Mongolia

Baganuur and Shivee-Ovoo Coal Mine Development Project (1) (2)

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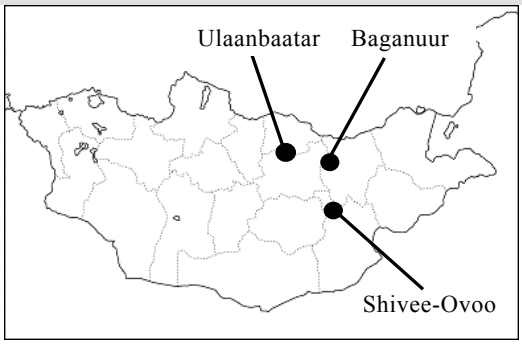
1. Project Profile and Japan's ODA Loan



Map of project area

Baganuur Coal Mine

1.1 Background

Mongolia is a country with an area of 1.57 million km^2 (four times larger than Japan) and a population of about 2.6 million (as of 2006). It has about 3,500 lakes and about 7,000 rivers. The northwestern part is surrounded by high mountains while most of the southeastern part is gravel land, and the central area is flat. The average altitude is 1,580 m, and the capital Ulaanbaatar is located 1,350 m above sea level. The Baganuur Coal Mine, approximately 200 km east of Ulaanbaatar, has a mining area of approximately 530 km^2, 44 km wide and 12 km long. The exploration and development of the Baganuur Coal Mine began in 1925 with the cooperation of the former Soviet Union. The Shivee-Ovoo Coal Mine in Dornogobi Province is located 260 km southeast of Ulaanbaatar. This relatively new coal mine was developed by Mongolia independently in order to supplement the decreased production of the Baganuur Coal Mine and started production in 1992.

In the energy sector of Mongolia, domestic coal is used as the primary fuel source to generate electricity and heat. Approximately 70–80% of the coal is used at power plants that supply electricity and heat. With the demise of the former Soviet Union, financial assistance stopped. At the time of appraisal, machines and equipment were decrepit and production efficiency had decreased.[1] Since coal is an important energy source in Mongolia, increase in the production of high quality coal was required to ensure stable lives and to support economic development. The reality was, however, that insufficient

[1] The annual coal production decreased from 8.56 million tons in 1988 to 4.84 million tons in 1995.

coal production jeopardized the stable supply of electricity and heat, the essential energy sources. In spite of the critical need to maintain and increase coal production capacity, the weakness of the private sector and the instability of the national economy made it difficult to implement coal mine development projects financed by private funds utilizing investment from overseas, etc. On the other hand, because of its urgent nature, the project to increase coal production had to rely on public investment.

At the time of appraisal, it was deemed necessary to increase the production of the Baganuur Coal Mine from 3 million tons/year to 4 million tons/year and that of the Shivee-Ovoo Coal Mine from 0.3 million tons/year to 2 million tons/year in order to meet the expected increase in demand. Due to the limitation of the fund, the project was divided into two phases. In Phase 1, rehabilitation of the Baganuur Coal Mine was planned along with the purchase and increase of materials and equipment urgently needed for the operation and maintenance of the Shivee-Ovoo Coal Mine. It was decided to procure necessary materials and equipment with the target of increasing the annual coal production of the Shivee-Ovoo Coal Mine to 1 million tons in Phase 1, and 2 million tons in Phase 2. Also, because it was expected to take a long time to procure the excavator necessary for the Shivee-Ovoo Coal Mine, the project needed to be implemented in two phases.

1.2 Objective

The project objective was to increase coal production capacity to meet coal demand in Mongolia and improve the quality of coal to satisfy the needs of power plants by rehabilitating the Baganuur Coal Mine, the largest coal mine in country, and expanding the Shivee-Ovoo Coal Mine, thereby contributing to economic development.

1.3 Borrower/Executing Agency

Ministry of Infrastructure Development / Ministry of Fuel and Energy

1.4 Outline of Loan Agreement

Loan Amount / Loan Disbursed Amount	(1) 5,827 million yen / 5,821 million yen (2) 4,298 million yen / 4,219 million yen	
Exchange of Notes / Loan Agreement	(1) February 1997 / February 1997 (2) February 1998 / February 1998	
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	Main 2.3% 30 years (10 years) General untied	Consultant 0.75% 40 years (10 years) Bilateral tied
Main Contractors	(1) Montechmash JVC (Mongolia), Neyon Co. Ltd. (Mongolia), Burvodservice Co. Ltd.	

