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# MONGOLIAN ECONOMY

A city or a ghost town?

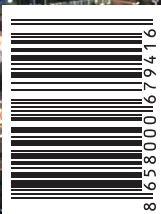
Business that follows business

Father of the city,  
eldest son of the state

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# THE BACKBONE OF MONGOLIA



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THE BUSINESS AND ECONOMICS MAGAZINE PUBLISHED EVERY FORTNIGHT IN BOTH ENGLISH AND MONGOLIAN

# Mongolian Economy

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## Editorial note

This issue contains comprehensive information about a company that has played a huge role in the national budget of the state for many years: Erdenet Mining Corporation.

The joint Mongolian-Russian enterprise is in its 38th of operations since its establishment. Its contributions to the society and economy

### Our journalists visited Erdenet city a couple of days to learn more about the economy of EMC.

of Mongolia have been invaluable. Until recently, the media and press had described the company as “the lone cow with milk.” Even during these times of economic difficulties, EMC has not fallen in performance. It cannot be said that there is a single journalistic organisation which has not covered this company, some positive and some negative. However, there have been very few cases of delivery of such omprehensive information about this company from different angles and perspectives. Therefore, our magazine is dedicating a full issue to this company which has been the backbone of the state budget in the past and continues to be so in the present. It is

not our intention to heap empty praises. Most importantly, we examined EMC’s revenues and profits, whether the company will be able to maintain its contributions to the budget and its strategies to overcome the challenges presented by a global market in which commodity prices have fallen sharply and show no signs of pickup anytime soon. Our journalists visited Erdenet city a couple of days to learn more about the economy of EMC.

From the articles, reportages and interviews by our journalists, our readers can get to know more about the oldest mining company that has become a shining example to many new start-ups during the development of the minerals sector of Mongolia.

In addition, readers can see from relevant documents and statistics that the company is demonstrating palpable results by emphasising investment, technological upgrades and new policies to successfully overcome the present situation. This company of around 6,000 employees has not cut jobs due to the downturn and strives to pay taxes on time. The future of this company upon which a city was built looks as bright as ever. ■

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**Ts.Davaatseren: Some people are angry with me for fighting against nepotism**

Other sectors must be developed, while mining is profitable. It is not an issue of just extracting and exporting minerals. We must produce finished products and develop industries based on the mine, *page 10*



**Effective reforms**

Noise sputters in the huge hall encircled by iron walls, stairs, doors, fences and massive machinery, *page 32*



**At the future machinery production centre**

Our study tour began at the mechanical plant, *page 40*



**Intellectual Erdenet**

The company has developed a comprehensive policy document on intellectual property, *page 42*

## Mongolia

## Exports

As of the first quarter of this year, exports of mineral products decreased by USD 137.7 million from the same period of the previous year. Mineral products, precious and semi-precious stones and metal jewelry items accounted for 88.1 percent of net minerals exports.

Despite the increase in the volume of products exported, revenue is declining due to falling prices. For example, exports of copper concentrate increased by 33 percent in terms of volume, but revenues decreased by six percent. In addition, exports of crude oil rose to 2.2 million barrels, but revenues fell by 20 percent due to lower oil prices. The volume of iron ore exported in the first quarter was almost at the same level as the same period of the previous year, at about 992 thousand tonnes; however, revenues were halved, falling to USD 29 million.

Revenues from coal exports reached USD 99 million, a decline of 30 percent from the previous year. One commodity that gained was gold, whose export volume reached 2.9 tonnes, with revenues amounting to USD 111.3 million. This is an 18 percent increase in volume and 13.6 percent increase in revenue.

## Productivity



In the first quarter of this year, the total output of the industrial sector reached MNT 1,787.5 billion, an increase of MNT 15.4 billion, or 0.9 percent, from the same period of the previous year. The total output of the mining and quarrying sector played a large role in this increase, as it reached MNT 1,180.9 billion, which is an increase of MNT 49.1 billion, or 4.3 percent, from the same period of the previous year.

The output of molybdenum concentrate, crude oil, copper concentrate and gold increased by 0.2-92.7 percent from the same period of the previous year, while output of coal, zinc concentrate, fluorite, crushed stone and iron ore decreased by 7.1-75.7 percent.

