

SECTION B: BASELINE ASSESSMENT

CHAPTER B11: TRANSPORT AND INFRASTRUCTURE

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11. TRANSPORT AND INFRASTRUCTURE

11.1 INTRODUCTION

This Chapter of the ESIA describes the context of the Oyu Tolgoi Project in relation to transport and social infrastructure, including: road, air and rail transport, power and energy, water supply, waste management facilities, sanitation provisions, education and communication facilities. The Project is located in Khanbogd *soum* which has very limited infrastructure and services. There are no paved roads in the *soum*, water is supplied from wells or is delivered by trucks, waste management and sanitation facilities are not widely available, and community services do not, at present, adequately cover health, education and other requirements of the growing *soum* population.

11.2 METHODOLOGY

Data on transport and infrastructure have been sourced from a combination of publicly-available information, Oyu Tolgoi's own survey programmes and a series of baseline studies conducted by consultants appointed to Oyu Tolgoi.

Primary Data Collection

Oyu Tolgoi commissioned the *Omnogovi Aimag Social, Economic and Environmental Baseline Survey* in 2008. The survey was conducted by the Centre for Policy Research Mongolia, and the Population Training and Research Centre. A more detailed analysis of the *soums* neighbouring the Project, entitled the *Oyu Tolgoi Project Social, Economic and Environmental Subset*, was completed in 2009 based on the same dataset. The focus of the main study was *Omnogovi aimag*, and the focus of the subset report was the *soums* of Khanbogd, Manlai, Bayan-Ovoo, Tsogttsetsii and Dalanzadgad. Data are provided on public transport, regional and local infrastructure, together with household types and ownership.

Specific data for Khanbogd *soum* has been collected by CRSD through the Khanbogd *soum* Governor's Office and through key informant interviews with government and civil service representatives. Data have been compiled into the *Soum Social Mapping Database, 2010*. The database is an internal monitoring and planning document which has been produced by CRSD to record the changing socio-economic dynamics of Khanbogd's population, with data collected during the period 2005-2010. The database has been supplemented through the regular, often daily interactions between CRSD and the local community.

A *Traffic Census Survey* was conducted between 13-20 March 2011 by Oyu Tolgoi to register vehicles arriving at and departing from the site gate, as well as to monitor traffic on other roads within the *soum*.

In addition to the above sources, the various Environmental Impact Assessments conducted for the Project have been used to validate baseline findings:

- Oyu Tolgoi Project Environmental Impact Assessment, Vol. III Mine and Processing, Eco-Trade LLC, Ulaanbaatar 2006;
- Oyu Tolgoi Project Environmental Impact Assessment, Volume I Report of Oyu Tolgoi to Gashuun Sukhait Road and Infrastructure Corridor, Environmental Protection Plan and Environmental Monitoring Plan, Eco-Trade LLC, 2004; and
- Oyu Tolgoi Supplementary Environmental Impact Assessment Oyu Tolgoi to Gashuun Sukhait Road and Infrastructure Corridor, 2006.

Secondary Data Sources

National and *aimag* infrastructure and transport information has also been obtained from several Mongolian and South Gobi regional studies commissioned by the World Bank and United Nations. These reports are: S. Ochirbat, *Problems of Rural Roads in Mongolia*, October 2010; World Bank, *Southern Gobi Regional Environmental Assessment*, January 2010; World Bank, *Southern Mongolia Infrastructure Strategy*, Washington, D.C, 2009; and the United Nations, *Status Paper on Road Sector of Mongolia*, 2006.

Traffic projections relating directly to the Oyu Tolgoi to Gashuun Sukhait Road were obtained from *Oyu Tolgoi Project, Economic Report/Feasibility Study of Oyu Tolgoi to Gashuun Sukhait Road*, Vol. I, Ulaanbaatar 2010. Other minor secondary data sources are referenced as applicable in the Chapter.

11.3 NATIONAL CONTEXT

Prior to the 1990s, the majority of transport services in Mongolia were provided by state-owned companies at heavily-subsidized tariffs. Since the 1990s, road passenger and freight transport, urban passenger transport and aviation services have either been privatized and/or private operators have emerged in competition with state-owned operators. There has been one significant change in the external context: the massive increase in trade with China, which will impact on demands for transport infrastructure and services in the next few decades. Although road transport continues to dominate the sector, air transport remains strategically important due to the large distances between settlements.

11.3.1 Roads and Highways

The Mongolian national road network comprises three highways together with a number of state roads and numerous earth roads. There are three principal highways which form part of the Asian Highway network which connects Mongolia with other Asian countries and eventually with Europe.¹ AH3 connects south east Mongolia with the Russian Federation across 1,009km, AH32 traverses the country east to west over 2,325km and AH4 connects the north and south of the country over a link of 758 km.

Roads in Mongolia are classified into two groups:

- *State roads*, connecting the capital to provincial (*aimag*) centres, major towns and important border crossings, and designated as such by resolutions passed by the Government of Mongolia; and
- *Local roads*, connecting *aimag* centres with district (*soum*) centres, to cover sections that are not connected by state roads. There are also internal roads to connect *soum* centres to other population centres and farms.

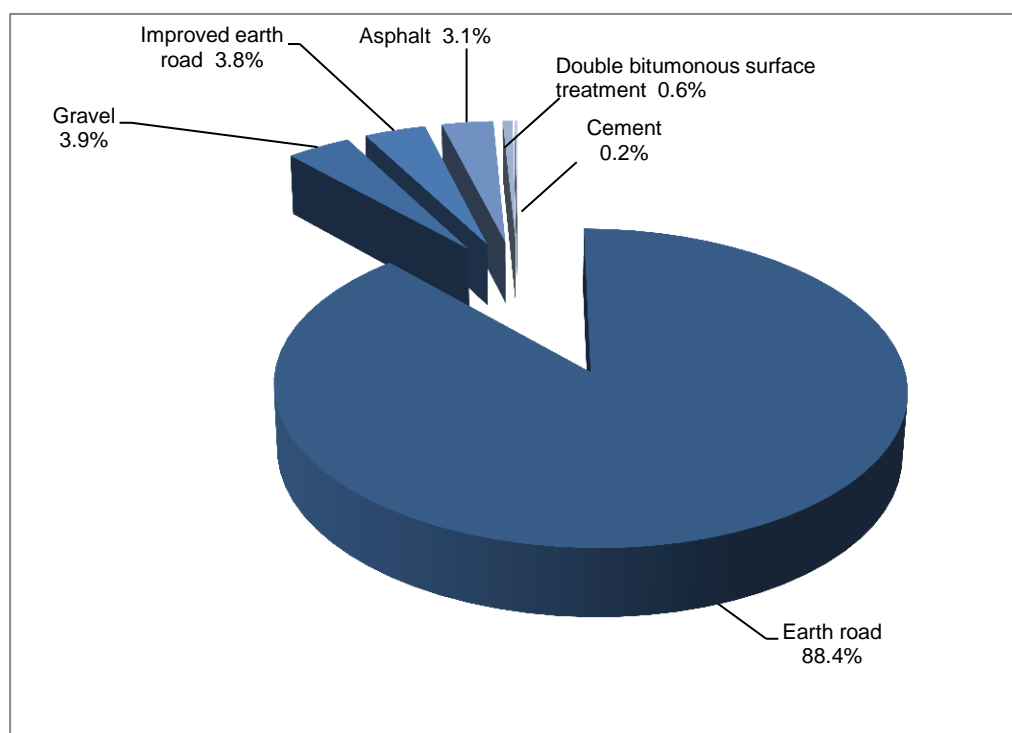
Mongolia's road network (including both state and local roads) totals 49,250 km, connecting 21 major cities and towns and 160 *soum* centres and smaller settlements. As much as 76% of state roads and 98% of local roads are earth roads², producing an overall total of 88% (by overall length).

The breakdown of roads by surface quality is displayed in *Figure 11.1* below.

¹ The Intergovernmental Agreement on the Asian Highway Network was adopted on 18 November 2003 by an intergovernmental meeting held in Bangkok and entered into force on 4 July 2005. For more information see The United Nations Economic and Social Commission for Asia and the Pacific, source URL: <http://www.unescap.org/ttdw/index.asp?MenuName=AsianHighway>

² United Nations. Status Paper on Road Sector of Mongolia, 2006.

Figure 11.1: Mongolia's Roads by Surface Type



Source: From United Nations data³

The total length of Mongolia's *state road network* is 11,219 km, including the international roads/highways. Approximately 1,500 km is paved, 1,440 km comprise roads with a gravel surface, 1,346 km of roads have an improved earth surface, and the rest are earth tracks.

To provide connectivity between *aimag* centres and their surrounding regions, the state network is also supported by a network of *local roads*. Of the 38,000 km of local roads, only 400 km are paved and 500 km have a gravel surface; over 97% of this network comprises earth tracks. Not only does this make journey times long, but it has implications for the maintenance of vehicle fleets, community and road user safety and the access of goods to market. Unsurfaced tracks and poor signage (which in turn lead to off-road driving) are seen as a major contributor to environmental degradation in the South Gobi.⁴

Only one road leading to a border post is paved - the road from Ulaanbaatar to Russia. The road to the Chinese border at Zamyn Uud is under construction.⁵ The state road from Ulaanbaatar to Dalanzadgad (the Omnogovi *aimag* capital) as of 2008 had 56 km of paved road, 220 km of improved earth road, and 284 km of earth road. The key routes on national road network as used by Oyu Tolgoi is shown in *Figure 11.2* below.