	(Mongolia), Konoike Co. (Japan), Wagner Asia Equipment Co. Ltd. (Mongolia), Itochu Corporation (Japan), ECS International PTY Ltd, Bowral NSW (Australia) (2) Itochu Corporation (Japan), Konoike Construction Co., Ltd. (Japan), AGT Trade Co. Ltd. (Mongolia)
Consultant Services	Taiheiyou Coal Mine / The Institute of Energy (consortium, Japan)
Feasibility Study (F/S), etc.	Japan International Cooperation Agency (1995)

2. Evaluation Result

2.1 Relevance

2.1.1 Relevance at the time of appraisal

The energy sector was the most important sector in the Public Investment Program of Mongolia (1996–1998), which planned to allocate 860 million dollars, about half of the total public investment, to the energy sector. As coal was a particularly important energy source, it was crucial to increase the high quality coal production capacity of the Baganuur and Shivee-Ovoo coal mines, which, combined, produce over half of the domestic coal production in order to stabilize people's lives and support and promote economic development. Therefore, rehabilitation and modernization of these two coal mines were considered a project of the highest priority.

2.1.2 Relevance at the time of evaluation

In the Policy for Millennium Development (2007–2021), the energy sector and the coal sector are mentioned as the priority sectors and the Social and Economic Development Policy (2006–2008) puts the highest priority on the improvement of energy supply, particularly the increase in power supply. In the mining industry, increase in the mining volume is the most prioritized issue along with development of new mines. The Public Investment Program (2004–2008), which includes specific projects, focuses on the support for the manufacturing, agriculture and service sectors in order to maintain the economic growth rate at 6%. It also sets the objectives of maintaining the growth of the economy by improving infrastructure, including that of the energy sector. In the coal mining sector, considered the most important, it aims to enhance productivity by improving the technology and equipment, thus increasing coal supply to urban areas.

The Master Plan for the energy sector (2000–2020) places the highest priority on ensuring a stable power supply to major cities such as Ulaanbaatar and securing heating and emphasizes the importance of stabilized operations of electric power companies. Following the achievement of the targets under the Master Plan at the Baganuur and

Shivee-Ovoo coal mines in 2004, the Coal Sector Development Program (2006) was established for further development with the priority of increasing coal production through the introduction of new technology and introducing clean coal and other new technologies. Its focus is not only on the development of new mines but also on the expansion of the Baganuur and Shivee-Ovoo coal mines. Thus, the coal sector is becoming increasingly more important. This project aims to improve and increase the coal supply for the purpose of ensuring a stable power supply to Ulaanbaatar, the capital, and therefore remains highly important.

2.2 Efficiency

2.2.1 Outputs

This project is divided into Phase 1 and Phase 2. A comparison of the project plan at the time of appraisal and the actual outputs is shown in Table 1. There was not much difference between the plan at the time of appraisal and the actual result. Although there was some change in the design of the coal handling plant (CHP)[2], the planned handling capacity has not been changed. This design change was made to reduce cost by selecting thinner wall material for the coal crusher and conveyor sections as the successful bidding price at the international competitive bidding (ICB) was higher than estimated (for both the Baganuur and Shivee-Ovoo coal mines). The change did not affect the coal production activity. In addition, at the Baganuur Coal Mine, the method of conveying crushed coal to the coal yard was changed in order to reduce cost. As a result, consulting services increased by 61%.

In the World Bank's portion of the project scope, the means of conveying stripped soil from the coal mine was changed to truck transport, which entailed procurement of vehicles and equipment. Other items such as guidance on the improvement of business efficiency and financial management was provided as planned.

Table 1: Project Outline and Outputs

(1) Baganuur Coal Mine

Item	Plan (at appraisal)			Actual		
	JBIC	IDA	Total	JBIC	IDA	Total
1 Coal mining equipment						
Bulldozer	6	11	17	As planned	As planned	As planned
Truck (40 t)	10		10	As planned		As planned
Dump truck (90 t)		20	20		As planned	As planned
Trailer		2	2		As planned	As planned
Crane		3	3		As planned	As planned
Other equipment		6	6		As planned	As planned
2 Coal handling plant	2		2	Almost as		Almost as

[2] Coal crushing and loading facilities. Brief explanation to be added.

