



**SUSTAINABILITY**  
FUTURE GROWTH



ENERGY RESOURCES LLC

## **Energy Resources LLC**

**Ukhaa Khudag Project  
Environmental and Social Impact Assessment**

**Executive Summary**





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## **1. EXECUTIVE SUMMARY**

### **1.1 INTRODUCTION**

Energy Resources LLC (ER) has been awarded the Mining License for the Ukhaa Khudag (UHG) coal deposit, a medium sized high quality coal deposit, which is located in Tsogttsetsii soum, Umnugobi aimag, Mongolia. UHG is located in the large coal producing basin: currently existing adjacent mines in that region are extracting around 2 million tonnes per annum (Mtpa) of coal for sale locally and in China. At present, around 400-500 heavy trucks transport coal from that area to the Gashuun Sukhait border point into China by an existing earthen road.

ER will commence early production at the UHG coal mine in early 2009 with the mining of about 0.6 Mtpa of "Run-of-Mine" (ROM) coking coal. This coal will be shipped by road to customers in China using 85 tonne trucks. The first year of operation will see approximately 80 to 90 truck movements per day along the road between Gashuun Sukhait and the UHG project site. After about 12-18 months, the second development phase will start, with the first module of the processing plant launched: this will allow the coal to be treated and processed prior to transportation. Around 2.5Mtpa of ROM coal will then be processed to produce approximately 1.75 Mtpa of clean coking coal. For the development of UHG, ER will employ an international, reputable Mining Contractor of the highest standard to both mine and process the coal to produce coking coal.

The scope of the "Project", subject to Environment and Social Impact Assessment (ESIA), refers to:

- The mine project with an initial production rate of 0.6 Mtpa expanding to 1.75 Mtpa after 12-18 months (refer above). The scope of the ESIA excludes the coal processing plant and infrastructure required for this coal processing plant. The impacts associated with these aspects of the mining at UHG will be examined at a later date once sufficient design detail is available; and
- the upgrade of the existing earthen road to compacted gravel, including the excavation of the borrow pits. Further development of the road is planned by the Government of Mongolia with a sealed road along the current route.

### **1.2 PROJECT DESCRIPTION**

The proposed UHG coal mine is located in Tsagaan-Ovoo bagh (sub-district) of Tsogttsetsii soum in Umnugobi aimag and the total area of the mine licence is 2,962 ha.

The total resource estimated by Norwest Corporation in late July of 2008 was 364 million tonnes of coal.

The initial mining area consists of approximately 140 ha, or roughly 13%, of the 1,050 UHG mining tenement.

ER's road upgrade project aims to improve the quality of the existing earthen road between UHG project site and Gashuun Sukhait at the Mongolian-Chinese border some 245 km of road length.

Considering the current and proposed use of the road route to Gashuun Sukhait, and the benefits of the road upgrade, the addition of a further 80 to 90 trucks per day from the UHG coal mine project is not significant in terms of environmental and social impacts. Substantial environmental and social benefits are expected from the development of a suitably engineered and constructed road, particularly in regards to pasture impacts, public safety and dust emissions.

The planned rehabilitation and up-grading of existing road will benefit all local communities by the much needed improvement to this integral infrastructure. Improved transport infrastructure will assist local communities in accessing trade routes to Gashuun Sukhait and reduce the impacts associated with the multiple tracks currently being used.

### **1.3 OPERATIONAL FRAMEWORK**

The preparation of a Detailed Environmental Impact Assessment (DEIA) for the Project is a requirement under the Mongolian Law on Environmental Impact Assessment (1998) and the Minerals Law (2006). ER commenced this process in 2008 with two Mongolian consultants, Eco Trade LLC (Eco Trade) and Enco Co Ltd, being commissioned to complete the DEIA report for the mine and road upgrade respectively. The Ministry of Nature & Environment (MNE) has approved a DEIA prepared by Eco Trade in 2007. The DEIA for the road upgrade has been lodged with the MNE and is currently awaiting approval.

Mongolian National Standards relevant to the Project include rehabilitation, soil conservation, air quality and water quality standards. ER is committed to ensuring that these standards, and laws applicable to labour, cultural heritage and pollution prevention, are complied with during the design, construction and operational phases of the Project.