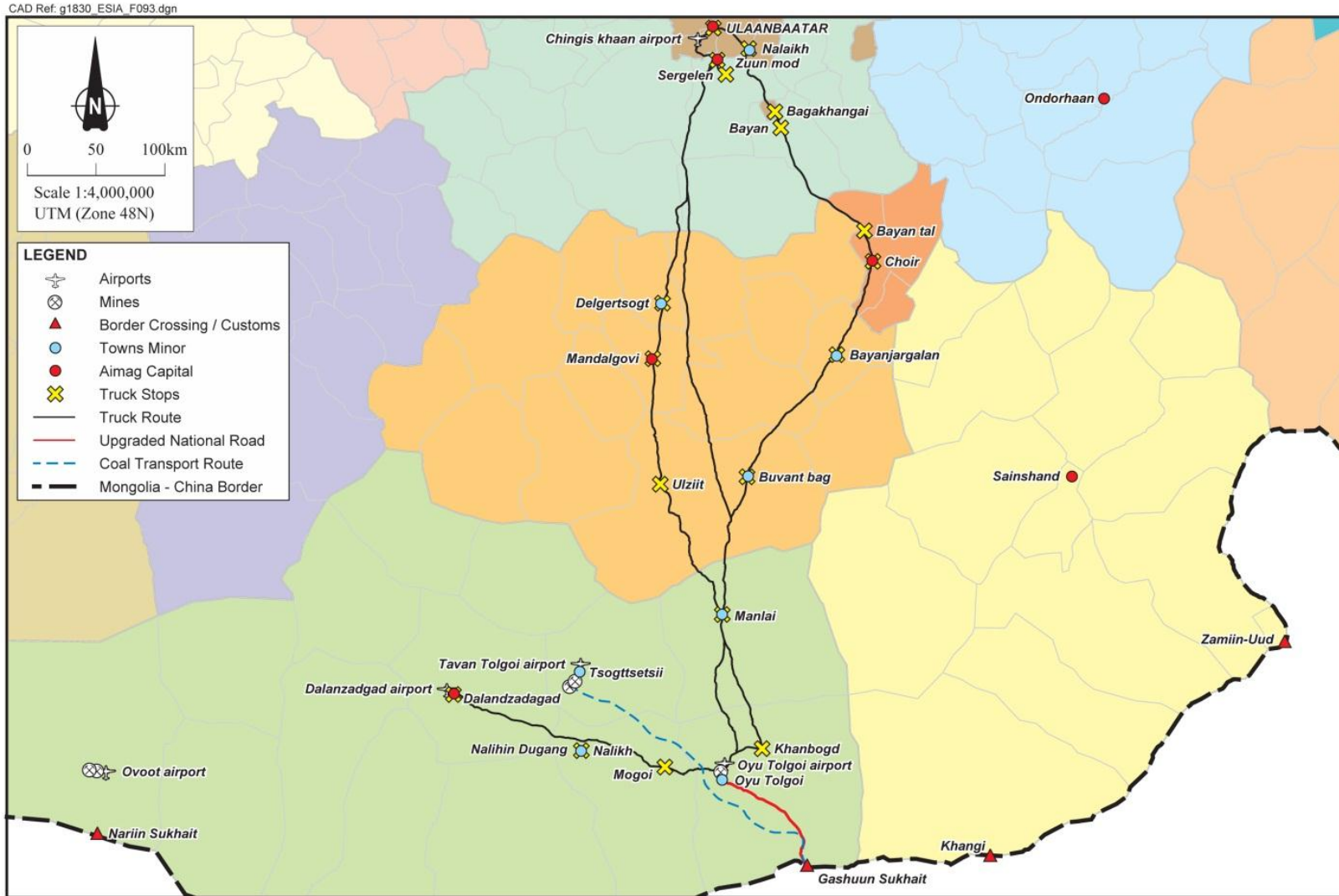
³ *Ibid.*

⁴ *Ibid*

⁵ World Bank website (Transport in Mongolia):

<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/EXTEAPREGTOPTRANSPORT>

Figure 11.2: Key Routes on the National Road Network as used by Oyu Tolgoi



Responsibility for overseeing the country's road sector is vested with the Department of Roads which implements the Government's road-related policies, provides road construction and maintenance companies with professional administration and operational guidance, and supervises the construction and maintenance of both roads and bridges.

Government investment in roads has risen during recent years; road transport improvements are cited as a priority by the government to link distant communities and to cope with the increasing traffic levels associated with mining and exploration projects.

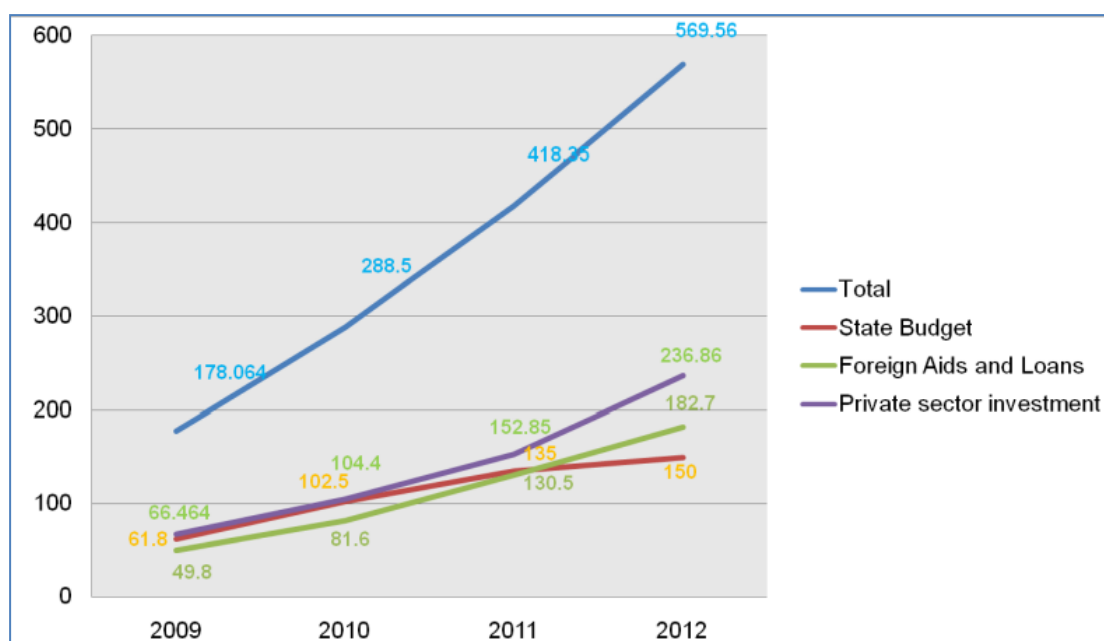
Funds for the development of the state road sector are collected into *Mongolia's Road Fund*. The Fund is financed through a variety of sources such as fuel taxes, vehicle registration fees, and the state budget. Since 1992, road development projects of approximately US\$164 million have been implemented in Mongolia. These projects were funded through loans, technical assistance, grants, and other types of aid received from various sources such as the World Bank, Asian Development Bank (ADB), European Union, Government of Japan, and Kuwait Fund for Arab Development.⁶

Major road network development programmes and plans implemented to date include the following:

- Master Plan for Mongolian Mid-Term Road Network Development, ADB: 1995;
- Mongolian Transport Development Strategy, World Bank: 1996;
- Sustainable Development Programme of Mongolia in 21st Century, Government of Mongolia: 1999;
- "Millennium Road" Project or New Strategic Policy for Road Network Development, Government of Mongolia: 2001;
- Millennium Development Goals-based Comprehensive National Development Strategy of Mongolia, Government of Mongolia: 2007; and
- Master Plan for Development of Mongolian Road Network up to 2021, ADB: 2009.

Road sector investments are illustrated in *Figure 11.3*.

Figure 11.3: Investment in Road Network, Bln. MNT, 2009 – 2012 (projections)



Source: S. Ochirbat, 2010⁷

⁶ United Nations. Status Paper on Road Sector of Mongolia, 2006.

⁷ "Problems of Rural Roads in Mongolia", S. Ochirbat, October 27, 2010.

11.3.2 Bus Transport

Bus is a popular transport mode in Mongolia. Privately-run firms carry people from *soum* centres to Ulaanbaatar and from the *aimag* centre to other *soums* etc. An announcement is generally made 2-3 days prior to a planned trip to attract passengers. Buses operate on a daily basis between Ulaanbaatar and Dalanzadgad, the centre of Omnogovi *aimag* (Table 11.1). Each bus has 28 seats and a regular time-scheduled service is provided at comparatively low fares.