				planned (design changed)		planned (design changed)
3 Spare parts	For 3 years		For 3 years	As planned		As planned
4 Other related machines and equipment (testing equipment, etc.)		4	4		As planned	As planned
5 Consulting services	36 MM		36 MM	58 MM		58 MM

(2) Shivee-Ovoo Coal Mine

Item	Plan (at appraisal)			Actual		
	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total
1 Coal mining equipment						
Bulldozer	2	2	4	As planned	As planned	As planned
Truck	16		16	As planned		As planned
Grader	1	1	2	As planned	As planned	As planned
Crane	1		1	As planned		As planned
Hydraulic excavator	2		2	As planned		As planned
Wheel loader	1		1	As planned		As planned
Wheel pusher	1		1	As planned		As planned
Road sprinkler		1	1		As planned	As planned
Rock drill	2		2	As planned		As planned
Loader (small)		1	1		As planned	As planned
Electric excavator		1	1		As planned	As planned
Excavator		1	1		As planned	As planned
Coal conveyor	1		1	As planned		As planned
Sprinkler truck	1		1	As planned		As planned
2 Drainage treatment system	1		1	As planned		As planned
3 Coal handling plant	1		1	Almost as planned (design changed)		Almost as planned (design changed)
4 Other related machines and equipment (repair facilities, installation of power transmission lines, etc.)	1		1	As planned		As planned
5 Spare parts	For 3 years		For 3 years	As planned		As planned
6 Consulting services	38 MM		38 MM	As planned		As planned

2.2.2 Project period

The project period planned at the time of appraisal was from February 1997 to December 1999 (2 years 11 months) for the Baganuur Coal Mine, while actually it took 5 years 4 months from February 1997 to May 2002, 83% longer than planned. As for the Shivee-Ovoo Coal Mine, the project took 8 years 2 months from February 1997 to March 2005, 107% longer than the initially planned 4 years 8 months from February 1997 to September 2001. The project was deemed complete with the start of facility operation. Main causes of the delay were as follows: (1) the government changed four times from 1996 to 2000 and the transfer procedure took time; (2) a foreign-owned enterprise brought up a plan to purchase mines and power supply facilities in 1999, and the project was suspended during the investigation and consideration for the plan; (3) the government was reorganized in 2002 and 2004 and the supervisory authority of the energy sector changed

from the Ministry of Infrastructure Development to the Ministry of Infrastructure in 2002 and to the Ministry of Fuel and Energy two year later. In addition, as mentioned above, the successful bidding price at the international competitive bidding (ICB) was higher than estimated and therefore the design of CHP was changed in order to reduce the cost, which also caused delay. Another cause of delay was the World Bank's proposal for partial change of the project portion concerning the Baganuur Coal Mine, which took time to process (no change was made in the end).

2.2.3 Project cost

The total project cost was estimated at 14,672 million yen (ODA loan portion: 10,125 million yen) at the time of appraisal, while the actual cost was 13,720 million yen (ODA loan portion: 10,040 million yen), down 6.5% from the estimated total cost and 0.8% from the estimated ODA loan portion. The total project cost was lower than estimated because the effect of inflation on the foreign currency portion of the World Bank's financing was estimated high. The amount of the local currency portion was about 20% higher than estimated due to price increases caused by inflation and additional operation and maintenance expenses of the Project Management Unit (PMU), which was not planned at the time of appraisal. However, because this portion occupied a small part of the project cost, it had little impact on the total cost.

2.3 Effectiveness

2.3.1 Effectiveness indicators

Before this project was implemented, aging facilities and lack of equipment at the two coal mines not only caused a decline in the coal production capacity but also hindered supply of the sufficient volume and quality of coal demanded by power plants. The effectiveness indicators used for this report include the annual coal production, the volume of coal handled at CHP, and water content of the coal. The comparison results of these indicators before and after the project are presented below.

Table 2 below shows the annual coal production of the two coal mines. The actual production volumes of the two coal mines are far below the planned figures because the buying customers are limited. Therefore the plan was revised downward in 1998 and the revised figures are mostly achieved. The production of the Baganuur Coal Mine declined in 2004 and 2005 because the main customer Ulaanbaatar No.4 Power Plant reduced the purchasing volume due to the increase in coal prices. The actual production for 2006 was 2,800 thousand tons and the contracted production volume for 2007 recovered to 3,300 thousand tons. The production of the Shivee-Ovoo Coal Mine increased in 2004 because power plants purchased more coal from the Shivee-Ovoo Coal Mine, whose price was

lower than that of Baganuur Coal Mine. The price of coal from the Shivee-Ovoo Coal Mine has been 35–40% lower than that of Baganuur Coal Mine for the past several years.