## Slowdown

Mongolian experts are predicting that Mongolia's economy can achieve five percent growth in 2016 due to a stable external



environment and revival of investment in the mining sector. However, the Asian Development Bank estimated that growth will be 0.1 percent this year and 0.5 percent in 2017 due to regional and global trends and

## Technology

A fully automatic liquid pump capable of pumping 2,000 tonnes is being assembled at the Mechanical Plant of EMC's Mechanical Foundry Plant. By installing this instrument produced in Taiwan, the plant will become capable of domestically producing import-substitutive products such as large-sized rubber products, rubber for grinding mill armatures and sieves.

The Mechanical Foundry Plant is planning to put the pump into commission within the 15th of April. In addition, they have developed the guidelines for the equipment's operation to train staff. In 2015, the plant gained experience commissioning a liquid pump with a capacity of 1,000 tonnes.

## Exhibition

The Mongolia Mining 2016 International Mining & Oil Expo was held April 6-8. The exhibition was organised at the Buyant Ukhua Sports Complex, where 120 foreign and domestic suppliers introduced their advanced technologies. The BelAZ factory of Belarus introduced their new hybrid engine dump truck for the first time to the market of Mongolia. Also during the event, Oyu Tolgoi introduced plans for procurement and its underground mine project, while Erdenet Mining Corporation introduced their procurement management. EMC, which makes procurements of MNT 300 billion per year, has a set goal of making procurements from domestic industries as much as possible in order to support the domestic industries.

## Water management

Erdenet Mining Corporation is conducting research into re-using the waste water of the Mineral Processing Plant's grinding and processing section. Installation and adjustment of this work is planned to be done in August. Should the test be successful, expensive import equipment will be purchased less and the service life of the pump will be extended. ▶

declining mining productivity. They have recommended that Mongolia tighten fiscal and monetary policy due to aggravating issues regarding balance of payments and debt management.

According to the ADB, the revised estimate of the budget deficit reached 11.5 percent of GDP last year. It is necessary to take into account that payments on certain loans are to begin in the next two years. "Diversifying the economy remains the key challenge, as the mining sector, which requires a high amount of fixed assets, does not contribute that much in reaching the goal of stabilising economic growth and creating jobs," stated

the ADB in its Asian Development Outlook. The World Bank has also warned in its studies about Mongolia that the country needs to pay careful attention to the rate of unemployment.

## World



## Chinese stockpiles

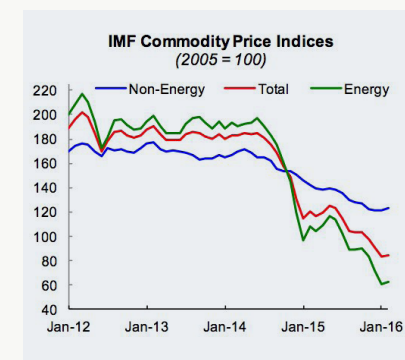
China is sitting on massive stockpiles of copper. According to estimates, nearly 80 percent of the global copper stockpile has been hoarded in China after heavy import of the commodity in 2015. Furthermore, these stockpiles are likely to be put on the global market, as domestic demand for refined copper falls due to the a slowdown in construction and manufacturing. China consumes more than 40 percent of the world's copper, so analysts still expect the usual seasonal increase in demand that comes in the second quarter of the year. However, it is likely to be weaker than in previous years. Goldman Sachs estimates that China contains 1.8 million metric tonnes and also that demand will be stagnant this year and the next. At an industry meeting in Santiago, Chile in early April, only four out of 16 experts surveyed believed copper has hit a bottom. CEO of Turquoise Hill Resources Jeff Tygesen, who was in attendance, relayed that he is still confident in the long term, but conceded that things will be tough in the short term.

## Copper slides

Amid a supply glut and continued worries regarding China, the price for three-month futures for copper at the London Metal Exchange fell by 3.8 percent in the week ending April 8, ending the week at USD 4,650 per tonne and erasing the gains for the year. This was the biggest weekly drop in LME copper since January 8. Last autumn, copper prices were around USD 5,260. Many believe that by the end of 2016, copper could fall to USD 4,000 per tonne. There seems to be a number of people and investors that are bullish as well as bearish, indicating the uncertainty in the market; however, even the optimists are re-examining their positions. How severely China's unleashing of its stockpiles will affect the global market already in a

supply glut is yet to be seen. The crash in oil prices and weakening local currencies have affected copper and other commodity producers favourably, allowing them to cut costs to a certain degree.