Table 11.1: Inter-Town Public Bus Routes (between Ulaanbaatar and Omnogovi)

Public transport company	Route	Bus Type	Number of seats	Trips per week		One-way ticket price for adults, Tugrugs
				Winter	Summer	
Aj Myangan LLC	UB-OM-UB	Paz 3305	28	7	7	20,500 (circa 16 \$USD equivalent)
Kharaatsain Jiguur LLC	UB-OM-UB	Paz 3305	28	7	7	20,500
Bat-Undrakh LLC	UB-Khanbogd	Paz 3305	28	1	1	25,500

Note: 1,650 Tugrug = US\$1

Source: Data from Governor's Office of Omnogovi *aimag*, 2008, cited in *Subset Report*, 2009.

OM is Omnogovi *aimag*, UB is Ulaanbaatar city.

Private minibuses also carry passengers between Ulaanbaatar and Dundgovi but do not have fixed timetables, tending to depart when seats are filled. The majority of these vehicles are not officially permitted to transport people.

11.3.3 Railway Transport

The Mongolian rail network comprises 1,815 km of broad gauge⁸ track, of which 1,110 km forms the main line linking Russia to China; 238 km is on a separate network in Eastern Mongolia that has its own link to the Russian railway, and the remaining 477 km comprise branches from the main line. Rail freight remains the preferred means of transport for most of Mongolia's international trade.⁹

11.3.4 Air Transport

Air transport plays an important role in national transport, connecting widely-dispersed communities over large areas. More than 98% of international air transport services use the Chinggis Khan International Airport in Ulaanbaatar, while domestic aviation comprises 17 separate airports with runways suitable for unpressurized turbo-prop aircraft.

11.3.5 Waterways, Ports & Shipping

Mongolia is land-locked with no external ports. The nearest ports are on the eastern seaboard of China to the southeast of the Mongolia/China border. Inland waterway transport is also very limited. The "Sukhbaatar" ship, 3 barges and around 30 motor-boats operate on Khuvsgul Lake. Other than that, there are 20 motor-boats in operation in the Khovd, Dornod and Selenge *aimags*.¹⁰

11.3.6 Power and Energy

The main sources of heating in Mongolia include the following:

- *Combined heat and power plants (CHPs)*, providing electricity, heat and hot water to households in Ulaanbaatar and a few other cities;

⁸ Railway gauge is the measure of the distance between the inner sides of the load-bearing rails. Broad gauge is 1.520-m. Source: The CIA World Factbook 2010: www.cia.gov

⁹ World Bank website (Transport in Mongolia): Source URL: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/EXTEAPREGTOPTRANSPORT>.

¹⁰ <http://www.ub-mongolia.mn/economy-a-industry/transport-and-road/water-and-sea-transport.html>.

- *Heat-only boilers*, which meet heating and hot water needs of a small central network of several buildings. *Aimag* centres and larger *soums* rely predominantly on this type of heating; and
- *Individual heating stoves*, which burn coal, dung, wood, or diesel oil and are the only means of heating in the *ger* areas. *Ger* stoves are inefficient heat sources and are reported to generate a range of air pollutants.

The Ulaanbaatar heating network has recently been expanded to provide heating and hot water services to most of those within the city centre, and systems in some *aimag* centres have also been rehabilitated. However, many of those systems are either inoperable due to a lack of maintenance, or have operational inefficiencies.¹¹

There are three combined heat and power plants in Ulaanbaatar (coal-fired) servicing some of the urban population, but the majority of the urban and rural population still rely on heating from traditional stoves and heat-only boilers. Nearly all *aimag* centres in Mongolia have some electricity supply either from the central system or from small diesel-fired power plants operating from isolated grids.

Poor reliability and efficiency (both economic and operational) of heat and electricity supply, particularly in the rural areas, has been a consistent problem in Mongolia. Heat access is a matter of human survival for Mongolia's citizens. While 72% of Mongolia's population have access to electricity (primarily supplied by the central inter-connected system), the grid only provides subsidised heat supply to 47.1% of households in Ulaanbaatar and 35.4% of the population in *aimag* centres.

This means that nearly 64% of the rural population relies on traditional stoves, and most have no access to electricity.

Coal is used for home heating in coal stoves that burn continuously throughout the winter. Poorer households spend about a third of their annual budget on coal purchases.¹² Both electricity and heat demand are expected to increase in the range of 4% and 5% annually between now and 2020. Medium-term electricity sector investment needs are estimated at US\$65 million per year. Overall investment required for heating sector expansion is estimated to be around US\$ 150-200 million.¹³

11.3.7 Water Supply

On an area basis, the availability of Mongolia's water resources is much lower than the world's average. There are 11,182 m³/year of water for every inhabitant in the country.¹⁴ Mongolia's total water consumption is approximately 540 million m³/year. Over 80% is consumed by the industrial and agricultural sectors and 20% by domestic use. About 80% of drinking water comes from aquifers (see *Chapter B6: Water Resources*).¹⁵

Ulaanbaatar is situated within the Tuul River basin. Daily water consumption of Ulaanbaatar is about 150-170 thousand m³. This is 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 centre.

An estimated 50% of the urban population have access to household water supplies through centralised distribution networks with the remainder largely relying on water kiosks or tankers.¹⁶ Approximately 50% of the one million population that live in informal settlements (*ger* areas) in Ulaanbaatar, have a water consumption of about 5-10 litres per capita per day, *less than half of the WHO recommended minimum*, and very few are connected to the city's water distribution network.¹⁷ Government surveys record that, in

¹¹ Current Urban Sector Performance, Mongolia, Rapid Assessment, Asian Development Bank, October 2008.

¹² The World Bank. Mongolia: Development Topics. Mongolia and Energy. Source URL: <http://web.worldbank.org>, 2011.

¹³ *Ibid*, worldbank.org

¹⁴ "Urban Water Vulnerability to Climate Change in Mongolia" Report. By Water Authority, Ministry of Nature, Environment and Tourism of Mongolia and United Nations Environment Programme. Ulaanbaatar 2011.

¹⁵ Annual report. Ministry of Nature and Environment. Ulaanbaatar. Admon Publishing: 2007.

¹⁶ Access to Water and Sanitation Services in Mongolia, UNDP, 2004

¹⁷ <http://reliefweb.int>.

2006, almost half of Mongolian households indicated that they did not have access to clean water.¹⁸ After the collapse of the Soviet Union, it became extremely difficult to operate and maintain infrastructure properly and this has led to a significant decline in the functioning of water facilities.¹⁹

Almost all *aimag* centres are located on the bank of one of the major rivers which are the major water source for these areas. There is not much centralized water supply in *aimag* centres. In rural areas, *soum* centre residents and herder households predominantly rely on wells (boreholes and hand dug wells) to provide drinking water and water for domestic livestock.²⁰

11.3.8 Waste and Wastewater Facilities

Sewerage coverage in Mongolia is one of the lowest in Asia. Only 30% of the population have access to adequate sanitation. Only a fraction of the wastewater generated is fully treated as many of the sewage treatment plants and collection systems built before 1995 are non-functional or have limited functionality. There is a tendency for untreated or partially-treated wastewater to be discharged into rivers or other watercourses, or directly onto the ground. In *ger* areas, residents rely almost exclusively on unimproved open pit latrines or open field defecation, both of which pose public health risks.

Proper collection and management of solid wastes covers a small proportion of the waste stream. The formal planned urban areas are generally well-served in terms of solid waste collection, but this is not the case with informal *ger* areas. A survey of *ger* area residents found that 100% of respondents complained about insect and rodent infestations linked to poor sanitation and inadequate waste collection practices.²¹ Although collection is acceptable in most planned areas, the disposal is generally implemented on to insecure and unregulated open disposal sites or dumps.²²

Residents of *ger* districts in Ulaanbaatar dispose of ash from home heating stoves and boilers and waste water directly in the streets, particularly in winter. In *aimag* centres there are very few formal waste facilities, and domestic and other wastes are usually buried in a simple way in designated areas on the outskirts of cities.²³ A number of Government and donor programs have focused on waste management reform in Mongolia, particularly in Ulaanbaatar. The “*Solid Waste Master Plan of Ulaanbaatar*” was developed in conjunction with the Japanese International Cooperation Agency (JICA) between 2004 and 2007, and one of the key outcomes was reclamation of approximately 4 ha of the Ulaanchuluut disposal area and construction of a new disposal site with improved environmental controls and management.²⁴

11.3.9 Housing²⁵

Traditional Mongolian housing comprised *gers* (felt tents with wooden lattice substructures). The *ger* was an ideal living solution for nomads because it is mobile (it can be assembled quickly), lightweight (one person can erect a *ger*), and portable. In rural areas, much of the population still live in *gers* today with winter shelters usually made of wood or mud brick. In urban areas there is a mixture of *gers*, apartments and wood and brick houses.

In recent years there has been rapid population growth and urbanization in Mongolia. In urban areas, under the socialist regime, housing (mainly apartments), was provided by the Government. Since the collapse of the socialist system, very little new housing has been constructed either by the public or private sector. As a result, there is now a serious shortage of housing in urban areas, which is causing house prices to rise. Those who cannot afford to obtain an apartment are forced to build a *ger*. A

¹⁸ Urban Water Vulnerability to Climate Change in Mongolia Report (as above).