Table 2: Annual Coal Production (thousand tons)

Baganuur Coal Mine	1997	1998	1999	2000	2001	2002	2003	2004	2005
Plan	3500	3600	3800	4000	4000	4000	4000	4000	4000
Plan (revised)	--	3500	3500	3200	3300	3000	3000	3000	3000
Actual	2972	3242	2991	3069	2874	3093	3046	2711	2811

Shivee-Ovoo Coal Mine	1997	1998	1999	2000	2001	2002	2003	2004	2005
Plan	300	1000	1200	1500	1750	2000	2000	2000	2000
Plan (revised)	--	300	600	600	830	850	900	900	1200
Actual	222	295	482	603	857	932	941	1309	1200

In strip mining, the amount of soil stripped and coal volume are predetermined, and soil is stripped away up to a depth which is planned prior to development. At both of the two coal mines, stripping has been carried out within the planned amount, which is good for maintaining adequate production volume in the future.

Table 3 shows the annual volume of coal handled at the CHP of the two coal mines. The planned volume was 4,000 thousand tons for Baganuur and 2,000 thousand tons for Shivee-Ovoo. Although each CHP has a capacity of handling the planned volume, the capacity utilization ratio is around 60% because the sales volume is small.

Table 3: Volume of Coal Handled at CHP (thousand tons)

Baganuur Coal Mine	2001	2002	2003	2004	2005
Actual	1107	2294	2532	2254	2549

Shivee-Ovoo Coal Mine	2001	2002	2003	2004	2005
Actual	272	897	902	1241	1243

Table 4 shows the water content of coal which is an indicator of the quality of coal. The water content of coal from the Baganuur Coal Mine is at an appropriate level and the coal quality improved, whereas the water content of coal from the Shivee-Ovoo Coal Mine is higher than planned. At the Shivee-Ovoo Coal Mine, it is planned to take measures to reduce the water content such as removing groundwater completely and increasing drying time at the coal yard.

Table 4: Water Content of Coal (%)

Baganuur Coal Mine	1999	2000	2001	2002	2003	2004	2005
Plan	37.5	37.5	37.5	37.5	37.5	37.5	37.5
Actual	36	34	34.7	35.1	35	34.1	35.2

Shivee-Ovoo Coal Mine	1999	2000	2001	2002	2003	2004	2005
Plan	42	42	42	41	41	40	40
Actual	47.2	47.1	47.1	46.9	45.8	45.4	44.0

2.3.2 Internal rate of return

The internal rates of return at the times of appraisal and the ex-post evaluation are shown in the following table.

Table 5: Internal Rate of Return

Baganuur	Appraisal	Ex-post evaluation
FIRR	6.8%	5.8%
EIRR	33.1%	29.8%
Shivee-Ovoo	Appraisal	Ex-post evaluation
FIRR	5.8% → 5.2%	Negative
EIRR	15.2% → 13.7%	4.3%

(1) Baganuur Coal Mine

The financial internal rate of return (FIRR) was calculated to be 6.8% at the time of appraisal based on evaluating new and replacement investment, operating expenses, sales tax, and land use tax as costs, and revenue from coal sales as benefits and assuming that the project life would be 20 years. The FIRR recalculated at the time of ex-post evaluation under the same conditions was 5.8%. The economic internal rate of return (EIRR) was calculated at the time of appraisal to be 33.1% as a result of an economic analysis based on evaluating new and replacement investment and operating expenses as costs and revenue from coal sales as quantitative benefits. It was calculated to be 29.8% at the ex-post evaluation based on the same criteria for costs and benefits. At the time of appraisal, it was assumed that coal prices would increase and that both production and sales would recover to a satisfactory level. As a result, FIRR and EIRR were calculated at high values. Instead of the additional sales brought by repair and expansion, total sales was itemized under benefits for calculation. This is considered another factor that pushed up FIRR and EIRR. At the time of ex-post evaluation, both FIRR and EIRR were lower than planned because: coal prices had been kept low; coal sales did not increase as expected; and coal production costs increased due to the rise in fuel costs.

