector to extend service (discussed in the next chapter). An output-based contract could be agreed with state-owned or private companies to provide infrastructure services to particular households (those with incomes under a certain cutoff level or in certain areas) at agreed prices and service quality, with payments based on actual service provision. If private companies are used, the contract can be competitively awarded to the company who offers to provide services at the lowest subsidy cost. If a state-owned monopoly is used to provide services, the contract can be based on an agreed unit cost of provision in line with efficient costs from other countries or regions of Mongolia.
Recommendations:

- The most urgent pricing reforms cover those sectors where there is an urgent need to increase private sector involvement. This suggests that the priority is introduction of independently regulated (price cap) cost-recovery tariffs for energy and water (discussed further in the next chapter). Metering should be introduced as part of pricing reform.

- In order to improve the political sustainability of price increases and reduce any transitional poverty impact, price reform should be accompanied by the introduction of a transparent, central government–funded subsidy mechanism for domestic energy and water tariffs output–based aid is one approach to accomplish this goal.

- Transport pricing reform may not be as urgent a priority, but will be important for the long-term sustainability of the sector. This suggests the need to raise gasoline taxes towards international norms, introduce tolling on major trunk roads, remove price regulation on domestic air transport, and provide direct subsidies for air travel on a per capita basis if required. In urban transport, increase tariff collection rates combined with improved cost recovery for parking may avoid the necessity of overall tariff increases.

- Price increases should be introduced simultaneously with or after improved service quality and greater participation, and under a new subsidy mechanism. Methods to avoid across-the-board tariff increases are preferable where possible.
CHAPTER IV:

IMPROVING EFFICIENCY AND GOVERNANCE

Key Messages: Governance institutions for infrastructure regulation and operation are fragmented, overlapping, and inefficient. Utility service providers lack commercial structure, suffer considerable technical and commercial losses, and have weak accounting and billing operations. Sustainable private sector involvement is hampered by limits to competition and weak institutions in the sector and beyond. Transparency is limited and corruption is a growing concern. Retail water and sanitation services should be consolidated, and road funds should be replaced with direct allocations on maintenance from the general budget. Water and energy operations should be corporatized and operated under performance-based contracts. The number of regulatory bodies should be reduced and overlapping regulatory responsibilities removed. Price (and other) regulation should be minimized and based on yardstick competition where appropriate. Private participation should be encouraged through a Public Private Partnership (PPP) unit, greater allowance for competition and tools and incentives for connection of localized systems. There should be greater transparency in licensing, contracting, budgeting, and state enterprise accounts. Stakeholders should be directly involved in pricing and efficiency reform.

There is widespread evidence of inefficient operation of existing infrastructure stocks in Mongolia. Current institutional arrangements encourage poor performance in both the public and private operation of infrastructure, not least by fracturing markets, limiting competition, over-regulating, and reducing transparency.

EXISTING MANAGEMENT OF GOVERNMENT-OWNED INFRASTRUCTURE

Regarding transport, as we have seen, the quality of the existing road network is declining in large part due to underfunding of maintenance. The system of national, urban and aimag road funds does not prioritize maintenance and the funds spend 75 percent of their (limited) resources on new road construction rather than maintenance. There is no independent physical or financial accountability for how the revenues are used, nor is there any user representation in the boards that manage the funds. It is also worth noting that from 1998 onwards the Ministry of Finance retained an increasing proportion of (supposedly hypothecated) petroleum tax revenues for other purposes, so the difference between total road expenditure and the allocation of road fund revenues had to be met from national budget allocations, largely defeating the purpose of road funds to provide a reliable source of revenue.

Low pricing is undoubtedly one fact behind operational problems in energy, again as we have seen. But there remains considerable variation in performance within 100 percent state-owned power production, transmission and distribution companies. Figure 32 displays the average, best, and worst profit performance for 2001–05, as reported by the State Property Committee. As can be seen, the average performance in both sectors is a small loss, but some firms have proven profitable. Dalanzagad Power Plant made consistent losses 2001–05 while Darkhan has made a consistent profit. In part, this reflects markedly different technical efficiencies of the underlying capital stock, but also
the efficiency of utilization, which can be considerably improved. Dalanzagad, for example, was a bad investment choice—a 10 MW coal-powered plant which supplies power at a marginal loss. Nonetheless, reforms to the way the sector is operated could reduce the economic impact of this earlier mistake.

Figure 32: State Electricity Enterprise Profits: Average and Range, 2001–05

Source: State Property Committee. Transmission and distribution includes Central Region transmission companies and Erdenet-Bulgan, Hovd, Ulaanbaatur, and Uvs distribution companies. Power includes Dalanzagad, Darkhan, Dornod, Erdenet, and power plants II, II, and IV.

The Central Electricity System (CES) is made up of 18 separate state owned companies which are responsible for supplying over 95 percent of energy in the country. As is the case with water and sanitation, the energy companies have high costs due to high technical losses, poor meter reading, partial billing, and theft. This combined with tariff levels below the economic cost of supply for both electricity and heating results in a pattern of persistent financial losses. In 2005, the CES’s loss in aggregate was assessed to be in the range of Tog 7.8 billion to Tog 18 billion. That the exact figure is unknown is a sign of the weak accounting systems in place in the sector. As noted previously, efficiency gains will be an important part of returning the electricity and heating companies to sustainability at the lowest political cost. Figure 26 suggests that improved efficiency could bring down the cost-recovery tariff by 20 percent, reducing the need for price increases in the electricity and heating sector from close to 100 percent to approximately 60 percent.

The Ulaanbaatar Water and Sewerage Company (USUG), owned by the Municipality, has made considerable institutional development progress since incorporation in 1997 but has not made a profit since 1999. Its financial position has deteriorated on the cost side because of continuing overstaffing, salary increases (determined by government decisions), rising electricity costs, and obsolete electrical equipment.

USUG’s major customer is another municipally owned company, the Housing and Public Service Company (OSNAAG), which supplies water services to over 1,000
apartment buildings in Ulaanbaatar along with heating and electricity services. OSNAAG has delegated the management of services to most apartment buildings through 17 management contracts given to private firms. OSNAAG believes that none of the contractors has fully performed its obligations under the agreement and that the allocation of responsibilities was inefficient. Bill collection rates at the Kantors bear no relation to staffing levels, and range between only 50 and 80 percent of amounts owed.

Across the rest of the country, there has also been a widespread introduction of management contracts, but there is no competition for management services; contracts are poorly drafted and do not include incentives to meet performance targets, and governors effectively make all decisions. In practice, privatization has amounted only to the removal of the payroll from local government responsibility, without giving management any real scope for change.

A further set of general issues regards broader concerns with governance and anti-corruption. Mongolia has made considerable progress in improving the environment for good governance. Most recently, it has put many of its licenses and permits online, it is in the process of removing unnecessary regulation and standards, and it is setting up complaints hotlines. Nonetheless, there is a perception that governance weaknesses and corruption in the country may be an increasing threat. Transparency International’s Corruption Perceptions Index has fallen from 4.3 in 1999 (placing it alongside countries like Poland, Uruguay, and Jordan) to 3.0 in 2004 (placing it alongside Armenia, Madagascar, Iran, and Romania). While such general perceptions measures may only weakly reflect an underlying reality, especially regarding the status of infrastructure in particular, they can nonetheless act to deter investors. Declining corruption perceptions provide a reason to undertake transparency and participatory reforms that would be of benefit regardless of the level or trend in actual corruption in the country.

**IMPROVING THE MANAGEMENT OF STATE-OWNED BUSINESSES**

To improve the governance of state-owned businesses, the government could legislate and regulate to:

- Separate the commercial and noncommercial functions of government-owned infrastructure service providers.

- Transfer the commercial functions of state-owned infrastructure to new “government-owned enterprises” and give them a commercial objective. Appoint business-like boards of directors and give them appropriate autonomy to run the government-owned enterprise, for example, allowing them to hire and fire the management team. In turn, ensure the management team has the freedom to hire and fire the business’s staff, and make other business decisions, subject only to general employment and other laws. Hold the board of directors accountable for performance of the government-owned enterprise, possibly by means of a negotiated agreement between the board and the shareholding ministers.

- Ensure other potential providers of services, including private companies, cooperatives, and not-for-profits, are not prevented by regulation from competing with government-owned enterprises. Remove government-imposed
competitive advantages and disadvantages between private and state-owned operators, such as discriminatory tax treatment.

- Transfer noncommercial functions to government departments or other agencies under political control, and establish procedures by which the government can contract with the government-owned enterprises for the delivery of any unprofitable services that the government wishes to ensure.

This policy direction could apply to all government-owned infrastructure service providers that sell services in return for user fees, including energy companies, airports, air traffic control, and MIAT. The government could also encourage aimags and Ulaanbaatar to adopt a similar policy for their infrastructure service providers—something likely to be particularly helpful for water service providers.

Turning to sector-specific issues, in transport, the structure of the ministry should evolve from a modal to a topic focus (currently, the transport services center deals with roads, the CAA deals with aviation and so on). This is particularly important to ensure that investment planning captures potential substitution impacts between transport modes—for example, a new rail proposal may use a demand forecast that does not account for new road development which may absorb some of that demand. This may have already occurred in the case of transport planning in Mongolia regarding demand for traffic with China, discussed in the next chapter.

In the roads sector, it is also important to move toward a system whereby funds for road maintenance and upgrading are guaranteed as a first priority through hypothecated funds designed to ensure sufficient resources to avoid a deterioration in the existing road stock. Investment funds for new construction in the sector can be provided out of general revenues. Both maintenance and investments funding could be channeled through the ministry rather than a plethora of poor-performing road funds, with additional technical support to ensure the quality and sustainability of the road stock as well as provide economic analysis of new transport proposals housed in the ministry.

In the energy sector, any economies of scale that the electricity distribution system might achieve in the country are dissipated by the presence of 18 distribution companies, which should be encouraged to merge. Additionally, the proposed wholesale market which will be based on direct bilateral contracts between generators and distributors or large users should play a significant role in providing incentives for reduced costs, greater efficiency, and improved collections. Similarly, in water, amalgamation should be encouraged, so that economies of scale in management, engineering supervision, and customer service systems can be made. Provincial Public Urban Services Organization (PUSO) management contracts should be developed so that there are clear financial and operational objectives under independent regulation. Outside Ulaanbaatar consideration should be given to letting management contracts for groups of PUSOs.

Moves towards improved management, regulation, and increased competition suggested elsewhere in the report should improve governance in the infrastructure sector, but in addition, governance improvements for state operations in the sector should involve:

- Greater transparency. The flow of government funds, the rationale behind investment decisions, choices of supplier, and implementation of investment
projects could all be subject to greater public oversight. The implementation of public expenditure tracking surveys, which track the flow of funds through levels of government to see what proportion of resources budgeted for activities actually reaches the intended beneficiaries, can uncover significant leakage. SOE accounts and business plans should be published. At the same time, there is little reason to withhold from the public the contents of licenses and contracts to provide infrastructure services, or procedures and results of policymaking and regulatory bodies in infrastructure (71 percent of East Asian regulators disclosed procedures and decisions, while 42 percent disclosed licenses and contracts, in a 2004 survey). The state of Victoria in Western Australia routinely publishes the full text of contracts valued over US$5 million, it is quite possible for Mongolia to follow this example. Similarly, the regulatory process should involve public consultation and publication of outcomes.

- Increased use of audits. Beyond financial audits of projects, independent auditing in infrastructure should extend to ensuring the physical quality of construction and maintenance work.

- Greater community involvement. Scorecards for government service provision have been used successfully in Bangalore in order to highlight failings in service provision, including the need to bribe to get services, and catalyzed changes that improve service quality and efficiency (see Box 6). Similar approaches could be used in the water and energy sectors in particular. They could be combined by official (published) benchmarking of providers by regulators.

Box 6: Bangalore’s Experiments with Citizen Report Cards

In 1994 Bangalore’s Public Affairs Centre surveyed a sample of the city’s residents to discover their level of satisfaction with a range of government services including utility provision. Questions were asked about staff behavior, quality of service, information provided and the extent of petty corruption. The findings were grim—overall, only 9 percent of respondents pronounced themselves satisfied with the services they received. The Public Affairs Center published the results and the “report card” was used as the basis for a discussion of reforms to make service providers more responsive to client needs. As a result of reform, a second survey, in 1999, suggested increased satisfaction, although still some way to go—34 percent of respondents were satisfied overall. Again, the survey results were publicized and used to inform continuing reform efforts. A more recent round of surveying suggests considerably increased satisfaction with government services.


MAXIMIZING SUSTAINABLE PRIVATE SECTOR INVESTMENT

It is worth noting that infrastructure services are ultimately paid for by one of two sources—consumers or governments. If some service prices are set below cost-recovery levels, either utilities cross-subsidize from other consumers (usually businesses) who pay above costs for their services or utilities require government subsidies to avoid bankruptcy. This applies whether the utility is government-owned or privately owned.

25 Muzzini 2006.
Private investment is a means to the end of greater efficiency of service provision in part because it promotes cost-covering tariffs and transparent subsidies. Private firms will not enter a market if they will not cover their costs, and so they will require either the right to charge tariffs equal to the long-term cost of providing services or a subsidy to cover the gap between the tariffs they are allowed to charge and the costs that they face. Private sector operation should also improve allocative efficiency and greater investment—if a firm sees service rollout as a profitable venture, it will finance that investment. Finally, private operation should ensure efficient provision of services because operators have the incentive to reduce costs in order to maximize profits.

It should be noted, however, that these theoretical advantages of private provision do face a number of practical limits. If a private monopoly merely replaces a public monopoly, the incentives to increase efficiency of provision are considerably reduced. If a private operator does not own its assets, but is acting under a management contract, for example, once again its incentives to maximize efficiency may be significantly dulled. Furthermore, fully competitive private provision of services is a rarity in infrastructure provision—it can exist in parts of the telecommunications sector, but is unknown in sanitation, for example. Economies of scale, significant sunk costs of provision and network externalities are three features of utility provision that tend to limit direct private competitive provision.

Given these practical issues with private provision, there is a significant role for the public sector in infrastructure—as regulator, financier, and supplier. Nonetheless, there are regulatory and policy tools to maximize the role for beneficial private provision of services. And with an improved policy and regulatory environment in Mongolia, especially covering pricing, it should be possible to attract additional private management and financing resources to the sector. This will be important both to increase efficiency and as a source of investment resources.

To date, the record of private investment in Mongolia has been mixed. Positive cases include that private operators in the air transport sector appear poised to expand their route offerings. In telecommunications, the rapid rollout of services over the last five years has been funded largely by private investment. At the same time, there have been failures. As noted above, water management at the Kantor level is in private hands, but lack of competition, adequate regulation or real independence from local authorities has blunted any potential positive impact on service quality or extent. The sewage plant serving Erdenet, operated by the mining company, is working very poorly—55 percent of wastewater entering the plants are discharged untreated (there is an ongoing discussion about using a combination of loans and a grant from the mining company to replace the plant). The majority of privatized bathhouses have shut down. And, overall, private investment in infrastructure remains limited, estimated at around US$7 million/year 1995-2004.
In order to attract sustainable private investment and involvement, there is an urgent need for policy, regulatory and pricing reform to ensure a level playing field for private providers based on cost-based tariffs and the confidence that such a regime will extend into the long term. There is also a need to ensure that private provision delivers on its promise through fair but active regulation of quality and delivery targets. Improvements in the regulatory environment are discussed in the next section; the focus here will be on providing a better general environment through broader policy changes.

A PPP unit can play an important role in helping sector ministries, regulators, and local governments to develop policies, rules, and information resources that allow for private investment while helping to ensure that investment opportunities are both packaged in a way that is attractive to the private sector and advantageous to the economy (Box 7). Managing the distribution of foreign exchange risk and subsovereign policy risk will also be important elements to attract direct investment.

The OBA model can be a useful method to extend access to (and improve the quality of) public services through a public-private partnership. We have seen that teledensity in rural areas stands at only 1 percent. As a result, many rural residents have to travel up to 40 kilometers to make a phone call, resulting in the loss of 2 working days per phone call. Two OBA pilot programs are underway which are designed to bridge the rural information infrastructure gap. The approach is broadly patterned on schemes already providing universal access services in rural and remote areas in Chile, Peru, Columbia, Nepal, Uganda, and Nigeria. The two pilot programs in Mongolia will focus on the delivery of satellite-based public access telephone service for herder communities in approximately 30 baghs (the smallest administrative units under a soum) in 6 soums within 2 aimags (Arkhangai and Bayankhogor) and a wireless-based voice and data services system in 1 soum center (Tariat). Operators will compete on the basis of the lowest subsidy required to take on communications service obligations in the pilot areas. The subsidy amount will be complemented by private sector investments made by the operators on the basis of the return they plan to make from (preagreed) service charges. A successful pilot will lead to scaled-up implementation of a universal access strategy based on the OBA approach with expected subsidy of US$10–16 million in the USOF benefiting about 700,000 people.

**Box 7: Public-Private Partnership Units: What Do They Do?**

Greater private participation in the provision of services offers the hope for new sources of investment and improved quality of services. At the same time, private participation raises a host of challenges, not least around deciding the nature of participation, contracts governing that participation and oversight of operations. PPP Units have been set up in a number of countries to support the introduction of private participation in a way that maximizes economic benefits. A recent survey of PPP Units found that most provide resources and general guidance on PPPs, as well as project-specific advice. A number provide funding for consultants to assist in the development of PPPs and help to develop projects. Some PPP units also have a role in approving and monitoring PPPs.

The South African PPP Unit, based in the National Treasury, is an example of a unit that combines a general advisory and support role with a monitoring and approval function. The Treasury relies on the PPP Unit to assess whether line agencies and provinces can meet the costs of PPPs within their future budgets. The unit evaluates proposals at the stage of the feasibility study, prior to issuance of bidding documents and again prior to contract signature. The PPP Unit relies on a combination of permanent staff and long-term consultants to provide that support.

*Source: Dutz and others 2006.*
Combined with pricing reform and improved regulation, OBA can provide a useful tool to attract private investment where market returns alone would not attract private financing. It may be a particularly suitable device to roll out access to basic water and sanitation services, and is being used for this in Cambodia. It may also have a role in improving the delivery of energy services, and could be used to contract for road maintenance services.

More generally, it should be noted that the recent investment-climate assessment of Mongolia identifies many ways Mongolia could improve the environment for the private sector, for example, by making it easier for firms to borrow. The assessment finds that loans are difficult to get and interest rates are high because of poor corporate governance, a lack of transparency, and weak bankruptcy and debt-recovery rules (see Box 8).

FOSTERING COMPETITION

The GoM needs to identify regulations that impede private provision and remove them, except when they address serious market failures, safety or environmental risks. Examples of such rules are not hard to find:

• The prices of domestic air transport are effectively controlled despite active competition. International air links are also limited, partly because of restrictive international air services regulations. The government could adopt an open-skies policy, both domestically and internationally, to foster competition, efficiency, and sustainable pricing. Central and local governments can always subsidize air services in a nondiscriminatory manner if they consider commercial services to be insufficient. A detailed mechanism is outlined in the transport chapter.

• Under the Energy Act, licenses are required for generating units of capacity of just 1.5 MW, including backup units and local-supply services. Even if the ERA does not currently enforce the rule strictly, investors may fear that it will enforce it in the future. Provided safety issues are dealt with by other means and network operators can handle interconnection issues, the licensing requirement could be removed.

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26 Such a policy would also address concerns about unsolicited bids. A developer could freely proceed with its proposed venture subject only to the constraints imposed by general law. Bidding would only arise if the developer needed access to scarce public resources, such as land, radio spectrum, or mining rights. Otherwise, the developer would be expected to proceed with the development if it chose to, potentially in competition with other developers. No special government financial or regulatory assistance would be available.

27 GoM 2000.
Box 8: The Business Environment in Mongolia

The 2004 Productivity and Investment Climate Survey (PICS) of Mongolia reports that businesses cite three main impediments to doing business: (1) the burden of taxes; (2) corruption; and (3) lack of access to finance. While taxes, access to finance, and corruption are common complaints of firms in many countries, the share of firms that view these three constraints as major or severe obstacles is higher in Mongolia than in most of the 62 other countries for which comparable investment climate survey data are available.

At over 32 percent, the tax-to-GDP ratio in Mongolia is high. Corruption is also a worsening problem. Since 2001, Mongolia’s position in a number of global rankings of governance and corruption has fallen. In the 2001 PICS, 44 percent identified corruption as a major obstacle, while in the 2004 PICS, 56 percent of firms said it was a major obstacle. Growing firms are the ones that report themselves most troubled by corruption.

Finally, interest rates have declined in recent years, but they continue to be considerably higher than in comparator countries. Evidence suggests that interest rates are high because of systemic and structural factors that make bank lending a risky activity and limit the range of financial products that are available. Long-term credit remains scarce with loans of more than five years term accounting for only 5 percent of all loans.

Perceptions of Mongolian Firms Regarding the Main Investment Climate Impediments

- The current information and regulatory environment reduces the scope for small scale provision of water. There is a significant need for improved information and regulation regarding the rules for private (including nonprofit) sector provision as well as the interface between public and private networks. For example, it is important that the government look to maximize water provision by NGOs, the private sector and communities themselves through preparation and publication of WSS distribution network drawings and future plans indicating areas where new connections are technically possible and welcome, including areas where localized water and sanitation systems are possible.
Furthermore, clear procedures regarding payment, ownership, and maintenance responsibilities of privately built networks are required.

- The Communications Act (Article 14) allows the Communications Regulatory Commission to refuse to issue a license if there is more than one application for service provision in an area. The government could remove the requirement for licensing telecommunications services and focus instead on the best allocation of the spectrum including managing any radio interference problems.

- The capital city and aimags have power to control the price of new infrastructure services. This reduces the supply of such services, and these powers should be removed and placed in the hands of an independent regulator. Again, if local governments wish to provide services below costs, the more transparent and appropriate mechanism is a subsidy.

All else equal, competition in the market, with multiple firms offering similar services to the same potential client base, operating in an environment of minimal necessary regulation, is the most likely to guarantee efficient and quality service provision. Small scale NGOs and private providers can help to extend this competition even where traditional utility models predominate. And even though we have seen that competition in the market is unlikely to be possible in large parts of the infrastructure sector, this does not mean that all forms of competition are impossible. Two approaches to introduce a competitive element even where services are likely to be offered on a monopoly basis are competition for the market and yardstick competition.

Competition for the market involves bidding out the right to provide noncompetitive or limited-competition services. Such competition can be on the basis of outright ownership transfer or operation concessions. If well designed, a competitive bid structure should allow governments to ensure social and economic objectives related to infrastructure provision at the lowest cost to consumers and taxpayers. For example, a number of countries have auctioned mobile phone spectrum licenses to the highest bidder, while some (including Uganda) have auctioned licenses to those companies that bid the largest investment or fastest rollout of services to those previously uncovered. Similarly, contracts to operate water companies are usually offered on the basis of a combination of quality and price requirements.

It should be noted that competition for the market has a mixed record in East Asia and beyond. Well-designed auction can bring revenues to the treasury while improving service quality and extent for customers at price-reflective (or even cross-subsidized) tariffs, and evidence suggests that private participation in water and energy has brought about improved efficiency and quality of service in most cases. Nonetheless, the nature of infrastructure provision makes successful contracting complex. Utilities face very high capital costs and long payback periods, which makes them susceptible to political and economic risk—expropriations, reneged agreements on pricing reform or currency crises, for example. This is one reason that many contracts, and in particular concession contracts, have been renegotiated—74 percent of water concession contracts in a recent survey of Latin American experience, for example. It will be important for Mongolia to learn the lessons of earlier attempts to introduce competition for the market in

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infrastructure provision—both its own and experiences from elsewhere—prior to extending the model. This is one role that a PPP Unit, discussed earlier, might play.

Under yardstick competition, individual companies’ performance is measured according to similar companies operating in other regions. This performance measure is used to influence decisions on regulatory responses. One example would be setting electricity prices at the mean cost of production for all electricity companies in a country. Efficient firms (those who produce electricity at below the mean cost) make a profit. Inefficient producers make a loss. Regulators are often concerned about more than one outcome—in the case of electricity, for example, they may want to increase the reliability of supply as well as reduce the price. As a result, yardstick competition cannot “stand alone” as a regulatory tool. Furthermore, it is important to compare like with like—we will see that scale economies in the provision of water and sanitation, for example, would make it unreasonable to expect a small-scale provider to offer services at the same cost as a major city utility. The problem of finding a fair yardstick has plagued attempts introduce the technique to date—including in the United Kingdom water sector. Nonetheless, carefully designed, yardstick competition may be a useful tool in the regulator’s armory to monitor the performance of companies providing monopoly services.

IMPROVING REGULATORY GOVERNANCE

Independent regulation under a legal structure that mandates economic pricing will play an increasingly important role if state-owned enterprises are themselves to be independently managed and if the private sector is to play a larger role in service provision. Independent regulation based on sound technical and economic principles allows operators to invest with some confidence of future returns, but also regulation ensures that provision is carried out in the public interest.

There has been a considerable amount of progress in the regulatory environment in Mongolia over the last 10 years. Not least, the country has one of the most independent and active energy regulatory entities in Asia. Nonetheless, infrastructure regulation in the country suffers from multiple layers of overlapping authority in some areas and lack of any oversight in others. Mongolia has both a new competition authority with price-control powers and sector-specific agencies regulating prices for aviation, energy, and telecommunications—so, for example, the competition agency and the telecommunications regulator both have the power to regulate telecoms prices. Some regulatory functions are duplicated by aimags, the capital city, soums, and districts. In total, Mongolia has over 20 separate governmental entities with price-control powers.

The measure for market dominance in Mongolia’s Competition Law is greater than 30 percent market share. Under the law, dominant firms are banned from price discrimination, predatory pricing, resale price maintenance, and exclusive dealing. The Competition Agency can control new product introduction as well as the quality and price of services offered by dominant firms. Such firms are also prohibited from merging with another dominant firm. Beyond setting a low threshold for dominance and an extensive interference in the operation of “dominant” firms, many of the Competition Agency’s powers are also held by sector regulators, putting operators in a situation of doubly jeopardy. The greatest threat to consumers is that “truly” dominant operators
(those with a commanding or monopoly share of the market) set prices too high or
provide a very low quality of service. These two concerns should be addressed by a
single agency for each sector (either one cross-sectoral regulator, or independent sector
regulators), not by multiple authorities at different levels of government.

Again, the newly established Water Agency within the MNE has full de jure authority
for water management, nonetheless, the general nature of the new Water Law leaves a
great deal of detail subject to numerous additional regulations and decrees; and
considerable confusion over authorities and responsibilities in the meantime, to the
extent that sector coordination is acknowledged as being weak (see Table 1).29
Furthermore, regulation can be inconsistent. In the transport sector, there are now more
than 6,000 companies offering interurban road freight services and as many as 12,000
buses and minibuses. While road freight almost unregulated, leaving unsafe drivers and
vehicles on the road, urban transport is heavily regulated with regard to prices and
rights to operate.

Overall, there is need for considerable regulatory consolidation and simplification.
Armenia, with a slightly larger economy than Mongolia, has one cross-sectoral economic
regulator and a separate competition authority. New Zealand, with an economy 40 times
as big as Mongolia’s, has one institution.30 One option would be to authorize the
establishment of one agency incorporating both competition law and price control
functions. This could be achieved by the merger of the ERA and the newly established
competition agency. Other agencies with competition law or price-control functions,
such as Civil Aviation and the Communications Regulatory Commission would lose
these responsibilities. A second option would be to consolidate all sectoral regulatory
functions in existing regulatory bodies.

29 There is also significant potential for water saving in industry. For example, reduction of 50–60
percent in process water use would be possible in Ulaanbaatar tanneries, through introduction of
low cost process changes and controls that could also reduce chromium use by up to 60 percent.
Improving industrial water use efficiency and providing incentives to adopt cleaner processes
will become increasingly important as industrial activity increases.

30 The institution has within it specialist energy and telecommunication groups.
Regulatory agencies usually work best when they have the following features:

- The agency is legally autonomous, not a part of the government, and has its own staff and premises. It can recruit its own staff based on its needs and can pay market rates (not necessarily civil service rates) to attract and retain expertise. It has access to its own source of funds and decides how they are used (subject to rules regarding transparency, accountability, audits, and other controls on the abuse of powers).

- Regulators are selected by a clear process with clear criteria and can be dismissed before the end of their term only on certain grounds, such as incompetence, malfeasance, and conflicts of interest.

- The agency can make decisions (subject to appeal) and enforce them through fines, penalties and, ultimately, preventing the firm from operating. It makes its decisions following clear criteria and a transparent process, in which affected parties have a chance to be heard.

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Table 1: Overlaps and Gaps in Mongolia’s Water Regulation

<table>
<thead>
<tr>
<th>Policy</th>
<th>Regulation</th>
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<tbody>
<tr>
<td></td>
<td>Licensing</td>
</tr>
<tr>
<td>Use of Water resources</td>
<td>MNE, Water Agency, MCUD</td>
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<td></td>
<td>MCUD, MH</td>
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<tr>
<td>Water Suppliers and Water Quality</td>
<td>MCUD, MUB</td>
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<tr>
<td>Waste Water Collection</td>
<td>MCUD</td>
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<tr>
<td>Waste Water Treatment and Effluent Quality</td>
<td>MCUD, Ministry of Trade and Industry, MH</td>
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<tr>
<td>Ger Area sanitation</td>
<td>MCUD, MNE</td>
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Source: Consultant’s interpretation and MCUD Infrastructure Strategy Working Group members.

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Proposals for independent regulatory agencies are sometimes mixed up with proposals for independent institutions to perform other functions, such as to appoint directors to the boards of public enterprises (as happens in the United Kingdom). Such institutions are an option—although they raise questions of the accountability of the government-owned businesses. Any such institution, however, should not be combined with or called an economic regulator.
The design of Mongolia’s current regulatory agencies sometimes falls short of fulfilling these principles. For example, the ERA’s independence is insufficient. Members of the regulatory board of ERA are appointed by the Prime Minister on the recommendation of the Cabinet member responsible for energy. But no qualifications are identified in the law and there are no limitations on the grounds for dismissal. These provisions make it easier to replace recalcitrant regulators. And, although the ERA has access to funds from license fees and other charges, its budget is subject to Cabinet approval. Some form of check on ERA’s budget is appropriate, but this requirement has apparently been used to impose restrictions such as compliance with civil service pay scales, which may hinder ERA’s effectiveness in attracting a (small) well-qualified staff. Again, in telecoms, revisions to the law will be required to clarify the role of the Competition Agency regulator vis-à-vis the Information and Communication Technology Authority as well as provide greater independence from political interference while opening up the regulatory decision-making process to greater transparency and consultation.

New legislation should ensure that regulatory policy is consistent with the principles set out above. The regulation of pricing will be a vital and urgent priority for regulators and a new regulatory and pricing law should specify the process and criteria the government should follow to decide if prices should be controlled. The law should also require that price controls are determined by an economic regulator, legally separate from the government but accountable for effectively and efficiently undertaking that function.

To give greater protection to investors, the regulator(s) could also be required to set prices no lower than the unit cost of new capacity and to allow investors a reasonable prospect of earning a commercial return on their investment. The process should require interested parties to be consulted before the government comes to a decision and should require the government to explain its decision. Given the importance of price control decisions, it may make sense to allow the regulated company to appeal on grounds of the substance of the regulator’s reasoning, not just on matters of law.\footnote{It should be noted that if greater private sector participation (and efficiency) is to be achieved in the energy sector, the regulator will also have to change the mechanisms whereby wholesale prices are set to buy electricity and heat from power plants. Currently these are based on the plant’s total average costs, thus electricity is not supplied on the basis of merit order dispatch. The regulator is planning to move towards a wholesale electricity market, which will provide better incentives to both generators and distributors to increase efficiency. But given the limited size of the market, generation prices will still have to be regulated.}
Under a price cap, the controlled price is set, in real terms, for several years in advance. Under the CPI-X form of price cap, the controlled price increases each year by the consumer price index (CPI) less a fixed adjustment X. ERA has proposed a shift to a multiyear price cap system, with a duration of two to three years initially. If properly designed and implemented, a change of this nature can be expected to reduce regulatory risk for enterprises and to introduce stronger incentives for cost reductions provided it is associated with governance reforms allowing more commercial management. It could also be extended to other sectors.

It should be noted that price cap and yardstick regimes will have to allow for differential service costs. For example, Figure 33 reports on the costs per cubic meter of water measured in togrogs reported for selected PUSOs and Ulaanbaatar (the black bars). In order to make a fairer comparison between PUSO serving very different markets, an adjustment is made for the scale of the locality being served by the PUSO using an allowance based on an estimate of scale economies from international experience (the same used in Figure 10). This “yardstick” measure (the red bar) reports what prices would be if provincial PUSOs retained the same level of underlying efficiency but served a customer base as large as Ulaanbaatar’s. Smaller operators see their “yardstick prices” reduced to reflect the greater unit costs of serving a small community. The measure would require further adjustments, not least to account for costs related to nonwater activities of PUSOs. Nonetheless, suitably refined, it could be used by monitoring agencies to help determine the efficiency of suppliers in Mongolia.

As it stands, the figure suggests that the Choibalsan, at least on this measure, is providing efficient services while Ulaanbaatar (given its large size) and Baruun Urt (even allowing for its small population) face large costs per cubic meter.

Finally, it is worth repeating that, while regulating prices paid to infrastructure firms at an economic level will be important to sustain both public and private investments in the sector, the political sustainability of an overall reform program can be compromised if reform is associated (only) with price rises. This is why it is important to introduce a number of reforms at the same time as regulatory pricing reform—including improved service quality and rollout and movement to a transparent system of subsidy based on government transfers. Box 9 discusses regional experiences with pro-poor regulation.
Addressing the needs of the poor requires an integrated approach cutting across different areas of intervention. According to a recent survey in East Asia, regulators are using a number of instruments available to shape a pro-poor regulatory strategy, including:

- **Designing pro-poor policies.** Regulation is often set within a broader strategy of social policy interventions. In East Asia, most regulators are actively involved in the design of pro-poor policies; main areas of intervention include subsidy schemes and universal service obligations.

- **Setting minimum standards of service.** Regulators must ensure that quality of service provision is in line with users’ expectations and meet minimum standards. Seventy percent of the surveyed regulators are involved in setting minimum quality standards. Regulators concerned with the welfare of the poor may also consider setting lower quality standards in areas underserved by traditional utilities in order to ease expanded access.

- **Fostering competition.** Competition can deliver benefits to customers by widening the range of products available on the market, constraining price increases and improving quality of service. Fifty-six percent of the surveyed regulators in the EAP region take actions to facilitate the development of competition. However, the scope of competition differs significantly across each sector. For example, all telecom regulators have taken steps to develop competition in the market, against 50 percent of the regulators in the electricity sector. In the water sector, the nature of local monopoly of the industry significantly restrains the scope for introducing competition, although some forms of competition can be introduced by benchmarking service providers’ performance or allowing unregulated service providers to compete with regulated utilities. Nonetheless, in the EAP region, only 3 out of 11 surveyed water and sanitation regulators have so far taken steps to introduce forms of competition in water supply.

- **Partnering with service providers to introduce pro-poor payment schemes.** Introducing payment schemes tailored to the needs of low-income customers is critical to solve affordability issues, in particular in relation to connection fees. Forty-two percent of the surveyed regulators partner with service providers to design payment methods suitable for the poor. For example, the Office of the Tasmanian Energy Regulator in Australia requires service providers to develop credit policies for customers willing to pay for service provision but unable to access commercial credit lines.

- **Designing connection policies.** Bans on disconnection are not to the benefit of low-income consumers, as they fail to distinguish between customers in financial hardship from those simply unwilling to pay their bills. Companies do need to the threat of disconnection to secure payment from those who are able to pay but choose not to. However, a balance must be struck between ensuring timely debt recovery and protecting the rights of those consumers who genuinely cannot pay. Customer disconnection for nonpayment of bills ought to be complemented by safeguards to protect consumer rights during the disconnection process, such as adequate notice periods before disconnection. Seventy percent of the surveyed regulators in the EAP region do allow disconnection for nonpayment of bills, while the remaining 30 percent do not have a specific disconnection policy in place. The survey results indicate that independent regulators tend to set slightly stricter disconnection policies than government regulators, requiring an average notice period of 2.3 weeks of disconnect delinquent customers, compare to an average notice period of 3.2 weeks for government regulators.

Recommendations:

- There are two priorities in terms of the institutional structure of Mongolia’s infrastructure provision: 1) to ensure that the slide in quality of existing infrastructure is halted, and 2) to allow for efficient provision of urgently required new infrastructure, including national energy capacity and infrastructure required for mining. This suggests that reform of management (particularly in roads and water) and regulation (particularly in energy) should be carried out as rapidly as possible, alongside efforts to increase transparency and competition.

- In order to improve maintenance of roads, road funds should be replaced by ministry funding, and prioritized (hypothecated) resources put aside for maintenance.

- Other infrastructure management reforms include the creation of state owned enterprises operating under a commercial model with independent boards of directors on a level playing field with private providers in water and energy as well as parts of transport (including airports and MIAT). There is also scope for consolidation of both water and energy provision.

- In order to improve regulation, regulatory bodies should be consolidated and overlapping powers removed. They should be granted greater independence, but the scope of regulation should be reduced to allow maximum competition under transparent (price-cap) pricing rules and yardstick competition.

- In order to improve transparency, regulatory decisions, contracts, licenses, and accounts of state-owned enterprises should all be made public. Stakeholders should be involved in the reform process through the use of scorecards and public consultations.

- Expanding the scope for competitive provision would involve deregulation of air transport services, reducing the scope of licensing in telecommunications and energy provision to cases where there are natural scarcities, completing the move towards an electricity wholesale market and publicizing WSS and energy distribution network designs while creating tools and incentives for connection of localized systems.
CHAPTER V:

BETTER PLANNING

**Key Messages:** Infrastructure planning in Mongolia is weak. There are insufficient resources for operations and maintenance of existing infrastructure, and a number of planned investments, especially in transport, appear likely to have low economic returns. Investment plans in water and sanitation in particular are skewed towards benefiting a wealthy few. In energy, planning has been shortsighted to the point that brownouts and blackouts are a significant threat. Plans also lack attention to sources of financing and management of new stocks, especially with regard to mining-related investments. Regional planning emphasizes approaches that have a poor track record internationally, while urban planning in Ulaanbaatar is too restrictive in some cases while not active enough in the case of *ger* areas. Spending priorities should be realigned towards preserving and improving existing infrastructure stocks. Sector investment plans should be reviewed on the basis of their economic efficiency and poverty-reduction focus. The role for private financing and operation of projects (including output-based approaches) should be evaluated in each case, as should the role for alternate, less expensive and more effective interventions. At the national level, sector plans should be evaluated for their contribution to national development objectives and prioritized on that basis. Regional investment plans should focus on human capital over infrastructure. Infrastructure investments related to mining should, as far as is feasible, be built and operated by mining firms, with a coordination role for government. Planning in cities should involve greater flexibility in “formal” areas while planning to ensure the delivery of improved infrastructure and reduced environmental costs should be stepped up in *ger* areas.

Greater efficiency in provision and regulation supported by price increases will do much to sustain the quality of existing infrastructure stocks as well as freeing some additional resources for investment. Using private financing will help to bridge more of the gap between investment plans and financing realities. Revisiting existing expenditure plans to prioritize and adjust will still be necessary, however. We have seen that while the government has made good progress in defining broad expenditure levels by establishing a medium-term expenditure framework, a systematic assessment of expenditure priorities and an investment plan is missing. This has been further corroborated by civil society, private sector, and members of the government itself. To date, infrastructure investments have been driven by the availability of donor resources, and “planning” appears to have involved the creation of a wish list of projects at the sectoral level with the hope of attracting donor funds. Going forward, as government and private financing plays a growing role, planning to maximize economic returns from these resources will be key (see Box 10). The urgency of a planning exercise is underscored by the fact that, even assuming 10 percent annual GDP growth over the next 10 years and reduced investment programs outlined in the transport and water annexes, proposed investments suggest annual expenditures over the decade approaching 22 percent of GDP, an unsustainable level without international precedent.

The existing financing plans for infrastructure do not address chronic underfunding of maintenance, the need for selection of investment projects using analysis of their potential economic benefits, nor the respective roles of the public and private sectors. In
particularly, weaknesses in the planning system will affect Mongolia’s ability to effectively meet three of the government’s top priorities (a) fostering regional development; (b) promoting mining activity; and (c) achieving urban development for Ulaanbaatar and responding to the city’s growing environmental challenges.

**IMPROVING CURRENT INFRASTRUCTURE PLANNING**

**Maintenance: A Growing Problem**

While much of the 1990s involved rehabilitation of existing networks, the budget for operations and maintenance is completely inadequate to preserve the quality of existing infrastructure stocks. Overall expenditure on capital maintenance has dropped from 0.6 to 0.2 percent of GDP over the 2000–06 period (see Figure 34). Problems are particularly severe in transport and utility provision.

Mongolia’s very large road network given economic density is reflected in a required maintenance budget that is a larger percentage of GDP than that for most of Mongolia’s regional comparators. The 2004–05 budget for national road maintenance, at US$4 million, represented almost a threefold increase over figures for 2000. At the same time, the budget was still half of that requested by MRTT and one-fifth the estimated requirement based on international norms for a network of Mongolia’s size (at close to US$23 million or around 1.7 percent of GDP). This accounts for the declining quality of the road network discussed in Chapter II. Similarly, road maintenance funding in Ulaanbaatar, US$3 million a year, is also less than what is needed. The city’s roads need major rehabilitation, at an estimated cost of US$60 million.

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**Box 10: The Roles of the Private Sector, Government and Donors in Infrastructure**

Ten years ago, government ministries were the only provider across most of infrastructure and donors were the major investors in new capacity. But the respective roles of the private sector, the government and donors in building and operating Mongolia’s infrastructure has changed over the last 10 years and will continue changing.

Private providers are building and operating a growing part of the infrastructure stock. This change is most noticeable in telecommunications and transport services where private provision is dominant. But there have been some early steps in other infrastructure services and, going forward, it is plausible to imagine a major role for private finance and operation in areas such as trunk roads, rail, and energy production, with expanded possibilities in water and energy distribution.

The government retains an important role in constructing and operating infrastructure, but increasingly this has been through independent, commercially operated state-owned enterprises. Going forward, greater autonomy of operation for state-owned transport, energy and water companies would be a positive step. This greater autonomy, and the increased role of the private sector, has increased the importance of government as a regulator and as a source of subsidies for supporting uneconomic, but socially advantageous, levels of infrastructure provision.

As the economy grows, donors will inevitably lose their status as the primary financier of new rollout. Increasingly, the role for donors will be to leverage and catalyze other sources of finance in order to ensure pro-poor provision and to support public or public-private investments as a partner rather than a lead.
In electricity, the CES has seen maintenance expenditure fall from US$4 million to US$1 million during 1998–2004. This minimal expenditure helps to account for growing technical losses in the system, as does similarly limited spending in water and sanitation help to account for high losses and limited treatment of sewage. As noted, this lack of maintenance presents a growing environmental burden on increasingly scarce water supplies in the country.

**Economic Assessment of Investment Plans**

Beyond mistargeting between new construction and maintenance expenditures, planning methods for new expenditures appear to be ad hoc, lacking an underpinning of economic analysis. This has led to the development of unsustainable investment programs in some sectors including road transport, programs based on impossible targets in other sectors including water and sanitation, while leaving until very late in the process planning for some essential investments including new electricity capacity. This has been shown again by the recently approved (March 2007) rural electrification program, whereas uneconomic line transmission extension has been approved at a cost of about US$3,200 per connection.

We have seen that there is a need for considerable additional funding for maintenance of the road network, suggesting that Mongolia should spend far more of its GDP on maintenance than neighboring countries (see Figure 35). Despite this, Mongolia’s current transport strategy emphasizes expenditure on an extensive network of new roads, many of which appear to lack any economic justification. The Millennium Road is an example. A 1999 transport strategy envisaged the building of a link across the country from East to West, making use of existing roads, many of which pass through aimag centers. Under the final plan, however, the Millennium road avoids existing communities, to avoid having to build by passes around them. Unfortunately, the traffic forecasts on which the feasibility study were predicated appear optimistic, and there is a high risk that road will attract insufficient traffic to justify its costs.
Subsequently, the Millennium Road Program was expanded to include five new north-south routes, (see Figure 36). No prefeasibility or feasibility studies have as yet been conducted on these routes. They are intended to improve the connectivity between aimags and their surrounding region. But with a population that would benefit directly estimated at about 1.3 million, the cost per person approaches US$1,000, and it appears unlikely that benefits could come close to this level. We will see that they are also likely to be poorly designed as tools for regional income convergence.

Similarly, in rail transport, in anticipation of the output of mines, mostly destined for China, thought is being given to the construction of new railways within Mongolia to the existing line into China, and a parallel line along the Russia-China track (see Figure 37). However, there have been no studies of the capacity of the existing infrastructure or of how that capacity could most cheaply be increased. The concern with over-construction is exacerbated by the completion of a paved road from Ulaanbaatar to the Chinese border at Zamyn Uud. Despite being cheaper within Mongolia, rail transport is poor in China; so much international freight to China may go by road. As noted earlier, this is one example of the importance of viewing sectors in an integrated manner, to increase the development impact of invested resources. A transport demand forecast

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33 It is also worth noting that many of the road performance standards for roads date from Soviet times and are now inappropriate. For example, the standards for road width are too high, while the standards for axle loads are too low.
that looks across road and rail may suggest that existing proposals for investment will outstrip demand. Again, the proposed new airport for Ulaanbaatar, costing about US$120 million, would add new capacity and be more reliable than the current one. But excess capacity at the existing airport means a new airport is unlikely to be the most efficient solution.

Figure 37: Potential Rail Projects

In water and sanitation, by far the largest budget item is Tog 1,500 million for mains WSS connections to the new 274 ha site northwest of Ulaanbaatar, where 7,250 new apartments are planned to be built—part of GoM’s “40,000 apartment program.” Yet it is not obvious that there will be strong demand for apartments in such a remote area, while it is clear that there are many current residents of Ulaanbaatar who make do with very poor quality and very expensive water provision. Going forward, existing investment plans suggest that 88 percent of investment financing 2005–15 will go to the improvement and extension of service provision in apartments and other formal areas, leaving only 12 percent for ger areas.

At the same time, the government has committed to meeting MDG targets for water and sanitation. As noted previously, these targets are unlikely to be reached, and a focus on subsidy or government provision of connections to water and sewage concentrated on new households in formal areas under the cover of an unfeasible water and sanitation
rollout target will reduce the financial and economic returns of investment in the sector. It will also be distinctly regressive—favoring wealthy occupants of new formal housing at the cost of ger residents left to subsist on water supplies that are below acceptable international quality standards and far more expensive than household supplies.

In electricity, planning has been too shortsighted rather than excessively optimistic, and there is an urgent need to begin construction of new capacity and to reinforce and expand distribution assets, particularly in Ulaanbaatar. Forecasts suggest that, with the current schedule of plant retirement, the country will suffer electricity shortages as early as 2011. New capacity will be required as early as 2009 and by 2014 the country will need an extra 285 MW in capacity (assuming mines finance their own power needs of 200–300MW). It should be noted that 87 percent of the proposed investments for the next 10 years in the energy sector are accounted for by generation capacity required to avoid electricity shortages, suggesting that, unlike transport, there is little in the way of excess spending to be cut.

**Public versus Private Financing**

In addition to mistargeted spending, existing infrastructure plans lack adequate attention to the sources of financing and management of new infrastructure stocks. Given Mongolia’s low population density and complexity of infrastructure provision, and given the high fixed costs and considerable nonfinancial benefits of some infrastructure investments such as rural roads, water and sanitation, a number of high priority investments are unlikely to attract significant private financing. At the same time, there are a number of proposed investments where the gap between financial and economic rates of return are likely to be small, suggesting that private financing may be available and public financing is not necessary. For example, transit freight from Russia to China is profitable, potentially enough so that there is a chance that the investment could be self-financing, hence the interest of private investors. If it is not that profitable, the economic returns to Mongolia of the project may not be sufficient to justify expenditure of scarce government resources on construction. A similar logic applies to mine infrastructure, as we shall see.

Again, it is not clear that scarce government resources should be financing the construction of apartments that will only be able to benefit a small percentage of the population living in formal settlements. Private housing and apartment construction should be actively encouraged, but construction companies should bear the cost of extending utility services to new developments.

In telecommunications, the government, through the ICTDC, is making public investments in developing a north–west fiber optic transmission network, trialing a high capacity optical transmission network with Railcom. The estimated cost of financing the backbone network is approximately US$100 million. Given competing priorities for scarce government investment resources, the profitability of the telecommunications and the already active role of the private sector, such financing should be obtained on commercial terms, preferably through private or public-private partnership.

**Improved Planning for Sustainability**

A first step in improved planning involves ensuring the sustainability of infrastructure through adequate operations and maintenance financing. As noted above, for roads this
is likely to involve the redesign and reprioritization of the road fund institutions. It is worth noting that even with an anticipated doubling of GDP over the next 7-10 years, the existing road stock would still require maintenance expenditures as a percentage of GDP considerably above regional averages, suggesting that new road investments should be very carefully evaluated to ensure that they can be maintained, with the sources of additional maintenance financing identified as part of this evaluation.

The first stage in prudent water management is the reduction in the vast quantity of wasted water. In Ulaanbaatar OSNAAG’s 40 outmoded CTPs require upgrading, at a cost of about US$2.4 million, and metering should be extended, with the medium-term aim of 100 percent individual customer metering supported by a US$1.5 million program to assist the poor to install meters on a subsidized basis. Central budgets could be usefully allocated in support of water saving—perhaps through one-off retrospective payments to suppliers which reduce their (a) unaccounted-for water and/or domestic per capita consumption by specified amounts; and/or (b) fit meters for households officially classified as being poor.

Regarding new investments, we recommend that a government infrastructure investment plan be produced, based on a consistent and rigorous application of social and economic assessment criteria, and it includes an assessment of priorities for government financing that takes account of the limited resources likely to be available and the potential for private investment (see Box 11). A prioritization would involve more than an ordering of existing plans, but evaluation of “second best” or alternate options where appropriate. If the Ulaanbaatar monorail proves too expensive, for example, the government may want to consider dedicated bus lanes as a cheaper alternative. If meeting the water and sanitation MDGs will take more resources than are likely to be available, the government may wish to use what resources are available to improve kiosk services and existing pit latrines.34

34 If large paved roads to proposed regional hubs turn out to have limited economic value, it may be that some additional small, but all-year, gravel feeder roads to local communities within the hubs have a higher payoff in terms of economic impact, especially on the poorest. It is worth noting, for example, that the quality of the local road network was significantly correlated with lower livestock mortality in 2002.
In particular, we would recommend significant cuts in proposed transport investments, deprioritizing the Western Mongolia and other north-south roads, the Ulaanbaatar monorail and intelligent transport system, the proposed parallel railway and railway electrification, and the new airport. A detailed list of higher priority transport projects is contained in the transport chapter of this report, which amounts to US$733 million over the 2008–15 period (see Figure 38). Even this list, as suggested above, will be difficult to finance under current budget constraints. This suggests the importance of looking to private finance for those investments where financial and economic returns are likely to be close. For example, regarding infrastructure connected with mine expansion, we would suggest that this should be privately financed, as we shall see. Mines could more simply be connected to consumers by direct links to China, and these links could be financed by the mine owners themselves.
Cheaper investments could provide similar economic benefits in road transport. For example, traffic congestion is becoming a problem in Ulaanbaatar, which could be addressed by building new and bigger roads. But much can be done using a low-cost combination of demand and traffic management. Possible demand-management measures include more use of vehicle license fees and charges for car parking. Possible traffic-management measures include prohibiting parking on through streets during the day; introducing a system of one-way streets; expanding and updating the system of traffic signals; and restricting pedestrian crossing of main streets to designated crossing places.

Excluding mine traffic, there appears to be sufficient rail track capacity to meet projected traffic at least until 2011 (when the additional crossing loop between Darkhan-Zuunbaraa will be needed). Furthermore, and as with roads, there are a number of solutions that would expand capacity with considerably lower cost. The cost of providing a rail bypass to Ulaanbaatar (the busiest part of the line) is one half of that of a complete new north-south line, while the short-term solution to potential congestion of upgrading the existing line would cost US$30-50 million compared to US$400 million for the complete new line.

In electricity, the situation does appear to be different. It may be possible to delay some proposed generation investments in the short term by purchasing more power from Russia, and by delaying plant closures and immediate loss reduction investments in heat and electricity distribution. However, it appears likely that the more significant measure to reduce the demand for government investment resources is to increase financing from within the sector by raising prices and improving efficiency, while also attempting to attract private sector financing.

35 The calculation assumes percentage growth in all sections in line with the average.
With heating, it will not be possible to extend the central heating network to the majority of urban consumers in the medium term. As a result, it is important to put in place pro-poor, environmentally friendly solutions in the near term that will reduce heating expenditures and particulate emissions. A one-time trade in of inefficient stoves for more efficient models could reduce average household coal consumption in ger areas from 5 to 3 tons during the winter season would generate very high economic returns. Savings would amount to US$225 per household per year in heating costs for 8–10 years, while the stove costs only US$80. An exchange program involving 100,000 ger households could be implemented for about US$3.2 million.

Given that resources to meet the water and sanitation MDGs are unlikely to be forthcoming, the focus should be on low-cost solutions which improve service quality for those households unconnected to water and sewage networks rather than public support for investments to connect new households in formal areas which will reach a very small percentage of the unconnected. Plausible investment approaches designed to improve the quality, efficiency and reach of kiosk water services and the design of sewage and solid waste systems in ger areas include:

- Self activated insulated hydrants rather than manned kiosks and connection of remaining kiosks to the network. This second solution has been shown to considerably reduce the risk of contamination as well as increasing consumption to nearer 10 liters per capita per day.
- Piloting of off-grid options for grey water disposal (such as holding tanks) where water connections are made but sewer connection is not technically or financially feasible.
- Low cost improvements to upgrading estimated 72,000 pit latrines with improved ventilation and lining, or dry technology in areas where groundwater is extremely shallow.
- Piloting approaches to collection and reuse or disposal systems for latrine emptying, including possibilities for on-site composting.

In telecoms, higher return and lower cost than a fiber cable, especially in terms of rural development, as well as a more obvious candidate for government financing, is rollout of basic telecommunications services to the local level. The private sector is willing to extend services only to those areas that are commercially viable, which is likely to exclude considerable rural areas. An access initiative which provided satellite-based public access at the level of approximately one phone per 100–150 herder families, and extended voice connectivity through base stations in sum centers currently lacking them would cost between US$8 million and US$11 million. The proposal is to use market-based mechanisms to roll out access and as we have seen, such a scheme may be applicable to other sectors as well where it is suitable.

Finally, given limited resources, it is important that investment priorities are set not just within sectors and regions but across them. Donor led ger area WSS improvement projects have economic returns ranging from 13 percent to well over 20 percent, demonstrating that well designed projects aimed at improving ger area services are good national investments. Such investments are also comparatively well targeted towards the poor. Available investment resources may well be better spent on demonstrably pro-
growth, pro-poor activities than investments with a less direct link to poverty and greater uncertainty as to their overall economic impact, such as extensive new road construction projects. Ger areas, which have largely been ignored in investment planning to date, are likely to remain home to the great majority of the urban poor. Pro-poor investment planning would reverse this neglect.

At the same time, it is important to note there will be tradeoffs between a direct poverty focus and maximizing economic returns in some cases. Given the very low population density of rural areas, for example, it is likely that rollout of infrastructure services will frequently carry very high costs. Pro-poor objectives in rural areas may frequently be better met by other programs than infrastructure provision. A review of government infrastructure investment plans should take account of potential returns in noninfrastructure investments, and be tailored accordingly. This may be particularly important for regional investment planning, as we shall see.

FOSTERING REGIONAL DEVELOPMENT

Mongolia’s current regional development plan emphasizes five economic regions created out of the 21 provinces. In three of these five regions, the government proposes tax and other incentives to lure investment to non-mining locations away from Ulaanbaatar. In addition, the current focus on regional development includes the construction of a considerably expanded transport network, this to include connections from the existing rail network to new mines.

Experience with Regional Planning

Given the limited critical mass of population needed to benefit from agglomeration affects, it seems unlikely that all 8 urban centers designated as regional pillar centers in the regional strategy will be able to catalyze economic growth. Furthermore, cross-country experience suggests that fiscal incentives yield a modest effect in influencing relocation decisions of firms from large agglomerations to lagging areas or small cities (see Box 12). At the margin, these programs may induce firms to choose among comparable jurisdictions with similar nontax attributes. When choosing where to invest, firms focus first on the availability of appropriate human capital, the productivity of labor (including but not only labor cost), market access, supply of raw materials, political and social stability, and quality of the local infrastructure. In short, the benefits of agglomeration make firms less sensitive to differentials in tax rates. In particular international experience suggests that “free zone” experiments are successful only if other conditions such as market access, attractive labor skills, cost, and productivity, are in place to attract firms. The viability of the three planned free zones in Mongolia should be reconsidered in light of these other necessary preconditions.

There is a role for the government to improve livelihoods in areas outside Ulaanbaatar where many of the country’s poorest people live. Furthermore, there is a role for the government to maximize the economic benefits flowing from mine development by maximizing network economies and spillover impacts. But a general rule is that concerns with equitable outcomes should focus on people rather than places. Looking at transport, for example, cross-country evidence suggests that inter-regional infrastructure, without complementary investments in local infrastructure and public services, may worsen relative regional inequality. But this is likely to reflect people with
Box 12: The Scorecard on Regional Development Policies

Interventionist regional development policies have seen limited success in almost all countries, federal and centralized alike. In a recent survey of 10 countries with high and or substantial regional income inequality, countries were classified by degree of convergence in regional incomes:

- **Countries experiencing regional income divergence**—Brazil, China, India, Indonesia, the Philippines, Romania, the Russian Federation, Sri Lanka, and Vietnam.
- **Countries experiencing no significant change in regional income variation**—Canada and Mexico.
- **Countries experiencing regional income convergence**—Chile, Pakistan, Thailand, the United States, and Uzbekistan.

Countries experiencing divergence in regional incomes tend to focus on interventionist policies, while those experiencing convergence have taken a hands-off approach to regional development and instead focused on promoting an economic union by removing barriers to factor mobility and ensuring minimum standards in basic services across the nation. In Chile, for example, convergence in regional incomes is largely attributable to liberalizing the economy and removing distortions so that regions could discover their own comparative advantage. In Pakistan and the United States convergence is attributable to greater factor mobility. Paradoxically, creating a level playing field may help disadvantaged regions more than do paternalistic protectionist policies.

*Source: Shankar and Shah 2001.*

From a transport perspective, international experience suggests that government investment in infrastructure that facilitates transactions within a lagging region may contribute to regional income convergence. This may be better planned at the local rather than the national level. Looking beyond transport, one example of an infrastructure investment that may garner high economic returns while also favoring the development of regions outside of Ulaanbaatar would be improving the provision of water and sanitation services in aimags. This is likely to cost considerably less than providing connections in Ulaanbaatar, while providing similar development benefits.

However, it is worth noting that most of the successful examples of regional development are not based on infrastructure at all, but instead human capital development. Noninfrastructure investments may make more sense because they are more transferable if regional development efforts are not successful. In rural areas, improved access to quality education might have particularly high returns. To this end, it would be useful to reassess the per-pupil funding formula and provide for those sparsely populated soums that are at a disadvantage from the budget allocation. In addition, increasing the quality of teachers in rural areas and the incentives to get professionals to teach in remote areas is crucial. Again, in health, it may be worth revisiting budget resources allocation by refining the allocation formula to reduce the disconnect between health outcome and health care spending by tightening the link between the costing of desired outcomes and spending priorities. Within these “multi-
purpose” investments some sector-specific prioritizing can be undertaken, for example, towards vocational education in areas where there are likely to be jobs as projected in the country’s overall development strategy.

A Highly Centralized Governance Structure

Attempts to encourage regional growth will occur under a highly centralized governance structure which provides little financial or planning autonomy to regions and the municipality of Ulaanbaatar. Since 2003 there has been a significant centralization of fiscal powers in government. Local governments are not involved in revenue collection and are responsible for limited service delivery. To finance their expenditure, local governments mainly rely on central government transfers which are allocated in an ad hoc manner, without any explicit and predictable criteria. This has resulted in significant fiscal uncertainty for local authorities, thereby making budget planning difficult. Attempts to raise local finance have been discouraged—recent attempt by the Municipality of Ulaanbaatar to introduce a new vehicle tax to boost city road funds was vetoed by the State Hural, for example. Ulaanbaatar generates only 13 percent of its revenues from property taxes, well below the East Asia average of 38 percent, and it is not involved in the collection of this or any other tax, which are also set at the national level.\textsuperscript{36}

Reviving Local Government

One method to increase local capacity to deliver services would be to increase financial independence at the local level. A priority should be to ensure that the municipalities and aimags have clearly allocated responsibilities, appropriate autonomy in carrying out their functions and, importantly, access to adequate local tax bases to fund their services. The absence of a proper functioning land tax is notable by international standards. With a proper valuation of the opportunity cost of land and by eliminating the bias towards apartment area users under the existing land tax regime, municipal revenues could be increased by 20–30 percent. Ulaanbaatar and the aimags should also have full responsibility for urban planning.