## Commodities and debt



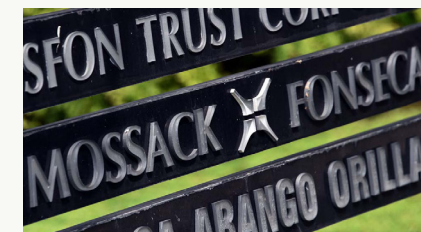
The global commodity prices plunge along with the appreciating US dollar affects poorer countries more severely. The falling prices of commodities such as crude oil, iron ore, copper and other metals mean that state revenues have taken a hit, causing many national budgets to run deficits. At the same time, a stronger US dollar increases the relative burden of repaying dollar-denominated debt obligations. In a report by the Jubilee Debt Campaign, external debt service payments of low and lower-middle income countries in 2016 will be 10.8 percent of government revenues on average, as opposed to the 6.1 percent figure forecasted three years ago. Avoiding a situation similar to the 1980s, when a mixture of a strong dollar and falling commodity prices sparked debt crises, may be a topic at the International Monetary Fund's meeting in mid-April.

## Resignations

As a result of the revelations from the Panama Papers, several big names have under fire, and the resignations have been gradually coming in. The first major casualty was the Icelandic Prime Minister Sigmundur Gunnlaugsson. Citizens took to the streets in Reykjavik after it was revealed that the PM's family owns an offshore investment company with claims on Iceland's failed banks. The CEO of Austrian lender Hypo Landesbank Vorarlberg also stepped down after Austrian national broadcaster ORF (one of the more than 100 organisations

cooperating on the Panama Papers) said the bank was linked to offshore companies. Austria's financial regulatory body is now investigating whether Hypo Vorarlberg and another Austrian bank, Raiffeisen Bank International, took the appropriate steps necessary to prevent money laundering.

In other places, Argentine President Mauricio Macri denied any wrongdoing before a judge, while a federal prosecutor called for an investigation. UK Prime Minister David Cameron has also come under fire after admitting that he benefitted from an offshore trust fund set up by his late father. He admitted that he and his wife once owned shares in the fund, but said he sold his shares before becoming the British PM.



At the world football governing organisation FIFA, a member of its ethics committee, Juan Pedro Damiani, stepped down after the leak linked Damiani to three men convicted in a corruption case related to FIFA. Damiani was a member of the organ which handed Sepp Blatter a ban in the world of football. Swiss authorities also raided UEFA, the governing body for European football, as a result of the revelation that current FIFA president Gianni Infantino co-signed a broadcast deal in 2006 with two men accused of bribery.

China and Russia were the two countries most mentioned in the leak. In China, Xi Jinping and eight members of the Politburo Standing Committee were implicated. However, mentions of the leak have been censored from the Internet and social media. In Russia, President Putin denied any involvement in offshore financial activities and implied the Panama Papers are a conspiracy by the West to undermine him and Russia. The news has not dented the general public's favourable view of their president.

Others in the hot seat include the prime ministers of Pakistan, Malta, president of Ukraine and numerous other current and offer high-level officials and leaders in government and business. ■



EMC did not develop the city; it created it

Photo by O. Lkhagvakhoro

## Partnership

# City on a factory

BY TS.ELBEGSAIKHAN

**E**rdenet Mining Corporation, the basis of the city with more than 100 thousand residents, is a role model for Mongolia's mining industry and sets the bar quite high. To put it bluntly, no other mining company can compare to the example of corporate social responsibility set by EMC.

When Mongolia's provinces were ranked by competitiveness, Orkhon province received the highest possible score of 100 points. It indicates effective governance, a more capable economy and a more favourable business environment. The close cooperation between EMC and provincial authorities is evident.

The residents of Orkhon province have already realised how helpful mining, when done right, can be to development, according to a study conducted by Nepko Publishing last year. Such positive views are a result of the factory's benefits reaching the local community, households and individuals. Today, mining extraction activities are being carried out in almost every province, and every citizen owning shares in Tavan Tolgoi used to receive

MNT 21,000 from the development fund. With that being the case, why people have such a contrasting opinion regarding mining from the residents of Orkhon province?