Additionally, the Government of Mongolia have signed and ratified a number of environmental treaties and conventions that the Project will comply with.

As well as Mongolian Law, international finance companies involved in providing finance to projects have their own set of guidelines on which they assess the environmental impact of a proposed project. This includes organisations such as the European Bank of Reconstruction and Development (EBRD) who have developed Environmental Procedures which have two basic objectives:

- To ensure that the environmental implications of potential EBRD-financed investment and technical co-operation projects are identified and assessed early in EBRD's planning and decision-making process and that environmental considerations are incorporated into the preparation, approval and implementation of projects at an appropriate level.
- To identify ways in which EBRD's projects can be enhanced by incorporating environmental benefits or improvements.

The Procedures have been applied in the development of ER's Project Environmental and Social Impact Assessments (ESIA).

## 1.4 ANALYSIS OF ALTERNATIVES

At this stage, an analysis of alternatives with respect to the mine is primarily whether or not mining should commence or not. There will be more scope for analysis of alternatives to be undertaken following initial start-up of the mine, when beneficiation options can be considered (such as coal washing) and future mining plans are developed.

Following a comparison of transport alternatives, it was determined that upgrading the existing earthen road to Gashuun Sukhait provides the best outcome for minimising negative impacts and enhancing the positive social and environmental aspects of the Project.

## 1.5 EXISTING ENVIRONMENT

### 1.5.1 Physical

The UHG mine area is one of gently rolling desert plains with minor relief where elevations range from 1,500 m to 1,600 m above sea level.

The region has a continental climate with extreme fluctuations of air temperature and very low precipitation, less than 120 mm per year. Average wind speeds reach 5 m/s and maximum wind speeds can be up to 34 m/s causing seasonal dust and sand storms. The average temperature in the warmest month of June is about 23°C, with the maximum temperature reached being 39°C.

The dry climate, seasonal strong winds (particularly in spring) and light desert soils provide conditions that generate dust storms in the South Gobi area. In addition to the natural levels of dust, the use of the existing road in the current state of disrepair (being damaged and eroded) causes elevated localised dust concentrations adjacent to the road.

The UHG coal deposit and adjacent basin areas are within the closed Central Asian drainage basin and have no outflow to the ocean. There are no surface water springs or creeks in the proposed UHG coal mine area. The nearest surface water depression is Ulaan Lake which is located approximately 10 km southwest. Also, there is no permanent surface water within the region of the road. However, there are many dry water beds that cross the road that contain water during rainstorms and possible seasonal flooding events.

The region containing the mine and road is dominated by poorly developed and eroded semi-desert brown soils, desert brown grey soil and Galbyn Gobi soils. The ground surface is subject to freezing in winter but there is no permafrost.

Seventy (70) percent of the sparse desert vegetation around the UHG mine is drought resistant plants that are commonly found across the desert and semi-desert steppe.

Mongolian endemic plants including *Caryopteris mongolica* and *Astragalus pavlovii* and the endangered plant *Asterothamnus centrali-asiaticus* were recorded in the general area. *Caryopteris mongolica* is also included in the Red Book of Mongolia.

The road route crosses a variety of landscapes and therefore various vegetation communities. There are five plant species listed as Rare in the Mongolian Red Book, including: *Cynomorium soongoricum*; *Amygdalus mongolica*; *Glycyrrhiza uralensis*; *Ephedra equisetina*; and *Sophara alopecuroides*.

Forty-two species of vertebrate animals belonging to 3 classes of mammals, birds and reptiles inhabit the area containing and surrounding the UHG project area. Three species of mammals, *Cardiocranius paradoxus* (Five-toed Pygmy Jerboa), *Salpingotus crassicauda* (Thick-tailed Pygmy Jerboa) and *Euchoreutes naso* (Long-eared Jerboa) were found surrounding the UHG area and are listed in the Mongolian Red Book. One species of bird, the *Aegypius monachus* (Eurasian Black Vulture) is registered in Appendix II of CITES.

Five mammal (Wild Ass; Gortred Gazelle; Stunin Jerboa; Thick-tailed Pygmy Jerboa; and Long-eared Jeboa), 2 bird (*Chlamydotis undulata* and *Prodoces Hendersoni*) and 2 reptile species (Tartary Sand Boa and *Coluber spinalis*) are included in the Mongolian Red Book and protected by law. In addition, 2 mammal (Wolf and Wild Ass) and 2 bird species (*Aegypius monachus* and *Neophron percnopterus*) are included in Appendix II of CITES (the Convention on International Trade in Endangered Species).