Clearer local government responsibilities and associated local funding instruments may lead to better decisions on the best provision of local public goods. At the same time, it will be important to devise disclosure mechanisms for the local citizenry to keep abreast of how much funding has been provided to local service delivery units and how it was spent (e.g., parents being informed of the budget execution in their children’s schools). The authorities should regularly publish information which can be effectively accessed by the public on fiscal transfers to service delivery units in an effort to increase accountability and efficiency in public service provision at the local level.

One way to ensure both transparency and that investment priorities are those of the community is to use community-driven approaches to allocate investment funds. Community-driven development involves beneficiary communities in the selection, design and oversight of investment projects. The Kacematan Development Project (KDP) in Indonesia, for example, uses a competitive process through which communities forums rank and select investment priorities for projects. These projects have usually

\textsuperscript{36} Urban background report (internal document).
supplied water, sanitation and local roads. Initial evidence suggests that community-driven investments are cheaper and more likely to be maintained than top-down investments, reflecting community oversight and involvement.

**Promoting Mining Activity**

Looking at mining investments in particular, it is undoubtedly the case that new infrastructure will be required to reap what we have seen will be considerable economic benefits. Possible mineral exploitation projects are spread widely across Mongolia and are often far from existing infrastructure. For example, the Oyu Tolgoi mine is more than 300 kilometers from existing water, energy, and transport infrastructure. The government is planning significant investments to meet these needs, including (not least) a rail spur connecting mining areas to the north South line, noted in the previous chapter.

The infrastructure requirements of mines are thus large, but they are often specific to particular mines: without the mine, the infrastructure is of little value. The benefits to Mongolia of the infrastructure will thus be the benefits to Mongolia of the mine. If the mine is foreign owned, the national benefits of the mine are the taxes and royalties collected by the government, plus any increase in wages for locals employed as a result of the development, less the loss of resources and any environmental costs. The infrastructure investments will have a net benefit for Mongolia only if those benefits exceed the capital and operating costs of the infrastructure.

The easiest way to improve the likelihood that this is the case, and to move the risk of an incorrect forecast of the financial returns of a mine from the government to the private sector is to make mining companies pay for the construction of infrastructure that they require. The government (and government-owned infrastructure providers) could build project-specific infrastructure only if a credible mining company has agreed, in a long-term contract, to pay for the infrastructure over its life. Alternately, and given the costs of negotiating and enforcing satisfactory contracts with mining companies, it is likely to be simpler for the government to require large mines to build and operate mine-specific infrastructure under a light regulatory regime. (The government should continue to set and enforce rules governing taxes, royalties, the environment, and public safety.)

International best practice suggests that the focus of a regional strategy connected to large mines should be to leverage what the private sector can (and should be expected to) do alone in order to maximize the development impact of such investments (see Box 13). For example, mines require electricity, water, transportation, and ICT services for their own operation. Leveraging potential mining investments in these areas to ensure sustainable provision of infrastructure services to mining towns and other communities in the vicinity of the mine will allow limited public investment to extend access. Government infrastructure companies providing services near likely mine-specific infrastructure may wish to negotiate with miners to ensure coordination between state and private infrastructure. An example of a possible independent supporting project is the Herlen—Gobi water project, which aims to transfer water from the Herlen River to the South East Gobi at a cost of some US$390 million. While 70 percent of estimated demand is for mining, some 30 percent could be used by urban consumers in Sainshand,
Zamin Uud, and Erlian in China. Given the mixed experience with mine-owned public infrastructure to date, however, it will be important to ensure quality provision through enforcement of appropriate contractual and regulatory obligations.

Many of the new mines will be small to medium, and in these cases there may be a role for the government to act as a finance aggregator and direct infrastructure provider. Even here, however, the role for scarce general government savings to support the rollout of mine infrastructure appears limited, and infrastructure should be provided on a clear cost-recovery basis.

Small mines may also create significant domestic demand for domestic suppliers of goods and services, such as high quality grinding balls, security and transport services, and safety equipment. Evidence of this can be found at the Borro Gold mine where the mining company has outsourced a range of services to a number of local companies to assist during the construction phase of the mine. SMEs are now supplying maintenance, haulage, catering, lime supply, and transportation services to Borro. There suggests there may be an additional role for the government to provide promotional support to incubate and nurture fledgling SMEs in order to develop skills base in IT, accounting, marketing, promotion, finance, and general management. Again, the focus should be on transferable skills investment in order to minimize the risk of the investments.

### IMPROVING URBAN PERFORMANCE

#### Weak Planning at the City Level

At the city level, in Ulaanbaatar, prescriptive urban plans such as the Master Plans developed in Mongolia under the Urban Development Law 1998 may unnecessarily constrain alternative suppliers of water, transport, and energy. They also allocate considerable land to uses where there is limited existing demand (for example, a surplus of industrial zoning). Land management has improved with the creation and protection of private property rights, but management of public lands remains nontransparent, and

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**Box 13: Mining and Infrastructure Policies: An International Perspective**

In many countries with significant mining sectors, mining companies are responsible for construction of roads, power plants, railroads, and ports as part of major projects. Practice regarding coordination and integration of this mining infrastructure with local and national general-use infrastructure rollout is mixed, however. Laws in most Latin American mining countries generally do not impose requirements on concession holders with respect to mining infrastructure integration with regional and local infrastructure. Of large Latin American countries, only Venezuela requires concession holders and work contractors to plan and implement mine infrastructure in coordination with regional and local planning authorities.

Regarding smaller mines and multi-use infrastructure, a number of countries emphasize coordination and flexible responses dependent on circumstances. In Tanzania, government policy encourages mining companies to invest in water, water supply, and social infrastructure such as schools, hospitals, and recreational facilities within the mines and adjoining localities. The policy emphasizes coordination of efforts among the sectors involved in planning and development of infrastructural facilities including local and central governments to address mining industry needs. Again, in Fiji, the government is willing to participate in multi-use mining infrastructure projects provided major benefits accrue to the public-at-large. The government would consider participation provided infrastructure projects: (1) are cost effective; (2) have quantifiable social benefits; (3) contribute to rural or social development; and (4) be within the general scope of public sector infrastructure investment planning criteria.

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Sources: World Bank 1996; United Republic of Tanzania 1997; Government of Fiji (1997), Section 8: Infrastructure Policy, Mineral Policy.
plagued with corrupt practices. Furthermore, there are overlapping responsibilities between the central and municipal governments.

At the same time, new ger districts are developing with minimal if any intervention by planning agencies, so not only are there inadequate water supply and drainage services, but also a lack of a road network that allows access to public transport and to vehicles delivering utility services—including water and garbage trucks. Furthermore, many informal settlements are springing up above the height of reservoirs, adding to the complexity of water provision.\textsuperscript{37}

Regarding traffic management, private car ownership in UB is growing at more than 25 percent per year and is likely to continue at a similar level for the foreseeable future. Within 10 years, the number of vehicles per kilometer of the city’s roads will approach 300—a similar level to those faced by some of the most congested cities in the region. Yet current use of road space is very inefficient, and intrusion of parked vehicles into the road space needed for circulating traffic is common.

Improving Outcomes in Ulaanbaatar

The municipality of Ulaanbaatar may need to revisit its own planning efforts. Urban planning is important in ensuring the best allocation of Ulaanbaatar’s and other cities’ scarce public resources and can also be a cost-effective way of addressing some externalities. Modern planning tries to ensure that local public goods are provided and that people and organizations face the costs of externalities they generate (such as pollution). It must also try to avoid being captured by firms wanting to use planning to impede their competitors. Plans should not usually aim to “pick winners” by permitting only specific economic activity in certain locations or by proscribing economic activities.

The layout of roads and the direction of urban expansion are partial exceptions, since the government must decide where roads will be built, and remains responsible for provision of other basic services.

A number of long-term environmental challenges in Ulaanbaatar will also involve stronger planning and regulation (in areas such as ger expansion, traffic management and control of pollution output from industry (and particularly tanneries). At the same time, considerable environmental progress can be made by providing more efficient infrastructure services to the city. These activities are win-win—reducing financial costs and improving environmental outcomes at the same time:

- Supporting the rollout of improved stoves in ger areas will not only save householders money and reduce indoor air pollution, but significantly reduce ambient PM 10 concentrations in the city as a whole.
- Inefficiencies in generation, transmission and distribution losses as well as poor insulation and lack of thermostatic control at end use account for 38 percent of gross generation. Again, reducing these inefficiencies saves time and reduces output of pollutants.

\textsuperscript{37} The city’s sewage system is outdated and frequently dumps raw sewage, while the city’s share of Mongolia’s 487 open waste dumps (collecting 10 million cubic meters of waste) is a considerable health hazard (Ministry of Nature and Environment 2006).
• A well insulated building can reduce energy use by over 70 percent compared to traditional designs.
• Improved public transport combined with traffic management might reduce transport emissions by 25 percent.
• Improved water quality would remove the need for boiling water for consumption, saving considerably on requirements for cooking fuel.

Regarding the boom that is apparent in urban housing, construction in Ulaanbaatar’s central and ger regions suggests that private investment can take the lead. There is, of course, the need for improved provision of road, water and sewage, and energy infrastructure as noted elsewhere in the report. At the same time, there may also be a role for private construction firms to absorb a greater part of the connection costs to utilities (including a share of the fixed capital costs) as part of a strategy of increasing resources for expansion of the network. With new construction, private developers should be responsible for infrastructure within their development, the government needing only to ensure interconnections with existing infrastructure. A more activist approach is required for informal settlements, however.

Because of the limited finance available, public funding for ger improvements should focus on strategic investments and pilots, incentives and subsidies aimed to mobilize community and private resources to find workable solutions to water, sanitation and heating. This would entail the municipality taking a facilitating role, rather than being a service provider, for example through improving urban planning to direct future ger development for areas that can be cost effectively serviced and mapping and widely publicizing WSS network plans to guide private development on where municipal connections are feasible and desirable. The municipality will need to decide which ger areas can be sustainably expanded, and ensure that land in these areas is available for infrastructure development. This can be combined with improved (tradable) property rights in ger areas.

Regarding urban transport, there is still an opportunity to implement policies that will delay or prevent worsening congestion. Measures should combine of demand management (which introduces costs that reflect the economic use of road space) and traffic management (which uses regulations to improve traffic flow). The measures could include active use of vehicle license fees by Municipality and economic charging for car parking, peak, off-peak combined with prohibiting, and enforcing the prohibition, of on-street parking on through streets throughout the day and introducing a system of one way traffic flow and bus lanes on specific streets.
### Recommendations:

- The three most pressing investment priorities are to 1) maintain the existing stock of infrastructure, 2) exploit the potential of recent mining discoveries and 3) avoid national electricity shortages. This suggests a focus on maintenance, planning for private investment in mining areas and for new sources of power. At the same time, given investment plans out of range of resources, a second set of priorities revolves around improving the planning process.

- As part of the institutional reform process outlined in Chapter IV, the government should not reconstitute the Road Fund, but should ensure that state-owned enterprise management and regulation focuses on the issue of sustainability of infrastructure provision. This will involve an increase in the road maintenance budget in particular.

- In consultation with potential bidders, the government should develop priority list of infrastructure investments required for new mines and incorporate permissions, licenses and necessary use of eminent domain as part of bid package for cases of mine company-led infrastructure investments. For small mines, bid packages should incorporate shared cost of infrastructure construction.

- Fast-track planning for a new power plant to avoid shortages post-2009 is a priority, but this should include an evaluation of public and private financing and operational options.

- Existing sector investment plans should be reviewed on the basis of their economic and poverty reducing efficiency as part of a national planning exercise. A number of alternate investments should be considered, including subsidy/incentive packages for provision of improved stoves in ger areas and use of output-based aid to extend service coverage for water and sanitation in ger areas and to telecommunications nationwide. Investment priorities should be matched with potential funding sources, maximizing private sector participation.

- Plans for regional development should be revisited to focus on human capital and local infrastructure as part of a broader effort to introduce greater fiscal autonomy/capacity at the local level, potentially including elements of community-driven investment decision making.

- Urban land management processes and plans should be updated along with systems of property rights in ger areas. New transport management techniques including pricing should be introduced.
CHAPTER VI:
PRIORITIZATION

The present report proposes a comprehensive list of recommendations covering pricing, planning, and institutional change both within and across sectors and levels of government. Even were none of the recommendations likely to be politically contentious, simultaneous implementation would be very complex. This suggests the need to prioritize reforms, but acknowledge that their likely success is interlinked.

The process of prioritization can be undertaken as part of an exercise of developing new sector policies that could identify and build consensus around reform and investment plans. As part of that development, strengthening the capacity to undertake economic analysis of sector expenditures and investment proposals at both the central and local government level is critical.

Figure 39 highlights recommendations from this report in three categories: pricing, governance, and planning. The figure gives some indication of the more urgent of recommendations by listing them in approximate order of priority within categories. As noted before, a number of the actions are highly complementary. Sustaining investment levels will require greater private sector participation, such participation will require regulatory and pricing reform, and it is unlikely that pricing reform will be sustainable absent quality improvements and consumer participation, for example.

In particular, the level of private participation will depend in large part on pricing reform. This is a lesson learned in other countries in the East Asian region. Current pricing structures in Mongolia are regressive and drain resources from both maintenance and new infrastructure investment. Pricing should be introduced in road transport and raised through gasoline pricing. In air transport, energy, water and telecommunications, cost-based tariffs overseen by independent regulation will be key to reassuring private investors that they can make a return. At the same time, tariff increases are likely to be politically sustainable only if they are accompanied by reforms which increase participation and transparency as well as service quality. Remaining subsidies should be transparently implemented through central government support.

Regarding governance, the key institutional reforms related to pricing and investment are independent and clarified regulation and expanded metering to ensure that a credible pricing regime can be implemented. In order to deliver on the promise of improved quality for increased price, further institutional reform of state provision will also be required—not least through improved governance of state-owned enterprises and performance-based contracting with private firms managing water and heating. State-owned enterprise reform should ensure operation on commercial principles under an independent board, with social objectives (such as pricing and access for poor consumers) supported through a system of transparent subsidy from government. Systems of regulation in Mongolia require considerable simplification—fewer regulatory bodies with distinct responsibilities issuing transparent and minimal regulations with
the aim of maximizing competition and ensuring the sustainability of provision through fair pricing and quality management.

As noted above, there are three sets of investment required to ensure that, over the near term, infrastructure does not become a constraint to economic performance. These are (a) investments required to maintain the existing stock of infrastructure; (b) those required to exploit the potential of recent mining discoveries; and (c) investments in capacity to avoid national electricity shortages and disruptions in distribution system in Ulaanbaatar in particular.

How these investments are made will depend in part on a broader process of reform and prioritization. The report has noted that given a small gap between financial and economic returns to infrastructure connected to mining, mining companies should pay for, and preferably build and maintain, requisite infrastructure. Approaches that ease such provision should be rapidly evaluated. Given pricing and regulatory reform, electricity production capacity could be provided by the private sector.

In order to increase the potential catalytic role of infrastructure investment in the growth process, additional infrastructure projects can and should be undertaken. But it is worth emphasizing that current plans contain a mix of potentially high return investments and others which are likely to have a limited impact on growth and poverty reduction. Existing plans also ignore a number of cost-effective solutions which may be more plausible in the light of limited resources. A process of review and reformation of proposed investment plans should be undertaken to whittle down potential projects to a plausible level, and focus on those with the maximum potential return in terms of economic growth and poverty reduction. At the same time, approaches that maximize the role for private sector and civil society participation should be introduced.

Regarding regional investment in particular, current plans are heavily focused on transport. International experience suggests that a human capital focus is more likely to succeed. Furthermore, there is a role for greater local level decision-making regarding investment planning, perhaps suggesting the need for some fiscal decentralization.

In Ulaanbaatar, moving towards a series of investments that improve the provision of services in ger areas may have considerably high returns. Approaches that attract private and community provision of improved heating, water and sanitation using output-based approaches under a more friendly institutional regime may be particularly effective.

There is the potential for significant development progress in Mongolia over the next 10 years. Absent reform and prioritization, infrastructure might become a bottleneck to that progress. However, if the government takes the initiative to improve sector governance and pricing, and combines this with an investment program focused on poverty reduction and high economic returns, the infrastructure sector can become an additional platform for growth and broad-based development.
Figure 39: A Cross-Sectoral Perspective: The Way Forward

**Improved Infrastructure Service Delivery in Mongolia**

- **Elimination of Regressive Subsidies**
  - Ensure Additional Resources for Maintenance and Expansion

- **Higher Service Quality and Extent**
  - Encourage New Sources of Financing

- **Allocative Efficiency**
  - High Economic Returns
  - Greater Poverty Alleviation Impacts

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**Better Aligning Pricing with Costs**

**Energy, and Water Supply and Sanitation**
- Priority 1: Introduce independently regulated cost recovery tariffs and expand metering.
- Priority 2: Introduce transparent, well-targeted central government funded subsidy mechanism.

**Transport**
- Priority 3: Remove price regulation on domestic air transport, replace with direct subsidy on a per capita basis if required.
- Priority 4: Increase tariff collection in urban transport, examine cost recovery for parking.

**Telecoms**
- Priority 5: Move towards cost-based tariffs and interconnection charges. Undertake tariff rebalancing for fixed and leased line tariffs.

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**Improving Efficiency and Governance**

**Energy, and Water Supply and Sanitation**
- Priority 1: Increase independence of regulatory bodies and consolidate functions. Introduce yardstick competition.
- Priority 2: Involve stakeholders in pricing/efficiency reform—scorecards, community discussion of tradeoffs.
- Priority 3: Introduce electricity wholesale market based on bilateral contracts among market participants.

**All Sectors**
- Priority 4: Increase transparency: publish licenses, contracts accounts of state owned enterprises.

**Transport**
- Priority 5: Replace road funds, introduce user representation on boards, secure resources for maintenance.

**Water Supply and Sanitation**
- Priority 6: Improve governance through consolidation of retail water provision services, and creation of state owned enterprises with independent boards of directors, use of performance measures in contracts.

**Telecoms**
- Priority 7: Complete transition to independent, minimally (price, license) regulated telecommunications regime.

**Transport**
- Priority 8: Improve traffic management system in Ulaanbaatar to reduce accidents and improve traffic flow.

**All Sectors**
- Priority 9: Introduce greater fiscal autonomy/capacity at local level.

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**Planning Better**

**All Sectors**
- Priority 1: Review existing sector investment plans for economic and poverty reducing efficiency
- Priority 2: Match investment priorities with potential funding sources, maximizing private sector participation
- Priority 3: In consultation with potential bidders, develop priority list of infrastructure investments required for new mines, incorporate permits, licenses and necessary use of eminent domain as part of a bid package for cases of mine company led infrastructure investments, and incorporate shared cost of infrastructure construction in bid documents for small mines.

**Energy**
- Priority 4: Begin construction of new power capacity to avoid shortfalls post-2009, including an evaluation of public and private financing and operational options.

**Transport**
- Priority 5: Increase transport maintenance budget

**Energy**
- Priority 6: Introduce subsidy/incentive package for provision of improved stoves in ger areas.

**Telecoms**
- Priority 7: Implement nationwide output-based access regime for telecommunications.

**Water Supply and Sanitation**
- Priority 8: Introduce output-based mechanisms for improved pit-latrine installation, delivery of solid waste collection services.

**All Sectors**
- Priority 9: Revise regional development plans to focus on human capital over infrastructure and tax incentives.
mongolia

ENERGY

annex one
OVERVIEW

The Government of Mongolia (GoM) stands now at a crossroads of sector expansion and reform. Mongolia, the world’s largest landlocked country between the two large economies of China and Russia, is in a unique position to facilitate regional cooperation in the Northeast regional energy market in the areas of trade, mining, and energy services. Doing so will require changes in the way the energy sector is developed in the future.

ACHIEVEMENTS AND SHORTCOMINGS

Despite significant achievements in its reform program to stabilize the supply of energy services, which yielded positive results in the mid-1990s, Mongolia’s main energy supply—chain-linking coal output, electricity production, and heat supply—still shows an overdependence on donors’ financing for its rehabilitation and expansion, high levels of technical and commercial losses, energy tariff levels below the cost of supply, allocation of subsidies to better-off consumers, and a market structure that does not provide incentives to distributors in particular to improve efficiency. This mode of operation is not sustainable and makes the energy system vulnerable to supply disruptions in the future.

To enhance the security of the Central Energy System (CES), a major objective of Mongolia’s reform program should be to improve the performance of the energy system so that it will become capable of raising an increasingly larger portion of investment funds for the maintenance and expansion of its services. To that end, the government established a legal and regulatory framework, which separates the government’s policy role from the operational role of the energy companies, and gradually introduced commercial practices among multiple, state-owned energy companies. Yet five years since these changes, the 18 companies operating in the CES, which supplies about 96 percent of Mongolia’s electricity needs, have not yet been able to generate significant funds for projected large investment requirements in new energy generation capacity or for the proper operation and maintenance of existing facilities.

The government now stands at the crossroads of energy sector reform. Moving forward in the direction of reform will require a new business model that simultaneously addresses problems on several fronts that ultimately affect the delivery of energy services—government policy on pricing and subsidies, market structure, and factors affecting individual company performance. Without such a model, it will be difficult for the energy sector to meet the future challenges and, moreover, the sector could lose past gains and in the process compromise the security of the electricity and heating supply as the country’s transition economy enters a new phase of growth.

THE MAIN CHALLENGES IN MONGOLIA’S ENERGY FUTURE

The future of energy in Mongolia faces three primary challenges:

- Providing clean and affordable energy for space heating.
- Meeting projected growth in energy demand in response to shifts in the economy.
- Balancing the benefits of regional integration with concerns for security of supply.
Providing Clean and Affordable Energy for Space Heating

In Mongolia, where winter lasts about three quarters of the year and temperatures often dip to 20–40 degrees Celsius below zero, energy for heating is not just a matter of comfort; it is critical to survival. In fact, heating is the single largest consumer of energy in Mongolia amounting to about 35 percent of the total. For example, in the education sector, expenditures on fuel and heating together form one of the largest single budget items and amount to more than 30 times the expenditures on textbooks (Figure 1).

At the same time, the quality and quantity of heating and energy services are important social concerns. In Mongolia’s household sector, a substantial disparity exists between quality of heating services and their costs between urban centers and periurban areas. All primary city centers have access to centralized district heating systems, which transmit the steam that was created in the generation of power from coal to residential and commercial buildings. However, households in the periurban ger (semipermanent tent-like structures)—amounting to slightly more than half of the population in Ulaanbaatar—depend on heat from the direct burning of coal in cooking/heating stoves, thus contributing to a major source of outdoor and indoor air pollution. The low chimney stacks of the stoves in the ger combined with unfavorable air flow conditions contribute to the severe outdoor air pollution during the long winter months.

Further, data suggest that indoor air pollution can be even worse. The air pollutants from the emissions of heating stoves, and heat-only boilers (HOBs), have caused major health problems, especially in the capital city of Ulaanbaatar.

As Figure 2 shows, particulate emissions inside the ger are way above acceptable standards. The concentrations are more than 11 times the safe limit according to the standards of the U.S. Environmental Protection Agency (EPA) and about 4 times in excess of Mongolia’s concentration standard. In addition to their higher exposure to air pollutants, households in the ger tend to pay a larger portion of their income—about 20 percent during the winter months—for the poorer quality of fuel and heating than those living in apartments.
Addressing the provision of clean and affordable heating will require first tackling current inefficiencies in both the supply of and demand for heating services. Heat supply costs are relatively high in part because of losses in the heat transmission and distribution (T&D) system. As a result of a lack of insulation and heat controls on the consumer end, estimated space heat consumption is 130 Mcal/m³ per year, or nearly five times higher than that in northern European countries. The makeup water required by Ulaanbaatar’s heating system alone is equivalent to replacing the entire water supply every four days. In contrast, the norm for efficient modern systems is to replace the water supply only once a year.

Meeting Projected Growth in Energy Demand in Response to Shifts in the Economy

Three factors affect a trend in increased energy demand, particularly electricity: (a) the growth in the share of trade, services, and mining sectors in the economy; (b) rapid urbanization in main cities and associated housing upgrading; and (c) higher incomes resulting from the aforementioned factors combined (see Figure 3). The shift in an economy from an agricultural base to a larger share of services and industry signals a substantial rise in electricity demand, which has averaged a 7.6 percent per year growth over the last five years.

Furthermore, wages and salaries for all categories of workers combined increased by about 42 percent in current terms during 2001-04.
Expanding household income usually heightens the demand for more comfortable housing and the greater use of electrical appliances, as well as an increase in passenger vehicles. This trend already is taking place in Mongolia. Figure 4 shows that private housing construction more than doubled between 2001 and 2005. Also, during the same period, the number of private automobiles grew by 48 percent. Already, in 2004, the share of households in final energy consumption at 28 percent was only slightly lower than that of the industrial-commercial share (31 percent) with that of the transport sector at 26 percent and all other sectors combined at 15 percent. A continuation of this trend is likely to require substantial amounts of heat and electricity from a system that already is hard pressed to meet current demand and is operating with considerable technical and financial constraints. Indeed, firm capacity reserve margins in the energy sector are already at about 10 percent, a very low level for a growing economy.

Balancing the Benefits of Regional Integration with Concerns for Security of Supply

A major trend in world energy markets is to reduce domestic energy supply costs by integrating the national energy market with regional energy markets. This integration in Nordic countries, Central and South America, Southeastern Europe, and Europe and Russia has resulted in added benefits to domestic energy markets, as well as greater uncertainties, as has been the case with Russian gas supplies to Europe. Such integration could benefit Mongolia, which is in a geographic position to become both an energy exporter and a transit country, in particular, facilitating power exchanges between Russia and China, as well as exporting to China. Currently Mongolia's integration is limited primarily to its electricity interconnection with Russia, with imports exceeding exports. Expanding electricity imports from Russia is one way to meet incremental increases in power demand in Mongolia's electricity system, which is under severe financial constraints for investment in new capacity. However, the government is also rightly concerned about the risks related to increasing dependence on foreign energy sources.

The current prices of electricity imports from Russia, about US$28–36/MWh,¹ are significantly lower than the cost of new capacity in Mongolia. These relatively low prices reflect the present excess capacity in the Russian electricity system. However, it is not

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¹ Calculated from a monthly fixed charge of US$180,000 and a variable charge of US$14/MWh (for imports up to 120MW), for average imports of 150GWh per month.
certain how long this surplus will remain and what will happen to prices when the Russian system requires large-scale investment in its aging infrastructure. In fact, the Russian utility (RAO-UES) has indicated the need for more than 20,000 MW of generating capacity by 2011, requiring a threefold increase in current capital expenditure levels. Another uncertainty Mongolia faces is the extent to which China may become an important importer of power from Russia and, equally important, an investor in Mongolia’s territory to export electricity to China’s growing energy market. Moving in the direction of greater integration with regional energy markets will not only require expanded knowledge of these markets and emerging technologies, but also methodologies for incorporating risk factors into analyses of cost benefits and costs.

**KEY ISSUES IN ADDRESSING THE MAIN CHALLENGES**

Following are the principal issues to address concerning the main challenges of the future of energy in Mongolia:

- The need for a financially sustainable energy sector.
- Potential regulatory constraints to private sector participation in the energy sector.
- Distributional inequities in the availability and quality of electricity and heat.
- Environmental solution for a coal-based sector.
- Regional perspective and institutional capacity in energy planning.

**Need for a Financially Sustainable Energy Sector**

In aggregate, the CES energy system has registered net losses for the past five years. Several factors have prevented the sector from becoming financially viable. First, a tariff level below the economic cost of supplying various categories of customers that is insufficient for raising cash to meet future investment needs. The last tariff adjustment took place in February 2005, and since then, tariffs have dropped in real terms. Second, the current market structure does not provide commercial incentives, particularly for the distribution companies to reduce their losses. Furthermore, there is no merit order for economic dispatch of power from the generators. Third, at the company level, the lack of a commercial focus and reduced funds for proper maintenance result in unacceptably... 

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2 RAO-UES 2005.
high technical and commercial losses in the T&D system, amounting to about 25 percent of energy distributed in 35 KV and lower voltages, in addition to high, own-consumption levels at the generation end (about 20 percent).

The government has proposed the Mongolia Integrated Power System (MIPS), a 40-year power and heat development program, as a way to address looming shortfalls in capacity, which could occur as early as 2009-11 (see Figure 5). The cost of this program is currently well beyond the system’s financial resources, and will amount to about US$1.7-2.0 billion over the period through 2020, or an average of US$120 million annually. This annual amount is far in excess of the average yearly revenue that the CES takes in, which amounts to about US$100 million.

If concessionary debt were available to the CES to finance the program, the related annual debt service would approach US$50 million by 2020, and rise thereafter as grace periods expired. Reliance on commercial debt alone would cause the annual debt service to increase to about US$400 million equivalent—a level that is unsustainable. Further, under current tariff, revenue, and efficiency conditions, the power sector on the aggregate does not have the capacity to meet debt service obligations under the terms on which existing loans are currently on lent from the government to energy sector enterprises.

A program of sector reforms—including the establishment of a more efficient market structure, the introduction of multiyear tariffs, bringing private sector investors to provide growing demand from the mining sector, and more efficient subsidy mechanism for poor households—would allow the system to make significant contributions to future investments, service debt on concessional terms without a substantial increase in the expenditure burden on households, and increase security of supply. Under the needed new business model, future financing of capital expenditures will need to rely more evenly on tariff income, government contribution, concessional lending, and private financing.

Potential Regulatory Constraints to Private Sector Participation in the Energy Sector

The government has expressed its commitment to expand private sector participation in the energy sector. Effective participation of the private sector in the future will depend, to a considerable extent, on the condition of Mongolia’s regulatory framework, which has several impediments to successful regulation. If regulatory reforms are not consolidated, the result will be to greatly increase the financing gap between available funds and capital expenditures needs, while also, given the worsened financial situation of the CES, making it harder to fill the gap from private investment.

Some of the principal elements this strategy should cover are providing the Energy Regulatory Authority (ERA) with the authority to issue and revoke licensees, and removing possible impediments to establishing multiyear tariff increases, as well as increasing the ERA’s independence in funding, and establishing an appropriate salary structure for its staff. Additionally clarification of the qualifications for the selection of the regulators and the conditions for their dismissal are not sufficiently clear.
Distributional Inequities in the Availability and Quality of Electricity and Heat

Outside of the large cities, electricity access, power availability, and subsidies vary substantially—and most subsidies do not effectively target the most needy population groups. The analysis of billing data in one of the branches of the electricity distribution company in Ulaanbaatar shows that periurban customers at the top end of the consumption distribution are the main beneficiaries of the de facto nondisconnection policy, since they are liable for the bulk of arrears payables to the electricity distribution company. Further, as Figure 6 shows, ger households in the lowest quintile of income had the greatest share of fuel expenditures (coal and fuel wood for heating stoves) in their total household expenditures. These households, mostly living in gers, typically must rely on heating stoves usually paying the full retail price for wood and coal. As Figure 6 shows, this income group spends about 37 percent of their income in the winter months. In the aimag (province) centers, the empirical evidence clearly indicates that the current “across-the-board” subsidy scheme does not reach the part of the customer base in hardship.

Although the introduction of a lifeline tariff may succeed in bringing electricity spending in line with acceptable standards, the ability to pay for electricity is contingent upon the share of income spent on essential goods, which during the winter months is inflated by fuel expenditure. It is therefore critical that the government evaluate the linkages among the different utility sectors (such as heating, hot water, and energy) and ensure that the overall economic burden associated with multiple utility expenditures is affordable for the poorest households.

For the electricity sector, the strategy should include the evaluation of two possible mechanisms for making power more affordable to poor households. The first is the continuation of the existing means-tested subsidy. This subsidy offers a 20 percent discount for poorer households, but with the provision of a government subsidy to the electricity distribution companies, compensating them for the cost of the subsidy. The second possible mechanism is the conversion of the existing 20 percent subsidy into a rising block tariff, which would consist of charging a reduced rate for consumption of electricity by lower-income customers and recovering costs by charging a higher rate for customers with consumption exceeding this level. The advantage of this option over the
mean-tested subsidy would be a reduction in administrative costs. It also would ensure
the full funding of subsidies.

Concerning the sizeable nomadic population, the government has addressed their need
for a decentralized source of energy through a program to facilitate distribution of
portable renewable sources, such as solar home systems (SHSs). In the heating sector,
the government needs to find a way to target subsidies to reach the poorest households.
Based on international experience, subsidizing the capital cost of more efficient heating
stoves (that is, equivalent to the capital cost of service provision) rather than fuel
expenditure is likely to be the most effective way of addressing the affordability issue.
The Ministry of Nature and Environment is piloting a program along these lines,
whereby local manufacturers bid—under Output-Based Aid procedures—for the lowest
subsidy needed to produce and sell efficient stoves.

Environmental Solution for a Coal-Based Sector

Coal will most likely remain the main fuel source in the foreseeable future. Currently,
Mongolia’s coal-based power plants, HOBs, and stoves operate on low-quality, highly
polluting domestic lignite. According to environmental studies of indoor air pollution,
pollution concentrations are four times the safe limit for particulates. There is, therefore,
a need to address in a comprehensive manner the associated economic costs of pollution
and options for reducing the adverse environmental impact of coal use.

To avoid further deterioration of air quality and adverse health consequences, the
government should conduct a comprehensive evaluation of continued dependence on
domestic coal as the country’s main energy source. This evaluation would consist ideally
of three elements. The first should be a study of the economic cost of damage by coal to
Mongolia’s environment, focusing on the impact and associated cost of air pollution on
human health and improved monitoring systems. Second, the identification of the major
energy sources of air pollution, particularly large point sources, such as power plants
and HOBs, where changes could have major impacts. The third part should consist of
developing long-term energy scenarios to determine the least-cost solution to power
generation and cooking fuels, taking account of the environmental cost of coal and clean
c coal options. These studies should take place with coordination among the Ministry of
Energy, the Ministry of Nature and Environment, and the Municipality of Ulaanbaatar.

Regional Perspective and Institutional Capacity in Energy Planning

Mongolia’s energy planning in the past has been inward-looking, with considerable
concern about increasing reliance on energy resources outside the country. Maintaining
this perspective would not necessarily prevent Mongolia from obtaining lower-cost
energy supplies in the future. However, it could cause the country to miss an important
opportunity to play a role as a transit country, situated between two countries with large
power markets and potential future interconnection.

The government should assess the planned long-term developments in the energy
sectors of China and Russia to determine their potential impact on the choice of energy
source and technology for the future expansion of Mongolia’s energy system. Such an
assessment should cover oil production levels and exports, the potential for Chinese
manufacturers to reduce the cost of clean-coal technology for power generation by
Chinese manufacturers, and regional advances in technologies for the development of wind power and other renewable energy sources.

**CREATING AN INTEGRATED BUSINESS MODEL FOR EFFECTIVELY IMPLEMENTING THE STRATEGY**

The above building blocks that this report recommends reflect the five basic principles the government set out in its 2002 Energy Sector Strategy:

- Ensuring financial sustainability and independence of the energy sector, including a program for financial recovery.
- Completing the process of restructuring the energy sector, making it more reflective of a market-based economy, especially the participation of the private sector in the ownership and operation of the energy companies.
- Creating the necessary legal, regulatory, and institutional framework to promote energy conservation and efficiency.
- Building the institutional capacity for formulating policy and regulations in a market-oriented energy sector.
- Improving access to energy supplies by the rural population, especially by making greater use of renewable energy resources and introducing lifeline tariffs for low-income groups.

The government’s principles are sound, but have fallen short from translating them into clear strategies and establishing a framework for implementing them. In the past, a key problem in achieving the objective of the reform program has been the lack of a business model that links together the strategies required at various levels of the energy sector along with a timeline for implementing them. For example, Mongolia has an Energy Law that allows for energy companies to operate in a market environment and provides for private sector participation in service delivery. It also has an independent regulatory authority that incorporates some elements of best practice in the industry. However, although these legal and regulatory conditions are necessary, they are not sufficient for meeting the reform objective. Other conditions must be in place as well, such as a market structure that encourages efficiency and actions at the company level to reduce technical and commercial losses.
Figure 7 provides a conceptual framework that the government could use as a starting point for designing an integrated business model that links related actions on various levels—government policy and planning, market structure, and operations of the energy companies—represented by interlocking circles. Actions in each of these interlocking circles are necessary conditions for moving forward toward the reform program’s objective, but none alone is sufficient. This framework, in addition to being helpful to implementing the development strategy to meet the urgent, short-term needs of the CES, also could be useful in implementing longer-term strategies as well. For example, it could help address market failures in accounting for the environmental damage costs of fossil fuels and concerns about the affordability of energy among the various categories of consumers.

**Figure 7: Conceptual Framework for the Development of a New Business Model**

- **Government Policy and Planning**
  - Move toward best regulatory practice.
  - Allow adequate tariff levels for profitability.
  - Rationalize subsidies for affordability.
  - Take measures to reduce the large existing debt of operating companies.
  - Coordinate cross-sector planning.

- **Market Structure**
  - Restructure to for least-cost operation.
  - Make energy distribution companies accountable for power purchased.
  - Reduce the number of distribution companies.

- **Operation of Energy Companies**
  - Introduce efficient firm-level models based on best-practice examples adaptable to conditions in Mongolia to reduce technical and commercial losses.
POLICY AND INSTITUTIONAL FRAMEWORK

INSTITUTIONAL TRANSFORMATION

The institutional evolution of Mongolia’s energy sector over the period 1994–2006 has been remarkable. In 1994, all functions were concentrated at the Ministry of Geology, Energy and Mining (MEGM). The CES and mining companies operated as extensions of the MEGM, mingling policy and management roles. Petroleum imports and distribution were the sole responsibility of the state-owned petroleum company (NIC). Government ownership and control of all aspects of supply, distribution and pricing of energy sources was the rule.

During the past five years, there has been a gradual decentralization and separation of policy, operational and regulatory functions among different agencies (see Table 1).

THE ENERGY LAW OF 2001

The law established the foundation for the current structure and operations of the energy sector. Its main objective was to improve the efficiency of energy sector services. The law limited the central government’s role to policy making, allowed the operation and ownership of energy services by public or private companies, or both, and provided for a regulatory agency. In the power sector, the Energy Law stipulates the separation of generation, transmission, and distribution operations. There are multiple generation and distribution companies, and only a single transmission company. The law specifies that the ownership of power generation facilities must be separate from that of the

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3 There were a total of 31 enterprises under the MEGM’s Energy Board.
transmission company in order to avoid potential discrimination against third parties. However, the law does allow for the licensing of power distributors as power generators.

OTHER LAWS AND POLICY GUIDELINES

In addition to the Energy Law, there are other laws and guidelines governing energy policy making and the operation of the energy services. The Minerals Law governs the granting of exploration and exploitation rights for coal, Mongolia’s main primary energy source. The Renewable Energy Law, recently approved, establishes an energy fund to provide incentives to encourage energy producers to develop renewable energy sources, including large-scale hydropower resources and wind farms. In 2002, the government approved guidelines for the petroleum sector’s development through 2010. These guidelines emphasize the importance to Mongolia’s economic security of developing and increasing strategic oil exploration, production, and exports, including the construction of refinery capacity.

There are also laws not specifically related to the energy sector that govern the operations of all companies in Mongolia. For example, the Unfair Competition Law of Mongolia addresses issues of fair competition in the marketplace. The Unfair Competition Supervisory and Regulating Authority supervises the application of the law. The Unfair Competition Law has an impact on energy-related activities, since it adds another layer of price regulation for energy services—and the ERA is responsible for regulating these prices. Furthermore, currently there is nothing in this law that specifies deferring decisions on pricing matters to the sector regulators.

INSTITUTIONAL RESPONSIBILITIES

The Ministry of Fuel and Energy is in charge of formulating overall energy policy in line with the legal framework. Both public and private companies are involved in energy production and distribution, although the majority is government-owned. Eighteen joint-stock energy companies are operating in the country’s three main regions (Central, Eastern, and Western), offering services that include electricity and steam for space heating and hot water. The CES, which includes the capital city of Ulaanbaatar, dominates production by far, accounting for about 96 percent of the country’s electricity supply for the three main cities. In the coal sector, there are five large mining companies (government- and private sector-owned) and 25 small private mining companies. Mongolia imports virtually all of its petroleum supply through five private companies, which handle downstream distribution of petroleum products.

The responsibility for the regulation of the energy sector is divided among several institutions. The ERA issues licenses and sets tariffs in power sector. In line with its mandate, the ERA applied a cost-based rate of return regulation of tariffs for energy companies, setting such charges annually, under the last tariff adjustment in February 2005. The Ministry of Trade and Industry issues licenses for coal development—

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4 The law defines dominance as being the supplier of more than one third of the market (Article 5.1). Under it, dominant firms—such as Power Plant 4—are subject to a range of prohibitions beyond those normally found in competition law. Further, it defines natural monopoly (Article 5.3), and it requires approval from the authority for changes in prices and outputs.
sometimes without proper coordination with the Ministry of Fuel and Energy—and the Ministry of Fuel and Energy determines coal price methodology. The retail price of petroleum products is market-based and based on import parity, which the Ministry of Trade and Industry monitors. The State Inspectorate Department is the only authority with the power to suspend or revoke licenses of companies in the energy sector for noncompliance with laws and guidelines.

SECTOR STRUCTURE AND OWNERSHIP

The core of the energy market in Mongolia is an integrated system of coal production for the generation, T&D of heat and power. This section focuses on the market structure and ownership of both the electricity sector and its largest customer—the heating sector. However, for the sake of completeness, the chapter includes a brief discussion of the market structure and ownership in the coal and petroleum sectors.

Map 1: Mongolian Power Systems

There are three main regional energy systems in Mongolia (see Map 1):

- The Central Energy System (CES) is the largest one, accounting for 96 percent of electricity production.
- The Eastern Energy System (EES).
- The Western Energy System (WES) merely account for two percent of production and isolated power systems using diesel oil make up the remaining 2 percent.
Outside the combined heat and electricity system, approximately 2,500 HOBs produce hot water and steam fueled by coal to meet the space heating and tap hot water needs.

In the CES there are operating five electricity generation companies (gencos), one transmission company, and four distribution companies (discos). The gencos have 782 MW of installed capacity. Power Plant 4, located in Ulaanbaatar, is the dominant plant with 69 percent of the installed capacity. The others, Power Plant 3, Darkhan, Erdenet, and Power Plant 2, have 17, 6, 5, and 3 percent of the installed capacity, respectively. Four distribution companies (discos) operate in the CES. They bought about 2,967 GWh in 2005. The biggest is Ulaanbaatar with 43 percent of the market. The others are Erdenet (37 percent), Darkhan (13 percent), and Baganur (7 percent). The transmission company, Central Region Electricity Transmission Grid (CRETG), has 1,703 km in 220 kV, 2,653 km of 110 kV lines, and 4,298 km in 35 kV. The Darkhan electricity distribution company is owned by the local private sector, and the government is the owner of the remaining companies in the heating and electricity sector.

Each of the combined heat and power plants (CHPs) has two supply outlets: (a) an electricity transmission system that buys the electricity and sells it to multiple distribution companies; and (b) a district heating company that buys the heat and transmits it to substations and the municipal housing service company, which in turn is responsible for delivering both heat and tap hot water to buildings.

**ELECTRICITY SECTOR: STRUCTURE AND OPERATION**

The electricity market operates theoretically under a “single buyer” scheme. According to usual utility practice, the transmission would buy competitively from generation companies and sell to distribution companies based on contractual arrangements. However, currently in Mongolia the structure is really a “cash settlement system,” in which electricity distribution companies deposit payments for electricity purchases into a zero-balance account that the transmission company (CRETG) administers. When the distribution company collects less than 100 percent of revenues for the power that it sends out, the company reduces the amount it deposits into the account accordingly. In turn, CRETG and the various generation companies, which receive payment from the account, receive less than the total amount due. The differences accrue as intercompany receivables to the account from the distributors and payables to the generators. CRETG’s payables have been climbing from zero at the start of this system in 2003 to about US$10 million in 2005.

**POTENTIAL BENEFITS OF MOVING TOWARD A WHOLESALE MARKET**

The ERA has recognized the need to move away from the existing cash settlement system to a more commercially based system and has proposed establishing the foundation for a new wholesale electricity market (Box 1), based on direct bilateral contracts between generators and distributors or large users. The introduction of direct contracting between generators and distributors of heat and electricity would provide incentives for distribution companies to improve their operational efficiency and reduce the high level of receivables. The distribution companies unable to pay for all electricity purchased would find it more difficult to procure low-cost, reliable supplies from the generation companies. Together with multiyear distribution pricing, the new market
structure would create incentives for investments to reduce distribution losses to economic levels.

The proposed structure also should help promote new investments in power generation (competition for the market), because the generators will have greater assurance of income from long-term contracts for power sales.

**ESTABLISHMENT OF BILATERAL CONTRACTING AS AN INITIAL STEP**

Currently, the number of generating companies (five) is small and dominated by Power Plant 4, the reserve margin is limited, and the nature of heating demand, which drives electricity demand, is inflexible. Therefore, in the short term, the ERA is proposing to move to bilateral contracts, but with continued regulation of generation prices, initially through vesting contracts and subsequently through the ERA’s ability to approve variable costs for generators and to set the system capacity price. This seems to be a prudent action to follow as the market grows and gains experience. As the system evolves and new players come into place, it can then eventually evolve into a more competitive market.

**Box 1: Elements of the Proposed Medium-Term Wholesale Market for Electricity**

**Bilateral Sales Contracts.** As the number of participants and fuel-generation choices grow over time, the proposed wholesale market for electricity and heat would have generators signing power sales contracts directly with distributors and large users. These contracts would be financial in nature, stating a volume of energy to be supplied at agreed prices (expressed as an energy price per kWh and capacity price per kW).

**Merit-Order Dispatch System.** In daily operation of the system, generators would be centrally dispatched to meet demand. Dispatch would be based on the declared variable costs of each generator, as reviewed and approved by the ERA. The order also would be subject to any constraints required to meet heat supply commitments. The variable cost of the most expensive generator dispatched would set the “spot market” price in each hour. If the dispatch of a generator takes place at a level below the volume of the supply contract, it will be deemed to have purchased the difference from the spot market at the price prevailing in that hour (or the average over a period of hours). Where it is dispatched at a level exceeding its contracted volumes, it is deemed to be selling the difference to the spot market and hence receives the hourly price. A generator will only be dispatched if its variable cost is at or below the spot market price (the variable cost of the most expensive generator), thus ensuring that the costs of meeting demand are minimized and that all generators can maximize their profits by trading shortfalls and surpluses between actual and contracted output through the spot market.

**Pricing.** Since the spot market price is determined by variable costs, there is a need for a separate mechanism to compensate generators for the fixed operating and capital costs of making capacity available. This is achieved through a capacity settlement system. Generators are required to show that they have sufficient firm capacity to meet contracted demand. Where they have a shortfall, they are required to "purchase" the difference at a capacity market price (expressed per kW) set by the ERA. Generators with a surplus of firm capacity over contracted demand are required to “sell” this at the capacity market price. The capacity market price is based on the fixed operating and annualized capital costs of the least-cost potential new entrant.

**Advantages.** The market thereby benchmarks generators while still retaining extensive regulatory control over prices. The ERA’s power to approve variable costs, which in turn determine the costs of energy purchases from the spot market, effectively caps the energy price contained in contracts (a distributor will not be willing to pay more than the spot market price). Similarly, the capacity market price set by the ERA effectively caps the capacity price that can be included in contracts.
HEATING SERVICES: A MIXTURE OF PUBLIC AND PRIVATE OPERATION

HEATING SERVICES

There are three main sources of space heating in Mongolia: (a) CHPs provide electricity heat and hot water (district heating) to the urban centers in Ulaanbaatar and a few other cities; (b) HOBs meet heating and hot water needs, usually serving either a single building or a small central network of several buildings; and (c) in periurban areas, individual heat stoves—burning coal and/or wood—meet residential heating needs.

CHPs dominate central heating capacity, accounting for 88 percent of the total. The combined total capacity of the central heating systems is about 2011 MW$_{th}$, of which Ulaanbaatar, with 1,523 MW$_{th}$, has by far the largest share (67 percent). The next largest systems, in Darkhan and Erdenet, are much smaller, with capacities of 210 MW$_{th}$ and 140 MW$_{th}$, respectively. Taken together, the systems in these two cities make up 17 percent of total capacity. The other 11 cities have capacities averaging 33 MW$_{th}$ and ranging from 13 MW$_{th}$ to 86 MW$_{th}$, and combined account for about 16 percent of the total.

There is a marked difference in heating sources between urban and rural areas and in Ulaanbaatar, between the city center and the periurban gers. Gers, which account for 52 percent of the capital area’s population, use mainly coal-fired heating stoves; the balance is connected to the district heating system. The aimag centers have much smaller district heating networks than the urban centers and depend primarily on HOBs. In addition, 65 percent of households living in aimag centers and nearly all rural households rely on traditional stoves for heating. Only 20 percent of soums (administrative subdivisions of an aimag, or province) have functioning centralized heating networks and the other 80 percent depends on a variety of individual systems using mostly dung, wood, coal, diesel oil, and, in very few cases, electrical boilers.

Coverage

In Ulaanbaatar, three CHP companies supply district heating to a single buyer, the Ulaanbaatar District Heating Company (UBDHC). This company sells heat and hot water to about 2,400 direct consumers directly, covering a population of 237,000 together with numerous commercial and public consumers. The company also sells heat to 19 city housing services companies that provide space heating and tap hot water to about 216,000 residents. The central government owns the CHP companies and UBDHC, the municipal government of Ulaanbaatar owns the city housing services companies.

The second largest central heating system outside Ulaanbaatar is that of Darkhan. The CHP system in that city serves about 45,900 people or about 63 percent of the city’s population. The remaining 37 percent live in the gers outside the system. Two HOBs, outside the urban area, serve nonresidential customers. No data are available on the heating sources for households in the ger area of Darkhan. The city’s district heating system has two operating companies—a CHP company, which generates the heat in the production of electricity, and a single buyer of this heat, the Darkhan District Heating Company (DDHC). The DDHC supplies hot water from the CHP plant in a two-pipe system to 583 customer connections for space heating, of which 454 also receive hot
water. The DDHC also maintains the secondary networks located inside the buildings, even though they are owned by the customer.

**Limitations of the Unbundled Utility Model**

The heating market has a similar configuration as the electricity market—unbundled generation, transmission, and distribution operations. This structure, which may be conducive to promoting efficiency in Mongolia’s electricity market, may not be advantageous for the heating market. In contrast to the electricity sector, where various generators interconnected by the transmission network have to compete, such opportunities do not exist in the limited local heat markets. Furthermore, the unbundling process in Mongolia is not complete. The CHP companies and the transmission company have permission to retain their larger industrial, commercial, public, and even residential customers; direct sales to these customers amount to two-thirds of the sales of the heat transmission company. These customers are subject to the same tariffs as the customers of the distribution companies. As a result, this incomplete process has left the distribution companies with the bulk of the smaller, less profitable customers.

**Weakest Link in the Supply Chain**

The heat distribution companies are the weakest link of the supply chain because they have to take the full collection risk. They also do not have access to financing for investments in system improvements and expansion because the companies do not own the assets they use and thus cannot provide collateral. Furthermore, under the current system, the heat distribution companies do not benefit from any measures to improve efficiency. Finally, they are also the most vulnerable to a systemic technical collapse from poor infrastructure.

**Suboptimal Market Size**

The industry structure of the Ulaanbaatar’s district heating sector could benefit from a program to optimize its earnings through measures to lower costs and maximize cash flows. Revenues of the heating companies amounted to about US$1.6 million total, after heat purchases from the UBDHC. The division of the market among 19 heating companies increases administrative structures and costs, reducing available revenue for system maintenance and investment in new capacity. In particular, the separation of T&D operations appears to be a suboptimal structure for the size of the market and the number of skilled personnel.

**Defined Management Contracts and Low Productivity**

The heating companies operate under management contracts between what appear to be private firms and the municipality. However, the terms and conditions of these contracts are often vague and the contractors receive no clearly defined compensation for any investments in the space heating and hot water systems. A proxy for staff productivity is the ratio of heat purchased by the district heating system from the CHPs and the staff involved with heat T&D. The staff productivity ratio is about 8-9 Tcal/person in Ulaanbaatar and 4 Tcal/person in Darkhan. By comparison, in efficient systems the ratio
generally is above 10 Tcal/person. In Darkhan, the lower productivity figure is likely an indicator of the system’s increasing maintenance needs. However, it is difficult to analyze the underlying costs of distribution because there are no identified cost centers between heating services and other municipal services provided by heating companies.

**COAL INDUSTRY**

The viable performance of the coal industry is critical for the operation of Mongolia’s energy system, as well as its role in the Northeast Regional Energy Market. Estimated potential coal reserves are 150 billion tons, with annual production of about 6 million tons, and growing demand in China, Russia, and Asia in general.

The quality of Mongolia’s reserves covers the full range, from lignite (low-grade coal) through bituminous and coking coals, but most of the current production is low-grade coal. Three large mines (Baganuur, Shivee Ovoo, and Sharyn Gol) produce most of the lignite that supports current core energy services in Mongolia. Their production is mainly lignite with heating values ranging from 2,700 to 4,000 kcal/kg, 18–35 percent moisture, and 12–21 percent ash. In addition, small and medium-size mines produce coal of similar quality with a heating value of 5000 kcal/kg and low moisture. All coals in Mongolia are low in sulfur (less than 1 percent).

In contrast to the main coal deposits currently producing, the coal at the Tavan Tolgoi deposit is very high-quality bituminous coal by international standards—a heating value of 5,000–8,000 kcal/kg, 8.5 percent moisture and 20 percent ash. About 27 percent of the reserves in this deposit are classified as coking coals. The deposit’s location, close to the border with China and near the Oyu Tolgoi mine, places it in a unique position for its development by the private sector.

Five large joint-stock companies are operating in the coal sector with a combination of state, local government, and private ownership. Also there are 25 small, privately owned companies and business entities producing coal in about 30 coal mines under special licenses. Most of the producing mines are open cast operations. The coal market is still mainly under government control. However, the government plans to privatize the large state-owned mines, such as Baganuur and Shivee Ovoo.

**PETROLEUM INDUSTRY**

Mongolia depends on petroleum imports from Russia for about 90 percent of its supplies, the balance coming from China. There are nine main privately owned petroleum distribution companies, which account for about 90 percent of the market. Petroleum imports amounted to about 574,000 tons in 2005. As a sign of a gradual fuel shift, one of the main distribution companies, Petrovis, has concluded an agreement with Japanese and Russian companies to establish a liquefied petroleum gas (LPG) network.

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6. Copper mine with a development investment over US$1 billion.
FORMAL AND INFORMAL FUEL TRADERS IN COAL AND TRADITIONAL FUELS

In Mongolia, formal and informal fuel traders sell coal and traditional fuels, such as firewood and charcoal, to households, mainly for heating and cooking. Animal dung is also a significant traditional fuel, but is mainly used by herding communities. There is a substantial seasonable variation in the cost of coal, which amounts to about US$12/ton in the winter months and US$9/ton in the summer months. Therefore, households with means often buy coal in large amounts during the summer, transporting it with trucks that hold up to 5 tons at a time. Poor households that cannot afford to do so buy coal in small amounts—in sacks of 20–25 kilograms. They pay much higher prices, about US$25–30/ton.

INVESTMENT NEEDS AND FINANCING

This section first outlines, as background, the present energy demand and supply situation in Mongolia with particular emphasis on the coal-electricity-heat supply chain and respective demand projections over the 2006–20 period. It then moves to a discussion of alternative scenarios—and implications—of projected capacity demand and an indicative investment program to meet demand during the period, including potential demand from mining developments in the South Gobi region. The section concludes with a discussion of the financing requirements of the indicative development program and alternative ways of meeting energy needs.

OVERALL ENERGY DEMAND AND SUPPLY

The overall energy balance available for Mongolia shows that the country depends on coal as a primary energy source, accounting for 81 percent of the total. This will remain the case in the medium term. The second most important source of primary energy is petroleum, which accounted for most of the remaining 19 percent of the total.

About 96 percent of gross energy supply goes into the production of heat and electricity, the core of Mongolia’s energy supply system. Of this amount, the conversion process consumes about 49 percent. The need for improvements in production, distribution, and use of energy is a recurrent topic and a cause of concern, particularly at a time of growing demand and limited funds for investing in new capacity.

As shown in Table 2, commerce and industry accounted for the largest share of final energy consumption by (31 percent) followed closely by the residential and transport sectors, at 28 percent and 26 percent, respectively. In final energy consumption, heating

<table>
<thead>
<tr>
<th>Sector</th>
<th>Share (percent)</th>
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<tbody>
<tr>
<td>Residential</td>
<td>28</td>
</tr>
<tr>
<td>Commercial and industrial</td>
<td>31</td>
</tr>
<tr>
<td>Transport</td>
<td>26</td>
</tr>
<tr>
<td>Agriculture</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
</tr>
<tr>
<td>Stock</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

7 The source of the demand projections, least-cost investment program, and analysis of the financing capacity of the CES is ECA (2006).
8 Total primary energy supply amounting to the equivalent of 20,517 GWh, converted to GWh using 1 ton of oil equivalent = 10,000 kCal = 41.871 gigajoules = 11.631 MWh.
9 There is some hydroelectricity, but it accounts for less than 1 percent of the total.
accounts for about 35 percent of the total, nearly three times the amount of electricity used.

DEMAND FORECASTS

The electricity and heating sectors consume about 5 million tons of coal or 64 percent of total domestic coal production used domestically (7.8 million tons). In addition to the regional coal-based energy systems, isolated diesel-power generators make up the remaining 2 percent of electricity production (Figure 8).

Electricity Demand

In preparation of this background note, electricity demand forecasts have been prepared using an assumed income elasticity of 0.8, and gross domestic product (GDP) growth forecasts prepared by the IMF and World Bank. Combined, these forecasts give an annual demand growth of about 4 percent on the CES. To this is added the significant demand from new mining developments in the South Gobi region. This is expected to reach a peak demand of 193 MW in 2008, compared with 622 MW for the remainder of the CES in that year, and to exceed 300 MW by 2014.

Applying these assumptions yields peak demand going from 570 MW in 2005 to 1,099 MW in 2014, and energy supply from 2,849 GWh to 6,288 GWh. Demand from South Gobi is only included from 2008 onwards, following the planned completion of a transmission link from the CES and when Oyu Tolgoi commences operations. Prior to this, South Gobi demand is assumed to be met from local sources.

Such levels of rapid growth in such a short period are unprecedented in Mongolia's electricity sector and bring with it new opportunities and challenges. As highlighted later in this section, it will require a fundamental different way to finance the sector, interconnect it, and manage it.

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10 The quality of domestic coal varies, including lignite, bituminous coal and coking coals. Coal companies supply about 4 million tons of coal to the power system. The average calorific value of the coal ranges from 2,700 kcal/kg, with an incremental production cost of between US$6 and US$15 per ton.
**Heating Demand**

Heat demand forecasts are based on projections from the Ulaanbaatar District Heating Network (UBHDN) and other sources. These include the impacts of the ongoing heat efficiency program for UBHDN and Darkhan, which are expected to improve load factor and consequently reduce heat demand by about 20 percent in the 2008-2012 period. For purposes of this background note, the UBHDN forecasts have been adopted, that is, 2.9 percent and 1.8 percent in the 2006-2010 and 2011-2020 periods, respectively.

**PROJECTED CAPACITY DEFICITS IN ELECTRICITY AND HEAT**

**Figure 9: Electricity Demand Forecast Used for System Expansion Scenarios**

In Figure 9, a comparison of the demand projections with projected electricity capacity, taking into account planned investments and the retirement of existing capacity between 2006 and 2020, shows a capacity deficit in electricity from 2009 onward with or without the additional power demand from the South Gobi Region. With the South Gobi demand, the gap occurs one year earlier. The projections of electricity capacity take account of the only additional capacity currently in Mongolia’s power system investment program. They also assume that the only new capacity available in the power system will be the 220 MW Egiin hydropower plant for which the commissioning of the first stage will take place in 2012, and the second stage will take place in 2018.

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11 An analysis of investment options through 2020 show that given fuel choices the 220 MW Egiin hydropower plant is the least cost solution for (a) meeting the power system’s need for additional peaking capacity, and (b) providing the load-following capability necessary to improve both system reliability and stability.
Commissioning both stages in 2012 would lead to an increase in upfront investment requirements with no corresponding increase in available cash flows.

On the heating side, a capacity gap will develop with planned retirements of CHP capacity in the electricity and heat networks of Ulaanbaatar—Power Plant 3. The capacity deficit begins in 2016 amounting to 374 MW\textsubscript{th}, rising to 489 MW\textsubscript{th} by 2020. The Darkhan CHP was also identified in the 2002 Master Plan for retirement in 2013. If that were the case, a gap would develop—163 MW\textsubscript{th} and rising to 174 MW\textsubscript{th} by 2020. It is not realistic to expect the existing plants to continue to operate indefinitely without substantial rehabilitation.