Erdenet's business and market has a unique cycle. They say the prices of all consumer goods go up when EMC workers receive their paychecks and go back down some time later. It is a real example of the impact of the factory's 6,000 jobs on the city. There are many other things connecting the lives of the residents of Erdenet city to the factory. The 38-year history of EMC shows how mining and a province can coexist with mutual benefits by making direct investments in the city instead of indirectly financing things.

In general, all the infrastructural developments, such as city roads, electrical lines and residential apartments of Erdenet city, were based on the factory. Even now, the city is expanding along with the factory. The provincial government decided to establish a new settlement area to the south-east of "Sarkhia" ski resort. This will provide many of EMC's workers

as well as other city residents living in ger districts with an opportunity to move into apartments.

Last year, a new diagnostic treatment centre of international quality was commissioned for the residents of Orkhon province as well as neighbouring provinces. The "Erdenet Medical" hospital has the capacity to serve over 500 people per day. It is the first rural hospital of Mongolia with much-needed technologies such as an MRI machine and instruments for vascular diagnosis. For example, only the State Clinical Hospital-III has an MRI. The Japanese-standard hospital has been fully connected to electronic systems and makes distance diagnostics. If necessary, the hospital connects patients with foreign hospitals in developed countries. Erdenet Mining Corporation spent about MNT 50 billion to build the hospital.

When we think of ger districts, a dusty, uncomfortable place with bumpy dirt roads comes to our mind. However, it is the opposite here. Paved roads can be seen along the streets, and the lighting is no different than that of the city. ▶

▶ It is perhaps the answer to the previous question. Numerous investments and works have been done in this city which developed along with the factory for decades. In just the last three years alone, EMC made investments amounting to MNT 55.2 billion in civil service, legislation, the environment, ecology, industrial and technological parks, roads and transportation, communication, society, the economy, education and development, all under the cooperation agreement with Office of the Governor of Orkhon province.

EMC has created incomparably broad opportunities for Orkhon province. The province has developed a plan to establish a science and technology park based on this opportunity. Currently, EMC has conducted a feasibility study in collaboration with the provincial governor's office. The company will produce innovative advanced technology by establishing the science and technology park, and its technological institute will expand to become the University of Erdenet, a large university and research centre. Finally, three decades later, when

the mining extraction stops here, this training, research and industrial incubator must become the employment of local workers and the business environment of enterprises. As it will become the lone science and technology park not just in this city, but the entire Khangai region, it will have a positive impact on the economies of its neighboring provinces. The Erdenet Mining Corporation is not just a standard that is developing a city, but a mining factory which established a new city. Therefore, they are hard at work for the future of its city's developments. ■



## Management

# Ts.Davaatseren: Some people are angry with me for fighting against nepotism

BY D. BEKHBAYAR

*We sat down the General Director of Erdenet Mining Corporation, Ts.Davaatseren.*



**- EMC plays a huge role when it comes to state budget, development of the country and lives of people. How would you express the contribution of EMC to the country's development?**

- The people of Mongolia are proud of EMC. It is an excellent factory with a great team. This is our 38th year of operations since its establishment in 1978. Throughout its existence, EMC has produced four million tonnes of pure copper to export. We have contributed MNT five trillion to the state budget and reaped profits of USD 1.3 billion throughout the years. From these figures, the benefits of the factory are clear. EMC is also responsible for invaluable social benefits. A city with about 100 thousand residents has been established alongside the factory. These are tangible contributions to the development of Mongolia.

We are a living example that shows mining can bring development with good policies and calculations of mineral resources. We have implemented major policies regarding environmental impact. There are issues to consider in the future. For instance, certain measures need to be taken dust control and the environment. EMC has been operating an orphanage under its tutelage for about 20 years. More than 250 children have reached adulthood under the care of this orphanage. At the moment, about 40 children are being raised there. At the same time, we provide additional support in addition to the state pensions to our retirees. These are just a few of the many benefits of EMC to society.

**- How many people do you currently employ?**

- About 6,000 employees at the moment.

**- Lots of organisations are cutting jobs due to the current economic situation. How is the situation at EMC?**

- We are maintaining jobs. There are thousands of families behind our 6,000 employees. We have been working hard in order not to disrupt the livelihoods of these people. Other factories with the same capacity as ours are currently working with 4-5,000 employees. We strived not to cut even one position and pay our taxes on time.

