

**BASIC DECISION-MAKING THEORY: A CASE STUDY ON
THE OYU TOLGOI MINE PROJECT IN MONGOLIA**

by

Naranzul Bayasgalan

M.S., The Mongolian University of Science and Technology, 2000

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ABSTRACT

My thesis briefly discusses decision-making basic theory, in particular the deliberation method, and applies it to decision-making in the mining sector when making investment agreements between government and the private sector. However, decisions could be examined and applied in every industry sector. For instance, the mining sector includes many different decision making methods such as cost benefit analysis and socio-economic, environmental and health impact assessments. Every analysis and impact assessment requires different stakeholder participants and analysts from different sciences. This can sometimes make decisions more complicated. My thesis analyzes the planned Oyu Tolgoi (OT) copper and gold project in Mongolia using the Multi Account Evaluation method, which includes financial, economical, social and environmental analysis. It also briefly discusses social and environmental impacts from the Mongolian government point of view and whether this project will have a positive or negative influence on Mongolian economic and social development. My thesis also shows the current Mongolian decision-making situation and its problems.

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CHAPTER ONE: DECISION-MAKING BASIC THEORY

Brief introduction of thesis

Two decades ago, Mongolia began a dual transition both from an authoritarian state to a democracy, as well as from a centralized to a market economy. Before its peaceful transition to a democracy, Mongolia had experienced seventy years of socialist rule. During the socialist state period, Mongolian politics depended on the input from a few top leaders and strategically important decisions could not be made without the involvement of the USSR.

The USSR contributed greatly to Mongolia's economic development. However, in terms of human development, the socialist regime in Mongolia stymied human freedoms.¹ The MPRP controlled the media, and there was no freedom of speech or association. There was no opportunity for private initiative. In short, the Mongolian people were governed, not governing.² However, it should be recognized that Mongolia developed considerably under communist rule.³

Today Mongolian government operates under a new political culture and institutions. Over the last two decades, Mongolia has matured both institutionally and economically. However, as compared to these rapid political and institutional changes, the ability of human leadership to adapt to the new environment of is still lacking. Most people who used to work in socialist state institutions still can not catch up the new system. The products of Mongolia's political reforms, such as the Parliamentary system mixed with limited presidential power; a government cabinet led by party leaders; new ministries, agencies, and local administrations were created as part of functional democratic system. Unfortunately, the people who work within in these institutions cannot correspond fully to the new system.

The reason for this is that Mongolia began its institutional and legislation reform right after the adoption of democracy. From 1992 to 1998, the State Great Hural enacted nearly 180

¹ Tom Ginsburg, May, 1995, Political Reform in Mongolia: Between Russia and China, 35 Asian Survey, NO. 5, 459, 462

² Astrada Sebastian R., Apr 2009, Exporting the rule of law to Mongolia: Post-Socialist Legal and Judicial Reforms, P71

³ K.L. Abeywickrama, The Marketization of Mongolia, Monthly Review, 1996: 47, 10: p.25, at 27.

independent laws and approved over 200 amendments, and Mongolia joined nearly 60 international agreements and treaties.⁴ Following Mongolia's democratic transition, the legal reform process was intense and immediate. All this led to such negative consequences, as incompatibility of laws and inappropriate mechanisms for their enforcement.⁵

Pushing through such a huge number of foreign laws by donor organizations in a short period without taking into consideration Mongolia's cultural attributes was not much different from the socialist closed door decision and policy making practices. In addition, human capacity and mind changes, and capacity enhancement cannot happen in such a short period. In other words, the foreign institutional and legislation mechanisms were imposed directly onto the socialist mindset. Also these huge numbers of laws and decisions were made without any public participation. Therefore, policy makers were arguably not thinking about or adopting a genuinely democratic decision-making process. Society is changing slowly, but it takes time to adopt new political and institutional changes.

Therefore, democratic, well-informed and rational analyzed economic and political decision making is difficult, often at the expense of social and economic development. One of the main values of democratic institutions is deliberative decision-making which encourages the incorporation of stakeholders as much as possible and informed decision-making. Policy-makers and decision-makers in Mongolia have tried to introduce a deliberative decision-making style to government but loopholes and inconsistencies within the system are problematic. Even if there is good public participation, decisions often lack the necessary technical and informed analysis. Conversely, if there is good technical analysis, there is often not enough public participation. Likewise, law enforcement mechanisms should also be the result of a complete and well thought decision-making process. Therefore, Mongolia needs a decision-making model that can be followed and verified by each government institution and public sector. However, while decision-making styles differ, some incorporate the same basic methods. Additionally, decisions

⁴ See Ts. Munkh-Orgil, Legal reform in Mongolia, Speech at the Investor's Forum available at <http://www.mol.mn/modules.php?name=News&file=print&sid=7611>. A noteworthy piece of legislation is Mongolia's liberal Mining Law, said to be among the best in the world.

⁵ lbd

should be contextualized to each decision, depending factors such as the sector to which it will be applied, what kind of information needed, and who should be involved. For example, if you are making decisions regarding policy in the mining sector you should consider several factors: which state institutions should be involved, what kind of information needs to be collected, what kind of technical analysis is required, whose voice should be heard, etc.

My thesis will explore how decision-making democratic institutions and decision-making practices functioned in Mongolia after 20 years of democratic adaptation. Has democracy helped improve decision-making? If not, why?

In order to answer in this question explicitly, I have chosen the mining decision-making process, in particular the Oyu Tolgoi, mining project agreement, as a case study that has been extensively discussed in Mongolia in the last few years. In order to test the Oyu Tolgoi agreement decision-making process, I have chosen deliberative decision-making theory as part of democratic participation and the Multi Account Evaluation method that is used in public projects at state institutions as a base-line study to help to make better decisions.

My thesis will contribute to a better understanding of the current Mongolian decision-making practices and suggests several recommendations in order to improve the democratic decision-making process.

The paper will begin with a discussion of general decision-making theory then apply it to a case study of how mining decisions should be made in Mongolia. The first chapter will present a review of basic decision making theory and the second chapter will discuss decision making in mining and its important factors. The third chapter will discuss the Oyu Tolgoi (OT) case study. Chapter 3 shows the results of the Multi Evaluation Assessment on the OT case study that is necessary for an investment agreement; additionally it will briefly discuss social and environmental impacts to the existing community and their trade-offs. Concluding thoughts and recommendations will be provided in Chapter 4.

Basic decision-making theory

There are various decision-making theories that exist and I have chosen to talk about deliberative decision-making. Decision-making can be subdivided into decisions that are made by individuals and more complex decisions between multiple stakeholders, as well as by public and private organizations. This chapter will briefly discuss the level at which decisions are made in order to better classify, analyze, and understand the processes of decision-making. My case study on decision-making in the mining sector requires extensive public participation and a deliberative democratic decision-making process.

Deliberative decision-making

Deliberative decision-making theory was advanced by the German political philosopher Jürgen Habermas. One of his best-known ideas is *communicative action*, in which actors in society seek to reach common understanding and to coordinate actions by reasoned argument, consensus, and cooperation rather than strategic action strictly in pursuit of their own goals (Habermas, 1984, p. 86, in Bolton 2005). Habermas provides a theoretical basis for a view of planning that emphasizes widespread public participation, the sharing of information with the public, consensus through public dialogue rather than exercise of power, and avoids privileging of experts and bureaucrats, it replaces the model of the technical expert with one of the reflective planner (Bolton 2005, Argyris and Schön 1974, Schön 1983, Innes 1995, Lauria and Soll 1996, Wilson 1997). In this view, the legitimacy of democracy depends not only on constitutional processes of enacting laws, but also on "the discursive quality of the full processes of deliberation leading up to such a result," as Stephen White (1995, p.12) puts it. A third reason, almost from the start of Habermas's discussion of communicative action one sees the possibility of a connection to social capital. Communicative action is individual action designed to promote common understanding in a *group* and to promote *cooperation*, as opposed to "strategic action" designed simply to achieve one's personal goals (Habermas 1984, especially pp. 85-101, 284-8, Bolton 2005). Deliberation is the style and nature of problem-solving through communication and collective consideration of relevant issues (Habermas, 1970, 1978). This style includes different forms of argumentation and communication; for example, exchanging observations and

viewpoints, weighing and balancing arguments, offering reflections and associations, and putting facts into a contextual perspective (Renn, 2004). The word deliberation implies equality among the participants, the need to justify and argue for all types of (truth) claims, and an orientation toward mutual understanding and learning (Habermas, 1987, 1989, 1991, Renn, 2004). Renn considered that there are several aspects of a decision-making process when a decision proposal implies a multiplicity of uncertain impacts on several affected groups (2004). Normally, a society needs effectiveness, efficiency, legitimacy, and social cohesion in order to solve complicated problems that decision-makers cannot tackle by themselves and must be faced as a group. Decision-makers need efficiency to utilize scarce resources for reaching the intended goal. Legitimacy is a composite term that denotes the degree of compatibility with the legal requirements, due process, and political culture. It includes an objective element such as legality and a subjective judgment such as the perception of the acceptability (Luhmann, 1983). Lastly, social cohesion covers the need for social integration and collective identity in spite of plural values and lifestyles (Parsons, 1971). Within the macro-organization of modern societies, these four foundations are predominantly handled by different societal systems: economics, science (expertise), politics (including the legal systems), and social structure (Parsons, 1967). However, the political system often associated with the rationale of hierarchical and bureaucratic reasoning; the economic system, monetary incentives and individual rewards; and the social sphere, and with the deregulated interactions of groups within the framework of a civil society (Etzioni, 1968). Parsons suggested a classical division of society into four subsystems: politics, economics, culture, and social structure (1951). Each system is embedded in the other systems and mirrors their structure and functionality within its own subsystems. Renn provides a detailed comparison of these four systems (2004).

1. In the market system, decisions are based on the cost-benefit balance established on the basis of individual preferences, property rights, and the individual willingness to pay. The main goal here is efficiency.
2. In politics, decisions are made on the basis of institutionalized procedures of decision making and norm control (within the framework of a given political culture and system of government). The target goal here is to seek legitimacy.
3. Science has its disposal methodological rules for generating, challenging, and testing knowledge claims, with the help of which one can assess decision options according to

their likely consequences and side effects. These insights help policy makers to be effective.

4. Finally, there is communicative exchange of interests and arguments within the social system which helps the actors to come to a jointly agreed-upon solution. This creates cohesion and social acceptance.

Corresponding to their respective system logic, the four systems can be allocated certain methods or instruments, which are used basically or in hybrid forms when making decisions under uncertainty, setting trade-offs, or integration conflicting values. Economic system logic uses the instruments of (shadow) price setting, financial incentive systems, transfer of rights of ownership of public or non-rival goods and financial compensation (damages, insurance) to persons whose utilities have been reduced by the activities of others. The expert system uses wide variety of knowledge-based decision methods (e.g., choice of appropriate methodology, peer review, Delphi, meta-analysis among others) to determine the likelihood of impacts from different decision options. The social field includes discursive forms of communication and joint problem-solving groups, as well as citizen participation procedures. The conventional instruments of the political system comprise the processes of enacting, implementing, and scrutinizing collectively binding decisions in executive, legislative, and judicial bodies.

Renn believed that socially relevant problems are rarely dealt with within the limits of one single logic system. Rather, situations are dealt with through recourse to hybrid procedures, which are seen as combinations of individual logic systems (2004). For example, the need for linkages between the economic and the social sector and the cooperation between experts and political representatives in joint advisory committees (i.e., the experts provide background knowledge, while the politicians provide the preferences for making the appropriate choices) represents a combination of knowledge-oriented elements and political governance. Public hearings are combinations of expert knowledge, political resolutions, and the inclusion of citizens in this process.

The term deliberation refers to the style and procedure of decision making without specifying which participants are invited to deliberate (Renn 2007, Stern and Fineberg, 1996; Rossi, 1997). For a discussion to be called deliberative, it must rely on mutual exchange of arguments and reflections rather than on decision-making based on the status of the participants, sublime

strategies of persuasion, or social-political pressure (Renn, 2004). Deliberative processes should include a debate about the relative weight of each argument and a transparent procedure for balancing pros and cons (Tuler and Webler, 1999). In addition, deliberative processes should be governed by the established rules of a rational discourse. The term discourse has different meanings in the social sciences (Renn, 1998). In the theory of communicative action developed by Habermas, the term discourse denotes a special form of dialogue in which all affected parties have equal rights and duties to present claims and test their validity in a context free of social or political domination (Habermas, 1987b, Renn 2007). A discourse is called a rational if it meets several specific requirements (McCarthy, 1975; Habermas, 1991; Kemp, 1985; Renn and Webler, 1998, Renn, 2004, p.303). In particular, all participants within the discourse are obliged to:

- Seek a consensus on the procedure that they want to employ in order to derive the final decision or compromise, such as voting, sorting positions, establishing consensual decision making, or involving a mediator or arbitrator.
- Articulate and critique factual claims on the basis of the “state of art” of scientific knowledge and other forms of problem-adequate knowledge (in the case of dissent, all relevant camps have the right to be represented).
- Interpret factual evidence in accordance with the laws of formal logic and analytical reasoning.
- Disclose their relevant values and preferences, thus avoiding hidden agendas as strategic game playing.
- Process data, arguments, and evaluations in a structured format (e.g., a decision-analytic procedure) so that norms of procedural rationality are met and transparency can be created.

According to Habermas, deliberation is the lubricant that helps each system (the utility-based theory of rational action, theory of communicative action, or theory of social systems) to move independently within society without bumping into the domains of other systems.

Turning back to the question of suitability, one can deduce from these three theoretical concepts the following inferences:

- Deliberation can produce common understanding of the issues or the problems based on the joint learning experience of the participants with respect to systematic and anecdotal knowledge (Webler et al., 1995b; Renn, 2007).
- Deliberation can produce a common understanding of each party's position and argumentation and thus assist in a mental reconstruction of each actor's argumentation (Warren, 1993). The main driver for gaining mutual understanding is empathy. The theory of communicative action provides further insights in how to mobilize empathy and how to use the mechanism of empathy and normative reasoning to explore and generate common moral grounds (Webler, 1995, Renn, 2007).
- Deliberation can produce new options and novel solutions to a problem. This creative process can either be mobilized by finding win-win solutions or by discovering identical moral grounds on which new options can grow (Renn and Webler, 1998, pp.64ff.). Even seen from a system-analytical perspective, joint statements can be generated in deliberative process that may not resolve the issue but instead define the conditions under which each system can handle the problem using its own resources (Renn, 2007).
- Deliberation has the potential to reveal and the document the full scope of ambiguity associated with a risk problem. Even if one shares the skeptical view of systems analysts, deliberations help to make a society aware of the options, interpretations, and potential actions that are connected with the issue under investigation (Wynne, 1992b). Each position within a deliberative discourse can only survive the crossfire of the arguments and counterarguments if it demonstrates internal consistency, compatibility with the legitimate range of knowledge claims, and correspondence with the widely accepted norms and values of society. Deliberation clarifies the problem, makes people aware of framing effects, and determines the limits of what could be called responsible within the plurality of interpretations (Skillington, 1997, Renn, 2006, p.8).

Deliberations can also produce agreements. The minimal agreement may simply be a consensus over dissent, in which the participants agree to disagree (Raiffa, 1994; Renn and Webler, 1998, Renn, 2004). If all arguments are exchanged, participants know why they disagree. They may not be convinced that the arguments of the other side are true or morally strong enough to change their own position; but they understand how the opposition came to its conclusions. At the end of the deliberation, the process may produce several consistent and domain-optimized positions that can be offered as package options to legal decision makers or the public. After these options have been subjected to public discourse and debate, political bodies such as agencies or parliaments can make the final selection in accordance with the legitimate rules and institutional arrangements by mechanisms such as a majority vote or an executive order (Renn, 2006). Final selections could also be performed by popular vote or referendum (Hartman, 1983).

According to Renn, many desirable products and accomplishments are associated with deliberation (2004). Depending on the structure of the discourse and the underlying rationale, deliberative processes can enhance understanding; generate new options; decrease hostility and aggressive attitudes among the participants; explore new problem framing; enlighten legal policy makers; produce competent, fair, and optimized solution packages; and facilitate consensus, tolerated consensus, and compromise.

Model description

Renn suggested an integrated analytic-deliberative process model that would be easier to work with in a fair, competent, and cost effective way. This model combined elements of different models that create an overall participation process that is effective, efficient, legitimate and socially acceptable. He expected that this model could produce feasible outcomes that are appropriate to the problem and the cultural setting. According to Stern, an integrated model must combine technical expertise and rational decision making with public input and preferences (1991). Renn's model reflects the basic discourse requirements and offers a structure to make them operational in a given policy context (2004). The main features of the model follow:

- First, all parties affected by a decision should have an equal opportunity to participate in the decision making process.
- Second, each party participating in the discourse has equal rights and duties and is obliged to provide evidence for its claims.
- Third, only the best knowledge available should be integrated into the decision process to ensure competence.
- Lastly, a rational procedure of decision making derived from a formal decision analysis is not just envisioned (Edwards, 1954; Chen et al.,1979) but also oriented toward a multi-actor, multi-value, and multi-interest situation (Vlek, 1996).

To integrate these multidimensional aspects of decision making into a practical procedure, the model assigns specific tasks to different groups in society. These groups represent three forms of knowledge (Renn et al., 1993. p.190.)

- Knowledge based on technical expertise (cognitive discourse).
- Knowledge derived from social interests and advocacy (reflective discourse).
- Knowledge based on common sense and on personal experience (particular discourse).

These three forms of knowledge and their corresponding functions within the discourse are integrated into a sequential procedure in which different societal actors are given specific tasks that correspond to their specific knowledge potentials. The model entails three consecutive steps (Renn et al., 1993).

The first step in policy or decision-making refers to the identification of objectives or goals that the process should serve once a problem is identified or a political program is established (Merkhofer, 1986). The identification of concerns and objectives is best accomplished by asking all relevant stakeholder groups (i.e., socially organized groups that are or perceive themselves to be affected by the decision) to reveal their values and criteria for judging different options. This can be done by a process called value-tree analysis (Keeney, Renn, and von Winterfeldt, 1987, Renn, 1993, p.190). The evaluative criteria derived from the value-trees are then operationalized and transformed into indicators by either the research team or an external expert group.

The second step follows after different policy options and criteria are established. Experts representing varying academic disciplines and viewpoints about the issue in question are asked to judge the performance of each option on each indicator (cognitive discourse) (Renn, 2004). The last step is to evaluate each option profile by one group or several groups of randomly selected citizens in participatory discourse. These groups are typically referred to as “Citizen Panels for Policy Evaluation and Recommendation” (Renn et al., 1993, Renn and Webler, 1998). The main objective of this panel is to provide citizens with the opportunity to learn about the technical and political facets of policy options and to enable them to discuss and evaluate these options and their likely consequences according to their own set of values and preferences. However, the whole process should be supervised by a group of policy makers and major stakeholders and the major task of the citizen panels is to evaluate options and generate or modify policies assisted by expert and stakeholder witnesses. There also should be an oversight committee that has the tasks of exercising external control over the whole process, providing the necessary links between the three steps, and ensuring the compatibility of the results with the political institutional frames in which the results will be processed. Experts are responsible for constructing performance profiles for each option, through consideration of the institutional knowledge of the sponsor and the specific knowledge of the various stakeholder groups. Finally,

the research team has the important tasks of providing first draft of the three products (joint value-tree, performance profiles, and citizen report), gaining approval for these products from the respective actors, and feeding this input back into the process (Renn, 1993).