(3) Shivee-Ovoo Coal Mine

The financial internal rate of return (FIRR) was calculated to be 5.8% at the time of appraisal based on evaluating new and replacement investment, operating expenses, sales tax, and land use tax as costs and revenue from coal sales as benefits and assuming that the project life would be 20 years. It was later adjusted to 5.2% at the time of the appraisal of Phase 2. At the time of ex-post evaluation, FIRR was recalculated to be negative probably due to the sluggish sales and overinvestment compared to the production volume. The economic internal rate of return (EIRR) was calculated at the time of appraisal to be 15.2% as a result of an economic analysis based on evaluating new and replacement investment and operating expenses as costs and revenue from coal sales as the quantitative benefits. It was later adjusted to 13.7% at the time of the appraisal of Phase 2. At the time of ex-post evaluation, it was calculated to be 4.3% based on the same criteria for costs and benefits. At the time of appraisal, it was assumed that coal prices would increase and both production and sales would recover to a satisfactory level. As a result, FIRR and EIRR were calculated at high values. As with the case of the Baganuur Coal Mine, instead of the additional sales brought by repair and expansion, total sales was itemized under benefits for calculation. This is considered another factor that pushed up FIRR and EIRR. At the time of ex-post evaluation, both FIRR and EIRR were lower than planned because: coal prices had been kept low; coal sales did not increase as expected; and coal production costs increased due to the rise in fuel costs.

2.4 Impact

2.4.1 Environmental impact

At the two coal mines, measures to control dust disperse and drainage problems were taken under the guidance of the government and no environmental problem exists. Under this project, monitoring is conducted and proper measures are taken based on the monitoring data.

(1) Baganuur Coal Mine

Baganuur Joint Stock Company (BJSC) established the Environment Department in 2005 to address environmental issues. The department has a laboratory and engages in activities concerning post-mining restoration in addition to environmental measures during the project implementation. As a result of the environmental monitoring, gas, dust and noise that may have some impact on the soil, water quality, air, and animals and plants were detected in small amounts and environmental measures against them are now being implemented. For example, water sprinkling was intensified in order to prevent dust dispersion from the road, disposal sites for stripped soil and other places where spontaneous combustion could occur. In addition, iron, etc. contained in extracted

groundwater is now properly treated before discharging. Thus, adequate environmental measures are in place.

(2) Shivee-Ovoo Coal Mine

Shivee-Ovoo Joint Stock Company (SOJSC) regularly conducts environmental monitoring to measure dust and water quality of groundwater and the nearby lake because it was feared that expansion of the coal mining business could have some impact on the environment at the time of appraisal. However, no problem such as water pollution has been found in monitoring. The heap of waste rocks that cannot be used as resource was leveled off to an area of 3.5 ha to prepare for planting and 5,000 shrubs were planted.

2.4.2 Others

Coal testing laboratory of SOJSC

As the BJSC's facilities to crush raw coal were decrepit and SOJSC did not have a coal crusher, coal sizes were not uniform and power plants had to spend time processing coal. After the completion of the project, the coal processing capacity of BJSC and SOJSC increased, and it became possible to reduce the coal size to meet the demand of power plants. As a result, power plants managed to reduce the cost of coal processing. At BJSC, approximately 96% of the coal for shipment is crushed into sizes of 0–200 mm. SOJSC succeeded in improving coal quality by increasing its coal processing capacity and reinforcing quality control at the testing laboratory constructed under this project. Today, approximately 96% of the coal is crushed into sizes of 0–300 mm.

2.4.3 Beneficiary survey

A beneficiary survey was conducted by interviewing employees of the two coal mines (41), residents around the two coal mines (7 families), and residents of 6 Ger areas in Ulaanbaatar—the main destination of coal supply from the two coal mines—(53 families) and received 101 valid responses. Among the coal mine employees, 6 were women (15%). By academic background, 44% of the respondents at Baganuur and most of those at Shivee-Ovoo were university graduates. Of the residents of the 6 Ger areas who answered the interview, 34% were men and 37% were university graduates. Their occupations included public service employees (42%), workers in the manufacturing industry (2%), self-employed (7%), university students (22%), and the rest 28% were unemployed or were pensioners.

All of the employees of the two coal mines interviewed answered that this project

helped increase productivity of the coal mine and improve the working environment. They pointed out high performance of the trucks and bulldozers procured in this project and the improvement in productivity and the working environment. They appreciated that the new CHP was easy to operate and equipped with monitor cameras, which made it unnecessary for employees to be stationed all the time, and that the profit increased as it became possible to supply the high quality coal demanded by power plants.

