

Environmental Impact

The Environment and Social Department (ESD) at the EBRD has been involved in a comprehensive environmental and social appraisal of the project since early 2010. Over this time period, the Bank has made numerous visits to the site to review and observe critical aspects of the project and to meet with potentially affected people and government officials near the mine site, and at Khanbogd and Dalandzadgad.

The main tasks completed by ESD during the appraisal included:

- Seven separate site inspections to make first hand observations of site conditions and company practices, as well as detailed interviews and discussions with site personnel
- Interviews with administration officials in Khanbogd, Dalandzadgad and herders located in the vicinity of the site;
- Review of numerous reports and documents on background environmental and social conditions for the site and the region;
- Detailed review of the draft Environmental and Social Impact Assessment (ESIA) prepared for the financing. This review process included chapters and identification of areas where additional information, clarification, justification, etc was required. ESD worked closely with OT personnel to make sure that, where identified, such additional information/clarification was provided and included in the document prior to disclosure.

It should be noted that in addition to the involvement of EBRD personnel, other potential lenders (including IFC and EDC) were also involved in appraising the project, and that an international consulting company was retained to assist the lender group and to perform their independent environmental and social appraisal.

The onsite operations do not include any refining or smelting operations, purely a gravitational separation process producing concentrate. Initially, the project will operate an open pit copper-gold mining operation, with an ore processing plant and infrastructure to support processing of up to 100,000 tpd of ore. In addition, the project is developing underground mining operations which will be operational in the coming years. OT is considering a future expansion to the plant to process up to 160,000 tpd of ore within the 27-year life of the project. This expansion is subject to any necessary regulatory approvals and the identification and permitting of additional water resource required to provide the increased processing capacity. It is still at an early stage of planning and is considered as part of the assessment of cumulative impacts in the project ESIA. Any such expansion would be subject to the environmental and social review and approval process outlined in the ESIA for Management of Change. Specifically, the EBRD and the other lenders would need to approve the environmental documents prepared prior to OT beginning construction work for any proposed expansion. This will include a comprehensive assessment of possible water recycling/re-use/minimization options.

Onsite processing will include the typical steps of crushing, grinding, floatation, concentrate dewatering and tailings disposal. For this operation, the following facilities have been identified as part of the project:

- All facilities within the mine license area;
- Export road to China and associated quarries;
- Overhead power line connection to the Chinese border, to the well field and to Khanbogd;
- Guni Hooloi groundwater well field and associated supply pipeline and reservoirs;
- Temporary and permanent airports and access roads; and
- Any worker accommodation outside the Mine License Area.

And the following areas have been identified as Area of Influence:

- Khanbogd soum; and
- Access road from mine site to Khanbogd soum centre.

In accordance with Mongolian legislative requirements, several Detailed Environmental Impact Assessments (DEIAs) have been prepared and submitted to the regulatory authorities for project approval and permitting. These documents have been part of the project disclosure and consultation process dating back to 2004 and have been the source for much of the information contained in the comprehensive and integrated ESIA. One of the main differences between these two documents and the relevant approaches is that the DEIA is an iterative approach splitting the project into many different elements each requiring a DEIA. Therefore, this process is extended over many years as the project transitions from early exploration, through design stages and on to detailed design/construction. On the other hand, the decision to seek financing on this project could not be taken until after the final investment decision and detailed design (in this case the Investment Agreement signed in October 2009) and the EBRD required a comprehensive ESIA covering all known project elements. Therefore, the separate ESIA was required.

The mine is located within the South Gobi Region, in the Gobi Desert. This area is subject to extreme weather conditions with some of the world's largest fluctuations in daily and annual temperatures. Despite the harsh weather conditions, there is an abundance of local biodiversity, with several priority species including:

- Argali;
- Asiatic Wild Ass;
- Goitered Gazelle;
- Saker Falcon;
- Houbara Bustard;
- Mongolian Ground-Jay;
- Tall Saxaul Forest; and
- Mongolian Chesney.