It is possible to use Renn's suggested cooperative discourse method at distinctly different social and governmental tiers such as at the local, regional, and national level (2004). In addition, public participation should be evaluated by several criteria: legitimacy, participatory quality, accountability, and efficiency. Some of the criteria reflected to same mirror images; for example, competence refers to effectiveness, and fairness to social cohesion (Renn, 2004). When participation is fair, everyone takes part on an equal footing. This means that people are not only provided equal opportunities to determine the agenda, the rules for discourse, and to speak and raise questions, but also equal access to knowledge and interpretations (Webler, 1995, 1999). Political equality and popular sovereignty also make an argument for competence. Competence is defined neither from the quality of the outcome or the level of satisfaction among the participants, but rather according to adherence to the participants' rules for knowledge presentation and selection (Webler, 1995). Decisions should rely on the best expertise. Without the proper expertise to inform and guide the process, the decisions made cannot be effective. One danger is that participants can make assumptions based on invalid beliefs or prejudices. This is why a high level of competence is extremely important in all deliberative procedures. Competence provides the structure that enables participants to use discourse in such way that all participants reach a sufficient level of understanding and are aware of the potential consequences of each course of action; this includes knowledge about the uncertainties and ambiguities of the situation (Renn, 2004, p.337).

As outlined above, these criteria are used to evaluate analytic-deliberative processes. However, according to Roch and Renn, this multi-criteria model also functions as a guideline for internal and external evaluations of the various applications of the cooperative discourse model (1997). A similar model used in the Mongolian context but only sporadically; for example, very few decisions made based on extensive public debate. In the next section, I will briefly discuss a key factor of decision-making: the structure and operational level to which decisions are valued and targeted.

Decision levels

Some decisions are more important than others depending on the immediate impact or long-term significance. In this context, according to Harris three levels of decision-making can be identified (1998):

Strategic. Strategic decisions are the highest level. Here a decision concerns general direction as well as long term goals, philosophies, and values. These decisions are the least structured and most imaginative; they are the most risky and of the most uncertain outcome, partly because they reach so far into the future and partly because they are of such importance.

Tactical. Tactical decisions support strategic decisions. They tend to be medium range, of medium significance, and with moderate consequences.

Operational. These are every day decisions, used to support tactical decisions. They are often made with little thought and are clearly structured. Their impact is immediate, short term, short range, and usually low cost. The consequences of a bad operational decision will be minimal, although a series of bad or sloppy operational decisions can cause harm. Operational decisions can be preprogrammed, pre-made, or set out in policy manuals.

A key implication of this classification system is that a lack of organizational decision-making at any of these three levels might have certain consequences. For example, if nearly all of an organization's decision-making is taking place at the operational level, then it is probably not doing enough strategic thinking, planning and might not even have a clear vision for the future.

Deliberative decision-making in Mongolian context

In order to understand deliberative decision-making in Mongolia, we must first look at the institutional framework that produces decisions and policies. The Constitution of Mongolia adopted in 1992 divides the powers of the state into Legislative, Executive and Judicial branches. The Constitution defines the unicameral Parliament (the State Great Hural or SGH) as the highest organ of the state and the supreme legislative power, providing it with wide-ranging

authority to enact and amend laws; to determine domestic and foreign, fiscal, and monetary policies; and to approve the state budget.

Legislative and policymaking process

The deliberation process is one of the main components of the legislative and decision-making process. Therefore, I discuss the legislative process in Mongolia. Legislative initiative formally belongs to the Government, President, and the SGH, but the Government is the only institution with real drafting capacity.

Drafting

Government bills and other important policy papers are developed within the line ministries in conjunction with the Ministry of Justice and Home Affairs (MOJHA), which has drafting responsibility (Ginsburg, 2005). Any policy analysis takes place in the line ministries, associated working groups, and other groups formed by MOJHA for its own drafting. When the President or Parliament decides to propose a new law, it will form its own working group, or ask the Government to draft the law on its behalf.

With regards to expertise, the working groups involved in drafting are in charge of selecting expert participation. In many cases, the working group draws on sources of expertise identified by the MOJHA. Moreover, the MOJHA can establish a working group, including representatives of NGOs, the private sector and universities. However, MOJHA and other line ministries currently do not have much experience with the organization of public hearings. As a result, laws and public policy often do not represent the on-the-ground reality and instead reflect the more expertise-based law in line ministries or the more politicized Parliamentary environment. In addition, much of the legislation produced is modeled on foreign laws, and there are problems both with internal consistency among laws and with fitting foreign models into the Mongolian context. Furthermore, there is a tendency for the Government to continue to play a dominant role in determining the legislative agenda and other important policy. This weakens Parliament's authority and their decisions are often dependent on support from the Cabinet or other powerful political figures.

In well-functioning democracies, representative legislatures play a crucial role in formulating, deliberating over, and overseeing policy. In Mongolia, however, there is an increasing concern about the ability of the Parliament to engage in public participation and to reflect public opinion in the law and other important decisions and policies.

Parliamentary consideration and committees

Once a bill is submitted by MOJHA to the Parliament, the Speaker assigns it to a standing committee. Standing committees and their members work on the draft law and thus it should reflect their opinion. For certain bills, these committees can also form working groups that include outside experts; the composition of these groups may and often does differ from that of the drafting group. Currently, very few committees hold public hearings. Therefore, committees should be strengthened by the ability to hold hearings and call outside witnesses. In addition, the Parliament Secretariat office is trying to provide public access to Parliament, especially through the internet connections to the other provinces.⁶ After detailed discussions at the standing committees, draft laws are finally passed in Parliamentary session.

The Parliament initiated its own independent research center two years ago in order to provide enhanced information access and policy analysis. However, it is difficult to say whether or not researchers' analyses fully reflect the public opinion, rather the research center has produced more individual research-based analysis. Therefore, this system cannot replace deliberation-based policy and legislations. Occasionally, some MPs and standing committees do request alternative analysis, seek public input, or ask for detailed information on the bill or public policy. However, the plenary Parliament session hardly ever takes into consideration these additional sources of information. Members of Parliament organize meetings with constituents twice a year and introduce draft bills under discussion or laws enacted by Parliament. However, these meetings cannot substitute for the policy and law enacted through deliberation process. A newly created Open Government website is working to maximize public access and participation to policy-making processes by posting drafted and finalized legislation. Building public awareness

⁶ Daily news, Encourage more public opinion to legislative process, Mar 22.2010.

of this resource, and providing offline access of its services for remote populations, would be a significant step towards enhancing the public participation process.

Current sources of policy analysis in Mongolia

Apart from the line ministries and Parliament, there are several types of organizations that could possibly organize public hearings and encourage actively public involvement in the decision-making process; these include party research facilities and interest groups, including NGOs and donor organizations. Which of these sources would be effective in any particular context is highly dependent on the nature of the political system.

Political party research capacity

Party research capacity in Mongolia is weak. Factionalism between party leaders and is strong and power struggles within the main parties are pervasive. As a result, leadership often does not have a unified policy and it is exceptional to develop a party platform and make decisions based on the public opinion. Politicians work regularly with organizations that conduct survey and opinion polls about their party ratings and other issues considered important by the society. However, this cannot replace real debate involving the public. Party members regularly hold group meetings and party assemblies; however, they may occasionally organize open public discussions to help update their party policy with regards to national development or the improvement of laws and policies.

Citizens, NGOs and interest groups

Although there is a lack of acceptance of public opinion at the higher legislative and government institutions, there are movements, street protests and petitions aimed at trying to influence important decisions. These movements often offer their position and opinion to the relevant organizations and have some media presence, but they do not often succeed.

Academic institutions

Academic institutions such as universities and the Academy of Sciences provide resources for policy research. Academics develop their own research agendas, which may or may not focus on policy-relevant information. In addition, this research usually does not often appear in policy-

relevant formats such as policy papers. However, researchers do participate in working groups within legislative bodies if their contribution is required in particular policies and regulations.

Donor community and international organizations

International organizations have a strong advocacy role in Mongolia. Most important policies and regulations are developed with help of these organizations. They work closely with the governmental agencies, ministries and legislators while providing their recommendations in specific policies. Currently, donor agencies are only organization model in Mongolia that organize public hearings and in order to present public opinion for the policies that are submitted to the authority organizations. However, Parliament and Government ministries have organized several public hearings with support of donor organizations in the past few years.

Conclusion

In terms of deliberative decision-making theory, the Mongolian decision-making process is far from reaching the models outlined under deliberative decision-making theory.

There are many obstacles that block off real public participation within the legislative and decision-making process even though sufficient institutional design exists. The major constraint is a lack of political will and initiative. For the most part, higher officials and members of Parliament do not have an incentive to improve public participation at the decision-making level. One reason is that members of Parliament simultaneously serve as Cabinet members. Thus, when parties have their own members at the cabinet, they do not pay close attention to existing draft bills and policies.

In addition, the Mongolian Parliament does not actively initiate the drafting of bills; therefore, they do not have an incentive to make changes in existing draft bills that come from the line ministries. Even the standing committees that deliberate draft bills do not involve public participation with the deliberation process. Apart from the standing committees, research centers, party caucuses, and other advisers assist MPs. Even though these actors provide a great deal of relevant information, the majority of the MPs do not actively make use of these resources and Parliamentary decision-making does not usually reflect their analysis.

In addition, most important decisions often decided according to Cabinet proposals if those decisions do not explicitly and implicitly conflict with their interests. MPs and other higher officials sometimes make decisions in favor of their interest even if the bills and policies are based on rigorous technical analysis and contain public input. At the ministerial level, even though policy-making requires the involvement of technical expertise, input and participation from the general public is left out.

Therefore, it is difficult to say whether or not legislations, decisions, and policies accurately reflect actual conditions and are reflect public opinion. The lack of participation in important decisions may in turn lead to lower quality policy formulation, poor implementation and enforcement of laws, as well as large gaps between the law on the books and its actual role in governing society, politics and economy.

CHAPTER TWO: DECISION-MAKING IN MINING SECTOR

Introduction

The main objective of this chapter is to show “How government should make mining related decisions”. Basic decision-making theories can be applied to mining decisions in some general aspects. If we consider mining related decisions as consisting of several decisions that are made by different sector and different stakeholders, basic theory will apply to each decision. Likewise, if we consider a mining decision as a compact integration of several decisions, we will have to make trade-offs between its components.

Decision-making cannot be perfect and it is impossible to input all the best solutions in one single compact decision. Moreover, each component decision should be contextualized to its particular field and it must be recognized that not all the components will fit into the same decision-making process.

Mining decisions are complex and should follow the sustainable development international concept. For instance, I have chosen mining exploitation investment decisions as these decisions are packaged and each decision has a different purpose. For example, mining investment related government decisions include both mining investment and exploitation related regulations as well as mining tax legislations. Furthermore, if the host country is developing country then they need to develop mechanisms such as anti-corruption laws to prevent rent-seeking behavior.

Mining decisions should also be based on several impact and cost benefit analysis. Analyses would include a cost benefit analysis to clarify whether an investment is beneficial to the country as well as a socio-economic impact assessment to evaluate and determine how mining activities will influence the existing community, how much in- and out-migration is expected, how to mitigate harmful influences, if additional government services should be supplied, if more community infrastructure is needed, how much additional financing is required, and what operational expenditures will be. Environmental impact assessments before, after, and during the

mining operation are also required. In addition, one of the most important issues is mining closure policy and planning.

In terms of deliberative decision-making process, different stakeholders are involved in different decisions. Legal issues related to mining will be more involved in institutions such as government ministries, relevant departments, and interested stakeholders and public. Although they include the same set of actors, taxation issues are often mutually agreed-upon decisions involving the multinational corporation in charge of the mining project. It is important to note that a taxation policy created through joint negotiation between the government and the corporation may not be open to future negotiation for prospective mining partners and thus become standard for the industry.

Community development issues regarding socio-economic impacts should be based on detailed research and analysis made by professionals and analysts that are based on extensive surveys and interviews with the local community. Environmental impact assessments should be made by independent professional organizations or governmental agencies. All these decisions are made in different places and involve different stakeholders. Each decision and related impact assessment consists of different issues and different scientific and technical fields.

In addition, the decision of whether or not to mine on certain area should be undertaken through a democratic decision-making process and based on an integrated assessment of ecological, environmental, economic, and social impacts. In general, mineral exploitation decisions should follow internationally agreed sustainable development guidelines that incorporate every essential aspect of mining development.

What is the sustainable development?

Mineral products are essential to contemporary societies and economies. Many basic needs cannot be met without them. The process of producing, using, and recycling mineral products could help society reach many other goals including job creation and national economic development (MMSD, 2002). There are several important factors stated below that are important to the stakeholders involved in mining activities; governments expect that minerals development will be an engine of sustained economic growth; local communities expect that the industry will provide employment, infrastructure, and other benefits that counter the risks and impacts they experience and will leave them better off than when the project started (Frohman, 2006); the industry's employees expect safer and healthier working conditions, a better community life, and re-training when their employment ends; local citizens and human rights campaigners expect companies to respect and support basic rights, even when they are operating where the government does not; environmental organizations expect a much higher standard of performance and that the industry will avoid ecologically and culturally sensitive areas; investors expect higher returns and are concerned about the industry's financial results.

According to the Brundtland Commission, sustainable development is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations. However, Mining, Minerals and Sustainable Development Project (MMSD, 2002) developed more broad mining sustainable development concepts that resource-rich countries and the international mining community should reflect on their decisions. MMSD's report states that, "One of the greatest challenges facing the world today is integrating economic activity with environmental integrity, social concerns, and effective governance systems. The goal of that integration can be seen as 'sustainable development'. In the context of the minerals sector, the goal should be to maximize the contribution to the well-being of the current generation in a way that ensures an equitable distribution of its costs and benefits, without reducing the potential for future generations to meet their own needs." The MMSD developed four basic "pillars" of ideas which consists of economic sphere, social sphere, environmental sphere, and governance sphere. Each sphere has a set of guiding principles as indicated in below.

Main principles of the sustainable development

Economic sphere

- Maximize human well-being
- Ensure efficient use of all resources, natural and otherwise, by maximizing rents.
- Seek to identify and internalize environmental and social costs.
- Maintain and enhance the conditions for viable enterprise.

Social sphere

- Ensure a fair distribution of the costs and benefits of development for all those alive today
- Respect and reinforce the fundamental rights of human beings, including civil and political liberties, cultural autonomy, social and economic freedoms, and personal security.
- Seek to sustain improvements over time; ensure that depletion of natural resources will not deprive future generations through replacement with other forms of capital.

Environmental sphere

- Promote responsible stewardship of natural resources and the environment, including remediation of past damage.
- Minimize waste and environmental damage along the whole of the supply chain
- Exercise prudence where impacts are unknown or uncertain
- Operate within ecological limits and protect critical natural capital

Governance sphere

- Support representative democracy, including participatory decision-making
- Encourage free enterprise within a system of clear and fair rules and incentives
- Avoid excessive concentration of power through appropriate checks and balances
- Ensure transparency through providing all stakeholders with access to relevant and accurate information
- Ensure accountability for decisions and actions, which are based on comprehensive and reliable analysis
- Encourage cooperation in order to build trust and shared goals and values

- Ensure that decisions are made at the appropriate level, adhering to the principle of subsidiary where possible

According to the report, even though the spheres are very different these principles should be applied in integrated manner in decision-making. For example, the government should protect the environment and social and cultural values while using mineral resources as a means to economic development. However, it is difficult to make integrated decisions on based on above-mentioned spheres. Many issues such as conflicts among different groups of stakeholders and between global, national and local priorities are bound to arise. Different groups such as grass root organizations, social movements, NGOs, local communities, and political parties act for different purposes that may not coincide; for example, sustaining mining environmental damage in exchange for major social and economic gain, or of sacrificing economic and social goals for significant environmental benefit. However, companies and government should try to work together closely and recognize that everyone's needs apply to the final decision.

As the MMSD (2002, p.xvii) report recommends, implementation of sustainable development principles in the minerals sector requires integrated tools that are capable of bringing these diverse principles and objectives into manageable decision-making structures. It includes regulatory, fiscal, educational, and institutional tools. These instruments need to be effective; administratively feasible; cost-efficient, ready for innovation and improvement; transparent; acceptable and credible to stakeholders; reliable and reproducible across different groups and regions; and equitable in the distribution of costs and benefits.

There are several challenges can be faced in mining industry.

Viability of the minerals industry

If a company's work is not profitable, then it has no incentive to contribute to the sustainable development of the nation. Moreover, the company's success depends on a safe, healthy, educated, and committed work force; access to capital; a social license to operate; the ability to attract and maintain good managerial talent; and the opportunity for a return on investment, as well as good transparent relationships with both government and community.

The control, use, and management of land

Mineral development often creates competition and disputes over land use. If there is lack of planning or other required regulations to balance and manage possible land uses, problems and disagreement will arise regarding compensation, resettlement, land claims of local peoples, and protected areas.

Minerals and political and economic risks

It is difficult to guarantee that minerals exploration directly bring economic benefits, especially for countries that do not have alternative sources of development. Governments should spend wisely the taxes and royalties earned from the development of their mineral resources.

Additional benefits from mining activities include employment, infrastructure such as roads and hospitals, linkages upstream to industries that supply goods and services or downstream to industries that process mineral outputs, and technology transfer. However, in some countries, mining exploitation has not brought sustained economic development because sudden wealth may have detrimental effects on social and political life by leading to or supporting corruption, authoritarian government, human rights abuse, or armed conflict.⁷

Other issues include: a lack of economic resources for the spending on important investments, decentralized institutions, lack of specialized and well trained staff, and a lack political will and rent-seeking behavior of the officials to that leads to underdevelopment and gives rise to inequalities. Also, when governance and national-local linkages are weak, communities may see none of the economic benefits from mineral resource development. Government should pay attention to find better ways to capture and manage mineral wealth and to ensure that it is invested for lasting benefits in support of national, regional, and local development.

There are many political and economic risks are related to sudden influxes of income from mineral development. One of the major risks is known as “Resource Curse” in which resource rich countries become too dependent on mining industry income.

⁷ Breaking New Ground: Mining, Minerals, and Sustainable Development report, 2002, IIED and World Business Council for Sustainable Development, Earthscan Publications Ltd, London and Sterling, VA

Dutch disease

The term “Dutch disease” was coined in 1977 by *The Economist* to describe the decline of the manufacturing sector in the Netherlands after the discovery of a large natural gas field in 1959. The discovery of the new gas field resulted in the formation of the world's biggest public-private partnership N.V. Nederlandse Gasunie between Esso (now ExxonMobil), Shell and the Dutch government in 1963.⁸ While the term “Dutch disease” initially referred to “the overvaluation of the Dutch guilder in the wake of a boom in the Netherlands’ natural gas earnings in the 1960’s”, it was soon expanded to explain the negative effect of currency appreciation due to resource over-exploitation on the competitiveness of other industries (Sachs 181, 2007).