In the Baganuur Coal Mine, a dust explosion accident happened before the completion of the project (2001). After that, with the reinforcement of dust collection and safety management, the number of accidents decreased and there has been no serious accident such as involving death since 2001. In the interview with government officials concerned, accidents in the two coal mines were reported to have been decreasing mostly thanks to this project. In particular, they mentioned the improvement in the working environment and the strengthening of the management system including monitoring as the factors resulting in the decline in accidents. The number of accidents in 2006 was 2 in Baganuur and 1 in Shivee-Ovoo including a minor truck collision and a finger injury during the repair of equipment. There was no major accident.

According to the doctor working in the Shivee-Ovoo Coal Mine, disease incidence has been decreasing gradually after the completion of the project. The incidence rate of lung diseases in 2006 was 50% of that in 2001, and no incidences of hepatitis nor pneumonia have been reported since 2003. It is presumed to be the result of the reduction in dust generation and dispersion. (According to the government's report, 12 workers in the Baganuur Coal Mine and 8 workers in the Shivee-Ovoo Coal Mine suffered lung disease in 2006. Considering that the Shivee-Ovoo Coal Mine is relatively new, there is a strong possibility that those in the Shivee-Ovoo Coal Mine contracted lung disease when they were working in other coal mines before employed by the Shivee-Ovoo Coal Mine.)

Most respondents said that the increased productivity led to the improvement of business management of the coal mines and as a result the employment conditions and the stability of employment improved. In the Shivee-Ovoo Coal Mine, where working conditions were severe especially in winter, inventory management and repair of mining equipment became easier since the spare parts and repair machines could be stored in the repair plant constructed under this project. Also, most respondents pointed out the improvement of housing conditions for employees.

In the household survey, the respondents said they could not purchase the necessary amount of coal in spite of the fact that a sufficient amount of coal was on the market because of the lack of money (27%) or the increase in the market price of coal (61%). Asked about the heat value of coal, 51% answered it was sufficient

2.4.4 Coal consumption and power generation of power plants

BJSC supplies coal to Ulaanbaatar No.3 and No.4 Power Plants and SOJSC supplies coal to the No.4 Power Plant only. The annual coal consumption in the No.4 Power Plant in 2005 was 2,504 thousand tons as shown in Table 6, and the annual consumption in the No.3 Power Plant was about 900 thousand tons. In total, these two power plants consumed about 3,400 thousand tons of coal in one year. The coal consumption in the whole of Mongolia was 5,200 thousand tons (actual result in 2006), only 57% of the estimate for 2005 as of the time of appraisal. At the time of appraisal, a significant increase in power consumption was expected and the demand for coal was also expected to increase. However, as of the time of evaluation (2006–2007), the planned figures have not been achieved. Table 7 shows the annual power generation of No.4 Power Plant.

Table 6: Annual Coal Consumption in No.4 Power Plant (thousand tons)

1998	1999	2000	2001	2002	2003	2004	2005
2,045	2,076	2,198	2,330	2,446	2,338	2,487	2,504

Table 7: Annual Power Generation of No. 4 Power Plant (1,000 MWh)

1998	1999	2000	2001	2002	2003	2004	2005
1,732	1,825	1,910	1,958	2,002	2,009	2,148	2,261

2.5 Sustainability

2.5.1 Executing agency

The executing agency as of the time of appraisal was the Ministry of Infrastructure Development. It changed to the Ministry of Infrastructure in 2002 and to the Ministry of Fuel and Energy in 2004. With the enactment of the Public Procurement Law in 2000, the Project Steering Committee was established with 7–9 officials of government agencies, including the Ministry of Finance, for the purpose of supervising this project. The responsibility for the implementation of the project was transferred to the Coal Authority under which PMU was organized to carry out procedures relating to ODA loans and daily work including communication with JBIC and the World Bank.

The Baganuur Coal Mine is operated and maintained by Baganuur Joint Stock Company (BJSC), a holding company 75% owned by the government and 25% privately owned. The Shivee-Ovoo Coal Mine is operated and maintained by Shivee-Ovoo Joint Stock Company (SOJSC), a holding company 90% owned by the government and 10% privately owned.

2.5.2 Technical capacity

(1) Baganuur Joint Stock Company

Two maintenance units respectively take care of mining equipment, CHP, heavy machines, trucks, etc. BJSC conducts examination to measure employees' skills every

other year. According to the result of the latest examination, they were evaluated to have a high level of skills. Enhancing employees' capabilities is one of the missions of BJSC. BJSC provides necessary training to employees while monitoring their skills. It is planning to further increase training and reinforce monitoring.