**- The state budget and budgets of two provinces depend on EMC. How much in taxes has EMC paid in the last three years?**

- Last year, EMC contributed MNT 381 billion to the state and local budgets. Our company has won the award for best taxpaying company of the year many times. The amount paid as tax has decreased compared to previous years, however. EMC paid taxes amounting to MNT 462 billion in 2014. In addition, our company accounts for the majority of the budget revenues of Orkhon and Bulgan province.

This year, we may pay less in taxes than the previous years. The price of copper has fallen sharply on the global market. The price of copper, which was USD 5,200 per tonne, has fallen to USD 4,200 per tonne. It has increased slightly, though. The price has been falling sharply over the past few years. It is about half of what it was in 2011. The peak of the price of copper was five years ago, when it was USD 9,800 per tonne. Since then, it has been falling every year to come to the current price of USD 4,800 per tonne. In 2011, our company made sales of about USD one billion, while last year we made a profit of about USD 500 million. Such is the effect of the price plummet.

**- The revenue of the Mineral Processing Plant is ▶**

**▶ directly related to the price of copper. How does the future look in this regard?**

- We are looking at research by more than ten major forecast companies. According to their research and conclusions, the price is unlikely to increase anytime soon. Some studies say that it will go down even further due to copper supply glut. Therefore, we have to adapt to these falling prices. We have to strive to work profitably with cost-saving measures, such as reducing expenditures, not purchasing fixed assets or postponing certain maintenance works. When I took this job in early 2013, the price of copper was USD 6,625 per tonne. According to our estimates, the factory can survive if the price is between USD 4,500-4,900 per tonne.

**-When you became the General Director of EMC, you were saying "I will fight hard against nepotism in business." How did the fight go? Were there any results?**

-In order to reduce costs, I emphasised the fight against nepotism and corruption. Our team has worked well. I rewarded some of the people who worked well and was criticised for this. On the other hand, some people get irritated when a person fights against corruption. Of course they would be angry, since their corrupt businesses go under. However, my main objective was to make reforms in this state-owned company to ensure its survival during this difficult market situation. There was a need to make analyses based on the reality of the situation. My thinking was that the state and the people would benefit if this factory's profits are higher. I think that most people appreciate my efforts to correct bubbles in the economy and implement appropriate policies.

**- The government must appreciate EMC maintaining these many jobs and paying taxes on time.**

- We are striving to overcome the situation through the economic austerity policy for the company implemented over the last three years and efforts of our employees to produce value-added products. Some people see that works are going as they have to, but in fact, it is not so. For example, how much of a deficit we would bear if we produce one tonne of copper for its actual cost of USD 6,625 and sell it for USD 4,600. The reason why the company's economy is going smoothly is the result of the managerial team and the faith shown in me by our miners. The situation would have been difficult if the appropriate economic austerity policy and management measures were not taken in time. In that sense, we need to acknowledge the team's cohesion. I rewarded members of the administrative team in accordance with the criteria I set as the director. I would like to say again that our company is working normally as a result of setting criteria for rewards and giving bonuses in cases of cost savings and positive results. As an administrative body, I must reward and encourage people by evaluating results. However, rumours were spread, saying that I just gave some money to the executives.

**-Were the salaries of the employees reduced?**

- No, they were not. People are only talking about the rewards to the administrative team. A total of MNT

22.5 billion was spent on rewards to other employees in a span of three years. I have reduced nepotism in business and provided bonuses and rewards to employees from the savings. Yet, no one is talking about why this money separate from the salary was given to employees. Salaries were raised by 10 percent in both 2013 and 2014. Our company increased wages, despite the overall economic situation of the country. Although base salaries and wages were not raised last year, a comparable amount of money was given to employees in the form of rewards and bonuses.

**- It my understanding that Erdenes Mongol LLC is working to improve the skills and capacity of state-owned enterprises and factories. What are your thoughts on this?**

- In order to improve the governance of companies, ensuring the independence of companies, improving competitiveness and reducing state influence is key. The implementation of increased transparency through glass accounts is correct for state-funded organisations. However, it should be noted that companies such as ours compete in the market, create their own wealth and create their own budgets. Companies competing in the market will not go forward without economic incentives. People will work well when there are incentives, bonuses and rewards. It makes no differences whether a company is state-owned or private.