¹⁹ Status and Challenges of Water Infrastructure Development in Mongolia, J. Davaasuren, 20.10.2008.

²⁰ *Ibid*, Urban Water Vulnerability..., 2010.

²¹ Quoted in: Mongolia, Foundations for Sustainable Development, PPIAF, World Bank, 2007.

²² *Ibid*, Current Urban Sector Performance..., 2008.

²³ Country Environmental Analysis, Mongolia, ADB, 2005.

²⁴ http://www.un.org/esa/dsd/dsd_aofw_ni/ni_pdfs/NationalReports/mongolia/waste.pdf

²⁵ *Regional Development Urban Planning, and Housing Upgrading International Policy and Experiences. UNCRD et al 2005*

collection of such housing is called a *ger* area, which is an informal settlement. These have expanded in and around the cities in Mongolia.

More than 60% of Ulaanbaatar's population live in these peri-urban informal settlements, which lack modern infrastructure services such as piped-in water, sanitation, paved roads and public transportation. The peri-urban *ger* areas surround the built-up "downtown" of Ulaanbaatar, and are characterized by low-density scattered arrays of fenced properties containing informal housing structures, a mix of *gers* and detached houses.²⁶

11.3.10 Education

Development of the education sector is one of the key priorities of the Mongolian Government; the Government's main goals are to nurture both the physical and intellectual development of Mongolian youth, increase their awareness and sensitivity, and enhance their ability to study, work and live independently.²⁷

Education in Mongolia follows the older Soviet model of nursery school, kindergarten, ten-year primary and secondary school, and then university. After a decline in enrolment ratios during the transition to a market economy in the 1990s, school attendance is now high again with primary school attendance rate estimated at 97% (national average).

Mongolia has an extensive, state-financed pre-school education system. Currently there are over 700 state and private kindergartens which enrol children over the age of 3. As in many post-socialist countries, Mongolia's school system, previously based on the ten-year school, has been shifting towards 11 years of education. The official school entrance age was lowered to six in 2008. Compulsory education is eight years. Each school year begins on September 1st. Schools in *soum* centres usually have boarding schools for pupils from the countryside. Many of these schools only go to the eighth grade; pupils who want to complete secondary school then have to attend schools in the *aimag* centres. In Ulaanbaatar and cities like Erdenet there are some private schools, though of mixed quality.

11.3.11 Veterinary Services

The privatisation of livestock in 1992 made the herders legal owners of their animals and responsible for the health and hygiene of the livestock in order to provide high quality products and raw materials for consumers. The veterinary service sector was then privatized in 1998, enabling independent businesses to provide professional veterinarian services. Following privatization, various activities have been necessary to transfer responsibility from the government to the herders and to clarify the roles and responsibilities of stakeholders of the veterinary service.

There are two types of veterinary service available; the state-owned (*aimag*) authority and the *soum*-based private service. However, the veterinary service is mainly provided and delivered at the *soum* level with the main stakeholders being herders, veterinary clinics and *soum* government.

The *aimag* veterinary authority comprises a small team of veterinarians and provides several major services including prevention and treatment of diseases, as well as disinfection to herder households, and other organisations. The private *soum*-based service comprises 23 units based in 15 *soums* (2008 survey) and although the services differ from *soum* to *soum* depending on the dominant type of animal, they typically include vaccinations, diagnoses and tests, dipping, de-worming and treatment of hypodermatosis.

Access to veterinary services for livestock health purposes is reported to be as follows:

- 85.7% of livestock herders have full access;
- 11.9% have occasional access; and
- 2.4% have no access.

²⁶ *Managing urban expansion in Mongolia : best practices in scenario-based urban planning. World Bank 2010*

²⁷ *Booklet of laws in educational sector, 2006*

11.4 OMNOGOVI *AIMAG*

11.4.1 Road Network

Aimag Roads

Omnogovi *aimag* has 1,672 km of local roads connecting Dalanzadgad to its constituent *soums*, and a state road connecting Dalanzadgad to Dundgovi. Current traffic levels are low with the exception of roads linking the various mining projects. The Khanbogd *soum* road network is illustrated in *Figure 11.5* below.

Roads in use by mining operations include the logistics routes to/from Ulaanbaatar and other supply centres and through the *aimag* to the Chinese border crossing at Gashuun Sukhait, principally for the export of coal. In the last four years, most of the road infrastructure investment by the Mongolian government in Omnogovi *aimag* (amounting to Tugrugs 2,340.7 million or circa US\$2 million) has been spent on road improvements in Dalanzadgad *soum*, with little spending on road improvements in the *aimag's* other *soums*.²⁸ *Figure 11.4* illustrates a typical state road in the *aimag*.

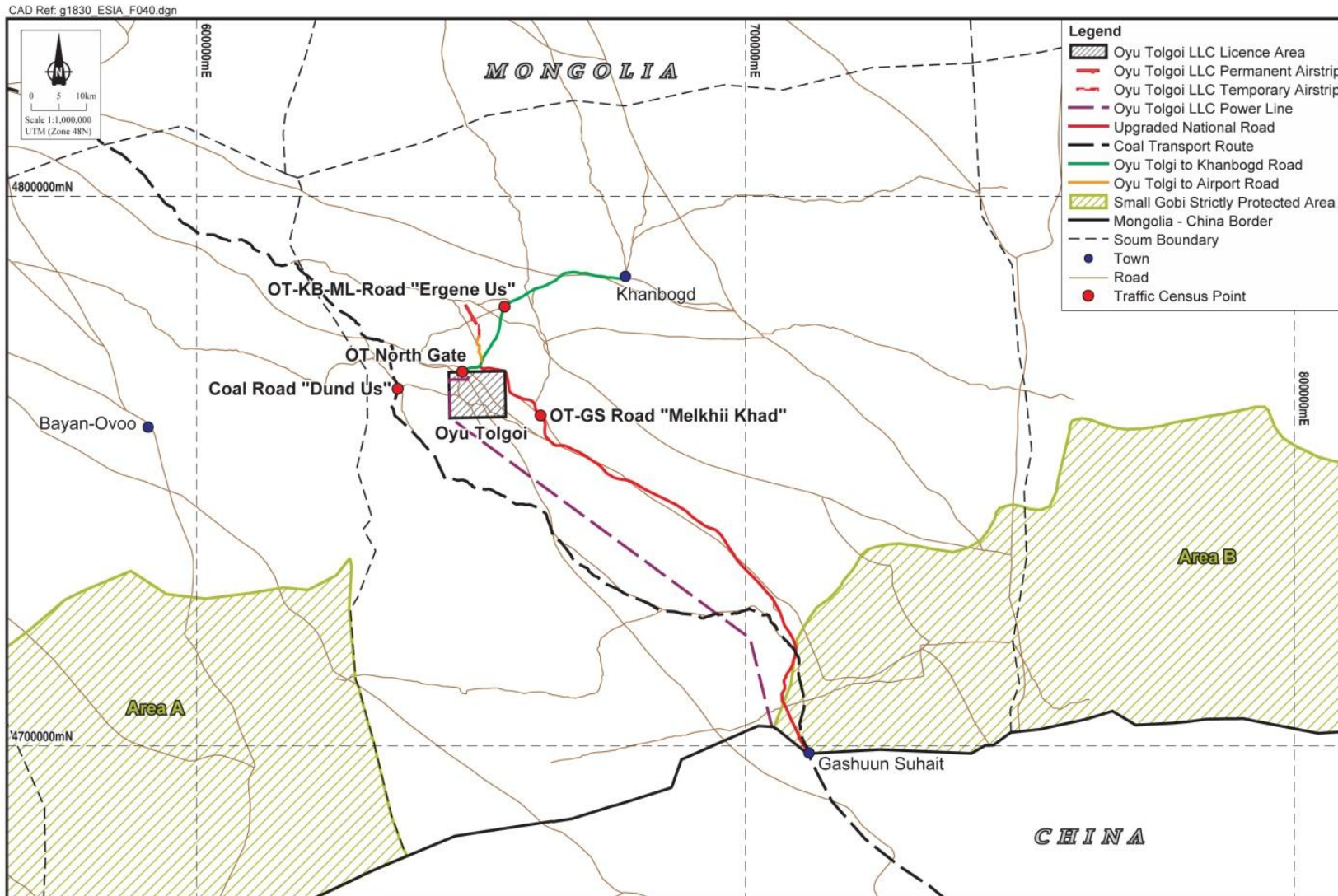
Figure 11.4: State Road, Omnogovi Aimag



Photo taken 2010.