Sachs et al (2007) approached the issue of Dutch Disease with their book named “Escaping the Resource Curse” that defined the syndrome as a problem of both single-industry dependency and development by half measures. First, we have to understand what makes natural resource wealth different from other types of wealth. Two key differences stand out; the first is that unlike other sources of wealth, natural resource wealth does not need to be produced it simply needs to be extracted (even if there is often nothing simple about the extraction process).⁹ Since it is not a result of a production process, the generation of natural resource wealth can occur quite independently of other economic processes that take place in a country; it is, in a number of ways, enclaved. For example, it can take place without major linkages to other industrial sectors and it can take place without the participation of large segments of the domestic labor force. The second major feature stems from the fact that many natural resources are nonrenewable. From an economic aspect, they are thus not so much a source of income rather than an asset. Moreover, the nonrenewable nature of natural resources gives rise to a large array of political and economic impacts that produce adverse effects on the economy. One of the greatest risks concerns the emergence of what political scientists call “rent-seeking behavior”. In essence, the Dutch disease is when a sudden rise in the value of natural resource exports produces an appreciation in

⁸ “The Dutch Disease” (November 26, 1977). *The Economist*, pp. 82-83., http://en.wikipedia.org/wiki/Dutch_disease

⁹ Humphreys, Sachs & Stiglitz, 2007. *Escaping the Resource Curse*, Columbia University Press, New-York

the real exchange rate. This in turn makes exporting non-natural resource commodities more difficult and competing with imports across a wide range of commodities is almost impossible (called the “spending effect”). Foreign exchange earned from natural resources meanwhile may be used to purchase internationally traded goods at the expense of domestic manufacturers. Simultaneously, domestic resources such as labor and materials are shifted to the natural resource sector (called the “resource pull effect”). Consequently, the price of these resources rises on the domestic market, thereby increasing the costs to producers in other sectors (Sachs et al, 2007, p.5). Overall, extraction of natural resources sets in motion a dynamic that gives primacy to two domestic sectors-the natural resource sector and non-tradable sector, such as the construction industry - at the expense of more traditional export sectors. Any shift can be costly for an economy, as workers need to be retrained and find new jobs, and capital needs to be readjusted (Sachs et.al, 2007, p.6). Beyond this, the particular shifts induced by the Dutch disease may have other adverse affects. If the manufacturing sector is a long-term source of growth - for instance, through the generation of new technologies or improved human capacity - then the decline of this sector will have adverse growth consequences (Sachs and Warner, 2001, Sachs et al, 2007, p.6). Another important issue is income distribution, if returns to export sectors such as agriculture or manufacturing are more equitably distributed than the returns to the natural resource sector, then this sectoral shift can lead to a rise in inequality (Sachs et.al, 2007). In general, the Dutch disease spells trouble down the road as when activities in the natural resource sector eventually slow down, other sectors may find it very difficult to recover. The Dutch disease problem arise because of the quantity of the oil (mineral) money coming in to state; and its volatile characteristics depend on the rate of extraction and uncertain unstable commodity prices(Sachs et al, 2007). Additionally, huge inflows of revenue to the government tends to lead to more spending than saving. Another problem may arise even before revenues from natural resource extraction make it back into the country because of a lack of expertise on part of the host government. According to Sachs¹⁰ and his colleagues, governments face considerable challenges in their dealings with international corporations, which have great interest and expertise in the sector and extraordinary resources on which to draw. Mining exploration is both capital and technologically intensive; extracting minerals such as gold, copper and silver

¹⁰ Humphreys, Sachs & Stiglitz, 2007. *Escaping the Resource Curse*, Columbia University Press, New-York

typically requires cooperation between governments and experienced international private sector actors. In many cases, this produces the unusual situation in which the buyer - the international mining companies - actually knows more about the value of the good being sold than the seller - the government of the resource rich country. In such instances companies are in very strong bargaining positions relative to the government. The challenges for host countries is to find ways to contract with the international corporations in a manner that also gives them a fair deal (Sachs et.al, 2007, p5).

Corruption

Corruption is a major problem to the equitable distribution of minerals revenues. Many operations take place in countries where corruption is prevalent. Some companies in the minerals sector may have colluded in a variety of illicit activities – bribery to obtain licenses and permits; to get preferential access to prospects, assets, or credit; or to sway judicial decisions. The minerals sector also has characteristics that heighten the risk of corruption, such as the large capital expenditures involved, the extensive regulation required, and the fixed locations.¹¹ Fixed locations may contribute to corruption because of the proximity of local administration the relative distance from the central government. Another problem is if the government's handling of the revenues from taxes on resource extraction is not transparent and open to the public it can mis-appropriated and embezzled. Politicians and government officials sometimes make side deals with companies that would benefit both parties at the public's expense. Indeed, former Prime Minister of British Government Tony Blair created an international initiative named “The Extractive Industries Transparency Initiative (EITI)” to combat such transparency and corruption problems. The main aim of the EITI is to strengthen governance by improving transparency and accountability in specifically the extractive industry sector. Currently, the EITI supports improved governance in resource-rich countries through the verification and full publication of company payments and government revenues from oil, gas and mining. The voices of the public and civil society organizations can also be a powerful weapon against corruption.¹²

¹¹ Breaking New Ground: Mining, Minerals, and Sustainable Development report, 2002, IIED and World Business Council for Sustainable Development, Earthscan Publications Ltd, London and Sterling, VA

¹² <http://eititransparency.org/>

Human rights

Miners' rights are can be threatened by difficult and dangerous working conditions; as the industry and its constituents share a long history of labor management conflict. Some advocates argue that multinationals should take responsibility not just for respecting but also for promoting human rights. National governments should protect their citizens' rights and should ratify the International Labor Organization's conventions regarding worker's rights.¹³ In addition, human rights issues will arise regarding the existing community in the mining area. Government should pay attention in human rights issues here as well by protecting minority rights, mitigating the impacts on the hardest hit communities, compensating for lost land and livelihood, as well as preventing water shortages and unwanted migration.

Local communities and mines

Local communities can be greatly affected by the mining activities as they face huge influxes of people during the mining operation and must deal with the negative impacts of unemployment after mine closure. According to MMSD (2002), community demands for relevant, direct, and sustained benefits from mineral wealth are a relatively recent phenomenon, except for highly experienced mining companies or developed nations, few actors in either the public or private sphere are properly equipped to respond on them. In countries that have weak governance, communities often turn to the operating companies which may find themselves providing development services to obtain or to maintain their social license to operate. Based on recognition of the rights of communities and the need for community participation in decision-making, a new relationship is beginning to emerge. Moreover, new initiatives seek to avoid situations where the company assumes the role and responsibilities of government, by focusing on improving the capacity of local government and other local institutions to deliver mine-derived benefits over the long term (MMSD, 2002, p.209). NGOs and other civil society groups can also act as independent mediators, facilitating the flow of information to and from

¹³Breaking New Ground: Mining, Minerals, and Sustainable Development report, 2002, IIED and World Business Council for Sustainable Development, Earthscan Publications Ltd, London and Sterling, VA

communities and coordinating actions in partnership with companies and government. In this scenario, the benefits from minerals explorations should be invested in the diversification and establishment of industry and development for the local community. For instance, support for local businesses, preferential procurement policies towards local suppliers and distributors, employment of locals, and skills training are important means of benefiting local communities and building human and financial resources.¹⁴ Additionally, health services should be provided by companies to employees. However, communities have generally reflected an inadequate understanding of local needs, as well as a lack of consideration for the ability for the community to sustain such services after the operation closes. Therefore, government also should pay close attention to local health care issues and must provide sufficient health care services, facilities, and personnel. Beyond work related diseases, few endeavors attempt to prevent diseases that affect the wider community or to consider the community's broader well-being. In general, well-recognized international mining companies are involved with the local community, organize multi-stakeholder forums and facilitate community awareness, capacity building, as well as reducing the power differential between the community and company. Mining companies also should conduct socio-economic impact assessments to understand community needs and furthermore plan for, prevent, or mitigate serious impacts to the community.

Mining, minerals, and the environment

In general, most mineral development has had a negative impact on the environment. Even mining operations conducted with minimal invasiveness, following the best practices, and with the best intentions may have some undesirable environmental impacts. However, the objective of improved performance is to ensure that critical natural capital is maintained, that ecosystems are enhanced where possible, and that minerals wealth contributes to net environmental continuity. The challenge is to define where, in the short and medium term, resources can be targeted to ensure the best chance of meeting these objectives in the future (MMSD, 2007, p.xx). Mining companies should be responsible enough to work in an environmentally friendly and clean manner. The government has to provide enforceable legislation and regulations for the protection

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of the environment and either NGOs or local community can act as watchdog organizations. The government should also require an Environmental Impact Assessment (EIA) before allowing a mining operation to go ahead, and further EIAs should be repeated throughout the mining operation to catch potential problems. EIAs are now mandatory in many countries for most large-scale development projects. However, implementation of an EIA is often not enough as the biodiversity conservation is increasingly recognized as an important topic. Essentially, a loss of biodiversity is a loss of natural capital, it is irreversible. Some companies have formulated biodiversity policies and introduced innovative design and operating management. However, governments cannot leave biodiversity conservation policies solely to the companies.

Large-volume waste

Mining produces very large volumes of waste, so decisions about where and how to dispose of it are often virtually irreversible. Facilities designed to contain this waste are among the largest structures ever built. The long-term impacts of the options for waste disposal are among the most important in the minerals cycle.¹⁵

Mine closure planning

MMSD highlighted waste handling and mine closure as a particular aspect of mining operations that is often difficult and expensive to reverse and therefore must be done right in the first place. The best way to get off on the right foot is to ensure that a closure plan exists at the outset of operations. This can guide individual decisions made over the life of the mine to ensure that they are oriented towards this objective. Moreover, mine closure planning should be consider environmental aspects and as well as integrated social and economic aspects. Oftentimes, a large number of people left without jobs when mining sites close. Government and companies should plan ahead of such a situation and take responsibility over the development and diversification of the local economy. Government should also provide ample regulations concerning closure

¹⁵Breaking New Ground: Mining, Minerals, and Sustainable Development report, 2002, IIED and World Business Council for Sustainable Development, Earthscan Publications Ltd, London and Sterling, VA

planning to create a simple, clear, and yet thorough framework for mine closure. Mine closure regulations and guidelines should require and spell out the process regarding the creation of a reclamation and remediation plan, provision of financial assurance, and adherence to a compliance mechanism.

Environmental legacy

The environmental issues of current and prospective mining operations are daunting enough. But in many ways far more troubling are some of the continuing effects of past mining and smelting. These sites have proved that some impacts can be long term and that society is still paying the price for natural capital stocks that have been drawn down by past generations.¹⁶

Access to information

Mining development needs a greater transparency of information and dissemination from the beginning to the end of mine lifecycle. Access to information is not just one of the fundamental rights of the democracy but also a requirement for full transparency. Sharing information with the stakeholders and public ensures transparency and helps outside parties negotiate effectively with the company and promotes understanding about mining activities. Fair information can be a tool to enable all stakeholders to participate in decision-making on equal ground. Open information regimes are critical to more efficient economic decisions by all and effective public participation in decision-making. They will not work without access to justice (MMSD, 2007, p.xxii).

Sector governance: roles, responsibilities, and instruments for change

Achieving effective governance is a major challenge facing the mining sector. Specifically, many resource rich developing countries have poor governance and oversight; this usually results from

¹⁶Breaking New Ground: Mining, Minerals, and Sustainable Development report, 2002, IIED and World Business Council for Sustainable Development, Earthscan Publications Ltd, London and Sterling, VA

a combination of factors, including a lack of institutional resources and capacity, power imbalances, poor performance of the democratic process, lack of political will, lack of coordination and integration, or a lack of representation of stakeholders in decision-making.

Additionally, poor governance is might be due to weak enforcement mechanisms, lack of accountability and transparency, or corruption and rent seeking behavior. Current governance structures continue to reflect imbalances in power among different actors and in the priorities given to their interests at the national and international level.¹⁷ However, sustainable development requires understanding and defining the roles, rights, and responsibilities of all actors – and introducing new instruments for change. Developing countries should pay special attention towards strengthening their institutions, governance and capacity building throughout the mining sector. Government has a central role to play in improving the national policy framework, regulations, and enforcement mechanisms.

The story behind the OT agreement and mining decision-making in Mongolian context

This section will present a brief synopsis of the OT agreement process that has taken place over the last few years and try to connect it with the decision-making theories and principles as well as the mining sector specific issues previously discussed. The focus of this section is “How the government should have made decisions regarding the OT mining agreement”. According to deliberative decision-making theory, the Mongolian government's first step should have been to send the OT draft agreement to the public for input instead of making it a political matter between the two major political parties. However, the government did not include the public into the information sharing and approval process and as a result public suspicion over possible corruption and closed-door deals grew. Eventually, this suspicion erupted into public protests against approval of the OT agreement. This public outcry, along with intervention by some of the larger powers in the mineral resource sector combined to delay approval of the agreement for several years. Moreover, instead of debating the OT agreement on its technical merits, politicians

¹⁷ Breaking New Ground: Mining, Minerals, and Sustainable Development report, 2002, IIED and World Business Council for Sustainable Development, Earthscan Publications Ltd, London and Sterling, VA

were using it as an opportunity for political gain. Politicians thought more about how to take advantage of the inflow of money that the OT agreement entailed to help rally support and win their Parliamentary election campaigns. Indeed, the two biggest parties – the Mongolian People’s Revolutionary Party (MPRP) and the Democratic Party (DP) - competed against each other over how to distribute this new mining revenue to the public.¹⁸ Moreover, neither party conducted a proper quantitative economic impact analysis on the agreement to figure out exactly what the result of it would be.

Eventually, both political parties realized that they could not fulfill all the promises that they had made regarding disbursement of the funds, but by the time this became apparent both parties had established a coalition government. The MPRP and DP had promised money disbursements as part of their election platforms but the actual distribution of funds was problematic as elders, children and disabled people received much less than they had been promised. The current elected President from the Democratic Party promised that he would push the Parliament to distribute the money that they had promised. Even worse, according to one questionnaire in which people were asked about “how they spent their received money”, most answered that they had spent it on lunar new year celebrations.¹⁹ Moreover, on an individual basis the money handed out was not enough to invest in the establishment of a business. However, the money that was distributed was not actually from the taxes or the state's portion of the income from natural resource extraction, it was money that the Mongolian government had borrowed to buy into the OT project. Mongolia has to pay back this money to the investing companies with 9.9 % of interest. Unfortunately, the current government and parliament are trying prevent any disclosure of this information and actively misinforming the public due to a very real fear of being voted out of office in the next election. The public believes that the money that they received was simply the initial share distribution from the OT project. Only a few opposition members of Parliament are willing to speak out about the reality of the situation. The next payment of fifty million US dollars will be paid by OT project in April 2010 after the feasibility study is approved

¹⁸Democratic Party promised to distribute 1 million mongolian tug which is equal to \$730 US, Mongolian Revolutionary Party promised to distribute 1.5 million which is equal to \$1100US.

¹⁹ “82 percent of natural resource share distributed”, Feb 19.2010, www.news.mn

and the agreement becomes official. Government is again preparing to distribute this money to the general public as promised, but this time will be distributed to every citizen and individual amount received will be smaller than before.

If the OT project is to have a long lasting effect on the economic development of Mongolia beyond the mine's lifetime then the government must conduct a thorough economic impact analysis as early as possible and try to coordinate the project with a long term development strategy. If the OT project will result in a large amount of foreign money coming into Mongolia, how can the nation take advantage of this huge opportunity for the economic development? Which industries and economic sectors should receive investment and what policies need to be in place to protect it? Furthermore, one must be mindful of the Dutch disease resource curse that has trapped many other resource rich developing countries. It is necessary to start thinking about how to spend money more efficiently instead of simply distributing borrowed money. If we expect the government to act as it has in the past and near future then Mongolia will not benefit from the OT project, rather, it will widen the gap between poor and rich. When the OT agreement draft first came to the government and parliament, they were obliged to conduct a cost benefit analysis in order to determine project expenses and revenues for the state. However, this process should have included public hearings and discussions with relevant academics and civil society organizations in order to allow for public input. This would have enhanced public participation by informing citizens of the expected costs and benefits for Mongolia from the OT investment as well as soliciting their opinions regarding key questions such as OT's strategic importance to the region. Moreover, outside input on a host of issues would be helpful. How can mining related infrastructure (energy supply, railroad, road etc.) be best used now and in the future for the public good? Should the government exploit other alternative strategically important deposits first? How can we convert, build, and fund the types of social service and development infrastructure that growing communities requires? What is the best way of funding mining projects, and if we are going to spend from the state budget how much money we can afford on an annual basis and over the long term? One can even ask whether or not potential investors should be presented with detailed plans that outline the possibilities for sharing expenses or building infrastructure that will be useful beyond the life of a mine. How will we supply energy for both the mining operations and the existing community? If we cannot supply

the required energy by ourselves, what other possibilities are there? Should we import energy from other countries? Is this strategically secure and economically beneficial for us or not? How will existing communities be affected by mining activities, how many people are expected to migrate to the area and what kind of additional community services will be required? How many more schools, health clinics, hospitals, maternity wards, police stations, fire stations and additional housing complexes should be built? Do we have enough capacity to meet future demand for services such as water, power transmission etc.? How much will maintenance and operations expenses for these services cost? Should the mining company share these expenses with us?

Government and mining companies should jointly discuss with the public the of trade-offs and challenges inherent to development; these include regional health impacts, soil and air pollution, water degradation, loss of biodiversity, and long-lasting mining legacies. Additionally, rather than leaving the mining company with the sole responsibility of determining and mitigating these impacts, the local community should be involved as they are the ultimate stakeholders. However, the Mongolian government left the resolution of all of these issues with the mining companies and depended on them for planning and implementation of policy and mitigation measures. Clearly, government should be responsible for protecting local communities on behalf of the whole nation. In my opinion, local communities and public input was left out of very important decisions regarding their long-term welfare. Civil society organizations, noted scholars, and the general public tried to make their opinions heard within government but with little to no success. In fact the government did not organize even one single public discussion on the OT agreement. Furthermore, the government ignored the technical analyses done by academia and NGOs on the OT project. Indeed, the fact that the analyses conducted by international consultants and NGOs reflect their own point of view emphasizes the need for internal review and analysis of OT by the government. After all, international consultants and domestic researchers' studies might be biased or have left out some important factors. Therefore, the Mongolian government should conduct an analysis that pays attention to important questions brought up in internationally and domestically made analyses. Moreover, important information regarding OT has always been kept secret by some agencies and remained undisclosed even within government circles. In fact, Parliament approved OT without proper information, as it was only provided with an older

feasibility study that was completed in 2005 using baseline data and commodity prices from 2004. Thus, Parliament approved the OT agreement without a current or updated version of the feasibility study. In December 2009, the mining companies introduced their own updated feasibility study but it was inadequate according to technical committee of the Ministry of Mineral Resources; one of the cited reasons was that the project's allocated water resources were not sufficient for the scale of proposed operations and could not depend on the existing reserve rate.²⁰ Additionally, serious tax issues were also raised in last version of the feasibility study. If the OT proposal was not treated like political tool by the main political parties, the public was not lied to regarding the distribution of benefits and the government had reacted properly and did their job well, then this agreement should have been approved much earlier and with less controversy.

²⁰ “The mine hydrology report did not properly report the fact that the mine will drain the Gobi groundwater reserves within 5-6 years and the reserve rate of the OT was 45Mt while 19Mt of it turned out to be “useless”.” <http://www.business-mongolia.com/mongolia-news/the-ot-puzzle/>

Conclusion

This chapter discussed mining decision-making in general and how Mongolian politics influenced the OT agreement related decision-making process. Indeed, mine related decision making in Mongolia can be framed in terms of the main challenges for resource rich countries. An effective governance system is not yet fully established in Mongolia. Mining policy in Mongolia is highly politicized and decisions are made behind closed doors. As well, important information related to the OT project was not officially released and did not have accurate accounting or sufficient exposure to the public. Additionally, the abundance of differing predictions and analyses from different resources made people more even suspicious of the OT agreement. Lack of concrete information contributed to the public's misunderstanding of the situation, and grass roots organizations and movements began to challenge the government's depiction of the OT project. This is directly related to the government's deliberately non-transparent behavior. As a matter of fact, the current government and main political parties pushed the OT agreement for several reasons: first, OT had already been delayed for many years; second, politicians had promised large mining income distributions to the public; third, international investors had high expectations for the agreement; fourth, other large mineral deposits in Mongolia awaited development and the framework of future decisions rests on the OT project. As a consequence of the government's failure to develop a complete plan regarding the windfall profit for the development of Mongolia's mineral resources, future minerals development cannot be counted on as an engine of sustained economic growth for the nation. Moreover, the political parties' encouragement of profligate spending reflects the dangers of the Dutch disease or "resource curse". This can be explained as the officials and party in power have every incentive to promise disbursements of borrowed money hedged on OT's profitability without any regard for saving money for the next government. Employment shifts between different economic sectors have already started as many people are looking for or anticipate jobs from the OT project. Finally, according to the sustainable development principles stated above, the Mongolian government needs to strengthen its institutions and enhance capacity building not only throughout the mining sector but also general government system.