The District of Khanbogd has a total population of 3,522 (as of 2010), of which about 2,000 are herders and, while less than a quarter of the local population live below the regionally defined poverty level, the predominant livelihood is pastoral nomad which is considered to be very vulnerable to changes in the environment. Mongolia's herders are part of the dominant ethnic group and dominant culture and as such are not considered as an Indigenous People according to the EBRD Environmental and Social Policy (ESP).

As part of the ESIA, the potential risks posed to environment and social receptors were assessed in terms of likelihood and consequence to derive the overall risk assessment. The full assessment of impacts can be found in the ESIA document. From this process, the main risks posed by this project can be grouped into the following three categories:

- (i) risks to water resources;
- (ii) risks to biological resources; and
- (iii) risks to impact the baseline social conditions of the area.

Water resources

As with any desert environment, fresh water within the Gobi Desert is a limited resource. The area surrounding the project has relatively low topographic relief with several ephemeral channels that discharge surface water immediately following significant rainfall events. While not evident to the naked eye, these ephemeral drainages have carved out channels into surrounding and underlying materials, and deposited permeable gravels and sands with some to trace amounts of silt and clay. These sediments in the ephemeral channels often contain fresh groundwater, at depths of one to five meters below the ground surface. Local herders, wildlife and vegetation all rely upon this source of groundwater and changes to the availability or quality of such would have profound consequences.

The site requires large volumes of water for operations. Fortunately there are deep (up to 400 meters) alluvial/colluvial filled basins in the site vicinity that hold water of mixed quality but typically brackish/saline, including the Gunni Hooloi basin which the site will utilize for water supply. Stratigraphy of these basins is generally a fining upwards sequence resulting in up to 100 meters of primarily silt and clay near the surface. These fine sediments in the upper horizons minimize recharge from rainfall to the deep basins and provide the confining layer for the pressurized Gunii Hooloi. Most importantly, these fine grained sediments separate the upper shallow groundwater from interacting with the groundwater in the deep Gunni Hooloi basin. Due to this separation, it is considered highly unlikely that the proposed pumping from the deep Gunni Hooloi basin will have an impact on the shallow groundwater. Nonetheless, there is a comprehensive program of monitoring (involving many of the local herders) to verify this separation/isolation. In the unlikely event that pumping from the Gunii Hooloi has any impact on a water supply used by a herder, OT made a commitment to provide an alternative supply of equal quality and quantity. In fact, to date OT has already provided several replacement wells to herders when they had problems with existing wells. The most common problem experienced is "silting in"

due to ingress of fine grained sediments caused by poor construction techniques and materials.

Another sensitive area in terms of potential impacts to surface and groundwater is in and around the open pit and the proposed location of the waste rock pile where the Undai ephemeral river and the Bor Ovoo spring are located. The current alignment of the Undai is through the planned waste rock pile and the open pit of the mine. This requires re-alignment of the Undai to preserve the flow and re-creation of a surface water spring to replicate conditions/water currently available at the Bor Ovoo. OT retained an international company to develop a detailed engineering design of this diversion, covering the cut off and interception of surface water and groundwater, re-directing this flow to an adjacent channel. The design has been prepared to ensure constant surface water will be available in the replacement spring. Detailed plans for monitoring shallow groundwater in the vicinity and immediately upgradient of this diversion have been developed aimed at identifying any impacts that dewatering of the nearby pit may have on the availability of shallow groundwater in the subsurface sediments of the Undai. While this influence on the subsurface Undai water is considered by site personnel to be unlikely, detailed monitoring will be conducted to confirm this. In case any influence is identified, the subsurface catchment will be moved further upgradient to a location beyond such influence from the pit dewatering. It should be stressed that as of July 2012 no significant amounts of groundwater have been encountered in the pit.