One needs to qualify the apparent urgency of new heating capacity. A business-as-usual scenario shows the urgent need for CHP5 in year 2010 at the latest. However, focusing near-term investments as shown in Figure 10 will drastically reduce new expansion capacity through the following changes:

- Automation of substations and installation of thermostatic valves, which will improve (reduce) the coincidence factor.
- Reducing losses particularly in the secondary system, which has a significant impact on peak load.
- Converting the current temperature differential from 135/66 Celsius to 130/50 Celsius, which will increase available capacities; and introducing consumption based billing to promote both energy and load savings.

As shown in Figure 10, adoption of these measures will change the heating energy balance in Ulaanbaatar.

**Figure 10: Efficiency-Focused Investments and Consumption-Based Billing in Ulaanbaatar’s Heating System**

![Figure 10](image)

*Source: Kalkum 2006.*
INVESTMENT PROGRAM

The proposed investment program laid out in by the government assumes that investment in the Egiin hydropower plant alone will not be able to avert expected deficits in electricity and that it will not be possible to commission any new capacity before 2012 because of the lead time required for planning, financing and construction. This program would consist of the following:

- Commissioning of the Egiin I and II HPP in 2012.
- Construction of new CHPs in Ulaanbaatar to meet the respective heat demand in these cities. The addition of these units would take place in increments, matching a generic unit size of 80MWe / 160 MWth.
- Increased imports of power from Russia, as required, up to 255 MW, the maximum capacity of the existing transmission.
- Construction—by the private sector—of a new mine-mouth TPP at Tavan Tolgoi, with units in increments of 100 MW, in the South Gobi region, to meet any electricity demand in that region or the CES that the other two sources of power do not meet.
- A reserve margin of 20 percent throughout the period (compared to only 10 percent at present).

The investment requirements—covering generation, transmission, and distribution—are large, about US$1.7 billion over the period 2006-20, or about US$120 million annually. Nearly 90 percent of the total investment will be in generating facilities. If concessionary debt is available to finance these requirements, annual debt service would be about US$39 million by 2020, rising thereafter as grace periods expire.\textsuperscript{12} If debt is available in accordance with standard bilateral agreements,\textsuperscript{13} annual debt services by 2020 would be US$115 million. If Mongolia relies on commercial sources, annual debt service by 2020 would be about US$343 million\textsuperscript{14}—a level that is clearly unsustainable under current conditions.

Both electricity and heating investments needs could be postponed for a few years through efficiency-type investments, particularly in the heating sector in two areas: (a) introduction of heat and hot water consumption-based billing together with hot water system rehabilitation in Ulaanbaatar; and (b) optimizing use of steam production at CHPs, moving away from industrial steam supply to the use of steam for electricity production. This shift alone will increase electricity availability by about 100 MW with marginal investments.

\textsuperscript{12} Assumes concessionary debt is available at a 1 percent interest rate, 40 year term, and 10-year grace period.
\textsuperscript{13} At a 2 percent interest rate, 20-year term, and 3-year grace period.
\textsuperscript{14} Assumes commercial debt is available at a 10 percent interest rate, 10-year term, and 3-year grace period.
HISTORICAL AND PROJECTED FINANCIAL PERFORMANCE OF THE CES


It is important to understand the genesis of the current financial problems facing the energy sector so that proper solutions can be designed. Before the energy sector’s reforms in 2001 and the subsequent restructuring of the CES, the system operated as a state-owned, vertically integrated company. Tariff levels were below the cost of supply, and financial management was weaker. As a result, for the period 1994–2000, the CES incurred net financial losses for each year, except for 1997, during which the company reported a net profit of US$11.1 million equivalent. The improved performance in 1997 coincided with a major increase in tariffs, by 78 percent for electricity \(^{15}\) and 47 percent for heat.\(^{16}\)

After 1997, however, customer receivables of the CES grew substantially and financial losses amounted to the equivalent to US$4.1 million in 1998 and US$17.1 million in 2000.\(^{17}\) The declining commercial performance of the CES eroded the system’s asset base and financial solvency. As a result, the CES was unable to raise sufficient financing for the proper maintenance of existing capacity. The poor financial performance diminished the capability of the CES to finance the maintenance of existing system, new capacity requirements and debt service commitments to the government.

Sector Restructuring (2001–Present)

The establishment of a new Energy Law in 2001 introduced reforms to improve the commercial performance of the energy sector. The intention of these reforms and a variety of donor-financed projects was to arrest and reverse the deterioration in the system, improve the investment climate, and encourage private investment in new capacity. A principal element in the reform package was the unbundling of the CES along functional lines and locations of population centers, resulting in the establishment of 18 joint-stock companies. One could make the case that it was too diluted for such a small and concentrated sector.

The allocation of assets and the assignment liabilities to energy companies did not recognize the realizable value of the assets and their income-producing capacity. At the time of restructuring, aggregate intercompany arrears plus the liabilities of these companies to external donors amounted to Tog 74 billion and Tog 134 billion, respectively, with sales debtors amounting to Tog 22 billion. At present, the CES in aggregate is making a small profit,\(^{18}\) of Tog 5 billion in 2005. This is not expected to last, and the sector could rapidly fall back into making substantial losses, as was the case before 2005 while, in parallel, external debt amounting to some US$282 million.

Today, the sector—in an aggregate—does not have the self-financing capacity to service existing debt, let alone any future new investments. To illustrate this point, and as part of the work undertaken in preparation of this background note, consolidated financial

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\(^{15}\) The tariffs increased from 3.1 US cents/ kWh to 4.3 US cents/ kWh).

\(^{16}\) The tariff increased from 2.6 US cents/ Gcal to 3.4 US cents/ Gcal.

\(^{17}\) World Bank 2005.

\(^{18}\) Defined as income before tax.
projections were developed. They are intended to illustrate how the sector’s financial position might be expected to evolve rather than definite estimates of the future financial condition of individual companies and, in particular, its ability to meet debt service and other external commitments and raise finances for vitally needed new investments. We discuss below the consequences of following a business-as-usual strategy and implementing a minimum set of reforms.

FINANCIAL PROJECTIONS

Business as Usual

Under this scenario, minimal reforms are based on (a) steady implementation of loss reduction program in Ulaanbaatar from the current 25 percent to 12 percent by 2012; (b) an adjustment of 5 percent in 2007, after which electricity and heating tariffs from 2008 onward will increase in line with inflation at about 6-8 percent per year; (c) rehabilitation of the heat system with investments of about US$50 million over the next five years to improve heating efficiency and reduce unit operating costs; (d) full implementation of financial restructuring under Government Statute 141 of June 21, 2006, which wrote off a proportion of inter-CES receivables and directed the adjustment of onlending terms for donor loans to conform with those of the original sovereign loans; and (e) incremental demand in excess of existing capacity being met by imports from Russia. Overall, these projections suggest that, over the next 10 years, the following scenarios are likely to occur in the sector:

- A progressive increase will be demonstrated in being able to cover minimum operating costs\(^\text{20}\) with a breakeven position being reached in 2012. Despite this, it is unlikely that free cash flows generated by the sector will be sufficient to fund the required increases in capacity\(^\text{21}\) and will therefore be unable to translate this improved performance into a sustainable and viable industry. Moreover, this situation critically depends on the assumption that no new investments are made, other than to connect additional residential customers, which means that the sector is being systematically decapitalized and its asset base significantly reduced over the forecast period.

- Figure 11 shows that further increases in both intercompany arrears and sales debtors as internal cash flows are constrained and cash collections fall short of billed revenues. By 2014 the total stock of CES receivables is projected to increase to Tog 188 billion (in 2005 prices), some four times the normal level of Tog 45–50 billion.

- Be unable to service onlent debts, or to raise new funds for investments—be they private or public. Not surprisingly, in an environment in which sales receivables and intercompany arrears are growing over time as a result of inadequate cash flows across the sector as a whole, the sector’s capacity to service existing debts and to finance new investments is extremely limited. Further, the inability to

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\(^{19}\) ECA 2005.
\(^{20}\) Defined as income before tax.
\(^{21}\) The projected aggregate projected cash reserves in 2014 would only be sufficient to finance the capital costs of a new 30MW coal fired generator assuming a bench mark capital cost of US$1,315/kW.
service existing debts means that the sector is unlikely to be able to access domestic or international capital markets and private sector investors, other than through further multilateral loans or with sovereign guarantees, to any significant extent.

**Figure 11: CES Debt Services**

![CES Debt Services Chart]

**Source:** Staff estimates.

**Economic Recovery Scenario: Financial Restructuring and Regulatory Reform**

Reviving the sector from its existing malaise will require adjustments, considerable political will, and a well-targeted social net program for low-income consumers. To improve the sector’s financial performance and liquidity, encourage investment, and expand capacity, the impact of a number of regulatory reforms and financial restructuring were investigated. Options open to the government to turn the sector around on a sustainable basis include some or all of the following:

- Increasing retail electricity and heating retail tariffs by 60 percent in real terms between 2008 and 2014, combined with an efficient subsidy mechanism for poor households.
- Introducing a multiyear tariff mechanism for distribution utilities, with the effect of providing management incentives for cost-cutting and loss reduction.
- Moving away from the existing cash settlement system (currently referred to as a single buyer system) to one based on bilateral contracting between generators and distributors.

The introduction of these basic strategies could be considerably reinforced by full implementation of the financial restructuring under Government Statute 141 of June 21,
2006. This will reduce the sector’s aggregate stock of receivables and free up cash flow in the earlier years to finance the proposed work out strategies and, particularly, will reduce the debt service burden in earlier years on the sector without affecting the government’s debt service commitments to the donor community. Last, the sector will benefit from the adoption of International Accounting Standards (IAS) and annual audits and reporting standards under IAS to provide reliable information to shareholders to assess the financial status of the sector, measure progress against monitorable benchmarks, and enhance the sector’s borrowing capacity.

The various regulatory, operational, and restructuring proposals, if implemented, would lead to progressive improvements in the financial performance and position of the energy sector. From 2010, the sector should be able to fully cover operating costs and service debts at their original sovereign terms, receivables will stabilize, and the sector can expect to contribute with tax revenues. Still, the sector would be unable to service standard commercial debt terms so it will be reliant on government support (our estimates show it to be about 1 percent of GDP) to cover shortfalls in debt service and capital expenditures (Capex).

**Strategic Implications—Who Pays and the Importance of Efficiency**

The analyses of alternative restructuring scenarios—carried out in the preparation of this background note—have shed light on two elements that should be part of the new business model to develop the sector:

- **Who pays for investment?** As mentioned before, all energy investments—public or private sector—are ultimately paid by consumers (through tariffs), taxpayers (through budget revenue) or donors (through grants or a grant component of concessional loans). If adopted, the reform scenario will change this composition: about 29 percent of investments requirements would be covered by free cash flow generated by the sector through tariff income or proceeds of privatization. About 12 percent from government in the form of grants, equity contribution, and subsidies to cover operating expenditures (Opex) and Capex. This leaves about 59 percent of investment needs to be raised from other sources, both private sector funding and concessional loans.

- **Efficient procurement leads to lower operating cost.** As a variant on this scenario, we also investigated the impacts of applying the assumption that new CHPs can be constructed with a capital cost of around 55 percent of previously assumed levels. This has the effect of significantly reducing post-2011 investment requirements, which are largely comprised of the costs of the new Darkhan CHP and of Power Plant 5, and consequently a reduction on tariff revenues from 2013 onwards to cover a portion of investment costs.

The effect of an efficient energy sector is discussed in the following section.
SECTOR PERFORMANCE

This section provides an overview of the sector’s performance over the last few years, focusing on energy access, quality of service, structural and economic efficiency, and technical efficiency. Steady improvement in the sector’s performance is crucial to addressing future investment requirements.

Mongolia’s energy sector has steadily been moving in a positive direction, so it is crucial not to lose those gains. As seen in Figure 12, electricity losses on T&D have been dropping at a time of rising demand. During the last five years, there has been on average a 7.6 percent growth in electricity demand, in spite of this growth in consumption and gross generation, the sector has succeeded in reducing losses over this same period at an average of about 11 percent per year.

ENERGY ACCESS

Table 3: Total Households and Percentage Electrified by Dwelling Type

<table>
<thead>
<tr>
<th>Area</th>
<th>Total</th>
<th>Share with Electricity (percent)</th>
<th>No. of Households</th>
<th>Share with Electricity (percent)</th>
<th>No. of Households</th>
<th>Share with Electricity (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulaanbaatar</td>
<td>161,273</td>
<td>98</td>
<td>126,043</td>
<td>99</td>
<td>35,230</td>
<td>92</td>
</tr>
<tr>
<td>Aimag center</td>
<td>118,104</td>
<td>92</td>
<td>73,797</td>
<td>98</td>
<td>44,307</td>
<td>81</td>
</tr>
<tr>
<td>Village</td>
<td>17,021</td>
<td>85</td>
<td>12,586</td>
<td>93</td>
<td>4,435</td>
<td>63</td>
</tr>
<tr>
<td>Soum Center</td>
<td>85,281</td>
<td>80</td>
<td>36,948</td>
<td>86</td>
<td>48,333</td>
<td>77</td>
</tr>
<tr>
<td>Rural</td>
<td>159,470</td>
<td>9</td>
<td>16,171</td>
<td>28</td>
<td>143,299</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>541,149</td>
<td>67</td>
<td>265,545</td>
<td>92</td>
<td>275,604</td>
<td>43</td>
</tr>
</tbody>
</table>


For a country with one of the lowest population densities in the world (around 1.5 person per km²), electrification rates are relatively high. As shown in Table 3, an estimated 67–75 percent of the population (363,965 households out of 541,149) has access to electricity. This level is even more striking since about one-third percent of the population are nomads, outside the three regional heat and electricity grids. Per capita electricity consumption, at 1,300 kWh, is much higher than that of most companies with a similar level of per capita income (US$480). This is because of the large share of electricity consumed by the energy-intensive mining sector.

The residential/commercial market for heat and electricity reflects a high degree of urbanization, substantial poverty, and diversity of living conditions. The largest

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residential/commercial consumption is in the urban market, where grid connections provide low-cost electricity to the majority of households. This market accounts for some 97 percent of total electricity consumption. The second largest market consists of nonconnected larger towns (at the aimag, or province level) and smaller towns (soums), where stand-alone diesel generators provide limited service. This market accounts for most of the remaining 3 percent of the electricity supply. Although the cost of electricity service in this category is higher than in urban areas, the level of service provided is lower, less than 24-hour service.

The 2006–20 Mongolia Integrated Power System (MIPS) program aims to increase electricity access to all soums and herders by 2010 through a combination of government, private sector, and donor participation.

QUALITY OF SERVICE

Since the early 1990s the quality of service, in terms or reliability, has increased from operating from only two to three days of coal supply to a normal steady supply. Firm capacity in the CHP plants also has improved considerably. About 10 years ago, the availability of boilers was less than 60 percent. Forced outages were above 30 percent in most CHPs. Still, the system suffers from lack of flexibility to follow load and if problems occur there are no spinning units that can restart quickly, thus depending on the Russian system. Some of these problems are inherent to the way the system is dispatched, or lack of proper merit order dispatching. CHPs are used to provide peak heating loads, while in modern systems this is a role played by efficient heat only boilers.

There are substantial differences in the quality of service in rural areas compared to urban areas and among the rural areas of various regions. Electricity consumption, calculated as the reported monthly electricity bill divided by electricity price, is low for a country with such a cold climate as Mongolia. Average monthly electricity consumption amounts to approximately 117 kWh per month in urban areas and 76 kWh per month in rural areas (Table 4). Households use electricity mostly for lighting in rural areas. In urban areas, lighting is an important end use of electricity, but household consumption is likely to be higher because urban dwellers are more likely to own appliances and small numbers of households may use electricity for space heating and cooking.

Currently, electricity supply is reliable in most urban areas, and sampled households in the 2003 LSMS survey reported that on average they received 23 hours of electricity service per day (Table 4). In rural areas the quality of electricity supply is substantially lower than in urban areas, with an average of 13 hours of electricity per day. In the Western, Eastern, and Highland regions, the quality of supply is substantially lower than in the Central region and the city of Ulaanbaatar. Furthermore, although the supply of electricity in Ulaanbaatar appears to be satisfactory at present, the supply situation is beginning to deteriorate because rapid migration from rural to periurban areas is creating a growing number of periurban dwellers without access to reliable electricity supply. This a major concern, given projections of urbanization in the future.
**Table 4: Reliability of Electricity Supply and Household Electricity Consumption**

<table>
<thead>
<tr>
<th></th>
<th>Reported Average Daily Hours of Supply</th>
<th>Estimated Consumption (kWh/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban</td>
<td>Rural</td>
</tr>
<tr>
<td>West</td>
<td>21</td>
<td>8</td>
</tr>
<tr>
<td>North</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Central</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>East</td>
<td>23</td>
<td>10</td>
</tr>
<tr>
<td>Ulaanbaatar</td>
<td>24</td>
<td>Na</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>13</td>
</tr>
</tbody>
</table>

n.a. Not applicable.

*Note: kWh was estimated by dividing monthly electricity bill by the price. No adjustments for nonpayment were made. Electricity consumption estimates in this table are for households with positive reported electricity expenditures from centralized supply and exclude households that either unelectrified or do not pay for centralized electricity supply.*


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**EFFICIENCY OF ELECTRICITY AND HEATING SYSTEMS**

**Energy Losses in the Power System**

There is still considerable room to improve the overall efficiency of Mongolia’s power system. Coal-based generating plants operate at efficiency levels below international standards. The coal-fired CHPs consume an estimated about 400 grams of coal equivalent (gce)/kWh of electricity compared with international standards of 316 gce per kWh (see Figure 13). And the plants themselves consume an excessively great amount of power, about 19 percent of gross generation, which is at least double the efficient industry standard. In the T&D system, technical and commercial losses are on average 25 percent of generation. Maintaining system efficiency requires periodic maintenance and spare parts. However, expenditures on maintaining the system plummeted dramatically from US$14 million equivalent in 1998 to US$1 million equivalent in 2004.
Figure 13: Efficiency Indicators for Mongolia’s Electricity System

Technical Losses in the Heating System

Mongolia’s heating systems are highly inefficient in the use of both energy and water. HOBs operate on average at about 40 percent efficiency. Estimated total losses in the central T&D network are about 20 percent of energy produced. Annual water losses in the heating system in Ulaanbaatar are about 4.5 million cubic meters. That is the equivalent of replacing the makeup water once a week. The low level of efficiency in the district heating systems of Ulaanbaatar and Dakhran increases the amount of capacity and energy required to deliver heat and hot water services. The systems also have sizeable commercial losses because of the lack of metering, which reduces revenues.

Figure 14 shows the district heating balance for Ulaanbaatar and the technical losses in various parts of the system. Transmission losses amount to 5 percent of the energy delivered to the distribution system. Losses in distribution to residential buildings range between 12 percent and 18 percent, compared to about 5-10 percent in Europe. In addition, water loss levels are equivalent to replacing the entire network’s water volume every four days and energy losses in hot water from the apartment entrance to the consumer amount to 55 percent. Losses from inefficiencies in buildings amount to about 25 percent.

There are two main reasons for the losses in the distribution network. First, many of the pipes in the network are old and corroded. Second, the lack of metering for the consumption of hot water has reduced incentives for energy and water conservation, leading to commercial losses. The Asian Development Bank (ADB) has supported a modernization of the primary system’s network. However, there has been no modernization program for the secondary or distribution network, the domestic hot water circuit, or a small part of the district-heating network supplied by CHP-2.
The district heating system in Darkhan also has experienced considerable losses. The heating system requires extensive modernization. Unlike the system in Ulaanbaatar, all customers in Darkhan are connected directly to the transmission network; there are no substations that separate hot water produced by the Darkhan CHP from the water flow in a building’s internal system. Therefore, temperatures of hot water in the network—before entering buildings—have to be lower than usual, reducing the capacity of the network by about half. The current consumption of makeup water is extremely high, equivalent to the replacement of the entire volume of the network every 1.5 days. Inadequate treatment for the large volume of water causes a high rate of corrosion.

There is also a substantial need to improve efficient and clean heating supply in the decentralized Heat Only Boiler (HOBs) market. A survey of HOBs conducted in 2003\(^\text{23}\), indicated efficiency levels at about half of current efficient boilers in the western markets. HOBs in Mongolia require much more coal to achieve a similar comfort level as more energy efficient boilers currently on the market. Figure 15 shows the gains in efficiency possible from switching to more efficient heating systems to attain the same degree of comfort, reducing coal requirements by more than half.

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\(^{23}\) World Bank 2003a.
STRUCTURAL INEFFICIENCIES IN THE ENERGY MARKET

There appear to be inherent structural inefficiencies in the way the energy sector in Mongolia has evolved over the last five years, leading to higher operating costs than necessary. As part of a tariff design study under the ERA’s oversight, it evaluated the relative cost of efficient operations for electricity distribution companies serving areas with different densities of power service. To determine efficient margin levels, the study calculated the distribution added value (DAV) of four power distribution companies in Mongolia. The DAV is the monthly capital cost (in U.S. dollars per kW per month) of developing an efficient power distribution grid, with a given density of service, plus efficient operating and maintenance costs.

The results indicate a wide variation in DAVs relative to service density in Mongolia. For example, UEBDN, the largest power distribution company, operating in a high density service area, has a DAV of US$4.4 per kW per month. This compares to a DAV for Baganuur operating in a low-density service area which has a DAV of US$21.6 per kW per month or more than four times the DAV of UEBDN.

Two companies in medium-density service areas—Darkhan and Erdenet—have DAVs of US$9.6 per kW per month and US$16.9 per kW per month. These results suggest that that power distribution companies in Mongolia would benefit from merging to reduce the cost of efficient operation and that the market may not yet be large enough for 18 companies to be efficient and profitable. To illustrate the cost advantages of merging some of the companies, the tariff study calculated the DAV of joining Bagannur Erdenet...
companies with UBDEN, which would place the combined operations of these companies in the medium-density category and result in a DAV of US$8.1 per kW per month. This DAV compares favorably with that of efficient utilities in western markets.

Distribution companies in the heating sector could benefit from consolidation as well. In Ulaanbaatar, these companies are too fragmented to organize and finance expansion effectively. Either the tariff must be differentiated to reflect supply costs for each company, or another institutional approach (such as rebundling T&D) is needed. Revenues from space heating and hot water services through the central heating service companies (CHSCs) amount to about US$1.6 million total, after heat purchases from UBDHC. Dividing this revenue by the existing 20 companies leaves little revenue to cover administrative costs and investment. Furthermore, the separation of T&D operations appears to be a suboptimal structure for the size of the market, the number of skilled district heating personnel (mainly concentrated in UBDHC), and the nature of the district heating business, where investments in rehabilitation provide benefits across the heat delivery chain.

ENERGY TARIFFS, ECONOMIC COST OF SUPPLY AND AFFORDABILITY

Electricity Tariffs

While electricity tariffs are not low by regional standards, they are below the levels necessary to reflect the cost of service and particularly system expansion. The lack of regular tariff adjustments to account for increasing fuel costs has exacerbated financial losses. In January 2005, the ERA approved a tariff increase of 8.5 percent, from Tog 47/kWh to Tog 51/kWh (see Figure 16). However, there have been no price adjustments since then. To mitigate the potential impact on poor consumers, the ERA also introduced a lifeline tariff rate. However, as noted earlier, the tariff increase has not been sufficient for a substantial improvement in the financial condition of the power companies. Furthermore, because households in Ulaanbaatar’s city center receive a greater portion of the overall subsidy, it is likely that the benefits are accruing to nonpoor households because most of the poor households live in periurban areas.24

The provisions of the law relating to the regulation of tariffs by the ERA also create some difficulties, in particular with the implementation of multiyear tariff regimes under a price-cap regime. Section 26.2 of the Energy Law requires basing tariffs on real costs based on those that an energy company incurs the year prior to the requested change in tariffs. Such a provision might prevent the use of a price or revenue-cap based on forecasts of the licensee's efficient cost levels in future years. Also, in Section 27.4 of the law, it appears that the licensees, rather than the ERA, should initiate requests for changes in tariffs. Also, according to Section 26.3, the ERA cannot itself determine justified cost levels. Instead it must return proposals to the licensees for revision without any guidance on the changes required.

24 ESMAP 2005a.
Retaining such provisions in the Energy Law will make it difficult for the ERA to implement and enforce a multiyear tariff, which would incorporate targets for efficiency improvement. Together these provisions essentially would allow licensees rather than the ERA to determine when the tariff should come into effect. They could delay its implementation and request adjustments during the price-control period when unable to meet the efficiency targets set by the ERA. The effect would be to remove most of the incentives for improved performance, which is the rationale for multiyear tariffs.

The government plans to address these issues in the near future, whether through amendments to the Energy Law or subsidiary legislation. Such changes will help to remove some of the risks to continued political involvement in decisions on tariff levels and at the same time ensure that the recovery of costs reflects efficient service provision.

Comparisons of average unit revenues (in Tog/kWh) for typical customers in Ulaanbaatar suggest that increases of up to 60 percent for residential customers and 10-30 percent for industrial and commercial customers would be necessary to reach cost-reflective tariff levels. Although these increases are large, there does appear to be scope for significant tariff increases while retaining affordability. As the subsequent section shows the share of household incomes spent on electricity and heating services is expected to fall over the period of financial projections. The current electricity tariff in Mongolia is the same at all voltage levels, accounting only for a variable energy charge. Recognizing the need for reform, the ERA has proposed an unbundled tariff system at bulk, transmission, and distribution level at different voltage levels.

Figure 16: Electricity Tariffs in Real Terms

Source: ERA and staff estimates.

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Box 2: Explanation of Price Caps

Traditional utility regulation has followed a rate-of-return or cost-plus model, under which prices are set based on the actual costs of the regulated enterprise. Price adjustments may be at preset and frequent intervals, such as annually, or be made, generally at the enterprise’s initiative, when there is a significant change in costs.

Since the early 1980s, various experts have drawn attention to the deficiencies in this regulatory approach and, in particular, to the following:

- The lack of pressure on management to control their costs, when they can expect prices to adjust to match cost increases.
- The difficulties faced by regulators, who will always know less than managers, to identify the “true” costs of an enterprise and, thereby, to determine whether current prices are excessive.
- The incentives to undertake unnecessary investments (“gold plating”) that increase the asset base on which regulated enterprises earn a return, compared with the lack of incentives to control capital expenditures.

Starting with the regulation of telecoms in the United Kingdom in 1983, price-cap regulation has been increasingly used. The key characteristics of price caps are that:

- Allowed prices are set on the basis of a forecast of efficient cost levels over the future price control period, rather than the actual costs of the enterprise.
- A price control is set for a multiyear period, within which the regulator commits not to adjust allowed prices irrespective of how actual costs move compared to forecast costs.
- During the price control period, allowed prices are indexed to measures of expected cost changes (such as inflation plus an efficiency improvement factor).

The effects are to:

- Create strong incentives on managers to reduce their costs through improved efficiency. By doing so, they can increase profits as cost reductions below forecast levels do not lead to corresponding reductions in prices during the price control period.
- Allow regulators to determine what the “true” costs of the enterprise are by observing how much managers are able to cut costs below forecast levels. This evidence can then be used to set forecast costs for the next price control period, thereby reducing prices paid by customers to the efficient cost level.

The operation of a price cap is illustrated in the figure below.
Heating Tariffs

Tariff setting is regulated by Chapter 4, “Prices and Tariffs,” Article 26, “Principles for Setting Tariffs,” of the Energy Law. Although the law stipulates basing tariffs on real costs, the stipulation is curbed by the request for “price stability,” which in practice seems to prohibit larger tariff increases. Tariffs for district heating are distorted because of a nontransparent settlement of heat generation prices from CHPs and cross-subsidies for residential customers at the cost of commercial customers. It will likely take a long time to achieve full cost coverage. Currently, the heat price from CHP is about Tog 4,000 per kWh or US$3.3 per kWh. Setting tariffs according to the traditional method would cause the price of heat from a CHP to double (US$6.6 per kWh). At the margin, the heat price would increase by about 50 percent if a new CHP were to provide the heat and tariffs would be calculated in accordance to the above described method (see Figure 17).

The current level and structure of tariffs provide no incentives for heating companies to respond to growing demand and reduce system inefficiencies or for heat and energy conservation by consumers. The benefits of investments in system efficiencies that yield fuel savings accrue to the CHPs and their electricity customers, not to the heating companies and their customers. The current method of cost allocation for electricity and heat from CHP plants allocates 70 percent of the fixed costs and variable costs to heating. This method results in relatively high costs for heat, which could sometimes even exceed the costs of heat produced in HOBs. However, in order to keep tariffs at affordable levels, the ERA has reduced the calculated heat supply price by approximately 50 percent. To compensate for this lower revenue from heating services, the ERA has raised electricity prices by 15 percent.

On the demand side, because of a lack of consumption-based billing for most of the system, consumers have no incentives to reduce their energy use. The tariff system differs based on the category of consumer (residential, nonresidential, and foreigner) and type of usage, that is, space heating, air conditioning, domestic hot water. In addition to normative tariffs—those linked to floor area and number of occupants instead of consumption levels—there are one-part tariffs for metered consumption. Pricing of domestic hot water has been especially problematic. The tariff is based on the number of persons living in an apartment rather than metered usage. Because the actual...
number of occupants is often much higher than the registered figure, this tariff structure tends to result in high commercial losses.

Tariffs for the various consumer groups derive from a formula fixed two decades ago, but with some adjustments for increases in production costs. The tariff structure reflects the principle that residential tariffs must be low relative to those of commercial and industrial employers. As a result, tariffs for residential consumers do not cover costs, and the system must rely on cross-subsidies from other consumer categories (see Figure 18). The lack of cost coverage in the residential sector is a major concern because this sector is projected to grow substantially in the next 10–15 years. Under the current tariff regime, additional connections of residential consumers would result in less cost coverage, requiring additional adjustments in other customer categories or in bulk heat prices and, ultimately, electricity prices.

Source: Kalkum 2006.
AFFORDABILITY AND SOCIAL IMPACT OF ENERGY SUPPLY

Energy for Heating

In a very cold country where more than half the populations lives in gers, heat for households is the main source of energy. More than a third of the population lives below the poverty line, the main heat source is highly polluting coal, and the social impact of energy supply—and specifically heating—is a major concern. This impact in Mongolia varies considerably by geographical, area, income group, and source of heating. In all areas, poor income groups spend a larger share of their household expenditures on heat than higher-income groups. For households receiving district heating, the share is lower than that of households using individual heat stoves that use a combination of traditional fuels—coal, firewood, and dung. And perhaps of even more concern than the increased financial burden, is the adverse environmental and health impact of widely used heat stoves outside the district heating systems.

In Ulaanbaatar’s city center, results from the LSMS survey show that the average household monthly expenditure on heating ranges from 1.4 percent for the highest income group to 2.8 percent for the lowest income group. This is very low based on international comparisons and household surveys in Russia. Selected countries in Central Asia indicate shares ranging from 5 percent to 20 percent. More detailed surveys are recommended.

Outside the city center, most households depend on individual stoves for heating and cooking using a variety of traditional fuels—coal, firewood, and animal dung. The share of their expenditures on heat in total household expenditures is considerably higher than those of the poor that are connected to the district heating system. These expenditures range from a high of 37 percent in ger areas to 3.2 percent in the countryside. They also indicate that the farther away poor households live from city centers, the lower the share of heat expenditures in their total household expenditures. This may result from the greater availability of fuel. Focus group discussions in the ger areas have revealed a variety of coping strategies during the winter months. These include buying poor quality coal and other cheap fuels. However, the environmental and health-related costs of relying on poor quality “dirty fuels” available are high based on the preliminary findings of research on indoor air pollution in the ger areas.

Electricity

Surveys indicate that the social impact of electricity expenses on the household budget is lower than the impact of heating expense (see Table 5).

On average, the share of electricity expenditures is higher in Ulaanbaatar than in the aimag and soum areas. In all areas, the poor pay a higher share of their income on electricity than the nonpoor. There is a substantial difference between the share of electricity expenses for households connected to the grid and those that receive electricity from isolated diesel generators. In the aimag centers, households with grid connections have a higher proportion of electricity expenditures than those receiving electricity from isolated diesel units. In contrast, households in the soum centers connected to isolated diesel-based power systems have a higher share of electricity expenditures than households connected to the grid. In city center of Ulaanbaatar, the reliance of households on electricity is significantly higher than in those living in the periurban ger. However, within the city center, there is a very small gap between the poor and nonpoor groups and within the ger areas, the consumption levels of these two groups are nearly the same. Subsidies to offset tariff increases in 2004 have very little impact on the share of household expenditures on electricity.

The source of the power that households receive in the aimag and soum centers has a significant impact on the share of their electricity expenditures in their total expenditures. In the aimag centers, households receiving electricity from the grid spend 5.1 percent of their household expenditures on electricity compared to 3.8 percent for households that depend on diesel-based electricity.

Survey and empirical information indicates that this difference is mainly because of the lower availability of power from diesel generators. This availability ranges from 14 to 17 hours compared to 24 hours for grid-based electricity. In the soum centers, survey data show the reverse situation. Poor households that depend on diesel-based electricity spend 5.8 percent of their monthly household expenditures on electricity compared to 4.1 percent for households connected to the electricity grid. This larger share is likely a result of the higher cost of supply for diesel systems.

In contrast to the disparities in consumption by income group between the city center and periurban areas of Ulaanbaatar, within each of these areas, the similarities in consumption levels between the poor and nonpoor groups are remarkable. In the city center, the average monthly electricity consumption of poor households at 174 kWh is about 89 percent of the consumption level for nonpoor households. Outside the city center, the average consumption levels between poor and nonpoor are even closer, 107 kWh and 110 kWh, respectively. Surveys indicate that these levels are close due to under-reporting of electricity consumption, resulting from meter tampering and theft. Furthermore, there are indications that households in the ger with the highest household expenditure levels are the main beneficiaries of unmetered tariff arrangements.
ENVIRONMENTAL IMPACT

Air pollution has become a serious problem in the capital city of Ulaanbaatar. The World Bank Environmental Monitor of 2004 reported a daily mean concentration of particulates at 131–162 mg/m³, which is two to three times higher than internationally accepted standards. The city’s location in a valley combined with prevalent cold temperatures and low-mixing heights, results in less dispersion of air in and out of the city. Therefore, air pollutants released into the atmosphere—especially the low-lying sources, such as household stoves—tend to exacerbate the impact of the particulates (PM₁₀ and PM₂.₅), sulfur dioxides (SO₂), and nitrogen oxides (NOₓ).

Most of the air pollution in Ulaanbaatar comes from large stationary sources of emissions. Three power plants in Ulaanbaatar supplying 80 percent of the energy needs consume more than 3.3 million tons of coal per year. HOBs and power plants using coal accounted for close to 50 percent of the total emissions of Ulaanbaatar in 2005.

Industrial and commercial sources apparently pose less of a threat to the environment than the use of heat stoves in households that are not connected to the district heating system. An initial study conducted by the office of the Mayor of Ulaanbaatar has concluded that about 90 percent of the ground-level pollution originates from the household heat stoves in the gers. There over 120,000²⁷ individual stoves consuming an estimated 600,000 tons of coal per year to provide the heat to ger housing. Each household consumes an estimated 5.0 tons of coal and 4.7 m³ of wood per year. The stoves households use are not only inefficient, but also produce large amounts of indoor air pollution, especially fine particulates, such as PM₂.₅ and PM₁₀. Research has shown a high correlation of these fine particulates and incidence of respiratory disease, which is the leading cause of child mortality in Mongolia and which dominates the morbidity pattern.

Preliminary findings of research on indoor air pollution inside gers indicate that PM and carbon monoxide are way above safe levels. For example, the Mongolian standard for 24-hour suspended particle concentration is 150–200 mg/m³. This standard is not very high, considering that, for example, the standard of the U.S. EPA’s standard for PM₂.₅ is 65 mg/m³. Yet according to mean measurements of PM₁₀, concentration above the baseline in homes with individual heat stoves is about 750 mg/m³, between four and five times the safe concentration based on Mongolian standards and more than 11 times the concentration based on higher EPA standards.²⁸ Health studies have shown a high correlation between long exposures to high levels of indoor air pollutants and increased respiratory diseases. In Mongolia these diseases are the primary causes of child mortality.

²⁷ Ulaanbaatar City Mayor’s Office, December 2005, identifies 120,000 ger households, but 270,000 ger area stoves.
²⁸ Cowlin and others 2005.
In addition to stationary sources of pollution, there are mobile sources of pollution, such as cars, trucks, and buses (Figure 19). These vehicles primarily increase concentrations of NO\textsubscript{x} and carbon dioxide. While these sources of pollution are currently not the greatest concern, the continuation of recent growth trends could increase their contribution to the deterioration of air quality.

As previously stated, the provision of clean, efficient, and affordable space heating is one of the primary challenges facing Mongolia in the coming years.

**MAIN ISSUES**

Moving forward in the direction of a sustainable energy sector based on efficient public and private sector partnerships for maintenance and expansion of energy facilities will require a new business model that simultaneously addresses problems on several fronts—government policy on pricing and subsidies, service financing and payment, market structure, and ownership and management of individual companies. Without such a model, it will be difficult for the energy sector to meet the future challenges and, moreover, the sector could lose any gains achieved in the past 10 years, thus compromising the security of the electricity and heating supply as the country’s transition economy enters a new phase of growth.

Table 6 in the following section summarizes the main issues in the sector. Failure to address these issues could compromise the security of Mongolia’s energy supply in the broad sense of the term—inadequate capacity, lower reliability, and further deterioration of air quality because of the dominance of coal as a primary energy source. Without efficient subsidies and with continuing distributional inequities in the quantity and quality of energy supply, the government might not meet its social objectives. Importantly, Mongolia could miss important opportunities for income stemming from its important geographic position in Asia.

**LACK OF FINANCIALLY SUSTAINABLE ENERGY COMPANIES IN THE CES**

In aggregate, the CES energy system has registered net losses for the past five years. Several factors have prevented the sector from becoming financially viable. First, the tariff structure does not reflect the economic cost of supplying various categories of customers and the tariff level is insufficient for raising cash to meet future investment needs. The last tariff adjustment took place in January 2005, and since then, tariffs have dropped in real terms. Second, the current market structure does not provide commercial incentives, particularly for the distribution companies to reduce their losses. Furthermore, there is no merit order for economic dispatch of power from the

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**Figure 19: Number of Vehicles by Type**

![Number of Vehicles by Type](image)

generators. Third, at the company level, the lack of a commercial focus and reduced funds for proper maintenance results in unacceptably high technical and commercial losses in the distribution system, which amount to about 25 percent of net generation in addition to an extremely high, own-consumption levels at the generation end (about 20 percent). Fourth, inefficiencies in the heating sector, in the order of 40 percent, increase the investment requirements for the power sector. All of this factors combined are undermining the country’s security of energy supply, as Mongolia’s growing economy is beginning to require large amounts of energy while at the same time facing the decommissioning of a substantial amount of power generating capacity.

If concessionary debt were available to the CES to finance the program, the related annual debt service would approach US$50 million by 2020, rising thereafter as grace periods expire. Reliance on commercial debt would cause the annual debt service to increase to around US$400 million equivalent—a level that is clearly unsustainable. However, a program of sector reforms, including the establishment of a more efficient market structure m the introduction of multiyear tariffs, as well as a more efficient subsidy mechanism for poor households, would allow the system make a significant contribution to future investments and service debt on concessional terms without a substantial increase in the expenditure burden on households. In addition to programs for capacity expansion, the strategy should target ways to reduce losses on the demand and supply side especially in the heating sector, which is highly inefficient and is driving the need for an increase in the capacity of CHPs.

POTENTIAL REGULATORY CONSTRAINTS TO PRIVATE SECTOR PARTICIPATION IN THE ENERGY SECTOR

The government has expressed its commitment to expand private sector participation in the energy sector in the near future. Effective participation of the private sector in the future will depend, to a considerable extent, on (a) the signals the government sends on decisions concerning operation, management, and financing of new power plants, that is, Taishir, Dorgun, and Egiin; and (b) the condition of Mongolia’s regulatory framework, which has several impediments to successful regulation.

Current signals are worrisome. Both Taishir and Dorgun appear as though they will be operated by government entities without a sustainable business plan. Egiin hydro plant appears to be under similar arrangements. The ERA currently has serious constraints on its enforcement powers. The qualifications for the selection of the regulators and the conditions for their dismissal are not sufficiently clear. Some of the required government approvals, particularly concerning the ERA’s budget seem inconsistent with the independent nature of the agency. Finally, there are several sections of the law governing tariff changes could constrain the establishment of multiyear tariff increases. For example, one section of the law requires basing tariffs on the actual costs the licensee incurs during the year prior to that of the proposed increase. Such a provision might prevent the modern regulatory practice of using price caps based on forecasts of a company’s efficient costs in future years. Another section states that the ERA cannot determine justified cost levels on its own, but must instead its recommendations to the licensee for revision without any guidance on the changes required.
DISTRIBUTIONAL INEQUITIES IN THE AVAILABILITY AND QUALITY OF ELECTRICITY AND HEAT

Outside the large cities, electricity access, power availability and subsidies vary substantially, and most subsidies do not effectively target the most needy population groups. The analysis of billing data from one of the electricity companies serving the capital city shows that periurban customers at the top end of the consumption distribution are the main beneficiaries of the de facto nondisconnection policy, as they are liable for the bulk of arrears payables to the electricity distribution company. The share of fuel in expenditures is inversely proportional to the level of income. For example, households in the lowest quintile of income had the greatest share of fuel expenditures in their total household expenditures. These households, mostly living in the periurban ger, are typically not connected to the district heating system and must rely on heating stoves usually paying the full retail price for wood and coal. This same income group spends about 37 percent of their income in winter months, as compared to only about 9 percent among the households in apartment buildings, whose income is in the highest quintile. In the aimags centers, the empirical evidence clearly indicates that the current “across-the-board” subsidy scheme does not reach the part of the customer base in hardship. Electricity expenditure of low-income customers (at 9.4 percent of total income) appears to be significantly high in relation to level of consumption (40KWh/month).

ABSENCE OF AN ENVIRONMENTAL SOLUTION FOR CONTINUED, COAL-BASED ECONOMIC GROWTH

Mongolia’s coal-based power plants operate on low-quality, highly polluting domestic lignite. According to environmental studies of indoor air pollution concentrations quadruple the safe limit for particulates. Although it is likely that the country will continue to depend on substantial domestic coal sources for the next 15–20 years, the government has not yet addressed in a comprehensive manner, the associated economic costs of pollution and options for reducing the adverse environmental impact of coal.

Investments focused on energy efficiency on both supply and demand side are crucial to enhancing the security of supply and reducing the risk of disruptions, including proper allocation for maintenance expenditures.

LACK OF A REGIONAL PERSPECTIVE AND INSTITUTIONAL CAPACITY IN ENERGY PLANNING

Mongolia’s energy planning currently is inward-looking, with considerable concern about increasing reliance on energy resources outside the country. Maintaining this perspective would not necessarily prevent Mongolia from obtaining lower cost energy supplies in the future. However, it could cause the country to miss an important opportunity to play a role as a transit country, situated between two countries with large power markets and potential future interconnection.

RECOMMENDATIONS

This section outlines recommendations for the next decade (2006–15) by addressing the five main issues illustrated earlier, while at the same time reinforcing the three
overriding themes for successful implementation of energy sector development in Mongolia. The country is in a unique position to develop regional linkages for greater expansion and integration of its energy system. However, to do so successfully will require a new business approach that links key actions in the development of government policy and market structure to the management, financing and expansion of energy companies in a commercially sustainable footing.

The recommended strategy highlighted here will put Mongolia in a better position as a key partner in the region’s ever-growing global economy.
<table>
<thead>
<tr>
<th>Issues</th>
<th>Recommended strategy</th>
<th>Time frame</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Improving financial viability</strong></td>
<td>Restructure the finances of the energy companies, including write-off or rescheduling of debt.</td>
<td>2007–09</td>
</tr>
<tr>
<td></td>
<td>Complete the reform process for efficiency at the company level by:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Creating a market of bilateral contracting for greater accountability.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Increasing tariffs to cost-recovery levels.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Establishing loss reduction programs at the company level.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prepare a least-cost investment program, including investments in energy efficiency as well as new capacity along with a financing plan.</td>
<td></td>
</tr>
<tr>
<td><strong>Increasing effective private sector participation</strong></td>
<td>Align the regulatory framework with best practice examples that have led to the development of efficient public/private sector partnerships and increased funds for investment.</td>
<td>2006–10</td>
</tr>
<tr>
<td></td>
<td>Providing the ERA with the authority to issue and revoke licensees; removing potential impediments to establishing multiyear tariff increases; increasing the ERA’s independence in funding and establishing an appropriate salary structure for its staff.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assessing, and implementing, a strategy for competent private sector participation in management and financing of new generations assets and existing distribution facilities.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evaluate the interlinkages among the different utility sectors (such as heating, hot water, and energy).</td>
<td>Medium to long term</td>
</tr>
<tr>
<td></td>
<td>Buffer higher increases in tariffs with efficient subsidy measures targeted at the poor.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facilitate the distribution of portable renewable sources, such as solar home systems (SHSs), especially for nomadic population.</td>
<td></td>
</tr>
<tr>
<td><strong>Ensuring equal, reliable, safe, and affordable access to electricity and energy for heating</strong></td>
<td>A joint collaboration between the Ministry of Energy, the Ministry of Nature and Environment, and the Municipality of Ulaanbaatar to carry out the following parallel studies:</td>
<td>2007–14 under an Air Pollution Reduction Management Program</td>
</tr>
<tr>
<td></td>
<td>• Assessment of the damage costs of air pollution to consider in evaluating the investment costs of coal use compared to other fuel alternatives and the economic of pollution control equipment for coal.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Identification of the major energy sources of air pollution, particularly large point sources such as power plants and HOBs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Development of long-term energy scenarios to determine the least-cost solution to power generation and cooking fuels taking account of the environmental cost of coal.</td>
<td></td>
</tr>
<tr>
<td><strong>Promote clean air and mitigate health impacts from air pollution</strong></td>
<td>Study successful examples of regional integration in other parts of the world. Evaluate Mongolia’s unique assets and opportunities for such integration and future expansion of its energy system to Russia and China.</td>
<td>2007–10</td>
</tr>
</tbody>
</table>

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OVERVIEW

The Government of Mongolia’s (GoM’s) Economic Growth Support and Poverty Reduction Strategy aims to accelerate pro-poor growth and reduce poverty through improving the environment for private sector led development and enhancing regional and rural development. Improving the availability and quality of Information and Communication Technology (ICT) infrastructure and services and thus eliminating one of the major causes of poor economic competitiveness is one of the key elements of this strategy. ICTs have the potential to improve productivity, help to attract private investments and significantly reduce the economic and social isolation of rural population.

As part of its transition to a market economy, the GoM has implemented a telecommunications reform and modernization program leading to effective liberalization of all market segments, partial privatization of the fixed line incumbent, Mongolia Telecom (MT), and establishment of the Communications Regulation Commission (CRC) as an independent regulatory authority. As a result, the telecommunications sector has seen considerable foreign investments and witnessed tremendous growth. The market structure has evolved into a multi-operator environment, with two national cellular operators, an additional newly licensed mobile operator, two fixed line operators, one rural wireless local loop (WLL) operator, and multiple VoIP, VSAT (very small aperture terminal), Internet, and other value added service providers. The market has grown at a compound rate above 25 percent per year over the period of 2002-2005. As of December 2005, total fixed and mobile (including WLL) teledensity reached 29.8 percent, up from 13 percent in 2001.

Despite the successes achieved in the sector, the country’s telecommunications infrastructure remains an obstacle to economic growth and the development of the telecommunications sector is central to the overall development of the country. A dramatic disparity in availability of information and communications infrastructure and services between rural and urban areas, limited backbone infrastructure, inadequate capacity to regulate and promote ICT development, and lack of institutional clarity are all challenges facing GoM in meeting its sector development objectives.

Over 70 percent of existing phones and Internet users are in the Ulaanbaatar area. Despite market liberalization, operators have provided services mainly in the urban areas of Ulaanbaatar, the aimag capitals and other commercial centers like Erdenet due to the high cost of service provision in rural areas. Teledensity in rural areas stands at about 1 percent.

The current backbone infrastructure does not allow for network redundancies and, thus, cannot provide high reliability of services provided over it. In addition, it supports mainly voice communications, whereas convergence of technologies requires an upgrade of the infrastructure to support the Internet Protocol and other technologies and services.

Additionally, the capacity to proactively regulate and promote the development and implementation of a growing ICT sector agenda is inadequate. With the implementation of the first phase of sector reforms, the regulator needs to build institutional capacity to further implement and consolidate reforms and address convergence in the ICT sector. This is made more challenging by the lack of institutional clarity in the sector following the 2004 restructuring of the government.
Government actions to improve the policy and regulatory environment are required, specifically:

- Developing an adequate and effective regulatory environment and providing the legislative basis to implement effective regulation;

- Amending the Communications Act in order to (i) clarify the roles of the Information and Communication Technologies Authority (ICTA), CRC and other agencies involved in the sector; (ii) provide the regulator with independence from undue political interference; (iii) provide the basis for implementing secondary sector regulations; and (iv) establish a transparent, consultative process for decision making by CRC;

- Rebalancing local and national long distance fixed line tariffs;

- Establishing a modern, cost based tariff regime and a well functioning and equitable interconnection regime that promotes expansion into rural areas and allows operators to recover costs;

- Increasing teledensity and availability of information services in rural areas by implementing programs under the government’s Universal Service Obligation Fund (USOF);

- Undertaking the further privatization of Mongolia Telecom, with the objective of improving competition in the sector; and

- Creating a roadmap for the development of the telecom sector, through a consultative process with stakeholders.

**INSTITUTIONAL AND LEGAL FRAMEWORK**

The GoM has a number of economic and social objectives for the telecommunications sector as articulated in its “Guideline of the Government Program and Mid Term Policy Statement”. The main objective is the provision of cost efficient, timely and innovative telecommunication services on an ongoing, fair and equitable basis to all existing and potential users. The social objectives include: (i) development of a knowledge based society; (ii) upgrading the living standards of Mongolian; and (iii) creating access to telecommunication services. The economic objective is to promote competition for the long term benefit of the end users of telecommunications by liberalizing the sector, promoting non-discrimination, establishing an efficient regulatory environment and conditions for investments and privatization of the sector.

The telecommunications sector in Mongolia is governed by the sector specific Act on Communications of 2001. A snapshot of the institutional structure is provided in Table 1 below.
Table 1: Institutional Structure of Telecommunications Sector

<table>
<thead>
<tr>
<th>Information and Communications Technology Authority (ICTA)</th>
<th>Agency Responsible for Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications Regulatory Commission (CRC)</td>
<td>Regulatory Body, also responsible for spectrum management</td>
</tr>
<tr>
<td>State Inspectorate Department</td>
<td>Agency to enforce law</td>
</tr>
<tr>
<td>Information and Communication Networking Company (ICNC)</td>
<td>Owner and operator of main state owned network assets</td>
</tr>
<tr>
<td>State Property Committee</td>
<td>Government representative in its role as shareholder in MT and ICNC</td>
</tr>
</tbody>
</table>

The current Act on Communications was passed by Parliament and came into effect in November 2001, setting the stage for a liberalized communications sector. The Act was passed at approximately the same time as the Mongolian Telecommunications Sector Policy Statement, Resolution No. 372, dated December 28, 2001. The Act on Communications allowed for the establishment of the Communications Regulatory Commission and specified its powers, responsibilities and obligations.

In 2004, the government announced its vision of “E-Mongolia” (See Box 1) in order to establish an information society and the foundation of a knowledge-based economy in Mongolia by enhancing application of ICTs in all sectors.

That same year, the restructuring of the Mongolian government resulted in the policy responsibility for the ICT sector being transferred from the Ministry of Infrastructure to the Information and Communications Technology Authority (ICTA). ICTA is responsible for the formulation and implementation of government policy for the sector. It is charged with functions and powers to formulate and implement the state policy on ICTs, and develop a legal environment for policy implementation and enforcement. Specifically, ICTA’s role is to:

- Implement legislation and decisions of the GoM on ICTs;
- Elaborate policy on ICTs;
- Formulate policy on creation of competition in the ICTs market;
- Approve procedures on establishment of costs for regulatory service to license holders;
- Approve the integrated numbering plan;
- Develop policy on universal service obligations and monitor its implementation;
- Ensure reliability, timely provision and quality of ICT services and monitor security protection of communications; and
- Formulate policy on professional HR development in the ICT sector.
Box 1: E-Mongolia: Vision for Future

GoM’s E-Mongolia vision approved in 2004 sets the stage for establishment of an information society and the foundation of a knowledge-based economy in Mongolia, including the following telecom sector specific objectives:

- establishment of a conducive legal environment for ICT development;
- development of a broadband backbone network throughout the country;
- connection to the international backbone;
- abolishment of monopoly in ICT sector to enhance competitiveness and public access;
- establishment of the government institutional memory by creating an integrated information and data center (centralized database and information system) for the government;
- establishment of a new management structure based on ICT;
- creation of a new economic environment and enhancement of the competitiveness utilizing e-commerce;
- development of knowledge based industries;
- implementation of a result-oriented, citizen-centered social policy, utilizing ICT;
- development of human resources at all level;
- improvement of the public ICT literacy and bridging the digital divide;
- establishment of an information security system; and
- utilization of ICT as a tool for improving quality of life.

As a general policy, the government has targeted digitalization, expansion of optical fiber based transmission systems, to connect all aimag centers to the national broadband information and communications network, to promote wireless local loop in the fixed network (in urban and rural areas), and to introduce satellite and wireless based communications into rural communications.

The sector policy, stated through a resolution, clearly envisages an open competitive environment, with free entrance of service providers. Competition exists in all market segments including international gateway service, fixed local and long distance services, fixed wireless services, mobile services, Internet service provision and data communications services. There is also no policy distinction between data and voice services, implying free access for Voice over Internet Protocol (VOIP) services.

In keeping with this policy position, under the Act, the issuance of licenses for the provision of communications services, through the auspices of CRC, is not limited either in number or geographical extent. Licenses may be defined in terms of a limited geographical area, but the Act does not preclude full national or regional coverage, depending on the wishes of the applicant. However, the CRC is empowered to refuse a license if the requested radio...
frequency spectrum is unavailable, or to organize a tender in the event more than one applicant wish to serve a specific area. The government does not have a separate spectrum policy or law governing the efficient use and management of radio spectrum.

The Act does not place technological restrictions on licensees but allows them to propose their technical solutions and frequency requirements, subject to certain technical and technological requirements and standards. In reality, the incumbent operator, MT, operates a fixed network, including wireless local loop, although almost all of the major network assets are still state owned (see below). Three other private operators (MobiCom, Skytel and Unitel) operate mobile networks (and fixed wireless loop in the case of MobiCom) using the GSM and CDMA standards, which were selected by the companies themselves and approved by the CRC. The Act does not preclude mobile operators from providing, for example, fixed payphone service.

A policy approved by the GoM in July 2006 set out to restructure the sector by stipulating a structural separation between provision of services and ownership and operation of network assets owned by the GoM.

**UNIVERSAL ACCESS/SERVICE**

The historical approach of the GoM to improving rural access to ICT infrastructure and services has been to expand and develop the state-owned telecommunications network through public investments via Information and Communications Technology Development Centre (ICDC). Provision has however been made under the Communications Act of 2001, for the establishment of a USOF, whose purpose will be to accumulate and disburse funds for the construction of new networks, expansion or renovation of existing networks and the provision of services to remote areas and to populations without access.

The GoM has developed a framework and strategy for universal access to telecommunications services and for the use of the USOF to support the strategy. The focus is on achieving an appropriate and self-sustainable level of access to voice telephony and public Internet/information services in all underserved areas, particularly rural soums and baghs (the smallest administrative units under a soum) that are unlikely to see sufficient private investment without intervention in the form of financial support.

The Act defines universal service as the delivery of essential telecommunications service to populations of remote areas and areas without service access at real cost. The term real cost indicates that the level of service provision will be carefully measured against what is affordable, in recognition of the cost challenges associated with serving remote areas in the country, in order to minimize required subsidies. ICTA is empowered to elaborate a policy on universal service obligations and to monitor its implementation through CRC.

The policy states that USOF’s objective will be the establishment of communications centers at each soum providing a range of services including telecommunications and Internet. The Policy specifically relieves MT of the burden of having to provide universal access/service, though to date MT is the only operator to have a full national presence and extensive networks into the rural areas, including a presence at least in every soum. The Policy

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1 ICDC had been formerly known as the Post and Telecommunications Agency (PTA) until it became a division of ICTA. Currently, it is being transformed to ICNC under the sector restructuring policy.
envisages that the liberalization of international gateway and national services will provide opportunity for collection of contributions toward universal access/service provision and that operators will have an opportunity to secure universal service funding for the provision of rural services under commercial conditions.

According to the Act, funds for USOF can be collected from donations, loan and aid grants from international organizations, and from other sources. The Policy specifically recognizes that funds can come from operators, but also allows funds to be obtained from the GoM budget.

A new Law on Government Funds covering also the USOF was approved in July 2006. It specifies that a levy equal to 2 percent of the taxable income of legal entities offering telecommunications services shall be accumulated in USOF. There is uncertainty over the exact interpretation of the term “taxable income” and an official interpretation from the tax authority should be sought. Postal service providers are also expected to contribute to USOF. Therefore, clear rules and procedures have to be agreed and approved on the allocation of the proceeds of USOF between the postal and telecommunications sectors.

Subsequently, a “Procedure on Accumulation and Disbursement of Universal Service Obligation Fund” was adopted by the GoM in December 2006, and CRC started collecting the levy from operators in December 2006.

**REGULATION**

In addition to general competition law\(^2\) which applies to this sector, CRC is the specialist regulatory body established by the Act on Communications to develop an effective and fair environment for competition between market participants, to issue, suspend and revoke licenses, ensure adherence by licensees to their license conditions, determine and set technical standards, certify network equipment, and approve a full range of tariff, interconnection and policy functions. CRC’s competencies include:

- Approving and monitoring the general terms of interconnection between networks;
- Approving accounting methodologies for the setting of tariffs;
- Approving and monitoring tariffs of dominant operators in the market;
- Ensuring implementation of universal service obligations;
- Developing and implementing a nationally integrated numbering plan;
- Allocating and monitoring radio frequencies; and
- Settling disputes between license holders and customers.

The Act established the structure of CRC, its Chairman and Commission members (all of whom, except the Chairman are non-executive), their qualifications, mode, term and conditions of appointment, and certain operational conditions, in particular the independent sources of their funding.

CRC members and the Chairman are appointed by the Prime Minister, upon recommendation of the Minister in charge of the sector. While members are tenured, the CRC is not protected from political interference as members can be removed, without cause.

\(^2\) GoM 2000.
The CRC currently has approximately 39 employees, of which 21 are professional and 18 are administrative. As a relatively young organization, CRC is still establishing its position and authority.

TARIFFS AND INTERCONNECTION

Tariffs for services, such as mobile, Internet and data services, in market segments open to competition are unregulated. Fixed telephony services, including local and long-distance, are regulated. Fixed line telephony tariffs are not re-balanced and local tariffs and connection fees are below cost. The GoM developed a tariff rebalancing strategy and implemented the first phase of rebalancing in August 2004, after the elections. The second phase of tariff rebalancing is expected to take place in 2007.

Interconnection is bilaterally negotiated between operators, with the CRC intervening only in the event that operators are unable to reach agreement. The regulator does not mandate the dominant operator to publish a reference interconnection offer. Interconnection pricing is a mixture of bilateral settlements and unilateral transit fees.

ICT SECTOR RESTRUCTURING

In keeping with the government’s privatization guidelines for 2005-08, the GoM is undertaking a restructuring, through unbundling of state owned assets, of the telecom sector. The telecommunications infrastructure owned by the GoM and currently leased on an exclusive basis to MT has been separated from the competitive services it provides and has been placed under the control of a newly established network company (NetCo) – Information and Communication Networking Company (ICNC). It is expected that the full privatization of MT (currently 40 percent owned by Korea Telecom) as a service-only company (ServCo) will also take place. The Netco will provide open access to its network facilities to all service companies including Servco. The full implementation of the restructuring policy is conditioned by the successful completion of ongoing negotiations between GoT and Korea Telecom on the cancellation of the exclusive lease.

SECTOR STRUCTURE AND OWNERSHIP

The telecommunications market in Mongolia is formally liberalized and the incumbent, Mongolia Telecom (MT) has been partially privatized. Telecom sector revenues in Mongolia are approximately 7 percent of GDP. Fixed teledensity at the end of 2005 stood at approximately 6.3 percent and combined mobile and WLL at 23.5 percent.

Four operators effectively provide the public telecommunications infrastructure of Mongolia, though the bulk of the national transmission and fixed line network leased by the incumbent operator (MT) is operated by ICNC, on behalf of the GoM. A snapshot of the market structure is provided in Table 2 below.
Table 2: Mongolian Telecommunications Market Structure

**Fixed Line Operators**
- Mongolia Telecom (MT) partially privatized in 1996; 60% state-owned, 40% owned by Korea Telecom
- RailCom (subsidiary of Mongolia Railway)

**Mobile Operators**
- MobiCom (Mongolian joint venture with Sumitomo and KDDI of Japan) provides GSM services and CDMA WLL services
- Skytel (Mongolian joint venture with SK Telecom of South Korea) provides CDMA services
- Third operator UNITEL (Mongolian Joint Venture between BSB Telecom and UAngel of South Korea) commenced service provision in June 2006
- Additional rural mobile operator G-Mobile received a license in April 2006 for CDMA-450 WLL services. G-Mobile is planning to provide services in 180 soums.