The existing road passes through the western edge of the "B" section of the Small Gobi Strictly Protected Area (SGSPA). The SGSPA is divided into three zones: pristine, conservation and limited use and the road route crosses through the limited use zone. Road construction and therefore the upgrade of a road, is an activity **not** prohibited in the limited use zone.

### 1.5.2 Social

Although Umnugobi is the largest aimag in Mongolia, covering 165,377 km<sup>2</sup>, it is the least densely populated with approximately 50,000 residents. 2005 Government figures give the population density as 0.29/km<sup>2</sup>. The capital city Dalanzadgad (approximately 80 km west of the proposed UHG mine) serves as the province's logistics, administrative and population centre and has the province's only high school and civilian airport.

The UHG mine is situated in Tsogttsetsii soum, which is located in the eastern region of Umnugobi. The coal export road runs through the Bayan-Ovoo and Khanbogd soums, which are perhaps the most affected by the existing poor road condition, and who in turn stand to benefit the most from the proposed road upgrade.

Tsogttsetsii soum is indicative of the region, with the majority of the population (2,200 people) relying upon animal husbandry and government employment/entitlements for their livelihood. Average herder families are considered economically poor by Mongolian and International standards. Traditional nomadic herding practices involve an informal system of seasonal grazing of sheep, goats, camels, horses and cattle. Herders rely largely on cashmere, dairy and other animal products for subsistence. The total land area of the soum is 7,246 km<sup>2</sup>, giving a population density of 0.30/km<sup>2</sup>.

Facilities currently available in Tsogttsetsii soum centre include a 20 bed hospital, a primary and middle school for 400 pupils, a dormitory for the children of herders, mobile phone access and banking facilities as well as community heating system. The Tsogttsetsii soum centre is 2-3 km from the site of the UHG mine camp.

Bayan-Ovoo soum, through which the road runs, has a population of just 1,539 people spread across 10,474 km<sup>2</sup>, giving a population density of just 0.15/km<sup>2</sup>. Bayan-Ovoo relies heavily upon animal herding, although the soum centre has a high level of educational and healthcare infrastructure, reflecting efforts made by the soum governor.

Khanbogd soum has a population of 2,659 people, spread across 15,151 km<sup>2</sup>, giving a population density of 0.18/km<sup>2</sup>. Khanbogd soum has experienced substantial socio-economic development as a result of mining and exploration activity within its region in recent years. Issues of employment and impacts on traditional herding practices have been raised by respondents from Khanbogd during public surveys. Yet as the soum most affected by the road, Khanbogd stands to benefit from the road upgrade.

The most important stakeholders with respect to the Project are:

- the local herders (eg the ten herders who graze their livestock in the mine affected area). These herders practice traditional nomadic herding lifestyles that are prevalent throughout Umnogobi aimag;
- the administrators with respect to the local levels of government in the region (eg bagh, soum and aimag governors); and
- the Protected Area Authority with respect to the road passing through the SGSPA.

## **1.6 IMPACTS AND MANAGEMENT MEASURES**

### **1.6.1 Environmental Impacts**

Implementing the Project will result in substantial and permanent changes in landform from mining and road construction. These changes to the landscape are largely irreversible and will be mitigated through the implementation of measures to make the post-mining landscape a safe, stable and non-polluting landform that, as much as practicable, reflects the contours and surface characteristics of the surrounding landscape. This will be achieved through implementation of a Mine Closure and Rehabilitation Plan and rehabilitation of the borrow pits once the road upgrade project is complete.

The potential for dust emissions from open pit and borrow pits, wind erosion of waste rock structures and coal transportation are the most significant potential impacts on air quality. The implementation of dust controls at UHG will incorporate:

- use of engineering design criteria that includes objectives to prevent emissions at the potential source;
- integration of effective and practical dust control contingencies and strategies in operational procedures for all aspects of the mine site and road operations;
- a comprehensive dust monitoring program that will quantify the effectiveness of control strategies and clearly identify the emissions associated with the Project from other regional sources; and
- protection and enhancement of natural vegetation surrounding the Project as a dust abatement strategy, in partnership with existing land users.