Investigations to date have proven groundwater resources to allow the development of the 100,000 tpd project. Over the first several years of the project, detailed studies will be conducted to assess possible expansion of the project up to 160,000 tpd. If these studies support such expansion, additional studies will be required to prove that the additional water resources are available. It is agreed with OT that EBRD will need to approve of such studies before any expansion proceeds.

Biodiversity

The project lies in the eastern sub-region of the Central Asian Gobi Desert ecoregion which covers an area of over half a million square km in southern Mongolia. The low human population density and the high degree of isolation of the region have resulted in the survival of many threatened species that no longer exist in neighbouring countries. There are several key species in the site area, and the ESIA provides a detailed review of these. Section B7 of the ESIA identifies the "priority biodiversity features" of the area which includes (but are not limited to) the Asiatic Wild Ass, Giotered Gazelle, Saker Falcon, Houbara Bustard, 18 very rare plants such as the Mongolian Chesney and several habitats considered as critical such as ephemeral lakes and pools and tall saxaul forests. Perhaps the key species of conservation interest is the Asiatic Wild Ass or Khulan, which is considered as endangered by the IUCN. Southern Mongolia currently holds the largest population of Asiatic Wild Ass in the world, representing almost 80% of the global population. The global population of mature Asiatic Wild Ass has declined by about 50% in the past 16 years, and the range of this species is being impacted by development of the southern Gobi region, including the rapid development and increased use of roads.

The project has retained international experts to advise on this issue, and has applied international methods to develop a program of biodiversity offsets aimed at achieving net positive impact to the priority biodiversity features over the life of the project. If EBRD invests in this project, it will actively monitor performance of this commitment over the life of the loan, working closely with international conservation experts.

While the final approach for addressing biodiversity on this project is considered acceptable and “precautionary” it should be noted that the ESIA process/approach applied has not been fully compliant with the EBRD ESP, and therefore derogations to it have been identified relative to Performance Requirements 1 and 6. As detailed in the project ESIA, a high voltage power line is being constructed connecting the site with the Chinese power grid at the international border to the south of the site. The decision on routing of this power line was taken prior to 2009 as part of the local DEIA and permitting process. This power line is roughly a straight line to the border and crosses habitat considered disturbed, natural and also critical, and as shown in the ESIA, crosses an area identified as an Important Bird Area (IBA). One of the reasons for this IBA is that this area is used by Houbara Bustards during the spring and summer period for nesting, display, breeding and raising young. While the alignment of the power line was agreed with the government years ago, the process applied did not satisfy the requirements of PR1 in terms of the need to complete the appraisal based on an appropriate level of baseline data or the need to apply the mitigation hierarchy to avoid, or where avoidance is not possible, to minimize, mitigate or offset adverse impacts. In this case, there is very little baseline data available on the Houbara Bustard along the alignment of the power lines. Further, a robust review of alternatives looking at different alignments aimed at avoidance was not completed for the power lines. In terms of PR 6, there are shortcomings in terms of application of the mitigation hierarchy (as methods to avoid impacts were not completed) and due to the fact that the extent of due diligence was not sufficient to fully characterize the risks and impacts associated with placement of the power lines, consistent with a precautionary approach (again, due to the lack of baseline data and subsequent analysis). The work completed to date does not establish baseline conditions in terms of the Houbara Bustard, nor does it fully assess impacts or methods to avoid, minimize or otherwise mitigate such impacts. Nonetheless, mitigation measures have been developed and will be implemented including the installation of bird flight diverters to minimize collisions, as well as restrictions to construction activities inside the IBA during the most sensitive season (mid-April through end of June). Further, work is ongoing during 2012 spring and summer to survey the presence of species in this area, recognizing that Houbara Bustards may already avoid the area due to the presence of the power lines.

Given the shortcomings identified above, OT has retained international conservation experts to develop a biodiversity strategy including the implementation of onsite and offsite mitigation measures and the development and implementation of biodiversity offset measures aimed at achieving net positive impact. The main elements of this work are captured in the Biodiversity Action Plan (BAP) which is part of the information disclosed for public consultation. OT will continue to work with Mongolian and international conservation experts on the development and

implementation of the various elements required to achieve and demonstrate net positive impact.