CHAPTER THREE: THE OYU TOLGOI CASE STUDY

Overview and brief history of the Oyu Tolgoi investment agreement

I have chosen to study the OT project as a decision-making case study on mining in Mongolia. There are several reasons why the OT project is important as a case study: the size of the project; the extensive debate among the public; its highly politicized nature, the length of time it took to become an official agreement; and finally that the project will greatly influence Mongolian economic development and simultaneously tests whether Mongolian democratic institutions can successfully function. Moreover, the fact that this is the first huge investment decision made by the Mongolian government and that the OT project required the use of diverse decision-making methods and extensive analysis is also extremely important. The project agreement process itself also clearly shows the progress of current Mongolian decision-making process of the last few years.

The government of Mongolia signed a long-term Investment Agreement with Ivanhoe Mines on Oct 6, 2009. This agreement established a comprehensive framework for the construction and operation of the OT copper-gold mining complex in Mongolia's South Gobi Region²¹. OT is one of the world's largest undeveloped copper-gold porphyry projects.²² The investment agreement creates a partnership between the Mongolian Government - which will acquire a 34% interest in OT's license holder, Ivanhoe Mines Mongolia Inc (IMMI) - and Ivanhoe Mines, which is retaining a 66% interest in OT. However, global miner Rio Tinto, which joined Ivanhoe Mines as a strategic partner three years ago, recently increased its stake in Ivanhoe Mines from 9.9% to 22.4%²³. Under the current financing agreement with Ivanhoe Mines, Rio Tinto may increase its stake to up to 43.1%, with a right to go to 46.6% through purchases on the open market during the next two years.²⁴

²¹ Figure 8: South Gobi and the OT location map, illustrated in appendixes part.

²² "Ivanhoe mines and Rio Tinto sign long-term investment agreement with Mongolia to build and operate OT copper-gold mining complex" Oct 6, 2009, www.ivanhoemines.com

²³ According to press release, "Rio Tinto Increases Ownership in Ivanhoe Mines to 22.4% with US\$232 Million Purchase of Shares" Mar 01, 2010 08:16 ET, <http://www.marketwire.com/press-release/Rio-Tinto-Increases-Ownership-Ivanhoe-Mines-224-with-US232-Million-Purchase-Shares-TSX-IVN-1123821.htm>

²⁴ "Ivanhoe mines and Rio Tinto sign long-term investment agreement with Mongolia to build and operate OT copper-gold mining complex" Oct 6, 2009, www.ivanhoemines.com

Based on Ivanhoe Mines' discoveries at OT during the past nine years, independently verified estimates indicate that OT contains approximately 79 billion pounds of copper and 45 million ounces of gold in measured, indicated, and inferred resources. Initial indications are that the current resources will support planned open-pit and underground mining at OT for 60 years. According to the OT technical studies, annual copper and gold production during the mine's life are expected to exceed the levels projected in the 2005 Feasibility Study.²⁵ The 2005 Plan forecast annual average copper production in the first ten years of operation to exceed one billion pounds per year and gold production to exceed an average of 500,000 ounces per year. According to John Macken, Ivanhoe Mines' President and Chief Executive officer, "Drilling already has discovered mineralization at OT over a distance of 20 kilometers and at depths of 2,300 meters - and it remains open to length and depth. We're confident that additional resources will be delineated and that OT will still be an important part of Mongolia's economy 100 years from now."²⁶

Given the extent of the discoveries to date and the potential for additional finds, Ivanhoe and Mongolian Government negotiators agreed that the OT Investment Agreement should conform with the provision of Mongolia's Minerals Law specifying that projects of this scale qualify for 30 years of stable tax rates and regulatory provisions, with an option of extending the agreement for an additional 20 years.

According to Ivanhoe's officials, OT development and construction requires approximately US\$4 billion in capital investments from the three project partners. A future decision to build a coal powered electricity generating plant would require an additional capital commitment. Current planning indicates that initial production can be achieved at OT in mid- to late-2013.

One of the major obstacles to the conclusion of an investment agreement in the last few years was the Windfall Profits tax. The Mongolian Parliament cancelled the existing 68% Windfall

²⁵ lbd

²⁶ lbd

Profits Tax on copper and gold in Aug 2010, effective by January 1, 2011. Any future taxes introduced will not be imposed on the project unless future legislation is more favorable. If Mongolia enters a treaty that provides greater benefits to the investor, Ivanhoe may request the benefit of such law, regulation, or treaty to help ensure that a stable taxation environment is maintained.

Mongolia will join Ivanhoe Mines and Rio Tinto as a partner in OT. In accordance with Mongolia's Minerals Law, Mongolia will acquire a 34% interest in the OT Project. Ivanhoe will arrange financing for the construction of OT within two years of March 31, 2010, the date that the Investment Agreement took effect; production must begin within five years of financing being secured. Ivanhoe will fund the government's share of initial capital costs through loans and equity during the construction and initial production periods. Ivanhoe will receive loan repayments, redemption of the equity, dividends and annual interest at a rate of 9.9%, adjusted to the US CPI.

The government will have the option to purchase an additional equity interest of 16% of Ivanhoe Mines Mongolia Inc. LLC (IMMI), at an agreed upon fair-market value, one year after the expiry of the initial 30-year term of the Investment Agreement and following the start of the permitted 20-year extension. This would give the government a total maximum interest of 50% of OT for the remainder of the project's operational life. A condition of ownership is that Erdenes²⁷ must remain wholly-owned and controlled by the state for the life of the project. The only exception would be if the state listed Erdenes shares on the Mongolian Stock Exchange, at which time any and all money invested on the Government's behalf would have to be immediately paid in full. The three payments, which will total US\$250 million, will be secured by Mongolian Government bonds that will mature after five years and pay annual interest of 3.8%. An initial \$100 million was transferred to the government in October 2009. A further \$50 million will be transferred within 14 days of the Investment Agreement taking full effect and after all conditions precedent have been satisfied. The final \$100 million will be transferred within 14 days of the

²⁷'Erdenes MGL LLC' is established by Mongolian Government and will work as Government corporate body. OT Investment agreement, Oct 06.2009,

successful raising of funds required to build the open-pit mine and complete shaft and tunnel access to the initial underground deposit at the site.

"Local procurement, training and employment opportunities will only increase in size and scope in the future."²⁸ Looking to the future, specific terms of the Investment Agreement include commitments that: at least 90% of the project's employees will be Mongolian citizens. During construction and any expansion periods, at least 60% of the contractors' employees will be Mongolian citizens; and for mining and mining-related work, at least 75% of contractors' employees will be Mongolian citizens. Ivanhoe will ensure payment of fair wages and equal remuneration for work of equal value.

According to the OT agreement, the company has a commitment to business development, sustainable communities and best-practice environmental management. A report on the economic viability of a copper smelter in Mongolia will be prepared within five years of the start of production at OT - a response to the Government's interest in adding value to Mongolian ore concentrate. Ivanhoe has agreed that any smelter it might build in connection with the OT Project will be located in Mongolia.

If a smelter is built with Ivanhoe's involvement, or through a third party, the Government may request preferential access, on agreed terms, to Rio Tinto's proprietary flash-smelting technology for use at the smelter. OT ore concentrate would be supplied to such a smelter - in which the Government may have an interest - on fair commercial terms and at international prices. Ivanhoe will build an international road from OT to the Gashuun Sukhait crossing on the Mongolian-Chinese border, with costs to be deducted from annual taxable income. The Mongolian Government would be responsible for maintaining the road and collecting fees from other users.²⁹

²⁸ "Ivanhoe mines and Rio Tinto sign long-term investment agreement with Mongolia to build and operate OT copper-gold mining complex" Oct 6, 2009, www.ivanhoemines.com

²⁹ *ibid*

The government may construct, or permit a third party to construct, a railway in the vicinity of OT to the Mongolia-China border that will be made available to OT on competitive commercial terms.³⁰ Ivanhoe would be consulted on the route.

Currently, the final version of the OT feasibility study has been approved by the Mongolian Government and will be discussed by the Parliament in order to finalize the agreement.

Multi-account evaluation of the OT project

Governments and mining companies have different objectives. A government's objectives are to maximize economic and social welfare for the country. A mining company's objective is to maximize profit for shareholders. Agreement on how government and mining companies' objectives are met is reflected in formal agreements (such as an investment agreement) between governments and the mining companies.

In order to gain an understanding of the potential earnings and expenses from the OT project, the parliament, government and other economic institutions in Mongolia should perform a multi-account evaluation (MAE) of the proposed project.

Some analysis is provided here in order to illustrate the type of work that is necessary for making informed decisions. The analysis is illustrative because results are based on a number of assumptions and data that are publicly available.

Below, I focus on quantitative analysis and perform a MAE that includes financial, economic and social analysis.

MAE entails the systematic documentation and assessment of the financial, environmental and other relevant implications of alternative plans and projects in order to determine the advantages and disadvantages they entail. It involves three basic steps: specification of evaluation accounts;

³⁰ Currently, not decided yet, in second week of the Apr, 2010, Mongolian Government and National Security Council will discuss about the OT and Tavan Tolgoi railways route and its related issues.

documentation and assessment of implications under each account; and finally the presentation and interpretation of the results.³¹

The evaluation accounts

Evaluation Accounts define the range of criteria by which the relative advantage or performance of alternative plans and projects can be judged. In general, however, the evaluation accounts should cover the major concerns and objectives of government. These include:

- Financial performance
- Economic development
- Social
- Environment

The financial performance account documents the revenue and expenditure implications of the alternatives from both a corporate and state perspective.

The economic development account documents the nature, magnitude and significance of the personal income and employment impacts.

The social account documents the major impacts of the alternatives on social fabric and values or goals of directly affected communities or groups, including where relevant impacts on specific local community values and concerns.

The environment account documents the nature, magnitude and significance of the major biophysical and natural resource impacts of the alternatives.

According to Graig (1993), not all accounts are relevant to all evaluations. In some cases, there may be no significant implications or matters of concerns under a number of accounts.

Evaluation procedures

The evaluation procedures are designed to provide summary measures or statements that clearly identify the implications, advantages, and disadvantages of the different alternatives. The

³¹ Multi Account Evaluation Guidelines, Crown corporations secretariats, Feb.1993, Province of British Columbia

specific methods for this generally follow the principles of cost-benefit analysis. Advantages and disadvantages are defined and assessed in terms of social benefit and costs as values that people, business, and government attach to the positive and negative implications of the alternatives.

While similar to traditional cost-benefit analysis, the methods used in multiple account analysis differ in two respects. First, in MAE it is explicitly recognized that not all benefits and costs can be expressed in dollar terms. Secondly, even where dollar estimates are developed, it is not generally intended that these be combined into one measure of the overall net benefit.

Combining dollar estimates from different accounts can be misleading because of the different bases and reliability of the estimates.

Financial performance

The financial performance of projects should be documented and assessed on the basis of forecasts of their impacts on annual revenues and expenditures. In the broadest and simplest term, the analysis attempts just what the name implies: to identify and measure all expected benefits and costs from development on a comparable basis. Comparison of benefits and costs is made from the perspective of the economy as a whole and indicates whether or not there is any gain to be realized from proceeding with the project. The scope of analysis is different from and broader than that which we would expect to be adopted a private firm considering the development of a copper and gold mine. This broader scope is made necessary by the fact that what might be counted as a gain or a loss by an individual firm is not necessarily a gain or a loss from the perspective of the economy as a whole. And since the rationale for the analysis is to determine whether and how the proposed developments would contribute to local and national economies, costs to governments will also have to be considered.³²

³² Multi Account Evaluation Guidelines, Crown corporations secretariats, Feb.1993, Province of British Columbia

Analysis

The OT project will extract gold, copper, and a small amount of silver and molybdenum from the South Gobi. For this reason, I will begin the financial performance evaluation with an analysis of metal prices. All numbers and calculations on this analysis shown in current US dollar value, and \$1 US is considered equivalent to 1,420 Mongolian tugrug, reflecting the exchange rate between January and March 2010. Finally, all values are shown in thousands of dollars.

Markets for Mongolia's copper

The Chinese market should be able to absorb all of OT's copper production. China's copper consumption in 2008 was around 5 million tons, while its output of refined copper was about 3.7 million tons. To meet the additional demand for copper, China imports about 4-5 million tones of ore concentrate.³³ In the first six months of 2009, China's apparent consumption of copper increased by 47 per cent year on year. In the next few years, China's apparent copper consumption is forecasted to increase, albeit at a slower rate than in 2009. Continued urban infrastructure spending and a recovery in export demand for copper intensive goods associated with an assumed recovery in OECD economies are expected to support increased copper consumption.³⁴ Compared with other countries, Mongolian copper concentrate will have a freight advantage in selling to China. Copper prices have been very volatile over the past few years, experiencing an unprecedented period of high prices from 2007 to beginning of 2009. It was challenging to choose metal prices for a realistic evaluation because the ten-year average prices would not reflect current price levels, but current price levels alone might also be unrealistic to assume over a longer period.

³³ Southern Mongolia Infrastructure Strategy, Ausaid and World Bank, 2009 The International Bank for Reconstruction and Development / The World Bank, www.worldbank.org

³⁴ Australian commodities, September quarter in 2009, http://www.abare.gov.au/interactive/09ac_sept/htm/copper.htm

Metal prices

Below I show graphs of metal prices over different intervals³⁵ and summarize these price developments in table 1.

Figure 1: Gold price, 2000-2010

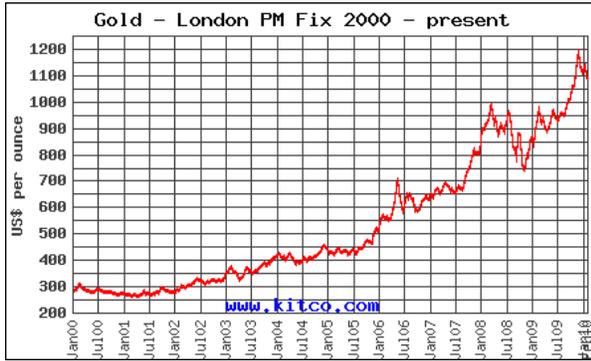


Figure 2: Silver price, 2000-2010

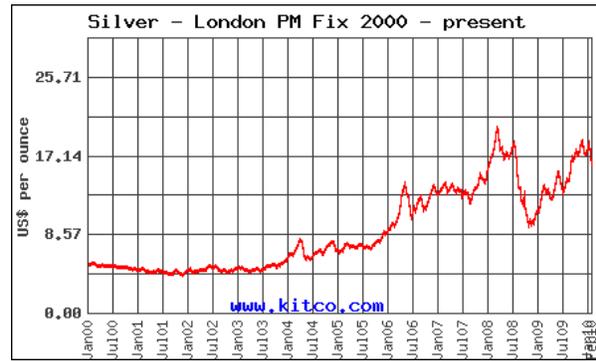
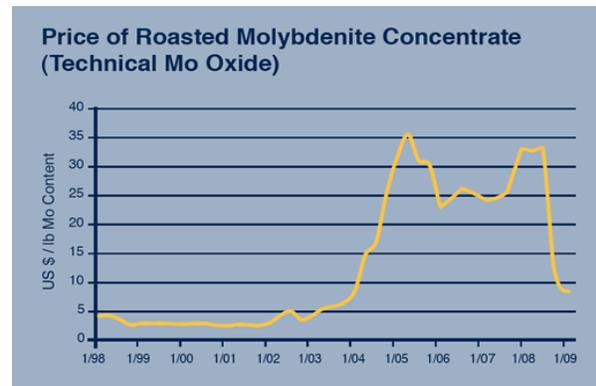


Figure 3: Copper price, 2005-2009



Figure 4: Molybdenum price, 1998-2009



³⁵ <http://www.cochilco.cl> and www.kitco.com

Figure 5: Gold price, 1971-2004



Figure 6: Copper price, 1996-2010

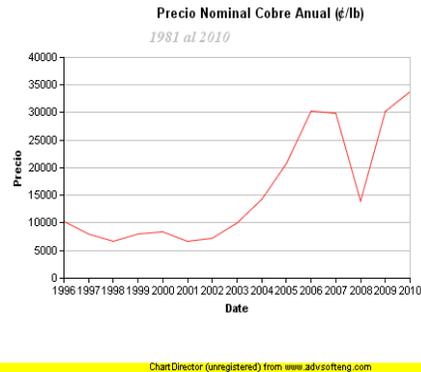


Table 1: Forecasted price of metals based on last three years' and last thirty years' price

	Metal	Price for the metal (US\$)				Average price 2007-10	Average price 1980-2010
		2007	2008	2009	2010		
1	Gold/per oz	695.39	871.96	972.35	1110.6	912.6	447.051 ³⁶
2	Copper/per lb	1.550	2.100	2.300	2.9	2.2155	1.3 ³⁷
3	Silver /per oz	13.38	14.98	14.67	17.38	15.1	=
4	Molybdenum /lb	25	24	11.2	15	15 ³⁸	=

The OT investment agreement frames the project as a thirty-year project, including four years of construction (2010-2013) and 30 years of metal production (2013-2043). According to the latest OT press release, the annual average copper production in the first ten years of operation would exceed one billion pounds per year and gold production would exceed 500,000 ounces per year.³⁹ According to the draft Feasibility Study carried out after approval of the investment agreement in Oct 2009 the project is expected to produce 22 million tons of copper (48.1 billion pounds) and 770 tons of gold (24.7 million ounces) over the life of the operation. The mine will also produce

³⁶ Please see table 11 in appendices part.

³⁷ Referred as lowest price version in the OT feasibility study.

³⁸ Calculated average molybdenum price is 18.8 US\$ but in last few years price of molybdenum fell down therefore took it by lower than average price.

³⁹ Ivanhoe Mines and Rio Tinto sign Long-term investment agreement with Mongolia to build and Operate OT copper gold mining complex, Marketwire-Oct.6, 2009, www.ivanhoe.com

5,300 tons of silver (170 million ounces) and 50,000 tons of molybdenum (109,000 pounds). The OT project estimates combined mineral reserves of 2,801 million tons of processed ore.⁴⁰ The company clearly estimated and planned out the first ten years of annual production according to their Feasibility Study, but have not done the same for the last twenty years of production. If you aggregate the first 10 years worth of production and subtract this from total expected production and divide the result by 20 years, then the result is annual expected production for the last twenty years of the project. Gold and copper production is specified but silver and molybdenum production is not defined by year, therefore I divided sum of resource production by thirty years of project life.

Income for the Mongolian government

The next step is to calculate tax income derived from metal production per year over thirty years of operations. Direct taxes and royalties paid on metals would appear as provincial returns in the public sector, and corporate and personal income tax payments from the mine would appear as returns to Umnugovi province and Mongolia. Table 3 will be shows the integrated tax return income. Before calculating the tax income, table 2 briefly shows applicable taxes and the rates that the government levies on commercial mining activities.