During operation, the transportation of coal will cause dust from the road. However, dust generation will be at a lower level than current emissions due to the compaction and binding of the gravel road. Notwithstanding, the road will be watered regularly to minimise dust emissions during construction and operation.

Groundwater levels at the mine site will be lowered during and following operations of dewatering of the open pit in the first stage of the Fast Track Mine. The coal deposit area has a shallow aquifer and so dewatering of the pit will be required early in the mining operations and water from the pit will be used to recharge downstream aquifers and for dust suppression. Dewatering is a requirement to safely and effectively mine the ore body.

Potential impacts to surface water include the interruption to surface water flow during flood events both at the mine site and at the road.

The environmental management objective for water resources is to minimize impacts as much as possible through design and operation; and also to confine these impacts to the Project area. Downstream water resources can be protected and maintained through effective diversion of flow and prevention of off-site contamination from activities on the mine site.

Dry river bed crossings along the road will include engineered floodways and culverts that maintain surface flows during the infrequent flood events.

Wells required as a water source for dust suppression will be developed along the road route where shallow water sources are identified. These wells will be regularly monitored to ensure no impact to local herder wells – no local herder wells will be accessed for road construction or maintenance purposes.

The road upgrade will result in the rehabilitation of the multiple branches of the current earthen road. Management measures to be implemented to mitigate negative impacts to the soil from the activities associated with the Project include minimising soil disturbance, top soil conservation and managing vehicle access.

The removal of vegetation will only occur where necessary for the development of the mine, associated infrastructure and road construction, including borrow pits. Vegetation will be maintained on areas within the Project Area not used for mining and associated activities. The Vegetation Management Plan will include measures to minimize vegetation clearing at UHG and on the road. The rehabilitation of vegetation will occur progressively throughout the life of the Project in accordance with the Rehabilitation Plan prepared during mine development.

The Preliminary Mine Closure and Rehabilitation Plan will provide initial details of plans for temporary mine shut down, progressive closure of waste facilities and the final restoration of the site once the Project is complete.

Mitigation measures with respect to the impacts on fauna include:

- integration of exploitation, protection and reclamation activities into Mine Development & Closure Plans;
- progressive reclamation of disturbed area; and
- fencing around holes, trenches and borefields, in order to protect livestock and wild animals.

Impacts on the SGSPA will be managed in co-operation with the Protected Area Authority. The increased use of the border crossing point into China requires the management of temporary settlements and any unauthorised vehicle access to the protected area. Management plans will include the funding and participation in regional studies including those to improve the understanding and management of Asiatic Wild Ass and Black Tailed Gazelle.

### 1.6.2 Social Impacts

Social Impacts from the UHG coal mine and associated mine camp will be generally positive. Although initial screening identified the mine as a Category A project under the EBRD project criteria, due to its size and present situation (degraded environment and social problems caused by a nearby operator), the social impacts of the Project are limited. Manageable and negative effects are offset by significant positive outcomes such as employment and economic development. There is strong local demand for the UHG project to commence, especially due to the expectation of local employment creation.

Once the mine commences production, employment of local people is expected to increase significantly, with the potential for a large proportion of the mine's potentially 1,000 workers (including drivers and subcontractors) being sourced from within the Umnogobi aimag.

The changes that the mine will bring to the region also threaten to create negative social impacts, such as risks to human and animal health from the mining activities – as well as social changes from having a greatly expanded non-resident population in the area. The impact of potentially 1,200 temporary residents (assuming high rates of families and dependents) on a remote population centre of 2,200 people should not be under-estimated. However, potential negative impacts can be managed, and ER is already taking steps to ensure proper management and mitigation procedures are in place. Equally, the potential improvements in the livelihoods of Tsogtsetsii residents are considerable.

Social impacts from the upgrade of the road represent a significant improvement in the livelihoods and health for local herders. The current state of the road and its manner of use present numerous social and environmental problems which include:

- loss of livestock to dust related illness,
- human health problems from inhaling airborne silica,
- accidents relating to drunk and/or irresponsible driving, and
- local dissatisfaction with the lack of access to employment opportunities in the mines.