Baganuur Coal Mine

(2) Shivee-Ovoo Joint Stock Company

The Professional Training Committee established by the Board of Directors of SOJSC conducts examination to measure technical capabilities and skills of employees every year. According to the result of the latest examination (January 2006), it was determined that the operations and maintenance staff have adequate skill and their technical capabilities is of a level that meets the needs of the current mining technology. The information and training concerning coal technology are provided by the Energy Research and Development Center (formerly National Coal Corporation).

Shivee-Ovoo Coal Mine

2.5.3 Operation and maintenance system

(1) Baganuur Joint Stock Company

Operations and maintenance activities are performed by BJSC. The government intends not to sell its share in BJSC until 2016. Currently, 1200 employees are working for BJSC including 152 engineers and 173 women. Since the start of operations, BJSC was awarded various prizes by the government for its excellent operation management and high level of technical capacity. The company introduced Japanese-style management policies (such as Kaizen, etc.) in 2004 with the aim of preventing accidents, improving efficiency of the business, and improving morals. In 2006, it was honored by the government as the best business establishment in the coal mining sector.

(2) Shivee-Ovoo Joint Stock Company

The operations and maintenance agency is SOJSC. The organization and composition of 368 personnel are as follows. The Board of Directors has 10 members. Under the Manager (1) and Deputy Manager (1), employees are allocated to one of various departments; finance (8), CHP (60), engineering (7), coal mining (60), machines and

equipment (33), bulldozer operators (115), general affairs/procurement (64) and personnel affairs (6). In addition, the Monitoring Committee (3 members), to monitor the operations and management, is established under the Board of Directors. There are 12 employees in charge of repairs of machines and equipment. Maintenance of equipment and materials is performed by the Operation and Maintenance Section under the Engineering Department. In the laboratory constructed under this project, 7 technical experts check the coal quality by measuring water content, ash content and sulfur content so that they can supply coal of the quality demanded by users. In the new repair plant, inspection and repair of bulldozers, trucks and coal mining equipment are carried out on a regular basis. After the repair plant was constructed under this project, it became possible to perform repairs, which had been difficult during the winter. As with the case of BJSC, the government intends not to sell its share in SOJSC until 2016.

2.5.4 Financial status

(1) Baganuur Joint Stock Company

For FY2005, BJSC posted a profit of approximately 210,000 MNT as shown in Table 8. However, it is pointed out that further increase in sales is not expected because customers are limited and that there is a possibility of falling into deficit because it is difficult to raise coal prices.

Table 8: Income and Expenditure of BJSC (unit: MNT)

	2003	2004	2005
Revenue	34,780,840	26,486,554	32,072,996
Direct Expenses	24,952,865	24,763,818	26,891,856
Overhead Expenses (Administrative Expense, etc.)	9,208,759	7,485,525	4,700,054
Pretax Profit	619,216	-5,762,789	481,086
Taxes	32,201	0	272,974
Net Profit	587,014	-5,762,789.53	208,112

The decline in revenue in 2004 is attributable to the coal price hike that caused a decrease in sales. Although expenses such as administrative expense have been decreasing due to personnel reduction, large foreign exchange losses incurred in 2003 and 2004 caused an increase in expenses. BJSC drew up a business plan including market development for increasing sales and improve the management situation, which is now awaiting government approval (2007). BJSC says that because of inadequate involvement of the government agency as the executing agency during the project period, the initially planned phased increase in coal prices was not implemented and coal prices have been kept the minimum level, a situation which prevents raising profit. This system, which does not allow bill collection from power plants, is another factor contributing to the

unsatisfactory financial position, though it has been improving recently.

(2) Shivee-Ovoo Joint Stock Company

SOJSC made efforts to reduce costs by 140 million−1,200 million MNT. However, it is difficult to reduce expenditure due to external factors such as debts, payment for consulting services, exchange fluctuations, etc. (These factors account for 47% of expenditure).