**WLL**
- 3 existing and 2 new (CityFone, PopularCom)

**Internet Service Providers**
- 26 licensed operators (both Mongolian and foreign owned)

**Others**
- Local telecommunication services, FM radio broadcasters, MMDS and cable TV providers, VOIP service providers, urban broadband network operators, VSAT service and GMPCS operators

**International Gateway Operators**
- 5 operators

The recent fast growth of the number of telephone lines was driven by very rapid increase of the number of mobile phone users. There were only 889 mobile users in 1996 compared to 766,052 (including WLL lines) ten years later. Table 3 below shows the growth of fixed and mobile users year by year.

Table 3: Subscriber Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of subscribers (Fixed)</th>
<th>Mobile</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MT</td>
<td>RailCom</td>
<td>MobiCom</td>
</tr>
<tr>
<td>2000</td>
<td>113,000</td>
<td>4,000</td>
<td>80,000</td>
</tr>
<tr>
<td>2001</td>
<td>120,000</td>
<td>12,000</td>
<td>190,000</td>
</tr>
<tr>
<td>2002</td>
<td>129,390</td>
<td>8,826</td>
<td>193,182</td>
</tr>
<tr>
<td>2003</td>
<td>140,789</td>
<td>9,035</td>
<td>258,911</td>
</tr>
<tr>
<td>2004</td>
<td>150,951</td>
<td>9,391</td>
<td>395,107</td>
</tr>
<tr>
<td>2005</td>
<td>147,631</td>
<td>14,328</td>
<td>478,987</td>
</tr>
</tbody>
</table>

Source: CRC 2006.

The total market size has grown at a compound rate above 25 percent per year between 2001 and 2005. By far the fastest growing segment is the GSM network owned by MobiCom, with 95 percent of its customers on pre-paid accounts. Although, Mobicom’s average revenue per
user (ARPU) of US$ 11.4 per month is much less than MT’s US$ 16.8 due to some very high revenue government and business customers as well as public payphones, MobiCom gradually became the largest operator on a revenue basis also. While Skytel’s network is also growing significantly, its national presence is much more limited. Unitel the second GSM operator provides services in five provinces and has a customer base of approximately 40,000 subscribers. RailCom’s customer base is limited to communities through which its optical fiber network passes on the North-South rail route.

**Figure 1: Existing Backbone Telecom Infrastructure in Mongolia**

As shown in the Figure 1, the national transmission infrastructure includes:

- 2,800 km analogue and 900 km digital microwave links operated by ICNC from Ulaanbaatar to the Western aimags;
- Broadband digital microwave owned by MobiCom to 7 Western and Southern aimags. In the western provinces, MobiCom is largely leasing space from ICNC in the same buildings and on the same towers as used by the analogue microwave network;
- 2,500 km of optical fiber operated by ICNC linking Eastern (Khenti, Domod and Sukhbaatar) and Western (Bulgan, Murun, Khovd, Uvs, Zavkhan) aimags to Ulaanbaatar;
- 1,450 km optical fiber owned by RailCom – North-South from the Russian border to the Chinese border via Ulaanbaatar;
- 120 km of optical fiber owned by Skytel in Ulaanbaatar;
- VSAT satellite terminals operated by ICNC linking 13 aimag centers and 5 soums to Ulaanbaatar;
- 25,000 km of open-wire line, owned by ICNC, linking soum centers with the aimag centers; and
• More than 3,000 km of fiber optic network installed in 2006 linking western and southern regions of Mongolia.

OWNERSHIP AND RIGHTS WITH RESPECT TO NATIONAL INFRASTRUCTURE

The newly established network company, ICNC, is responsible for managing and further developing the state owned telecommunications backbone network. The network consists of international and domestic long distance transmission and international switching facilities. This does not imply exclusivity and monopoly over all such services. The Act does not impose restrictions on other operators in building out their own transmission networks. For example, RailCom and Mobicom have constructed and own major optical fiber and digital microwave facilities. Skytel owns optical fiber facilities and all own their own switches. New network operators have also been licensed to provide broadband network infrastructure in Ulaanbaatar.

ICNC was given the right and responsibility to carry out technical design and implementation for its facilities, organize investment into the network, and conclude operating contracts with operators. However, the privatization agreement between the GoM and Korea Telecom confers upon MT exclusive rights over the leasing of bandwidth on the state owned backbone, such that third parties – other telecommunications operators and Internet service providers (ISPs) – must sub-lease bandwidth from MT.

MT pays an annual lease fee to the GoM. The lease fee is not based on MT’s revenues but is a percentage of the value of the assets, specifically, 7.5 percent of local network assets, 7.45 percent of national network assets and 12 percent of international assets.

MONGOLIA TELECOM (MT)

In the first phase of privatization, the state-owned Mongolian Telecommunications Company was converted to Mongolia Telecom (MT), a shareholding company, in August 1995. Under the arrangement, MT leases the national telecommunication network assets from the government, which owns the entire network infrastructure. ICNC operates all of the international and national long distance transmission and switching facilities and all rural distribution networks comprising of about 25,000 km of open wire transmission and an array of small switching systems, mostly Private Branch eXchanges (PBXs). The network assets are utilized to offer a range of basic telecom services such as international and domestic long-distance and local telephony services.

Korea Telecom invested US$ 4.5 million for a 40 percent stake in MT upon the establishment of the shareholding company in 1995. Part of the remaining 60 percent was offered to the public, raising US$ 6.5 million. With a 5.56 percent share moved into the hands of private investors, the government retained a 54.44 percent stake.

The network is present in all aimags and has been considerably updated in the last few years in accordance with a comprehensive Network Master Plan to 2010. All aimag centers now have digital exchanges (mostly Siemens EWSD with approximately 2,000 lines capacity) and are linked to the national backbone with digital microwave or optical fiber transmission systems. Darkhan and Erdenet have much larger exchanges.

MT’s revenues currently stand at approximately US$ 31.9 million per year (in 2005). Approximately 75 percent of MT’s revenues come from Ulaanbaatar.
**MOBICOM**

MobiCom Co. is majority owned by Japanese companies KDDI and Sumitomo, with approximately 20 percent being held by Mongolian shareholders. It was the first mobile entrant, launching operations in March 1996. The company provides GSM 900 and 1800 based service and has now established a presence in every aimag though over 80 percent of its mobile customers are in Ulaanbaatar. MobiCom’s growth has been aggressive and is still growing at approximately 15,000 customers per month. About 95 percent of its customer base uses prepaid services through the Mobicard service marketed through its subsidiary NewTel Card. MobiCom also has more than 13,000 WLL city customers using CDMA technology.

MobiCom has its own digital microwave backbone to seven provinces in the Khangai and Western regions and leases RailCom fiber in the Central Region and microwave and optical fiber from MT to other provinces. It mostly uses existing towers and equipment buildings, e.g., ICNC microwave and TV broadcast towers.

MobiCom’s annual revenue is US$ 65 million indicating monthly ARPU of approximately US$ 11.4. The company admits that this is declining (similarly to other mobile operators worldwide) as market penetration increases. It is committed to serving rural areas in a commercial manner and has some recent experience from special rural marketing campaigns. However, its ARPU in some rural areas is as low as US$ 1-2 per month.

**SKYTEL**

Skytel, a Korean-Mongolian joint venture between SK Telecom and Taihan Electric Wire Co. of Korea (60 percent ownership share) and Mongolian partners (Altai Holding, MCS Holding, and Univcom Co Ltd), commenced mobile service provision in 1999, offering first the AMPS standard and then converting to CDMA. About 90 percent of its cellular customers are prepaid. Skytel is currently present in 20 aimags, has installed 120 km of optical fiber cables in Ulaanbaatar and is planning to install its own fiber in the northern aimags of the Central region.

While having a much smaller network and presence than MobiCom, Skytel also has experience with serving rural population and showed some interest in reaching rural areas. It reports having customers up to 30 km from some of its base stations. However, both Skytel and MobiCom would venture only carefully into areas where pay-back could be secured over five years.

**UNITEL**

UNITEL, a joint venture between a local Mongolian firm BSB Telecom and a South Korean firm U-Angel, was licensed through a competitive process in August 2005 to provide nationwide GSM services. Unitel launched commercial services in June 2006 and had approximately 40,000 subscribers in five provinces as of December 2006.

**G-MOBILE**

In April 2006, CRC licensed G-Mobile, a wholly Mongolian owned CDMA 450 operator, to provide services in rural Mongolia. According to the tender conditions for the competition in which G-Mobile was awarded the license, it is obliged to serve 125 soums and cannot
provide services in the 3 main urban areas, i.e., in Ulaanbaatar, Darkhan, and Erdenet. According to its plans, G-Mobile is planning to reach 180 soum centers.3

RAILCOM

RailCom Company was established in 2002 to operate Mongolia Railway’s telecommunications network and to offer telephony and Internet services, in competition with MT, in communities along the railway route. It currently has 14,000-15,000 customers. RailCom’s communications network includes 1,400 km of 12 strand optical fiber, carrying STM4 transmission systems, 5 Siemens EWSD public exchange switches and 13 digital PBXs. In addition to serving its customers, RailCom leases multiple E1s to MT, MobiCom and Skytel. RailCom is currently considering upgrading its fiber network. RailCom acts as a national Internet gateway linking up one STM1 bandwidth with international carriers and retails bandwidth to local Internet Service Providers (ISPs).

SATELLITE SERVICE OPERATORS

Incomnet and MCS are both 100 percent privately owned local companies. They provide voice and data services to corporate clients, including banks and the Ministry of Finance.

The three global providers of global mobile personal communication service (GMPCS)? Iridium, Globalstar, and Thuraya? all offer services in Mongolia. The advantage of GMPCS is that it can offer near mobile quality of service without geographical limitation, virtually anywhere in the country. The handset terminals typically cost in the US$ 700-1,000 range and thus much less than VSATs. The disadvantage is that there is no local ground station hub in Mongolia and therefore all national call traffic is currently priced in the neighborhood of US$ 1.60 per minute. In total there are 226 subscribers of GMPCS in Mongolia.

INTERNET SERVICE PROVIDERS

Mongolia has 26 Internet service providers (ISPs), offering leased line and dial-up access and interconnected to an Internet exchange installed in 2001. The companies active in the market, with approximate market shares and presence are shown in the Table 4 below.

Under the Act and Policy, ISPs are not precluded from owning their own infrastructure and access networks. However, apart from MT, MobiCom, Magicnet and Incomnet (operates a VSAT network), all companies either offer only dial-up service or use leased lines for backhauling customer terminations to Ulaanbaatar.

There are over 1,400 Internet hosts in the country; the number of registered customers is estimated at approximately 70,000 and there are about 165,000 Internet users. Internet cafés mainly exist in Ulaanbaatar, some aimag centers and bigger towns also have Public Internet Centers (PICs).

3 A post-license agreement between CRC and G-Mobile allows G-Mobile to enter the Ulaanbaatar, Darkhan, and Erdenet markets after it starts providing services in 175 soum centers. However, CRC reacted to the legal action by MT, Mobicom and Skytel, by deciding to rescind this post-license agreement in early 2007.
Table 4: Market Share of ISPs

<table>
<thead>
<tr>
<th>Approximate market share (%)</th>
<th>Presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>MagicNet 24.2</td>
<td>Has leased lines to provide local presence in aimag centers</td>
</tr>
<tr>
<td>Micom 22.5</td>
<td>Offers local dial-up &amp; leased line access nationally in aimag centers</td>
</tr>
<tr>
<td>MobiNet 11.6</td>
<td>Offers mobile dial access nationally</td>
</tr>
<tr>
<td>Erdemnet Tuv 0.1</td>
<td>Offers corporate connection</td>
</tr>
<tr>
<td>Bodicom 1.2</td>
<td>Offers local dial-up and purchase of computers</td>
</tr>
<tr>
<td>MCSCom 20.4</td>
<td>Installing a corporate VSAT network in several aimag centers</td>
</tr>
<tr>
<td>Railcom 8.3</td>
<td>Offers local dial-up</td>
</tr>
<tr>
<td>Sky C&amp;C 7.5</td>
<td>Offers wireless connection</td>
</tr>
<tr>
<td>Incomnet Corporate &amp; VSAT only &amp; 59 sites nationally</td>
<td></td>
</tr>
<tr>
<td>Sansar Internet 2.9</td>
<td>Provides Internet over CATV</td>
</tr>
<tr>
<td>Wireless Com 0.6</td>
<td>Offers wireless connection</td>
</tr>
<tr>
<td>Sita 0.6</td>
<td>Offers local dial-up</td>
</tr>
<tr>
<td>Boldsoft Newly established</td>
<td>It offers ADSL and xDSL services</td>
</tr>
<tr>
<td>Hanscom Newly established</td>
<td>It offers Internet services and connection fiber optical cable</td>
</tr>
</tbody>
</table>

INVESTMENT NEEDS AND FINANCING

Mongolia has one of the smallest communication markets in East Asia, largely due to having a relatively low GDP per capita combined with a small population base and limited access to telecommunication services outside of the capital.

Financing for the sector mostly comes from private investors in the data and mobile markets. Grants, supplier credit and soft loans (from JBIC, KfW and ADB) have been used to upgrade and build the long-distance transmission infrastructure. These investments were made by ICDC through the government budget until the recent sector restructuring.

Private mobile operators have made cumulative investments of over US$ 100 million in the sector over the last ten years. This trend will likely continue as new entrants make investments in the sector, and existing operators, expand their networks and service offerings.

Mongolia faces similar challenges to other developing countries in terms of financing substantial network rollout. To achieve a target of 35 lines per 100 inhabitants by 2010 from the current level of about 30 per 100 (fixed plus mobile), it would require about US$ 30 million assuming that 30 percent of all lines installed were fixed and the remaining were mobile.4

Financing needs are greatest in: (i) upgrading the infrastructure in rural Mongolia, and providing services to unserved rural communities; and (ii) developing an improved

4 Assumptions: Cost per fixed line about US$ 500 per line and cost per mobile subscriber about US$ 150 per subscriber. Higher benchmark costs attributed to high cost of service provision in rural Mongolia.
transmission network in the country and building redundancy in the backbone network. While the private sector has made investments in those areas where demand exists, the government, through ICNC, is making public investments in developing a north-west fiber optic transmission network, trialing a high capacity optical transmission network with Railcom, and considering utilizing supplier credit from Chinese equipment manufacturers to finance upgrades and new investments in the publicly owned infrastructure network. The estimated cost of financing the backbone network is approximately US$ 100 million.

The private sector is extending services on its own to those areas that are commercially viable. The cost of supplying communications services to rural communities, and especially to remote areas is many times higher than the cost of providing the same services in the urban environment. In Mongolia, this is particularly true because of large distances combined with very low population density. Thus the cost per potential customer is very high in all but the few soums which are located very close to the aimag centers.

The financing required to provide telecommunication and data services in rural Mongolia are in the range of approximately US$ 18-25 million indicated below in Table 5.

<table>
<thead>
<tr>
<th>Service</th>
<th>Beneficiary targets</th>
<th>Quantity</th>
<th>Estimated cost to USOF, US$ million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satellite-based public access telephony service</td>
<td>1 terminal per group of approx. 100-150 herder families, located at or in vicinity of Bagh headquarters</td>
<td>1500 terminals</td>
<td>6.0 – 8.0</td>
</tr>
<tr>
<td>Competitive voice and data services through wireless access points</td>
<td>Residents and businesses in commercially viable soum centers, average 100 lines per soum 1 PAC per soum, located at school, bank, telecom service provider, small business or other publicly available locale, including initial training and support</td>
<td>Up to 200 systems</td>
<td>4.0 – 8.0</td>
</tr>
<tr>
<td>Internet public access centers (PAC)</td>
<td>1 PAC per soum, located at school, bank, telecom service provider, small business or other publicly available locale, including initial training and support</td>
<td>Up to 200 PACs</td>
<td>3.0</td>
</tr>
<tr>
<td>Schools Internet support</td>
<td>3 years support for vanguard schools in soum center locations</td>
<td>Up to 200 schools</td>
<td>3.0</td>
</tr>
<tr>
<td>Public Mobile (e.g., GSM or CDMA) service</td>
<td>Residents within line of sight of one base station located at or in vicinity of the soum center</td>
<td>30 base stations</td>
<td>2.0 – 3.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>18.0 – 25.0</strong></td>
</tr>
</tbody>
</table>

Thus, the total financing needs in the sector up to 2010 amount to approximately US$ 150 million. This will allow for an upgrade of the national backbone network, the provision of improved telecommunication and data services in soum centers, and the provision of basic access to herder and other rural populations.
SECTOR PERFORMANCE

Mongolia has demonstrated a strong commitment to modernizing its national telecommunications infrastructure. In the early 1990s, the country had an analogue network which essentially only supported a basic telephony service. There were no data or other value added services in the country. However, starting in the late 1990s, the efforts to transform the situation has resulted in the digitalization of over 70 percent of the country’s fixed telephone lines with the installation of modern switching systems and digital microwave and satellite transmission systems. By 2005, 99.5 percent of the network was digital.

ACCESS AND QUALITY

Major advancements were made in bringing telecommunication services quality closer to the international standards since 1995, especially in urban areas. By end 2005, total number of fixed, mobile and wireless telephone lines was 766,052, and the national telephony density recorded 29.8 lines per 100 inhabitants as a total. National teledensity is summarized below in the Table 6.

Table 6: National Teledensity, as of end 2005

<table>
<thead>
<tr>
<th>Type of telephone</th>
<th>Lines</th>
<th>Teledensity (%)</th>
<th>Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td>161,956</td>
<td>6.3</td>
<td>MT and RailCom</td>
</tr>
<tr>
<td>Mobile and WLL</td>
<td>604,093</td>
<td>23.5</td>
<td>MobiCom, Skytel, and MT</td>
</tr>
<tr>
<td>Total</td>
<td>766,052</td>
<td>29.8</td>
<td></td>
</tr>
</tbody>
</table>

Source: CRC 2006.

Figure 2 shows that the percentage of the population covered by mobile telephony in Mongolia compares favorably with countries in the same income bracket. It must be noted however, that the majority of mobile telephone subscribers are concentrated in the urban centers.

Figure 2: Mobile Phone Coverage: An International Perspective

In terms of quality indicators for mainlines, as measured by reported telephone faults in 2003, Mongolia also ranks better than its comparator countries as shown in Figure 3.

**Figure 3: Reported Mainline Telephone Faults**

![Figure 3: Reported Mainline Telephone Faults](image)

*Source: Estache and Goicoechea 2005.*

Table 7 compares Mongolia with its neighbors (Russia and China) and other benchmarks countries. It seriously lags its neighbors in almost all basic telecommunications indicators, partially due to its much lower per capita income. However, it is on par or more developed than its peers in Central and South-East Asia. Low personal computers (PCs) penetration and high cost of access, particularly in rural areas, is one of the main inhibitors of Internet expansion. In 2005 the GoM launched a budget PC program to increase the number PCs in Mongolia.

**RURAL TELECOMMUNICATIONS**

Hard data on the digital divide (both in terms of geography and income) are not available. Nevertheless there is enough evidence that the shortage of access to telecommunications services is most extreme in rural areas. Without a stable regulatory structure any inflow of private sector investment is unlikely to address the severe rural access problem.

There is a dramatic disparity in the availability of information and communications infrastructure and services between the rural and urban areas as illustrated in Table 8 (data for end of 2005). Over 90 percent of all subscribers are in the aimag capitals and larger soums.

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5 We made an effort to use the most recent data available. However, data on the rapidly developing ICT sector are often outdated by the time they are published. Moreover, in order to be able to make comparisons we had to go back to years where data were available for most of the countries. It is recognized that the question of benchmarks selection is complex. China and Russia are the only neighbors. Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan are geographically close with common communist past. Pakistan, Nepal, Cambodia, Viet Nam, Bangladesh, and India are countries from South-East Asia with similar GDP per capita. Estonia’s progress in the last 15 years serves as an inspiration.
Table 7: Basic Telecommunications Infrastructure Benchmarks

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP per capita 2003, PPP (US$)</th>
<th>TVs per 100 inhabitants, 2001</th>
<th>Main lines per 100 inhabitants, 2003</th>
<th>Cellular penetration, March 2005</th>
<th>Total telephone subscribers per 100 inhabitants, 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mongolia</td>
<td>1,850</td>
<td>7.2</td>
<td>5.6</td>
<td>14.4</td>
<td>18.6</td>
</tr>
<tr>
<td>China</td>
<td>5,003</td>
<td>31.2</td>
<td>20.9</td>
<td>25.0</td>
<td>42.4</td>
</tr>
<tr>
<td>Russia</td>
<td>9,230</td>
<td>53.8†</td>
<td>25.3</td>
<td>55.9</td>
<td>50.2</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>6,671</td>
<td>33.8</td>
<td>14.1</td>
<td>19.0</td>
<td>19.5†</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>1,751</td>
<td>4.9</td>
<td>7.6</td>
<td>7.5</td>
<td>10.3</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>1,106</td>
<td>35.7</td>
<td>3.7</td>
<td>2.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>5,938</td>
<td>18.2</td>
<td>7.7</td>
<td>0.3</td>
<td>7.9†</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>1,744</td>
<td>28.0</td>
<td>6.7</td>
<td>2.3</td>
<td>8.0</td>
</tr>
<tr>
<td>Pakistan</td>
<td>2,097</td>
<td>15.0</td>
<td>2.7</td>
<td>6.3</td>
<td>4.4</td>
</tr>
<tr>
<td>Nepal</td>
<td>1,420</td>
<td>0.8</td>
<td>1.6</td>
<td>1.0</td>
<td>1.8</td>
</tr>
<tr>
<td>Cambodia</td>
<td>2,078</td>
<td>0.8</td>
<td>0.3</td>
<td>7.5</td>
<td>3.8</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2,490</td>
<td>18.6</td>
<td>5.4</td>
<td>6.3</td>
<td>8.8</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1,770</td>
<td>5.0</td>
<td>0.5</td>
<td>3.5</td>
<td>1.6</td>
</tr>
<tr>
<td>India</td>
<td>2,892</td>
<td>8.2</td>
<td>4.6</td>
<td>4.9</td>
<td>7.1</td>
</tr>
<tr>
<td>Estonia</td>
<td>13,539</td>
<td>46.9</td>
<td>34.1</td>
<td>92.4</td>
<td>111.9</td>
</tr>
</tbody>
</table>

† Data from 2002.
‡ Data from 2000.


With virtually no exceptions, the only fixed telecommunications service reaching into soums is provided by MT. However, this is limited almost exclusively to a few lines extended into the 350 soum centers by means of an open wire link from the aimag centers. Whereas soums do typically have many lines (average 26) there is a very wide variation in both the number and quality of the lines. A small PBX provides local switching in most soums, though the connection to the aimag center is operator-handled in many cases. In about 40 soums (mostly located closest to the aimag centers) a low capacity carrier system is used for transmission, to allow automatic dial connection from the PBXs. However, the automatic dial provision in most soums is just one or two single public access lines, extended from the Siemens EWSD digital exchange at the aimag center. These access lines are typically located at the MT office.

In about 20 remote soums, VSAT rather than open wire is used for the long distance connection and MT has plans to use VSAT in about 30 additional soums—typically those where the open wire transmission link to the aimag center is above 200 km.

Local distribution within each soum center to local government offices, businesses and residences, is usually by means of overhead metallic wires. In a small number of soums, a low capacity DECT or other cordless system is used.

Although the coverage of mobile services is expanding, the only cellular mobile service in most soums today is spillover from aimag center and highway route base stations.
Table 8: Teledensity by Aimag

<table>
<thead>
<tr>
<th>Aimag</th>
<th>Population</th>
<th>Number of mobile and WLL subscribers</th>
<th>Number of fixed subscribers (only MT)</th>
<th>Teledensity per 100 person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkhangai</td>
<td>95,884</td>
<td>2,807</td>
<td>1,707</td>
<td>4.7</td>
</tr>
<tr>
<td>Bayan-Olgii</td>
<td>103,042</td>
<td>4,743</td>
<td>3,109</td>
<td>7.6</td>
</tr>
<tr>
<td>Bayanhongor</td>
<td>84,809</td>
<td>4,461</td>
<td>2,092</td>
<td>7.7</td>
</tr>
<tr>
<td>Bulgan</td>
<td>61,201</td>
<td>1,328</td>
<td>2,233</td>
<td>5.8</td>
</tr>
<tr>
<td>Govi-Altai</td>
<td>61,776</td>
<td>3,334</td>
<td>2,403</td>
<td>9.3</td>
</tr>
<tr>
<td>Darhan-Uul</td>
<td>88,716</td>
<td>18,563</td>
<td>10,561</td>
<td>32.8</td>
</tr>
<tr>
<td>Dornogovi</td>
<td>53,037</td>
<td>12,725</td>
<td>4,299</td>
<td>32.1</td>
</tr>
<tr>
<td>Dornod</td>
<td>74,506</td>
<td>6,668</td>
<td>2,579</td>
<td>12.4</td>
</tr>
<tr>
<td>Dundgovi</td>
<td>50,502</td>
<td>2,217</td>
<td>2,066</td>
<td>8.5</td>
</tr>
<tr>
<td>Zavkhan</td>
<td>81,593</td>
<td>2,794</td>
<td>2,500</td>
<td>6.5</td>
</tr>
<tr>
<td>Orkhon</td>
<td>79,377</td>
<td>17,803</td>
<td>9,991</td>
<td>35.0</td>
</tr>
<tr>
<td>Uvurhangai</td>
<td>114,617</td>
<td>5,158</td>
<td>3,436</td>
<td>7.5</td>
</tr>
<tr>
<td>Umnugovi</td>
<td>47,265</td>
<td>3,237</td>
<td>2,138</td>
<td>11.4</td>
</tr>
<tr>
<td>Sukhbaatar</td>
<td>57,080</td>
<td>2,357</td>
<td>1,527</td>
<td>6.8</td>
</tr>
<tr>
<td>Selenge</td>
<td>101,476</td>
<td>8,649</td>
<td>3,638</td>
<td>12.1</td>
</tr>
<tr>
<td>Tuv</td>
<td>89,185</td>
<td>3,745</td>
<td>2,341</td>
<td>6.8</td>
</tr>
<tr>
<td>Uvs</td>
<td>82,318</td>
<td>4,535</td>
<td>2,732</td>
<td>8.8</td>
</tr>
<tr>
<td>Hovd</td>
<td>89,135</td>
<td>4,946</td>
<td>2,715</td>
<td>8.6</td>
</tr>
<tr>
<td>Huvsgul</td>
<td>122,933</td>
<td>5,581</td>
<td>4,110</td>
<td>7.9</td>
</tr>
<tr>
<td>Hentii</td>
<td>71,953</td>
<td>3,283</td>
<td>2,584</td>
<td>8.2</td>
</tr>
<tr>
<td>Govisumber</td>
<td>12,421</td>
<td>1,481</td>
<td>1,253</td>
<td>22.0</td>
</tr>
<tr>
<td>Ulaanbaatar</td>
<td>939,996</td>
<td>486,289</td>
<td>93,064</td>
<td>59.5</td>
</tr>
<tr>
<td>Total</td>
<td>2,562,822</td>
<td>588,126</td>
<td>162,346</td>
<td>29.2</td>
</tr>
</tbody>
</table>

Source: CRC 2006.

There are virtually no fixed lines outside the soum centers, i.e., at the bagh level, and the vast majority of residents are seasonally nomadic. The Japanese government provided an HF radio network, which is not interconnected with the PSTN network, for the use of bagh administrators. However, the utility of the network is reportedly very limited. The only other communications available in the rural areas, outside the soum centers, are the following:

- In the vicinity of aimag centers, some rural dwellers have mobile phones;
- A small number of permanent mining communities have PSTN services because their demand is at least as strong as that of a remote soum center; and
- There are about 226 individuals or organizations (e.g., mines, NGOs, and government) with GMPCS subscription in Mongolia. Probably only half of these are in permanent or semi-permanent localities; the remainder will be kept in Ulaanbaatar or another city and used only on the occasion of travel into remote areas.

**EFFICIENCY AND AFFORDABILITY**

Although the telecommunications sector has seen impressive growth in the last five years, based data available for 2003 (see Figure 4), Mongolia still ranks among the lowest in revenue per telecom employee.
Price data from the same year (see Figure 5) shows Mongolia with the lowest price in its income group. However, rather than reflecting cost advantages, this low rate is indicative of the unbalanced and below cost tariffs for fixed lines. Figure 6 shows that among East Asian countries, Mongolia also has the lowest residential telephone subscription cost.

**Figure 5: Cost of Local Phone Call**


THE MAIN ISSUES

**POLICY AND INSTITUTIONAL ISSUES**

The regulatory and legal framework governing the sector is somewhat developed, although significant bottlenecks remain. Some of these are created by the unusual structure of the fixed-line market, whereby the network assets are owned and controlled by a state entity, but operated by Mongolian Telecom. However, despite a generally positive environment, Mongolia’s telecommunications market suffers from some limitations and regulatory barriers which, combined with the country’s vast and challenging geography, limit the sector’s capacity for growth and could impact the ability to achieve universal access/service.
At the very least, these factors will tend to increase the cost of providing universal access/service.

The challenges faced by the market include the following:

- Despite privatization and liberalization, the small population size (2.5 million) and low affordability (per capita income of only US$ 400) mean that the telecommunications market is not readily attractive to outside investors; and
- Under current arrangements, which provide MT with control over most third-party leasing of state-owned backbone, the private sector operators feel that the terms and cost of leasing network backbone capacity are unfavorable. As a result, they are building their own facilities in various parts of the country, thus incurring additional costs and, in some instances, creating duplicate facilities which in a country with a small market such as Mongolia could be considered inefficient.

The tariff and interconnection regime, usually pillars for achieving true market liberalization in the fixed service market, are still in need of some reform and enforcement. Tariff rebalancing is still only partially completed and CRC’s ability to enforce compliance with principles of fair interconnection, which are spelled out in principle in the Act, needs to be strengthened.

There are several public agencies participating in the sector including ICTA as the key policy department, CRC as regulator, the Supervisory and Regulating Commission in respect of general competition law, and the State Property Committee as owner of MT. There are conflicting powers and functions amongst existing authorities within the sector without a properly defined legislative basis, function or objective. These could potentially lead to duplications and disputes. Moreover, after the restructuring of government and establishment of ICTA, the agency exercises the role of policy-maker, regulator and operator, through the membership of its officials in CRC and on the board of MT. The role of ICTA as policy maker and operator is an arrangement that is seen as inappropriate, especially since the private sector plays a leading role in telecommunications development in Mongolia. There is also an informal overlap of the functions of ICTA with the functions of CRC in the management of a competitive environment for telecommunications, and the settling of tariff and interconnection issues. Therefore, there is a risk of over-intervention illustrated by the fact that ICTA has in the past, issued a number of specific directives to CRC and operators such as issuing a CDMA 450 licenses, even though government policy stresses technology neutrality and requiring that all international gateway operators terminate incoming international VOIP traffic through a government-owned switch.

Achieving the appropriate balance of autonomy and accountability is a serious issue for CRC as it does not have adequate authority to enforce its decisions, nor the political independence to make important decisions required under the law. Because many of the members of the Commission are senior government officials there is a high risk of
government influence. With the government still a majority owner in the fixed line incumbent MT, independence of CRC from industry is also an issue. The CRC and operators have increasingly also come under political pressure to decrease tariffs without economic justifications.

Since the restructuring of government in October 2004 and the subsequent formation of ICTA, a new sector policy defining strategic objectives for the sector and roles and responsibilities of the various agencies has not yet been approved by the government. While the “E-Mongolia” vision provides some guidance, it is lacking in details, strategy and a monitoring framework.

The legal environment for telecommunications in Mongolia is not well developed. The Communications Act is general in nature and does not provide detailed provisions for regulating the sector. Secondary implementing legislation in the areas of interconnection and dispute resolution is also inadequate. Additionally, the processes followed by the CRC in making regulatory decisions are not always transparent with little public consultation in arriving at regulatory decisions. The process, proceedings and decisions are seldom published.

COMPETITION

While competition in the sector exists in the areas of service provision, MT’s monopoly lease over state-owned transmission assets continues to be a bottleneck to sector development. This is evidenced by MT’s high leased line charges, vis-à-vis prices in comparable countries for transmission capacity on the backbone. Once ICNC becomes fully operational, it is expected that operators will have open access to ICNC’s network transmission capacity.

Further, given Mongolia’s relatively recent move from a socialist centrally planned to a market economy, there is limited understanding within government and industry on the functioning of competitive markets. The current legislation and processes in Mongolia focus on dominant services and dominant operator in deciding whether or not to regulate, with market share being the only test for dominance. In determining dominance, the CRC does not test whether a telecom company can exercise market power at the national and local level, and whether the company uses price and non-price factors to create barriers to competition.

Larger access providers offer their own ISP subsidiaries preferential terms and conditions for access to the network—in comparison to those offered to their competitors—in terms of price, timely access to bottleneck infrastructure, and different quality of service. While such behavior is covered by both the Unfair Competition Law and the Communications Act, enforcement remains a challenge.

UNIVERSAL ACCESS

Providing access to basic voice and data services in Mongolia remains an unresolved issue. Wide access disparities exist between the urban and rural area of Mongolia. The geographical and demographic characteristics of Mongolia, coupled with resource constraints have resulted in uneven access to telecommunication and other information services between rural and urban areas. While it is government policy to provide at least one line per Bagh center, the cost of providing rural infrastructure is very high and ensuring access is difficult and challenging. The incumbent MT bears the obligation to provide rural
services, but has limited resources and capacity to implement rollout of rural services in a
timely and efficient manner. USOF, which is provided for under the law to support the
extension of availability of telecommunications services in rural areas, was established only
recently and resources from sustainable sources only started to accumulate into the fund. A
World Bank financed project provided seed capital for the fund and the first pilot projects
were completed in 2006 with promising results.

Internet access is still low nationwide and virtually non-existent outside of urban areas.
Many of the smaller Aimag centers also do not have quality and affordable Internet access.
New approaches to improving Internet access in rural areas have to be explored, including
providing targeted subsidies for the provision of services.

**PRICING AND INTERCONNECTION**

MT’s tariffs for local and national long distance calls are below cost. International call rates
have reduced with the introduction of competition in the market. As a result, MT’s revenues
have dropped significantly. In 1999, 42 percent of MT’s revenues came from international
service, while today it is only 10 percent. There is need to further rebalance tariffs in order
that Mongolia Telecom can finance new investments and also service its debt.

CRC currently does not regulate tariffs of those services open to competition. While leased
line prices are subject to regulation, CRC does not have the capacity to carry out a modern
tariff review process for firms with significant market power. A forward looking review
would help CRC, ICTA, and industry stakeholders understand the implications of future
regulatory actions.

A non discriminatory and transparently managed interconnection regime, under which
major operators are obliged to provide cost based interconnection, is important for a
competitive environment but there are trade-offs between the available options. In
Mongolia, as in other countries, as real competition has developed, larger players have used
market and political power to manipulate interconnection terms and conditions to their
advantage. Mongolia does not as yet have a well functioning process to set or appeal
interconnection disputes and rates and CRC has limited capacity to deal with emerging
challenges in this area.

The terms and conditions of interconnection are critical to the development of the sector,
including rural communications. In particular, the rights of rural operators to secure
favorable terms for the physical interconnection of rural and long distance networks, and
the setting of termination rates for incoming calls that fairly reflect the cost of network
provision in rural areas, are both important. The latter is important because typically there is
a great potential for incoming calls to become a very significant factor in rural areas; thus
asymmetric termination rates which compensate rural operators fairly could create
significant investment incentive and potential for commercial viability.

**SECTOR RESTRUCTURING**

The State Hural adopted the privatization guidelines in July 2005 that provide for the
unbundling of the government owned assets into network and service companies and
further privatization of both the resultant NetCo and ServCo. A policy objective of the
restructuring is to improve competition in the sector by removing barriers to access.
The restructuring is expected to create incentives for operators to more efficiently utilize the existing and future infrastructure assets (through sharing) and compete more vigorously resulting in reduced prices for end users. To facilitate this separation, the restructuring will see the future issue to operators of either a network or service license, but not both, requiring operators to choose whether they will be service or network providers. The decision to opt for full separation of network and services was based, in part, upon the fact that the network infrastructure used by MT is leased from the GoM. Whilst the restructuring is a further development of the pre-existing sector structure, Mongolia will be one of the first markets globally to implement full separation of network infrastructure and services (and thus, this approach is not yet fully tested, results are uncertain and lessons learned are not available). Therefore, it is important to ensure that the full network/services separation model is adequately supported by a well thought-through regulatory framework.

The GoM approved the restructuring of MT into a network company (NetCo) owned by the GoM and a service company (ServCo) on August 22, 2006. With this restructuring, the nature of regulation will have to change, with regulation focusing on ensuring: (i) open access to networks; (ii) that NetCo and other potential network companies do not extract unfair monopoly rentals from ServCo and other service companies; and (iii) that cross ownership of service and network companies do not affect competition. CRC in its current form may not have the capacity to do this properly.

There are a number of issues related to the ongoing restructuring of the sector. These include the need to ensure that (i) property rights of privately owned companies who currently both operate networks and provide services are respected and private investments are sustained; (ii) services continue to be provided in areas currently being served (even in commercially unviable areas) until such time that the universal access program reaches these areas; and (iii) inefficient public investments, especially funded by bilateral supplier credits, are not made.

One of the critical steps in the restructuring is reaching an agreement with MT and its 40 percent owner Korean Telecom over the cancellation of the exclusive lease agreement regarding the telecommunications infrastructure owned by the GoM. In the absence of agreement the restructuring is only a virtual exercise without real implications. The limited availability of free GSM spectrum in the 900 MHz band and the possible implications of another GSM license on the telecommunications market might be the key obstacles of reaching an agreement.

A competent and efficient management team for ICNC is one of the key success factors for the sector restructuring, especially with no immediate plans for privatization. The authorities should make extra effort to ensure that a competent and efficient management team is in place from day one of ICNC’s full operation at the latest and that the management receives sufficient support.

THE WAY FORWARD

The challenge for the GoM is to establish an effective policy and regulatory environment, conducive to the growth of and increased private investments in the sector. The main priorities for the government should be to:

- Improve the institutional structure and entrench pro-competitive policies for the sector;
• Support the policies by establishing highly credible, transparent and effective regulatory processes within CRC, including in the areas of interconnection, tariff review, licensing and dispute resolution; and

• Adopt and implement policies and programs that will systematically provide access to telecommunications and information services in rural Mongolia.

**REVIEW AND REVISE INSTITUTIONAL STRUCTURE AND PROCESSES**

The current institutional structure in Mongolia is not in line with international best practice. The regulator is not independent from undue political interference and this weakens the regulatory process. In addition, there is an overlap in the roles of ICTA and CRC. To resolve these issues, legislative changes could be necessary. The GoM has an opportunity to address this through appropriate changes to the Communications Law. The demarcation between general competition law and the telecommunications law could also usefully be clarified to avoid unnecessary duplication and disputes.

The current Communications Law could also be refined to better provide for the following:

• Better definitions of key concepts;

• Creating a competitive, level playing field for operators especially in the areas of interconnection, tariffs, and licensing;

• Removal of conflicting powers and functions amongst existing authorities within the sector;

• Regulatory independence in terms of decision making and prevention of undue political interference;

• Establishment of public consultation processes in order to institute transparent regulatory processes; and

• Linkages between the IT provisions in the law and further legislation that is required to be approved in the areas of e-signatures and e-government.

In particular, the law can provide for: (i) tenure for the Chairman and members of CRC with removal only for serious causes specified in the law; (ii) a mechanism for appointing and removing members of CRC; (iii) a reduction in number of Commissioners while making them full time members; and (iv) clear definition and demarcation in the roles, responsibilities and functions of the various government agencies involved in the sector.

The government should also consider benchmarking the remuneration of CRC members and staff against the industry that they are regulating in order to attract and retain high caliber professionals.

As Mongolia has moved towards a more competitive market structure, CRC has had to address economic and market related regulatory issues. CRC however does not have an appropriate staff skill mix to adequately address evolving market issues. It is recommended that a detailed human resource review of CRC be carried out in order to assess the skill mix required to address the technical, commercial, legal, and economic areas of regulation.

It is also recommended that CRC develops a detailed, timely, and transparent public decision making process in order to encourage industry and other stakeholders to inform
the CRC’s decisions and enable the CRC to have a full understanding of the sector it is regulating.

In addition, CRC should be encouraged to develop a statement of regulatory policy as the initial step in clarifying how the CRC would move to exercise its functions under the law. The government could then assess whether the law needs to be amended to clarify its pro-competitive intention for the law, for example, via the insertion of an objectives statement in the law.

**PROMOTE COMPETITION AND PRIVATE PARTICIPATION**

Government policy is clear in Mongolia – a competitive, private sector driven telecommunications market is desired and it is now a matter for policymakers at ICTA and CRC to ensure that operational rules maximize the opportunity for real competition to occur. Mongolia’s peculiar industry structure, especially state ownership of the transmission infrastructure and the current exclusive lease arrangement to MT, has influenced the degree and nature of competition in the sector. The GoM’s intention to restructure the sector through unbundling, should also allow for open access to transmission infrastructure at reasonable cost to all service providers. It will be important that in this situation the infrastructure assets are operated and developed efficiently. In moving ahead with sector restructuring, the government needs to ensure that:

- The property rights of privately owned companies who currently both operate networks and provide services be respected;
- The regulation of service level agreements and quality of service standards between NetCo and service companies including ServCo be clearly defined in advance;
- The regulatory regime for the proposed unbundling be clearly defined as soon as possible, especially in the areas of price regulation for network companies and interconnection;
- Upon restructuring, services continue to be provided in areas currently being served, even in commercially unviable areas, until such time that the universal access program reaches these areas as there is usually a significant difference between the costs of continuing an existing service versus providing a new service;
- Reaching agreement on the number of employees to be transferred from MT to ICNC, in order to ensure that NetCo is not burdened with more staff than is necessary to efficiently run the company;
- Reaching agreement on the valuation/re-valuation of the assets to be held by ICNC. It may be necessary for the GoM to re-value assets and potentially write off ICNC’s unusable and loss making assets;
- Reaching agreement on the allocation of existing foreign debt between ICNC, MT, and the Electricity Energy Authority; and
- Cancelling the wholesale agreements between MT and other telecommunication carriers.

The legal functions and objectives in respect of CRC’s price control function should be clarified. Ideally the GoM should decide, after consultation with CRC, which services
should be subject to price control, the objectives such controls would seek to achieve (e.g., economic efficiency), the mechanism that should be utilized (e.g., mandatory five year price caps), and the key aspects of the process that should be followed (e.g., transparency, due process and the CRC fully explaining its decisions). CRC should then undertake that duty and be accountable accordingly. Appeals to the general courts over a CRC decision should be possible to give some protection to any price controlled firm.

Firm interconnection rules should also be enacted by CRC. To this end, CRC needs to revise its interconnection regime and bring on board more trained resources to carry out this mandate. Enforcement of a credible and equitable interconnection regime is critical to facilitate new entry and provide operators (including the incumbents) with incentives to make investments. In developing new interconnection rules, the CRC should identify carrier complaints and the effects of dominance and abuses, if any. Key features of the regulatory regime should include publication of reference interconnection offers by dominant operators and the publication of time bound interconnection dispute resolution procedures.

PROMOTE EXTENSION OF RURAL TELECOMMUNICATION SERVICES

Universal access is a serious issue confronting the GoM and the telecom industry. A public sector approach to providing universal access has not been an effective solution to the problem. The GoM’s Universal Access strategy focuses on achieving an appropriate and self-sustainable level of access to voice telephony and public Internet/information services in all under-served areas, particularly rural soums that are unlikely to see sufficient private investment without intervention in the form of financial support. The key to implementing this strategy is action. Action should be taken by the government to operationalize the USOF and utilize market mechanisms to decrease the cost and increase the speed of roll out in rural Mongolia.

CRC has developed a USOF Operating Manual that provides specific guidelines and operating principles under which rural telecommunication development projects funded by USOF will be implemented. This Operating Manual describes:

- The theoretical foundation and key principles of universal access and USOF;
- The specific universal access objectives and universal service obligation targets established by CRC and the GoM;
- An overview of candidate projects and sources of finance for USOF;
- The governance, management and administration structures of USOF;
- The description of the USOF program, and project prioritization and selection criteria;
- The tendering and selection process to enable private sector operators to participate in the rural communications and universal access program;
- Subsidy disbursement procedures; and
- The role of CRC and USOF in rural operator licensing, regulation, and monitoring.

7.14. For the overall success of the universal access program it is important to ensure that USOF is operationalized in line with the guidelines specified in the USOF Operating Manual.
PROPOSED ROADMAP FOR GOVERNMENT ACTION (IN ORDER OF PRIORITY)

Table 9 provides a summary of the recommended short and long term steps for moving the sector forward.
### Table 9: Proposed Roadmap for Government Action

<table>
<thead>
<tr>
<th>Institution Structure and Process</th>
<th>Steps for the Short Term (0–2 years)</th>
<th>Steps for the Medium Term (up to 5 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commit the government to ensure tenure for CRC Chairman and Commissioners e.g. fixed five year terms.</td>
<td>CRC and ICTA to continue to build capacity to address evolving sector issues.</td>
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<tr>
<td>Clearly define in law, the roles and responsibilities of the ICTA, CRC and other agencies involved in the sector.</td>
<td>Implement a transparent decision making process.</td>
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<tr>
<td>Review and revise CRC Commissioners and staff remuneration and budget.</td>
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<tr>
<td>CRC to recruit professional staff with skills in economic regulation</td>
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<tr>
<td>Develop a detailed, timely, transparent, and public decision making process.</td>
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<tr>
<td>Competition and Private Participation</td>
<td>Follow through with government proposal to restructure and unbundle the sector.</td>
<td>Move towards cost-based tariffs and interconnection charges.</td>
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<tr>
<td>Complete privatization of Mongolia Telecom.</td>
<td>Continue tariff rebalancing.</td>
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<tr>
<td>Move remaining state-owned infrastructure to a commercially focused ICNC, preferably under management contract and privatize ICNC in the future.</td>
<td>Privatize ICNC.</td>
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<tr>
<td>Implement and improve regulatory processes and capacity.</td>
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<tr>
<td>Establish and implement a modern interconnection regulatory regime including publication of RIOs by dominant operators, and publication of time-bound interconnection dispute settlement procedures.</td>
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<tr>
<td>Undertake tariff rebalancing for fixed and leased line tariffs.</td>
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<tr>
<td>Establish the USOF and adopt the USOF Manual.</td>
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<tr>
<td>Develop and publish telecom development policy roadmap</td>
<td>Implement the developed policy roadmap according to the agreed time schedule.</td>
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<tr>
<td>Develop a policy roadmap that elaborates and reflects the above solicits and incorporates stakeholder and public comments.</td>
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OVERVIEW

Transport sector development in Mongolia directly affects the country’s principal drivers of growth, namely, services (including trade), manufacturing and mining, and livestock. In 2004, these sectors accounted for 46 percent, 24 percent, and 32 percent of gross domestic product (GDP), respectively, with the majority of services concentrated in Ulaanbaatar. The main goal of the transport sector is to sustain continued growth of the economy, reduce poverty, and provide reasonable and affordable access within Ulaanbaatar, as well as to the remote regions of the country.

Geography, climate, and social topography all make development and maintenance of transport infrastructure in Mongolia particularly costly. With one-third of the population living below the poverty level, the small national economy, and low level of public revenues, financing transport infrastructure is indeed a challenge. Institutional and human capacities are limited because of the relatively short experience with market economy and the small size of the population from which to recruit and train staff. The poverty level has important implications for the service levels and affordability of transport services. Urbanization has created a new set of problems for the sector with many of the new urban residents having poor access to public transport services, and with those services being unaffordable to many of them. In addition, the rapid increase in car ownership with inadequate traffic demand management has resulted in severe traffic congestion, a high number of traffic-related fatalities, and significant transport contribution to the poor air quality in Ulaanbaatar.

To achieve its goal, the transport sector will need (a) to respond to the increasing congestion in Ulaanbaatar resulting from the rapid urbanization and to improve access and quality of urban bus services to the ger areas; (b) to ensure adequate access from the mining regions to international markets; (c) to provide adequate and reliable trade access to the Chinese and Russian borders; and (d) to improve the connectivity of the country’s seven regions to Ulaanbaatar in an affordable and cost-effective manner.

CHALLENGES AND THE WAY FORWARD

The limited ability of new transport infrastructure investments to be recovered either from users or from taxpayers is the most pressing and enduring infrastructure issue. For delivery of services, affordability, and quality, particularly in Ulaanbaatar but also for interurban movements, is also most pressing. Compounding these issues, the small population base from which to tap into for recruitment and expertise at the institutional level presents unique challenges in the development of Mongolia’s transport sector.

In moving forward, the government needs to confront and manage five main challenges: (a) how to strengthen the policy and planning frameworks to improve resource allocation efficiency; (b) how to achieve financial sustainability for the sector considering all available financing avenues; (c) how to develop the regulatory framework to address operational efficiency better; (d) how to facilitate efficient urban growth in Ulaanbaatar; and (e) how to develop institutional and human capacity to meet the sector’s needs.

1 The mining sector accounts for about 43 percent of Mongolia’s exports. See World Bank 2006a.
Enhancing Resource Allocation Efficiency

Enhancing resource allocation efficiency requires the government to undertake a number of coordinated actions:

• Develop a results framework closely linking measurable outcomes to sector goals.

  Although in principle the Ministry of Road, Transport and Tourism (MRTT) is responsible for overall policy coordination and implementation for the sector, the planning process is typically fragmented. Links to broader economic and spatial development goals are not very clear, and the different transport subsector agencies and departments develop their plans with little coordination. In developing the overall strategic direction for the transport sector, it is important for the MRTT and responsible agencies to identify sector goals and define the ultimate objective and measurable outcomes to be achieved. The focus is not on the activities, but rather on the actual desired outcome, which will result in defining specific projects or reforms, or both. Additionally, clear measurable performance indicators need to be defined to help assess project and reform success.

• Use rigorous and consistent economic and social efficiency criteria for prioritization.

  There is no investment plan for the transport sector as a whole, and modal agencies do not have transport plans as such, but rather intentions to make a number of specific investments. The cost of the proposed investments is beyond what is possible from the public sector, and the criteria for investment selection are not clear. Consequently, there is a risk that projects with low economic returns will be implemented. To ensure that the projects with the highest social and economic returns are undertaken, it is imperative that a transport investment plan be developed on the basis of a consistent and rigorous application of social and economic assessment criteria. The plan should reflect the government’s priorities and take into account the limited financial resources likely to be available. Typically ministries of planning or finance are best suited to take the lead in setting consistent criteria that are then followed by line ministries.

  A common practice by engineering firms when preparing feasibility studies for projects, some of which are unsolicited, is to provide too much detail on the technical aspects of the project with little, often poor, analysis of the demand and the economic impacts. A balanced approach that also ensures high-quality analysis of the projects’ economic and social benefits is necessary to minimize suboptimal allocation of resources. Moreover, subjecting unsolicited proposals to the same rigorous standards of appraisal would enhance efficiency in resource allocation.

• Invest in asset preservation.

  Expenditures on road maintenance are less than half those requested by the MRTT, with other estimates placing them at about one-fourth to one-third of the needs. One of the main reasons that investment in maintenance in many countries loses out to new investment is the political appeal of new construction. Unless this issue is effectively addressed, realizing the right levels of maintenance will remain an elusive goal. Moreover, the replacement value of the road network in Mongolia has been estimated at 58 percent of GDP. This level is well above the sustainable range of 20-40 percent of GDP that was estimated in a recent asset management study. This
would strongly suggest that prior to the decision on new road investment, that maintenance requirements and their financing plans be carefully considered. It is recommended that the MRTT utilize the findings from the asset management study, carry out an analysis of the consequences of not maintaining the road network, develop an asset preservation framework, and present the findings to members of the legislature.

Establishing a Sustainable Financing Framework for the Sector

It is estimated that the total cost of the transport projects under consideration for the next decade is about 9.8 percent of expected GDP. This level of investment is unlikely to be realized, let alone sustained for long periods. Even countries such as Japan and Vietnam, which are known to have invested substantially in transport infrastructure during heavy rebuilding periods, reached about half of Mongolia’s proposed level (as a share of GDP) and sustained those high levels for a few years only. With the fast economic growth, rapid urbanization, and the new and unforeseen demands of the mining sector, the investment needs of the transport sector cannot be met from the government’s budgetary resources alone. Achieving financial sustainability requires fiscally constrained planning and sound prioritization, as well as the utilization of different financing sources—the national budget, the subsectoral transport agencies, the private sector, and international financial institutions (IFIs). At present, there is very little use of private resources to finance transport infrastructure, and the amount of concessional finance from IFIs and bilateral donors is somewhat limited by the size of the population and the economy.

A number of the investments in the government program are likely to interest the private sector. Private sources could be attracted for the proposed north–south parallel railway and the mining railways, as well as railway maintenance. Some of the road and urban transport investments can be financed using concessional loans and grants from international financial institutions and bilateral donor agencies, in which case the cost to the national budget would be the counterpart financing, usually between 10 percent and 20 percent of the total, and the subsequent amortization charges in the case of loans.

However, financial sustainability requires a clear determination of two issues: (a) how the infrastructure and services will be financed and (b) how they will ultimately be paid for. Will they be paid for directly by the users through fees and user charges, or through general government revenue, or some combination both? This has a strong bearing on pricing, since a certain level of subsidization is deemed necessary on affordability grounds.

Following are some recommendations for establishing a sustainable financing framework for the sector:

- Do not reconstitute the Road Fund if conditions for its successful operation are unlikely to be met.

Financing from the Road Fund was never secure, since revenues flowed first into the national budget. The fund was also designed to allow for the use of revenues in both new construction and maintenance, with the result that maintenance remained underfunded, since a large percentage of resources was allocated to new
construction. As a result, the Road Fund did not provide a reliable source of revenue for maintenance.

Although there may be sound arguments for road funds, experience with other road funds has shown that many rarely achieve their objectives and that the conditions that might make such an achievement possible are difficult to bring about. Moreover, many countries have been successful in achieving a satisfactory level of road maintenance without the use of road funds. It is, therefore, recommended that the fund not be reconstituted as long as the conditions for its successful operation remain unmet and that reliance be placed on direct allocations from the general budget for the funding of road maintenance in the future. It should also be noted that the budgeted expenditures on road maintenance in 2004 and 2005 have increased significantly over earlier years. At about US$4 million per year in 2004 and 2005, expenditure levels were almost three times more than the average of the previous three years.

- Mobilize private sector funds for the mining railways; and separate infrastructure and operations management.

Mining companies need reliable and adequate railway capacity to be able to export their output, one of the key drivers of economic growth. The government’s strong desire for control of infrastructure ownership should not preclude the efficient operation of the railways. Most of the options for mining railways involve private investment in railway infrastructure or operations, or both. Experience in other countries where the same company has been responsible for infrastructure and operations (vertical integration) has been mixed. Often the necessary investment in infrastructure has not been made, since it reduces the short-term profitability. Where a principal client of the railway has been one of the major investors, it has proven difficult to ensure adequate access to track and services for competing clients.

One option that would give the Mongolian government control over railway infrastructure—while allowing for substantial private investment, as well as private control over operations and investment—is a joint venture between the government and a Railway Infrastructure Company (RIC). The government would own a 51 percent share in the venture. Under this option, infrastructure and operations would be separated. Ownership of equity in the RIC would be constrained to either exclude all shareholders in railway operating companies or to include all of them to avoid restricting access to competitors. Private interest in the venture could dictate the model to follow. The RIC would invest in the rail infrastructure and make capacity commercially available to operating companies. Such a structure would require significant financial contribution by the government. A build-operate-transfer (BOT) scheme or one of its variants for the infrastructure company would still maintain Mongolian ownership while reducing the financing burden. Careful consideration of the various options for mobilizing private resources and their associated risks is necessary.

- MTZ and MCAA should use modern accounting standards.

Without modern accounting standards, it will be difficult to understand the financial position of the Mongolia Railways Company (MTZ) and the Mongolian Civil
Aviation Authority (MCAA), the extent of their profitability and their ability to finance maintenance and new investment. MTZ cross-subsidizes passenger and domestic freight services from excess revenue from transit freight. MTZ, however, needs to use its excess revenues to invest in track upgrading and possibly expansion, and replace its locomotives. The extent to which the windfalls from transit traffic can finance new investments and replace existing ones is uncertain, and the sustainability of the freight revenue itself, if more closely linked to cost, is questionable. The financial situation of MCAA is also questionable, since it is expected to move from a position of profitability attributed to substantial overflight revenues to one of loss, since these revenues have become part of the national budget. Overflight revenues are likely to drop significantly over the next few years as they become more aligned with the cost of service provision.

- Reconsider the current dependence on the highly profitable transit traffic.

MTZ’s current tariff structure is unsustainable in the long or medium term. The high transit tariff already appears to be discouraging China from increasing the amount of oil it imports from Russia through Mongolia. It is unlikely that transit tariffs could increase beyond the current levels without having a detrimental impact on overall revenues. Without the high profit from transit freight, the railway would have no revenue to invest in capacity increases. If it is deemed a social need to keep the price of coal in Ulaanbaatar low, it is recommended that the difference between the commercial tariff and the subsidized tariff be reflected as a public service obligation. This will have the advantage of explicitly quantifying the magnitude of the subsidy while keeping the accounts of MTZ clear, hence making it possible to objectively assess performance. It is also recommended that the government consider discontinuing the passenger service (once the main north–south road is completed) if it does not cover its operating costs, including those of locomotives and wagons, particularly given the increasing competition from minibus services.

**Strengthening Operational Efficiency: The Regulatory Framework**

Passenger fares for railway transport and domestic aviation (at least for Mongolian nationals) are regulated and set at levels to ensure affordability, but not operational efficiency and sustainability. Since there is no price discrimination between passengers (other than between domestic and foreign on domestic flights), the resulting fares are very low by international standards and not enough to cover operating costs. For some time, the government was able to supplement fare revenue with deficit funding, but this policy is no longer sustainable. The Mongolian airline, MIAT, the state-owned carrier, reduced its presence in the domestic aviation market in 2005, when it was unable to replace its time-expired aircraft. It is, hence, necessary to find the balance between affordability and operational sustainability and efficiency.

- **Interurban passenger services: Deregulate fares.**

  It is recommended that regulations for interurban road transport be reduced to just those related to the safety of vehicles and qualifications of drivers. There is sufficient competition among the different operators to justify fare deregulation, particularly that charged fares are about 20 percent less than government set tariffs.

  **Domestic aviation**
• Deregulate fares: To ensure the financial sustainability of the industry, efficient pricing is necessary where operators are allowed to set tariffs based on market principles. The potential for exercising monopoly power on some routes, because of the limited size of the market, is small as a result of the low barriers to market entry and exit. Indeed, new operators are entering the market. In addition, charter flights, which constituted about 15 percent of domestic flights in 2004, provide further competition to scheduled flights.

• Consider subsidized concessions for certain remote routes if deemed socially necessary: In the event that the government perceives the need to provide flights to one or two remote aimags where commercial service would be unprofitable, it is recommended that the government consider awarding competitive concessions for these routes for a period of three to four years. This is similar to the concept of competition “for the market” rather than “in the market” that is widely and successfully used in land public transport. Concessions would be awarded to the operator requiring the least amount of subsidy for the desired level of service.

• Separate the administration of safety oversight and accident investigation: It is strongly recommended that the administration of the safety oversight and accident investigation functions be separated to avoid the inherent conflict of interest. Although the function of safety oversight clearly belongs with MCAA, the accident investigation unit could administratively report directly to the MRTT.

• Liberalize the jet fuel market: The difference between jet fuel prices in Mongolia and spot prices are significantly higher than what transportation and handling costs would justify. World spot prices for Jet A fuel were US$590 per metric ton in March 2006, yet fuel prices in Mongolia ranged between US$900 and US$1,000 per metric ton. Given that the cost of fuel accounts for 34–44 percent of the cost of operating a plane, the unnecessarily high cost of fuel has its implications for both affordability and profitability. It is recommended that the government consider removing the quotas on the amount of fuel sold by each vendor, relax the restrictions on the number of distributors, and charge storage prices commensurate with the cost of service.

• Interurban road freight: Establish lines of credit for truck purchase.

To overcome the high interest rates faced by small truckers who wish to upgrade their fleets, it is recommended that the government consider a scheme that was successfully implemented in a number of countries, including Colombia, Mexico, Nigeria, and Zimbabwe, when faced with the need to establish a line of credit from a small and medium-size enterprise for the purchase of trucks or buses. The schemes do not involve subsidized credit, but rather they address the high interest rates otherwise charged to cover the perceived risks of loans to transport operators.