²⁸ Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

Figure 11.5: Khanbogd Soum Road Network



Coal Transport

There is an improved road for coal transport that covers 270-km distance between the Tavan Tolgoi coal deposit and Gashuun Sukhait.²⁹ Current vehicle levels on this road exceed 800 heavy goods vehicle movements per day (see traffic census). This road was initially designed to be temporary with replacement by a permanent rail line to China, however, at the time of preparation of this ESIA, the road remains in use. A new railway between Tavan Tolgoi and Gashuun Sukhait is planned by the Mongolian Government.³⁰

11.4.2 Bus Transport

There is a bus network within Omnogovi *aimag* and the bus transport system comprises the following elements:

- internal transport within the *aimag* centre;
- inter-town transport between Dalanzadgad and the *soums*; and
- additional routes covering Dalanzadgad to Ulaanbaatar, Dundgovi and Uvurkhangai *aimags*, including border posts, such as, Gashuun Sukhait, Shivee Khuren and Zamiin Uud, as well as *soum* centres.

The official public transport service from the *aimag* centre to *soums* uses three Delica minibuses. Gobi Transport Company provides daily fixed-time transport from Dalanzadgad to Tavan Tolgoi and Tsogttsetsii, as well as operating its 8-seater minibuses travelling to 6 destinations at a ticket cost of Tugrugs 300 (0.36US\$). Unofficial transport is offered by people with UAZ 469 and Russian-made vans, but these do not have fixed timetables. In addition, there are 23 taxis with permission to carry passengers inside the *aimag* centre at a cost of Tugrugs 1,500 (circa USD \$1.10) per km. Private taxi services are also provided which vary in cost. *Table 11.2* shows the cost of official public transport between the *soums* in the Project Area of Influence and the other main travel destinations.

Table 11.2: Cost of Public Transport (Tugrugs)

Soum	Ulaanbaatar	Aimag Centre	Nearby soums	Border posts
Bayan-Ovoo	25,000	10,000	5,000	8,000
Manlai	25,000	15,000	7,000	15,000
Khanbogd	25,000	6,000	5,000	12,000
Tsogttsetsii	35,000	10,000	5,000	6,000
Dalanzadgad	25,000	0	5,000-8,000	15,000

Note: 1,650 Tugrug = US\$1

Source: Data from Governor's Office of Omnogovi *aimag*, 2008, cited in Subset Report, 2009.

11.4.3 Railways

There are no railways within the Project Area of Influence.

11.4.4 Air Transport

There is a domestic regional airport at Dalanzadgad – *Gurvan Saikhan Airport* – which is operated by the Mongolian General Authority of Civil Airways and has only a 60-person-per-hour capacity. Aero Mongolia and Eznis Airways provide regular air transport services between Dalanzadgad and Ulaanbaatar.

11.4.5 Waterways, Ports & Shipping

There are no navigable waterways within Omnogovi *aimag*.

²⁹ Brief Update on Tavan Tolgoi Coal Project, Mongolia. Presentation by A. Erdenepurev, Director of Fuel Policy Department, Ministry of Mineral Resources and Energy, Mongolia. November 2010.

³⁰ 26 top priority projects to be implement by the Mongolian Government. Source URL: <http://www.business-mongolia.com/mongolia/2010/11/02/6567/>, November 2010.

11.4.6 Power and Energy

There is no comprehensive electricity distribution network in Omnogovi *aimag*. The socio-economic baseline survey³¹ indicated that about 35% of households in Omnogovi *aimag* receive electricity from the *soum*-centre systems, 32% have solar generators, and 26% have diesel generators, 5% wind turbines and 1.6% gasoline generators. Most of the households in Dalanzadgad (92.5%) are supplied through the central electricity system, while a high proportion of households in other *soum* centres use diesel generators. Some households in the *ger* areas use a combination of wind and solar power sources (approximately 50-100). Rural households are largely powered by means of solar panels and wind turbines, some of which by combined solar and wind power (approximately 100). *Table 11.3* below illustrates power sources within Omnogovi *aimag*.

Table 11.3: Omnogovi Aimag Power Sources

Soums	Power Source	Capacity
Bayan-Ovoo	Diesel power	120 kW
	Solar	30 kW
Manlai	Wind	120 kW
Khanbogd	Diesel power	120 kW
Tsogttsetsii	Diesel power	120 kW
Dalanzadgad	Coal-fired thermal power station	6 MW

Source: Governor's Office of Omnogovi Aimag, 2008, cited in *Subset Report*, 2009.

With investment from South Korea, the *aimag centre* thermal power station (co-generation plant) in Dalanzadgad was built in 2000 and has been in operation since then. The power station has two turbines, each with a capacity of 3 MW, and two boilers with capacity to produce 27 tonnes/hour steam. *Figure 11.6* illustrates the Dalanzadgad power plant.

Figure 11.6: Dalanzadgad Power Plant



Source: Courtesy of Hyundai³²

A small proportion of households (12%) in Dalanzadgad are connected to a centralised heating system, but there are no such connections in Khanbogd, Bayan-Ovoo, Manlai and Tsogttsetsii. In these four *soums*, over 98% of households are heated by traditional wood/coal/dung stoves. Dung, coal and wood are also the most common types of fuel used for cooking.

³¹ Oyu Tolgoi Project. Social, Economic and Environmental Baseline Survey (Subset), 2009.

³² Posted on: Coal-Fired Plants in Mongolia, <http://www.industcards.com/st-coal-mongolia.htm>

11.4.7 Water Supply

Within Omnogovi *aimag*, the main source of water supply is from bore wells. Water is either distributed untreated through a network of steel, cast iron and/or polyvinylchloride-coated pipes (mainly in Dalanzadgad); or through water kiosks (in other towns). Inadequate supply, some incidence of poor water quality, and system water losses are the issues confronting water supply.³³ Less than 1% of households are connected to a central water supply as a high number of households live in *gers*. Of the rural wells surveyed by the baseline study team, 54% were protected from contamination by covers or caps. Wells provide all *ger* household needs in terms of drinking water, water for washing and water for livestock.

Table 11.4 indicates the number and type of water wells available in Dalanzadgad and the four *soums* in the Project's Area of Influence. Although over 60% of herders interviewed indicated that overall water availability is good, there are sometimes shortages in the warmer summer and autumn seasons when usage peaks, particularly in Bayan-Ovoo, Manlai and Tsogttsetsii *soums*.

Table 11.4: Number and Type of Water Wells by location

	Deep wells	Concrete-lined wells	Short-cased wells	Hand wells	Total number of wells
Bayan-Ovoo	21	22	24	264	331
Manlai	48	45	82	258	433
Khanbogd	38	7	39	302	386
Tsogttsetsii	23	12	57	160	252
Dalanzadgad	30	0	2	75	107

Source: Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

11.4.8 Waste and Wastewater Facilities

Public waste management facilities are inadequate across Omnogovi *aimag*. Opportunities for waste recycling and waste collection are also limited due to the large distances between communities and the poorly-developed commercial waste market. Household/domestic wastes are often burnt in cooking/heating stoves. At present, there are two organisations handling the collection and transport of solid wastes in the *aimag* centre:

- the Urban Improvement Department at the Office of the Dalanzadgad City Mayor has a total of 18 employees. The Department is financed from the local budget and is responsible for cleaning, improving and maintaining roads and public squares (including waste collection) in the *aimag's* administrative centre; and
- in 2005, 'Gunii Us' LLC established a solid waste processing facility in Dalanzadgad, creating 16 jobs. During 2005-7, the processing facility collected, sorted and processed 10,000 tonnes of solid waste. In 2007, with support from Oyu Tolgoi, the company installed equipment for recycling used polyethylene bags at its processing facility. The company purchased 1,855 kg of used polyethylene bags from residents and recycled these into 21 well caps.

In addition to waste management, Gunii Us LLC operates the drinking-water facility and waste-water disinfection and treatment facility in Dalanzadgad.

Currently, there are 13 waste disposal sites in the Project Area of Influence *soums*. Waste disposal sites occupy an area of 17.5 ha, temporary sites for the collection of solid wastes (0.18 ha), and unauthorised sites (2.6 ha) (see Table 11.5). Waste disposal tends to be on open, unprotected areas leading to the distribution of waste products by wind across large distances. Hazardous wastes, including hospital waste are commonly included in the general waste stream and dumped on the ground surface.

³³ Asian Development Bank (ADB). Southeast Gobi Urban and Border Town Development Project. Draft Initial Environmental Examination (Iee) Report – Omnogovi. February 2010

Table 11.5: Solid Waste Disposal Sites in Omnogovi Aimag

Soums	Centralised solid waste disposal site		Temporary sites for the collection of solid wastes		Unauthorised sites	
	Area ha	Distance km	Area ha	Place	Area ha	Distance km
Bayan-Ovoo	2.5	3	0.01	Soum centre	1.2	2
Manlai	2	1.3	0.05	Soum centre	0.7	1
Khanbogd	12	1.6	0.1	Soum centre	0.01	0.8
Tsogttsetsii	1	2	0.02	Soum centre	0.6	1
Dalanzadgad	1	1	None		None	-
Total	61.6		0.54		13.4	

Source: Professional Inspection Department of Omnogovi aimag, 2007 (distance is from soum centre).