ER are working to ensure that the benefits of the UHG mine also accrue to the residents of the neighbouring soums, Bayan-Ovoo and Khanbogd, which soums the road passes through. Research conducted in preparing the ESIA identified that the existing small coal mining operations in nearby basin that have been in production for the past few years are criticised by residents of Bayan-Ovoo and Khanbogd for creating social and environmental problems in particular in connection with road, without making any contribution to economic or social development. Noting that the road upgrade represents a significant, if still imperfect, improvement for the area, there is strong demand from local administration and residents for the road upgrade to commence as soon as possible.

## 1.7 ENVIRONMENTAL AND SOCIAL ACTION PLAN

An Environmental and Social Action Plan (ESAP) will be developed which will detail the actions and commitments required to manage the environment and social impacts of the Project. The ESAP is developed to meet the requirements of the Mongolian EIA process and EBRD's Performance Requirements.

The ESAP will establish the objectives, schedule of activities and responsibilities to manage, reduce or mitigate negative impacts and the environmental and social protection measures required to protect the identified environmental and social values from the risks posed from mining and related activities. The ESAP will also include the standards and regulations that apply in Mongolia as well as define performance objectives for each action.

The ESAP will be revised and updated as required on an annual basis or as required to respond to the outcome of the monitoring programs. The annual review of the ESAP will require an assessment of all negatives changes in the Project and surrounding areas in addition to the assessment of monitoring results. The annual review will also consider the outcomes of consultation with the relevant government environmental agencies and local communities.

### **1.8 STAKEHOLDER ENGAGEMENT PLAN**

The Stakeholder Engagement Plan (SEP) has been prepared and forms part of the Project's ESIA's. The SEP will help ER build and maintain a constructive relationship with their stakeholders, in particular the locally affected communities. ER has been active in liaising with the governors of affected soums and has appointed both an on-site Community Relations Manager as well as appointing an Ulaanbaatar based Director in charge of Environmental and Community issues.

The SEP includes the requirement for periodic visits to the homes of the most at-risk groups (eg the ten herders who graze their livestock in the mine affected area) as well as regular (monthly) contact with bagh governors – who act as a conduit for information in the rural Gobi.

In addition ER will organise a series of public consultation events, to be hosted in rural and urban locations, which will set out the Project plans and request feedback from stakeholders. As part of the on-going process of meaningful consultation, opportunities will be provided for affected communities to make complaints through the grievance mechanism.

The grievance mechanism will be a two stage process, with the first point of contact for all complaints being the Community Relations Manager. All complaints will be logged by the manager, who will then ensure that these complaints are assessed, addressed in project planning and the result reported back to the complainant.

In cases where the complainant is unsatisfied with the result, a further complaint can be made to the camp manager and soum governor – who will liaise directly with ER management in Ulaanbaatar, to ensure the grievance is resolved.

The Community Relations Manager will take a leading role in ensuring regular consultation with affected communities and stakeholders.

### **1.9 ER'S COMMITMENTS AND ENVIRONMENTAL MANAGEMENT SYSTEM**

For the successful implementation of corporate environmental policies, ER is establishing an appropriate management structure with clearly defined lines of authority and responsibility, as well as a formalized system to develop objectives, monitor progress and evaluate results.

ER's EMS will be developed based on the International Standard ISO14001:2004 (the Standard). The Standard specifies requirements for an EMS to enable the development and implementation of a policy and objectives which taken into account legal requirements and information about significant environmental aspects. The overall aim of the Standard is to support environmental protection and prevent of pollution in balance with socio-economic needs.

ER's social and environmental and health and safety management systems are fully integrated within the overall management system to control and eliminate occupational and environmental risks and impacts.

The Environmental Management Policy ('the policy') of ER is to minimize any significant adverse environmental impacts of new business developments, through the establishment of an Environmental Management System (EMS), the use of integrated environmental management procedures and planning, the development of environmental performance evaluation procedures, the prevention of pollution, the reduction of waste and consumption of resources, the recovery and recycling of wastes, the involvement of and communication with interested parties and the education and training of employees and contractors.

In accordance with the Mongolian regulatory requirements, ER forecasts annually, in advance, the amount of money to be committed to rehabilitation/reclamation, and 50% of the estimated amount is deposited with the local government. The deposited funds are returned to the company when the reclamation work is completed, and the environmental inspector considers the results are "satisfactory".