Table 9: Income and Expenditure of SOJSC (unit: MNT)

	2005
Revenue	9,464,151,141
Direct Expenses	10,290,983,238
Overhead Expenses (Administrative Expense, etc.)	870,159,521
Net Profit	-1,696,991,619

As shown in table 9, SOJSC was in the red for 2005 (sales: 950 million MNT; direct expenses: 1,030 million MNT; overhead expenses including administrative expense: 870 million MNT; net profit: -1,700 million MNT), and the sales price does not cover direct expenses. One of the factors contributing to this situation is the fact that the company has only one customer to whom it can sell coal and therefore it is difficult to reflect the increase in expenses due to the price increase of spare parts and oil. This system, which does not allow bill collection from power plants, is another factor contributing to the unsatisfactory financial position, though it has been improving recently.

2.5.5 Operation and maintenance status

(1) Baganuur Joint Stock Company

BJSC introduced a new maintenance system at the beginning of 2006. BJSC decides the timing of the maintenance of machines and equipment according to the demand of coal so that the maintenance is conducted at the time of the year when the coal demand is lowest. Partial repair and replacement are conducted at the same time.

(2) Shivee-Ovoo Joint Stock Company

SOJSC owns only one unit of each important machine and equipment such as CHP or excavator and, therefore, maintenance is conducted only during periods when there is no demand for coal. Since the excavator is made in Russia and there are no similar types of excavators, necessary parts have to be purchased from the manufacturer in Russia. Also, as there is no machine to assemble and disassemble this excavator in Mongolia, it is sometimes sent to Russia by rail. Trucks and other mining equipment are repaired when necessary.

3. Feedback

3.1 Lessons Learned

3.1.1 In this project, there was not enough coordination between the Ministry of Infrastructure and the coal mines (BJSC, SOJSC) and, as a result, opinions on the side of the coal mines were not fully reflected in the planning and implementation of the project. For a project involving more than one stakeholder, they should communicate and cooperate closely with each other from the planning stage. Also, consideration should be given so that procurement specifications would meet the needs of the operation site and lot allocation would be made in such a way that encourages international competition.

3.1.2 At the time of appraisal, the government of Mongolia set the policy of liberalizing coal prices and making it possible for coal mining companies to collect bills. However, coal prices stayed low even after the project started and the financial conditions of coal mines deteriorated. In a project like this that is affected by government policy on price revisions, etc., the government's deep involvement is important. It is necessary to follow up the situation of the government through the project supervision.

3.2 Recommendations

It is desirable for the two coal mines to increase coal production and coal sales in order to improve management conditions. Management efforts such as the expansion of the market and earlier collection of bills are also indispensable.

Comparison of Original and Actual Scope

Baganuur Coal Mine		
Item	Plan	Actual
(1) Outputs		
1 Coal mining equipment		
Bulldozer	17	As planned
Truck (40 t)	10	As planned
Dump truck (90 t)	20	As planned
Trailer	2	As planned
Crane	3	As planned
Other equipment	6	As planned
2 Coal handling plant	2	Almost as planned (design changed)
3 Spare parts	For 1.5 years	As planned
4 Other related machines and equipment (testing equipment, etc.)	4	As planned
5 Consulting services	36 MM	58 MM

Shivee-Ovoo Coal Mine		
Item	Plan	Actual
(1) Outputs		
1 Coal mining equipment		
Bulldozer	4	As planned
Truck	16	As planned
Grader	2	As planned
Crane	1	As planned
Hydraulic excavator	2	As planned
Wheel loader	1	As planned
Wheel pusher	1	As planned
Road sprinkler	1	As planned
Rock drill	2	As planned
Loader (small)	1	As planned
Electric excavator	1	As planned
Excavator	1	As planned
Coal conveyor	1	As planned
Sprinkler truck	1	As planned
2 Drainage treatment system	1	As planned
3 Coal handling plant	1	Almost as planned (design changed)
4 Other related machines and equipment (repair facilities, installation of power transmission lines, etc.)	1	As planned

5 Spare parts	For 3 years	As planned
6 Consulting services	38 MM	As planned
(2) Project Period		
Baganuur	Feb. 1997–Dec. 1999 (2 years 11 months)	Feb. 1997–May 2002 (5 years 4 months)
Shivee-Ovoo	Feb. 1997–Sep. 2001 (4 years 8 months)	Feb. 1997–Mar. 2005 (8 years 2 months)
(3) Project Cost (Total)		
Foreign currency	13,975 million yen	12,886 million yen
Local currency	697 million yen	834 million yen
Total	14,672 million yen	13,720 million yen
ODA loan portion	10,125 million yen	10,040 million yen
Exchange rate	1 yen＝4.83 Tg	1 yen＝8.48 Tg