In Dalanzadgad, about 36% of the population is connected to the sewerage system. The City's wastewater treatment facility uses simple waste stabilisation pond technology, the effluent of which is disposed of into the desert.³⁴

11.4.9 Housing

In Omnogovi *aimag*, a large proportion of the population (about 78%) live in *gers*³⁵, and the remainder (about 22%) live in houses (mainly brick/concrete and some wood). A large proportion (about 94%) of dwellings are owned by their occupants. Table 11.6 summarises the type of dwelling and ownership for those households surveyed as part of the socio-economic baseline study. The survey found that nearly half of households had built their own homes (47%), about one quarter were inherited (24%) and about 20% had been purchased. In Khanbogd, Bayan-Ovoo, Manlai and Tsogttsetsii, about 43% of *gers* have floors (this is higher in Dalanzadgad at 73%). Some residents own both a house and a *ger* and alternate between the two, depending on the season.

Rural herder households live in winter shelters usually made of wood or mud brick, together with a corral for keeping animals. Herder households usually also have one or more *gers* at their winter camp that they also use for summer camps if they migrate seasonally. Further details on winter shelters and housing for rural herders within Khanbogd *soum* can be found in *Chapter B10: Land Use*.

Table 11.6: Household Types and Ownership

Soum	Type of dwelling, %		Type of ownership, %	
	Gers	Houses	Owned	Not owned
Bayan-Ovoo	76.1	23.9	89.1	10.9
Manlai	79.7	20.3	96.9	3.1
Khanbogd	78.0	22.0	89.9	10.1
Tsogttsetsii	83.3	16.7	97.0	3.0
Dalanzadgad	71.7	28.3	94.9	5.1
Aimag average	78.1	21.9	93.9	6.1

Source: Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

³⁴ Asian Development Bank (ADB). Southeast Gobi Urban and Border Town Development Project. Draft Initial Environmental Examination (IEE) Report – Omnogovi. February 2010.

³⁵ The *ger* (also known as the '*yurt*' in Central Asia) is the traditional dwelling of the nomads in Mongolia. It represents a tent-type structure made from a wooden frame and covered by wool felt. A traditional *ger* is very easy to collapse and assemble again, and it can be transported on animals (horses, camels, yaks).

11.4.10 Education

There are four kindergartens (all Government-owned) with 315 children enrolled, and 4 schools with 1,951 pupils in the four *soums*. There is an average of 31 children per class in primary education and 24-25 children per class in secondary education.

The number of permanent professional teachers in schools is reportedly not sufficient, and 5% of teachers in the four *soums* have not been trained to professional levels. Part of the problem is that some schools do not receive enough funding to pay professional teachers. In addition, the survey indicated that nearly all the schools had insufficient quantities of books and stationery. All the schools do have computers, but do not have internet access and do not have a reliable electricity supply.

11.5 KHANBOGD SOUM

11.5.1 Road Network

Within Khanbogd *soum*, all roads comprise earth roads (i.e. without a tarmac or asphalt surface). Where road improvements have been made, these consist only of rock compaction. The use of multiple, un-surfaced tracks is a contributory factor to both soil degradation and dust generation.

Khanbogd *soum* centre is the closest settlement to the Oyu Tolgoi Mine Licence Area at a distance of approximately 42 km by earth road. Approximately 1,372 workers are commuting daily between Khanbogd *soum* centre and the Oyu Tolgoi site (September, 2011) compared with less than half this (approximately 600) a year ago, using a Company Bus-In and Bus-Out (BIBO) arrangement. Other Oyu Tolgoi transport in Omnogovi consists of four-wheel drive vehicles undertaking monitoring or consultation exercises in the immediate environs through to the border and also travelling to neighbouring *soum* centres and Dalanzadgad. Accessibility of the Oyu Tolgoi site to other *bagh* communities is hampered by poor road infrastructure requiring lengthy travel time. *Table 11.7* provides a summary of the road network in Khanbogd *soum*.

Table 11.7: Main Roads/Routes in Khanbogd Soum

Road/Route	km	Road Type/Condition
Khanbogd to Dalanzadgad	250	Earth road.
Khanbogd to Oyu Tolgoi	42	Oyu Tolgoi maintains the Khanbogd to Oyu Tolgoi earth road on a regular basis. Oyu Tolgoi may consider further improvement to the road in the future.
Oyu Tolgoi to Gashuun Sukhait	97 (4.1km within the mine site)	Earth road which will be paved by Oyu Tolgoi in 2011-2012 ³⁶ ; this road is designated for the transportation to market of the concentrate from Oyu Tolgoi operations, and extends southeast from the Mine Licence Area (MLA) following an existing track alignment to the border. The Oyu Tolgoi to Gashuun Sukhait road currently enters the Mine Licence Area from the north gate via a turn off from the national road. The operational road alignment runs to the south gate. 92.74km of the road will be classified as 'National Road' and will form part of the A0203 Highway. The operational road will be constructed as a fully-sealed all-weather road with a gravel sub-bed, using borrow materials from local sources adjacent to the road alignment, and will have an 8 m wide sealed running surface and 1 m wide shoulders. The design will be for maximum 40 tonne payload truck-trailers or trucks to transport ore concentrate to China. This road will be completed in 2011. Once completed by Oyu Tolgoi, the road will be under the Government's jurisdiction and will become the <i>National Road</i> from Oyu Tolgoi to the border.
Tavan Tolgoi to Gashuun Sukhait*	270	Hard-surface paved road. The coal transportation road, which is also currently being sealed, is a lower category of road; at the point where the Oyu Tolgoi and Tavan Tolgoi roads cross, coal trucks will give way to the National Road as

³⁶ Oyu Tolgoi to Gashuun Sukhait Auto Road. Invitation for expressions of interest for material, supply, and construction of the road. Source: Creative Solutions Mongolia, <http://www.csm.mn/en/tenders-a-bids-/tenders/665-oyu-tolgoi-gashuun-sukhait-auto-road> [February 2011].

Road/Route	km	Road Type/Condition
		described above. This road does not form part of the Oyu Tolgoi Project.
Khanbogd to Manlai (then Choir and Ulaanbaatar)	110	Gravel road.

* This is the Tavan Tolgoi coal transportation route from Tsogttsetsii soum to Gashuun Sukhait.

Traffic Census

Oyu Tolgoi commissioned a traffic census in 2011 to assess traffic loadings to the mine site and on roads used by the Project in Khanbogd *soum*. The census was conducted by staff from Oyu Tolgoi in March 2011. Traffic census sampling points are illustrated in *Figure 11.5*. Results of the traffic census are summarised in *Table 11.8* through to *Table 11.12*.

The figures show:

- just less than half of the traffic arriving at the Oyu Tolgoi site was related to the construction supply trucks; and
- the amount of heavy traffic on each of the roads around Oyu Tolgoi was less than a fifth of the heavy traffic recorded on the coal transportation route.

Table 11.8: Traffic Census on Arrivals at Oyu Tolgoi Gate, March 2011

Route/Vehicle	Entry at Gate		Trips	
	per week	Av. Per day	per week	Av. Per day
Bus from Khanbogd to site	101	14.4	202	29
Light vehicle from Khanbogd to site	24	3.4	48	7
Construction Supply Truck from Border to site	249	35.6	498	71
Fuel supply truck to site (from Ulaanbaatar)	24	3.4	48	7
All vehicles related to shift changes*	14	2.0	28	4
Light vehicles controlled by despatch [#]	100	14.3	200	29
Bus and other vehicles to Dalanzadgad	31	4.4	62	9
Catering supply trucks	3	0.4	6	1
Total vehicles arriving/leaving Oyu Tolgoi Gate			1,092	157

* Vehicles related to shift changes are those going to airport or Dalanzadgad for workers to fly to Ulaanbaatar.

Vehicles controlled by despatch are those vehicles leaving site with Oyu Tolgoi employees, contractors or visitors (e.g. conducting consultation in the *soum*, environmental monitoring etc).

Table 11.9: Traffic Census on Coal Transportation Route, 28 March 2011

Type	Heavy Vehicle (going north)	Heavy Vehicle (going south)	Light Vehicle (going north)	Light Vehicle (going south)
Number	388	406	4	3
Total	Heavy: 794		Light: 7	

Note: No Oyu Tolgoi vehicles or Oyu Tolgoi contractors. This is the total number of vehicles in one 24 hour period.

Table 11.10: Traffic Census on Oyu Tolgoi to Gashuun Sukhait Road, 29 March 2011

Type	Oyu Tolgoi Vehicles & Contractors				Other Vehicles			
	Heavy Vehicle (going north)	Heavy Vehicle (going south)	Light Vehicle (going north)	Light Vehicle (going south)	Heavy Vehicle (going north)	Heavy Vehicle (going south)	Light Vehicle (going north)	Light Vehicle (going south)
N	65	53	17	15	38	17	34	39
Total	Heavy: 118		Light: 32		Heavy: 55		Light: 73	

Note: This is the total number of vehicles in one 24 hour period. South of junction with road to south Oyu Tolgoi gate.