Social issues

The project will bring about significant socio-economic and cultural change in Khanbogd soum, as well as regionally and nationally. Locally, key adverse impacts will mainly be associated with land acquisition and fragmentation, population in-migration, as well as the environmental impacts described in this summary. These impacts have been and will be avoided or minimized where possible and residual impacts carefully managed by a well-staffed and experienced Community and Social Performance team. Positive impacts will also be experienced in Khanbogd and beyond the immediate project area, notably in terms of employment, education/skills levels and economic growth. Nationally, forecasts suggest that construction alone will increase national GDP by approximately 15%. OT supports the government of Mongolia in its transparency activities such as EITI (in 2010 Mongolia was designated as "EITI compliant") and will seek to coordinate with NGOs and international financial institutions to develop governance capacity within the government. In addition, OT will disclose tax and other payments made to the State.

The project's initial land take for the mine site in 2004-05 and subsequent land use for other project facilities have been at the source of the most immediate physical and economic displacement impacts on local herders. To date, physical displacement has been limited to 10 households and the resettlement was undertaken in 2004-05. Direct impacts on livelihoods (e.g. fragmentation of pastures, increased dust or restricted access to water) have been identified based on extensive consultation during 2010-2011 for a number of families living in the vicinity of other project components, notably the road and power corridors to China, the airport sites and the Gunii Hooloi pipeline. Several categories of compensation packages were defined for comparable impacts based on negotiations with these 84 households and are made public in the Resettlement Action Plan. Furthermore, the overall reduction or degradation of communally-owned pastureland is mitigated through a pastureland management program working with all seasonal herders in Khanbogd soum (about 400 households) with priority given to those 84 households identified as potentially directly impacted in terms of their livelihoods.

Population influx will undoubtedly be another key factor in creating adverse impacts on the host community and in both 2010 and 2011 population increase in the soum reached 7.3% (not including the construction workforce), which is considerable for a small municipal government with a low absorption capacity. It is, however, also seen as a positive development locally and represents varying opportunities for local herders, existing small entrepreneurs and others to benefit from employment opportunities, new markets and increased demand in goods and services that they can provide. Adverse impacts that need to be minimized and carefully mitigated include additional pressure on and potential degradation of environmental resources, notably pastures and water, insufficient municipal capacity (health, education, power and water distribution, etc.) and related impacts on community health and safety, as well as negative effects on both tangible and intangible cultural heritage.

OT is committed to manage influx by minimizing speculative in-migration through sound recruitment practices, providing capacity building for local government and communities to help manage the population increase and facilitate investments in local and regional planning, infrastructure and service development in impacted communities to provide improved living standards. OT has developed a multi-year Community Plan aimed at maximizing local socio-economic benefits and providing support in the following areas: community health, education, local business and economic development, pastureland management, and urban planning.

OT has also developed a comprehensive Cultural Heritage Program (CHP) in collaboration with the Mongolian Academy of Sciences Institute for Archaeology and the University of Arizona. This program covers both tangible and intangible cultural heritage and is based on a detailed inventory undertaken over several years of Umnogovi aimag and Khanbodg soum, Phase II of the CHP articulates an integrated approach to protecting and conserving cultural heritage over the short, medium and long terms.

The construction phase saw a very large number of Mongolian and foreign (mainly Chinese) construction workers reside in construction camps at the mine site, peaking at about 14,800 workers in December 2011. Throughout construction, the project maintained a ratio of more than 65% of employment of national Mongolians as per the Investment Agreement. Under its labour strategy, OT gives preference to local workers from the neighbouring soums and the wider Omnogovi province. Many local jobs have been created during the construction phase, notably with subcontractors and OT will continue to implement their Local Economic Business Development (LBED) program during operations. At that time, the workforce will number between 3,000 and 4,000 people of which no less than 75% of direct mining workers will be Mongolian nationals. For the remainder of the OT workforce, no less than 90% of workers should be Mongolian. The number of expatriate workers will gradually reduce over time.