• International road and rail freight services: Reduce the obstacles at the border, and negotiate better arrangements with China to enhance the efficiency at border crossings.
Facilitating Sustainable Urban Growth in Ulaanbaatar

Certain inefficiencies in urban transport planning hinder both the efficient integration of ger districts into the city and its spatial growth for future urbanization. The inefficiencies stem from weak coordination between traffic management policies, parking policies, and demand management in general and the investment in additional road space. Responding to the increasing congestion levels through new road investments has not proved to be successful in other cities.

Following are some recommendations for facilitating sustainable urban growth in Ulaanbaatar:

• **Develop a metropolitan institution to coordinate infrastructure planning and land use.**

  Urban transport planning can only be effective if it is part of a comprehensive urban planning process. To ensure this link, there is a need to develop a metropolitan institution that coordinates among the different governmental bodies involved in infrastructure planning and land use in Ulaanbaatar. An important instrument for effective urban transport planning is the development of a multimodal urban transport strategy. Any solution to the problem of increasing traffic congestion and pollution emissions requires a combination of better management of road space and vehicle traffic, public transport improvements, and additional road capacity. Consequently, the strategy would cover activities, such as physical and operational improvements to junctions; improved enforcement of existing parking constraints; charging for on- and off-street parking; public transport reform; institutional and service restructuring; improvements to public transport infrastructure, equipment, and services; and increasing the geographic area covered by paved secondary roads and streets.

• **Urban transport infrastructure: Concentrate investment in the most heavily traveled corridors.**

  Given the elongated, geographically constrained configuration of Ulaanbaatar, it is recommended that investment at the present time be concentrated in the most heavily traveled corridors (running east-west, especially Peace Avenue), on roadways and other facilities that will improve the efficiency and effectiveness of public transport, and not in expensive ring road-interchange construction.

• **Vehicle traffic demand and flow management: Restrict the number of on-street parking places and charge for off-street parking; enhance the implementation of vehicle emission testing.**

  It is recommended that the Ulaanbaatar city government restrict the number of on-street parking places and charge for off-street parking rather than implement a policy to increase the number of freely available parking places.

  Although the Municipality of Ulaanbaatar has installed technical inspection and diagnostic centers to test buses, taxis, and passenger cars for emissions, as well as technical standards, the system seems to pass most vehicles. Both standards and procedures have to be carefully set and monitored to help bring the quality of air to acceptable levels.

• **Urban public transport: Develop a comprehensive public transport plan.**
There are several weaknesses in the present system of public transport services. The main issue faced by operators of the large buses is the financial unsustainability of the current controlled tariffs, whereas that of the users is the poor quality of service. These problems derive in one way or another from the low incomes of bus passengers and the attempts of the municipality to keep fares at an affordable level while not having the financial resources to subsidize either passengers or operators. The inter-relationships of these issues were demonstrated in December 2005, when in response to requests from the operators for a sustainable tariff, the municipality implemented a substantial fare increase, only to have to withdraw it several days later after sustained and at times violent protests. It is recommended that the municipality undertake a comprehensive study to determine the most appropriate bus network configuration for Ulaanbaatar, the optimal mix of services and vehicles for serving the many different Ulaanbaatar travel markets, appropriate fare, affordability, service and subsidy policies, and service procurement approach.

- **Subsidies:** Given income levels, some subsidy would be justified on affordability grounds. Although there are different alternatives for providing a subsidy, it is recommended that subsidies be specifically directed to low-income passengers rather than to capital purchase. The city government could use revenues from proposed parking charges to improve the bus system.

- **Procurement of public transport services:** It is recommended that the existing short-term contracts between the municipality and the large diesel bus operating companies be replaced by competitively bid concessions, and at the same time that minibus routes also be bid in a similar way. Terms of the concession, which are typically five to seven years, should include the fares to be charged, minimum frequencies to be met, and the amount of subsidy required, if any.

- **Financing bus purchases:** If public transport fares were to be increased, if operators were compensated for passengers traveling on passes, and if penalties for fare evasion were enforced, large bus operations could possibly be profitable. However, the bus companies would still have problems in raising the capital for the purchase of new vehicles. It is recommended that consideration be given to a bus financing scheme that has been used successfully in some other developing countries, similar to that recommended for trucking companies above.

**Developing Institutional and Human Capacity**

Implementing the reform programs for the transport sector and managing its needs in an effective and efficient manner requires further development and strengthening of institutional and human resource capacity in Mongolia. The needs span across the different subsectors and functions of transport and could have been raised in the discussion of each of the recommended reforms earlier. Nevertheless, capacity development is being treated in this strategy as a separate issue in its own right to signify both its importance and the urgency for addressing it.

A major difficulty that faces much of Mongolia’s public administration is the small population base from which it can recruit trained and experienced staff. Hence, any institutional structure that requires more than a minimum number of staff will have a significant problem. Another difficulty is that Mongolia does not have a long history of
operating political institutions in a market-oriented environment. Many of the experienced staff gained their experience in a planned economic context, whereas the graduates who might support them are too young to have gained much experience. These problems are exacerbated by the lack of a professional public service in which senior staff continues serving one administration after another. As a result, a change in administration results in not only a change of political staff, but also of technical and advisory staff.

It is recommended that no changes be made to the existing institutional structure for the remainder of this administration, but that consideration be given to what structural changes, if any, might be made for the next administration. Frequent changes in institutional structures should be avoided as much as possible. It is also recommended that the MRTT carry out an assessment of the existing needs and capacity and develop a plan accordingly. Much more training of professional staff will need to be undertaken under this plan. It is important that training be given on a more comprehensive and coordinated basis, and not just in response to proposals and offers from international lending and bilateral institutions.

Developing and Implementing a Road Safety Program

With road user error contributing to the vast majority of road crashes, the development of safe drivers skilled in defensive driving techniques should be the primary objective of a road safety program. There is readily available and easily accessible advice on actions that can be taken to reduce the number of road crashes that result in death and injury. The Global Road Safety Partnership is just one of many international agencies that can provide more specific technical advice. It is highly recommended that the Municipality of Ulaanbaatar develop a road safety program with technical and financial support from the various specialized agencies.

POLICY AND INSTITUTIONAL FRAMEWORK

THE ROLE OF GOVERNMENT

The MRTT is responsible for developing and implementing transport policies and plans. The MRTT discharges these responsibilities through its Transport Department, which is subdivided into road, railway, civil aviation, and sea transportation sections.

The institutional role of government in the transport sector is to ensure the provision and maintenance of transport infrastructure, the regulation of road and rail freight and passenger transport, domestic and international aviation services, and urban public transport. Since 1990, economic regulation has been relaxed on most transport services, including interurban freight and passengers and domestic aviation. At present, regulation of private services is "light" in that there are few entry constraints and no formal regulation of fares and tariffs other than for urban public transport where fares and licenses are heavily regulated. Fares for services provided by government-owned service providers, the Mongolian state-owned Civil Aviation Authority (CAA) in domestic and international aviation, the Mongolian-Russian joint venture (MTZ) for railway services, and bus operators are determined by the government. For interurban road passenger services, there are indicative but not compulsory tariffs, and for road
freight transport, there are no tariff regulations. Quality of service with respect to safety and emissions from road vehicles and aircraft is regulated, and vehicles for public service use are inspected and licensed.

**LAWS AND REGULATIONS**

During the 1990s the government passed Road Transport, Rail Transport, and Civil Aviation Laws that defined the role of government in the administration and provision of transport infrastructure and services.

**Road Infrastructure and Services**

The main function of the domestic road network is to provide connectivity (a) between aimag centers and Ulaanbaatar, (b) between aimag centers and their surrounding regions, and (c) to neighboring countries.

The Road Law of 1998 governs the road sector in Mongolia. The law coordinates relations between the state, road users, and citizens with respect to construction, maintenance, inspection, protection, and exploitation of roads and road structures. It also includes provisions on road classification and technical standards, as well as road funding.

The MRTT is responsible for policy and policy coordination for development of the road network, operating through its Road Policy and Coordination Department (RPCD). RPCD delegates its role in implementing strategic policy to the Road Supervision and Research Center (RSRC), which is responsible for planning, design, construction, maintenance and supervision of international and state road networks. RSRC establishes the technical standards and norms, including vehicle weights and axle loads for roads and road structural facilities of all classes of roads and bridges. It also coordinates the collection of road user fees.

The Road Transport Act of 1999 governs the licensing and regulatory aspects of the road industry. The MRTT’s Transport Service Centers (TSCs) in the urban areas and aimags are responsible for implementing road sector regulations including registration and annual inspection (including emission levels) of auto transport vehicles and procurement of passenger transport operators.

A National Transport Advisory Committee was established in February 1998, and subsequently reorganized in March 1999 and May 2000, to monitor policy implementation in the road sector. The committee comprises representatives of the MRTT, the state professional inspection agency, the TSCs, the traffic police department, the urban transport coordination department, national transport associations, and state-owned road construction enterprises.

The Road Law also sets provisions on local autonomy and delineates the powers and authorities of political units as the state, aimag, city, and sum (administrative unit within an aimag). The planning, construction, and maintenance of local roads are the responsibility of local governors of aimags and the capital city. Funding is approved by

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2 Prior to the reorganization of 2004, these functions were the responsibility of the Department of Roads in the then Ministry of Infrastructure Development.
their respective local governments subject to approval of the Ministry of Finance (MoF). Local governors are also responsible for the regulation of market entry and fare-setting for all road-based public transport within their territorial area.

Mongolia has acceded to the Convention on the International Transport of Goods under Cover of TIR Carnets (TIR Convention, 1975) on October 1, 2002. The International Road Transport Union (IRU) has authorized the National Road Transport Association in Mongolia (NARTAM) as an issuing association and the process of authorizing NARTAM as a guaranteeing association vis-à-vis the Mongolian Customs authorities. The TIR procedure has been in use in Mongolia since June 2003. Russia is also a member of the TIR Convention, but not China, although discussions are well advanced on China acceding to the Convention. Hence, TIR documents can only be used at present for trade with Russia.

**Rail**

The Railway Directorate, the government implementing agency for railways, is responsible for implementing the railway development policy of the government and directly reports to the MRTT. Railway infrastructure and services are provided by a vertically integrated railway company that is a 50:50 joint venture established in 1949 under an Agreement between the governments of Mongolia and the Russian Federation. The Agreement was augmented by the “Rules of the Ulaanbaatar Railway” in 1968. The Agreements, together with Mongolian law, serve as the main legislative body for MTZ’s operations. According to the agreement, MTZ is not subject to taxation. The Railway Safety Law of 1997 establishes safety requirements for rail freight and passenger transportation, and defines the roles of participants in rail transportation. Operation of Mongolian railways is administered and run by the Mongolia-Russia joint venture.

**Airports and Civil Aviation**

Civil aviation in Mongolia is regulated by the Civil Aviation Law (CAL) of 1999, amended in 2001. The CAL sets the framework for controlling airspace and airport facilities; certification and licensing of airplanes; qualifications, duties, and obligations for air crews; and requirements for aviation safety.

The MCAA was established under the CAL and is responsible to the MRTT. MCAA has four major responsibilities: (a) provision of all airport services; (b) provision of air navigation and traffic services; (c) economic regulation; and (d) safety oversight and accident investigation. In addition, it provides aviation policy advice to the minister.

According to the CAL, domestic and international air fares and freight tariffs should be monitored rather than regulated. There is no specific regulation on how this should be done, other than for the government-owned flag carrier MIAT for which fares are set by government. In practice, the monitoring process is used to regulate domestic fares of all

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3 The TIR convention provides for the transport of goods across borders without intermediate reloading.

4 Nathan Associates 2004, p. 110. The roles of MCAA are categorized somewhat differently in the CASDP report.
operators, since other operators are “encouraged” not to charge fares significantly higher than those of the MIAT.

**Urban Roads and Transport**

Urban road infrastructure and regulation of road transport operations on urban roads are the responsibilities of local municipal governments and aimags. Urban transport, however, is the sole responsibility of municipal governments, and is only provided in Ulaanbaatar. The Property Relations Department of the municipality of Ulaanbaatar determines the planning, investment, and operations policies of the public companies that operate large buses in the city through a seven-member Representative Administration Council.

**SECTOR STRUCTURE AND OWNERSHIP**

**DEMAND FOR TRANSPORT SERVICES**

After a long period of slow growth during the 1990s, both freight and passenger transport services have shown high rates of growth. Total domestic freight transport has been growing a little faster than GDP, at about 6.5 percent per year, with a higher growth rate for roads than for rail. Growth in passenger transport has been even higher at almost 9 percent per year (see Table 1). The difference in the growth rates of the modal shares for domestic passenger transport has been more pronounced than that of freight, with a slight decline in the number of rail passengers between 2000 and 2005. International rail freight has also been growing at almost 9 percent, with a massive increase approaching 30 percent per year for transit rail freight (see Table 2). This can be explained by the dominance of minerals in cross-border transport where rail has a comparative advantage to roads. International passenger transport has also been growing faster than GDP, with a large increase in international visitors in 2005. All the increase has been in air passengers, with the number of rail passengers remaining almost unchanged over the five-year period.

Most domestic freight is transported by road, with less than 30 percent by rail. Table 1 shows that between 2000 and 2005, the share of railways in domestic freight transportation has dropped slightly despite annual growth of 5 percent due to faster growth of road transport (7 percent per year). Road freight is mostly from Ulaanbaatar to aimags, whereas rail freight is mostly coal to Ulaanbaatar. Almost all domestic passenger transport is by road, with only about 0.1 percent of passengers traveling by domestic aviation (although the share would be higher if one were to use passenger-kilometers) and slightly less than 2 percent by rail. Most international passenger and freight transport is by rail, with about one-third of passengers traveling by air, a small proportion of freight by road to Russia and a negligible proportion of freight by air to neighboring countries. International freight by road transport, while unrecorded, is believed to be low but increasing.

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5 National statistical accounts of road transport do not include the unlicensed entities that have been estimated at 11–13 million tons.
Table 1: Domestic Transport: Growth and Modal Shares, 2000–05

<table>
<thead>
<tr>
<th>Mode</th>
<th>Freight</th>
<th>Passengers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000</td>
<td>2005</td>
</tr>
<tr>
<td></td>
<td>Milkion tons</td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>13.0</td>
<td>69.0</td>
</tr>
<tr>
<td>Rail</td>
<td>6.0</td>
<td>31.0</td>
</tr>
<tr>
<td>Air</td>
<td>neg.</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>19.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Annual growth 2000–05 (%): Freight - 7.2, Passengers - 6.5

Table 2: International Transport: Growth and Modal Shares, 2000–05

<table>
<thead>
<tr>
<th>Mode</th>
<th>Freight</th>
<th>Passengers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000</td>
<td>2005</td>
</tr>
<tr>
<td></td>
<td>Milkion tons</td>
<td></td>
</tr>
<tr>
<td>Rail-Int'l</td>
<td>1.7</td>
<td>53.0</td>
</tr>
<tr>
<td>Rail-Transit</td>
<td>1.5</td>
<td>47.0</td>
</tr>
<tr>
<td>Air</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>3.2</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Annual growth 2000–05 (%): Freight - 8.9, Passengers - 8.5

TRANSPORT INFRASTRUCTURE AND SERVICES

The central government is the dominant provider of rail and aviation infrastructure and the main operator of railway and air transport services. Road construction is largely carried out by the private sector. Interurban road passenger and freight transport services are provided exclusively by the private sector, and most urban public transport and domestic aviation is also privately supplied. All rail services are provided by the public sector. Nearly all of Mongolia's international aviation is provided by a public company, but it operates in competition with a small number of foreign-owned operators (a few of which are privately owned). The government delegates some of its obligations and authority for providing local road transport infrastructure to aimag and soum agencies.

As of 2003, there were 30 state-owned economic entities and companies involved in transport in Mongolia. They included the Mongolian civil air operator (MIAT), the four public bus companies, and road construction and maintenance companies. They are all administered by the government through the State Property Committee, the government agency responsible for providing the administration of state owned companies. While each state-owned company had a 5-member managing committee, decisions are subject to the State Property Committee’s approval. Through these managing committees, the State Property Committee can determine operational policies and activities, including...
those relating to wages and staff—matters far removed from the usual responsibilities of property management. The State Property Committee is also responsible for coordinating the privatization process in Mongolia.

**Roads**

The MRTT manages about 11,000 km of state roads, whereas local governments manage about 38,000 km (see Table 3). About 1,900 km of the road network is paved, of which 1,500 km are interurban state roads, with the remainder in urban areas—primarily in Ulaanbaatar, Erdenet, and Darkhan, and near aimag centers. The bulk of the network (88 percent) is earth tracks. More than half the state roads carry traffic volumes of 150 vehicles or less per day, mostly cars and Jeeps (60 percent), together with privately owned and operated trucks (23 percent) and bus services (17 percent).

**Table 3: Road Network Classification by Administrative Level and Pavement Type, 2005**

<table>
<thead>
<tr>
<th>Administrative Level</th>
<th>Paved</th>
<th>Gravel</th>
<th>Improved Earth</th>
<th>Earth Tracks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CC</td>
<td>AC</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>39</td>
<td>1,262</td>
<td>203</td>
<td>1,440</td>
<td>11,219</td>
</tr>
<tr>
<td>Local</td>
<td>55</td>
<td>276</td>
<td>498</td>
<td>499</td>
<td>38,031</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>1,538</td>
<td>270</td>
<td>1,938</td>
<td>49,250</td>
</tr>
</tbody>
</table>

CC: Cement Concrete; AC: Asphalt Concrete; M: Macadam.

Road construction in Mongolia has been privatized, with competitive bids required for new works including periodic maintenance. Routine maintenance activities are presently confined to state-owned maintenance companies, each with a monopoly in its geographic area, and operating with negotiated direct contracts with the MRTT.

**Table 4: Number of Motor Vehicles, 1996–99 and 2002–05**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars</td>
<td>30,001</td>
<td>35,578</td>
<td>37,795</td>
<td>39,921</td>
<td>63,224</td>
<td>69,531</td>
<td>79,691</td>
<td>86,893</td>
</tr>
<tr>
<td>All trucks</td>
<td>31,245</td>
<td>30,528</td>
<td>29,116</td>
<td>28,907</td>
<td>29,740</td>
<td>27,827</td>
<td>30,082</td>
<td>31,351</td>
</tr>
<tr>
<td>General cargo</td>
<td>26,887</td>
<td>26,473</td>
<td>25,473</td>
<td>25,049</td>
<td>24,610</td>
<td>23,248</td>
<td>25,400</td>
<td>26,486</td>
</tr>
<tr>
<td>Tankers</td>
<td>2,146</td>
<td>1,868</td>
<td>1,678</td>
<td>1,615</td>
<td>1,709</td>
<td>1,349</td>
<td>1,376</td>
<td>1,264</td>
</tr>
<tr>
<td>Specialized vehicles</td>
<td>2,212</td>
<td>2,187</td>
<td>1,965</td>
<td>2,243</td>
<td>3,421</td>
<td>3,230</td>
<td>3,276</td>
<td>3,601</td>
</tr>
<tr>
<td>Buses</td>
<td>3,784</td>
<td>3,982</td>
<td>4,579</td>
<td>6,012</td>
<td>10,841</td>
<td>9,937</td>
<td>10,645</td>
<td>10,994</td>
</tr>
<tr>
<td><strong>Total excl. motorcycles</strong></td>
<td>65,030</td>
<td>70,088</td>
<td>71,490</td>
<td>74,840</td>
<td>103,805</td>
<td>107,295</td>
<td>120,418</td>
<td>129,238</td>
</tr>
<tr>
<td>Motorcycles</td>
<td>25,950</td>
<td>26,114</td>
<td>26,443</td>
<td>26,618</td>
<td>27,525</td>
<td>26,361</td>
<td>24,776</td>
<td>23,308</td>
</tr>
<tr>
<td><strong>Total incl. motorcycles</strong></td>
<td>90,980</td>
<td>96,202</td>
<td>97,933</td>
<td>101,458</td>
<td>131,330</td>
<td>133,656</td>
<td>145,194</td>
<td>152,546</td>
</tr>
<tr>
<td>Trailers</td>
<td>7,461</td>
<td>7,170</td>
<td>6,155</td>
<td>5,504</td>
<td>5,370</td>
<td>4,651</td>
<td>4,614</td>
<td>5,416</td>
</tr>
</tbody>
</table>


Table 4 shows that the number of registered motor vehicles in Mongolia has increased by 50 percent between 1999 and 2005, with private cars having doubled during that
period and buses increasing by 80 percent. Most of the vehicles are located in Ulaanbaatar, and about 40 percent of the total vehicle fleet is over 10 years old.

Table 5 shows the distribution of trucking companies by size. Road freight services are provided by more than 6,000 operating companies, most of them owner-operators of single trucks. In 2005, about 73 percent of the companies owned fewer than six trucks, usually only one. These companies accounted for only 23 percent of the trucks. About 25 percent of the trucks belong to 1,000 owners of 6-10 trucks; 26 percent to about 500 owners of 11-20 trucks; only 1 percent to 12 owners of 21-50 trucks; 10 percent to 45 owners of 50-100 trucks; 6 percent to 14 companies owning 101-150 trucks; and 8 percent to 15 large companies owning more than 150 trucks. This distribution of trucks by size of ownership is typical of that of a low-income developing country.

<table>
<thead>
<tr>
<th>Size of truck fleet</th>
<th>Number of business entities</th>
<th>2000</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>Less than 6 vehicles</td>
<td>4,999</td>
<td>78</td>
<td>4,560</td>
</tr>
<tr>
<td>6–10 vehicles</td>
<td>721</td>
<td>11</td>
<td>1,055</td>
</tr>
<tr>
<td>11–20 vehicles</td>
<td>359</td>
<td>6</td>
<td>516</td>
</tr>
<tr>
<td>21–50 vehicles</td>
<td>169</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>51–100 vehicles</td>
<td>81</td>
<td>1</td>
<td>45</td>
</tr>
<tr>
<td>101–150 vehicles</td>
<td>85</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>+150 vehicles</td>
<td>14</td>
<td>0.2</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>6,428</td>
<td>100.0</td>
<td>6,217</td>
</tr>
</tbody>
</table>

*Source: Authors’ analysis based on data from the TSCs.*

Although road traffic appears to have been increasing by about 8 percent since the mid-1990s, it is only in the past few years that the truck fleet has also started to increase after a decline in numbers between 1990 and 2002.

Interurban passenger services are now mostly unregulated and provided by private operators. The MRTT publishes “indicative” tariffs—but most tariffs are some 10–20 percent lower and none are higher. The total number of vehicles registered to operate interurban passenger services is about 900, with almost as many unregistered. Vehicles now used range from mini-buses (generally with 25 seats), through Russian (UAZ) Jeep-based 4-wheel drive mini-buses (with 10 or 11 seats), various types of imported mini-buses (mainly 12-seat Hyundai Graces), to 4-wheel drive SUVs and private cars. The Russian Jeeps account for about 38 percent of vehicles and available seats, whereas most vehicles (about 57 percent) and seats are provided by the imported mini-buses.
Railways

The Mongolian railway consists of a single main-line track, linking Russia and China via Ulaanbaatar with little branch rails, with a total length of 1,815 km. Infrastructure and services are managed and operated by MTZ, the Mongolian–Russian joint venture referred to earlier. The joint venture owns 124 locomotives, 2,571 wagons, and 324 passenger coaches.

Although passenger tariffs are controlled by government, Ulaanbaatar Railway started responding to competition from the privately provided bus services, which are more frequent and flexible than the passenger trains. Transportation costs by rail are currently cheaper than by road, particularly for long-distance movements.

Airports and Civil Aviation

Mongolia has 2 international airports and 17 domestic airports with more than 98 percent of international air transport services using the Genghis Khan International Airport in Ulaanbaatar. Uglii in the northwest provides international connections to Kazakhstan. Few of the 17 airports available for scheduled domestic flights have infrastructure that complies with International Civil Aviation Organization (ICAO) standards, but they mostly have adequate infrastructure to accommodate the few scheduled domestic services that operate. Only four have paved runways, and only these and one other have runway lighting. All four paved runways exceed 2,440 meters in length, and the 13 gravel runways exceed 1,800 meters. Gravel runways are adequate for operations by unpressurized turboprop aircraft, such as have been used on domestic services for the last three decades, but they are likely to cause damage to the pressurized jet-powered aircraft now beginning to be used on domestic routes. With few exceptions, all airport services are provided by the MCAA itself, with no significant concessions to private operators other than for a few services in the international passenger terminal. A notable exception is a controversial monopoly concession for the provision of fuel to Mongolian airports to a private company.

Mongolia’s domestic passenger market is relatively small with considerable fluctuations and an overall downward trend for all destinations since the mid-1990s largely on the part of passengers’ preference for lower price and improved bus services—a viable alternative to air transport. Domestic scheduled services are presently offered using four aircraft: MIAT’s Antonov 26, Aero Mongolia’s two Fokker 50s, and one Fokker 100.

In 2001 private operators were allowed to provide domestic aviation services, which are now provided by both the public and private sectors. Table 6 shows the market share of MIAT, the state-owned carrier, and that of private operators. The implicit control of fares of private operators (they are encouraged not to charge fares significantly higher than those of the MIAT) in an effort to retain domestic aviation’s affordability could have implications for the financial sustainability of the service. MIAT has continued to

---

In 2004, the number of domestic air passengers increased 17 percent from its 2003 level to reach 163,000. The number then dropped again to 140,000 the following year. It should also be noted that these levels are significantly lower than the peak of 1 million in the late 1980s when air travel was heavily subsidized, there were fewer roads than there are now, and the population of aimag centers and other cities was considerably higher.
operate domestic services by cross-subsidizing them from the revenues of its international services, but has been unable to replace its aging fleet with now only one remaining in service for domestic routes.

Nevertheless, implicit fare controls and the fluctuating demand levels have not dissuaded private operators from entering the market. In addition to Aero Mongolia, the only private carrier to offer scheduled domestic flights, and a few others offering charter flights (Tengeriin Ulaach, Central Mongolia Airways, Hangard Airline, Blue Sky Aviation, and Air Future), a new airline, Ezniis, is awaiting a license to start providing scheduled flights, and another, Air Charter Mongolia, is expected to start operations soon.

MIAT is the only Mongolian operator of international flights (except for one route also operated by Aero Mongolia) and requires only two aircraft to satisfy current demands. The only other companies providing regular air passenger services to Mongolia are Air China, Korean Air, and Aeroflot. The highly seasonal nature of the demand for air travel to Mongolia requires additional planning by airlines to offer sufficient capacity during the summer while maintaining minimum winter schedules and keeping a reasonable utilization of their assets.

### Table 6: Activity in Genghis Khan International Airport in Ulaanbaatar, 2002–04

<table>
<thead>
<tr>
<th>Items</th>
<th>Activity</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number</td>
<td>Share (%)</td>
<td>Number</td>
</tr>
<tr>
<td>Flights</td>
<td>International</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scheduled</td>
<td>2,367</td>
<td>35</td>
<td>2,079</td>
</tr>
<tr>
<td></td>
<td>MIAT</td>
<td>1,595</td>
<td>24</td>
<td>1,370</td>
</tr>
<tr>
<td></td>
<td>Other airlines</td>
<td>772</td>
<td>12</td>
<td>709</td>
</tr>
<tr>
<td></td>
<td>Charter</td>
<td>359</td>
<td>5</td>
<td>177</td>
</tr>
<tr>
<td></td>
<td>Subtotal</td>
<td>2,726</td>
<td>41</td>
<td>2,256</td>
</tr>
<tr>
<td></td>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scheduled</td>
<td>3,233</td>
<td>48</td>
<td>3,010</td>
</tr>
<tr>
<td></td>
<td>MIAT</td>
<td>3,233</td>
<td>48</td>
<td>3,010</td>
</tr>
<tr>
<td></td>
<td>Aero Mongolia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Charter</td>
<td>710</td>
<td>11</td>
<td>1,827</td>
</tr>
<tr>
<td></td>
<td>Subtotal</td>
<td>3,943</td>
<td>59</td>
<td>4,837</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6,669</td>
<td>100</td>
<td>7,093</td>
</tr>
<tr>
<td>Passengers</td>
<td>International</td>
<td>205,974</td>
<td>62</td>
<td>208,061</td>
</tr>
<tr>
<td></td>
<td>Domestic</td>
<td>125,088</td>
<td>38</td>
<td>139,398</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>331,062</td>
<td>100</td>
<td>347,459</td>
</tr>
<tr>
<td>Freight (thousand tons)</td>
<td>International</td>
<td>2,295</td>
<td>97.5</td>
<td>2,166</td>
</tr>
<tr>
<td></td>
<td>Domestic</td>
<td>59</td>
<td>2.5</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2,354</td>
<td>100</td>
<td>2,223</td>
</tr>
</tbody>
</table>

Source: ADB (2005), Appendices, p. 38.
Table 7: Public Transport Vehicles in Ulaanbaatar, 2004 and 2005

| Owner and vehicle type | Number of Vehicles | Seats/vehicle | Static Capacity |
|-----------------------|--------------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                       | 2004   | 2005   | 2004 | 2005 | %    | %    | Change |
| State-owned large diesel | 305   | 230   | 50   | 15,250 | 11,500 | 18.5 | 14.1 | -4.3 |
| Private large diesel   | 385   | 372   | 50   | 19,250 | 18,600 | 23.3 | 22.9 | -0.4 |
| Trolley bus            | 53    | 50    | 60   | 3,180  | 3,000  | 3.8  | 3.7  | -0.2 |
| Mini bus               | 2,016 | 2,304 | 17   | 34,272 | 39,168 | 41.5 | 48.2 | 6.7  |
| Taxi                   | 2,673 | 2,269 | 4    | 10,692 | 9,076  | 12.9 | 11.2 | -1.8 |
| Total                  | 5,432 | 5,225 | 82,644 | 81,344 | 100.0 | 100.0 |
| Change                 | -3.8% | -1.6% | -1.6% |


Urban Roads and Transport

Ulaanbaatar, as the main urban center, has a road network of 464 km, of which about 78 percent is paved, the remainder being mostly earth tracks within ger districts. Although until the last few years, urban public transport services in Ulaanbaatar were provided by 4 municipally owned companies operating large buses, these companies are now joined by 12 private companies also operating large buses and by minibus operators. There are also large fleets of both formal (metered) taxis and informal (un-metered) taxis. Outside of Ulaanbaatar, the only public transport services available are provided by taxis.

Of the 305 large buses in service with municipal companies in 2004 (see Table 7), only 230 were operating with them in 2005. Even the number of large buses operated by private companies fell from 385 to 372 over the same period. There was also a reduction in the number of trolley buses in service, from 53 to 50. In contrast, the number of minibuses, all privately operated, increased from 2,016 to 2,304. They operated on 31 regular routes and 41 express routes. The vehicles are registered on a route basis, with an average of less than 5 minibuses per regular route but more than 40 per express route. The number of formal taxis also fell from 2,673 to 2,269. At present, 50 registered taxi companies are operating an average of 45 vehicles per company. It is not known what happened to the number of informal taxis, since no records are kept of their numbers. Operating permits for buses and taxi services and fares for both private and public services are controlled by the municipality.

SECTOR EXPENDITURES AND FINANCING

Consistent historical expenditures were only available for the road sector, but not the other transport subsectors. However, since most of the government’s budgetary expenditures on transport were on roads, those expenditures would provide a sense of the national government’s contribution to the sector. Although budgetary expenditures

\[ \text{7 Maintenance expenditures, while typically included in a government's current budget, are included with investment expenditures as they do indeed reflect investment in preserving the road assets.} \]
on the road sector increased from 0.6 percent of GDP in 1999 to 1.0 percent in 2005, transport investment and expenditures in 2005 well exceed those levels. Expenditures on heavy repairs by the Mongolian-Russian railway joint venture, MTZ, were equivalent to 2.3 percent of GDP in 2005. In 2005, total investments in transport in Mongolia were probably in the range of 3.5-4.0 percent, excluding expenditures on urban transport infrastructure.

GOVERNMENT TRANSPORT SECTOR DEBT TO IFIS

At the end of 2004, the outstanding public sector debt to international lending agencies for fully dispersed loans and credits to the transport sector (roads, railways, airports, and urban public transport) totaled about US$279 million, representing about 21 percent of the total debt. Annual debt service was sustainable at about US$6.9 million, or 9 percent of the total. The impact of loans and credits for transport sector and other infrastructure investments on public finances is discussed elsewhere in this report.

Roads

Figure 1 shows that between 1996 and 2005, total expenditures on state roads increased from 0.6 to 1.0 percent of GDP. In fact, expenditures had grown from a low of 0.5 percent of GDP in 1997 to a high of 1.4 percent in 2003 before dropping again. The large increases in 2002 and 2003 were largely associated with financing the Millennium Road. These expenditures are included under the heading, “Other Construction,” in Table 8. Expenditures on road maintenance averaged 0.16 percent of GDP during that period, showing high fluctuations from a low of 0.04 percent in 1999 to a high of 0.24 percent in 2006.

In the mid-1990s a system of national and aimag road funds was established. Revenue for the national Road Fund came from a charge on imported petroleum, with the National Customs Authority collecting fuel taxes at the border and transferring the revenues to the state budget account. Funds then flowed into the Road Fund as budgetary re-allocations. Revenues could be, and indeed were, used for new construction, as well as for road maintenance. The situation of the Road Fund at present is unclear.

Figure 1: State Road Expenditures as a Percentage of GDP

![Figure 1: State Road Expenditures as a Percentage of GDP](image-url)
Table 8: Expenditures and Financing of State Roads
(millions of current togrogs, unless otherwise indicated)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Expenditures on State Roads</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal (current)</td>
<td>4,111</td>
<td>4,301</td>
<td>6,012</td>
<td>6,454</td>
<td>7,932</td>
<td>9,825</td>
<td>14,055</td>
<td>19,823</td>
<td>17,378</td>
<td>22,095</td>
</tr>
<tr>
<td>Real 2000 togrogs</td>
<td><strong>5,768</strong></td>
<td><strong>4,874</strong></td>
<td><strong>7,185</strong></td>
<td><strong>7,032</strong></td>
<td><strong>7,932</strong></td>
<td><strong>9,067</strong></td>
<td><strong>12,128</strong></td>
<td><strong>15,334</strong></td>
<td><strong>11,381</strong></td>
<td><strong>12,960</strong></td>
</tr>
<tr>
<td>as a % of GDP</td>
<td>0.6</td>
<td>0.5</td>
<td>0.7</td>
<td>0.7</td>
<td>0.8</td>
<td>0.9</td>
<td>1.1</td>
<td>1.4</td>
<td>0.9</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Breakdown of Expenditures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td>1,414</td>
<td>849</td>
<td>1,298</td>
<td>374</td>
<td>1,490</td>
<td>2,018</td>
<td>2,152</td>
<td>2,443</td>
<td>4,305</td>
<td>5,452</td>
</tr>
<tr>
<td>Counterpart funding</td>
<td>215</td>
<td>588</td>
<td>1,952</td>
<td>3,539</td>
<td>3,844</td>
<td>4,772</td>
<td>3,452</td>
<td>4,649</td>
<td>4,106</td>
<td>6,970</td>
</tr>
<tr>
<td>Other construction</td>
<td>2,310</td>
<td>2,524</td>
<td>2,500</td>
<td>2,254</td>
<td>2,380</td>
<td>3,492</td>
<td>8,204</td>
<td>12,731</td>
<td>8,324</td>
<td>9,125</td>
</tr>
<tr>
<td>Other</td>
<td>172</td>
<td>341</td>
<td>262</td>
<td>287</td>
<td>218</td>
<td>406</td>
<td>278</td>
<td>0</td>
<td>552</td>
<td>548</td>
</tr>
<tr>
<td><strong>Total expenditures</strong></td>
<td><strong>4,111</strong></td>
<td><strong>4,302</strong></td>
<td><strong>6,012</strong></td>
<td><strong>6,454</strong></td>
<td><strong>7,932</strong></td>
<td><strong>10,688</strong></td>
<td><strong>14,086</strong></td>
<td><strong>19,823</strong></td>
<td><strong>17,287</strong></td>
<td><strong>22,095</strong></td>
</tr>
<tr>
<td><strong>Maintenance as a % of total</strong></td>
<td>34</td>
<td>20</td>
<td>22</td>
<td>6</td>
<td>19</td>
<td>21</td>
<td>15</td>
<td>12</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

| **Sources of Finance** |      |      |      |      |      |      |      |      |      |      |
| Road Fund             | 4,089| 4,200| 4,434| 3,481| 4,222| 4,655| 4,840| 5,789| 6,139| 8,300|
| Budget allocation     | 34   | 103  | 1,445| 2,943| 3,719| 6,371| 9,443| 14,034| 11,239| 13,791|
| **Total revenues**    | **4,123**| **4,303**| **5,879**| **6,424**| **7,941**| **11,026**| **14,083**| **19,823**| **17,378**| **22,091**|
| Road Fund %           | 99   | 98   | 75   | 54   | 53   | 42   | 34   | 29   | 35   | 38   |

| **Total road revenue (real 2000 togrogs)** |      |      |      |      |      |      |      |      |      |      |
| Road Fund             | 5,737| 4,759| 5,299| 3,793| 4,222| 4,296| 4,176| 4,478| 4,020| 4,868|
| Budget allocation     | 48   | 117  | 1,727| 3,207| 3,719| 5,879| 8,148| 10,856| 7,360| 8,089|
| **Total road revenue** | **5,785**| **4,876**| **7,026**| **6,999**| **7,941**| **10,175**| **12,325**| **15,334**| **11,381**| **12,958**|

Source: ADB (2005), appendices, p. 6.

Table 8 shows that, in 1996, revenues from the Road Fund were sufficient to finance almost all road expenditures, but from 1998 onward, the Ministry of Finance retained an increasing proportion of the revenues for other purposes, so the difference between total road expenditure and the allocation of road fund revenues had to be met from national budget allocations. Most of the expenditure went to new construction, particularly the counterpart funding of roads with international funding agency support.

**Rail**

There is no formal government contribution to railway finance. MTZ makes a contribution to government revenue through typically small annual dividend payments to its equity holders (the Mongolian and Russian governments). MTZ is responsible for amortization payments for the railway part of the IFI-funded transport rehabilitation credits. MTZ, like other revenue earning entities, does not receive the full benefit of IFI concessional financing (a nominal interest rate of 1 percent or less and long grace periods), but is assessed a 7 percent real rate of interest on these loans by the Ministry of
Finance. The difference in interest payments between what MTZ repays the Ministry of Finance and what the ministry repays IFIs is a contribution to government revenue.

Using its own accounting standards, MTZ made operating profits in 2004 and 2005 of Tog 2.3 billion and Tog 4.0 billion, respectively (see Table 9). Profits from transport operations in 2004 and 2005 at Tog 7.6 and 9.3 billion, respectively, are however, significantly higher than overall operating profits. This is because transport operations, which account for about 70 percent of MTZ’s business, subsidize other social investments, such as schools and clinics.

Table 9: Mongolia Railways Company (MTZ) Revenues and Expenses
(billions of current togrogs)

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total revenues</td>
<td>214.1</td>
<td>260.9</td>
</tr>
<tr>
<td>Total expenses</td>
<td>211.8</td>
<td>256.9</td>
</tr>
<tr>
<td>Profit</td>
<td>2.3</td>
<td>4.0</td>
</tr>
<tr>
<td>of which:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>to staff fund</td>
<td>1.4</td>
<td>2.5</td>
</tr>
<tr>
<td>to dividends</td>
<td>0.9</td>
<td>1.5</td>
</tr>
<tr>
<td>transportation revenue</td>
<td>157.3</td>
<td>190.6</td>
</tr>
<tr>
<td>transportation expenses</td>
<td>149.7</td>
<td>181.3</td>
</tr>
<tr>
<td>transportation surplus</td>
<td>7.6</td>
<td>9.3</td>
</tr>
<tr>
<td>of which</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated loss on passenger services</td>
<td>—</td>
<td>4.3</td>
</tr>
<tr>
<td>Estimated profit on freight services</td>
<td>—</td>
<td>13.6</td>
</tr>
<tr>
<td>Non-transport-related revenues</td>
<td>56.8</td>
<td>70.3</td>
</tr>
<tr>
<td>Non-transport related expenses</td>
<td>62.1</td>
<td>75.5</td>
</tr>
<tr>
<td>Non-transport related profit (loss)</td>
<td>-5.3</td>
<td>-5.2</td>
</tr>
</tbody>
</table>

— Not available.

Sources: ADB (2005), appendices, p. 25; for 2004 figures; authors’ estimates based on information provided by MTZ for 2005 figures.

Although it is not possible to express the profit as a return on equity or on assets, it is about 1.5 percent of gross revenue. However, the extent of MTZ’s profitability cannot be assessed without a careful examination of the accounting standards used. It appears that in practice significant investment is made under the cost heading of “major repairs.” This has been particularly the case in the last two years when the revenue from transit traffic has reached levels that have given an unaccustomed freedom to the operational departments. An informal estimate is that 46 percent of the Tog 52 billion expenditure on “heavy repair” in 2005 (Tog 24 billion), was in new investment rather than strictly repair. Substantial investments have been made in new crossing loops\(^8\) and the fitting of more powerful locomotive engines. Such investment is hence immediately expensed in the income statement instead of being depreciated over a number of years, a practice

---

\(^8\) Six new passing loops in 2005, with 18 station track extensions.
that would result in lower profits. Despite such investment, it remains unclear whether the depreciation provision and profit are sufficient to replace assets adequately and to allow expansion, given that depreciation is based on historical and not replacement costs of assets and that inflation has been relatively high during the past decade.\(^9\)

The estimated expenditure on heavy repairs alone in 2005 is equivalent to 2.3 percent of GDP. Total transport expenses are much higher at about 8 percent of GDP. Although these figures are very high, a large proportion of the costs are associated with transit traffic. About 72 percent of the transport expenses in 2005 were operating expenses and about three-fourths of the traffic task (ton-km) was transit traffic. It is also important to emphasize that MTZ uses its own revenues and does not rely on resources from the national budget. The sustainability of the transit revenues is an important issue and is discussed later.

An important issue in the pricing of the railway services is the current cross-subsidy of domestic freight transported by rail (which is mostly coal destined for the power stations in Ulaanbaatar) and passenger transport by transit freight that is mostly oil and timber from Russia to China. Based on 2004 figures, the revenue per ton-km for transit freight was about 2.5 times the rate for local movements and about 1.6 times the rate applied to imported and exported goods. This issue is addressed in the discussion of financial sustainability in the sections, The Main Issues and The Way Forward.

**Airports and Civil Aviation**

The latest years for which financial accounts for Mongolian Civil Aviation Authority MCAA were available were 2001 and 2002. These show that over-flights contributed 75 percent of total revenues. All other revenues, including airport and passenger user charges, amounted to only 53 percent of operating expenses and 36 percent of total expenses, respectively. There was, therefore, a cross-subsidy from overflights to other activities of MCAA. Income taxes, used as a tool to extract excess overflight revenue, amounted to 70 percent of income in 2002. Although income before taxes in 2002 was more than double that in 2001 (see Table 10), income after taxes in 2002 was about 13 percent less than that in 2001.

As the revenues from overflight revenues were well in excess of the cost of providing the service, since April 2006, all overflight revenues have gone directly into the national general revenue account. In fact, the expectation of the International Civil Aviation Organization (ICAO) is that charges for overflights will not exceed the costs of providing navigation services, so any excess revenue cannot be considered sustainable in the long term. Other countries that charge more than cost for overflight services have already agreed to reduce the charges to only cover the costs of the navigation services to them.

\(^9\) Using the GDP Deflator, prices have increased about 240 percent over the past decade.
MCAA’s operating expenses in year 2002 were equivalent to 1.2 percent of that year’s GDP. MCAA, however, similar to MTZ did not use the state budget for its expenditures. This situation will change now with diversion of the overflight revenues to the national budget and their imminent reduction.

Given that airport charges in Ulaanbaatar are comparable to those in other airports in the region (see Table 11), it would not be possible to offset the decline in overflight revenues by raising charges. Consequently, even if MCAA were to increase its charges and reduce its expenses, it would still have to rely on the national budget to some extent to offer the same levels of service.

### Table 10: Mongolian Civil Aviation Authority Income (current US$ 000)

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenues</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landing charges</td>
<td>1,673</td>
<td>2,466</td>
</tr>
<tr>
<td>Overflight revenue</td>
<td>21,337</td>
<td>21,476</td>
</tr>
<tr>
<td>Royalties</td>
<td>2,070</td>
<td>1,427</td>
</tr>
<tr>
<td>Passenger tax</td>
<td>1,052</td>
<td>1,188</td>
</tr>
<tr>
<td>Other operating revenue</td>
<td>-4,465</td>
<td>956</td>
</tr>
<tr>
<td>Non operating revenue</td>
<td>878</td>
<td>1,126</td>
</tr>
<tr>
<td>Total</td>
<td>22,545</td>
<td>28,639</td>
</tr>
<tr>
<td><strong>Expenses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating expenses</td>
<td>12,415</td>
<td>13,484</td>
</tr>
<tr>
<td>Other</td>
<td>6,568</td>
<td>6,347</td>
</tr>
<tr>
<td>Total</td>
<td>18,983</td>
<td>19,831</td>
</tr>
<tr>
<td><strong>Net income before tax</strong></td>
<td>3,562</td>
<td>8,808</td>
</tr>
<tr>
<td>Tax</td>
<td>567</td>
<td>6,185</td>
</tr>
<tr>
<td><strong>Income after tax</strong></td>
<td>2,995</td>
<td>2,623</td>
</tr>
</tbody>
</table>


### Table 11: Airport and Passenger Charges at Selected Airports* (U.S. dollars)

<table>
<thead>
<tr>
<th>Airport</th>
<th>Landing Fee</th>
<th>Passenger Charge</th>
<th>Navigation Charge</th>
<th>Total</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seoul</td>
<td>706</td>
<td>1,064</td>
<td>211</td>
<td>1,981</td>
<td>1998</td>
</tr>
<tr>
<td>Bangkok</td>
<td>378</td>
<td>1,438</td>
<td>335</td>
<td>2,151</td>
<td>2000</td>
</tr>
<tr>
<td>Kathmandu</td>
<td>903</td>
<td>1,739</td>
<td>306</td>
<td>2,948</td>
<td>1999</td>
</tr>
<tr>
<td>Beijing</td>
<td>1,508</td>
<td>1,414</td>
<td>250</td>
<td>3,172</td>
<td>2001</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>1,334</td>
<td>1,484</td>
<td>480</td>
<td>3,298</td>
<td>2001</td>
</tr>
<tr>
<td>Phnom Penh</td>
<td>885</td>
<td>2,600</td>
<td>470</td>
<td>3,955</td>
<td>1998</td>
</tr>
<tr>
<td>Ulaanbaatar</td>
<td>2,250</td>
<td><strong>1,560</strong></td>
<td><strong>300</strong></td>
<td><strong>4,110</strong></td>
<td>2000</td>
</tr>
<tr>
<td>Bishkek</td>
<td>2,745</td>
<td>1,300</td>
<td>320</td>
<td>4,365</td>
<td>2003</td>
</tr>
<tr>
<td>Moscow</td>
<td>2,115</td>
<td>2,730</td>
<td>450</td>
<td>5,295</td>
<td>2003</td>
</tr>
<tr>
<td>Irkutsk</td>
<td>2,115</td>
<td>2,730</td>
<td>450</td>
<td>5,295</td>
<td>2003</td>
</tr>
<tr>
<td>Narita (Tokyo)</td>
<td>2,902</td>
<td>2,730</td>
<td>1,475</td>
<td>7,107</td>
<td>2003</td>
</tr>
</tbody>
</table>

*Data is for an Airbus 310 at a take-off weight of 150 tons and with 130 passengers.*

*Source: Nathan Associates 2004.*
PLANNED INVESTMENT

Table 12 presents the investment proposals that have been inferred from the intentions of the different transport agencies. The costs associated with each investment are based on assessments by independent experts and not those of the respective agencies. Based on these assessments, the total cost of projects that the government and individual agencies are contemplating for the next decade is about 9.8 percent of expected GDP over the same period. This is about three to four times what countries typically spend on transport and would be very difficult to realize. The distribution of the proposed investments between the modes indicates the dominance of rail with a share of almost two-thirds of the total. Roads are second with a share of 21 percent, followed by airports and aviation with a share of 12 percent. According to the proposals, urban is to receive a very small proportion (0.4 percent of the total).

The four largest single investments in the government’s investment plan are a new rail line linking Russia to China (estimated to cost about US$1.1 billion) with a funding request under consideration by the Millennium Challenge Corporation\(^\text{10}\)), new east–west railways in the south of Mongolia (estimated to cost about US$500 million), railways for the maintenance sector (estimated to cost US$300 million), a new international airport (estimated at about US$300 million), and a new north–south road in Western Mongolia linking Russia to China (estimated to cost about US$160 million, with financing being negotiated with the Asian Development Bank (ADB)). Other significant investments include four additional new north–south roads (about US$220 million), completion of the Millennium Road (about US$120 million), new mining railways (about US$90, but contingent on the availability of private financing), completion of the road from Ulaanbaatar to the Chinese border (about US$60 million, with financing already arranged) and upgrading domestic airports (about US$40 million). Planned expenditures on the maintenance of transport infrastructure are about US$95 million over the decade.

The proposal is discussed in the section, The Way Forward.

---

\(^{10}\) A bilateral development fund established by the U.S. government.
Table 12: Government Proposed Investment Program for Transport Infrastructure, 2008–15

<table>
<thead>
<tr>
<th>Project</th>
<th>Government Proposals</th>
<th>Length or units</th>
<th>Unit cost</th>
<th>Total Cost</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roads</strong></td>
<td></td>
<td></td>
<td></td>
<td>US$m/UNIT</td>
<td>US$m total</td>
</tr>
<tr>
<td>Millennium road</td>
<td></td>
<td>600</td>
<td>0.2</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Western Mongolia North–South Road</td>
<td></td>
<td>800</td>
<td>0.2</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Other north-south roads</td>
<td></td>
<td>1,100</td>
<td>0.2</td>
<td>220</td>
<td></td>
</tr>
<tr>
<td>Completion of Ulaanbaatar (UB) to China road</td>
<td></td>
<td>300</td>
<td>0.2</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Southern road to Altai</td>
<td></td>
<td>225</td>
<td>0.12</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Upgrade aimag to soum roads</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridge maintenance</td>
<td></td>
<td>5,000</td>
<td>0.002</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Road maintenance</td>
<td></td>
<td>4,500</td>
<td>3,300</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal roads</strong></td>
<td></td>
<td>627</td>
<td></td>
<td>21.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Railways</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New parallel railway</td>
<td></td>
<td>1,100</td>
<td>1</td>
<td>1,100</td>
<td></td>
</tr>
<tr>
<td>Add capacity to N–S line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other railway extensions</td>
<td></td>
<td>500</td>
<td>1</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Mining railways</td>
<td></td>
<td>300</td>
<td>1</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Rail maintenance</td>
<td></td>
<td>1,100</td>
<td>0.05</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal railways</strong></td>
<td></td>
<td>1,955</td>
<td></td>
<td>66.4%</td>
<td></td>
</tr>
<tr>
<td><strong>Aviation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New international airport</td>
<td></td>
<td>1</td>
<td>300</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Upgrading domestic airports</td>
<td></td>
<td>4</td>
<td>10</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Expansion of the air navigation system</td>
<td></td>
<td>1</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Airport maintenance</td>
<td></td>
<td>5</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal aviation</strong></td>
<td></td>
<td>350</td>
<td></td>
<td>11.9%</td>
<td></td>
</tr>
<tr>
<td><strong>Urban</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roads to aimags in UB</td>
<td></td>
<td>100</td>
<td>0.1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Interchanges for outer by pass</td>
<td></td>
<td>5</td>
<td>0.4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Traffic management in UB</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Road maintenance in UB</td>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal urban</strong></td>
<td></td>
<td>13</td>
<td></td>
<td>0.4%</td>
<td></td>
</tr>
<tr>
<td><strong>Total transport infrastructure investment</strong></td>
<td></td>
<td>2,945</td>
<td></td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

Total GDP, 2008 to 2015: 30,000
Transport investment as % of GDP: 9.8%

*Source: Authors’ estimates.*
SECTOR PERFORMANCE

This section provides an overview of the performance of the various transport subsectors. It is organized by themes, namely quality, access, efficiency, and affordability. As the following discussion will show, poor maintenance of existing transportation assets has resulted in poor quality, inadequate access, and inefficiency of transportation services. The unaffordable nature of transportation services in Mongolia relative to the average income of citizens compounds the problem of sustainable transport services.

QUALITY

Road

Although there is no information on the condition of the road network, expenditures on road maintenance have been only about one-fourth to one-half of the needs over the past several years, indicating that the network is not in good condition and is declining. Recent estimates suggest that less than 30 percent of the paved roads more than 10 years old are in good condition, and gravel roads other than those funded through IFIs are graded about once every two years instead of twice each year as required.

Between 1995 and 2004, the fatality rate has remained fairly stable at about 25 fatalities per 10,000 vehicles (Tables 13 and 14), although this does not compare favorably with fatality rates for a sample of Asian countries (see Table 14). Almost 20 percent of the fatalities and injuries involve pedestrians.

Table 13: Mongolia Vehicle and Road Accident Statistics, 1995–2004

<table>
<thead>
<tr>
<th>Year</th>
<th>Vehicles</th>
<th>Fatalities</th>
<th>F/10,000v*</th>
<th>PIAs**</th>
<th>PIA/10,000v</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>101,300</td>
<td>294</td>
<td>23.82</td>
<td>865</td>
<td>90.80</td>
</tr>
<tr>
<td>1996</td>
<td>109,907</td>
<td>275</td>
<td>25.02</td>
<td>1032</td>
<td>93.90</td>
</tr>
<tr>
<td>1997</td>
<td>114,823</td>
<td>309</td>
<td>26.91</td>
<td>1283</td>
<td>111.74</td>
</tr>
<tr>
<td>1998</td>
<td>114,750</td>
<td>271</td>
<td>23.62</td>
<td>1522</td>
<td>132.64</td>
</tr>
<tr>
<td>1999</td>
<td>116,063</td>
<td>296</td>
<td>25.5</td>
<td>1488</td>
<td>128.21</td>
</tr>
<tr>
<td>2000</td>
<td>118,422</td>
<td>338</td>
<td>28.54</td>
<td>1619</td>
<td>136.71</td>
</tr>
<tr>
<td>2001</td>
<td>131,144</td>
<td>335</td>
<td>25.54</td>
<td>1812</td>
<td>138.17</td>
</tr>
<tr>
<td>2002</td>
<td>142,463</td>
<td>327</td>
<td>22.95</td>
<td>1636</td>
<td>114.84</td>
</tr>
<tr>
<td>2003</td>
<td>143,505</td>
<td>391</td>
<td>27.25</td>
<td>1224</td>
<td>85.29</td>
</tr>
<tr>
<td>2004</td>
<td>154,576</td>
<td>385</td>
<td>24.91</td>
<td>1119</td>
<td>72.39</td>
</tr>
</tbody>
</table>

*F/10,000v: fatalities per 10,000 vehicles; **PIAs: personal injury accidents.
Table 14: Road Fatality Rates in Select Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Fatalities per 100,000 people</th>
<th>Fatalities per 10,000 vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mongolia</td>
<td>13.7</td>
<td>24.9</td>
</tr>
<tr>
<td>Vietnam (2005)</td>
<td>13.6</td>
<td>6.6</td>
</tr>
<tr>
<td>Philippines*</td>
<td>0.9/5</td>
<td>2.9/16.0</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1.7</td>
<td>44</td>
</tr>
<tr>
<td>India</td>
<td>6.3</td>
<td>20</td>
</tr>
<tr>
<td>Pakistan</td>
<td>3.2</td>
<td>17</td>
</tr>
<tr>
<td>China</td>
<td>8.2</td>
<td>67.2</td>
</tr>
<tr>
<td>Indonesia</td>
<td>4.6</td>
<td>4.5</td>
</tr>
<tr>
<td>Malaysia</td>
<td>25.9</td>
<td>12.2</td>
</tr>
</tbody>
</table>

*Official statistic/estimate adjusting for under-reporting.


Rail

A program of repairs and track upgrading of the railway network is under way in an attempt to reverse the declining quality of the network. The railway network has suffered from lack of maintenance over an extended period which, coupled with recent increases in freight tonnages, has led to a decline in quality and imposition of weight and speed constraints and hence short-term capacity constraints. Nevertheless, the network has accommodated an annual increase of 20 percent between 2000 and 2005.

Airports and Civil Aviation

The international airport has few shortcomings, including frequent closures because of strong winds, sand or snow storms, or unacceptable visibility because of excessive air pollution, and a runway slope that exceeds ICAO standards. Although only a few of the 17 airports available for scheduled domestic flights have infrastructure that complies with ICAO standards, they all have adequate infrastructure to accommodate the few scheduled domestic services that operate. Gravel runways need upgrading to accommodate the landing of pressurized jet-powered aircraft.

Urban Roads and Transport

Ulaanbaatar has an urban road network of 464 km, of which about 78 percent is paved, the remainder being mostly earth tracks within ger districts. The city roads are generally in poor condition (no specific data is available) with extensive cracking, potholes, and subsidence. This condition results from substandard quality of the original design and construction with inadequate drainage, and subsequent lack of maintenance.

Of the 210 road junctions in Ulaanbaatar, only 48 have traffic signals. A Traffic Management Project undertaken by the municipality in 2005 showed that of the 2,800 traffic lights in Ulaanbaatar, only 75 percent were in service, and many of them were poorly illuminated. There appear to be no design or illumination standards for traffic signals or road lighting.
The average age of the large diesel and mid size public buses is more than 11 years, with more than 20 percent being over 15 years old, and some trolleybuses are more than 30 years old. The diesel buses operated by private companies have a similar average age to those operated by state-owned companies, but the average derives from a higher proportion of newer vehicles and a higher proportion of older ones and fewer mid-life vehicles. The old age of the buses exacerbate an already serious air quality problem in Ulaanbaatar. Although the primary sources of pollution are the three thermal power stations, about 200 small and medium-size coal-fired boilers, and more than 60,000 gers that burn lignite and coal, it has been estimated that 60 percent of vehicles have emissions that exceed the maximum allowable levels, and these vehicles are the major source of rapidly increasing levels of nitrogen and nitrous oxide.

ACCESS

There are only 103 km of roads, mostly compacted earth, in the ger areas that have a population in excess of 400,000. The roads are substandard, with narrow lanes that lack basic maintenance. Travel on these roads by vehicles is difficult, if not impossible. Therefore, public transport vehicles, water tankers, and other public service vehicles have difficulty entering the ger areas. Pedestrians have difficulty walking on uneven and narrow streets, which are often surrounded by uninterrupted wooden fences on both sides and sometimes blocked at one end. Travel times from Ulaanbaatar to aimag centers in Western Mongolia by interurban bus services are up to three days in each direction, including long periods of nighttime driving. Service information provided to passengers is also very limited. Although travel time would be significantly shorter by plane, domestic aviation is not affordable to most residents of these aimags, as discussed under “Affordability” below.

EFFICIENCY

Road

The paved road network has remained largely unchanged in length for two decades, during which time the vehicle fleet has more than doubled11 (see Table 15). This has resulted in widespread congestion at peak periods. The peak period flow-to-capacity ratios are close to or greater than one, indicating that the junctions are congested at the peak period. The peak-to-daily traffic ratios for the same intersections are relatively low, indicating that congestion lasts for a relatively long time.

Neither public nor private large bus operators are financially viable at current regulated fares. This is because of the low level of regulated fares, the large proportion of passengers that do not pay the fare (either through simple evasion or because they have been given a right to free or discounted travel), failure for the operators to be compensated for the loss of revenue, and because the scale of operation does not allow companies to realize any of the few economies of scale of urban bus operation. In addition, increasing traffic congestion reduces the efficiency of bus operations and

---

11 The increase in number of vehicles has resulted from two compounded influences, rapid growth of the urban population and increases in real incomes that has led higher rates of auto ownership among the long-term residents.
allows them to transport fewer passengers per day, while the increasing length of bus routes to serve new urban areas has a similar negative effect on productivity. The low efficiency is evidenced by the low number of passengers per large bus per day. Most analyses of large bus operations indicate that an efficient operation can result in about 1,200 passengers per large bus per day, and in the early 1990s operators in Ulaanbaatar came close to achieving this level when buses were new and the controlled tariff was still enough to cover direct operating costs.

Table 15: Ulaanbaatar: Growth of Population, Vehicles, and Vehicle Ownership Rates

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>Average Annual Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>612,500</td>
<td>775,000</td>
<td>950,000</td>
<td>4.50</td>
</tr>
<tr>
<td>Informal population</td>
<td>30,000</td>
<td>100,000</td>
<td>150,000</td>
<td>17.50</td>
</tr>
<tr>
<td>Total population</td>
<td>662,500</td>
<td>875,000</td>
<td>1,100,000</td>
<td>5.20</td>
</tr>
<tr>
<td>Private vehicles</td>
<td>17,500</td>
<td>28,062</td>
<td>50,000</td>
<td>11.10</td>
</tr>
<tr>
<td>Total vehicles</td>
<td>31,500</td>
<td>42,500</td>
<td>75,000</td>
<td>9.10</td>
</tr>
<tr>
<td>Length of paved urban roads</td>
<td>435</td>
<td>450</td>
<td>464</td>
<td>0.70</td>
</tr>
<tr>
<td>Private vehicles/1,000 people</td>
<td>26.4</td>
<td>32.1</td>
<td>45.5</td>
<td>5.60</td>
</tr>
<tr>
<td>Total vehicles/1,000 people</td>
<td>47.5</td>
<td>48.6</td>
<td>68.2</td>
<td>3.65</td>
</tr>
<tr>
<td>Vehicles/km of road</td>
<td>72.4</td>
<td>94.4</td>
<td>161.6</td>
<td>8.36</td>
</tr>
</tbody>
</table>

Sources: Authors’ estimates based on Traffic Police and Municipality of Ulaanbaatar (MoUB) data.