Table 11.11: Traffic Census on Oyu Tolgoi to Gashuun Sukhait Road, 30 March 2011 (2nd observation day)

Type	Oyu Tolgoi Vehicles & Contractors				Other Vehicles			
	Heavy Vehicle (going north)	Heavy Vehicle (going south)	Light Vehicle (going north)	Light Vehicle (going south)	Heavy Vehicle (going north)	Heavy Vehicle (going south)	Light Vehicle (going north)	Light Vehicle (going south)
No.	24	65	18	15	15	9	42	36
Tot.	Heavy: 89		Light: 33		Heavy: 24		Light: 78	

Note: This is the total number of vehicles in one 24 hour period. South of junction with road to south Oyu Tolgoi gate.

Table 11.12: Results of Traffic Census on Oyu Tolgoi to Khanbogd-Manlai Road, 31 March 2011

Type	Oyu Tolgoi Vehicles & Contractors				Other Vehicles			
	Heavy Vehicle (going east)	Heavy Vehicle (going west)	Light Vehicle (going east)	Light Vehicle (going west)	Heavy Vehicle (going east)	Heavy Vehicle (going west)	Light Vehicle (going east)	Light Vehicle (going west)
No.	85	55	34	26	18	20	61	44
Tot.	Heavy: 140		Light: 60		Heavy: 38		Light: 105	

Note: This is the total number of vehicles in one 24 hour period. Census conducted outside Khanbogd Soum Centre.

Traffic accidents

There have been no traffic accidents to date involving Oyu Tolgoi vehicles which have affected people, livestock or wildlife. In Khanbogd there were 9 recorded traffic incidents in 2009 and 8 in 2010 involving road users (non Oyu Tolgoi-related traffic), according to the Khanbogd *soum* Governor's Office. No accidents involving Oyu Tolgoi vehicles have occurred during 2011 on the Khanbogd/Oyu Tolgoi road (as confirmed by the *soum* Mayor's office).³⁷

11.5.2 Railways

There are no railways in Khanbogd *soum*.

11.5.3 Air Transport

The airstrips operated by Oyu Tolgoi – the Temporary Airport and the Permanent Airport – represent the only aviation infrastructure in Khanbogd *soum*. The original airport within the Mine Licence Area was relocated in 2010 to make way for the open pit and crusher. Site investigations suggested that it was unsafe to locate the new airstrip on the mine lease due to possible conflicts with aircraft approaches and proposed mine infrastructure, such as power lines and heavy surface mining equipment.

The new airport (called the "Temporary Airport") has been located approximately 7 km north of the Mine Licence Area. This airport is required to facilitate the transport of people and goods to the site from

³⁷ Whilst some accidents have occurred on this road in 2011, Oyu Tolgoi can confirm that these have not involved Oyu Tolgoi vehicles, hence there have been zero reported traffic-related accidents and injuries.

Ulaanbaatar and could serve other internal Mongolian airports. The landing strip surface is gravel with a concrete apron at the Terminal Building. The runway has been aligned to the prevailing north-south wind direction to minimise cross-wind conditions and to facilitate optimal landing and take-off conditions.

The Temporary Airport is an interim airstrip constructed to the south of the likely location for the final Permanent Airport. The interim airstrip is being used solely by Oyu Tolgoi until approximately mid-2012, after which the Permanent Airport will be constructed prior to the commencement of operations.³⁸ The Permanent Airport layout is based on specifications derived from the International Civil Aviation Organisations (ICAO) and will be suitable for Boeing 737-800 aircraft.

11.5.4 Waterways, Ports & Shipping

There are no significant fresh water bodies in Khanbogd *soum* and hence no waterways, ports or shipping activities.

11.5.5 Power and Energy

Nearly all households in the *soum* (96%) use fire as a source of heat, with only the remaining 4% using private low-pressure boilers. Households use a combination of fuel types; wood is used by 83% of households; 61% of households use coal and 34% of households use animal dung. The type of fuel used varies between households and seasonally with many using a combination of fuels depending on availability. *Table 11.13* and

³⁸ A contract for construction of the permanent domestic airport is expected to be awarded by the end of Q2 2011. Source: http://www.ivanhoemines.com/s/Oyu_Tolgoi.asp?ReportID=379189

Table 11.14 below indicate sources of electricity within the *soum*.

Table 11.13: Sources of Electricity in Khanbogd, 2007 data

Electric power sources	Percentage of Households
Centralised power supply	
<i>soum</i> centre	0
rural	0
Local diesel generator	
<i>soum</i> centre	88.1
rural	14.3
Solar panels	
<i>soum</i> centre	6
rural	31
Wind generator	
<i>soum</i> centre	1.5
rural	40.5
Gasoline generator	
<i>soum</i> centre	4.5
rural	14.3
Herder households equipped with power generators, %	48.7

Source: Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

Table 11.14: Capacity of electricity generators used by herders

Generation means	Capacity		Consumption
	Highest	Lowest	
Solar	75w	12w	daily livelihoods
Wind	100w	12w	daily livelihoods
Gasoline generator	380w	220w	daily livelihoods & small businesses

Source: Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.

Over the past few years, Oyu Tolgoi has provided diesel for the main electricity generator in Khanbogd *soum* centre as a means of contributing to the local infrastructure provision. The capacity of this generator is 550 KW and serves approximately 1,000 commercial and residential consumers. This equates to 88.1% of *soum* centre households and 14.3% of rural households.

The Oyu Tolgoi Investment Agreement (IA) allows power to be provided to the Project from the Inner Mongolia Autonomous Region (IMAR) until Year 4 of operations when it is to be sourced from within Mongolia. A new switching station (*Bayinhanggai* station in the steppe region of Inner Mongolia) will link Oyu Tolgoi with the wind farms and will connect it to the 220 KV grid operated by Inner Mongolia Power Company (IMPC). From Year 4 of production, a coal-fired power plant will be constructed in the vicinity of a coal source for long-term power supply. The coal fired power station will need to be sized to support the peak load of 255 MW. A diesel power station will also be constructed to serve a variety of uses.

The Oyu Tolgoi catering contractor which provides service for all the Oyu Tolgoi camps, has an accommodation camp for its catering and cleaning staff in Khanbogd. This camp (known as the CIS camp) operates its own 250 KW capacity diesel generator and is self-sufficient in power. The Project power supply is described in detail as part of *Chapter A4: Project Description*.

11.5.6 Water Supply

Khanbogd *soum* centre is located in the foot hills of the Khanbogd granite massif on the southern side of the Gunii Hooloi basin. Water supply for the residents and public buildings in Khanbogd *soum* centre currently comes from a mixture of private and public wells. There is no reticulated water supply, with the local community being supplied from tanked-in water and communal wells which are fitted with small pumps (see *Figure 11.7*).

For the rural population, water is supplied from individual hand dug shallow wells mostly associated with winter camps (*Figure 11.8*). These wells are lined with a variety of materials including concrete, wood and tyres. Water levels are typically less than 3 m below the surface and water is abstracted for potable and livestock water supply using buckets, frog (bladder) pumps and chain lifts. Ephemeral and permanent springs also provide an additional supply of water for the herder animals in the *soum*.

Figure 11.7: Members of Community Collecting Water in Khanbogd Soum



Source: Oyu Tolgoi.

Figure 11.8: Typical Shallow Hand Dug Herder Well



The rural areas of Khanbogd have no central water supply. Just over half of households (56%) obtain water from protected wells, whilst 43% obtain their water from unprotected wells, and a small proportion (0.9%) obtain their water from water transport distribution.

As at May 2011, Oyu Tolgoi was monitoring 333 water source locations³⁹ (boreholes, herder wells and springs), including the monitoring of wells in Khanbogd *soum* centre. Further details on the water monitoring data and results are presented in *Chapter B6: Water Resources*.

11.5.7 Waste Facilities

Khanbogd *soum* centre has an intermittent waste collection and waste is disposed to a partially-fenced open dumpsite located at 1.6 km distance from the *soum* centre (*Figure 11.9*). Due to the poor quality of the facilities, the site has become a source of windblown debris (indicated by the presence of plastic bags on vegetation down-wind). Unauthorised *ad hoc* dumping of wastes is also taking place outside the disposal centre. There is very limited informal recycling from the dump, except for the collection of

³⁹ Source: Oyu Tolgoi Environment Department, 2011.

materials (wood, plastic, glass, cardboard, etc) for use by local households which can earn a small income from these activities. Scrap metal can be sold in local markets. There is no registered formal hazardous waste disposal facility within Khanbogd *soum*.

Figure 11.9: Waste Disposal Dump Site in Khanbogd Soum Centre



Herders tend to generate a limited amount of waste and will typically either burn any combustibles, reuse materials or bury their waste. Herder activities are therefore not considered a significant source of waste.

Khanbogd centre has no centralised sanitary waste collection system, with the majority of residents relying on pit latrines and larger properties using septic tanks. Both of these approaches have the potential to contaminate the local shallow aquifers used by local communities for their water supply. Only 54% of households in Khanbogd *soum* have access to a toilet, and three quarters of these are outdoor pit latrine facilities. Just under half (46%) of households do not have a toilet.