⁴⁰ Draft Feasibility Study of OT in Nov. 2009

Table 2: Annual taxes and rates stabilized for the life of the agreement:

Tax	Percent	Reference
Royalties	5 %	Of sales value of products
Corporate income tax	25%	of annual, income if between MNT 0-0.3 billion; if income exceeds 3.0 billion then MNT300 million plus additional 25% tax to the income over MNT3.0 billion
Personal income tax	10%	From personal income such as labor salary
Customs duty		shall be imposed in accordance with Law on Customs;
Value-added tax	10%	of products produced, sold, imported, work performed and services rendered
Excise tax		in accordance with the Law on Excise Tax
Immovable property and/or real estate tax		
Mining Licenses Fee	\$15/ha	for the licensed area
Income from the sale of immovable property	2%	
Shall not be obliged to pay “windfall” tax or similar tax;	10%	
- Dividend income	10%	
- Royalty income is	10%	
- Income from interest is and	10%	
- Income from sale of rights is set	30%	

The agreement's comprehensive taxation provisions clarify the application of current Mongolian legislation. In addition, Ivanhoe Mines Mongolia Inc. will receive a 10% investment tax credit on all capital expenditures and investments made throughout the OT construction period.

Income from metals

Gold and copper income is calculated based on modest and highest price estimates and divided into the first ten and next twenty years of income according to OT’s production and exploration plan. Detailed analysis is shown in tables 12 and 13 in the appendix. The amount of silver and molybdenum production is small and prices have not fluctuated much in last few years making a fixed price estimate reasonable. Tables 14 and 15 show these estimates in the appendix. In addition to the 5% royalty and 25% corporate income tax, the OT project will account for additional taxes, including a 10% personal income tax from the wages of the national and international on-site workers and those workers employed at jobs created by other OT services.

In my analysis, I have added a 3% increase that includes other tax and fees, these figures are calculated as a fixed 33% tax to the Mongolian government. However, additional small taxes and fees are also illustrated in table 3.

Table 3: Expected income per year from metals and other taxes for the government

Metal	Income from tax for the government per year (1st 10 years with highest price)	Income from tax for government (last 20 years with highest price)	Income from tax for the government per year (1st 10 years with lowest price)	Income from tax for government (last 20 years with lowest price)
Gold income for 1st 10 years	\$150,579		\$73,763	
Gold income for last 20 years		\$296,641		\$145,314
Copper income for 1st 10 years	\$731,115		\$429,000	
Copper income for last 20 years		\$1,392,774		\$817,245
Silver	\$28,204	\$28,204	\$28,204	\$28,204
Molybdenum	\$18	\$18	\$18	\$18
Mining licence payment	\$127	\$127	\$127	\$127
Personal income tax	\$7,225	\$3,795	\$7,225	\$3,795
withholding tax, same as above (2009)	\$65	\$65	\$65	\$65
Vehicle and mobile equipment tax	\$12	\$12	\$12	\$12
immovable property tax	\$38	\$38	\$38	\$38
customs duty	\$97	\$97	\$97	\$97
Land, road, water use fee	\$169	\$169	\$169	\$169
Income per year from the taxes	\$917,648	\$1,721,939	\$538,718	\$995,084

The project will create a large number of new jobs for Mongolians. According to Ivanhoe’s estimates construction will involve 9,200 “person-years of employment”.⁴¹ Table 14 in the appendix shows the number of workers⁴² and their average wages and deductible personal income tax to the government. Average salaries for mining workers are calculated based on the Erdenet mining company’s average salary level and converted to US dollars.⁴³ For foreign workers, salary figures are also taken from Erdenet and the average monthly salary is US\$1,500.⁴⁴ The construction and the operation stages will require different types of skilled and unskilled foreign workers, therefore the \$1,500 monthly salary is an average of total pay. It is difficult to predict how many people will be working as construction workers and how many in

⁴¹ “Person years of employment” refers to the number of jobs times the number of years the job would persist. (expressed as full-time equivalent jobs)

⁴² OT Manpower study, 2009 shows only the 1st ten years of manpower that working at the OT project, rest of last twenty years of employees calculated based on OT agreement that stated at least 90% of employees will be Mongolian citizens. It was difficult to find whole study even I have tried to get studies from the OT project and other organizations.

⁴³ based on the Erdenet mining company’s reliable official source, it was difficult to find OT company’s official information in regard to employee salaries.

⁴⁴ Ordinary workers-1 million tugrug, engineers-2 mil, administrative workers-2.5mil, chief and managers-3mil, drivers-2.5-3mil, office workers-800-1mil, for international workers around 5mil tug. All financial data and Mongolian tugrug converted to US dollar in this analysis. US1\$ equals to 1420 Mongolian tugrug

higher and administrative levels as mining engineers, managers etc. Mongolian workers will be 90% of the workforce during operation. Therefore, foreign workers are assumed to account for 10 percent of the total workforce. Personal income tax is 10% in Mongolia for both foreign and national workers. Other small fees and taxes are taken from disclosed OT financial reports that shown 2000-2009 financial years, including withholding tax, vehicle and mobile equipment, immovable property tax, land, road, and water use fees. Mining license payment calculations are based on OT's current licensed area and are shown in table 10 in the appendix. According to the OT report, more than 500 Mongolian businesses have supplied their services and goods to the project in last few years and expected to work with 1,500 international and domestic corporate business organizations.⁴⁵ It is difficult to estimate impacts on employment that will be created by OT project for other sectors. According to Ernie Stokes's study⁴⁶, for every 1 million tugrug⁴⁷ increase in GDP in the service sector caused by the OT project, another 20 jobs will be created. However, exact employment estimates remain uncertain due to the method used in the study. Therefore, my analysis did not include estimates of additional job creation.

Costs borne by government

Operation of the OT mine will bring very significant benefits to the social and industrial structure of Umnugovi aimag (South Gobi Region). It will ensure that Umnugovi becomes a leading industrial and mining center, further contributing to the national development and progress of the Mongolian economy. Khanbogd, approximately 40 kilometers from OT, will be a major center for Ivanhoe employees and their families. Many people from the Khanbogd soum⁴⁸ will have full-time jobs at OT.⁴⁹ In addition, a higher percentage of the residents of Khanbogd are estimated to depend on jobs indirectly created by spending related to the exploration and

⁴⁵ From OT job fair exhibition in Ulaanbaatar in 13th Mar 2010, <http://olloo.mn/modules.php?name=News&file=article&sid=1168827>

⁴⁶ The Economic and Fiscal Impacts of the OT Project on Mongolia, Phase 2, Ernie Stokes, The centre for spatial economics, Toronto, Canada, Sep 2005

⁴⁷ US1\$ equals to 1420 Mongolian tugrug.

⁴⁸ A *soum* is the administrative unit below the province (*aimag*), perhaps comparable to a U.S. county.

⁴⁹ Ivanhoe Mines and Rio Tinto sign Long-term investment agreement with Mongolia to build and Operate OT copper gold mining complex, Marketwire-Oct.6, 2009, www.ivanhoe.com

development work underway at OT. More than \$1 million US⁵⁰ has been directly invested into Khanbogd by IMMI since 2004.⁵¹ In Khanbogd, IMMI already is enhancing community life through donations that have built an expanded kindergarten as well as supporting initiatives to improve medical services.⁵² However, there are operational expenditures and additional expenses that will have to be borne by government due to the huge influx of population into Khanbogd.

I estimated below the costs which will be incurred by the national and local governments in Khan Bogd soum where the total population is expected to rise from less than 3,000 to around 33,000 residents⁵³. Basic public service costs to government include community or project-related infrastructure expenditures. For example, more schools, kindergartens, hospitals, police and fire stations will be required. Additional costs incurred by public administration include the salaries of national and local civil servants, public infrastructure, and maintenance. Table 4 shows the number of public servants who will work on the project and their wages. Estimates are based on projected population size. Salary estimates are based on the current national average, however salaries are expected to increase in the future, further increasing government expenditures. Annual operating costs for the soum are illustrated in table 5.

⁵⁰ 1.2 billion Mongolian tugrugs

⁵¹ Reference Facts: Oyu Tolgoi Project, Jun 27.07, <http://www.ivanhoe-mines.com/i/misc/OTFact.pdf>

⁵² According to Reference Facts of Oyu Tolgoi Project, Jun.2007, www.ot.mn

⁵³ Urban Infrastructure for Southern Mongolia- Background Study Final Report by CASTALIA, Report to the World Bank Dec.2008

*Table 4: Wages for civil servants*⁵⁴

Position	Number	Salary US\$	Sum	Per year (multiply with 12 months)	30 years of mining life
Public administrative officers	40	\$264.00	\$10,560.00	\$126,720.00	
Medical doctors	63	\$243.00	\$15,309.00	\$183,708.00	
Teachers, and kindergarten	152	\$243.00	\$36,936.00	\$443,232.00	
public safety and emergency services	32	\$263.00	\$8,416.00	\$100,992.00	
Customs officers in Gashuun Suhait	10	\$347.00	\$3,470.00	\$41,640.00	
workers at the community center	20	\$243.00	\$4,860.00	\$58,320.00	
				\$954,612.00	\$28,638,360.00

*Table 5: Operational cost for soum*⁵⁵

Name	Cost per year	cost for 30 years
Administrative cost		
Soum (village) center expenditure per year (see detailed explanation)	\$2,598	\$77,954
Civil servant's salary for thirty years (subtract from general expenditure)	\$955	\$28,638
General administrative cost for the government	\$1,644	\$49,316

Note: Value Shown in Thousands of Dollars

According to international standards, a mining company and government should jointly determine how many people will be employed in the construction and operation of a project. They should also determine how much housing will be needed for the construction and permanent workforces. Will employees bring their family to the soum or not? If yes, how large a population influx might be expected? What type of housing will be needed for this population? Should the government and a private company share construction and maintenance expenses for additional housing capacity required? How should workforce-related transportation needs

⁵⁴ Numbers here predicted based on expected population size and wages based on current civil servants average salaries.

⁵⁵ Administrative cost calculated based on the other standard soum expenditure. For example, 1 soum with 5000 people spends 387323 US\$ per year (550 million tugrug), if multiply with expected Khanbogd soum's population as 6.7 times bigger population than ordinary soum) *6.7=2598480. Public servant's salary was calculated before finding administrative cost data and expected included in the administrative cost, therefore subtracted from administrative cost in order to make correct analysis.

(roads, travel, and railway), health and education requirements, utilities provision (power, water, heating, sewerage) be met? How much infrastructure capacity in these various areas is needed, and when will capacity be expanded? Who will design, build, operate, and maintain the infrastructure? What quality of infrastructure services will be provided, and what prices will consumers pay for those services? Table 6 shows the predicted expenditure for the government related to new infrastructure, including the number of housing units, hospital facilities, schools, community centers and administration buildings, as well as the cost of services based on the expected population influx to Khanbogd soum.

Planning and operation of infrastructure

A wide range of options for the planning and operation of infrastructure exist within Mongolia. National infrastructure has traditionally been planned and operated the by national government ministries and state-owned enterprises. Provincial (aimag) governments control municipal public urban service organizations (PUSOs) by owning their assets.⁵⁶ Internationally, many governments take responsibility for planning and controlling infrastructure assets. Even if private companies build, own, and operate infrastructure, governments typically specify where the infrastructure should be built, and who should benefit from it.

The national government is the institution best able to coordinate investments across multiple provinces and soums, and across multiple sectors. Aimag capitals (including Dalanzadgad) rely on national government to run their power plants. The PUSOs, which provide water services in many soums (villages) often look to Ulaanbaatar's Water Supply and Sewage Authority (USUG) for technical support.⁵⁷ On the other hand, national governments are not likely to understand or appreciate the needs of provincial and local populations as well as provincial and local officials do. Mining companies in other countries have also played a role in planning and controlling infrastructure. Mining companies, however, may be not interested or lack the capacity to plan and operate infrastructure for towns that include employees as well as a general population.

⁵⁶ Southern Mongolia Infrastructure Strategy, World Bank Australian Government, and PPIAF, 2009

⁵⁷ *Ibid*

Because of their business interests, mining companies may plan infrastructure for their workers and attached families, but will be less interested in making that infrastructure available to existing non-mining populations or newcomers. Mining companies also do not specialize in planning and controlling infrastructure assets. A government entity, whether national, provincial, or national, has incentives for planning infrastructure that are better aligned with those of the non-mining populations, and typically has more experience planning infrastructure for towns, and controlling those infrastructure assets.

Paying for infrastructure

Table 6 below estimates the cost of infrastructure needs based on assumptions including population size. The costing assumes that small 5MW combined heating and power plants are built to supply electricity and heat to the population. In practice, the population associated with OT could be served with power from the proposed 450 MW OT power plant, and the population could be distributed across several towns. World Bank estimates differentiate between residents of gers (yurts) and apartment dwellers, but do not differentiate between these two population groups in terms of what utility services these groups would require. WB estimated that 4,792 apartments are needed for the workers that would be located in Khanbogd soum.⁵⁸ However, while the national government is not responsible for covering the full cost of these apartments, but should consider paying at least half. WB also estimated that an additional 3,333 gers would be needed at a cost of US\$500 each for the workers but that the government would not be responsible for these expenses.

Currently, it is not clear how apartments would be financed. Generally, apartments are private in Mongolia and the state does not have any role in providing financing for construction. Customers pay for the capital costs associated with infrastructure construction in addition to the operating costs. However, for OT employees this will be difficult to handle if a sudden influx of people coming into the soum center is not provided with housing options. Mining company and

⁵⁸ Urban Infrastructure for Southern Mongolia- Background Study Final Report by CASTALIA, Report to the World Bank Dec.2008

government together finance apartments by splitting up their costs and selling units to the workers, yet mortgaging might be the better solution. It is not possible for the private sector to invest in infrastructure services unless it is clear that the tariffs will cover costs over the life of the investment. If the tariffs paid by consumers do not cover the capital costs, it is very difficult to raise the finance resources necessary for the replacement and renewal of assets as they age.⁵⁹

Internationally, some private mining companies have subsidized infrastructure services for their workers. In such cases, the subsidy expense is met from mining revenues, reducing the net revenue which is available to pay government taxes and charges.⁶⁰ When the private sector invests in infrastructure, it does so with the expectation of getting back the initial capital expenditure, plus a return reflecting the time value of money and a risk premium. In order to induce private investment, tariffs need to be set at a level which will ensure this rate of return. If the government does decide to regulate the price of infrastructure tariffs to a level below the cost of service, it is important that the service provider should be compensated with an explicit subsidy. Ultimately, either consumers or taxpayers will pay for all infrastructure services, and the service received is determined by the level of those payments.

However, other infrastructure costs such as construction of power plants, electricity transmission lines, heating, water, sanitation, wastewater, and utility services would be handled by the government. The government and mining companies should consult on who should have a dominant role in construction and determine how the infrastructure is to be built and managed and whether to include the private sector or not. The World Bank⁶¹ recommendations state that it is important to allocate responsibility for town development in Southern Mongolia to an entity, which has the ability to raise finance, and to act quickly and efficiently in getting the towns and infrastructure services built.

⁵⁹ Urban Infrastructure for Southern Mongolia- Background Study Final Report by CASTALIA, Report to the World Bank Dec.2008

⁶⁰ Ibd

⁶¹ Urban Infrastructure for Southern Mongolia- Background Study Final Report by CASTALIA, Report to the World Bank Dec.2008

OT will support and participate in the Southern Gobi Regional Development Plan which is planned by the national government to establish branch campuses of colleges and universities in the field of mining, technical sciences, and agriculture in South Gobi region including Khanbogd soum.⁶² In addition, vocational training centers will be set up in the area. It is currently unclear who will finance these vocational training facilities and they are therefore not included in the estimates. During the construction period, a hospital with 302 beds will be built. In addition, health centers with various specialization areas as well as out-patient dispensary and family-based practices will be operating in the area.

OT power supply

According to the OT agreement, Ivanhoe has the right to obtain power from inside or outside Mongolia, including arranging the construction of a high-voltage line from OT to the Mongolia-China border during the construction phase. Ivanhoe also has the right to build or sub-contract construction of a coal-fuelled power plant at an appropriate site to supply the project, which could be supplemented by renewable energy. Within four years of the start of mine production, all power requirements must be sourced from within Mongolia, either from a coal-fuelled plant or from the national distribution grid.⁶³ Coal for the plant would be supplied from Tavan Tolgoi, or possibly from Tsagaan Tolgoi. If running at full capacity, the plant would require around 1.8 million tons of coal per year.⁶⁴ In addition, the power supply plan should match the South Gobi region future plan. According to the World Bank study, without the OT TPP (Thermal Power Plant) it would be difficult to supply growing demand in Southern Mongolia. In 2013 and 2014, before the commissioning of a power plant at Tavan Tolgoi, capacity including potential transfers from the central electricity supply (CES) would be insufficient to meet electricity demand in Southern Mongolia. This could be addressed through additional imports of Chinese power. However, this may incur higher costs for electricity than could be supplied by a local

⁶² Ivanhoe Mines and Rio Tinto sign Long-term investment agreement with Mongolia to build and Operate Oyu Tolgoi copper gold mining complex, Press release, Marketwire-Oct.6, 2009, www.ivanhoe.com

⁶³ Ivanhoe Mines and Rio Tinto sign Long-term investment agreement with Mongolia to build and Operate OT copper gold mining complex, Press release, Marketwire-Oct.6, 2009, www.ivanhoe.com

⁶⁴ Urban Infrastructure for Southern Mongolia- Background Study Final Report by CASTALIA, Report to the World Bank Dec.2008

power plant, and problems of reliability may arise depending on a single inter-connector. Currently, Ivanhoe is negotiating to build the Nariin Suhait and Noyon Sevrei distribution lines, and Nariin Suhait and Noyon soum and Noyon Sevrei substations. The expenses for the construction of these projects will be reimbursed to Ivanhoe by the Mongolian government. Detailed costs are illustrated in table 6.

Table 6: OT mining development related Khanbogd soum's expenditure from the government

Name	Number	Unit	Per Unit \$	Cost (once), including operating	expenditure and maintenance	Total
Construction						
Apartments (if share with company)	4,792.00	Apartments	\$79	\$188,967		
Hospital 302 beds	302.00	beds	\$13	\$3,940	\$900	
Family hospitals	1,175.00	persons/day	\$3	\$3,460		
Equipment				\$1,341		
maternity hospital for new building	50.00	beds		\$1,057		
School						
School (640 seat, new)	8,051.00	students	\$1	\$10,603	\$867	
dormitory (100 beds)	671.00	beds	\$2	\$1,602		
recreation facility				\$1,110		
equipments for recreational facility				\$10		
computers & equipments for school and kindergarten				\$105		
Kindergarten						
kindergarten	2,013.00		\$3	\$5,389	\$549	
musical equipments and toys for the kindergarten and community center				\$291		
Community center						
community center new building				\$201	\$69	
equipment, furniture				\$17		
Administration						
Administration building					\$89	
Police						
Police office (new building)				\$590	\$208	
special purpose equipments				\$104		
vehicle and field equipments				\$104		
State emergency office						
Fire office new building in Umnugovi(construction started)				\$402		
Fire vehicle with special equipments (3)				\$416		
New fire office building in Hanbogd soum				\$649		
Border protection office						
Border force facility building (Gashuun Suhait)					\$69	
Portable water (see detailed WB calculation)				\$3,993	\$2,497	
Waste water				\$10,295		
Heat Distribution				\$36,312		
Construction for well and source of fresh water				\$284		
Government support to South Region infrastructure service from government (ADB, 400 000 \$)				\$75		
Solid Waste (see detailed WB study)				\$1,292		
Electricity						
Coal plant (5 MW CHP)(currently in discussion whether to share the cost or not, if share the new construction expense will be)	1.00	Plant	\$8,000	\$4,000		
Nariin Suhait and Noyon Sevrei distribution line (currently build by OT but later compensate by Government)				\$917		
Nariin Suhait and Noyon soum and Noyon Sevrei substation (same as above)				\$1,250		
Railway (not clear now)						
Road						
Dalanzadgad-Tavantolgoi-Oyu Tolgoi, (currently OT building the road but government will compensate later, 2010-2013)	251.00	km		\$66,167		
Inside the town	9,067.00	m		\$	\$1,795	
				\$346,740	\$5,249	\$351,990

Table illustrates the government's spending for the infrastructure and other public services see the reference⁶⁵.