Rail

Railway transit traffic and the coals movements have resulted in a high-density corridor for railway traffic. Traffic density for both freight and passenger traffic is about 5.5 million traffic units per year, which is relatively high compared to other countries in the region with the exception of China, which probably has the highest utilization rate of railways in the world. Although MTZ’s labor productivity at 634,000 traffic units per employee is comparable to other countries in the region, it would almost double if based on the number of staff involved in transport operations only (see Table 16).
Table 16: Rail Network Utilization

<table>
<thead>
<tr>
<th>Country</th>
<th>Annual Traffic (millions of units per route-km)</th>
<th>Annual Traffic (thousands of units per employee)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mongolia</td>
<td>5.5</td>
<td>634/1,115*</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2.3</td>
<td>124</td>
</tr>
<tr>
<td>Thailand</td>
<td>3.2</td>
<td>580</td>
</tr>
<tr>
<td>Indonesia</td>
<td>4.0</td>
<td>610</td>
</tr>
<tr>
<td>China</td>
<td>27.7</td>
<td>1,061</td>
</tr>
<tr>
<td>European Union</td>
<td>3.6</td>
<td>691</td>
</tr>
</tbody>
</table>

* First estimate using total staff; second using transportation staff.

Source: ADB (2005), appendices, pp. 22, 23, and 26 for Mongolia; International Union of Railways and World Bank analysis for other countries.

Table 17 shows both the extent of efficient pricing and efficient operations for the different modes. Comparing the last two columns indicates that there are significant efficiencies to be gained in urban transport and in domestic freight movements. Pricing of railway passenger and domestic freight services, as well as urban transport services, is well below the level required for financial sustainability.

Table 17: Transport Tariffs and Fares in Mongolia

<table>
<thead>
<tr>
<th>Mode</th>
<th>Unit</th>
<th>Present tariff or fare</th>
<th>Commercially viable tariff at present efficiency</th>
<th>Commercially viable tariff at internationally competitive efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interurban road passenger</td>
<td>US cents per pass-km</td>
<td>2.2</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Interurban freight</td>
<td>US cents per ton-km</td>
<td>1.5 to 4.5</td>
<td>2.0 to 3.0</td>
<td>2.0 to 3.0</td>
</tr>
<tr>
<td>Domestic aviation</td>
<td>US cents per pass–km</td>
<td>4.0 to 10.0</td>
<td>6.0 to 12.0</td>
<td>6.0 to 8.0</td>
</tr>
<tr>
<td>Railway passenger</td>
<td>US cents per pass-km</td>
<td>1.3</td>
<td>2.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Railway domestic freight (coal)</td>
<td>US cents per ton-km</td>
<td>0.9</td>
<td>3.0</td>
<td>1.8</td>
</tr>
<tr>
<td>Urban public transport</td>
<td>US cents per trip</td>
<td>18.0</td>
<td>50.0</td>
<td>35.0</td>
</tr>
</tbody>
</table>

Source: Authors’ estimates.

**AFFORDABILITY**

**Urban Roads and Transport**

At the present fare for urban public transport (Tog 200 per trip on large buses), a typical ger family would spend 25 percent of its income on getting one family member to work and back each day. When added to other utility charges, the total cost exceeds the family income. But the Municipality cannot afford subsidies and the bus operators are not financially viable at the current fares.
The average number of urban transport trips per person is very low by international standards, at just 16 one-way trips per month, compared with a global average of about 40 trips. If a typical ger resident were to make and pay for the international average number of trips, it would cost the equivalent of about one half of their income. So they make fewer paid trips, and it is believed that they do not pay for a high proportion of the trips they do make. Even then, if a typical ger family member makes the average of 16 one-way paid trips each month and there are two workers who travel by bus in the family, this would still take more than 25 percent of their family income.

If they were to travel by minibus, for which the fares are 50 percent higher (Tog 300 instead of Tog 200) the impact on family income would be even greater, and this impact would be emphasized by the inability to make unpaid trips on minibuses, whereas on large buses, those operated by municipal companies, fare evasion is relatively usual. The breakeven fare calculated by the Municipality at the end of 2005 was Tog 570 per trip, almost double that currently charged by large buses.

The fares charged by the Russian-Jeep-based services on interurban routes are equivalent to about 2.2 US cents per passenger-km, not high by international standards, but close to the limit of affordability in Mongolian terms. However, it is difficult to see how the fare could be reduced by making the services more efficient. The market appears to be working well, with a range of qualities and prices of services. There is a gap between the Russian-Jeep services and those of four-wheel drive SUVs, but this market is perhaps too small to be viable. There are two terminals in Ulaanbaatar from which interurban buses operate, but there are no formal schedules—passengers have to wait until a bus has sufficient passengers to justify departing for its destination.

Relative to average monthly incomes, the fares over the longer-distance routes are high. For example, the one-way fare to Khovd from Ulaanbaatar (1,400 km and three days of travel) is currently equivalent to about US$36, so three annual trips would consume about 20 percent of an average income. Similarly, the fare for a one-way domestic flight is typically equal to several months’ income for someone living outside Ulaanbaatar, which makes any domestic air trip unaffordable.

**Rail**

Railway fares are more affordable than those for urban transport or domestic aviation, but only because they are cross-subsidized from the revenue of transit freight on the railway. The average passenger fare is now equivalent to about 1.3 US cents per passenger-km, low by international standards and affordable even in relation to Mongolian incomes. However, if the fares were to be increased to cover the long-term marginal costs of providing the services, at about 2.5 US cents per passenger-km, the fares would be significantly higher than those of competing road services and only marginally affordable.

**Airports and Civil Aviation**

Blue Sky Aviation is a charter operation servicing commercial customers (50 percent of flights), missionary workers (40 percent), and those in need of immediate medical attention (10 percent) throughout Mongolia. The fleet consists of one Cessna Caravan single-engine turboprop. The company’s pricing and operations are based on breaking
even annually with its expenses—being part of the Mission Aviation Fellowship (MAF Europe), a nonprofit organization. Medical evacuations involve mining accidents or locals often too poor to afford immediate transportation to a hospital. Flights are initiated before the capacity to pay is established. Billing occurs after the mission, with fundraising from donors sought in the case of those who are poor or unable to pay.

**THE MAIN ISSUES**

Geography, extreme climate conditions, limited public revenues, and low personal income are all factors that make development and maintenance of transportation in Mongolia particularly costly, difficult to fund, and unaffordable to the majority of the population.

On the urban side, the migration of population from rural areas and aimags to Ulaanbaatar has created a new set of problems for the sector, with many of the new urban residents having poor access to public transport services, and with those services being unaffordable to many of them. The rapid increase in car ownership without a corresponding increase in urban road space, combined with inadequate traffic demand management, has resulted in severe (if localized) traffic congestion, resulting in an increasing number of traffic related fatalities and poor air quality in Ulaanbaatar.

The limited ability of new transport infrastructure investments to be recovered either from users or from taxpayers is the most pressing and enduring infrastructure issue. To effectively address these issues, the government needs to confront and manage five main challenges: (a) how to strengthen the policy and planning frameworks to improve resource allocation efficiency; (b) how to achieve financial sustainability for the sector considering available financing avenues; (c) how to develop the regulatory framework to address operational efficiency better; (d) how to facilitate efficient urban growth in Ulaanbaatar; and (e) how to develop institutional and human capacity to meet the sector’s needs. There are clearly strong linkages (and overlaps) between these issues, but they provide a convenient framework for discussion below. Affordability, an important issue throughout the whole discussion, receives particular attention when assessing the regulatory framework and transport services in Ulaanbaatar. Road safety, another cross-cutting issue, is addressed under the institutional and human capacity development issues.

**RESOURCE ALLOCATION EFFICIENCY**

Although in principle, the MRTT is responsible for overall policy coordination and implementation for the sector, the planning process is typically fragmented. Links to broader economic and spatial development goals are not very clear, and the different transport subsector agencies and departments develop their plans with little coordination among one another. These weaknesses in the planning process result in attempts by the different agencies to meet growth and access goals using rail, road, and aviation plans instead of assessing the comparative advantage of each mode, carrying out an analysis of the various alternatives, and focusing on one plan.

An important case in point is with respect to providing access from the mines in the South Gobi to the markets. The main products would be thermal coal, coking coal, and copper concentrates. They have a potential market in China. At present, mining output
from these deposits is transported by road to the border with China. From there the transport continues by road, or the minerals are transferred to rail if that option is available (at present only for the output of the Nariin Sukhait coal mine). No decisions have been made on which mine railways will be built, if any, where they will be built, how they will be funded, or how they will be operated. Many options are available for each of these decisions. The choice depends on a number of key variables: the objectives of the government and mining companies, the associated risks, and the government’s financing capacity.

There is no investment plan for the transport sector as a whole, and even the particular modal agencies do not have transport plans as such, but rather intentions to make a number of specific investments. The cost of the proposed investments is beyond what is possible from the public sector. In these circumstances, there is a risk that too many investment projects will be started without the funding being available to complete them. They would therefore take much longer to complete than assumed in their feasibility studies, so the costs will end up being higher and the benefits lower. More importantly, only projects for which international aid is anticipated are subject to full feasibility studies, and these are not always of a consistently high standard. So it is not generally possible to compare the expected social and economic outcomes of projects that are competing for priority use of resources. Little has been done to assess the relative priorities of the various proposed projects or their viability, so there is an additional risk that low priority projects will be implemented before those that would be more compatible with the government’s social and economic objectives.

Prioritization should also be between new investment and asset preservation. Returns to investment in maintenance tend to be multiples of those in new infrastructure. Nevertheless, expenditures on road maintenance are less than half that requested by the MRTT and have been estimated to be one-fourth to one-third of the actual needs. One of the main reasons that investment in maintenance in many countries loses out to new investment is the political appeal of new construction. Unless this issue is effectively addressed, realizing the right levels of maintenance will remain an elusive goal.

**FINANCIAL SUSTAINABILITY**

In Table 12, the authors’ estimates that the total cost of the transport projects under consideration for the next decade is about 9.8 percent of expected GDP. This level of investment is very high and is unlikely to be realized. Even countries, such as Japan and Vietnam, which are known to have invested substantially in transport infrastructure typically during heavy rebuilding periods, reached about half of Mongolia’s proposed (as a share of GDP) and sustained these high levels for a few years only. The proposed high level of investment dictates a two-pronged policy: (a) using strict prioritization criteria to reduce the investment plan to achievable levels and (b) tapping other sources of finance.

Financing from the Road Fund was never secure, since the revenues would flow first into the national budget. The fund was also designed to allow for the use of revenues in both new construction and maintenance, with the result that maintenance remained underfunded, because most resources were allocated to new construction. The combination of the supposed earmarked revenue going directly to the Ministry of
Finance, and the budget reallocations going mostly to new construction largely defeated the purpose of the Road Fund that was to provide a reliable source of revenue for maintenance.

The financial positions of the two main transport agencies, MTZ and MCAA are unclear. MTZ cross-subsidizes passenger and domestic freight services from excess revenue from transit freight. Now that MTZ must invest in track upgrading and possibly expansion, and replace its locomotives, it will need to use the excess revenue from transit freight for investment and not for revenue subsidies. The extent to which the windfalls from transit traffic can finance new investments and replace existing ones is uncertain and the sustainability of the freight revenue itself, if more closely linked to cost, is questionable.

In 2005 MTZ declared a profit of Tog 4.0 billion (US$3.3 million), equivalent to about 1.5 percent of its Tog 261 billion overall revenue. MTZ earns substantial additional revenue and incurs additional costs from other activities, including housing, health, and education. Of the total profit, Tog 0.8 billion was paid to each of the shareholding governments as dividends. This favorable overall result conceals the extent of cross-subsidy from the transit traffic to virtually all other aspects of the railway’s operation. The average breakeven freight rate per ton-km in 2005 (using MTZ’s accounting system) was Tog 16.75. If the average cost per ton-km and per passenger-km for all MTZ’s categories of freight transport (transit, import, export and local) are equal, the railway’s overall profit was only achieved through a surplus of some Tog 27 billion from transit, with a deficit of about Tog 19 billion from domestic freight traffic. Other than that for transit, none of MTZs tariffs appear to cover the direct operating costs of their services, so even if MTZ were applying a Ramsay pricing policy, most freight tariffs would be too low.  

The financial situation of MCAA is also questionable, since it is expected to move from a position of profitability attributed to overflight revenues to one of loss, because these revenues have become part of the national budget and are likely to drop significantly over the next few years.

**OPERATIONAL EFFICIENCY: THE REGULATORY FRAMEWORK**

Passenger fares for public urban transport, railway transport, and domestic aviation (at least for Mongolian nationals) are regulated and set at levels to ensure affordability but not operational efficiency and sustainability. Since there is no price discrimination between passengers (other than between domestic and foreign on domestic flights), the resulting fares are very low by international standards and not enough to cover even short-term operating costs. For some time, the government was able to supplement fare revenue with deficit funding, but this policy is no longer sustainable. MIAT, the state-owned carrier, reduced its presence in the domestic aviation market in 2005, when it was unable to replace its time-expired aircraft, and the four municipal bus companies have had to cede market share to private operators of both large buses and minibuses.

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12 Under Ramsay pricing, tariffs for each part of the operation needs to cover only its marginal costs, so long as the total revenue from all services is sufficient to cover total costs. Tariffs are set in inverse proportion to the elasticity of demand for the particular market to minimize the impact of tariffs on reducing demand.
Although interurban road freight services are not subject to economic regulation in Mongolia, as in other countries, small and inexperienced truck owners who want to update and expand their fleet face unaffordably high interest rates. Operators of interurban road passenger services are required to be registered and follow indicative fares. These fares however do not appear to be binding, since operators charge about 20 percent less than the indicative tariffs. The registered operators face competition from unregulated operators.

Domestic aviation services are more tightly regulated with respect to quality (at least one operator had its license suspended in 2005 because of inadequate maintenance arrangements). Although only fares offered by the state-owned aviation company (MIAT) are government determined, private operators are pressured to offer similar fares. Even though the fares charged by Aero Mongolia, the largest private domestic operator, sometimes exceed those charged by MIAT by as much as 100 percent, financial sustainability of these airlines is often raised as a concern.

The safety oversight and accident investigation functions fall within the same department in MCAA. This creates a conflict of interest because the investigation of an accident will typically include an assessment of the quality of safety oversight.

Although delivered jet fuel prices in Mongolia are expected to be higher than spot prices, the difference is too large even for Mongolia where the transportation and handling costs involved are higher than usual because of the landlocked nature of the country. World spot prices for Jet A fuel were US$590 per metric ton in March 2006, yet fuel prices in Mongolia ranged between US$900 and US$1000 per metric ton. Given that the cost of fuel accounts for 34–44 percent of the cost of operating a plane, the unnecessarily high cost of fuel has its implications for both affordability and profitability. Quotas on the amount of fuel sold by each vendor, restricting the number of distributors, and possibly charging storage fees unrelated to the cost of service all contribute to the excessively high price of jet fuel in Mongolia.

To stimulate international road freight between Mongolia and China, the government has nearly completed a paved road from Zamyn Uud at the Chinese border to Ulanbaatar connecting to the paved road leading to Altanbulag at the Russian Border. The full potential of the recently created free trade zones at Altanbuleg and Zamyn Uud will not be realized as long as border restrictions exist and Mongolian, Russian, or Chinese trucks can only cross the borders on an exceptional basis. Although goods traded between China and Mongolia can cross the border at six places, only the crossing at Zamyn Uud is open throughout the year.

INTERNATIONAL AND TRANSIT RAIL FREIGHT SERVICES

Being landlocked, Mongolian products have to transit either through China or Russia to reach world markets. As with the transit of goods for other land-locked countries, the tariffs and service quality provided for Mongolian goods are high and low, respectively. Even for goods destined for markets in these neighboring countries, there are penal tariffs and service inefficiencies that add more cost and time than is usual for cross-border trade. Although not within the direct control of the Mongolian governments, this increases the cost of Mongolian products.
The quality of transit rail services for Mongolian products through China has been an issue between the countries for more than a decade. More than two-thirds of the cost of moving a container from the Chinese port of Tianjin to Ulaanbaatar occurs within China (at the port, between the port and the border, and Chinese formalities at the border). Being landlocked, the tariffs and service quality provided for Mongolian goods are high and low, respectively. Even for goods destined for markets in China and Russia, there are penal tariffs and service inefficiencies that add more cost and time than is usual for cross-border trade.

Negotiations on a tripartite transit agreement between Russia, Mongolia, and China have made little progress in the 15 years that they have been under way. During that time, and with significant support from the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), there has been some improvement in the quality of service, with higher-cost but shorter-time road transport now being available as an alternative to rail transport. Regular train service now operates between Ulaanbaatar and the Chinese port of Tianjin, but it still fails to provide an acceptable quality of service. Services to Mongolian traders within the port of Tianjin have improved since intraport competition between alternative container berth operators (one of which is private and foreign-owned) became effective.

**EFFICIENT URBAN GROWTH IN ULAANBAATAR**

To resolve the increasing congestion problem in Ulaanbaatar, the government’s present strategy depends excessively on new road investment, particularly construction of an outer ring road, with grade separated intersections, upgrading access roads to newly developed ger districts and increasing the quantity of off-street parking space. Demand management and public transport improvements do not appear to be part of the strategy. Other cities have found that a strategy focused on road construction and car parking provision does little to alleviate congestion. Rather it facilitates an even greater demand for road use.

The current restriction of access of minibuses to the downtown area is an example of traffic management and can be seen as a possible precursor to a two-part public bus service, with large diesel buses serving the main routes leading to the city center, and minibuses providing feeder routes to these main routes. Although this concept has many advantages, including a reduction in downtown traffic congestion from minibuses, it would also require most passengers from ger districts to use at least two buses. Since an integrated fare system is probably not feasible in the foreseeable future, this would result in higher transport costs to passengers who currently use just one bus per trip.

There are also several weaknesses in the present system of public transport services. The main issue faced by operators of the large buses is the financial unsustainability of the current controlled tariffs, while that of the users is the poor quality of service. Minibus services, which account for about 48 percent of public transport capacity, are financially

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13 World Bank 2005b.

14 Road safety issues in Ulaanbaatar are addressed in the next section on capacity development issues.
sustainable, but they contribute to the high levels of congestion and place pedestrians at risk because of the driving habits of their bus operators. These problems derive in one way or another from the low incomes of bus passengers and the attempts of the municipality to keep fares at an affordable level while not having the financial resources to subsidize either passengers or operators. Although financial losses by bus operators are caused primarily by the low level of fares, the problem is often exacerbated by operating inefficiency and perhaps short routes and low asset utilization.

The inter-relationship of these issues was demonstrated in December 2005 when, in response to requests from the operators for a sustainable tariff, the municipality implemented a substantial fare increase, only to have to withdraw it several days later after sustained and at times violent protests.

The low quality of bus service is also a result of the use of old vehicles that break down often and the inability to upgrade the vehicles, given the low fare levels, free passes, and lack of penalties on fare evasion. Although remedying these problems could go a long way toward improving service and restoring some profitability, bus companies would still have problems in raising the capital for the purchase of new vehicles, or obtaining loans for their purchase. In many cities, buses of more than 10 years of age have been retired from the fleet, but this could not be done in Ulaanbaatar without addressing this problem.

Air quality in Ulaanbaatar is one of the most pressing of Mongolia’s environmental problems. The primary sources are the three thermal power stations, about 200 small and medium-size coal-fired boilers, more than 60,000 gers that burn lignite and coal, and more than 75,000 vehicles with an average age of more than 10 years. The atmospheric content of carbon monoxide exceeds the permissible norm by a factor of between 2 and 4, with the highest levels in the winter months when the effect is exacerbated by a temperature inversion that keeps the pollutants in the atmosphere in the city. It has been estimated that 60 percent of vehicles have emissions that exceed the maximum allowable levels, and these vehicles are the major source of rapidly increasing levels of nitrogen and nitrous oxide.

In an attempt to deal with both the level of vehicle emissions and the level of road accidents, the Municipality of Ulaanbaatar and the Transport Services Center have implemented systems of vehicle testing, both for technical quality and emission levels. From 1999, the Municipality of Ulaanbaatar installed six technical inspection and diagnostic centers to test buses for emissions, as well as technical standards. The system was extended to include taxis in 2000 and passenger cars in 2002. In 2002, the latest year for which data is available, less than 70 percent of registered vehicles were tested, and of these about 71 percent passed the test on the first attempt. However, less than 1 percent failed to pass the test on a subsequent attempt.

In 2005, three new vehicle inspections stations were established by the Transport Services Centers. These stations have computer controlled emission testing equipment, so that the inspector has little control over whether a vehicle satisfies the emissions test or not, only through the conduct of the test. The technical inspection equipment is also largely computer controlled, further reducing the discretion of the inspector. Although Mongolia has indeed upgraded its inspection and diagnostics equipment and centers,
both the standards and procedures have to be carefully set and monitored to ensure that the quality of air is brought to acceptable levels.

INSTITUTIONAL AND HUMAN RESOURCE CAPACITY

Implementing the reform programs for the transport sector and managing its needs in an effective and efficient manner requires further development and strengthening of institutional and human resource capacity. Road safety, a cross-sectoral objective, is largely about developing institutional and human capacity and is addressed below.

A major difficulty that faces much of Mongolia's public administration is the small population base from which it can recruit trained and experienced staff. Hence, any institutional structure that requires more than a minimum number of staff will have a significant problem. Another difficulty is that Mongolia does not have a long history of operation of political institutions in a market-oriented environment. Many of the experienced staff gained their experience in a planned economic context, while the graduates who might support them are too young to have gained much experience. These problems are exacerbated by the lack of a professional public service in which senior staff continue serving one administration after another. As a result, a change of administration typically results in changes not only of political staff, but also of technical and advisory staff.

The large increase in car ownership and use, together with inadequate road capacity and only rudimentary traffic management, and few provisions for pedestrians, has resulted in a high rate of road accidents and fatalities. The traffic police, typically under-resourced, have identified driver behavior as a major contributory cause of deaths and injuries in road accidents, but the method of recording accident data is inadequate to give a more complete understanding of causation. A particular problem in Ulaanbaatar, where about one-third of road accidents occur, is the inadequate separation of pedestrians from vehicles on the streets. Crossing roads at intersections is difficult because the traffic signals do not give pedestrians enough time to cross and there are no central refuges to help in this respect. There are also limited traffic lights and insufficient pedestrian sidewalks.

THE WAY FORWARD

The main challenges facing the transport sector as identified in the previous section are (a) how to strengthen the policy and planning frameworks to improve resource allocation efficiency; (b) how to achieve financial sustainability for the sector considering different financing avenues; (c) how to develop the regulatory framework to better address operational efficiency; (d) how to facilitate efficient urban growth in Ulaanbaatar; and (e) how to develop institutional and human capacity to meet the sector’s needs. Recommendations in this section follow the same structure and are summarized at the end in Table 19. They are divided on the basis of the implementation horizon into short-term recommendations (to be completed within 3 years) and medium- to long-term recommendations (to be completed in 4-10 years).
EFFICIENCY IN RESOURCE ALLOCATION

The following guidelines are recommended to achieve better efficiency in resource allocation:

- Develop a results framework closely linking measurable outcomes to sector goals.

  Figure 2 provides a stylized and partial framework for the strategic direction of the transport sector. It is intended to demonstrate the links between the indicators and the goals of the sector. By developing such a framework, the government can establish the interventions to use in targeting each of the sector’s goals and the associated resource cost and sources of finance.

  In Figure 2, goal number 1 is to reduce costs and increase efficiency by investing in the maintenance and expansion of the road and rail networks. The interventions to achieve this goal in this stylized example are the rehabilitation of the railway network and a road maintenance program. Even if both interventions were successfully undertaken, one cannot be certain that the specific goal was accomplished. To ascertain that efficiency has increased and cost of freight has dropped, it would be necessary to measure travel time, freight tariffs, and key performance indicators for this goal.

  The credibility of the formulated plans is also essential to attracting private sector investors. With uncertainty over future plans, investors may lack the confidence to finance rail operations or toll roads, for example, two potential areas for private sector participation. Prioritized and resource-constrained plans can reduce uncertainty while remaining flexible as plans evolve over time.

- Use rigorous and consistent economic and social efficiency criteria for prioritization.

  To ensure that the projects with the highest social and economic returns are undertaken, it is imperative that a transport investment plan be developed on the basis of a consistent and rigorous application of social and economic assessment criteria. The plan should reflect the government’s priorities and take into account the limited financial resources likely to be available. Typically ministries of planning or finance are best suited to take the lead in setting consistent criteria that are then followed by line ministries.
Figure 2: Stylized Strategic Direction of Transport Sector and Key Performance Indicators

Goals of the Transport sector

Reduce costs and improve transport efficiency

- by investing in maintenance and expansion of road and rail networks
  - Rehabilitation of railway network (xx USD)
  - Road maintenance Program (xx USD)
  - Donor project 1 (xx USD)

Goals of the Transport sector

Improve mobility/connectivity of people in remote regions

- by investing in and maintaining all-year round access to people in the western regions
  - Millennium Development Road (XX USD)
  - Targeted Subsidized domestic aviation to 1 or 2 remote aimags (xx USD)
  - Donor Project 2 (xx USD)

Goals of the Transport sector

Improve mobility of people and goods in Ulaanbaatar

- by supporting urban strategic planning, traffic management, public transport and investments in urban road improvements
  - Traffic Management Program (xx USD)
  - Peace Avenue improvements (xx USD)
  - Bus route concessions (xx USD)

Goals of the Transport sector

Reduce road accidents and fatalities

- by strengthening the Transport Service Centers (TSCs) and implementing road safety programs
  - blackspot program (xx USD)
  - public awareness campaign (xx USD)
  - Vehicle inspection program (xx USD)

... with Key Performance Indicators (KPIs)

Reduced travel time on improved roads and rail

Additional Households provided with access to an all weather road within 2 km

Reduced travel time/cost to district centers

Reduced number of accidents, injury and fatalities in project corridors

Performance targets for TSC achieved
• Require a balanced analysis of proposed transport investments.

A common practice by engineering firms when preparing feasibility studies for projects, some of which are unsolicited, is to provide too much detail on the technical aspects of the project with little, often poor, analysis of the demand and economic impacts. A balanced approach that also ensures high-quality analysis of the projects’ economic and social benefits is necessary to minimize suboptimal allocation of resources. Moreover, subjecting unsolicited proposals to the same rigorous standards of appraisal would enhance efficiency in resource allocation.

• Invest in asset preservation.

A recent study argues that trying to maintain and develop a road network without the necessary economic base from which to maintain that network is likely to fail, because the roads will inevitably deteriorate and ultimately will need to be reconstructed at a high cost, but funds will not be available for reconstruction. According to the study, an existing network with a replacement value equivalent to 20–40 percent of GDP is likely to be sustainable. The same study estimated that the replacement value of road network for Mongolia is well above sustainable levels at 58 percent of GDP. The analysis indicates that Mongolia’s current road network cannot be maintained by the current size of the economy without extracting funds from other economic sectors. This would strongly suggest that prior to the decision on new road investment, maintenance requirements and their financing plans be carefully considered.

Using “generally accepted” unit costs for the maintenance of roads and bridges in countries with geography and climate similar to Mongolia, the expenditure needed to maintain the road network in a stable condition is about US$20 million each year up from the recent expenditure level of US$5 million per year. It is recommended that the MRTT utilize the findings from the asset management study, carry out an analysis of the consequences of not maintaining the road network, develop an asset preservation framework, and present the findings to members of the legislature.

**Indicative Investment Program**

Table 18 presents two investment plans for the period 2008-15: one based on government proposals as inferred from the different government agencies and the second a set of recommendations reflecting our preliminary assessment of Mongolia’s needs and priorities. The latter is only a judgment and is not based on the application of consistent and rigorous economic and social efficiency criteria. All investments will need to be subjected to such criteria before the investment program is finalized to ensure optimal allocation of resources.

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15 Wood and Metschies 2006.
16 Equivalent figures for Lao PDR, Malaysia, the Philippines and Bangladesh were 68 percent, 16 percent, 20 percent, and 11 percent, respectively.
### Table 18: Preliminary Recommendations for the Modification of the Proposed Investment Program, 2008–15

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Government Proposals</th>
<th>Preliminary Recommendations</th>
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<td>Length or units</td>
<td>Unit cost</td>
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<td>Millennium road</td>
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<td>Western Mongolia North–South Road</td>
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<tr>
<td>Other north–south roads</td>
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<td>Completion of UB to China road</td>
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<td>Southern road to Altai</td>
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<td>Upgrade aimag to soum roads</td>
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<td>Bridge maintenance</td>
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<tr>
<td>Road maintenance</td>
<td>4,500</td>
<td>3,300</td>
</tr>
<tr>
<td><strong>Subtotal roads</strong></td>
<td>627</td>
<td></td>
</tr>
<tr>
<td>Railways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New parallel railway</td>
<td>1,100</td>
<td>1</td>
</tr>
<tr>
<td>Add capacity to N–S line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other railway extensions</td>
<td>500</td>
<td>1</td>
</tr>
<tr>
<td>Mining railways</td>
<td>300</td>
<td>1</td>
</tr>
<tr>
<td>Rail maintenance</td>
<td>1,100</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Subtotal railways</strong></td>
<td>1,955</td>
<td></td>
</tr>
<tr>
<td>Aviation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New international airport</td>
<td>1</td>
<td>300</td>
</tr>
<tr>
<td>Upgrading domestic airports</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Expansion of the air navigation system</td>
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<td>10</td>
</tr>
<tr>
<td>Airport maintenance</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td><strong>Subtotal aviation</strong></td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roads to aimags in UB</td>
<td>100</td>
<td>0.1</td>
</tr>
<tr>
<td>Interchanges for outer by pass</td>
<td>5</td>
<td>0.4</td>
</tr>
<tr>
<td>Traffic management in UB</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Road maintenance in UB</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Subtotal urban</strong></td>
<td>13</td>
<td></td>
</tr>
<tr>
<td><strong>Total transport infrastructure investment</strong></td>
<td>1,600</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: Authors’ estimates.
The government’s proposal was presented in Table 12 and discussed briefly. The recommendations in the right half of Table 18 below are based on the assumption that investment in transport would be about 4 percent of GDP. This figure, which implies achieving 40 percent of the government’s targets, is high and ideally should be reduced to about 2.5–3.0 percent of GDP. The key differences between the indicative program and that proposed by the government are highlighted below and then discussed in some detail afterwards:

Investment on roads, while recommended for increase from less than 21 percent to almost 44 percent of the total, is reduced to about 85 percent of that proposed by the government; but maintenance is increased to about one third of the road total rather than the 5 percent indicated in government proposals.

Public investment in new railways is recommended for a decrease to 28 percent of that proposed by the government.

Construction of a new international airport is recommended for deferral.

Investment in transport in Ulaanbaatar is recommended for an increase to four times the level proposed by the municipality, with investment proposed on interchanges for an outer by pass replaced by maintenance of existing roads.

**Figure 3: Proposed Millennium and Connecting Roads**

The largest recommended change in indicative plan is increasing investment in traffic management in Ulaanbaatar from 1 to US $25 million. In addition, it is recommended that US $10 million be invested in the maintenance urban roads.
The largest proposed reduction from the government’s investment program is US$310 million associated with the north-south roads. Although the Millennium Road will provide access from the east to the west of the country through Ulaanbaatar (see Figure 3), a north–south road passing through Ulaanbaatar, and another one in the west of the country will provide further connectivity, the case for other north–south roads is less compelling, given the scarcity of resources and the competing needs. Any additional effort to build north–south connectors that are not part of a Trans Asian Highway should be preceded by an assessment to study other ways of achieving the connectivity standards. Even the proposed sections of the Tran Asian Highway need to meet the economic efficiency criteria from Mongolia’s perspective.

There are concerns that the capacity of the existing north–south railway will be inadequate to deal with the demand expected by the end of the decade, and a new north–south railway is proposed for investment at a cost of US$ 1.1 billion. The two sources of expected growth are transit traffic between Russia and China and the export of Mongolian minerals to China.

Our analysis suggests that there is still some excess capacity in the present track, and a potential to increase capacity in the critical sections at moderate cost. Many of these increases are already planned by MTZ, such as the construction of more passing loops, most importantly one in the longest (33 km) stretch of single track between Darkhan and Zuunbaraa, and three others on sections of single track of more than 30 km length, all south of Choir. Even without these additional loops, there appears to be sufficient track capacity to meet the projected traffic at least until 2011 (when the additional crossing loop between Darkhan-Zuunbaraa will be needed). The next constraint is likely to be in 2013, when the next three crossing loops south of Choir will be needed. It is recommended that a more detailed analysis of the potential demand and track capacity on the main north–south line be carried out.

Some investment in the mining railways will be essential in the next few years. The government’s contribution could be up to US$150 million out of a total of US$300 million depending on the option selected by the government (see the next section on financial sustainability). Additional financial support from development partners would be necessary.

Key constraints on development of the existing international airport are the surrounding mountains, the high cost of realigning the runway to better suit the surrounding environment, the slope of the runway in relation to prevailing winds, and the impact of pollution on visibility. The current proposal to remedy this situation is the building of a new international airport at Zuun Mod, about 40 km south of Ulaanbaatar, with an cost estimated by MCAA of about US$ 117 million, excluding any costs for constructing road access. Our own estimate based on the costs of similar airports in other East and Central Asia is close to US$250 million, with an additional US$50 million for supply of utilities and transport. With a four-year construction period, the project would require about 10 percent of total government revenue over the decade.

17 The calculation assumes percentage growth in all sections in line with the average.
Even with a projected growth of 10 percent per year in international passengers, and if domestic passengers reach 400,000 within 20 years, the capacity of the existing constrained airport would still be more than adequate. It is recommended that the issue of a new international airport be set aside for a period of about five years, and then be reconsidered from an operational and financial perspective.

Only four domestic airports have paved runways. Although only a few flights use the airports with gravel runways, the risk of catastrophic damage from stones penetrating the body of pressurized aircraft now entering domestic service is sufficient to justify paving their runways. It is recommended that for safety reasons, all airports used by scheduled domestic services be provided with paved runways and runway lighting.

**Investment in Urban Transport**

The largest recommended change in indicative plan is increasing investment in traffic management in Ulaanbaatar from 1 to US $25 million. In addition, it is recommended that US $10 million be invested in the maintenance urban roads.

**FINANCIAL SUSTAINABILITY**

The 2008–15 proposed level of public investment in transport of 9.8 percent of GDP is unlikely to be realized, let alone sustained over this period, given the economy’s competing needs for resources. A more realizable level of investment is about 2.5–3.0 percent of GDP. To increase the level of investment in the sector in a sustainable manner, the government needs to consider the different financing sources, particularly the private sector. However, and irrespective of the sources of finance, financial sustainability requires that a clear determination be made of how infrastructure and services will be ultimately paid for. Will they be paid for directly by the users through fees and user charges, or through general government revenue, or some combination of both? This has a strong bearing on pricing, since a certain level of subsidization is deemed necessary on affordability grounds.

So far, private investment in infrastructure has been negligible, although substantial private investment has been made in road transport, particularly in vehicles for urban public transport (discussed under “urban” below) and in aircraft for domestic aviation. Some unsolicited offers have been made to invest in increasing the capacity of the rail network, and a request has been made to the Millennium Challenge Corporation for grant funding for the same purpose. In both rail-related cases, the objective is to increase the capacity for highly profitable transit freight from Russia to China.

A number of the investments in Table 18 are likely to interest the private sector. Private sources could be attracted to partially or fully finance the proposed north–south parallel railway and the mining railways, as well as railway maintenance. Some of the road and urban transport investments can be financed using concessional loans and grants from international financial institutions and bilateral donor agencies, in which case the cost to the national budget would be the counterpart financing, usually between 10 percent and 20 percent of the total, and the subsequent amortization charges in the case of loans.

Surpluses from overflight revenues, which were used to finance investment in domestic airports and the air navigation system, have started recently flowing directly into the
government budget and are likely to be reduced in the future as revenues come in line with the cost of service offered. More importantly, these surpluses were a windfall unrelated to cost of service delivery. Consequently, the aviation sector will have to compete with other sectors of the economy for additional resources beyond the revenues it generates.

Four key areas need to be addressed in the discussion of financial sustainability: (a) the Road Fund, (b) the financing of the mining transport infrastructure, (c) the accounting systems of MTZ and MCAA, and (d) the cross-subsidization of rail freight traffic.

**Is the Road Fund Necessary?**

As it became possible for the Road Fund to finance non-road expenditures, the fund became subject to the criticism that it was an off-budget mechanism used to avoid constraints imposed by the budget process. Consequently, the Road Fund was discontinued. Although there can be sound arguments for road funds, experience with other road funds has shown that many of them rarely achieve their objectives and that the conditions that might make such an achievement possible are difficult to bring about. It recommended that the Road Fund not be reconstituted if the conditions for its successful operation cannot be established and that reliance be placed on direct allocations from the general budget for the funding of road maintenance in the future. It should also be noted that the budgeted expenditures on road maintenance in 2004 and 2005, at just over US$4 million, were almost three times more than the average of the previous three years.

**Mobilizing Private Sector Funds for the Mining Railways; and Separate Infrastructure and Operations Management**

The mining sector has recently emerged as one of the main growth drivers of the Mongolian economy. It is hence essential to ensure that reliable and adequate railway capacity is available for mining companies to export their output. In general, the mining sector will have the resources to fund its own investments. This approach would help minimize the financial commitment by, and risk to, the Government of Mongolia (GoM). However, if the government considers it imperative that railway infrastructure remain under Mongolian ownership, alternative ownership structures could be considered, but it is important that the government assess risks carefully and ensure that they are commensurate with expected returns.

Most of the options for mining railways involve private investment in railway infrastructure, operations, or both. Experience in other countries where the same company has been responsible for infrastructure and operations (vertical integration) has been mixed. Often the necessary investment in infrastructure has not been made, since it reduces the short-term profitability. Where a principal client of the railway has been one of the major investors, it has proved difficult to ensure adequate access to track and services for competing clients. Also, where the railway business of the concessionaire is secondary to its main business, the railway operation has often been subjugated to the financial interests of the principal business.

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One option that would give the Mongolian government control over railway infrastructure while allowing for substantial private investment, as well as private control over operations and investment, is a joint venture between the government and a Railway Infrastructure Company (RIC). The government would own a 51 percent share in the venture. Under this option, infrastructure and operations are separated. Ownership of equity in the RIC would be constrained to either exclude all shareholders in railway operating companies (including mining companies) or to include all of them to avoid restricting access to competitors. Private interest in the venture could dictate the model to follow. The RIC would invest in the rail infrastructure and make capacity commercially available to operating companies. This solution would allow the Mongolian government to retain control of the railway infrastructure, together with the potential efficiency gains associated with private sector management, but would require significant financial contribution by the government. A BOT scheme or one of its variants for the infrastructure company would still maintain Mongolian ownership while reducing the financing burden. Careful consideration of the various options for mobilizing private resources and their associated risks is necessary.

MTZ’s and MCAA’s Accounting Systems

It is necessary to provide MTZ and MCAA the right incentives to operate efficiently. It is also important that the agencies set clear measurable targets that can be systematically monitored to ensure efficient operation. Without modern accounting standards, it will be difficult to understand the financial position of the two agencies, the extent of their profitability or the interpretation of key indicators. Moreover, without such standards, it will be not be possible to carry out medium- and long-term capital planning in a sustainable manner. Since historical costs are taken into account in estimating depreciation and profitability, depreciation allowance will not provide a reasonable proxy for the desired investment expenditures. Despite attempts to make MTZ’s accounting system more transparent, transportation revenue (but not total revenue) is understated, and in all some Tog 50-60 billion of 2005 revenue comes from unidentifiable sources. There is also an unknown number of commercial bank loans not fully recorded in the accounts, so it is not clear if the total declared profit is a true reflection of the actual profit or not. It is therefore recommended that MTZ and MCAA follow modern accounting systems.

Reconsidering the Current Dependence on the Highly Profitable Transit Traffic

MTZ’s current tariff structure is unsustainable in the long or medium term. The high transit tariff already appears to be discouraging China from increasing the amount of oil it imports from Russia through Mongolia. Without the high profit from transit freight, the railway would have no revenue to invest in capacity increases. If the tariff for domestic freight were increased to cover its long-term marginal cost without incurring an overall financial loss (the usual criterion for determining whether a particular traffic is profitable in the long term), it would have a significant adverse impact on the cost of electricity in Ulaanbaatar. Similarly, if passenger tariffs were increased to cover their long term marginal cost, it is probable that many passengers would use minibuses instead (as they already do from Ulaanbaatar to Erdenet and Darhan, and will able to do so to Sainshand when construction of the paved road is completed).
The uncertainty of continuation of the transit traffic revenue, and the difficulties associated with increasing the tariffs for domestic freight and passengers make it imperative that MTZ reduce its unit operating costs by increasing its efficiency. Although the capacity of utilization of the Mongolian railways is relatively high, some efficiency can still be gained. It is recommended that the government consider the concessioning of container transport and the breaking up of the vertical monopoly of MTZ into two companies, one for infrastructure and the other for operations, as a possible way of introducing operating efficiencies. If it is deemed a social need to keep the price of coal in Ulaanbaatar low, it is recommended that the difference between the commercial tariff and the subsidized tariff be reflected as a public service obligation. This will have the advantage of explicitly quantifying the magnitude of the subsidy, while keeping the accounts of MTZ clear, hence making it possible to objectively assess its performance. It is also recommended that the government consider discontinuing the passenger service (once the main north–south road is completed) if it does not cover its operating costs including that of locomotives and wagons particularly given the increasing competition from minibus services.

REGULATORY FRAMEWORK: OPERATIONAL EFFICIENCY

Interurban Passenger Services: Deregulate Fares

It is recommended that regulations for interurban road transport be reduced to just those related to the safety of vehicles and qualifications of drivers. There is sufficient competition among the different operators to justify fare deregulation particularly that charges fares are about 20 percent less than government set tariffs.

It is suggested that the government’s intervention in domestic aviation follow a two-prong approach:

To ensure the financial sustainability of the industry, efficient pricing is necessary where operators are allowed to set tariffs based on market principles.

In the event that there are certain commercially unprofitable routes that the government deems necessary to serve on social grounds, subsidized concessions can be considered.

One risk of fare deregulation, even with open competition on all routes, is the potential for monopoly power on routes that are served by one operator only because of the small size of the market. However, there are low barriers to entry and exit into the domestic aviation market, and new operators are indeed entering the market. Eznis, a new player, is awaiting a license to start operating domestic scheduled flights and a new company is planning on starting operations soon. In addition, charter flights which constituted about 15 percent of domestic flights in 2004 provide additional competition to scheduled flights.

It should be noted that the new operators have entered the market despite market analyses concluding that the sector cannot provide a minimum weekly service to distant aimags (those more than 500 km from Ulaanbaatar) at a tariff that would be considered reasonable by international comparisons. One way to enhance the sustainability of the sector is to consider consolidating some of the markets. At present, there are about 17 domestic airports (other than Ulaanbaatar), a few of which are about 200 km apart.
In the event that the government perceives the need to provide flights to one or two remote aimags where commercial service would be unprofitable, it is recommended that the government consider awarding competitive concessions for these routes for a period of three to four years. This is similar to the concept of competition “for the market” rather than “in the market” that is widely and successfully used in land public transport. Concessions would be awarded to the operator requiring the least amount of subsidy for the desired level of service.

An alternative with some appeal from an affordability perspective is to allow open competition and free fare setting on routes, subject to the operators providing a minimum number of seats at a “social” tariff. This approach however, would have two main limitations. First, such a strategy would depend on airlines being able to find a cost and operating structure that could sustain average revenues to financial levels. Given the marginal sustainability of some routes at present, this alternative would somewhat exacerbate the situation. Second, and from a practical perspective, it would be difficult to implement and monitor the targeting of the “socially-priced” seats.

It is strongly recommended that the administration of the safety oversight and accident investigation function be separated to avoid the inherent conflict of interest. Although the function of safety oversight clearly belongs with MCAA, the accident investigation can administratively report directly to the MRTT.

Finally, some aspects of the jet fuel market in Mongolia need to be liberalized, with another regulated. It is recommended that the government consider removing the quotas on the amount of fuel sold by each vendor, relax the restrictions on the number of distributors, and regulate airport storage prices to be commensurate with the cost of service.

**Interurban Road Freight: Establish Lines of Credit for Truck Purchase**

To overcome the high interest rates faced by small truckers who wish to upgrade their fleet, it is recommended that the government consider a scheme that was successfully implemented in a number of countries, including Colombia, Mexico, Nigeria, and Zimbabwe when faced with the need to establish a line of credit from small and medium-size enterprises for truck or bus purchase. Companies would be required to provide a credible Business Plan and demonstrate that they have the managerial capacity and operational and vehicle maintenance experience needed to function as a company. Training to achieve the required standards before a company applies for access to credit can be provided by a loan or credit from an international agency, or preferably through a bilateral agreement. The schemes do not involve subsidized credit, but rather address the high interest rates otherwise charged to cover the perceived risks of loans to transport operators by requiring borrowers to contribute to an escrow guarantee account that is available to the bank operating the line of credit if any of the borrowers default on loan payments. With this escrow account established, the penal rate of interest charged to truck operators who have no fixed assets to use as collateral can be reduced or eliminated. It is recommended that this type of scheme be implemented on a pilot basis and if found appropriate, adapted to Mongolian requirements, and a source sought for the line of credit.
International Road Freight Services: Enhance the Efficiency at the Border Crossings

It is recommended that once the paved road from Ulaanbaatar to Zamyn Uud is completed, operating times at the border crossings at Zamyn Uud and Altanbulag be harmonized with those on the other side in China and Russia, respectively. It is also recommended that, if border crossings are not to be kept open on a full time basis, that they be at least open to ensure timely flow of trade across the border.

International Rail Freight Services: Reduce the Obstacles at the Border and Negotiate Better Arrangements with China

It is recommended that Mongolia continue to pursue with the Chinese and Russian governments the simplification of the restrictive border practices to encourage trade. Given the emergence of China as a major importer of Mongolian exports (China imports about 50 percent of its copper concentrates), the quantity and quality of transport infrastructure and logistics services with China needs to improve. To speed up progress on this issue, the GoM may wish to consider the use of international agencies as facilitators.

FACILITATING SUSTAINABLE URBAN GROWTH IN ULAANBAATAR

Following are recommendations to facilitate sustainable urban growth in Ulaanbaatar:

- Develop a metropolitan institution to coordinate infrastructure planning and land use.

  Urban transport planning can only be effective if part of a comprehensive urban planning process. To ensure this link there is a need to develop a metropolitan institution that coordinates among the different governmental bodies involved in infrastructure planning and land use in Ulaanbaatar. This institution would need to have the capacity to plan, monitor, and manage urban growth effectively.

  An important instrument for effective urban transport planning is the development of a multimodal urban transport strategy. Any solution to increasing traffic congestion and pollution emissions requires a combination of better management of road space and vehicle traffic, public transport improvements, and additional road capacity. Consequently, the strategy would cover activities, such as physical and operational improvements to junctions; additional coordinated traffic signals; improved enforcement of existing parking constraints; charging for on- and off-street parking; public transport reform; institutional and service restructuring; improvements to public transport infrastructure, equipment, and services; and increasing the geographic area covered by paved secondary roads and streets.

- Concentrate on urban transport infrastructure investment in heavily traveled corridors.

  Given the elongated, geographically constrained configuration of Ulaanbaatar, it is recommended that investment be concentrated in the most heavily traveled corridors (running east-west, especially Peace Avenue) on roadway and other facilities that will improve the efficiency and effectiveness of public transport. Public transport carries far more people than private cars and is likely to for many years. Investment should also be made on paved secondary road and sidewalk access to and from, and within the ger districts that climb the hills on either side of major east-
west arterials. Modest infrastructure investments, combined with vehicle traffic
management and improved traffic-rule enforcement and can achieve substantial
improvements in vehicle traffic flow and safety, and bus operating efficiency at a far
lower cost than construction of grade separated interchanges, especially those built
outside the urban core. It is therefore recommended the city government not invest
limited available funds in expensive ring road-interchange construction at this time
and reconsider these investments in the future.

• Vehicle traffic demand and flow management: restrict the number of on-street parking places
and charge for off-street parking; enhance the implementation of vehicle emission testing.

It is recommended that the Ulaanbaatar city government restrict the number of on-
street parking places and charge for off-street parking rather than implement a
policy to increase the number of freely available parking places. The latter policy
would just increase the number of cars coming into the Ulaanbaatar core and be thus
self defeating. By contrast, limiting and charging for on-street parking, and
providing and charging for off-street parking would not only discourage cars from
coming into the downtown area. It would also make more road space available for
traffic movement instead of parking, allow better circulation, and even provide
funds that could be used for public transport improvements.

Disincentives to auto use are not enough if the objective is to reduce vehicle traffic
congestion, and retain if not improve access and mobility for all citizens. Disincentives to private auto use need to be complemented by traffic flow
management measures, such as greater use of, and better coordination of, traffic
signals, junction channelization, and generally improved traffic engineering (for
example, appropriate use of one-way streets and turn prohibitions at congested
intersections with high pedestrian flows).

Improving the quality and quantity of public transport would make it a better
alternative to the purchase and use of private automobiles. Improvements might
include bus-only lanes on some of the main streets, bus priority measures at
junctions, better location of bus stops and the provision of amenities, such as shelters
for weather protection and passenger information. Many cities have encouraged the
operation of what are called Executive or Express bus services that offer a higher
quality of service, including a guaranteed seat, more comfortable seats, a scheduled
service, and reliable air conditioning and heating.

Although the Municipality of Ulaanbaatar has installed technical inspection and
diagnostic centers to test buses, taxis, and passenger cars for emissions, as well as
technical standards, the system seems to pass most vehicles. Both standards and
procedures have to be carefully set and monitored to help bring the quality of air to
acceptable levels.

• Urban public transport: develop a comprehensive public transport plan.

It is recommended that the municipality undertake a comprehensive study to
determine the most appropriate bus network configuration for Ulaanbaatar, the
optimal mix of services and vehicles for serving the many different Ulaanbaatar
travel markets, the appropriate fare, affordability, service and subsidy policies, and
service procurement approach.
Subsidies

Even if bus services were to operate more efficiently and operators would be compensated for the passes and concessionary fares, bus service would still be unsustainable without some form of subsidy. Given income levels, some subsidy would be justified on affordability grounds. A number of alternatives are available in which the municipality could provide subsidies for public transport operations. For example, it could provide part of the cost of purchase of new buses by private operators. Another subsidy option is to charge market rate fares in general, but concessionary fares specifically targeted to those who cannot afford cost-recovery tariffs. It should be noted that subsidies specifically directed to low-income passengers would be more efficient than any type of capital subsidy (for example, for bus purchase) because they would benefit those with the greatest needs rather than all passengers regardless of income. The city government could use revenues from proposed parking charges to improve the bus system along the lines of the study’s conclusions.

Procurement of Public Transport Services

It is recommended that the existing short-term contracts between the municipality and the large diesel bus operating companies be replaced by competitively bid concessions, and at the same time that minibus routes also be tendered in a similar way. The precise approach and criteria would be worked out at the conclusion of a public transport study when all relevant parameters are known. The terms of the concession, which are typically five to seven years, should include the fares to be charged, minimum frequencies to be met, and the amount of subsidy required, if any. The bidders should also be required to submit Business Plans that indicate their managerial and financial capacity, and how they will acquire and maintain their vehicles and train their drivers. An alternative system that involves less demanding conditions is likely to result in more bids, but also in more concessions being cancelled for noncompliance, and therefore would require a more rigorous monitoring and regulatory system. It is also recommended that the municipality seek technical assistance in preparing the bidding documents and the route contracts.

There would be advantages in having the minibus routes concessioned to companies or cooperatives rather than to individual operators. It is not possible to hold individual operators responsible for the quality of service on a route, such as the frequency of service in times out of the peak period of the day or on weekend days, or for the time between successive vehicles. Individual operators tend to wait at their terminal stop for a bus load of passengers before departing, whereas a company or cooperative can be required to maintain a maximum time between departures. In addition, a company or cooperative can be held responsible for the behavior of its drivers and other staff. Hence, it is recommended that the municipality only issue minibus licenses to companies or cooperatives that have a legal identity and can be held responsible for their members' activities. Minibus routes should be concessioned under similar conditions to large bus routes, and technical advice on how to do this could be part of the same contract as advised for large bus route concessioning.
Trolley Bus System

At present, both the power infrastructure and vehicles of the trolley bus system are worn out. Its future should be seriously considered as it could be restored, expanded or abandoned. This issue should not be decided independently of what happens with the rest of the public transport network. The public transport study should thus answer questions pertaining to the functional role of the trolley bus system and what other alternatives (for example, clean diesel or compressed natural gas) might be better at performing the same tasks. A decision on how to proceed should only be made after an in-depth alternatives analysis that evaluates cost-effectiveness, financial viability, environmental effects, and so forth in the context of the functional role assigned to the system.

Capacity Development

Development partners have worked with Ulaanbaatar city government to provide technical, managerial and operational advice to Bus Companies Numbers 1 and 2 together with credit funding for new buses and maintenance depots. Given the greatly changed circumstances of the bus industry in Ulaanbaatar, it is recommended that the municipality seek similar technical assistance to the companies that will be operating buses following the recommended route concessioning process.

Financing Bus Purchases

If public transport fares were to be increased, operators were compensated for passengers traveling on passes, and penalties for fare evasion enforced, large bus operations could possibly be profitable, but the bus companies would still have problems in raising the capital for the purchase of new vehicles, or obtaining loans for their purchase.

It is recommended that consideration be given to a bus financing scheme that has been used successfully in some other developing countries, similar to that recommended for trucking companies. This scheme requires a commercial line of credit to be available to technically and administratively qualified companies. Each company is required to make a deposit into an escrow account in the commercial bank equivalent to about 20 percent of the value of the buses being financed. The line of credit would be available at commercially viable interest rates for the bank, the risk of nonpayment of loan installments being significantly reduced by the bank’s access to the escrow account in the event of a default in payment. Details of the scheme would need to be designed to fit with Mongolian financial customs and circumstances. It is recommended that the municipality approach commercial banks and international financing institutions to determine whether such a scheme could work under Mongolian conditions and, if so, to make the necessary arrangements to implement it.

Promoting Affordability and Sustainability of Bus Services

The discussion on affordability in the section, Sector Performance, clearly indicated that some level of subsidy of urban bus transport services would be necessary to support the poor in Ulaanbaatar, particularly the residents of the ger districts. It is
equally important to ensure the financial sustainability of the service and to have a reliable source of revenues to finance a large proportion, if not the entirety, of the necessary subsidies.

An analysis of the cost recovery potential of large bus operations was made in 1996 for the then three municipal and one private bus companies. It was concluded that if the companies were compensated for passengers traveling on passes and fare evasion was significantly reduced, the operations could be profitable. Nothing was done in either respect, however, and the companies remained unprofitable. With the introduction of minibus services, the financial sustainability of the large bus operators is even less certain. Although operations of large buses could be made more efficient, it is unlikely that the improvement could be sufficient to make the operations profitable as a whole at the present tariff and number of reduced-rate, concessionary passes in use. The government that requires the fare concessions is not compensating operators of large buses for travel by passengers using these passes. Since the passes are not generally accepted on the expanding minibus system, the negative impact on the revenue-earning capacity of the remaining large buses is increasing. Recent attempts to increase the tariff met with such strong opposition from passengers that the higher tariff was suspended.

The municipality therefore faces a dilemma. The operators cannot recover their full costs from the current tariff, but many passengers cannot afford to pay a higher tariff. At the same time many passengers who might be able to afford to pay the full tariff are able to travel free or at a reduced rate by using a pass, and others travel without paying, since the penalty for doing so is too small to act as a deterrent.

A preliminary estimate indicates that if:

the trolleybus service were discontinued,

the number of minibuses was reduced to 1,750 (to reduce congestion and increase productivity of all large buses and remaining minibuses), and

all basic bus fares remained at their present level, but 25 percent of passengers received free travel, and all other passengers paid the full fare,

...the required subsidy to cover the subsidized fares would be about US$2.5 million per year.

This cost could be recovered from a parking charge equivalent to about US$2.5 (Tog 2,700) per day, even after allowing for the operating cost of the parking charge system. However, this would require that all parked cars, even those in private parking places, pay the full charge to the municipality. An alternative could be an annual charge on all vehicles registered in the municipality, with perhaps a higher charge on less fuel efficient vehicles (such as on those with engines of more than 2-liter capacity). To raise the same revenue, the annual charge would need to be about US$25 on cars with smaller engines and US$100 on those with larger engines. These charges would reflect an “ability to pay” approach to charging, whereas the parking charge would reflect a “cost imposed on other road users” approach.

We recommend that the issue of affordability of urban transport be subject to a special study (possibly as part of the preparation for the proposed Municipal
Infrastructure Project). This study would review the affordability of commercial fares based on efficient operations in Ulaanbaatar to populations of different income levels and expenditure patterns. It would further assess how many people (and bus passengers) would need some form of subsidy to be able to afford this level of fare, and how this subsidy would be best be funded and distributed. If the subsidy were to be in the form of lower fares, the bus operators would need to be adequately compensated. Other cities that have adopted similar directed subsidies have often overspecified the quality and cost of services, and therefore the amount of subsidy needed. The study would therefore recommend a quality (or qualities) of service, break-even fare levels, a form of subsidy for those who could be reasonably expected to pay the commercial fare, and a source of funding for the subsidy.

INSTITUTIONAL AND HUMAN RESOURCE CAPACITY

The institutional structure of the transport sector remained little changed during the first years of the democratic transition. During the current administration, however, there have been two significant changes. Although since 1996, Transport was part of the Ministry of Infrastructure, in 2004 a separate Ministry of Road, Transport and Tourism was created. At the same time, an institutional separation was made between responsibility for policy, which remained with the ministry, and for implementation, for which responsibility was delegated to various directorates. For the first time, responsibility for implementing railways policy was taken away from MTZ and given to a new Directorate of Railways.

Under most circumstances, these changes would have been very logical and would have resulted in clearer responsibilities for political and technical activities, but Mongolia presents very special circumstances under which it proved very difficult to make this structure work efficiently. Compared with the previous, more traditional structure, the new one requires a much larger staff, and many of the functions that were shared previously must now be undertaken by separate staff.

It is recommended that no changes be made to the existing institutional structure for the remainder of this administration, but that consideration be given to what structural changes, if any, might be made for the next administration. It is also recommended that much more training of professional staff be undertaken and that this training be given on a more comprehensive and coordinated basis, not just in response to proposals and offers from international lending and bilateral institutions. It would be constructive for the MRTT to seek technical advice on formulating a medium term (up to five years) training program, and to present this program to development partners.

ROAD SAFETY: DEVELOP AND IMPLEMENT A ROAD SAFETY PROGRAM

With road user error contributing to the vast majority of road crashes, the development of safe drivers, skilled in defensive driving techniques, should be the primary objective of a road safety program. The driving test is as much related to basic vehicle maintenance (to reduce the risk of being stranded on a remote road by a disabled vehicle) as to safe driving techniques on urban roads. Effective traffic law enforcement can and should play a much more important role in reducing traffic crashes. It is recommended that the annual vehicle inspections be supplemented by frequent and
random checking of vehicles on the road, and that the legal responsibility for undertaking vehicle inspections be clarified, so that the inspections are undertaken by only one level of government. Our preference is that the system presently operated by the Transport Services Center be the basis for this system and that it be the responsibility of the state and not the municipalities or aimags.