The housing strategy for the workforce that will be present for the mine's operations is yet to be finalised. OT will undertake a full ESIA for the Worker Housing Development that will be reviewed by EBRD and the lenders' IESC, and will be disclosed for consultation 60 days prior to start of construction. In the meantime, any operations workforce will be accommodated in camps within the Mine License Area.

Summary of Process and Risk Management Procedures

As mentioned above, these three main issues and all other potential impacts are assessed in detail in the ESIA. The assessment of impacts follows the standard review of probability versus consequence to assess the potential risks in each area. Following this risk assessment approach, possible mitigation measures were reviewed for each potential impact. The mitigation measures to be adopted for the project are summarized in a set of Environmental and Social Management Plans (ESMPs) for construction. These plans contain commitments to actions that will be implemented by OT and are part of the ESIA disclosure package. As part of the loan agreement, OT will be required to implement the project as described in the ESIA, and will be required to implement the mitigation measures set forth in the ESIA, Environmental

and Social Action Plan, the BAP and the various ESMPs. If EBRD finances the project, ESD staff will be involved in periodical monitoring to ensure various commitments are satisfied, and will work closely with the IESC that will be appointed to perform periodical monitoring/audits of the site relative to the commitments in the ESIA and supporting documents.

Management plans covering activities through operation of the project will be prepared prior to operations phase beginning and will be reviewed by EBRD prior to disclosure in the public domain. These Operational Management Plans will also cover any construction related activities that will take place post start-up of operations.

As presented in the original Project Summary Document (PSD) released on this site in September 2012, an IESC was appointed to assist the Lender Group on the project starting in August 2010. One of the tasks of the IESC was to observe onsite activities during the appraisal process. Our original PSD stated that a summary of the IESC visits would be released during the disclosure period for this project. This summary is presented below.

The IESC was mandated to assess the consolidated international standard Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plans (ESMPs) being prepared to support the financing of the Project.

The IESC has conducted four site visits to review practices at the facility. These were conducted in June 2011, December 2011, June 2012 and September 2012. The objectives of the visits were to observe onsite operations relative to risks, international practices and compliance relative to the commitments of the ESIA.

As anticipated on all similar projects, some items were identified on each visit that require additional attention including environmental management; biodiversity; social impacts; and health and safety. In each case these concerns were documented and reported back to the Project. Each subsequent visit then examined progress towards addressing prior findings as well as conducting additional risk review and providing recommendations. Over a two year period of regular visits, the IESC was able to verify continuous improvement in Project ESHS performance.

In the most recent (September 2012) visit the IESC established that, based on progress against ESMP commitments, the Project's ESHS Management System was fit for purpose and that the Project demonstrates conformance with Lender Requirements and ESIA/ESMP commitments across a broad range of areas. Nonetheless, the IESC also identified some areas where the Project was not following ESIA/ESMP commitments, the intent of the Lender Requirements, GIIP or previous recommendations. The IESC identified issues related to critical aspects of the Project's ESHS performance, including water and biodiversity. These issues have been communicated to the Project. EBRD (and other Lenders) and the IESC has been working with Oyu Tolgoi to address these areas. Progress will be assessed at the subsequent IESC Audit currently planned for spring 2013. The results of the September 2012 audit will be incorporated with future audit results and will be disclosed as part of the future disclosure of ongoing audit results.

The full ESIA documentation for the project can be viewed electronically through the following links:

- Oyu Tolgoi Website
[English](#) | [Mongolian](#)

Documents can also be viewed at the Oyu Tolgoi Offices and Information Centers listed below

- Oyu Tolgoi Information Center – Ulaanbaatar
- Odcon building, 1st Floor (west side of NUM building No.4, School of Economic Studies)
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