⁶⁵ Apartment numbers, hospital, and family hospital information referenced from WB and Castalia studies. Maternity hospital need to be build and estimated based on expected numbers of population in soum, expenditure for school, kindergarten, community center, administration

Infrastructure

OT railway

During the initial five years of operation, the transport of bulk supplies (including coal from Tavan Tolgoi) and the delivery of copper concentrate to China will be by access road to the railhead. Direct rail transport is considered a long-term transportation solution after this initial development period. The government is planning to build a railway line from Zuun Bayan to OT (332 km) and another extension from OT to Tavan Tolgoi (150 km). These plans were made in recognition of the potential of OT as an economic (mining) cluster.

OT road transport

As railway construction is envisioned a long-term goal and entails significant financial commitments, the building of roads presents an attractive alternative for access to different parts of Mongolia. In the southern zone, the current planning includes the Dalanzadgad-Tavantolgoi-OT 251 km road from 2010-2013. In addition, a road will link OT to Gashuun Sukhait and a 50 km road extending from OT to the town of Hanbogd soum. Tavan Tolgoi to Gashuun Sukhait road allows greater ease in transporting copper and coal to the PRC's Inner Mongolia Autonomous Region (IMAR), while the second road will make commuting from Hanbogd soum to OT possible for the workforce.

Figure 7 maps Ministries' plans for South Gobi transport infrastructure. It also does show the lines to Sainshand from OT and Tavan Tolgoi.

building need a new building and estimated based on state budget law 2009 as referenced by similar base and multiplied by population numbers in soum. In addition, the government should supply police and state emergency services (fire office). According to current capacity, it cannot provide services to expected future huge influx of population, therefore public services need a new building and equipments. According to OT agreement, project will export their product through Gashuun suhait borderline to China, therefore Gashuun suhait border station need to be improved regard to expected expanded services for the OT and other South Gobi mining activities. ADB already approved Southeast Gobi Urban and Border Town Development Project (Gashuun suhait and other border towns) help to mining development in Southeast Region that costs US 475,000\$ and government will pay US 75,000\$ (ADB, 2008). Water, heat distribution, solid waste services and related infrastructure development will be one of the other required expenses from the government. Dalanzadgad-Tavantolgoi-OT road line will be build by OT, however government will compensate later (estimated cost taken from 2010-2013 state budget law plan). Inside the Khanbogd town roads should be improved and expected costs illustrated in the table. Table divided into cost once that build new building, infrastructure, and to some of its maintenance costs during the project life calculated based on similar costs to other soum center as standard in state budget law.

The Ministry of construction and urban development's plans include:

- Railway: Tavan Tolgoi to Oyu Tolgoi to Tsagaan Suvraga to Zuun Bayan (152 km)
- Roads: UB to Choir to Sainshand to Zamyn Uud to Tsagaan Suvraga to Oyu Tolgoi to Tavan Tolgoi (470 km)
- Air: An international airport with a paved runway will be constructed in Khanbogd soum.

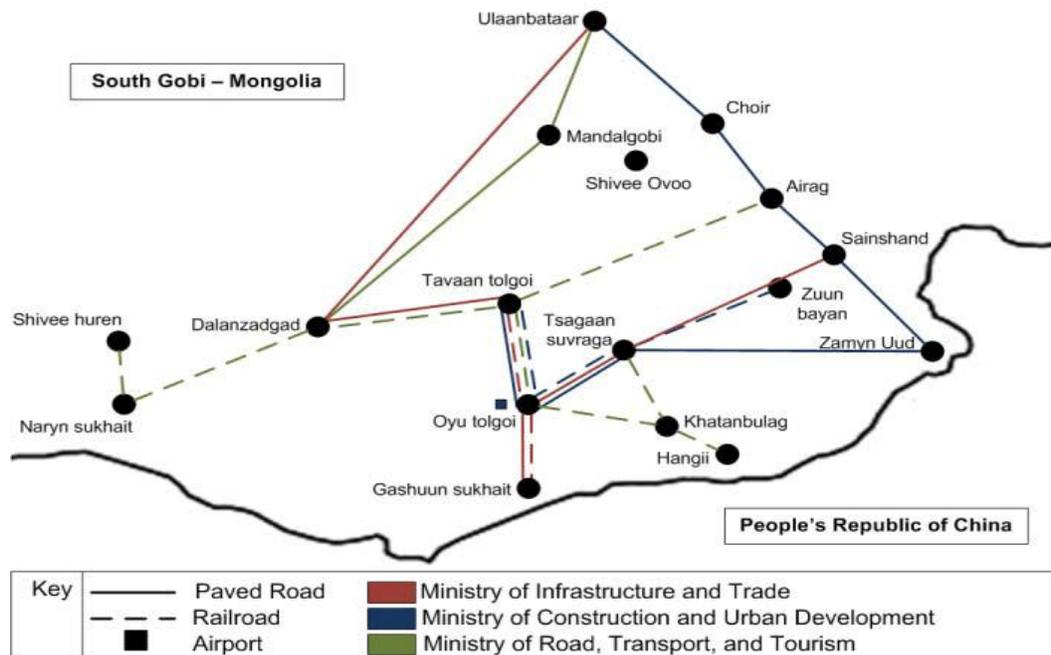
The ministry of road, transport and tourism's plans for south Gobi include:

- Railway: Several routes are proposed totaling 1455 km. These include:
- Airag to Tavan Tolgoi (470 km)
- Tavan Tolgoi to Oyu Tolgoi to Khatanbulag to Hangii (445 km)
- Roads: UB to Mandalgobi to Dalanzadgad (500 km).

The ministry of infrastructure and trade plans include:

- Railway: Tavan Tolgoi to Oyu Tolgoi to Gashuun Sukhait (270 km)
- Roads:
- Phase 1: Oyu Tolgoi to Gashuun Sukhait (105 km) via Tavan Tolgoi to Oyu Tolgoi route
- Phase 2: Ulaanbaatar to Dalanzadgad to Tavan Tolgoi and Sainshand to Tsagaan Suvarga to OT.

Figure 7: Government ministries' infrastructure plans for south Gobi transport infrastructure



Sources: Engineer Geodesy, LLC. "Galbyn Gobi" and presentations from: "Infrastructure Strategy for South Mongolia, Roundtable Discussion". May 15, 2008.

Water resources

The extent of underground water resources in Southern Mongolia is not known with any precision. OT water requirements will be supplied from the Gunii Hooloi basin that extends 35 to 75km north of OT. Bores will be developed in the southeast and the northeast areas of the Gunii Hooloi borefield with storage lagoons along the pipeline to provide for emergency use without affecting site water needs. A permanent water treatment facility and bottling plant will be constructed near OT to treat raw water from the Gunii Hooloi borefield to drinking (potable) and domestic water standards.⁶⁶ However, a difference in understanding over the water resource exists between the government and Ivanhoe. If there is not enough water for ore processing, it will be very difficult to produce the expected amount of metals. A feasibility study of OT was submitted to the government in Feb 2010 but it was rejected due to four reasons, including the water supply issue.

Total cost for the government

Table 7 shows the overall costs for the government during the project life. It includes initial costs for the infrastructure and public service cost, cumulative cost of wages for civil servants, and operational cost for the soum center per year. Costs are calculated based on current Mongolian tugrug and US dollar value. Estimated costs will help to calculate Present Value of the project and make clear how much the government will need to spend for public services and infrastructure.

⁶⁶ OT feasibility draft study, Nov 2009,

Table 7: General cost for the government

Name of the cost	Initial investment cost for the soum from Government	Per year cost	Cost for 30 years	General cost for the Government
Infrastructure and public service	\$351,990			\$351,990
Salary for the civil servants		\$955	\$28,638	\$28,638
Operational and administrative general cost for the soum center		\$1,644	\$49,316	\$49,316
Total	\$351,990	\$2,598	\$77,954	\$429,944

Government loan

My next calculation will be the loan to the government by Ivanhoe Mines and Rio Tinto. In accordance with Mongolia's Minerals Law, Mongolia will acquire a 34% interest in the OT Project. The Mongolian government should raise \$1.7 billion US for their 34% and will borrow \$900 US million from the OT project and \$800 US⁶⁷ million from other sources. The \$900 US million loan by Ivanhoe will carry 9.9% annual interest, however it is not clear now where the remaining \$800US mil will be raised and at what cost. I have based my calculations estimated on an assumption of similar conditions for the entire financial package, i.e. with a 9.9% interest rate. According to the agreement, the government will repay its debt from dividend payments. However, no dividend payments are likely before the end of year 9 of the project. In order to calculate the government debt, first the government dividend has to be estimated to deduct tax and operational costs. In order to find the total income after deducting taxes, I subtracted taxes from total income. Also, these figures were calculated under both the high and low metal pricing scenarios. (Table 18 in appendices.)

⁶⁷ Bayartsogt interview, Minister of Ministry of Finance, Mongolia

Table 8: Income after tax and production cost, government dividend

with high price							
	income after tax for the com (c1)	production cost (c2)	Net income per year (c3=c1-c2)	Gov share (c4)	Gov dividend per year (c5=c3*c4)	Company net income per year (c6=c3-c5)	Company net income 1st 8 years without share (c7=c3*8)
1st ten years	\$1,846,897	\$269,652	\$1,577,245	0.34	\$536,263	\$1,040,982	\$12,617,960
last 20 years	\$3,486,815	\$512,322	\$2,974,493	0.34	\$1,011,328	\$1,963,165	
with modest price							
	income after tax for the com (c1)	production cost (c2)	Net income per year (c3=c1-c2)	Gov share (c4)	Gover dividend per year (c5=c3*c4)	Company net income per year (c6=c3-c5)	
1st ten years	\$1,077,553	\$269,652	\$807,901	\$0.34	\$274,686	\$533,215	\$6,463,208
last 20 years	\$2,011,077	\$512,322	\$1,498,755	\$0.34	\$509,577	\$989,178	

Reference: c1= after 33% tax and additional payments subtracted except personal income tax, c2=all metal product added by per year and divided into 1st 10 years and last 20 years,⁶⁸ production cost taken from OT detailed preliminary studies that illustrated 0.40 cent per lb and oz including all taxes⁶⁹ therefore subtracted 33% tax and operational cost become 0.268 cent

Now it is possible to find out the total income for the government from the taxes and dividends recorded. Table 9 shows the government's total income under high and modest pricing scenarios for the metal market. It is not possible to share dividend in the first eight years therefore not calculated as in income. According to these calculations, the government will annually collect \$917,608 US from taxes over the first 8 years under the high pricing scenario. In contrast, over the next 20 years total annual government income will be \$2,733,266US and include both taxes and dividends. However, under the modest pricing scenario, annual government income for the corresponding eight and twenty year periods will be \$538,717 US and \$1,504,660 US respectively.

⁶⁸ Please see the table 17 in appendices "Production"

⁶⁹ <http://www.ivanhoemines.com/i/pdf/IVN-Feb022004.pdf>, 2004

Table 9: Total government income with dividends from the OT project.

Life of mine, 30 years	Income from the taxes with high price	Income from dividend with high price	total income with high price	Income from the taxes with modest price	Income from the dividends with modest price	total income with modest price
2013	\$917,648		\$917,609	\$538,718		\$538,718
2014	\$917,648		\$917,609	\$538,718		\$538,718
2015	\$917,648		\$917,609	\$538,718		\$538,718
2016	\$917,648		\$917,609	\$538,718		\$538,718
2017	\$917,648		\$917,609	\$538,718		\$538,718
2019	\$917,648		\$917,609	\$538,718		\$538,718
2020	\$917,648		\$917,609	\$538,718		\$538,718
2021	\$917,648		\$917,609	\$538,718		\$538,718
2022	\$917,648	\$536,263	\$1,453,912	\$538,718	\$274,686	\$813,404
2023	\$917,648	\$536,263	\$1,453,912	\$538,718	\$274,686	\$813,404
2024	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2025	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2026	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2027	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2028	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2029	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2030	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2031	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2032	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2033	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2034	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2035	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2036	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2037	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2038	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2039	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2040	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2041	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2042	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
2043	\$1,721,939	\$1,011,328	\$2,733,267	\$995,084	\$509,577	\$1,504,660
Total			\$64,914,032			\$36,029,759

Loan payment

Currently, it is not clear how the Government's loan will be repaid. However, according to the Research Center's position with the Mongolian Parliament, the Government will use its dividend income to pay back the loan. Therefore, it is necessary to calculate how the Government will spread out the life of the loan over the schedule of expected dividend income. If the Government

will not receive a dividend in any of the first eight years then these calculations must be based on the next 20 years of constant dividend income which is \$1,011,327 US⁷⁰ when the metal prices are high and \$509,576 US when prices are lower. The calculation methodology used is NPER (rate, pmt, pv,) = period⁷¹ and under the high price scenario NPER(9.9%; -1,011,327; 1,700,000) = 1.73⁷² years. When metal prices are low NPER (9.9%; -509,576,801; 1,700,000) = 3.8⁷³ years. However, since the annual dividend income is the sole repayment source, the first eight years of interest should be added into the main loan. Thus, 1,700,000+ 1,346,400 = \$3,046,400 US must be paid back. If the previous calculations are repeated with interest payments factored in then NPER (9.9%; -1,011,327,547; 3,046,400) = 3.35⁷⁴ years under the high pricing scenario. For the lower price, NPER (9.9%; -509,576; 3,046,400) = 8.2 years.⁷⁵

Net present value

The standard criterion for deciding whether a government program can be justified on economic principles is *net present value* -- the discounted monetized value of expected net benefits (i.e., benefits minus costs). Net present value (NPV) is computed by assigning monetary values to revenues and costs, discounting future revenues and costs using an appropriate discount rate, and subtracting the sum total of discounted costs from the sum total of discounted revenues.

Discounting revenues and costs transforms gains and losses occurring in different time periods to a common unit of measurement. Projects with positive NPV increase social resources and are generally preferred while projects with negative NPV are generally not implemented. However, NPV is not always computable as the monetary values of some benefits or costs cannot be determined.

⁷⁰ according to equation, it requires constant number, therefore not included 1st ten years of last 2 years (see the table) because of different from last twenty years

⁷¹ NPER-returns the number of periods for an investment based on periodic, constant payments and a constant interest rate. Rate-is the interest rate per period and 9.9%; Pmt-is the payment made each period, it cannot change over the life of the investment; Pv-is the present value, or the lump-sum amount that a series of future payments is worth now.

⁷² NPER method figure 9 shown in appendices

⁷³ NPER method figure 10 shown in appendices

⁷⁴ NPER method figure 11 shown in appendices

⁷⁵ NPER method figure 12 shown in appendices.

Before computing NPV, it is necessary to discount future revenues and costs. This discounting reflects the time value of money in that revenues and costs are worth more if they are experienced sooner. All future revenues and costs, including non-monetized benefits and costs, should be discounted. The higher the discount rate, the lower the present value of future cash flows. For typical investments with costs concentrated in early periods and revenues following in later periods, raising the discount rate tends to reduce the NPV. In this analysis, costs are discounted to 2010 present values equivalent using an 8 percent real/social discount rate. Table 10 shows the Present Value and Net Present Value of the OT project. Under both pricing scenarios the OT project has a positive NPV worth \$18,745,505 US when metal prices are high and \$10,365,216 US when prices are low.⁷⁶

⁷⁶ Discounting Deferred Costs and Benefits: 30-year project which will commit the Government to the stream of real (or constant-dollar) expenditures appearing in column (2) real benefits from high metal prices appearing in column (3), real benefits from modest metal prices appearing in column (4). The discount factor for a 8 percent discount rate is shown in column (5). The present value cost for each of the 30 years is calculated by multiplying column (2) by column (5); the present value benefit for each of the 30 years with high price is calculated by multiplying column (3) by column (5). the present value benefit for each of the 30 years with modest price is calculated by multiplying column (4) by column (5). The present values of benefits when price is high and low are presented in columns (7) and (8) respectively. The sum of column (6) is the total present value of costs and the sum of column (7) is the total present value of benefits when price is high and the sum column (8) is the total present value of benefits when price is low. Net present value is, the difference between the sum of discounted benefits and the sum of discounted costs and shown in column (9),(10).

Table 10: Net present value of the OT project

Year since initiation renewal (1)	Expected yearly cost (2)	Expected yearly revenue with highest price(3)	Expected yearly revenue with lowest price(4)	Discount factors for 8% (5)	value of costs Col. 2 x Col. 5 (6)	revenues with high price Col. 3 x Col. 5 (7)	revenues with lowest price Col. 4 x Col. 5 (8)	NPV with highest price Col7-Col6, (9)	NPV with lowest price Col8-Col6, (10)
2013	\$354,588	\$917,609	\$538,718	0.9259	\$328,313	\$849,614	\$498,799		
2014	\$2,598	\$917,609	\$538,718	0.8573	\$2,228	\$786,666	\$461,843		
2015	\$2,598	\$917,609	\$538,718	0.7938	\$2,063	\$728,398	\$427,634		
2016	\$2,598	\$917,609	\$538,718	0.735	\$1,910	\$674,443	\$395,958		
2017	\$2,598	\$917,609	\$538,718	0.6805	\$1,768	\$624,433	\$366,598		
2019	\$2,598	\$917,609	\$538,718	0.6301	\$1,637	\$578,185	\$339,446		
2020	\$2,598	\$917,609	\$538,718	0.5834	\$1,516	\$535,333	\$314,288		
2021	\$2,598	\$917,609	\$538,718	0.5402	\$1,404	\$495,692	\$291,015		
2022	\$2,598	\$1,453,912	\$813,404	0.5002	\$1,300	\$727,247	\$406,865		
2023	\$2,598	\$1,453,912	\$813,404	0.4631	\$1,203	\$673,307	\$376,688		
2024	\$2,598	\$2,733,267	\$1,504,660	0.4288	\$1,114	\$1,172,025	\$645,198		
2025	\$2,598	\$2,733,267	\$1,504,660	0.3971	\$1,032	\$1,085,380	\$597,501		
2026	\$2,598	\$2,733,267	\$1,504,660	0.3676	\$955	\$1,004,749	\$553,113		
2027	\$2,598	\$2,733,267	\$1,504,660	0.3404	\$885	\$930,404	\$512,186		
2028	\$2,598	\$2,733,267	\$1,504,660	0.3152	\$819	\$861,526	\$474,269		
2029	\$2,598	\$2,733,267	\$1,504,660	0.2918	\$758	\$797,567	\$439,060		
2030	\$2,598	\$2,733,267	\$1,504,660	0.2702	\$702	\$738,529	\$406,559		
2031	\$2,598	\$2,733,267	\$1,504,660	0.2502	\$650	\$683,863	\$376,466		
2032	\$2,598	\$2,733,267	\$1,504,660	0.2317	\$602	\$633,298	\$348,630		
2033	\$2,598	\$2,733,267	\$1,504,660	0.2145	\$557	\$586,286	\$322,750		
2034	\$2,598	\$2,733,267	\$1,504,660	0.1986	\$516	\$542,827	\$298,826		
2035	\$2,598	\$2,733,267	\$1,504,660	0.1839	\$478	\$502,648	\$276,707		
2036	\$2,598	\$2,733,267	\$1,504,660	0.1703	\$443	\$465,475	\$256,244		
2037	\$2,598	\$2,733,267	\$1,504,660	0.1576	\$410	\$430,763	\$237,134		
2038	\$2,598	\$2,733,267	\$1,504,660	0.146	\$379	\$399,057	\$219,680		
2039	\$2,598	\$2,733,267	\$1,504,660	0.1352	\$351	\$369,538	\$203,430		
2040	\$2,598	\$2,733,267	\$1,504,660	0.1251	\$325	\$341,932	\$188,233		
2041	\$2,598	\$2,733,267	\$1,504,660	0.1159	\$301	\$316,786	\$174,390		
2042	\$2,598	\$2,733,267	\$1,504,660	0.1073	\$279	\$293,280	\$161,450		
2043	\$2,598	\$2,733,267	\$1,504,660	0.0993	\$258	\$271,413	\$149,413		
Total	\$429,944	\$64,914,032	\$36,029,759		\$355,156	\$19,100,662	\$10,720,372	\$18,745,506	\$10,365,216

NOTE: The discount factor is calculated as $1/(1 + i)^t$ where i is the interest rate (.08) and t is the year.