**- Obviously EMC will contribute to the nation's development for many years to come. Today, the issues surrounding Oyu Tolgoi and Tavan Tolgoi are still under discussion. How do you see the future as an industry expert?**

- In recent years, it the mining industry has been heavily politicised. The majority of foreign investment goes into the mining sector. In general, foreign investment will continue to focus on this sector. Given this, we will develop further. A concrete example is our company. However, the most important thing is that the Erdenet mine is not going to be exploited forever. We must use this deposit properly. Other sectors must be developed, while mining is profitable. It is not an issue of just extracting and exporting minerals. We must produce finished products and develop industries based on the mine. Many SMEs should be established by the time the mine's reserves are depleted. These issues must be planned using mine closure management. Therefore, we are talking a lot about mine closure and development policy.

**- How do you see the future of Erdenet city?**

- Currently, the mine is estimated to have 30-40 years' worth of reserves. However, we need to implement good technology and investment policies. The issue is whether we will be able to extract the reserves, even though we have resources for the 40 years. Can it be efficient in ▶

**On the other hand, some people get irritated when a person fights against corruption. Of course they would get angry, since their corrupt businesses go under.**

► terms of technological and economic benefits? In general, it depends directly on the global price of copper. In the future, we need to produce not only copper concentrate, but also finished products. We need to build a copper smelting plant and plants that supply necessary goods and services. By doing so, the city can continue to develop even after the mine's reserves are exhausted. The city will develop further independent of mining. It will be a manifestation of the proper utilisation of mineral deposits absorbed into the country and the economy.

**- A copper smelting plant must be built in Erdenet. Some say that a copper smelting plant will allow the city to carry on when the mine's resources are depleted. What are your thoughts on this?**

- The government made the decision to build a copper smelting plant in Bor-Undur. I think it is a good decision because Erdenet is a basin for the Orkhon and Selenge regions, which means it is a source of water. It is very a very sensitive region ecologically. On top of this, the "law with the long name" (Law on Prohibiting Mineral Exploration and Extraction Near Water Sources, Protected Areas and Forests) covers regions with sources of water. Thus, it is risky to build a heavy industry plant in forested and ecologically fragile areas. Such risks should be carefully considered. EMC has not fully resolved the issue of white dust yet and is allocating funds to address this issue.

It is a metallurgical and chemical plant. A lot of sulphuric acid

Therefore, Bor-Undur is more suitable than Erdenet, since it is not a forest area and is relatively tolerant ecologically. Also, there are possibilities to produce secondary raw materials such as hydrogen fluoride and raw materials of aluminium by mixing sulphuric acid with spar products. This is the advantage of a region with high resources of fluoride. Raw materials of aluminium are made of spar concentrate. Even the technology is there. Bor-Undur has advantages such as less ecological sensitivity, jobs, lower risk and the sulfuric acid to be discharged from the plant being nearer to the next market. If we cannot make some kind of product from the sulphuric acid, we would have to export it to China. The market is there. The issue is to decide whether to transport it by rail from Erdenet or from Bor-Undur.

**- What plans does the company have for the near future?**

-We are working on the expansion of the thermal power plant. The development of the blueprint to expand the plant to 48MW is on-going. Two companies were selected through a tender announced last year. Four 12MW turbines are to be installed. The foundations will be built and the work will begin this spring if the Ministry of Energy gives approval. It will increase energy production and sources. Also, it makes it possible to satisfy 30-40 percent of domestic consumption and save money.

In addition, the opening of the Diagnostic and Treatment Centre built through the investment of EMC will be held in Erdenet next month. We consider it a huge investment in the health of the people

living in this industrial zone. We planned to have this hospital equipped with modern technology operated by Japanese management and made an agreement with a Japanese organisation that has experience in this regard. We wanted to build a hospital in order to provide high quality, advanced medical services to the people and reduce the outflow of people going overseas for treatment. It is a substantial investment made not only for Orkhon province, but for the entire region.

**- How is it working with the Russians?**

- It is a joint venture.