There is a readily available and easily accessible advice on actions that can be taken to reduce the number of road crashes that result in death and injury. The Global Road Safety Partnership is just one of many international agencies that can provide more specific technical advice. In addition, many countries providing bilateral aid have a priority for helping on road safety measures. It is highly recommended that the Municipality of Ulaanbaatar develop a Road Safety Program with technical and financial support from the various specialized agencies.
## Table 19: The Way Forward

<table>
<thead>
<tr>
<th>Issue</th>
<th>Actions for the Short Term (within 3 years)</th>
<th>Actions for the Medium to Long Term (4 - 10 years)</th>
</tr>
</thead>
</table>
| **Resource Allocation Efficiency** | • Develop a results framework by identifying ultimate goal and desired outcomes  
• Use rigorous and consistent economic and social efficiency criteria for prioritization and require a balanced analysis of demand  
• Develop a framework for asset preservation of transport infrastructure  
• Revise the government proposed investment program. | • Institutionalize the use of the result framework and economic efficiency criteria.  
• Implement the asset preservation framework. |
| **Financial Sustainability** | • Promote the utilization of modern accounting standards within MTZ and MCAA  
• Develop a framework for private sector participation in the sector.  
• Consider separating rail infrastructure and operations to government ownership of infrastructure and private control of operations.  
• Do not reconstitute the Road Fund. if conditions for its successful operation cannot be established. | • Limit the government’s investment in the sector from the national budget to about 2.5-3.0 percent of GDP  
• Implement 3-5 projects involving private sector participation and build on their experience to further strengthen the framework.  
• Consider discontinuing the passenger service (once the main north-south road is completed) if it does not cover its operating costs. |
| **Operational Efficiency: The Regulatory Framework** | • Establish a line of credit for truck purchase on a pilot basis to support interurban road freight services.  
• Deregulate interurban passenger service fares.  
• Deregulate fares; monitor market.  
• Consider subsidized concessions for certain remote routes if deemed socially necessary  
• Separate the administration of safety oversight and accident investigation.  
• Liberalize the jet fuel market  
• Harmonize operating times at border crossings and ensure that the number of open hours ensures timely flows of goods.  
• With the help of international facilitators, pursue with the Chinese and Russian governments the simplification of the restrictive border practices to encourage trade. Consider the use of international agencies as facilitators. | • Institutionalize the truck purchase program.  
• Assess the performance of the market, and assess the success of concessions and revise terms, if necessary. |
| **Facilitating Urban Growth in Ulaanbaatar** | • Undertake a comprehensive study to determine bus network configuration for Ulaanbaatar, optimal mix of services and vehicles for serving the different Ulaanbaatar travel markets, fare, affordability, service and subsidy policies and service procurement. | • Update study or plan.  
• Consider investments in ring road-interchange construction.  
• Review and adjust the subsidy policy to |
Urban transport infrastructure

- Concentrate investments in the most heavily traveled corridors, on roadway and other facilities that will improve the efficiency and effectiveness of public transport.
- Do not consider investments in ring road-interchange construction.

Demand Management

- Restrict the number of on-street parking places and charge for off-street parking rather than implement a policy to increase the number of freely available parking places.
- Use parking fees for targeted public transport subsidies.

Bus Concessions

- Replace the existing short term contracts between the municipality and the large diesel bus operating companies by competitively bid concessions.
- Concession minibus routes in a similar way to cooperatives and companies simultaneously with large buses.
- Seek technical assistance for the preparation of the concessions; and later for bus operators

Bus Finance

- Establish a line of credit for bus purchase on a pilot basis (similar to that recommended for trucks above).

Institutional and Human Resource Capacity Development

- Maintain the existing institutional structure for the remainder of this administration.
- Develop a long term comprehensive capacity development framework and plan; and begin phased implementation. Framework should include a comprehensive and coordinated training plan.

Road Safety

- Develop a Road Safety Program
- Supplement annual vehicle inspections by frequent and random checking of vehicles on the road;
- Clarify the legal responsibility for undertaking vehicle inspections. Ideally, Transport Services Centers should operate the inspection system under the responsibility of the State.

- Review and revise concession policies and terms and revise for next round.

- Review and revise framework and plan as necessary while continuing phased implementation.
- Further develop Road Safety Program and strengthen implementation.
mongolia

WATER SUPPLY

annex four
OVERVIEW

Mongolia’s eight-month-long winters, with temperatures not uncommonly registering —40°C, pose fundamental freezing challenges for engineers, requiring water pipes to be laid some 3 m below ground level and special consideration for sewage flows. Nevertheless all Mongolia’s principal settlements have relatively sophisticated water supply and sanitation (WSS) systems dating back to the communist period. However, they all also exhibit gross infrastructure inequalities between the formally developed core areas, which alone are served by these networked systems, and the surrounding self-built ger areas in which the majority of the urban population live—the long winters are particularly harsh for the 70 percent of Mongolia’s population relying on water supplies hauled manually from natural sources or kiosks. It is doubtful if the WSS systems would have been developed without assistance from the Soviet Union; and it is unlikely that the infrastructure inequalities would have arisen under democratic government. Without Soviet assistance the prevailing water supply system would be natural sources and wells with distribution by animal carts, and pit latrines for sanitation. Since 1989 the water agencies have been running down these assets, with financing being less than that required for adequate maintenance, and the challenges are to generate adequate financial flows to consolidate and upgrade existing services and to extend them to the ger area population.

SUMMARY OF CHALLENGES AND WAY FORWARD

There has been a good deal of consistency on the fundamentals of WSS policy since a pivotal shift from socialist policy in 1995. Subsequent governments have all stressed, in declarations, both the promotion of initiatives involving private entities in delivering services, and improvement of public utilities in the ger areas; and these themes can be expected to continue through the Strategy period. However during transition responsibilities within the sector have moved from a single authority to ever increasing fragmentation. The general nature of the 2004 Water Law leaves a great deal of detail subject to numerous additional regulations and decrees yet to be formulated; and considerable confusion over authorities and responsibilities in the meantime, to the extent that sector coordination is acknowledged as being weak and a barrier to progress.

The Millennium Development Goals (MDG) feature prominently in recent GoM and donor strategy documents. The GoM’s WSS targets are to improve the proportion of the population using satisfactory water from 37 percent in 2000 to 70 percent in 2015; and to increase adequate sanitation from 25 percent to 50 percent, respectively; however funding commitments continue at such low levels as to make it extremely unlikely that these targets will be approached.

While there are some minor efforts at private water supply, and many on-site industrial wells, the primary assets are State owned and operated by corporatized USAGs or Provincial Public Urban Services Organizations (PUSO) under management contracts. Ulaanbaatar’s Water and Sewage Company (USUG) wholesales services to the Housing and Communal Services Authority (OSNAAG) and its privatized ex-kantor companies, which retail to apartment households and institutions.1 The ger areas are supplied by communal water collection kiosks or

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1 Kantors are financially autonomous housing and communal services units.
in a minority of cases by natural sources; sanitation arrangements here comprise self-provided unimproved dry pit latrines or open field defecation.

Water is generally of good quality, and the source capacities of the existing systems are generally sufficient, although margins are not regarded as being comfortable in some of the Gobi towns. However centralized systems’ infrastructure has deteriorated significantly, and there is a need for rehabilitation to improve efficiency and to ensure regular supplies. Centrally supplied water is taken to the ger area kiosks by trucks, which are slowly being replaced by networked supply. The centralized sewage treatment plants are in many cases completely dilapidated and raw sewage simply bypasses them to open areas beyond. Collection networks too are in many cases in poor condition and raw sewage leaks sometimes to ground level and to water supply lines. Industrial activity is operating at some 10 percent of 1990 levels but is projected to increase significantly, causing more environmental damage when its untreated effluent enters the river systems.

Seven main strategic issues and recommendations are identified for specific attention, the first being the most important of these:

(i) Improving ger areas services, including enabling investment planning;

(ii) Clarification of responsibilities and increasing political commitment to socially equitable and financially sustainable WSS Systems, including the establishment of a sector regulator, and an increase in USUG and OSNAAG’s water supply tariffs for institutional and apartment customers.

(iii) Improving the efficiency of operational agencies.

(iv) Improving prospects for more effective private sector involvement—with public sector partnership (PUP) arrangements assisting with reorganization in Ulaanbaatar and the aimags.

(v) Bridging the financing gap; and concluding with two final issues concerning implications of current and possible future urbanization for WSS improvements.

(vi) Improving ability to manage informal settlement for easy future servicing.

(vii) Eagerness to invest in regional development for uncertain benefits.

It should be possible to establish a regulator and USUG PUP (Recommendations ii and iv), to prepare initial versions of “enabling investment plans” (Recommendation i), and also to arrange for Output-Based Funding Allocations (Recommendation v) in a reasonably short term; although the extent to which effective functioning depends on good corporate governance may moderate progress. The gradual reorganization of the Provincial PUSOs and ex-kantor companies (Recommendation iv.) will extend into the medium term.

**IMPROVING GER AREAS SERVICES**

Seventy percent of the urban population lives in ger areas with MDG WSS baselines far below global means and domestic water consumption less than half the WHO recommended minimum. The few improvements to ger area services since 1990 have been driven solely by donor assistance, but the “2004 GoM” was, in its Action Plan 2004-08, the first to fully recognize
the needs. There is, particularly following land privatization, an increasing interest from residents in improving ger area property, including an increasing number of approaches to the Municipality of Ulaanbaatar’s (MUB) USUG and OSNAAG for WSS connections. The blanket use of the term “ger areas” is misleading referring as it now does to an increasingly complex mix of houses and businesses of various construction qualities; and higher land value peaks are emerging through the previous uniform low levels.

Reasonable assumptions suggest that current donor led commitments will raise the MDG water access criterion by only 1 percentage point above the 2005 level and 4 percent of the way to the MDG. The Ministry of Construction and Urban Development (MCUD) have estimated the cost of achieving MDGs by 2015 as US$874 million, including investment for a new water source for Ulaanbaatar, rehabilitation and new water pipelines and sewers, wastewater treatment plant (WWTP) improvements and a relatively small allocation for connections to ger areas close to pipelines. Fully achieving the MDGs would cost, for utility connections alone i.e. excluding internal plumbing, fixtures and any required enhancements to mains water supply, a total of US$80 million using networked kiosks, and US$505 million using individual connections. GoM’s policy is that pit latrines should be replaced by individual household sewer connections; which would require an additional 262,000 households being connected at a cost of US$400 million. Thus the total cost, for the utility connections alone, of achieving both MDGs using individual water connections and sewers is of the order of US$900 million. These approximations, particularly when added to the US$874 required for system improvements, indicate that nothing like the required scale of expenditure is currently foreseeable over the next decade, and the MDGs for water and sanitation have only the most remote prospect of being achieved.

GoM investments should be targeted to have maximum benefit and leverage, and MCUD and urban authorities can provide a responsive enabling and catalytic framework to help mobilize interested individuals and groups of Mongolians, donors, NGOs, and so forth, and improve the situation with more emphasis on a bottom-up approach rather than the entirely top-down dynamic which currently prevails. The aggregate value of bottom-up resourcing will be much greater than anything GoM can muster.

The following actions are recommended: (i) Preparation and publicizing, by the Project Management Unit (PMU) for the Second Ulaanbaatar Services Improvement Project (USIP2) and USUG in Ulaanbaatar and elsewhere by PUSOs and MCUD’s Construction and Public Utilities Support Center (CPUSC)—WSS distribution network drawings and future plans indicating areas where new connections are technically possible and welcome, including areas where localized water and sanitation systems are possible; (ii) Preparation and publicizing, by PMU in Ulaanbaatar and USUG and elsewhere by PUSOs and the CPUSC clear procedures, including payment, ownership, and maintenance responsibilities, whereby the private sector, in whatever form, can instigate and complete connections.

**Clarification of Responsibilities and Increasing Political Commitment to Socially Equitable and Financially Sustainable WSS Investments**

The critical issue of investment decision making involves a great deal of inertia dating back to the 1980s. Infrastructure was then designed in accordance with rigid standards to complement what have proved to be overambitious urban Master Plans. Thus there is a catalogue of planned
investments based on out-of-date technology and out-of-date and grossly optimistic demand projections. GoM does not have the capability to design more appropriate projects. Successive new governments bring with them specific manifesto promises, and these, along with individual MOI Minister’s own priorities, are added to the catalogue with investment programs emerging from this essentially on the basis of political discussion and without any systematic assessment of the comparative costs and benefits of competing projects.

There has been a political unwillingness to approve tariff structures which are socially equitable and sufficient to sustain infrastructure. This has caused USUG to be in a default situation with regard to interest payments for the past two years; and an average tariff increase of 60 percent was required before September 2006 in order to assure that it could fulfill its legal obligations and commitments to debt service payments and counterpart funding for USIP2. It is recommended that the Ulaanbaatar municipal government increase USUG and OSNAAG water supply tariffs for institutional and apartment customers as soon as possible to make them 60 percent higher than the current average tariffs so that the water supply utility operations remain financially viable and distorted subsidies to higher-income apartment users are decreased. Such an increase is affordable and within willingness to pay (WTP) limits. MCUD recognizes that Mongolia should move as quickly as possible to a situation where water tariffs are based on actual use and appropriate cost recovery; and is keen to have an independent economic regulator established for this purpose. This is strongly supported.

GoM’s WSS interests are acknowledged as being too fragmented and the respective responsibilities unclear. It is recommended that enhanced WSS legislative environment is established to provide a clear and detailed delineation of the roles in public administration, such that Ministries are responsible for policies; CPUSC for contracting and administering PUSO management; Water Agency for water resources and environmental monitoring; the economic regulator for both regulation and pricing; and service providers for service delivery only.

Recognizing that Mongolia should move as quickly as possible to a situation where water tariffs are based on actual use and appropriate cost recovery, the MCUD is keen to have an independent economic regulator established. The belief, readily justified by international experience, is that this will depoliticize tariff setting, and thereby allow WSS agencies to levy reasonable charges which can sustain services on the basis of a socially equitable tariff structure.

It is recommended to establish a national economic regulatory structure for water and sanitation that is conducive to investment, transparency and continuously increasing productivity in the sector; with objectives to:

- protect the long-term interests of consumers with regard to price, quality and reliability;
- promote a stable framework conducive to long term infrastructure investment and to maintain the financial viability of the industry.

GoM’s preference has been for a separate water and wastewater sector utility regulator. However, WSS is less complex than energy and it could be more quickly and cheaply implemented through an extension of the remit of the Energy Sector, or indeed Telecommunications, regulator, building on the expensive and time consuming institutional development made therein to date and at the same time helping to rescue the WSS sector from its engineering dominance. In exercising its authority the regulator must be free of any
constraints from either GoM or the private sector; and it is recommended that, in the interests of regulatory independence, its authority is created by law, rather than decree or other subsidiary legislation, so that it can make all final decisions without obtaining the approval of any other party or agency.

**Improving the Efficiency of Operational Agencies**

The long recognized wastage of water persists. Metering is progressing but individually unmetered apartment households still consume some four times developed-world equivalents. WSS operators are monopolies with little incentive to improve; and the poor corporate governance of public operators reflects a national malaise. Their activities are constrained by Governors, and dominated by the inertia of engineering, rather than customer, led principles. PUSOs are greatly overstuffed; have no performance standards; and cannot afford proper maintenance or, increasingly, key staff. Existing supplies in Ulaanbaatar could serve at least twice as many residential customers, and, since production is already falling from leakage reduction, savings could delay the investment in new sources for many years.

Within Ulaanbaatar services are still adjusting from the communist institutional structure. The main division is between USUG, which, apart from the kiosk services in the ger areas, principally wholesales bulk both water supply and wastewater treatment to OSNAAG, which retails them. USUG is properly organized and technically and operationally competent. Retailing arrangements however are the vestigial remains of the once very powerful multifunctional Housing and Communal Services Authority and its privatized kantor branches, which have experienced difficulties in adjusting to the transitional socioeconomic situation and which are currently managed in a manner which obscures a great deal of inefficiency and unnecessary costs.

While donor-assisted projects have demonstrated the viability of significant improvements in WSS, the confusion of sectoral cross subsidies in some towns and universal regressive tariff structures are critical barriers. Water production costs are not covered by direct revenues, with apartment households being particularly highly subsidized, to the tune of some US$1.6 million per year outside Ulaanbaatar. Hot water is supplied to apartments without charge in many towns, and sewerage may also be free of charge or highly subsidized. Even amongst apartment households those who can afford individual meters pay much less than those without meters. By contrast ger area kiosk prices per liter are several times their cost in some towns.

In the first place it is recommended that requirements for reporting on costs and performance be immediately introduced into all PUSO and ex-kantor contracts, so that efficiency can be benchmarked.

It is recommended that the next stage in prudent water management is the reduction in the vast quantity of wasted water. Before committing to new water supply sources policies aimed at more efficient use of existing supplies should be vigorously implemented. In Ulaanbaatar OSNAAG’s 40 outmoded CTPs require upgrading, at a cost of about US$2.4 million, and metering should be extended, with the medium term aim of 100 percent individual customer metering supported by a US$1.5 million program to assist the poor to install meters on a subsidized basis.
It is recommended that the Provincial PUSO management contracts be developed so that there are clear financial and operational objectives. The licensing of the entity, monitoring of PUSO performance and determination of its tariffs should be carried out by an independent regulatory authority (see ii. above). In order to ensure the ongoing viability of the industry economies of scale in management and services should be sought.

Outside Ulaanbaatar Provincial PUSOs are too small to justify their management overheads, and it is recommended that in due time contracts should be let for the management of groups of PUSOs. These contracts could also include responsibility for intervening soum centers, which are programmed to receive new water purification plants and upgraded WWTPs, and the involvement of the private sector.

**Improving Prospects for More Effective “Private Sector” Involvement**

Successive GoMs have long hoped that increasing private sector involvement will be the route to increased WSS efficiency, but transition to the private sector, and the flow of expected benefits, has been slow. There has been a widespread introduction of management contracts but there is no market for management services; contracts are not drafted or managed to best effect, and Governors effectively make all decisions. In practice privatization has amounted only to the removal of the payroll from local government responsibility, to operate and maintain WSS systems, without giving management any real scope for change. There is a clear distinction between WSS markets, and potential markets, in the formal and ger areas. The former is essentially concerned with modernization of conventional centralized services. While many ger areas are also suitable for the extension of these services, many others, particularly in Ulaanbaatar, are too remote to take advantage of them in the short / medium term, but are suitable for a variety of innovative localized engineering and ownership / management solutions. The institutional framework should foster such appropriate innovations rather than insisting on outdated norms and standards which preclude them.

Privatization is a means rather than an end in itself. There is a need for a more robust introduction of customer oriented and commercial attitudes, but little prospect of international private sector investment in the medium term, particularly if the risks of jeopardizing the public interest and losing excessive profits to the private sector are to be minimized. As with other aspects of urban development, Ulaanbaatar’s problems in WSS far exceed any others. It is recommended that consideration be given to establishing a PUP with an international WSS authority for USUG and a foreign water authority; a recommendation supported by USUG. PUP arrangements could also be introduced for Provincial PUSOs, particularly if they are grouped in a more efficient way. Beyond this, there is the possibility of more private sector management, for example, for water kiosk operations, which should be established within a comparison-competitive regime; and for restructuring the core service area of Ulaanbaatar, where there is considerable inefficiency hidden in the margins which OSNAAG adds to its wholesale purchases from USUG.

It is recommended that the intensification of private sector involvement in both the PUSOs and ex-kantor companies continues their gradual development trajectory in a series of steps: (i) performance measures and targets should be introduced under the existing basic contract arrangements. This will provide the basis for comparative performance and begin the development of a market in WSS management services. (ii) amalgamation so that economies of
scale in management, engineering supervision, customer service systems, and so forth can be made. Regulation, comparative competition on standard performance measures and penalties for failed targets should be used to improve performance over time.

**Bridging the Financing Gap**

A major problem in the sector is the financing gap between urgent basic human needs and the enormous cost of providing them. While donor assisted projects have demonstrated the viability of significant improvements in WSS, the confusion of sectoral cross subsidies in some towns and universal regressive tariff structures are critical barriers. Water production costs are not covered by direct revenues, with apartment households being particularly highly subsidized, to the tune of some US$1.6 million per year outside Ulaanbaatar. Hot water is supplied to apartments without charge in many towns, and sewerage may also be free of charge or highly subsidized. Even amongst apartment households those who can afford individual meters pay much less than those without meters. By contrast, ger area kiosk prices per liter are several times their cost in some towns.

WSS Investment over the last decade has come overwhelmingly from foreign assistance; a perhaps excessive reliance continuing the pattern of the communist period. This averaged US$9.8 million per year from 1996–2004; of which 53 percent was loans, 4 percent loan counterpart funds, and 43 percent grants. Loans are generally to be repaid through customer charges. The other principal source of finance for the sector is the treasury via the budget of the MCUD, currently Tog 4 billion for 2006. Historically there has been no expectation that these investments would be repaid to central government. There are also internationally financed charitable asset contributions, particularly water kiosks; and a significant new source of investment is the Millennium Challenge Corporation (MCC).

Reasonable annual projections for WSS investment might total some US$22 million comprising US$10 million from multinational agencies, US$3 million from internal GoM sources, US$1 million from other miscellaneous sources and a possible US$8 million from the MCC for each of five years.

GoM’s mineral based revenue, from royalties and taxes, is likely to increase sharply and sustainably during the next decade. This offers real prospects for the redistribution of mining benefits throughout the community targeting water-saving and ger area improvements. As an incentive to increased system efficiency it is recommended that central government transfers of capital expenditure for improvements and extensions should be structured in part so as to reward demonstrated improvements.

In addition to enabling the MCUD to increase it’s spending on the backlog of capital works priorities, increased domestic capital availability will make it possible to specifically target critical sector needs using demand management. It is recommended that consideration be given to allocating budgets on the two activities, with output-based approaches:

- **Water Saving**—one-off retrospective payments to suppliers which reduce their (i) unaccounted-for water and/ or domestic per capita consumption by specified amounts; and/ or (ii) fit meters for households officially classified as being poor.
• Ger Area Water and/or Sewage Connection—connection costs reimbursed at fixed rates per connection.

MCUD’s 2005 and 2006 Budgets place more emphasis on ger areas than previous GoMs: 36 percent compared with 64 percent for apartments and other formal area elements. However, finance that may be available for ger area improvement is in competition with spending on opening up new land in relatively remote urban locations. Donor-led ger area improvement projects have ERRs ranging from 13 percent to well over 20 percent, demonstrating that well designed projects aimed at improving ger area services are good national investments. No detailed viability studies have been undertaken for projects aimed at opening up new land, in particular no detailed demand estimates have been made. In the absence of economic and financial viability studies, it appears likely that the returns to WSS investments aimed at improving ger area services will be greater than those aimed at opening up new land in remote locations, and that the proportions of GoM spending should be adjusted accordingly.

Since USIP1, USIP2 and the ADB assisted Provincial Towns projects have demonstrated viability of projects in selected areas there should be no affordability difficulty in sustaining improved water service levels; provided suppliers can be liberated, modernized and allowed to charge reasonable tariffs in order to properly maintain their assets. However, donor financing for demonstrably viable projects will continue to be crucial to progress in the medium term, and it is therefore recommended that compliance with existing borrowing conditions, particularly regarding tariffs, be strictly adhered to in order not to jeopardize the flow of funding from this source.

It is recommended that thorough feasibility studies should be carried out for proposed major investments so that they are properly justified and prioritized against other ways of investing the available finance.

**Improved Ability to Manage Informal Settlement for Easy Future Servicing**

There are now more residents in Ulaanbaatar than nomads in Mongolia, mostly in the ger areas; but management of urban migrant settlement is ineffective, with new plots self-demarcated in a random way and many prohibitively expensive to service. Thus future servicing difficulties and costs are unnecessarily amplified. As an extension of the recommendation in ii. Above—it is recommended that the Municipality of Ulaanbaatar (MUB) revises its land management policies so that immigrants and summerhouse builders settle in laid-out areas that can be serviced at reasonable cost and convenience.

**Eagerness to Invest in Regional Development for Uncertain Benefits**

Regionally balanced development is important, but GoM’s proposed strategy relies on large infrastructure investments where economic feasibility is unproven. At the same time regional planning does not take sufficient account of the huge unplanned and uncoordinated developments taking place on the ground as the international mining sector begins to exploit Mongolia’s mineral wealth with new railways, pipelines and other infrastructure under construction and offering secondary opportunities for economic development. It is recommended that any approach to regional development is subjected to realistic costing and benefit analysis, and any infrastructure investments, which are currently in effect targeted at
unproven future benefits, be kept in perspective when compared with the immense existing problems and obvious benefits. It is also recommended that MCUD carefully monitor mining projects from an early stage in order to maximize secondary infrastructure benefits for the wider community.

POLICY AND INSTITUTIONAL FRAMEWORK

LEGAL PROVISION

Table 1 indicates the key legal provisions. Early legislation focused on the importance of water as an environmental resource, and this has been a continuing theme with the 2004 amendments to the Water Law (available in Mongolian language only) providing for a new Water Agency within the MNE with wide ranging responsibilities. The other major theme has related to privatization of WSS operations, with wide ranging powers now available should GoM wish to apply them fully.

POLICY

There has been a good deal of consistency on the fundamentals of WSS policy since the National Development Board’s draft 1995 Medium Term Strategy which marked a pivotal shift from socialist policy. GoM’s 1996 policy agenda included (i) improving access and availability of water supply and sanitation services, and increasing the productivity and efficiency of service delivery; (ii) reducing inequality in access and availability of services between apartments and ger areas; (iii) improving financial resource mobilization, in particular through private sector development, privatization, and the introduction of cost-recovery and cost-sharing mechanisms, including tariff adjustments; and (iv) improving the operation and maintenance of infrastructure. Current policy is hardly distinguishable from this, with GoM’s Action Plan for 2004–08 stressing the promotion of initiatives involving private entities in delivering services, and improving public utilities in the ger areas. It is thus likely that these themes will continue through the 10 year Strategy period.
Table 1: Key Legal Provisions

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Date</th>
<th>Key Provisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constitution</td>
<td>1992.01.13</td>
<td>Guarantees citizens’ rights to a healthy environment.</td>
</tr>
<tr>
<td>Environmental Protection Law</td>
<td>1995.03.30</td>
<td>Regulates stakeholder relations regarding a healthy living environment, ecologically balanced social and economic development, protection of the environment, proper use of natural resources.</td>
</tr>
<tr>
<td>Water Law</td>
<td>1995</td>
<td>Regulates protection and ensures proper use and restoration of water resources. Includes general provisions concerning research, monitoring, databanks, water use, and the plenary rights of various institutions involved in water resource management.</td>
</tr>
<tr>
<td>Government Resolution</td>
<td>1997.01.</td>
<td>Establishing PUSOs.</td>
</tr>
<tr>
<td>Environmental Impact Assessment Law</td>
<td>1998.01.22 Amended 2001.11.22</td>
<td>Requires EIAs and environmental clearance before the implementation of major infrastructure projects.</td>
</tr>
<tr>
<td>Sanitation Law</td>
<td>1998.05.07</td>
<td>Local governments, water utilities, economic entities and citizens shall protect water sources, distribution networks, pumping stations and water kiosks. Water utilities shall test water quality and improve it.</td>
</tr>
<tr>
<td>Water &amp; Mineral Water Use Fees Law</td>
<td>2004.12.2</td>
<td>Sets limits for household (Tog 1–10/m³) and commercial use (Tog 1–20/m³), within which Cabinet sets precise charges.</td>
</tr>
<tr>
<td>Government Resolution 159</td>
<td>1999.10.06</td>
<td>Provided a privatization program for basic urban services.</td>
</tr>
<tr>
<td>Regulations for Privatizing PUSOs. State Property Committee (SPC) Decree N123</td>
<td>2001.03.22</td>
<td>Obliges the Governors of aimags and the capital city to “privatize” PUSOs in accordance with the “Program of PUSO Privatization”. Regulations and a management contract are provided.</td>
</tr>
<tr>
<td>Water Supply And Sewerage Treatment Law</td>
<td>2002.06.13</td>
<td>Wastewater discharged to the municipal treatment plant must comply with minimum quality standards. Water and wastewater tariffs to be set according to government-approved methodology.</td>
</tr>
<tr>
<td>Revised Water Law</td>
<td>2004.04.22</td>
<td>As original plus provides for integrated management of water resources revised institutional structure and management of the sector; in particular establishing a new Water Agency.</td>
</tr>
<tr>
<td>Government Resolution No. 25</td>
<td>2005.04.21</td>
<td>Endorsement of the MDGs</td>
</tr>
</tbody>
</table>

Four of the five main objectives of GoM’s Action Plan for 2004–08 are directly relevant to WSS to:

- upgrade the quality of public service to a new level by strengthening the capacity and accountability of public service institutions and civil servants, expanding civil participation at all levels of decision making and ensuring transparency;
- deepen legal reforms in all spheres of political, economic and social life and substantially improve standards for ensuring human rights and creating safe living environments;
• sustain higher rates of stable, private sector-led economic growth by implementing a regional development concept to reduce disparities in development between urban and rural areas;
• conduct social policy aimed at improving living standards of families and households by providing them with a stable legal environment, adequate infrastructure and a financial environment conducive to accumulating savings, owning, possessing and disposing of immovable property such as land and houses.

From the long list of GoM Actions the following have been extracted as having WSS relevance and are grouped to assist in interpretation for current purposes. Specific Actions relevant to WSS are to:

• Improve the quality of potable water for all Mongolians, including continuation of the installation of water softening equipment in soums and settled areas where water is hard and rich in minerals;
• Install drinking water purification filters and equipment for 102 soums of 17 Aimag and supply residents of all settlements with drinking water meeting standard requirements;
• Promote initiatives involving private entities in delivery of services such as water, heat, power supply, wastewater and removal of trash in the peripheral areas of the cities;
• Expand, repair and renovate facilities for public utilities of the ger districts of cities and other settlements;
• Initiate the connection of ger district families to the WSS networks.
• Provide for the ever-increasing needs of cities and populated settlements, introducing progressive and cost-saving technologies that use renewable energy resources for heating, water supply, sewage and power transmission networks.

Actions with less specific impact on WSS are to:

• Implement a regional development program appropriate to each region. Provide consistency of regional development, urban development and land management.
• Intensively develop infrastructure to enable economic growth;
• Promote opportunities to privately own houses, improve housing conditions, support and prioritize the infrastructure development for housing;
• Implement a program called “40,000 apartments”;
• Promote investment directed at increasing areas with the infrastructure necessary for urban development;
• Promote construction of private housing blocks in unsettled areas of suburban Ulaanbaatar.

Regarding environmental objectives to:

• Intensify reforms of water policy and, with assistance of foreign and domestic investments, start implementation of projects to protect river basins, to optimize use of water, to increase the utilization of surface water, to expand underground water
prospecting efforts, to establish large water reservoirs, and to utilize rain and snow water;

- Impose penalties for causing environmental damage from a direct polluting source;
- Establish a new government body in charge of water issues in conformity with the Law on Water and promote adequate administration and management to implement water related policy.

Actions (a) and (b) are addressed in GoM’s Budget. Action (f) is a general requirement with a specific intention to improve technology. Actions (c)—increased private sector involvement, and (d) and (e)—ger area improvements, are actions requiring specific strategic consideration. Actions (g) to (l) also have large potential implications for the WSS investment program, along with those of other infrastructure sectors. With their emphasis on opening up new land they may create a tension with funds for ger area improvement if available funding is constrained. Items m) and n) have important but in the short term less focused strategic implications for WSS; while Action (o) introduces another stakeholder into the policy and regulatory arena.

The MDGs feature prominently in recent GoM and donor strategy documents including two items which are central to WSS: halving by 2015 the proportions of the population that have no access to reliable water and sanitation services. GoM’s MDG targets, endorsed in April 2005, are to improve the proportion of people using satisfactory water from 37 percent in 2000 to 70 percent in 2015; and to increase adequate sanitation from 25 percent in 2000 to 50 percent in 2015. The ADB’s CSP 2006–08 and the World Bank’s CAS include baselines of 61 percent with access to safe water in 2002 and 55 percent in 1990 respectively; both to be increased to 77.5 percent by 2015. The ADB baselines adequate sanitation at 52 percent in 2002, presumably because it regards Mongolia’s current pit latrines as adequate. Thus while GoM’s water access target is more modest than these donors the 33 percentage point improvement to 70 percent is much more ambitious than theirs; and might even imply that some nomads would have satisfactory facilities.

The variety of MDG baselines is symptomatic of the inconsistency amongst the Mongolian data, and indicates large differences with best-practice international definitions; which prefer consumer rather than the provider based estimates of levels of service used in Mongolia. According to the WHO/UNICEF Joint Monitoring Program (JMP), boreholes and the typical pit latrine are satisfactory; but kiosks served by trucks are not. The JMP also regards a 30 minute round trip to collect water as a maximum; a figure achieved by only a small minority of kiosk users in Mongolia.

A recent policy thrust, since 2001, is increased emphasis on development outside the capital, in order to improve the living conditions of the majority of people, via implementation of a State Regional Development Concept. The infrastructure implications of this have not been fully spelled out, but are potentially immense.

The MCUD are actively considering the establishment of a regulatory authority for water and wastewater utilities including user charges. It is believed that this would have the advantage of weakening the effect of any political reluctance to increase prices by depoliticizing the charge-setting function and making it a principally technical activity.
INSTITUTIONAL FRAMEWORK

Prior to 1987 the Ministry of Water was responsible for the water sector in its entirety, but this has subsequently been fragmented amongst a number of line Ministries and their various agencies as well as research institutions; and sector coordination is now acknowledged as being weak. Table 2 summarizes the current allocation of responsibilities for policy making and regulation, but responsibilities are in many areas unclear, regulation is weak and nonexistent for performance.

<table>
<thead>
<tr>
<th>Policy</th>
<th>Licensing</th>
<th>Performance</th>
<th>Tariffs</th>
<th>Environmental standards and impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of Water Resources</td>
<td>MNE, Water Agency, MCUD</td>
<td>Governors, Water Agency</td>
<td>None</td>
<td>Governor</td>
</tr>
<tr>
<td>Water Suppliers and Water Quality</td>
<td>MCUD, MH</td>
<td>MCUD, CPUSC</td>
<td>None</td>
<td>Governor</td>
</tr>
<tr>
<td>Water Distribution</td>
<td>MCUD, MUB</td>
<td>MCUD, CPUSC</td>
<td>None</td>
<td>Governor</td>
</tr>
<tr>
<td>Wastewater Collection</td>
<td>MCUD</td>
<td>MCUD, CPUSC</td>
<td>None</td>
<td>Governor</td>
</tr>
<tr>
<td>Wastewater Treatment And Effluent Quality</td>
<td>MCUD, Ministry of Trade and Industry, MH</td>
<td>MCUD, CPUSC</td>
<td>None</td>
<td>n.a.</td>
</tr>
<tr>
<td>Ger Area Sanitation</td>
<td>MCUD, MNE</td>
<td>None</td>
<td>None</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

n.a. Not applicable.

Source: Consultant’s interpretation and MCUD Infrastructure Strategy Working Group members.

The main elements of the policy environment below Parliament and the government are the MCUD and the MNE.

The MCUD, operating since September 2004 and with a change of Minister in 2006, is responsible for advising the government on the policy framework for public services, urban development and housing; and for ensuring implementation of associated State policy and national programs. Of most relevance to WSS is its Department for Policy and Coordination of Construction and Public Utilities with responsibility for (i) formulation and implementation of public utility policies; (ii) preparation of a legal system for public services, management coordination and implementation; (iii) planning of funding for public services; and (iv) management of design and research, and provision of government expertise. The MCUD’s CPUSC provides direct technical support and research in policy development and implementation, and is charged with improving laws, regulations and standards.
The MNE is responsible for regulating stakeholder relations regarding a healthy living environment, with an appropriate ecological balance with social and economic development. While the newly established Water Agency within the MNE has full de jure authority for water management the general nature of the recently amended Water Law leaves a great deal of detail subject to numerous additional regulations and decrees which are yet to be formulated; and considerable confusion over authorities and responsibilities in the meantime. This has a recognized negative impact on sector development.

The critical issue of investment decision making involves a great deal of inertia dating back to the 1980s. Infrastructure was then designed in accordance with rigid standards to satisfy urban Master Plans. The subsequent experience has been that the Master Plans have proved to be far too ambitious for all settlements outside Ulaanbaatar; but the WSS plans do not recognize this at all. Thus there is a catalogue of planned investments based on out-of-date technology and out-of-date and grossly optimistic demand projections. GoM does not have the capability to design more appropriate projects; but the ADB has assisted with investment plans for 13 centers under their Provincial Towns Basic Urban Services projects. Thus the catalogue is much reduced but remains exactly as it was in the 1980s with respect to towns which have not received ADB assistance, including Erdenet and Darkhan, the largest settlements outside Ulaanbaatar. Successive new governments bring with them specific manifesto promises, and these, along with individual MOI Minister’s own priorities, are added to the catalogue with investment programs emerging from this essentially on the basis of political discussion and without any systematic assessment of the comparative costs and benefits of competing projects.

The State Professional Inspection Agency consolidated, in 2003, all inspection offices in Ministries and aimags into a single agency reporting to the Prime Minister. It is the most effective agency involved in environmental inspection, but even its policing powers are moderated by the scale of available penalties, and are ineffective against illegal tannery sludge dumping for example.

New institutional stakeholders in the water sector are the mining companies, which are intensifying mineral exploitation in Mongolia to a much higher post-communist level. International companies, which now include the major global players, are already constructing railways and other infrastructure. Particularly important are the potential secondary benefits for towns and pastoral activities.

**SECTOR STRUCTURE AND OWNERSHIP**

**WATER SUPPLIES**

Some 80 percent of Mongolia’s water supplies are groundwater; pumped through pipelines constructed without corrosion protection, with breaks and leaks being increasingly common. In Ulaanbaatar’s case in 2005 57.4 million m$^3$ were pumped from four well fields along the Tuul River, with 100 km of raw water pipes connecting wells and pumping stations and 350 km of distribution lines supplying the city core. The 2002 estimates for national water use were 39 percent for industry, 24 percent animal husbandry, 18 percent drinking and household use, 17 percent agricultural irrigation and 1 percent for other purposes.
KEY OPERATORS

MUB’s USUG was established as a State enterprise in 1959 and incorporated in 1997 with responsibility for water supply and sewerage in the city and its three satellite towns. Ulaanbaatar’s City Manager chairs the Board, which also includes three non-USUG technical sector specialists and a representative from MUB’s Property Department with respect to its assets. The management team includes USUG’s Director and Deputy Director, and the Heads of Human Resources, Finance, Investment / Procurement, and Technology Divisions. Thus MUB is directly involved in WSS policy matters, planning, tariff setting, capital funding, technical design, contract preparation and bidding, and construction supervision. Its 1,332 employees are organized in 8 Departments which, in order of decreasing number of employees, focus on: ger area tankers (419 employees); secondary water and sewerage networks (341); water sourcing and primary distribution (251); WWTP (143); apartment services (51); customer relations (50); emergencies (43) and administration (34). The apartment services department is a recent innovation which it is understood is in competition for some of OSNAAG’s customers. USUG is self-financing with respect to operations and routine repairs, but any major repairs require additional allocations from municipal or central government or from donor funds. USUG services to domestic consumers are provided through the Housing & Communal Service Authority (OSNAAG), responsible to the City Governor’s Office, which manages 19 ex-kantors serving groups of apartments and organizations with water bought wholesale from USUG. Ger area provision is principally by USUG’s kiosks, either networked or supplied by its Tanker Department. OSNAAG has recently begun responding to public demand by extending individual house connections, into the ger areas of Districts 3, and is anxious to accelerate this work.

A 1997 GoM resolution enabled the establishment of Public Utility Service Organizations (PUSOs) with the objective of facilitating the management and delivery of urban services in the Provincial capitals as well as in Ulaanbaatar i.e. water supply and sewerage systems, the supply of hot water and heating to apartment blocks and other formal buildings, public bathhouses and solid waste collection. These responsibilities were previously assigned to independent utility companies or local government departments. The Provincial PUSOs are, principally because of locally constrained revenues, unable to afford to maintain their assets properly, and any expenditure for capital improvements is normally sourced by MCUD.

WSS administration in Erdenet is unusually complex. Water is sold by the Mining Company to two PUSOs for distribution in the town. It also “operates” the long defunct wastewater treatment plant for which the current flow is variously estimated at 24,000 m³/d or 32,000 m³/d by the Mining Company and 14,000 m³/d by the PUSOs.

COMPETITION AND PRIVATE SECTOR PARTICIPATION

Given the enormous resources devoted to it, it should be said that the final link in the ger area water supply chain is already in the private sector, since households must haul their own water from kiosks or natural sources. On the same basis ger area sanitation is fully private, since each household constructs its own latrine or resorts to open field defecation.

While monopoly operation is the norm for water providers there are a few small signs that competition is introducing itself. The earliest indications were in the Provincial town ger areas,
with newly emerging water suppliers who deliver by animal carts at competitive prices, or operate private wells and the occasional private kiosk. These account for less than 1 percent of the total market but are becoming more widespread, to the extent that they are in some towns regarded as a threat to PUSO profitability, particularly with the proliferation of well drilling. Another indication is Darkhan, USAG’s biggest customer, the Combined Heat and Power Plant (CHP) station, which reputedly supplied 60 percent of its revenue prior to sinking its own wells. The CHP Stations in Ulaanbaatar have their own tube wells in the Tuul River flood plain, which are under the jurisdiction of the Heating Authority.

The first step in privatization in the sector has been through management contracts. There has been some keen competition and they have not always been awarded to the incumbents. All 19 of OSNAAG’s ex-kantors in central Ulaanbaatar now operate under management contracts to local private companies, but their service areas are mutually exclusive and there is no competition between them and no requirement to aspire to performance targets. While Provincial PUSOs are now also managed under contracts, these do not favor a commercial orientation either: their Rules stipulate that they are accountable to the Provincial Governors, the CPUSC and their boards of directors, 80 percent of whom represent non-PUSO interests. In Ulaanbaatar kiosk and tanker operations are regarded as having the most ready potential for privatization. USAG has twice recommended that kiosks operate on lease contracts—in 1999 for four new kiosks and in 2000 for all the kiosks—but the MUB did not approve. There is currently renewed examination of this issue, with World Bank assistance.

Public bathhouses were an important sanitation component during the communist period, being the only practical source of hot water in significant volumes for ger area residents, as well as the apartment residents in the many towns which do not have hot water supplies. They were also used as laundries. Their number decreased drastically from 740 in 1990 to 134 in 2000 following privatization in the early 1990s. It is difficult to operate them on a commercial basis because of the high cost of heating buildings and heating water during the 8 months of winter; the generally old and inefficient boilers and the low levels of affordability, with tariffs for adults most commonly in the range of Tog 600–1,000, i.e., about the daily income at the poverty line. There has been a recovery since 2000, largely with publicly subsidized facilities, but with some being privately owned and operated. Most bathhouses rely on a subsidy from the Provincial government or the PUSO. Even some of the bathhouses in Ulaanbaatar recently provided with JSDF assistance in association with USIP1 have been closed. Nationally there were 349 bathhouses, with a capacity of 1,774 cubicles, in 2004, but provision is still grossly inadequate. For example, there are no bathhouses in Darkhan for the 50,000 people without piped hot water supplies.

INVESTMENT NEEDS AND FINANCING

COSTS AND TARIFFS

Table 3 presents the tariffs for centrally provided water and sewerage services. In Ulaanbaatar USUG wholesales water to OSNAAG at Tog 189/m³ and charges an additional Tog 98/m³ for its treatment as wastewater. There is huge variation in water tariffs, with OSNAAG’s metered charges for organizations being lower in Ulaanbaatar than anywhere else in the country, and only a twentieth of the cost for sewerage compared with Baruuin Urt, which also has by far the
highest metered charge for water. On the other hand the charge for unmetered water for apartments in Ulaanbaatar is 50 percent more than anywhere else. By far the largest group of customers, numerically but not by volume, are the ger area kiosk users; and Ulaanbaatar is at the bottom of the Tog 500/m³ to Tog 2,000/m³ tariff range.

Table 3: Tariffs for Water and Sewerage
(Tog/m³, including VAT at 15%)

<table>
<thead>
<tr>
<th>Customer Type</th>
<th>Ulaanbaatar–USUG</th>
<th>Ulaanbaatar–OSNAAG</th>
<th>PUSO Range outside Ulaanbaatar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water piped</td>
<td>Sewage piped</td>
<td>Water piped</td>
</tr>
<tr>
<td>Central Areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- industries</td>
<td>367.25</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>- metered enterprises and</td>
<td>367.25</td>
<td>170</td>
<td>319</td>
</tr>
<tr>
<td>organizations</td>
<td></td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>- unmetered enterprises</td>
<td>371</td>
<td>140</td>
<td>350–2900</td>
</tr>
<tr>
<td>and organizations</td>
<td></td>
<td>319</td>
<td>144–2800</td>
</tr>
<tr>
<td>- unmetered apartments</td>
<td>189</td>
<td>98</td>
<td>304.5 for 6.9m³, 2100/c/m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>897/c/m</td>
</tr>
<tr>
<td>- metered apartments</td>
<td>189</td>
<td>98</td>
<td>208</td>
</tr>
<tr>
<td>OSNAAG</td>
<td>189</td>
<td>98</td>
<td>110</td>
</tr>
<tr>
<td>Ger Areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- water kiosks</td>
<td>500</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Other Areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- industries &lt;10km</td>
<td>3455</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- industries &gt;10km</td>
<td>3455</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- enterprises and</td>
<td>3455</td>
<td></td>
<td></td>
</tr>
<tr>
<td>organizations &lt;10km</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- enterprises and</td>
<td>3455</td>
<td></td>
<td></td>
</tr>
<tr>
<td>organizations &gt;10km</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From USUG well fields</td>
<td>1805</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum truck</td>
<td></td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>Summer Houses and others</td>
<td>1155</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


OSNAAG’s retail margins over wholesale prices are large and cover a wide range: from 12 percent on metered apartment water. The highest domestic tariffs in Ulaanbaatar are some 4 times those of Hanoi and 10 times those of Beijing; two other cities with communist heritages. Metered water for organizations is charged at 54 percent more than metered domestic water, which is a low ratio internationally: industrial tariffs are double domestic tariffs in China and Vietnam and seven times more in India, Lao and Malaysia.

In 2002 water production costs for PUSOs in a selection of typical Provincial towns ranged from Tog 220 to Tog 770/m³, and were some 3 to 14 times the estimated charge to apartment
households. In aggregate the apartment tariffs here covered 13 percent of the costs of servicing them with potable water; and, extrapolating from this, the subsidy to all apartment families outside Ulaanbaatar was of the order of US$1.6 million per year. Hot water is supplied to apartments without charge in many towns, and sewerage may also be free of charge or highly subsidized. The costs of supplying kiosks by tanker are more complex to estimate but ranged from Tog 500 to Tog 2,630/ m³. These costs were as little as half the kiosk tariff in some towns but were generally higher, in some cases by 2.4 times.

Apartments, with their full in situ plumbing and utility arrangements, have been privatized to sitting tenants at no charge. Flat rate monthly per capita tariffs, which are highly subsidized, ranged in 2005 from Tog 70 to almost Tog 2,000 for water and Tog 90 to Tog 1,200 for wastewater. In the case of Olgii, which has a US$1 million debt to the ADB, ger area residents are charged Tog 1,000/ m³ and apartment residents Tog 70 pcm, which is the lowest rate in Mongolia. Using reasonable assumptions about actual consumption and household size ger area residents here pay 100 times the Tog 10/ m³ of those in apartments.

INVESTMENT SOURCES

WSS Investment over the last decade has come overwhelmingly from foreign assistance. This totaled US$88.1 million over the 9 years 1996–2004, or US$9.8 million per year; of which 53 percent were loans, 4 percent loan counterpart funds, and 43 percent grants. Loans are generally to be repaid through customer charges.

Currently the principal foreign commitments are the ADB’s Integrated Development of Basic Urban Services in Provincial Towns Loan (project cost US$23.9 million) and USIP2 (project cost US$23.0 million). While the predecessors of both projects were implemented smoothly these have both suffered long delays, with significant construction to take place in 2007.

The other principal source of finance for the sector is the treasury via the budget of the MCUD, currently Tog 4 billion for 2006. Historically there has been no expectation that these investments would be repaid to central government. Ger area improvements are now receiving more attention than formerly and, with expectations of real growth in the economy and government revenues, it can reasonably be expected that MCUD’s budget will increase, probably significantly, in the short and medium term.

PUSOs are able to attract finance from any source and there are increasing signs of their willingness to do this. For example, Mandalgobi has recently completed construction of a new water source with direct twinning grant assistance, reputedly at a value of some US$2 million, from the Czech Republic. Consideration is being given to a contractor driven Euro 10 million loan supported by the French government for equipment to build a new WWTP at Erdenet with a capacity of 48,000 m³d, which is double or triple current flows, themselves reducible by some three times if apartment meters were installed. The Erdenet Mining Company is agreeable to providing the equivalent of a further Euro 3.3 million for construction, after which it would be transferred to the responsibility of a PUSO.

There are also internationally financed charitable asset contributions, particularly water kiosks, provided for example by the Rotary Club and World Vision, which together contributed Tog 115 million for the construction of 17 kiosks in 2005. A significant new source of investment is
the Millennium Challenge Corporation which is seriously evaluating a bid for grant aid of US$45 million for ger area improvements to be spent over 5 years.

Thus reasonable annual projections for WSS investment might total some US$22 million comprising US$10 million from multinational agencies, US$3 million from internal GoM sources, US$1 million from other miscellaneous sources and, if it is satisfied with GoM’s proposal, US$8 million from the MCC for each of 5 years.

Operations and maintenance are financed from PUSO customer revenues, but are, particularly in the aimags, invariably insufficient for satisfactory maintenance under current management arrangements.

**GOM’S CAPITAL WORKS EXPENDITURES**

From 2000 to 2004 the MOI spent Tog 6.3 billion on capital works: Tog 2.0 billion on water, Tog 1.5 billion on sewerage, Tog 1.7 billion on bathhouses in 108 soums, Tog 0.7 billion on heating, and Tog 0.3 on apartment construction. Only Tog 1.0 billion was spent in Ulaanbaatar. Thus WSS spending averaged Tog 1.3 billion per year.

MCUD’s 2005 and 2006 Budgets for capital works are Tog 640 million and Tog 3,948 million, respectively, for 12 projects, thereby increasing expenditure over earlier years, even when inflation is removed, as well as the number of projects. By far the largest budget item is Tog 1,500 million for mains WSS connections to the new 274 ha site north west of Ulaanbaatar, which has been master-planned for 7,250 new apartments—part of GoM’s “40,000 apartment program.” This is the first of a number of prospective satellite settlements of various sizes; and while the new infrastructure will increase land values it is not obvious that there will be strong demand for apartments in such a remote area. It compares with Tog 950 million allocated to ger area water and sewerage pipelines in Ulaanbaatar, but the beneficiary areas have yet to be identified, so that construction could not in fact start in the 2006 season. Another important project, which will also greatly benefit the ger areas, is commencement of construction of the “25th sewerage collector”, extending due north from Ulaanbaatar city center.

Eight Budget projects are outside Ulaanbaatar and include US$26.5 million for the ADB’s “Provincial Towns Basic Urban Services” Project, and Tog 340 million (US$0.28 million) for the first phase of the soum water purification program. They are all essentially renovation, rather than new, projects except for the Tog 200 million first stage construction of a Tog 3,100 million pipeline to carry sewage for 30 km or so from Nalaikh to Ulaanbaatar’s central sewage works. This is preferred to renovation of the local Nalaikh plant in the expectation that apartment housing development will be able to take advantage of the sewer en route. It is understood that this project has not been subject to a feasibility study and the Intermediate Report of the Water and Wastewater Master Plan of Ulaanbaatar, December 2005, recommends that Nalaikh is not connected to the central system in this way.

Table 4 summarizes some of the features of GoM’s investment planning for 2005–15, including 45 projects, with less precision for later years. It compares these projects with the Budget allocations for 2005 and 2006. The government was relatively new and the full project list incorporates a lot of inertia from past considerations, so that comparison with its Budgets may be a useful indication of its priorities and general direction, although this is again subject to review by the current GoM of January 2006. The comparison shows a distinct switch away from
the formal areas to the ger areas, which receive 36 percent of Budget allocations. Nevertheless this is Tog 300 million less than is allocated to apartments.

Table 4: Selected Features of MUCD’s Budget and Long-Term Investment Considerations for Construction and Public Utilities, 2005–15

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tog mill.</td>
<td>%</td>
</tr>
<tr>
<td><strong>Area Type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apartments</td>
<td>39,290</td>
<td>49</td>
</tr>
<tr>
<td>Other Formal Areas</td>
<td>31,961</td>
<td>40</td>
</tr>
<tr>
<td>Ger Areas</td>
<td>9,662</td>
<td>12</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outside Ulaanbaatar</td>
<td>40,255</td>
<td>50</td>
</tr>
<tr>
<td>Ulaanbaatar</td>
<td>40,657</td>
<td>50</td>
</tr>
<tr>
<td><strong>Project Type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Works</td>
<td>38,357</td>
<td>47</td>
</tr>
<tr>
<td>Renovations</td>
<td>42,555</td>
<td>53</td>
</tr>
<tr>
<td><strong>Sector</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WSS</td>
<td>53,162</td>
<td>66</td>
</tr>
<tr>
<td>Apartment Building</td>
<td>26,500</td>
<td>33</td>
</tr>
<tr>
<td>Heating</td>
<td>1,250</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80,912</td>
<td></td>
</tr>
</tbody>
</table>

Source: Consultant’s interpretation of CPUSC and GoM Budget data.

Other Budget emphases differing from the composition of the full project list are in favor of new works rather than renovation, which may or may not be desirable depending on the implications for existing assets; a switch away from housing to WSS services; and increased activity in Ulaanbaatar compared with elsewhere. This moves away from the declared Regional Development focus. Following the Parliamentary Resolution on the development of eight Regional Pillar Centers, the GoM provided assistance for the preparation of traditional Master Plans for these centers which identified infrastructure requirements and initial investment needs costed at US$93.62 million including US$8.8 million for water and sanitation, which is not included in the table. There is no budget investment in any of the pillar cities.

GOM’S SANITATION PROGRAM

MCUD’s draft Sanitation Program of 7 December 2005 (Mongolian language only) includes 45 specific proposals for completion by 2015. There is recognition of the need for a full spectrum of improvements, both physical and institutional / professional. The anticipated situation by 2015 is that the MDG for the percentage of people living in adequate sanitation, defined as having a sewer connection, will have increased from 23.9 percent to 50.0 percent; and the number of satisfactorily operating sewage treatment plants increased from 39.8 percent to 70 percent. Proposed capacity building activities are of 4 types:
(a) renewing laws and standards for wastewater premises, since existing norms and standards are inappropriate for current conditions, including revising the law on wastewater charges based on the principle that the polluter pays;

(b) institutional improvements, including increased privatization, for organizations responsible for the operation of sewerage treatment works in aimags and local areas;

(c) improving the skills of sector personnel; and

(d) establishing an overall control system for the operation of sewage treatment works (provide with laboratories, local inspectors).

The Program explicitly recognizes the need to develop and introduce improved ger area sanitation, for example, improved pit latrines and holding tanks, in a hierarchy of systems culminating in centralized sewerage; and MCUD, CPUDSC, USIP and MUB are identified for involvement in this, under loan assistance, during 2006–08. Private sector investment in sewerage both ger areas and private housing areas is called for.

The Program includes a comprehensive list of WWTPs requiring upgrading, mostly uncosted; although 8 will be upgraded under the ongoing ADB Provincial Towns project. It states, but does not otherwise substantiate, that deteriorating sanitation and other environmental pollution have resulted in a 20–30 percent increase in morbidity in recent years. There is no other justification for the works.

The proposed WWTP improvements are predominantly those made by the individual Provincial PUSOs. They incorporate a great deal of inertia from 1980s planning, including the expectations of greatly increased levels of demand from that period. There are no feasibility studies and neither the PUSOs nor the MCUD or CPUSC have the capacity to redesign them appropriately for current economic conditions.

INVESTMENT NEEDS

USIP2 is providing for critical improvements in the central water supply system by strengthening the primary network in selected areas, replacing energy inefficient equipment, and supporting water monitoring, conservation and leakage control. Nevertheless the system requires a great deal of additional investment to bring it to a fully satisfactory state. Probably the best value for money investment would be in upgrading the 40 CTPs, at a cost of US$2.4 million. Ulaanbaatar’s WWTP also urgently requires significant further investment to bring it to a satisfactory operating level.

The ADB’s Provincial Towns projects are assisting 13 of the small aimag centers with basic improvements to their central WSS systems, but no major provisions have been made for Darkhan and Erdenet, the second and third largest towns in the country, and feasibility studies here appear to be a priority.

While contamination of water supplies from poorly constructed and operated pit latrines may be an increasing problem, in Ulaanbaatar at least, it is unlikely that policies aimed at improving them will be so comprehensively effective as to remedy the situation; and improved water treatment may be the most effective solution. These issues have not been considered in detail.
It is not possible to formulate water or sanitation improvement programs until feasibility studies have been prepared. MCUD have estimated the cost of achieving MDGs by 2015 as US$874 million, including investment for a new water source for Ulaanbaatar, rehabilitation and new water pipelines and sewers, WWTP improvements and a relatively small allocation for connections to ger areas close to pipelines. Notwithstanding the need to upgrade much of the central system assets of the WSS sector, there will have to be massive investment in the ger areas if there is to be significant progress towards the MDGs. Careful tradeoffs will need to be made amongst alternative investments within the sector.

Figure 1: Indicative Costs for Alternative WSS Ger Area Improvements (utility connection costs only)

Figure 1 presents order of magnitude costs for principal ger area improvement options. It provides a rudimentary means of identifying the approximate costs and impacts of alternative investment packages. Estimates for such works vary enormously and these figures are best available estimates but should be regarded as being indicative only. They exclude internal plumbing, fixtures and any required enhancements to mains water pipelines, mains sewers and WWTPs. The cost of internal plumbing and fixtures inside houses varies enormously from a few dollars for a single tap on the end of the pipe upwards; depending on what the household can afford to enhance its enjoyment of water-on-demand and what means are available for disposing of wastewater. The aimag centers are dwarfed by Ulaanbaatar, averaging only 20,000 people for the 19 other than Darkhan and Erdenet, and, because of the shorter distances involved in running pipes and the lower price of labor, the costs of ger area improvements there are very much less: only one third of the cost overall and much less than this for the 19 centers.
Table 5: Indicative Requirements for MDG Achievement
(utility connection costs only)

<table>
<thead>
<tr>
<th>Households</th>
<th>Ulaanbaatar</th>
<th>Aimag Centers</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>221,071</td>
<td>132,339</td>
<td>249,709</td>
<td>603,119</td>
</tr>
<tr>
<td>2015</td>
<td>337,500</td>
<td>162,500</td>
<td>229,656</td>
<td>729,656</td>
</tr>
</tbody>
</table>

**WATER**

2005 Situation
% all households served 50% 20% 17% 30%

2015—Without Any Investment
New households served by 2015 0 0 0 0
% all households served 32% 16% 19% 25%

2015—Investment for Current Level of Service
New households served 23,615 14,070 0 37,685
% all households served 39% 25% 19% 30%
Cost US$mill using networked kiosks $7 $2 $0 $9
Cost US$mill using individual connections $47 $10 $0 $57

2015—Investment for Target MDG
new households served 207,503 123,634 0 331,137
% all households served 94% 93% 19% 70%
cost US$mill networked kiosks $66 $14 $0 $80
cost US$mill individual connections $415 $90 $0 $505

**SANITATION**

2005 Situation
% all households served 34% 20% 0% 17%

2015—Without Any Investment
new households served by 2015 0 0 0 0
% all households served 22% 16% 0% 14%

2015—Investment for Current Level Of Service
new households served 13,482 8,033 0 21,516
% all households served 26% 21% 0% 17%
cost US$mill using sewer connections $27 $6 $0 $33

2015—Investment for Target MDG
new households served 164,369 97,933 0 262,302
% all households served 71% 77% 0% 50%
cost US$mill using sewer connections $329 $71 $0 $400

**TOTAL WATER / SANITATION COST FOR MDGs**
cost US$mill: sewer + individual water connections $744 $161 $0 $904

*Source:* Consultant’s interpretation of available data.

Reasonable assumptions on population growth, migration and household size suggest (see Table 5) that with no further investment the MDG water access level of service, currently 30 percent, would, because of urban immigration, fall to 25 percent by 2015. Some 38,000
households will require improved service by 2015 in order to maintain the current 30 percent level of service; and ADB and World Bank commitments will raise the level to 31 percent, only 1 percentage point above the current level and 4 percent of the way to the MDG.

Achieving an increase to the 70 percent water access MDG would cost, for utility connections alone, a total of some US$80 million using networked kiosks and US$505 million using individual connections.

GoM’s policy is that pit latrines should be replaced by individual household sewer connections, or equally comfortable and hygienic arrangements, as quickly as possible. The current low sewage flows may not support properly functioning conventional sewers, and local septic or holding tanks may be more suitable. The best current estimate of access to adequate sanitation arrangements is 17 percent of the population. An increase beyond pit latrines to the MDG target of 50 percent implies (Table 5) an additional 262,000 households being connected at a cost of US$400 million, assuming sewer, or similarly effective, connections. The smaller percentage-point MDG improvement aimed for in the Sanitation Program would cost some US$316 million for this part of the Program.

The total cost, for the utility connections alone, of achieving both MDGs using individual water connections and sewers is of the order of US$900 million, which is doubled by MCUD’s estimates for required system improvements.

Much greater impact on the MDGs could be made by favoring investment in aimag centers, particularly the smaller ones, rather than Ulaanbaatar, for example, the US$98 million cost of providing individual connections to all 136,000 households in aimag centers by 2015 might provide for only 49,000 in Ulaanbaatar. Sewer connection costs are also generally more than water connections, so that impacts on MDGs are less expensively made for water.