Social impacts on the community due to migration to soum villages

Influx of people

Employment at the OT project will stimulate population growth rates much higher than the direct employment numbers. Miners will bring their families with them to the region, and additional population influx will be induced by commercial opportunities. According to ADB⁷⁷ study, one plausible estimate is that the total population will grow by 33,544 people. It is expected that 4,000 new mine workers move to Khanbogd soum accompanied with their immediate family, and since each family contains 3.1 members on average, migration will account for around 12,400 new residents. An additional population growth spurt will occur as business and commercial interests move into the area to support the new mine worker population. This extra growth spurt is predicted to produce another 16,400 migrants and contribute the net population growth of 33,544 people by 2020. In contrast to mine operations, the level of population influx associated with mine construction is difficult to predict. Construction workers will typically be housed in temporary construction camps without their families. According to a OT manpower⁷⁸ study, the construction worker population will reach a peak of around 13,000 temporary workers. As construction workers are typically housed in temporary camps with no accompanying families, they will migrate between job sites at other development projects within the South Gobi region.⁷⁹ Unfortunately, it is also difficult to predict how the local population will decrease or increase in the future due to migration or natural growth. A portion of the newly migrated mine workers will want to create or assimilate into the pre-existing community, settle down, and raise their children. The new influx of these mining workers and their families to the community will undoubtedly strain the social services network provided by the government. In particular, the construction and expansion of schools and educational infrastructure will be a major issue for the local government. Likewise, more teachers and instructors will need to be brought in to staff new schools. Moreover, as the portion of the labor force of reproductive age increases and the living

⁷⁷ Mongolia: Trade Facilitation and Logistics Development Strategy Report, Asian Development Bank, 2009

⁷⁸ OT, Manpower study, Jun 2009

⁷⁹Urban Infrastructure for Southern Mongolia- Background Study Final Report by CASTALIA, Report to the World Bank Dec.2008

environment changes, new health issues will arise and demand for health centers, maternity wards, hospitals and mental health care will increase. The government will have to increase the staffing for these local health services and hire new health care professionals and nurses. Furthermore, the new wave of population growth will both exacerbate old social issues and cause additional ones to crop up. For example, a massive influx of new residents may damage community cohesion. Social dysfunction may also be a problem as some mining workers are single males living outside the family safety net. Gender imbalance, alcoholism, drug abuse, prostitution (including issues related to HIV/AIDS), gaming and gambling issues are all potential problems that must be taken seriously. Finally, increased traffic; reduction of drinking water quality and quantity; noise, emissions, and dust pollution will all be major problems. None of these issues should be ignored as mining companies and the government should work together to begin mitigating the negative impacts and maximizing the positive opportunities of social change.

Local businesses

Some pre-existing local business services will benefit from the new community by maturing and branching out into new ventures. For example, agricultural producers and caterers might work with local procurement businesses to win government contracts and service the new mining population. In addition, not all new businesses arriving from outside will crowd out local business, they may in fact work as complements. For example, if an expected increase in local tourism brings in outside tourist agencies, then the pre-existing restaurants, shops and related service industries will profit from increased business.

Job creation

During the construction phase, not many local residents will have an opportunity to work on the project due to a lack of technical expertise. According to the OT plan, Mongolian employment levels will be reach a 90%⁸⁰ of the national workforce by the fifth year of operation of the

⁸⁰OT agreement, Oct 06.2009, Ulaanbaatar, Mongolia

project. However, extensive training programs will be required to employ such a level of local participation. Low-skilled seasonal rather than permanent jobs will be more available. However, there are employment related positive impacts to the local community. The benefits of project-generated employment include increased employment for locals, increased household income, as well as indirect employment and skills development for locals. Besides these direct positive impacts, there may be some indirect negative impacts, such as disaffection among locals at outsiders taking jobs, social conflicts between locals and outsiders, and the gender impact on labor force participation.⁸¹ In comparison to migrants, job availability for the pre-existing community will be limited.

Environmental issues

Impacts on the local environment and natural resources are expected to be negative due to several factors. Increased road traffic will generate and spread dust over large grazing and pastoral camp areas and this contamination of pasture and water sources directly impacts the local community.⁸² Another issue that may arise is that construction laborers might negatively impact the local environment through hunting and fishing.

Construction of major roads and railways will have a significant impact on movement of wildlife, including khulan (wild ass) and Mongolian gazelles. At present, not enough is known about the migration routes used by these animals, and how roads and railways can be constructed to allow their safe passage.⁸³ Studies to identify appropriate wildlife crossing arrangements are a high priority. Requirements to construct wildlife crossings should be included in the environmental management plans for approved roads and railways. Where feasible, transport networks should be planned to minimize disruption to major migration routes. One final issue is that dewatering of mines will drain ground water from the surrounding area. Development of bores and springs elsewhere could help to offset the environmental consequences.

⁸¹Oyu Tolgoi Project Socio-Economic Impact Assessment, Final Report, Centre for Policy Research and Population Training and Research Centre, Sep,2009

⁸²Southern Mongolia Infrastructure Strategy, World Bank Australian Government, and PPIAF, 2009

⁸³ibid

Development of OT and Southern Mongolia will involve a host of individual projects, including mines, towns, roads, railways, power facilities, and water abstraction. Each project will need its own environmental impact assessment (EIA) and environmental management plan (EMP).⁸⁴ The Ministry of Nature, Environment and Tourism will have an important role in ensuring the quality of EIAs, appropriate responses to EIAs, and consistent monitoring and enforcement of EMPs. The Ministry's resources may need to be increased, to provide high quality and speedy responses. Soum and aimag governments could also play an increased role in environmental impact assessment and environmental management, but will need substantial capacity building in order to play this role.

Mine closure

The Government is responsible to prepare required comprehensive legislations and regulations in order to reclaim the land and prepare for mine closure. If there are no alternative economic activities, the local community may be left with little or no economic support. Where possible, diversification of the local economy can reduce dependence on mining and ease the transition when the mine closes. If this is not possible, housing and other strategies should be applied to minimize population influx while the mine is operating. The closure of a mine can mean the loss of thousands of jobs, the emigration of skilled residents, the deterioration of service delivery, and the hollowing out of once vibrant communities. The impact on service delivery is likely to be particularly severe where the mining company itself is responsible for those services. Efforts to prepare for mine closure will require the engagement of multiple stakeholders.⁸⁵

Livelihood transitions for herders

As mining and towns develop in Khanbogd, the land available for grazing will diminish. Herders are the dominant users of land as they rely on their herds of goat, sheep, and camels for income,

⁸⁴ lbd

⁸⁵ lbd

food, housing, and clothing. Mining activities are likely to directly affect only a small proportion of the total land area of Umnugovi province. Nevertheless, for those herders directly affected by land acquisition, the impact of new mining development may be substantial.⁸⁶

⁸⁶ lbd

Conclusion

This chapter briefly introduced the OT mining agreement. In order to understand the important factors of mining decision making, I have chosen to conduct a Multi Account Evaluation on behalf of the government that calculates costs and benefits in regards to the OT mining agreement contract. The analysis included all countable relevant factors to the agreement such as the government revenues from taxes and fees, infrastructure issues and possible costs to the state, as well as probable public services to the community. These factors were then used to calculate the net present value of the project to determine if it has an overall positive impact on Mongolian economic development. This analysis also briefly stated the importance of and outlined several potential social and environmental impacts of the project on the community. I would like to emphasize that all calculations were based on data released by the government and the OT project; however, the current feasibility study conducted by Ivanhoe was not released to the public. If the released data does not accurately reflect the unreleased technical information contained in the current feasibility study of the OT project, then the results of this paper will be different from Ivanhoe's private figures. My calculations could also be affected by swings in the metal market. For example, NPV and debt payment period is highly variable because they depend on the prices set in the metal market. The Government's debt payback period also reflects the uncertainty in the metal market; it is expected to pay the debt back in 3.3 years so long as metal prices are high, but it would take 8.1 years if prices are low. In this analysis, costs and revenues are discounted to a real social discount rate of 8 percent. According to my calculations, the NPV of the project is positive and Mongolian government will earn \$ 18,745,505 US when metal prices are high and \$ 10, 365,216 US when metal prices are low. The Mongolian government will also spend \$ 352 million for the initial investment into project related expenses. However, social infrastructure and community related expenses would also require a large investment. When these social expenses are combined with the initial investment, government spending over thirty years for all OT related activities would be about \$430 US million. Moreover, the initial investment represents a huge burden on the state budget if it is not offset by other income sources or revenue from the OT project. Thus, it is not clear how the government can handle the large amount of investment expenses during the construction phase.

There are additional non-quantifiable benefits for Mongolia: these include international and domestic scholarship programs and improvements in human capacity for mining and other related sectors. It is also apparent that various local businesses and mining related services will be created or developed and the project will create many non-mining jobs that will help to reduce poverty. In terms of efficient use of the OT revenue, the Mongolian government should develop a clear policy that ties the investment of these monies to Mongolia's economic development. This follows Sachs recommendation for middle-income resource rich countries, that the overriding goal should be to promote the transition from a resource based rural economy (agriculture and mining) to a human capital and knowledge based urban economy. Key investments need to be made in knowledge creation and diffusion (higher education, scientific institutions) as well as in infrastructure in fast growing urban areas. However, government should also pay more attention to the improvement of the education and health sectors (2007). Since OT is a huge project, and well-recognized multinational companies are involved, many positive effects to Mongolian society and economic development are expected. The influence of multinational corporation can introduce international practices and standards to not only the mining sector but also to relevant governmental institutions, regulations, and decision-making practices. It also brings new attention to the development and enforcement of environmental regulations and accounting for social impacts. This is especially important as the Mongolian government had previously considered these issues unimportant. In fact, social, environmental, and health impact assessments become mandatory to other mining companies because of the standards developed under the OT project. Moreover, government ministries, NGOs, academics, and news media become more aware of and gave more attention to these issues in order to make them both visible and recognizable. In the last few years, the public, national NGOs, international organizations, and the Mongolian government have begun a discussion on mining law and related tax issues in order to meet in international standards in regards to the OT agreement. Many international organizations and scholars have worked with the Mongolian government to help institute better practices and to find more equitable agreements with international corporations. Therefore, the OT agreement initiated and brought on a new standard: that it is important not just to lobby for the next big mining project but also to pursue other programs and policies that are helpful to Mongolia's economic and social development.

However, in order to pursue sustainable development Mongolia must confront the pressing issues of environmental degradation, water shortages, desertification and loss of biodiversity. This agreement also will be one of the greatest tests of Mongolian democracy that will prove whether or not it can successfully create a strong democracy. If the OT project is successful Mongolia will be a richer and more maturely democratic country; but the price of failure will be increased inequality and corruption.

Finally, adoption of the Multi Account Evaluation or Cost Benefit Analysis standards would be a very important benefit for the Mongolian government as these techniques would enhance the transparency and rationality of governmental decision-making. Moreover, proper application of Multi Account Evaluation or Cost Benefit Analysis may exert a positive influence to important decisions further down the line as they form a new standard for decision analysis. While these techniques contribute to the creation of well planned and clear policy, on the other hand they also help prevent policy from becoming non-definitive and politicizing of decisions.

CHAPTER FOUR: FINAL DISCUSSION AND CONCLUDING REMARKS

In the previous chapters, I have touched on the political and institutional context of Mongolian decision-making. I would like to conclude by focusing on what I believe is the key reason for the poor quality of decision-making in Mongolia. Overall, the inadequacy of decision-making in Mongolia is directly related to the immaturity of its democracy. This to say that the immaturity of Mongolian democracy stems from weaknesses in the election system that allow for nepotism, non-transparency, disassociation from responsibility, and non-professionalism in state institutions.

Elections should bring democracy and place power in the hands of the people, however, in Mongolia elections bring power to minority leaders. There are three different types of election systems: majority, proportional and mixed electoral. However, Mongolia has chosen the worst election system possible for a new democracy to adapt. A majority election system was introduced in the Mongolian constitution in 1992. Although in certain societies and nations this system is both viable and effective, in the Mongolian context the majority election system has severe problems. For instance, the majority electoral system allows one candidate to win with only 30% of the vote. Even if the other candidates win a combined 70 % of the votes, they have no seat and representation in the Parliament. This means that 70 % of the population's opinions are not taken into account in making important policies and legislation. The worst consequence of this election system is that legislators, ministers and other higher officials from the winning party often appoint their acquaintances, relatives and party members for important positions in order to enhance and consolidate their political power. Moreover, politicians also abuse their position of power for private purposes. Another weakness of this system is that due to their inability to win support from outside a narrow political spectrum, members of Parliament become highly dependent on the continued support of their constituency. Politicians face an ongoing struggle to retain the support of their constituents and thus will consistently make decisions specifically favoring their supporters rather than the entire population that they are supposed to represent. In Mongolian politics, emphasis is placed on maintaining an existing constituency rather than winning new votes. For instance, when the state budget plan comes to Parliament, members allocate money to their constituency in hopes of retaining their

vote for the next election instead of following a policy plan that might benefit society as a whole. As a result, the state budget is spent on small, non-priority projects instead of much more larger important projects. In other words, the state budget is dispersed among a scattered set of voting blocs. This outright vote buying and factionalism is one of the worst examples of decision-making in the Mongolian Parliament.

Another negative factor, not particularly of the election system but of Mongolian democracy in general is party financing. As in most countries, solid financing is essential to winning elections. In order to be financially strong, parties vie to attract corporate support, and promise appointments for or allow heads of business to run for election. When one party gains enough seats in Parliament, they split up the important government positions among their corporate supporters as promised. Once appointed to government positions, these businesspersons also disseminate jobs to their own cronies and use their new authority to recoup the money spent on buying their positions. Moreover, the people appointed through this system are not necessarily prepared for the responsibilities and duties that their positions entail. It often takes several years for a new appointee to learn his job and some are still not qualified after many years at their post. In the past few years, a trend has arisen in which civil servants are dismissed from their job after an election to make way for the new governing parties appointees. As a result, the quality of the civil service in every sector has deteriorated and lacks trained professionals as cronyism and nepotism became widespread. Thus, decision-making at all state levels does not follow democratic principles such as deliberative decision-making. People work for and follow the leaders and officials that gave them their position but do not necessarily work for the public interest. At a higher level of Parliament, some important decisions are made with only the leaders' direct interests in mind. Sometimes, decisions are made at the party level by several leaders, but not by Parliament. The minority in Parliament tries to influence important decisions but their voice goes unheard by the governing party. Likewise, important decisions at the cabinet level are only made according to the top leaders' interests, and other cabinet members do not have influence or power beyond what has been afforded them by the top leadership they rely on the party for their position. In addition, information-sharing, public consultation, and transparency are regarded as unessential because public opinion is not reflected in high level decision-making.

Therefore, even though in the last few working groups and parliamentary committees suggested that the best solution would be switch to a mixed and proportional electoral system, institutional change has been almost impossible. The majority party in Parliament always chooses what favors them and thus favors maintenance of the old system. Moreover, the ruling party is also in charge of staffing important positions in election committees and uses this to their advantage in Parliamentary elections. Political parties can also buy votes through dirty money that has been gathered by abusing their power and positions some voters join in this corruption and others remain clean. Through these methods, politicians seek to preserve their positions over the long run; therefore, it is better for them if people are remain poor, weak and uninformed. The votes of a vulnerable populace are easier to buy.

As discussed earlier, politicians promised money to the public from the OT project. In this way, the OT project became an election issue to be fought over by the two big parties. Therefore, politicians did not pay enough attention to the agreement in regards to its real benefit to the public and thus they did not have any open public discussion and allow for public input. Robert Friedland, chairperson of the Ivanhoe Mines Company, is reported to have said that developing part of the mine would be like making "T-shirts for five bucks and selling them for \$100." [1] However, the public in Mongolia heard this speech, and as a result tensions flared and protests took place in Ulaanbaatar. This comment was one of the main reasons for the slow-down in reaching an agreement. Nevertheless, the protests helped bring the OT agreement to the public's attention. In other words, active grass roots organizations and movements are often created in response to the lack of transparency of the state and this lack of reliable information inevitably leads to misunderstandings and suspicions about the real situation. The public, civil society, scholars, and even the media make analyses and draw conclusions based on inadequate information and gossip, and then disseminate them throughout society resulting in widespread misinformation. Many Mongolians have always regarded the OT agreement with some mistrust and this mistrust is directly related to the neglectful behavior of Mongolian government and its lack of transparency. However, according to my evaluation of the OT agreement, the project will bring huge benefits for the economic development for Mongolia. Nevertheless, its success will directly depend on the actions of a transparent and accountable government, as well as the support of active and responsible Mongolian citizens.

Recommendations

In order to strengthen democracy and improve decision-making, Mongolia ought to focus attention on the following issues.

- Change the majority electoral system and introduce a mixed electoral system that is more flexible and allows for more parties' representation in the legislative and executive institutions.
- Financing of political parties needs to be changed and based on stricter regulations to be transparent.
- State Institutions should improve accountability and oversight mechanisms and introduce a scrutiny system
- Professionalization of the public service will improve decision-making practices as well as help fight corruption and reduce bureaucratic red-tape
- Encourage deliberative decision-making processes throughout state institutions.
- Approve an access to information law. State information needs be more open to the public
- Introduce cost benefit analysis and multi-account evaluation method to state institutions
- Identify the next development policy after the mining sector

Comments on future research

After shifting to a democracy, donor organizations pushed the State Great Hural of Mongolian (Parliament) to approve a huge amount of laws, treaties and amendments in a very short period, as stated in the introduction. Such reforms were introduced to Mongolian society without any prior discussion, public hearings or taking into account of the cultural and historical attributes of society. In a very short time, a huge amount of foreign legislation and totally new institutional system was introduced to Mongolia and the Mongolian socialist mind set. Mongolians are still far from understanding what real deliberative decision-making is, and why public participation is important. Therefore, people still do not much follow the rules, and legislation, and do not give much attention to enforcing laws.