Timber is donated by Oyu Tolgoi from the company's own waste management centre to residents of Khanbogd *soum* for fuel wood, construction activities or other purposes. While loading timber, Oyu Tolgoi safety officers supervise the local people collecting the material, providing a safety orientation and Personal Protective Equipment (PPE).

A high level of soil contamination (namely, tailings contaminated with mercury and cyanide) was observed in Khanbogd in 2008.⁴⁰ The cause of the contamination was the high incidence of illegal ninja mining activity in the past, which occurred uncontrollably in Khanbogd territory in the early to mid-2000s but was largely eliminated by mid-2007. Ninja miners used local water wells as a water source to operate their mobile mills which utilised mercury to extract gold. As a result, several water wells (in the range of 15-20) specifically in the Galbyn Gobi region were affected by mercury contamination. At later stages, the illegal miners started to use cyanide to refine gold from the tailings left from the extraction process.

These illicit activities were stemmed by the State regulatory agencies in 2007, resulting in a total of 35 illegal mills being destroyed and removed for metal recycling. In 2008 and 2009, all contaminated soils (tailings) were collected at Dorvoljin Teeg – a locality about 60km south-east from the Oyu Tolgoi site, where a single licensed gold refining facility is owned and operated by private businessmen. All contaminated soils at Dorvoljin Teeg are buried and secured by guards.

11.5.8 Housing⁴¹

Khanbogd has close to the *aimag* average of housing types with *gers* making up over three quarters (78%) of dwellings. Ownership levels are high – 90% own their own property, but levels are slightly lower

⁴⁰ According to the data from the Nature & Environment Office of Omnogovi *aimag*, a total area of 17.3 ha was chemically contaminated in Khanbogd *soum* in 2008.

⁴¹ Oyu Tolgoi Project. Social, Economic and Environmental Baseline Survey (Subset), 2009.

in Khanbogd than in the aimag as a whole. *Table 11.15* summarises the type of dwelling and ownership for those households surveyed as part of the socio-economic baseline study.

Table 11.15: Housing Types and Ownership, Khanbogd and aimag average

Soum	Type of dwelling, %		Type of ownership, %	
	Gers	Houses	Owned	Not owned
Khanbogd	78.0	22.0	89.9	10.1
Aimag average	78.1	21.9	93.9	6.1

Source: *Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009.*

44% of households have built their own homes. Nearly a quarter of households had bought their homes and nearly a fifth had inherited them. Some residents own both a house and a *ger* and alternate between the two, depending on the season.

Only just over half households had latrines (54%), with three quarters of these being outside the dwelling.

Rural herder households live in winter shelters usually made of wood or mud brick. Winter shelters normally consist of a built up area for livestock (corral) and storage area, plus a *ger* and small wood or concrete house. A corral is reported to cost between US\$800 and US\$1,000 to construct using locally-available materials.⁴² Herders usually have a hand dug well or borehole nearby to their winter shelter. Herder households usually also have one or more *gers* at their winter camp that they also use for summer camps if they migrate seasonally. *Figure 11.10* shows a herder winter shelter in Khanbogd *soum*.

Figure 11.10: Herder Winter Shelter



In the *soum* centre there is a mixture of housing – including brick and stone homes as well as *gers*. See *Figure 11.11*.

⁴² Ukhaa Khudag (UHG) Project, Draft Social and Environmental Impact Assessment, UHG Phase II, Energy Resources LLC, September 2009 (page 5-128).

Figure 11.11: Different Types of Housing in Khanbogd Soum Centre



11.5.9 Education Facilities

School Facilities

There is one “comprehensive secondary school” in Khanbogd *soum* which covers grades 1 to 12 and is located in the *soum* centre. It provides facilities for primary, secondary and high schooling (*Figure 11.12*). There is also a dormitory at the school which caters for rural students from herder families to board during term time, since it is not possible to travel to and back from the school on a daily basis.

Figure 11.12: Comprehensive School in Khanbogd



As at the end of 2010, there were a total of 733 students enrolled at the school in Khanbogd. The Director of the Khanbogd School stated in an interview in March 2011 that the capacity of the school was 350 children. The data below demonstrates that the school has been overcrowded since at least 2007, and that this will be exacerbated by the arrival of new families with school-age children (schooling starts at the age of six). Oyu Tolgoi will provide funding and supervision to extend and upgrade the school facilities in Khanbogd in 2011 (see also *Chapter D16: Influx Management Plan*).

Table 11.16: Number of children enrolled in Khanbogd School, 2007 to 2010

2007-2008			2009			2010		
Total	Male	Female	Total	Male	Female	Total	Male	Female
695	337	358	689	315	374	733	349	384

Source: 2007-2008 data are from the Oyu Tolgoi Project Social, Economic and Environmental Baseline Survey (Subset), 2009; and 2009 and 2010 data are from the Khanbogd soum Governor's Office, 2010.

The school principal and *soum* government report that there was a lack of three teachers as at end of the 2010 academic year: a Technological teacher for boys; a Geography teacher; and a Mongolian language teacher.⁴³ Further details on education levels and enrolments at the school in Khanbogd *soum* are provided in *Chapter B8: Population and Demographics*.

Kindergarten Facilities

There is one kindergarten in Khanbogd *soum*. In the 2007-2008 academic year, the number of children recorded as attending kindergarten was 111. In the 2009-2010 academic year, the number of children attending kindergarten was recorded at 180 children from 329 children between the ages of 2-5 years old registered in the *soum* (34%).⁴⁴

Other Education Facilities

There are no universities or vocational training centres in Khanbogd, therefore students study and board in Dalanzadgad, Erdenet or Ulaanbaatar for further education. Oyu Tolgoi is scheduled to open a company-managed vocational training centre in Khanbogd in 2012.

11.5.10 Other Social Services and Infrastructure

Most rural and herder households rely on radios, and some on televisions to obtain information from regional and national channels. In addition, information from *soum* authorities reaches citizens via *soum* and *bagh* meetings, as well as via field trips of the *soum* and *bagh* Governors. Information posters and comment boxes are provided in order to distribute information and receive comments and suggestions on various issues. National programmes are also aired on 1 radio and 3 television (TV) channels, and it is also possible to view TV programs broadcast by Inner Mongolian and other Chinese TV channels.

The use of home telephones (land lines) is reported to be very low or non-existent.⁴⁵ However, the use of mobile phones in the *soum* is considerably higher, with 78.9% of households in Khanbogd stating that they use a mobile phone. Khanbogd is estimated to have 66 telephone users and 505 mobile phone users per 1,000 people. Both MobiCom and Mongolia Telecommunications Company mobile phone companies operate here. A limited internet service is available in Khanbogd *soum* centre in one internet café. Postal services in Khanbogd are provided by local branches of the Mongolian Telecommunications Company and the Mongol Post Company (see *Figure 11.13*).

⁴³ Khanbogd *soum* Governor's Office, obtained by Oyu Tolgoi in 2010.

⁴⁴ *Ibid*, Khanbogd *soum* Governor's Office.

⁴⁵ Oyu Tolgoi Project. Social, Economic and Environmental Baseline Survey (Subset), 2009.

Figure 11.13: Khanbogd Soum Post Office



According to Mongolian law, each *soum* is provided with at least one school, police unit, hospital, administrative building and cultural centre.⁴⁶ This infrastructure is located in a centralised area (*soum* centre) which provides the additional necessary infrastructure and services of a small town (i.e., post office, bank, and small stores)⁴⁷. *Figure 11.14* below shows the cultural centre.

Figure 11.14: Khanbogd Culture Centre



Other key facilities and services in Khanbogd include the following:

- a designated police unit with seven police officers⁴⁸;
- a museum with 800 artefacts in the collection (as of 2007). The museum has been actively expanding its collection in recent years;
- a new tourist attraction which has opened in the past few years is the Wealth Cave;⁴⁹

⁴⁶ *Ibid*, Subset Report, 2009.

⁴⁷ Ukhaa Khudag (UHG) Project, Draft Social and Environmental Impact Assessment, UHG Phase II, Energy Resources LLC, September 2009.

⁴⁸ Khanbogd *Soum* Police Dept. 2011

- two branches of Khaan bank and one branch of Mongol Shuudan bank, as well as representatives of the Xac Bank and Zoos Bank;
- a cultural centre. In 2010, 65 events took place in the Centre, an increase from the 56 that were held in 2009. In 2010 there were 27 concerts/dances, 24 cinema events and 12 conferences;⁵⁰
- the Governor's office; and
- a number of temples.

These facilities are all located in the *soum* centre, but there are also four "*bagh* centres" in Khanbogd, which have one or two community buildings that the rural residents and herders use for their quarterly meetings and other important gatherings. In addition, the Truck Stop at Tsaagan Khad near Gashuun Sukhait and the border with China has five shops and a number of people living there on a permanent/semi-permanent basis. Details on health facilities are covered in *Chapter B13: Community Health, Safety & Security*.

⁴⁹ The cave is located 15 km from the Demchig Monastery. Reportedly, locals believe in the cave's ability to "grow" one's money if cash is rubbed against its walls.

⁵⁰ Khanbogd *soum* Governor's Office, Obtained by Oyu Tolgoi in 2010.