SECTOR PERFORMANCE

ACCESS TO SERVICES

The best available estimate of households with adequate water supplies, see Table 6 and Table 5 above, can be compiled from MCUD’s 2005 aimag survey, current data from USUG for apartments and networked kiosks and the UNDP’s WSS Pilot Household Survey of 2004, which found that 17.3 percent of the rural population in their sample used acceptable water sources. These combine to give a current measure of adequate water service of 30 percent when the urban population using tankered kiosks is excluded, compared with a 2002 world average of 83 percent. The general MDG target of reducing the underserved by half implies achieving a 65 percent level of service by 2015. This is a more modest target figure than those of GoM or the ADB and World Bank, but the increase of 35 percentage points is even greater than GoM’s 33 percentage points.
Table 6: Estimates of 2005 MDG Indicators for Access to Adequate Water and Sanitation Services

<table>
<thead>
<tr>
<th></th>
<th>Ulaanbaatar</th>
<th>Aimag Centers</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequately served households</td>
<td>109,668</td>
<td>26,754</td>
<td>43,200</td>
<td>179,622</td>
</tr>
<tr>
<td>% served of all households</td>
<td>50%</td>
<td>20%</td>
<td>17%</td>
<td>30%</td>
</tr>
<tr>
<td>Sanitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sewer served households</td>
<td>75,772</td>
<td>26,754</td>
<td>0</td>
<td>102,526</td>
</tr>
<tr>
<td>% served of all households</td>
<td>34%</td>
<td>20%</td>
<td>0%</td>
<td>17%</td>
</tr>
</tbody>
</table>

*Source: Consultant’s interpretation of available data.

Table 6 also presents estimates of the 2005 levels of the MDG indicator for sanitation, 17 percent on average, using the GoM position that pit latrines are unacceptable. The large proportion of nomadic families, who resort predominantly to open field defecation, is particularly, and perhaps unreasonable, difficult to present in a progressive report to the international community, since in practice it may not be a serious health risk.

SERVICE QUALITY

Table 7 presents the structure of USUG supplied water sales in Ulaanbaatar. In addition to this there are a number of other wells, particularly for industrial use and heat and power generation.

Table 7: Structure of Water Sales in Ulaanbaatar

<table>
<thead>
<tr>
<th>Type of Supplier and Consumer</th>
<th>Sales (mill. m³/year)</th>
<th>% of Total Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apartments</td>
<td>28.2</td>
<td>63</td>
</tr>
<tr>
<td>OSNAAG</td>
<td>21.4</td>
<td>48</td>
</tr>
<tr>
<td>- with meters</td>
<td>19.1</td>
<td>43</td>
</tr>
<tr>
<td>- without meters</td>
<td>2.3</td>
<td>5</td>
</tr>
<tr>
<td>USUG</td>
<td>6.8</td>
<td>15</td>
</tr>
<tr>
<td>- with meters</td>
<td>5.9</td>
<td>13</td>
</tr>
<tr>
<td>- without meters</td>
<td>0.9</td>
<td>2</td>
</tr>
<tr>
<td>Enterprises and Organizations</td>
<td>10.7</td>
<td>24</td>
</tr>
<tr>
<td>USUG</td>
<td>7.9</td>
<td>18</td>
</tr>
<tr>
<td>OSNAAG</td>
<td>2.8</td>
<td>6</td>
</tr>
<tr>
<td>Industries—USUG</td>
<td>4.9</td>
<td>11</td>
</tr>
<tr>
<td>- metered</td>
<td>2.5</td>
<td>6</td>
</tr>
<tr>
<td>- contracted</td>
<td>2.4</td>
<td>5</td>
</tr>
<tr>
<td>Water Kiosks—USUG</td>
<td>0.8</td>
<td>2</td>
</tr>
<tr>
<td>- piped</td>
<td>0.3</td>
<td>1</td>
</tr>
<tr>
<td>- trucked</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>44.6</td>
<td>100</td>
</tr>
</tbody>
</table>
The daily water consumption of ger area households is between 5-10 lpcd, averaging only 5.7 lpcd in Ulaanbaatar according to the Intermediate Report of the Water and Wastewater Master Plan of Ulaanbaatar, December 2005. This is very much less than the WHO recommended minimum of 25 lpcd. A significant number, but less than 10 percent, get at least some of their water from private wells, springs and rivers, where it is sometimes of dubious quality; and breaking through or melting ice is time and energy consuming. The majority use kiosks which are supplied by tanker, heated in winter and manned on a limited and erratic schedule in Ulaanbaatar officially closed on Mondays and otherwise open for an average of 6 hours each day. Some kiosks are closed in winter because they are inaccessible by tanker. The water chain is extended with transfers from source to tanker loading point to tanker to kiosk to domestic hauling container to house storage container to final use, providing ample opportunity for contamination.

The UNDP 2004 sample survey found that 60.4 percent of households without individual connections were within 300m, a locally required maximum standard, of their water supply and 11.6 percent more than 1km away. Animal carts and sometimes vehicles are used more frequently as distances increase, and by 16 percent of households overall, but even at more than 1 km distance, each way, 44 percent of trips are on foot. One or two hours spent queuing at the kiosk is not unusual. Women and children are the principal water collectors, and the time involved, not infrequently in temperatures below -20oC, is physically arduous, accident prone, calorie consuming and time consuming to the extent that it seriously impacts on time devoted to education.

The World Bank and ADB are assisting with connecting kiosks to the network, and 152 of Ulaanbaatar’s 429 kiosks are now on the central network. While this somewhat reduces contamination risks it does not reduce the household resource requirement and has resulted in only a marginal increase in household consumption. Several studies have demonstrated a WTP for more than ger families actually spend on water, implying again that the water hauling effort is the main constraint on consumption.

Outside the main urban centers about 30 percent of the 335 soum centers consume highly mineralized water, and 33 percent water with a high magnesium content, but these do not always constitute a health threat. GoM’s Action Agenda 2004–2008 includes the installation of water purification equipment in 102 soums. Rural wells, used for human as well as livestock consumption, are State property and there are often disputes about access.

Even at the highest level of Mongolian domestic water service there are contamination risks with tap water. 53 percent of UNDP surveyed apartment residents assessed their water as “good” and 10 percent as “poor”; 54 percent reported rust traces and 45 percent hardness. Moreover supplies are threatened by fecal contamination from leaking sewer pipes and well-field infiltration. Mongolian households invariably boil water for human consumption, which, if done vigorously enough, effectively destroys all forms of disease-producing organisms. However it is expensive, requiring about 1kg of wood per liter.

Water quality monitoring services are generally weak, with shortages of staff, equipment and materials being the norm nationally. In Ulaanbaatar, which is best served, official jurisdiction lies with the Sanitation Department of the MUB, but USUG operates a water testing laboratory in its central office, and there is a separate wastewater testing laboratory at the WWTP. The
USUG water laboratory carries out routine monitoring of basic parameters but must presently outsource more sophisticated testing to the State laboratory.

EFFICIENCY

USIP1 assisted with the installation of 18,000 hot and cold water meters on the rising pipes of apartment buildings, and 1,117 flow and bulk meters were installed in 5 western aimags with ADB assistance. As of August 2005 there were 21,695 water meters installed nationally, with 99 percent in working order. Ninety percent were in Ulaanbaatar but two aimag centers still had no meters at all. Manufacturers are from Germany, France, Russia, China, Hungary, Poland, Korea, Italy, Japan and the Czech Republic. Such variety does not make for economy in maintenance, but does provide wide experience for the selection of models best suited to Mongolian conditions.

Most Ulaanbaatar consumers are now metered to some degree but only some 25 percent on an individual apartment basis, as opposed to apartment buildings. All newly built apartments are required to be metered, but some old ones in Districts 1, 3, 4, 10 and 16 require as many as 5 meters at a cost to the householder of Tog 125,000. The standard assumption for the consumption of unmetered water is 230 lpcd but the actual mean consumption when whole apartment blocks are metered is 320 lpcd. Individual metered households consume only 87 lpcd, which is in line with international experience. With the current tariff structure a four person household pays on average Tog 8,404 pm when it is not metered, Tog 9,960 when the building is metered and Tog 3,362, only a third, when it is individually metered.

A critical further barrier to real savings in water, pump electricity and maintenance costs are the outmoded CTPs which have nonadjustable throughputs unresponsive to actual demand. Eleven of these were upgraded under USIP1, but the remaining 40 were excluded from USIP2.

Very large savings in domestic water consumption and sewage generation could be made nationally—halving Ulaanbaatar’s total consumption for example—if all consumers were individually monitored and CTPs were upgraded.

Unaccounted for water is estimated at 29 percent for USUG, 27 percent for OSNAAG and 37 percent for Ulaanbaatar as a whole. Figure 2 presents the number of staff per 1,000 connections and bill collection rates for each of the 19 ex-kantors, arranged here in order of increasing staff ratios. While the staff ratios, ranging from under 4 to over 8 staff per 1,000 connections would be regarded as efficient by international standards for whole systems, here they relate only to the retail component. The bill collection rates bear no relation to staff levels, and are notable for their extremely low levels by international standards: only 2 are above 80 percent and 2 are below 50 percent.
The principal item of operating expenditure for water agencies is the electricity required to run the pumping stations. This is exacerbated for Provincial PUSOs by their having to pay for a loss factor of some 25 percent resulting from oversized transformers installed in the past. With no funds for capital improvements or replacement of deteriorating equipment, PUSO maintenance programs are necessarily reactive with no formalized program for maintenance management and planning. All of the PUSOs have experienced engineers and managers who know their systems well, but they do not have the means to analyze component maintenance costs in order to prioritize activities. Moreover the PUSOs are staffed according to traditional “norms” that are based on the general size and type of systems they are running and not on specific needs. Their financial and managerial skills are unsuited to the new economic situation and it is particularly difficult to recruit more appropriate people in the Provincial towns. The management contract puts an obligation on the PUSO management not to lay off professional staff; which in practice means not laying off any staff.

The Provincial PUSOs have responsibilities beyond WSS, and employ cross-subsidies amongst their activities in order to balance their accounts. Heating and hot water supplies dominate their financial activities, and annual statements do not differentiate amongst services, so that summary financial indicators for WSS are not available. Performance data for WSS activities have been provided directly by some Provincial PUSOs; for which: the mean bill collection rate is 77 percent (for 5 PUSOs), mean total staff 108 (15), mean staff per 1,000 connections 45 (11), and mean water losses 37 percent (9). Staffing levels are notably high by international standards and the bill collection rate is notably low.

Table 8 presents cost and performance data for the Water Units of a selection of PUSOs.

Figure 2: Performance Indicators for Ulaanbaatar’s Ex-kantors, 2005
(arranged in order of increasing staff / 1,000 connections)

Source: Consultants interpretation of data supplied by OSNAAG.
Their scales, as indicated by the volumes of Revenue Water, vary greatly, with Choibalsan being 16 times larger than Baruun-Urt and Ondorkhaan. Electricity is the largest cost item although not in Ondorkhaan, where it was exceeded by staff costs. Together these two items account for 74 percent of the total costs. Choibalsan may be the most efficient water supplier in Mongolia, notwithstanding its economies of scale in this table. (However, this is from the engineering point of view only—it is less efficient in terms of customer relations, with only half of its apartment customers being billed in 2002.) Certainly it performs better than the other towns here, while Baruun-Urt performs particularly badly. If Choibalsan is excluded from the totals, it is from 2.8 to 5.6 times better than the aggregate of the other three towns on these performance ratios. However scale is not the only factor operating here, as indicated by the much poorer performance of Baruun-Urt compared with Ondorkhaan, which is the same size.
The central cores of all major urban areas are served by sewer collection systems and WWTPs. In Ulaanbaatar’s case a 158 km sewer system discharges into a biological treatment plant, which for many years has functioned poorly. Figure 3 indicates the dates at which the aimag center WWTPs were opened and their efficiency in mid 2005 as measured by the proportion of wastewater which was treated. The five plants opened after 2000, subject of ADB assistance, are working normally, but only one of the 13 of those opened in the preceding 20 years is working, and this at 30 percent efficiency. Choibalsan and Darkhan, dating from the 1960s, are functioning well, but Erdenet, which is the responsibility of the mining Company, is reportedly completely dysfunctional. 55 percent of the wastewater entering these plants is simply passed to the local river untreated.

Ger area residents’ sanitation overwhelmingly comprises simple pit latrines, which do provide hygienic and private separation of human excreta from direct human contact, but rarely observe the local standards of having a sealed superstructure and being at least 25m distance from a dwelling. The pits are filled after some 3-5 years, when a new one is dug in the compound. Many compounds in long established ger areas have exhausted the space for this, and this will be an increasing problem over time. Open soak pits, about one meter deep, are often used for disposing grey water. A State Professional Inspection Agency study in Ulaanbaatar in 2003 enumerated 67,000 ger area plots with 84,000 households. 14 percent plots were without any latrine; 59 percent of latrines did not meet required standards; and 34 percent of plots were without soak pits. On-plot drilling for water is increasing, sometime for sale to other householders, and the dangers of localized pollution of groundwater are also increasing. Moreover there are some indications that poor ger area sanitation may be causing large scale ground water contamination in Ulaanbaatar. For example there is some contamination of wells at the Central Source, although in fact this may originate from a leak in the trunk sewer that runs along the South Road. Chlorination is already carried out here, but treats only bacteria, and there are traces of nitrates which are more expensive to remove.

Industrial activity is reputedly operating at some 10 percent of 1990 levels, thus moderating potential environmental damage when untreated effluent enters the river systems. It is however currently increasing slowly and projected to increase significantly. Chromium from tanneries is a particularly dangerous pollutant, difficult to remove at central treatment works when highly diluted, and best treated as close to the factory as possible. The Khargia Company’s treatment works in the Leather Association Industrial Park in Ulaanbaatar’s central industrial zone is fully privatized and completely dysfunctional. Its wastewater, with high contents of chromium and other heavy metals, chemical oxygen demand and ammoniums is treated in Ulaanbaatar’s WWTP. Tanneries at Tolgoit have no pretreatment facility and discharge directly to the central plant or illegally dump sludge, causing serious soil and groundwater pollution.
AFFORDABILITY AND WILLINGNESS TO PAY

It is doubtful that Mongolia would have developed such relatively sophisticated WSS systems without assistance from the Soviet Union or under more democratic government; and it is unlikely that the gross infrastructure inequalities between ger area and apartment areas would have arisen under democratic government. Without Soviet assistance the prevailing water supply system would probably have been wells with distribution by animal cart and pit latrines for sanitation. Since 1989 the water agencies have been running down the assets established in the communist period, with financing being less than that required for adequate maintenance. Institutional arrangements commonly provide for multiple service entities with collective financing arrangements clouding cross subsidization. It is normal for heating services to effectively cross subsidies WSS recurrent costs, particularly for apartment consumers, and for organizations also to subsidize apartment household’s costs. Organizations’ costs are paid by central government, so that the Treasury is ultimately responsible for the bulk of service costs in the Provincial centers. Nevertheless USIP1, USIP2 and the ADB’s Secondary Towns Feasibility Studies have demonstrated that it is possible, with appropriate institutional adjustments and long term loans at concessional rates, to consolidate, improve and extend services on the basis of consumer affordability and WTP.

Mongolian studies on affordability for water supplies have generally found WTP at levels in excess of prevailing prices. Ger area water purchases were found by the USIP2 Feasibility Study to constitute on average 1.1 percent of household expenditure, well below the international rule of thumb of 4 percent maximum. The majority of those questioned in the Study were willing to accept a price increase, provided that there was improvement in the quality and reliability of supply. The weighted average unit price that they were willing to pay was Tog 743/m$^3$, compared with the current Tog 500. This study also estimated that proposed tariff increases would lead to an average payment for apartment WSS of 4.1 percent of household incomes. The widespread adoption of individual apartment metering is leading to much reduced bills compared with those assumed in the Feasibility Study, and some reduced pressure on affordability, albeit the beneficiaries tend to be at the upper end of the income distribution.

There is no household income/ expenditure distribution available for Ulaanbaatar, but ADB’s Provincial Towns Studies have revealed great variations not only between formal and informal areas within towns, but also between towns. Sainshand, one of the wealthiest towns, had, in 2002, a mean per capita income of Tog 26,023 and an estimated annual community income of US$3.08 million, compared with Bulgan, a poor town with figures of 53 percent and 63 percent of Sainshand’s respectively. Median income figures are more meaningful here than means, and in Bulgan’s case were estimated as Tog 36,000 household income per month, which was very far below the poverty line. Comparing the distribution of household incomes in Sainshand and Tsetserleg, representative of wealthy and poor towns, the incomes of households in the ger areas of Tsetserleg were at all points below those of Sainshand, and only half as much at the 50th percentile; and those of apartment households in Tsetserleg were less than those of Sainshand’s ger area households for much of the distribution. Thus sensitivity is required in tariff setting for Provincial communities, and they may, as communities, have significantly different abilities in affording major capital improvements.
FINANCIAL SUSTAINABILITY

While PUSOs have captive customer bases, and the responsibility to deliver monopoly services and raise revenue from the delivery of those services, the Governors have a command and control relationship with all public organizations. The operations and performance of PUSOs could be a factor in whether or not a political party is reelected. Consequently a local government needs to establish basic policies and principles to guide the operations of a PUSO, including expected returns on investment, pricing for the poor and the quality of service to be provided. Thus PUSO requests for tariff increases are invariably moderated by Governors to levels which provide insufficient finance to maintain systems properly or to hire expensive key staff, such as accountants; and necessitate resorting to unconventional activities, particularly animal husbandry, hairdressing and beauty parlors, to subsidize core activities. This lack of a long-term financing mechanism for sustainable operation and maintenance, not to mention capital investment, has meant that, since the withdrawal of the subsidies from the Soviet Union, the agencies have been unable to assemble sufficient funds to arrest the deterioration of infrastructure.

USUG has made considerable institutional development and operational progress since incorporation in 1997, but it has not made a profit since 1999. Its extremely adverse financial performance is mainly attributable2 to (i) a smaller than expected increase in sales volume; (ii) an increase in unaccounted for water; (iii) increases in operating expenses; (iv) large exposure to foreign currency loans; (v) the belated and insufficient tariff increase. Depreciation and interest charges have increased markedly. USUG has been unable to secure approval for tariff increases necessary for appropriate cost recovery. Its financial performance for 2005 was worse than expected at appraisal, with the operating ratio of 1.08 being significantly worse than the appraisal estimate of 0.82. The adverse situation is mainly due to the belated tariff increase, which finally took place in October 2005, but at a lower level than that necessary for financial equilibrium. The water sales account receivable is rather high, with an equivalent of 56 days of sales revenues, caused by delays in the transfer of revenue from OSNAAG. Profits are planned to begin accumulating in USUG’s Capital Expenditure Fund in 2008 and to be equivalent to US$8 million by 2015. The Fund is to be applied to replacing aging assets, and expanding the system, particularly to the ger areas.

Table 9 provides performance data for Ulaanbaatar. The situation is complicated by the involvement of 3 sets of organizations, and also by the fact that the 19 ex-kantors act as agents for a variety of services, including heating, hot water, and piped radio. Full summary financial data are not available by service. The table presents data for USUG and the aggregate of the 19 ex-kantors, and also sums these to give an indication of overall city performance. The aggregated ex-kantor liabilities are owed to USUG. The sector is generally acknowledged to be overstuffed, and although USUG’s kiosk related employment has decreased by 7 percent to 417 over the last two years, other staff increased by 21 percent over this period; and the total payroll has increased by 11 percent to 1,363 at present. The 24 staff per 1,000 connections in Table 9 is extremely high by international standards, with developed countries averaging 2.1 staff per 1,000 connections3.

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2 World Bank 2006c.
3 Tynan and Kingdom 2002.
Figure 4 indicates annual revenue and expenses for Ulaanbaatar’s 19 ex-kantors. The smallest ex-kantor has revenues of Tog 16 million and the largest Tog 220 million. Only 6 have revenues exceeding Tog 100 million. The figure also presents the corresponding operating ratios, excluding depreciation. 5 of the operating ratios are above unity.

Figure 4: Revenues and Expenses for Ulaanbaatar’s Ex-kantors, 2005
(Arranged in order of increasing operating revenue. Expenses include depreciation.)

![Figure 4: Revenues and Expenses for Ulaanbaatar’s Ex-kantors, 2005](image)

Source: Consultant’s interpretation of data supplied by OSNAAG.

THE MAIN ISSUES
Seven main strategic issues and recommendations are identified for specific attention. The first being the most important of these: (i) Improving ger areas services, including enabling investment planning, (ii) Clarification of responsibilities and increasing political commitment to socially equitable and financially sustainable WSS Systems, including increases in USUG and OSNAAG water supply tariffs for institutional and apartment customers and the establishment of a sector regulator; (iii) Improving the efficiency of operational agencies; and (iv) Improving prospects for more effective private sector involvement, including public sector—with public sector partnership (PUP) arrangements assisting with reorganization in Ulaanbaatar and the aimags. (v) Bridging the financing gap, and concluding with two final issues concerning implications of current and possible future urbanization for WSS improvements: (vi) Improving ability to manage informal settlement for easy future servicing; and (vii) Eagerness to invest in regional development for uncertain benefits.
NEED FOR IMPROVED GER AREAS SERVICES

Seventy percent of the urban population live in ger areas with MDG baselines far below global means. They endure multiple service deprivations as well as consuming only a quarter of WHO recommended minimum amounts of water. While GoM’s declared policy for a decade has aimed at improvements investment has, and continues to be, minimal efforts are far outstripped by migration and the situation continues to worsen rapidly.

GoM’s Action Plan 2004–2008 includes the general expansion, repair and renovation of public utilities in ger areas, and the commencement of connections to WSS networks. However, its Sanitation Program of 2005, excluding investment in non-ADB assisted WWTPs, would cost some US$316 million to achieve the stated improvement in the MDG for sewer connections alone.

The approximations in Table 5 indicate that nothing like the required scale of expenditure is currently foreseeable over the next decade. Therefore the MDGs for water and sanitation have only the most remote prospect of being achieved.

MCUD is developing options for tackling these problems but to date has no affordable solutions which could be widely applicable. Improvement efforts to date have maintained the “top-down” approach characteristic of the command economy; been too expensive to be replicable; foundered on resettlement and compensation problems; overrun timetables and budgets; and called upon minimal contribution from the community and the private sector.
WEAK POLITICAL COMMITMENT TO SOCIALLY EQUITABLE AND FINANCIALLY SUSTAINABLE WSS

The general lack of metering of water used by formal users, and the flat charges for residents of apartments at rates well below the cost of supply, mean that there are few financial incentives to conserve water. A recent World Bank study found that an average tariff increase of 60 percent was required in Ulaanbaatar before September 2006 in order to assure that USUG can fulfill its legal obligations and commitments to debt service payments and counterpart funding for USIP2. Such an increase is affordable and within WTP limits. Ger area kiosk users still pay 4-20 times more per liter of water than apartment dwellers, before additionally employing their own resources to haul it home.

Wealthier households are buying individual meters, which attract the lowest tariff, while those unable to afford individual meters pay 3 times as much per liter. There is consequently a trend for a rump of poor people unable to afford meter installation paying increasing subsidies to the better off.

The great majority of investment is from foreign donors, but noncompliance with tariff related borrowing conditions—for example, on USIP and ADB Provincial Towns projects—threatens investment sustainability and reduces the probability of further donor assistance.

LOW EFFICIENCY OF OPERATIONAL AGENCIES

The long recognized huge wastage of water, which is undervalued and underpriced, persists. However major savings are possible, as demonstrated in the former German Democratic Republic's mean domestic water consumption reduction from 300 lpcd to 100 lpcd in 5 years. The fitting of individual apartment meters in Ulaanbaatar reduces consumption from 320 to an average of 87 lpcd. Metering is progressing but individually unmetered apartment households still consume some 4 times developed world equivalents. Existing supplies could serve at least twice as many customers, and, since production is already falling from leakage reduction, savings could delay the investment in new sources for many years. The remaining 40 of OSNAAG's 51 CTPs, and perhaps those in other towns, need upgrading before maximum savings in water, electricity and maintenance can be made in Ulaanbaatar.

Operators are monopolies with activities highly constrained by Governors and little incentive to improve. They have a heritage of engineering, rather than customer-led, operating principles. Ulaanbaatar's ratio of 24 staff per 1,000 water connections compares with 2.1 staff in developed countries.

Provincial PUSOs are also greatly overstaffed, but are on too small a scale to achieve a critical mass of management talent. They have no internal or national performance standards and cannot afford proper maintenance or, increasingly, key staff. Many of their Boards have no member representing the PUSO.

A debilitating effect of command economy planning attitudes pervades operations. Training and experience has been almost exclusively in a command economy with insignificant exposure to “modern” approaches. This is a general problem pervading society, and is a long term issue.

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which may take more than a generation to “modernize”. Significant short term sector progress is only possible with intensively focused international assistance.

**DISAPPOINTING RESULTS FROM PRIVATIZATION**

Private sector involvement to improve efficiency and effectiveness have been long desired by successive GoMs, but with generally disappointing impacts. Increasing instances of anomalous ownership arrangements, such as assets being siphoned off into private hands, are reported by MCUD, in the heating as well as water sector, and there are some clear failures, such as the closure of privatized bathhouses and the total nonfunctioning of Ulaanbaatar’s privatized Khargia industrial WWTP.

There has been a widespread introduction of management contracts but there is not a real market for management services and they have achieved only weak performance improvements. The contracts are not drafted or managed to best effect. PUSOs resort to cross-subsidizing their operations through such activities as hairdressing and beauty parlors.

The establishment of adequate regulatory and judicial frameworks to control international private sector investors is some years away, and international financial interest in such ventures has waned in recent years. In the meantime there is no decision about how to handle USAGs.

Erdenet’s WSS institutional arrangements are unsatisfactory, particularly in the absence of a regulator, with the Mining Company and 2 PUSOs involved in various ways. The Mining Company effectively acts independently in supplying water and being responsible for sewage treatment, without having treated any sewage for more than 15 years. GoM does not have the capacity to properly assess needs, which are being driven in a grossly inflated way by an international contractor.

The Provincial PUSOs operate under management contracts signed by the Governor and reviewed and approved by the MCUD or its agency. The contracts are simple and general documents but they severely restrict management. The Governor is responsible for control of the assets handed to the PUSO management team; final decisions on pricing; foreign and domestic investment; the introduction of new techniques and technology; effective control of the day-to-day activities; and dealing with customer complaints.

The obligations for the contracted management team are to operate and maintain the infrastructure; improve the financial viability of the business; expand the services to the community and industries; and introduce new technology and techniques into operation and maintenance. In doing this they are to keep accounts of revenue and costs; submit audited annual financial statements and have water tested for quality; but there are no other performance requirements. As an incentive the management team retains any reduction in financial losses, which tends to reduce the government subsidy to ensure that the business can keep operating, but the 3 year contract period may be insufficient to ensure that a management team does not run down the assets.

In practice privatization has amounted only to the removal from the payroll of local government responsibility to operate and routinely maintain WSS systems, without giving management any real scope for change. Attention needs to be paid to the improved efficiency, quality and secure biological protection of potable water supplies; and general hygiene
standards, as well as engineering infrastructure, should be upgraded. PUSOs require assistance in ensuring that their organizational structures are efficient and effective, that work is organized so as to be performance orientated, and that staff are properly trained to operate and maintain new and old equipment alike.

FINANCING, PRIORITIZATION, AND TRADEOFFS

GoM’s long term investment priorities target (Table 4) central systems (US$32 million, 40 percent) and apartment buildings (US$39 million, 49 percent); but not the ger areas—only US$10 million, 12 percent programmed in addition to USIP2. Shorter-term investment (Table 4) places more emphasis on ger areas, with 36 percent of the 2005–06 budget compared with 64 percent for apartments and other formal areas.

Investment planning still suffers from the inertia of communist attitudes with an entirely engineering, rather than customer-oriented approach. It is not always interested in least-cost solutions. For example, there is overly prolific manhole provision; manned and heated water kiosks rather than self-activated insulated hydrants and an absence of financial and economic viability studies.

The GoM finance that may be available for ger area improvement is in competition with spending on opening up new land in relatively remote urban locations. ADB’s two Provincial Towns projects and USIP1 and USIP2 have focused on ger area improvements taking care to upgrade central systems to sustainable levels. Their ERRs ranged upwards from 13 percent (that is, all above satisfactory 10–12 percent thresholds) and several exceeded 20 percent; and in all cases these ERRs are under-estimates: excluding benefits to health and hygiene, water carrying time and energy savings, consequent increases in property values. Thus well designed projects aimed at improving ger area services are good investments from the national point of view.

Despite the large proportion of MCUD spending, no detailed viability studies have been undertaken for projects aimed at opening up new land, and in particular no detailed demand estimates have been made.

In the absence of economic and financial viability studies, it is the opinion of the Bank that the returns to WSS investments aimed at improving ger area services are likely to be greater than those aimed at opening up new land in remote locations, and that the proportions of GoM spending should be adjusted accordingly.

Mineral exploitation appears to be the best hope for Mongolia’s economic future; but profits from this tend to accrue to only the very few involved; and trickle-down relies on the redistribution of accruals to GoM. The exception to this is artisanal gold mining, involving some 100,000 to 150,000 people in 2005, which approaches the equivalent of half the rural labor force generating 10 tons of gold per year with a value of US$63 million. GoM could redistribute some of its mining revenue via Output-based Funding Allocations targeting water saving and ger area improvements. MUB has operated a Water Fund, which might be applied to such purposes, for some 5 years; but its resources have been diverted to other uses.

There are a number of prioritization and tradeoff paradoxes for the allocation of secondary and tertiary pipeline investment. For example, apartment households received infrastructure, plus internal plumbing and fittings, free of charge from the state, and ger area financing cannot be
borne entirely by the residents and should be spread across the entire customer base. However, new high-cost apartment developments are already receiving free connections even though infrastructure is affordable by these developments. GoM investment programming indicates scarce network funding being spent on high cost private developments at public expense with little finance available for the ger areas.

A GoM Resolution of August 2005 removed value added tax (VAT) and customs duty from ger area investments in water supply and on water meters. It would be beneficial to the sector if ger area sewerage investments, such as the “25th sewer collector” could also be exempt as well as renovation and extensions to WSS works in the formal areas.

**INABILITY TO MANAGE INFORMAL SETTLEMENT FOR EASY FUTURE SERVICING**

There are now more Ulaanbaatar residents than nomads in Mongolia, mostly in the ger areas. The Master Plan policy for ger areas is inappropriate and unworkable and MUB’s management of migrant settlement is ineffective: new plots are randomly self-demarcated and inefficiently arranged. Many will be prohibitively expensive to service, for example, those above the heights of the reservoirs.

There is also a parallel uncontrolled rash of summer house development with similar characteristics; but greater affordability and WTP. Here too future servicing difficulties and costs are unnecessarily amplified.

**EAGERNESS FOR REGIONAL DEVELOPMENT PLANNING**

Regionally balanced development is important to Mongolia, but GoM’s proposed strategy relies on large infrastructure investments and the development of designated urban centers as growth poles with identification of designated production activities for each region.

The WB funded Joint Staff Assessment of the EGSPRS found tensions between interventionist and market-based policies; economic feasibility unproven; severe implications for debt sustainability; and a lack of successful international experience with similar approaches. There is thus an eagerness to invest in regional development for uncertain benefits.

At the same time regional planning does not take sufficient account of the huge unplanned and uncoordinated developments taking place on the ground as the international mining sector begins to exploit Mongolia’s mineral wealth with new railways and other infrastructure under construction and offering secondary opportunities for economic and urban development. For example if the Herlen-Gobi scheme is to be implemented then detailed consideration should be given to its supplementing water supplies in Sainshand, Zamin Uud and possibly even exporting to Erlian in China.

**RECOMMENDATIONS**

Recommendations are made here about each of the issues in Section 5 above. Table 10 indicates the ideal sequencing of the principal recommended strategic policy and institutional changes, but the sequence is not essential and the recommendations can proceed independently. They
indicate that it should be possible to establish a regulator and USUG PUP, and also to prepare initial versions of “enabling investment plans” and to arrange for Output-Based Funding Allocations in a reasonably short term; although the extent to which effective functioning depends on good corporate governance may moderate progress. The gradual reorganization of the Provincial PUSOs and ex-kantors will extend into the medium term.

IMPROVING GER AREAS SERVICES

The “2004 GoM” was the first to fully recognize the need for improved ger area services. Given the enormity of the problem it is essential that there is more involvement and contribution from the private sector, as fully recognized in the Action Plan 2004–08. MCUD is experimenting with a variety of possible technical and institutional solutions. However, good solutions that are affordable and otherwise suitable for widespread application have not yet been developed.

GoM investments should be targeted to have maximum benefit and leverage, and MCUD and urban authorities can most usefully provide a responsive enabling and catalytic framework so that stakeholders can contribute to improving the situation with more emphasis on a bottom-up rather than the entirely top-down dynamic which currently prevails. Good solutions will emerge from GoM led basic investments aimed at soliciting resource responses from others. The most successful investments can then be replicated.

The ger areas are not uniformly poor, and Mongolians see some advantages in their spaciousness compared with apartment living. Moreover there is, particularly following land privatization, an increasing interest in improving ger area property, including an increasing number of approaches to USUG and OSNAAG for WSS connections. The blanket use of the term “ger areas” is misleading referring as it now does to an increasingly complex mix of houses and businesses of various construction qualities; and higher land value peaks are emerging through the previous uniform low levels.

Box 1: Individual Ger Area Plot Water Connections? Maybe. But What about the Sewage?

Ever since the beginning of transition, ger area households in Dalanzadgad have been making individual water connections—this is most unusually progressive in Mongolia, to the extent that many professionals still maintain that it is impractical and nonviable. Connections are still made each year—currently totaling 146—but the strong latent demand is constrained by the limited length of water distribution line running through the area to serve public water kiosks. Many households keenly await construction of new lines under the ADB assisted Provincial Towns Project.

The PUSO’s policy is to extend its services to as many households as possible, and it does not levy a household connection charge. The construction of the connection is paid for and owned by the household, but repaired, if necessary, by PUSO at the householder’s expense. PUSO constructs but many households supply their own materials. The typical cost is US$275 per household and consumption is metered at Tog 460/m³. Consumption is little more than that of kiosk users in winter but is 100–150 lpcd in summer when horticulture is popular. This demonstrated WTP of as much as Tog 20,000 per capita per month for water is exceptionally high for Mongolia, indeed equivalent to total income at the poverty line.

Proximity to sewers is even more restricted in Dalanzadgad’s ger areas, but 10 households have both water and sewer connections and they tend to use more water: 20–35 lpcd compared with 10 lpcd. Other households use holding tanks and soak pits for wastewater. Some 200 households are eagerly awaiting additional ADB assisted sewer lines.
While there are the three classes of ger area recognized in GoM’s 1998 Housing Strategy i.e. ripe for densification, settled, and being-newly-settled, these are not concentric, but rather a patchwork as households differentially benefit from trading activities, overseas remittances, artisanal gold mining earnings, and so forth. There is also almost a plethora of assistance for property upgrading available in various forms from donors and NGOs. OSNAAG is already responding to these demands with plans to extend the network into the readily accessible parts of the ger areas of District 3. Improvements are more easily and more cheaply made in the aimag centers, and Dalandzadgad, for example, already has many individual ger plot connections (Box 1).

The aggregate value of bottom-up resourcing will be much greater than anything GoM can muster and a critical policy element should be the provision of a framework within which householders, individually and in groups, developers, donors and NGOs can find opportunities for WSS improvements constructed to USUG standards. MUB’s 2020 Master Plan provides no basis for this but the French assisted WSS Master Plan currently under preparation can provide it if followed / accompanied by practical USUG arrangements which the public can take advantage of. This should not be difficult since it is already handled smoothly as a matter of routine in Dalandzadgad (see Box 1). It would appear to be sensible for construction under USIP2 to accommodate as many individual connections as possible; and maximum use should be made of kiosk pipe work constructed in USIP1 and in ADB assisted Provincial Towns. The CPUSC could prepare similar simple plans for the aimag centers.

The following is recommended:

(i) Preparation and publicizing—by PMU and USUG in Ulaanbaatar and elsewhere by PUSOs and the CPUSC—WSS distribution and collection network drawings and future plans indicating areas where new connections are technically possible and welcome, including areas where localized water and sanitation systems are possible.

(ii) Preparation and publicizing—by PMU and USUG in Ulaanbaatar and elsewhere by PUSOs and the CPUSC—clear procedures, including payment, ownership, and maintenance responsibilities, whereby the private sector, in whatever form, can instigate connections. New assets up to the house connections should be owned, or at least maintained, by the supplier in order to maintain system integrity by limiting leaks from broken pipework.

CLARIFICATION OF RESPONSIBILITIES AND INCREASING POLITICAL COMMITMENT TO SocialLY EQUITABLE AND FINANCIALLY SUSTAINABLE WSS INVESTMENTS

GoM’s WSS interests are acknowledged as being too fragmented and the respective responsibilities unclear. There is a need for clarification and enhancement of the legislative environment for WSS services in order to establish clear and detailed responsibilities and a tariff regime which covers full system costs in a sustainable way. It is recommended that the confusion is clarified with a detailed delineation of the roles in public administration. For example, ministries should be responsible for policies, CPUSC for contracting and administering PUSO management, Water Agency for water resources and environmental
monitoring, the economic regulator for both regulation and pricing, and service providers for service delivery only.

In order to ensure that water supply utility operations remain financially viable, and distorted subsidies to higher-income apartment users are decreased, it is recommended that the Ulaanbaatar municipal government increase USUG and OSNAAG water supply tariffs for institutional and apartment customers as soon as possible to make them 60 percent higher than the current average tariffs.

Recognizing that Mongolia should move as quickly as possible to a situation where water tariffs are based on actual use and appropriate cost recovery, the MCUD is keen to have an independent economic regulator established. The belief, readily justified by international experience, is that this will depoliticize tariff setting, and thereby allow WSS agencies to levy reasonable charges which can sustain services on the basis of a socially equitable tariff structure.

It is recommended to establish a national economic regulatory structure for water and sanitation that is conducive to investment, transparency and continuously increasing productivity in the sector; with objectives to:

- protect the long-term interests of consumers with regard to price, quality and reliability;
- promote a stable framework conducive to long term infrastructure investment and to maintain the financial viability of the industry.

GoM’s preference has been for a separate water and wastewater sector utility regulator. However WSS is less complex than energy and it could be more quickly and cheaply implemented through an extension of the remit of the Energy Sector, or indeed Telecommunications, Regulator; building on the expensive and time consuming institutional development made therein to date; and at the same time helping to rescue the WSS sector from its engineering dominance. In Australia, for example, the Essential Services Commission has multiple sector responsibilities; and in Armenia, a closer parallel to Mongolia, the Energy Regulatory Commission’s responsibilities have recently been expanded to include water and wastewater regulation. In exercising its authority the regulator must be free, except for those constraints written in the constitution or laws, of any constraints from either GoM or the private sector. It is recommended that, in the interests of regulatory independence, its authority is created by law, rather than decree or other subsidiary legislation, so that it can make all final decisions without obtaining the approval of any other party or agency, subject only to a lawfully established appeal process. Decisions should be delegated to 3 regulators appointed on as professionally diverse and broad a base as possible; perhaps along the lines of the State Services Council where the Director is nominated by consensus of the President, Prime Minister and the Leader of the Opposition. Consideration should also be given to promulgating legislation or regulation limiting the grounds on which regulators can be dismissed.5

5 Detailed advice is provided in Handbook For Evaluating Infrastructure Regulatory Systems, Ashley C Brown; Jon Stern; Bernard William Tenenbaum, World Bank, 2006.
IMPROVING THE EFFICIENCY OF OPERATIONAL AGENCIES

Improvements in operational efficiency and effectiveness during transition have been slow. Agencies are not required to measure their performance for comparative purposes; so that the change required of management and staff—to a performance management system, in which plans are set and performance agreements established with owners who constantly seek improvements in performance—is great.

As elsewhere in the ex-Soviet-influenced bloc, Mongolia’s water supply policies have always been “engineering-led” and should be replaced by “demand management” approaches. There is a need to introduce clear commercial and operational objectives to the management of all agencies. In the first place it is recommended that requirements for reporting on costs and performance be immediately introduced into all PUSO and ex-kantor contracts, so that efficiency can be benchmarked.

GoM’s Action Plan for 2004–08 aspired to the reuse of water, particularly valuable in Gobi areas where groundwater stocks are in short supply. Foreign technical assistance, preferably commercially unbiased, such as through a PUP arrangement discussed below, will be invaluable in progressing this. However it is recommended that a first stage in prudent water management is the reduction in the vast quantity of wasted water. Before committing to new water supply sources policies aimed at more efficient use of existing supplies should be vigorously implemented. In Ulaanbaatar OSNAAG’s 40 outmoded CTPs require upgrading, at a cost of about US$2.4 million, and metering should be extended, with the medium term aim of 100 percent individual customer metering supported by a US$1.5 million program to assist the poor to install meters on a subsidized basis, perhaps using an Outcome-Based Aid (OBA) approach. There is justified concern in the MCUD that the meter certification interval of two years maybe too short, and an unnecessary burden for householders. Consideration should be given to establishing a longer period, subject to technical experience, with exceptional changes in metered consumption triggering investigation.

It is recommended that the Provincial PUSO management contracts be developed so that there are clear financial and operational objectives. The licensing of the entity, monitoring of PUSO performance and determination of tariffs should be carried out by an independent regulatory authority (see ii. above). In order to ensure the ongoing viability of the industry, economies of scale in management and services should be sought.

Recent World Bank studies of WSS services have concluded that “Aggregation provides opportunities for improved efficiency of service delivery through economies of scale and scope....Thus, larger systems will deliver services at a lower unit cost, all else being equal. These efficiency gains derive from a range of factors including sharing of overhead costs across a wider customer base and lower unit input costs through bulk purchases.” For example following the end of communism in Hungary in 1989 WSS systems had to be rapidly upgraded to meet European accession requirements. Aggregation of authorities assisted this through a wider sharing of skills and knowledge.

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Provincial PUSOs are too small to justify their management overheads, and it is recommended that in due time contracts should be let for the management of groups of PUSOs. These contracts could also include responsibility for intervening soum centers, which are programmed to receive new water purification plants and upgraded WWTPs, and to involve the private sector. It is difficult otherwise to imagine how these investments will be properly maintained. This is recommended despite the large geographic spread, which is regarded by some in MCUD as being an absolute barrier to implementation. A broader geographic base would also help to release PUSOs from the absolute control of local government, to be replaced by the nonpolitical control of the national regulator.

**IMPROVING PROSPECTS FOR MORE EFFECTIVE “PRIVATE SECTOR” INVOLVEMENT**

GoM hopes that increasing private sector involvement will be the route to increased WSS efficiency, but transition to the private sector, and the flow of expected benefits, has been slow. Privatization is a means rather than an end in itself, and the questions are What are the objectives? and What is privatization expected to fix? The usual reasons for involving the private sector are the need for capital investment to repair, upgrade and expand infrastructure; to improve efficiency, modernize and innovate using new technology; to make customers pay and ensure everyone realizes the true value of this essential commodity; and to reduce costs and charges in the long term. The completely privatized Khargia industrial WWTP in Ulaanbaatar is an example of the dangers of precipitous privatization. Its nonfunctioning can only be remedied by taking the unit back into public ownership and operation. It is recommended that for the foreseeable future State owned WSS assets are, because of their “essential” character, retained in public ownership.

However there remains the need for a robust introduction of more customer oriented and commercial attitudes to the operation of WSS businesses, and it is unlikely, because of the weak level of a market economy ethos, that this can be achieved in the medium term with Mongolian resources alone. This lack of capacity parallels that in planning and the absence of feasibility studies in justifying and prioritizing investments.

As with other aspects of urban development Ulaanbaatar’s problems far exceed any others. There is little prospect of international private sector investment in the medium term, in either total private ownership, public / private joint venture, concession, BOT or affermage, particularly if the risks of jeopardizing the public interest and losing excessive profits to the private sector are to be minimized7. The appetite of international companies for such contracts has waned in recent years, and it is essential that the institutional capacity to provide an environment which can maximize the benefits of private participation is well established before they can be contemplated. This includes the establishment of an effective sector regulator, which is bound up with issues of good governance and does not give hope that it will happen quickly; and the modernization of USUG. The lowest level of international private sector involvement is first on a consultancy basis and second as contracted technical or management services, for example, to implement a mains rehabilitation exercise or, with more commitment, to carry out day-to-day operational and routine maintenance. Such relationships should be the

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7 See for example *Pipe Dreams, The Failure of the Private Sector to Invest in Water Services in Developing Countries*. David Hall and Emanuele Lobina, Public Services International Research Unit, University of Greenwich, UK. March 2006.
early stages of any plan for private sector investment, so that the agency can develop its
capacity to properly manage private sector involvement. Such a trajectory would be gradual
and slow and would not easily grasp the urgent and very broad spectrum of potential
improvements extending from the top to the bottom of WSS agency activities.

A different approach to “modernizing” agency activities quickly and simultaneously at all
levels of operation, and in a financially nonthreatening manner, is the PUP exemplified by the
EU Tacis’ “twinning” program which is addressing water services in several FSU countries. It
has been a crucial capacity-building mechanism in the Baltic states, where one public sector
company, for example, from Scandinavia, assists in the development of another, such as St.
Petersburg and Kaliningrad. See Box 2 for a description of PUPs. It is recommended that
consideration be given to establishing a PUP between USUG and a foreign water authority.
USUG favors this approach and has already investigated it on the ground in Western Europe,
where it hopes that full membership of the EBRD will enable assistance. In addition the MUB
has many associations with foreign cities, which may provide another starting point for seeking
a suitable twinning partner. There is a long history of such cooperation in Asia. For example,
since 1973 Yokohama Waterworks Bureau has assisted city water supplies in 23 countries,
including, with the Japan International Cooperation Agency’s (JICA’s) assistance, long-term
twinning partnerships with Hanoi and Hồ Chí Minh City; and it is understood that USAG is
actively pursuing possible arrangements in Korea.

Beyond this is the possibility of more private sector management, for example, for PUSO-
networked water kiosk operations. Quality of service to ger area residents is vital so that
contractors for the management of groups of kiosks should bid and be assessed not only on
price but within a broader based comparison-competitive regime, which takes into account
actual hours of kiosk operation and so forth. The official attitude towards small individual
operators who wish to sink wells and operate kiosks and deliver water to homes should be
welcoming rather than the currently prevailing hostile view towards potential PUSO
competitors. Providing such suppliers do not seriously threaten groundwater resources and
operate hygienically they can be a spur to PUSO efficiency and the sector regulator can ensure
that they are dealt with on an equal footing. The core service area of Ulaanbaatar, with
OSNAAG and 19 retail companies, should also be restructured. There is considerable
inefficiency hidden in the margins which OSNAAG adds to its wholesale purchases. The
current 19 ex-kantor contracts offer the opportunity for competition between them, followed by
aggregation to a number of more economically sized competing retail suppliers purchasing
bulk water and water treatment services from USUG; with competition by tariffs and indicator
comparisons for such criteria as reliability of supply and customer service. It is not obvious
what OSNAAG’s essential functions might be under such a regime, since the ex-kantors could
deal directly with USUG.
Box 2: PUP—A Possible Arrangement Whereby USUG, and Provincial PUSOs, May Secure Commercial and Technical Improvements Without Risk of Private Sector Exploitation

**Key Features of PUPs:**
- restructuring within the public sector
- local control is retained through democratic structures
- responsibility for management and strategic guidance of operations is clearly allocated and not dispersed between a variety of public and private actors
- less costly and easier to introduce than PSP
- understanding of public sector objectives and requirements
- no conflicts between public interest objectives in terms of system development and profit-seeking considerations
- no-profit policy of twin public water companies
- all efficiencies translate entirely into savings for consumers, investments on infrastructure and environmental improvements
- no resources are diverted elsewhere from the local water system
- risk management is optimized and performance risk, currency risk and political risk are minimized
- mixed long-term finance from aid & development banks, in some cases without a government guarantee being required
- international solidarity and support

**EXAMPLE OF TYPICAL PUP MODEL: KAUNAS MUNICIPALITY, LITHUANIA**

Since 1995. The major elements are:
- investments in improved water supply
- construction of wastewater treatment plant
- renovation of the town sewer system
- with US$100 million finance:
  - loan finance from the EBRD of €14.9 million
  - other donor finance from:
    - EU-PHARE
    - Swedish International Development Cooperation Agency (SIDA)
    - Nordic Environment Finance Corporation (NEFCO)
    - Finnish government
    - Lithuanian government
    - a twinning agreement with Stockholm Vatten

Regarding privatization prospects outside Ulaanbaatar—the only realistic purchasers for assets in the aimag centers are unrelated interests such as gold mining companies; and their only motivation would be to maximize profits from their investment, which is unlikely to be in the best interests of the consumers. A PUP arrangement could be introduced for Provincial PUSO’s, particularly if they are grouped in a more efficient way.

It is recommended that the intensification of private sector involvement in both the PUSOs and ex-kantors continue their gradual development trajectory in a series of steps:

(i) At present, they do not have performance measures or targets, and such should be immediately introduced under the existing basic contract arrangements. This will provide the basis for a comparison of performance and, by initiating modern corporate attitudes and the need for modern commercial methods to what are groups of staff transferred from the public sector, stimulate the development of more effective suppliers, and ultimately make possible an effective market in WSS service provision. Ample personnel are already engaged in the sector, but their skills need upgrading, and the prospect of working in a more competitive and rewarding...
environment will be a spur to self-improvement. Part of any PUP involvement should involve the design of focused training material to be made widely available.

(ii) The next step is amalgamation so that badly needed economies of scale in management, engineering supervision, and customer service systems can be made. Regulation, comparative competition on standard performance measures, and penalties for failed targets should be used to improve the performance of these gradually expanding providers over time. It will be important to maintain a minimum of at least four different service companies in any market in order to ensure effective competition between them.

It is recommended that the boards of water companies have a more commercial orientation, with the sole objective of doing what is best for the company. This should replace Board membership structures based on government entity representation. Business skills, including commercial and customer service skills, should predominate, including directors from successful private sector companies; and engineering skills should have only minimal representation.

It is recommended that the administrative situation in Erdenet be clarified. Perhaps, if the scale warrants, with a single USAG letting management contracts for two companies; their subsequent comparative performance being carefully monitored, purchasing water from the mining company and distributing it. There is no difficulty in the relatively wealthy Mining Company continuing to be responsible for the sewage plant, but rather than committing to a new 48,000 m$^3$ capacity plant at a cost of Euro 13.3 million, it is recommended to implement consumer metering and other water saving measures to more accurately estimate needs, which may, on the basis of OSNAAG’s metering experience, be as little of 10 percent of the proposed WWTP capacity.

**BRIDGING THE FINANCING GAP AND PRIORITIZATION**

A major problem in the sector is the gap between what are urgent basic human needs and the enormous cost of providing them. However GoM’s mineral based revenue, from royalties and taxes, is likely to increase sharply and sustainably during the next decade, offering real prospects for the redistribution of mining benefits throughout the community.

Since USIP1, USIP2 and the ADB assisted Provincial Towns projects have demonstrated the viability of projects in selected areas there should be no affordability difficulty in sustaining the improved water service levels; provided suppliers can be liberated, modernized and allowed to charge reasonable tariffs in order to maintain their assets. However, because of urban migration, some US$9 million would need to be spent on networked kiosks by 2015 in order simply to maintain the current MDG performance level of 30 percent of people adequately served with water. US$80 million would be required by 2015 to fully achieve the MDG in this way. Solid progress towards the MDGs may rely heavily on a major shift in the targeting of MCUD spending. It appears that any GoM spending on ger area improvements will be competing with the servicing of undeveloped tracts of land and private housing areas. Furthermore donor financing for demonstrably viable projects will continue to be crucial to progress in the medium term, and it is therefore recommended that compliance with existing borrowing conditions,
particularly regarding tariffs, be strictly adhered too in order not to jeopardize the flow of funding from this source.

It is recommended that thorough feasibility studies should be carried out for proposed major investments so that they are properly justified and prioritized against other ways of investing the available finance.

It is recommended that cost minimization be adopted as a key planning criterion; and rehabilitating existing systems, rather than constructing new ones, as a sound guiding principle. However in cases where significant upgrading is required the opportunity should be taken to redesign systems rather than simply replace them. They are in many cases overly designed—for very large anticipated population and industrial developments which have not, and now will not, materialize. Indeed the trend has been towards lower levels of operation and activity. Thus it is in many instances possible to replace equipment with that of lower capacity, or to replace more than one unit, such as boilers or pumps, with a single one.

The availability of powerful and efficient modern water pumps permits the removal of some intermediate pumping stations. This saves not only on the capital cost of the pumps and their subsequent operating costs, but also on ancillary facilities, such as reservoirs, as well as pump houses, communication systems, and labor. New pumps will be more efficient than those they replace and more importantly, they will be sized appropriately for the present and anticipated demands.

The widespread installation of self-service water hydrants in ger areas would greatly reduce operating costs in labor and heating, and would provide up to a 24-hour service with reduced kiosk queues. They have long been used in Mongolia and Russia and are resilient in winter conditions. The objections to them raised by Mongolian professionals is the problem of extracting payment. It is perhaps not necessary to move to card-swiping technology just yet, but prepurchased tokens and other robust arrangements are proven technology. The hydrants would need some protection against vandalism and appropriate arrangements for surveillance and maintenance.

The human and environmental benefits of sanitation investments are overwhelmingly positive, particularly where continuation of the low financing levels will, as urbanization increases, otherwise lead to a continuously worsening situation. However at a time when people are unable to get sufficient water to properly maintain themselves the effects of current pollution in particular places should be properly considered before investment is made; and their urgency compared with other priorities. Most of the WWTPs have not functioned for some years and only if rehabilitation of particular ones is urgent on proven public health grounds should they be a high priority. Mongolian WWTPs are relatively sophisticated to operate and maintain, and are very heavy consumers of electricity. Recurrent costs can be greatly reduced by abandoning derelict facilities, and adapting or constructing new treatment systems based on stabilization and/or infiltration ponds. These are economical and easy to operate and have proved to be cost-effective under the ADB assisted Provincial Towns project.

As an incentive to increased system efficiency it is recommended that central government transfers of capital expenditure for improvements and extensions should be structured in part so as to reward demonstrated improvements. In addition to enabling the MCUD to increase its spending on the backlog of capital works priorities, increased domestic capital availability will
make it possible to specifically target critical sector needs using demand management. The rapid introduction of individual household metering also gives the opportunity for sophisticated tariff setting which can be used to assist the poor and low consumers by charging at lower rates for minimum consumption and at higher rates for excessive water use. It is recommended that consideration be given to allocating budgets in two key areas with output-based approaches:

- **Water Saving**—one-off retrospective payments available to suppliers which reduce their (i) unaccounted-for water and/or domestic per capita consumption by specified proportionate or absolute amounts; and/or (ii) fit meters, and commence charging, for households officially classified as being poor.

- **Ger Area Water and/or Sewage Connection**—connection costs reimbursed at fixed rates per connection, with different rates for Ulaanbaatar and elsewhere, when supplier charging of metered supplies has commenced. Poor households could simultaneously benefit from meter fitting subsidies in the Water Saving component.

GoM’s mining revenues, international donors, such as the MCC, and NGOs are possible funding sources.

In tandem with the FSU municipal water operator PUPs (see iv. above), hundreds of millions of Euros and dollars have been raised in long-term loans, on good terms, mainly through the EIB and EBRD, but also the World Bank. While multinational companies insist on government guarantees, some municipal utilities in transition countries have been found worthy of long-term credit without needing such underwriting. The EBRD has also issued loans in local currencies in order to protect municipalities and consumers from currency risk. It is recommended that such funding possibilities be pursued along with PUP arrangements.

It is recommended that GoM consider removing the remaining VAT and customs liabilities for water and sanitation infrastructure, thus reducing the financial burden on the sector as it undertakes reform.

**IMPROVED ABILITY TO MANAGE INFORMAL SETTLEMENT FOR EASY FUTURE SERVICING**

As an extension of the recommendation in i. above—it is recommended that the MUB in particular revises and tightens up its land management policies so that immigrants and summer house builders settle in laid-out areas that can, when funds allow at some future date, be serviced at reasonable cost and convenience.

**EAGERNESS TO INVEST IN REGIONAL DEVELOPMENT FOR UNCERTAIN BENEFITS**

It is recommended that any approach to regional development is subjected to realistic costing and benefit analysis, and any infrastructure investments, which are in effect targeted at unproven future benefits be kept in perspective when compared with the immense existing day-to-day problems of the ger areas. It is also recommended that MCUD carefully monitor mining projects from an early stage in order to maximize secondary infrastructure benefits for the wider community.
Table 10: The Way Forward

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<th>Main Issues</th>
<th>Recommendations</th>
<th>Timing</th>
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| Improving Ger Area Services                                               | (i) Preparation and publicizing, by PMU and USUG in Ulaanbaatar and elsewhere by PUSOs and the CPUSC, WSS distribution / collection network drawings and future plans indicating areas where new connections are technically possible and welcome, including areas where localized water and sanitation systems are possible.  
(ii) Preparation and publicizing, by PMU and USUG in Ulaanbaatar and elsewhere by PUSOs and the CPUSC, clear procedures, including payment, ownership, and maintenance responsibilities, whereby the private sector, in whatever form, can instigate connections. New assets up to the house connections should be owned, or at least maintained, by the supplier in order to maintain system integrity by limiting leaks from broken pipework.  
(iii) MUB should revise and tighten up its land management policies so that immigrants and summer house builders settle in laid-out areas that can, when funds allow at some future date, be serviced at reasonable cost and convenience. | Short-term      |
| Improved Ability to Manage Informal Settlement for Easy Future Servicing  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |
| Clarification of Responsibilities and Increasing Political Commitment to Socially Equitable and Financially Sustainable WSS Investments | (i) The confusion with a detailed delineation of the roles in public administration should be clarified. For example, ministries should be responsible for policies; CPUSC for contracting and administering PUSO management; Water Agency for water resources and environmental monitoring; the economic regulator for both regulation and pricing; and service providers for service delivery only.  
(ii) Ulaanbaatar municipal government should increase USUG and OSNAAG water supply tariffs for institutional and apartment customers as soon as possible to make them 60 percent higher than the current average tariffs so that the water supply utility operations remain financially viable and distorted subsidies to higher-income apartment users are decreased.  
(iii) Establish a national economic regulatory structure for water and sanitation that is conducive to investment, transparency and continuously increasing productivity in the sector; with objectives to:  
• protect the long-term interests of consumers with regard to price, quality and reliability;
• promote a stable framework conducive to long term infrastructure investment and to maintain the financial viability of the industry. | Short-term      |
| Improving the Efficiency of Operational Agencies                          | (i) Requirements for reporting on costs and performance should be immediately introduced into all PUSO and ex-kantor contracts, so that efficiency can be benchmarked.  
(ii) A policy to reduce the vast quantity of wasted water should be vigorously implemented before committing to new water supply sources  
(iii) Provincial PUSO management contracts should be developed so that there are clear financial and operational objectives.  
(iv) In due time, contracts for the management of groups of PUSOs should be allowed as provincial PUSOs are too | Short- to medium-term |
| Improving Prospects for More Effective “Private Sector Involvement” | (i) State-owned WSS assets are, because of their “essential” character, retained in public ownership. | Short- to medium-term |
| | (ii) Consideration should be given to establishing a PUP between USUG and foreign water authority. |  |
| | (iii) Intensification of private sector involvement in both the PUSOs and ex-kantors should continue their gradual development trajectory in a series of steps: a. Introduce performance measures under existing contracts b. Design of focused training materials to upgrade skills of sector personnel. c. Amalgamation to benefit from economies of scale in management, engineering supervision, customer service system, and so forth. |  |
| | (iv) Boards of companies should have a more commercial orientation, with the sole objective of doing what is best for the company. |  |
| | (v) Administrative situation in Erdenet should be clarified. |  |
| | (vi) Rather than committing to a new plant in the Erdenet mining area, it is recommended that consumer metering and other water saving measures be implemented to more accurately estimate demands. |  |
| Bridging the Financing Gap and Prioritization | (i) Thorough feasibility studies should be carried out for proposed major investments to properly justify and prioritize against other ways of investing the available financing resources. | Short-term |
| | (ii) Adopt cost-minimization as a key planning criterion; rehabilitation rather than constructing new systems. However, in cases where significant upgrading is required the opportunity should be taken to redesign systems rather than simply replacing them. |  |
| | (iii) Central government transfers of capital expenditure for improvements and extensions should be structured in part so as to reward demonstrated improvements. |  |
| | (iv) Consideration should be given to allocating budgets in two key areas with output-based approaches: a. Water saving: one-off retrospective payments to suppliers that reduce their: * Unaccounted for water and/or domestic per capita consumption specified proportionate or absolute amounts. * Fit meters, and commerce charging, for households officially classified as being poor. b. Ger Area water and and/or sewage connection—connection costs reimbursed at fixed rates per connection. |  |
| | (v) GoM should consider removing the remaining VAT and customs liabilities for water and sanitation infrastructure to reduce burden on the sector as it undertakes reform. |  |
| Eagerness to Invest in Regional Development for Uncertain Benefits | (i) Any approach to regional development should be subjected to realistic costing and benefit analysis. | Short-term |
| | (ii) MCUD should carefully monitor mining projects from an early stage in order to maximize secondary infrastructure benefits for the wider community. |  |
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