I fully acknowledge that one of the main reasons for poor decision and legislation making processes is the pushing of a new system without any prior prerequisites. From this point it is interesting to study how other newly democratized countries' decision-making process are proceeding and whether they are successfully introducing democratic decision-making principles. If not what kind of problems do they face? Is it right to push a new system without any prerequisite conditions? If yes, How? If not, Why? How have the countries suffered from these policies? Frankly speaking, a socialist mindset still exists today in Mongolia. Maybe the next generation will be ready to adapt fully to the new system.

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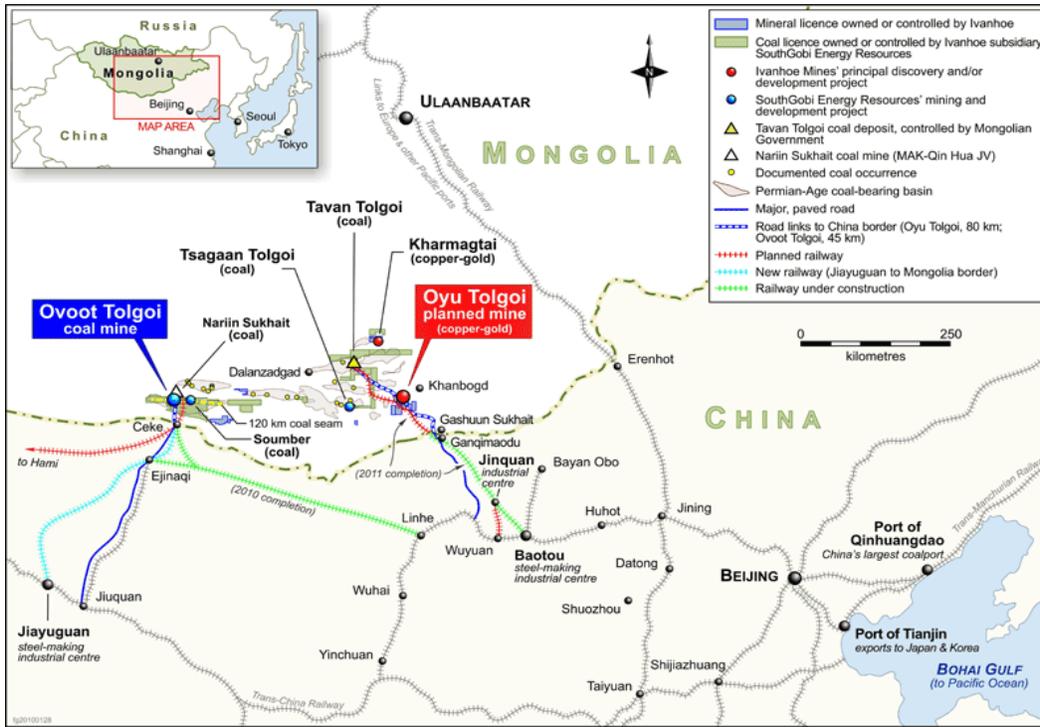
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APPENDICES

Figure 8: South Gobi region and the OT location⁸⁷



⁸⁷ http://www.ivanhoemines.com/s/Oyu_Tolgoi.asp?ReportID=379189

Table 11: Modest price based on last 30 years of metals price.

Year	Average Price for Gold(US\$ per oz)	Average price of 30 years	Copper (US\$ per lb)
1981	\$460.00		
1982	\$376.00		
1983	\$424.00		
1984	\$361.00		
1985	\$317.00		
1986	\$368.00		
1987	\$447.00		
1988	\$437.00		
1989	\$381.00		
1990	\$383.51		
1991	\$362.11		
1992	\$343.82		
1993	\$359.77		
1994	\$384.00		
1995	\$383.79		
1996	\$387.81		
1997	\$331.02		
1998	\$294.24		
1999	\$278.98		
2000	\$279.11		
2001	\$271.04		
2002	\$309.73		
2003	\$363.38		
2004	\$409.72		
2005	\$444.74		
2006	\$603.46		
2007	\$695.39		
2008	\$871.96		
2009	\$972.35		
2010	\$1,110.60		
		13411.53/ 30=447.0	1.3 (took from the OT
	\$13,411.53	51	

Table 12 : Income for government from gold during the 30 years of mine life with highest and lowest price forecast.

Life of mine, 30 years	Production (ounces)	Price per ounces (highest prediction)	Total income per year from the production (highest price prediction)	Price per ounces (modest prise based on last thirty years)	Total income per year from the production (modest price)	Government tax, royalty 5 %, corporate income tax 25% (addition other small taxes and fees)	Income for government from highest copper price	Income for government from lowest copper price
2013	500	\$912.60	\$456,300	447.051	\$223,526	0.33	\$150,579	\$73,763
2014	500	\$912.60	\$456,300	447.051	\$223,526	0.33	\$150,579	\$73,763
2015	500	\$912.60	\$456,300	447.051	\$223,526	0.33	\$150,579	\$73,763
2016	500	\$912.60	\$456,300	447.051	\$223,526	0.33	\$150,579	\$73,763
2017	500	\$912.60	\$456,300	447.051	\$223,526	0.33	\$150,579	\$73,763
2019	500	\$912.60	\$456,300	447.051	\$223,526	0.33	\$150,579	\$73,763
2020	500	\$912.60	\$456,300	447.051	\$223,526	0.33	\$150,579	\$73,763
2021	500	\$912.60	\$456,300	447.051	\$223,526	0.33	\$150,579	\$73,763
2022	500	\$912.60	\$456,300	447.051	\$223,526	0.33	\$150,579	\$73,763
2023	500	\$912.60	\$456,300	447.051	\$223,526	0.33	\$150,579	\$73,763
2024	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2025	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2026	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2027	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2028	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2029	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2030	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2031	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2032	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2033	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2034	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2035	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2036	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2037	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2038	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2039	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2040	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2041	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2042	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
2043	985	\$912.60	\$898,911	447.051	\$440,345	0.33	\$296,641	\$145,314
total	24,700		\$22,541,220				\$7,438,603	\$3,643,913
	24.7 million ounces							

Table 13 : Income for government from copper during the 30 years of mine life with highest and lowest price forecast.

Life of mine, 30 years	Production (pou	highets price	Total income per year from the production (highest price)	lowest price	Total income per year from the production (lowest price)	ent tax, royalty 5 %, corporat	government from the taxes (highest	Income for government from the taxes (lowest price)
2013	1,000,000	\$2.2155	\$2,215,500	\$1.30	\$1,300,000	0.33	\$731,115	\$429,000
2014	1,000,000	\$2.2155	\$2,215,500	\$1.30	\$1,300,000	0.33	\$731,115	\$429,000
2015	1,000,000	\$2.2155	\$2,215,500	\$1.30	\$1,300,000	0.33	\$731,115	\$429,000
2016	1,000,000	\$2.2155	\$2,215,500	\$1.30	\$1,300,000	0.33	\$731,115	\$429,000
2017	1,000,000	\$2.2155	\$2,215,500	\$1.30	\$1,300,000	0.33	\$731,115	\$429,000
2019	1,000,000	\$2.2155	\$2,215,500	\$1.30	\$1,300,000	0.33	\$731,115	\$429,000
2020	1,000,000	\$2.2155	\$2,215,500	\$1.30	\$1,300,000	0.33	\$731,115	\$429,000
2021	1,000,000	\$2.2155	\$2,215,500	\$1.30	\$1,300,000	0.33	\$731,115	\$429,000
2022	1,000,000	\$2.2155	\$2,215,500	\$1.30	\$1,300,000	0.33	\$731,115	\$429,000
2023	1,000,000	\$2.2155	\$2,215,500	\$1.30	\$1,300,000	0.33	\$731,115	\$429,000
2024	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2025	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2026	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2027	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2028	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2029	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2030	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2031	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2032	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2033	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2034	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2035	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2036	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2037	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2038	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2039	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2040	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2041	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2042	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
2043	1,905,000	\$2.2155	\$4,220,528	\$1.30	\$2,476,500	0.33	\$1,392,774	\$817,245
	48,100,000		\$106,565,550		\$62,530,000		\$35,166,632	\$20,634,900
Total	22 million tonnes and		106 565 550 000					

Table 14 : Income for government from silver during the 30 years of mine life with fixed price forecast.

Life of mine, 30 years	Production (ounces)	Price per ounces	Income per year from silver	tax, royalty 5 %, corporate income tax 25%	Income for government
2013	5,660	\$15.10	\$85,466	0.33	\$28,204
2014	5,660	\$15.10	\$85,466	0.33	\$28,204
2015	5,660	\$15.10	\$85,466	0.33	\$28,204
2016	5,660	\$15.10	\$85,466	0.33	\$28,204
2017	5,660	\$15.10	\$85,466	0.33	\$28,204
2019	5,660	\$15.10	\$85,466	0.33	\$28,204
2020	5,660	\$15.10	\$85,466	0.33	\$28,204
2021	5,660	\$15.10	\$85,466	0.33	\$28,204
2022	5,660	\$15.10	\$85,466	0.33	\$28,204
2023	5,660	\$15.10	\$85,466	0.33	\$28,204
2024	5,660	\$15.10	\$85,466	0.33	\$28,204
2025	5,660	\$15.10	\$85,466	0.33	\$28,204
2026	5,660	\$15.10	\$85,466	0.33	\$28,204
2027	5,660	\$15.10	\$85,466	0.33	\$28,204
2028	5,660	\$15.10	\$85,466	0.33	\$28,204
2029	5,660	\$15.10	\$85,466	0.33	\$28,204
2030	5,660	\$15.10	\$85,466	0.33	\$28,204
2031	5,660	\$15.10	\$85,466	0.33	\$28,204
2032	5,660	\$15.10	\$85,466	0.33	\$28,204
2033	5,660	\$15.10	\$85,466	0.33	\$28,204
2034	5,660	\$15.10	\$85,466	0.33	\$28,204
2035	5,660	\$15.10	\$85,466	0.33	\$28,204
2036	5,660	\$15.10	\$85,466	0.33	\$28,204
2037	5,660	\$15.10	\$85,466	0.33	\$28,204
2038	5,660	\$15.10	\$85,466	0.33	\$28,204
2039	5,660	\$15.10	\$85,466	0.33	\$28,204
2040	5,660	\$15.10	\$85,466	0.33	\$28,204
2041	5,660	\$15.10	\$85,466	0.33	\$28,204
2042	5,660	\$15.10	\$85,466	0.33	\$28,204
2043	5,660	\$15.10	\$85,466	0.33	\$28,204
Total	169,800		\$2,563,980		\$846,113
	170 million/ oz =5300		2 563 980 000		

Table 15 : Income for government from molybdenum during the 30 years of mine life with fixed price forecast.

Life of mine, 30 years	Production /pounds	Price	Income per year from Molybdenum	Government tax, royalty 5 %, corporate income tax 25%	Income for government
2013	3,630.00	\$15.00	54	0.33	18
2014	3,630.00	\$15.00	54	0.33	18
2015	3,630.00	\$15.00	54	0.33	18
2016	3,630.00	\$15.00	54	0.33	18
2017	3,630.00	\$15.00	54	0.33	18
2019	3,630.00	\$15.00	54	0.33	18
2020	3,630.00	\$15.00	54	0.33	18
2021	3,630.00	\$15.00	54	0.33	18
2022	3,630.00	\$15.00	54	0.33	18
2023	3,630.00	\$15.00	54	0.33	18
2024	3,630.00	\$15.00	54	0.33	18
2025	3,630.00	\$15.00	54	0.33	18
2026	3,630.00	\$15.00	54	0.33	18
2027	3,630.00	\$15.00	54	0.33	18
2028	3,630.00	\$15.00	54	0.33	18
2029	3,630.00	\$15.00	54	0.33	18
2030	3,630.00	\$15.00	54	0.33	18
2031	3,630.00	\$15.00	54	0.33	18
2032	3,630.00	\$15.00	54	0.33	18
2033	3,630.00	\$15.00	54	0.33	18
2034	3,630.00	\$15.00	54	0.33	18
2035	3,630.00	\$15.00	54	0.33	18
2036	3,630.00	\$15.00	54	0.33	18
2037	3,630.00	\$15.00	54	0.33	18
2038	3,630.00	\$15.00	54	0.33	18
2039	3,630.00	\$15.00	54	0.33	18
2040	3,630.00	\$15.00	54	0.33	18
2041	3,630.00	\$15.00	54	0.33	18
2042	3,630.00	\$15.00	54	0.33	18
2043	3,630.00	\$15.00	54	0.33	18
Total	108,900.00		1,634		539
	109 000 lb=50 000 tonnes		1 633 500		

Table 16: Manpower in OT project and deductible personal income tax

Life of mine	Labour (national)	Salary per	Sum	Income tax per year (multiplied with 12 months)	Labour (foreign)	Salary	Sum	Income tax per year	Cumulative personal tax income per year
2010	4,331	\$1,000.00	4,331	5,197	1,634.00	\$1,500.00	2,451	2,941	8,138
2011	7,426	\$1,000.00	7,426	8,911	5,477.00	\$1,500.00	8,216	9,859	18,770
2012	6,184	\$1,000.00	6,184	7,421	3,844.00	\$1,500.00	5,766	6,919	14,340
2013	3,533	\$1,000.00	3,533	4,240	561.00	\$1,500.00	842	1,010	5,249
2014	2,902	\$1,000.00	2,902	3,482	477.00	\$1,500.00	716	859	4,341
2015	3,116	\$1,000.00	3,116	3,739	389.00	\$1,500.00	584	700	4,439
2016	3,168	\$1,000.00	3,168	3,802	319.00	\$1,500.00	479	574	4,376
2017	3,218	\$1,000.00	3,128	3,754	324.00	\$1,500.00	486	583	4,337
2018	3,230	\$1,000.00	3,230	3,876	326.00	\$1,500.00	489	587	4,463
2019	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2020	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2021	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2022	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2023	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2024	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2025	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2026	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2027	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2028	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2029	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2030	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2031	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2032	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2033	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2034	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2035	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2036	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2037	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2038	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2039	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2040	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2041	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2042	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
2043	2,750	\$1,000.00	2,750	3,300	275.00	\$1,500.00	413	495	3,795
total sum				126,922				36,407	163,328

Table 17: Hectare land payment that owned by OT.

Year	Hectare	US\$	Total
2013	8,496	\$15.00	127
2014	8,496	\$15.00	127
2015	8,496	\$15.00	127
2016	8,496	\$15.00	127
2017	8,496	\$15.00	127
2019	8,496	\$15.00	127
2020	8,496	\$15.00	127
2021	8,496	\$15.00	127
2022	8,496	\$15.00	127
2023	8,496	\$15.00	127
2024	8,496	\$15.00	127
2025	8,496	\$15.00	127
2026	8,496	\$15.00	127
2027	8,496	\$15.00	127
2028	8,496	\$15.00	127
2029	8,496	\$15.00	127
2030	8,496	\$15.00	127
2031	8,496	\$15.00	127
2032	8,496	\$15.00	127
2033	8,496	\$15.00	127
2034	8,496	\$15.00	127
2035	8,496	\$15.00	127
2036	8,496	\$15.00	127
2037	8,496	\$15.00	127
2038	8,496	\$15.00	127
2039	8,496	\$15.00	127
2040	8,496	\$15.00	127
2041	8,496	\$15.00	127
2042	8,496	\$15.00	127
2043	8,496	\$15.00	127
			3,823

Table 18: Income after all levied taxes

	total product income (c1)	0.33 tax for the govern (c2)	after tax (c3)	other payments except personal income tax see the income for Gov sheet (c4)	total income after tax for company (c5=c3-c4)
1st ten years of income with high price					
gold	\$456,300	\$150,579	\$305,721		
copper	\$2,215,500	\$731,115	\$1,484,385		
silver	\$85,466	\$28,204	\$57,262		
molybdenum	\$54	\$18	\$36		
			\$1,847,405	\$508	\$1,846,897
last 20 years of income with high price					
gold	\$898,911	\$296,641	\$602,270		
copper	\$4,220,528	\$1,392,774	\$2,827,753		
silver	\$85,466	\$28,204	\$57,262		
molybdenum	\$54	\$18	\$36		
			\$3,487,322	\$508	\$3,486,815
1st ten years of income with modest price					
gold	\$223,526	\$73,763	\$149,762		
copper	\$1,300,000	\$429,000	\$871,000		
silver	\$85,466	\$28,204	\$57,262		
molybdenum	\$54	\$18	\$36		
			\$1,078,061	\$508	\$1,077,553
last 20 years of income with modest price					
gold	\$440,345	\$145,314	\$295,031		
copper	\$2,476,500	\$817,245	\$1,659,255		
silver	\$85,466	\$28,204	\$57,262		
molybdenum	\$54	\$18	\$36		
			\$2,011,585	\$508	\$2,011,077

Table 19: Production and its exploration cost

Production		
	1st ten years' production per year	last 20 years' production per year
gold	500	985
copper	1,000,000	1,905,000
silver	5,660	5,660
molybdenum	4	4
	1,006,164	1,911,649
cost per lb and oz by cent	\$0.268	\$0.268
	\$269,652	\$512,322

Figure 9: Government debt used excel NPER method

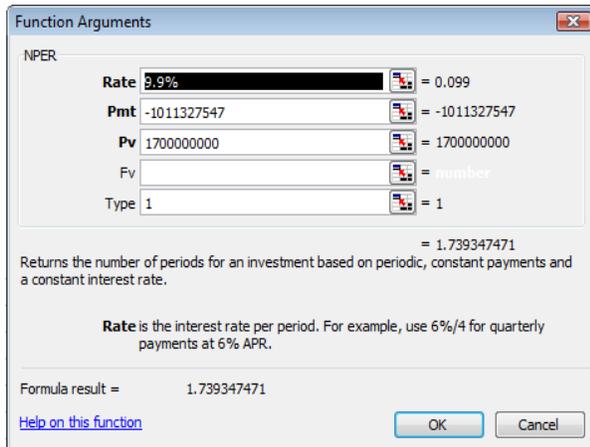


Figure 10: Government debt used excel NPER method

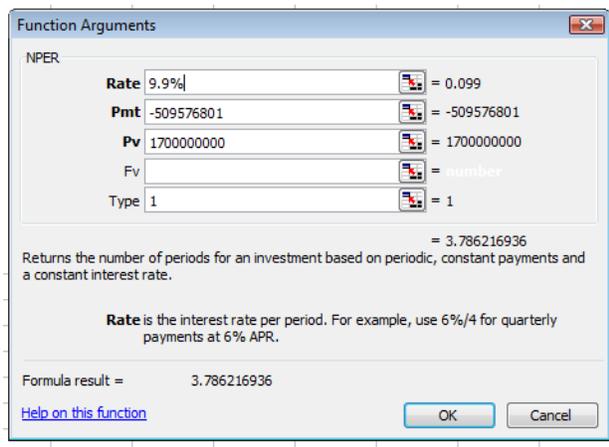


Figure 11: Government debt used excel NPER method

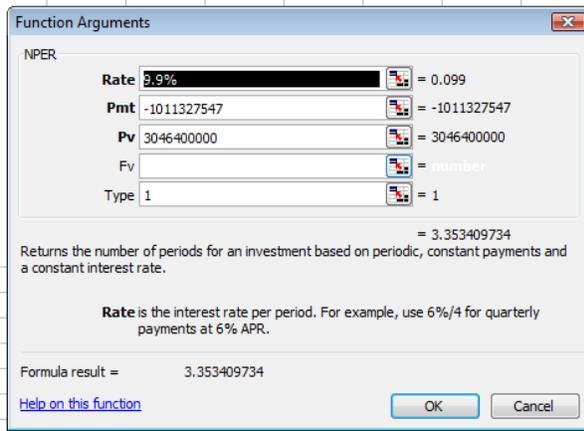


Figure 12: Government debt used excel NPER method