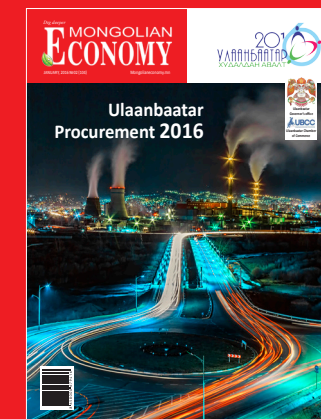
All the rules and regulations of the company are governed by agreements between the two governments. The agreement states that the operational direction will be applied by the law of Mongolia. The Russian side supports the company. About 300 Russian experts work here under contract. It is our duty to protect the rights and provide living accommodations for these people, which becomes half a thousand people when you include their families. As a shareholder, it obvious that they would want to have their citizens work here. We must work with a mutual understanding, and we are doing that by supporting and respecting each other. As for us, we cannot just think of ourselves and continue to politicise things. We must consider the fact that the Russian side owns 49 percent of the company. ■



Employees are rewarded for cost-saving and positive initiatives

and chemicals will be discharged from a copper smelting plant. How to address that is an issue. People talk as though it is an easy thing to solve. They say that they will produce fertiliser by bringing phosphorite from Khuvsgul and mixing it with sulphuric acid. This is actually a sophisticated task. If we decide to produce a fertiliser by mixing phosphorite and sulphuric acid, then we have to build another plant. The copper smelting plant will not only discharge sulphuric acid, but lots of waste slag with high iron content. The copper smelting plant raises many issues, such as what will be done with those slags. For example, we need to decide whether to use it for construction materials or build stockpiles. The most important thing is chemical issues related to ecology and the environment.

## Mongolian Economy - Dig Deeper



*"Magazine of the Year 2013" by the Mongolian Journalists Union*

*"Media Company of the Year 2012" by the Business Council of Mongolia*

*"Media Entrepreneur of the Year 2011" by Mongolian Chamber of Commerce and Industry*

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# The economic and social benefits of Erdenet Mining Corporation

D.GALBAATAR, Ph.D., mining engineer and economist

**The economic and social importance of the establishment of EMC can be viewed in a number of ways:**

1. The development of Mongolia's mining sector has accelerated, and its role in the national economy has widened. Before the establishment of EMC, mining products accounted for 4-5 percent of industrial products, whereas in 2015, this figure was 77 percent. Such a number may be encouraging, but without good mining management, Mongolia has become a resource-dependent nation, moving up and down in tandem with commodity prices. Hence, the issue of increasing the amount of processing rather than exporting raw minerals has become the key topic today. The establishment of the Ministry of Industry was an influential development in this regard. Now the state needs to continue forward after this good start.

2. Foreign trade turnover has increased and has started to account for a large percentage of the state's budget revenue. In 1980, Mongolia's budget revenue was MNT four billion, whereas it had become almost MNT six trillion in 2015, as Erdenet Mining Corporation accounted for 5.7 percent of the total budget and constituted 12 percent of export products, even though the price of copper on the global market has dropped. EMC's benefits to the country can be directly felt if you consider the fact that OT's gold revenue, which goes out along with its copper concentrate revenue, was 35 percent more than EMC's total revenue in 2015. If OT can be managed better and more similar to the Erdenet factory, Mongolia's finances will easily be revived.

3. Today, EMC serves as an impetus to the growth of the industrial sector. In particular, it alone is responsible for 10 percent of railway transportation and 20 percent of the energy revenue. It

has made significant contributions to import-substitutive small- and medium-sized enterprises by purchasing goods amounting to MNT 53.3 billion from domestic companies last year alone. This was a six-fold increase compared to 2012.

With new factories related to industry and technology being established alongside EMC's factory, it allows the company and city to ensure its needs domestically. The factory purchases 24,000 tonnes of steel bloom from Darkhan city's metallurgical plant per year, which is equal to a fifth of the total sales of this plant. In addition, the factory purchases 30,000 tonnes of lime per year from the Khutul cement and lime plant. It also purchases all of the sacks used for metal concentrates from domestic suppliers. As the factories in Erdenet city supply many kinds of products such as ball bearings, raw rubber and dust masks to the factory, it saves thousands of dollars over imports and creates many new jobs for these industries.

4. Erdenet city is a city based on industry, so it is hard to imagine its development without EMC. Today, EMC's factory is single-handedly responsible for 85-90 percent of the budget of Orkhon province.

5. As a result of becoming a major mine that develops qualified workers for the mining sector, many positive things can be said about EMC. It is a complex mining cluster of global standards and has strengthened itself with a qualified workforce. It adheres to exemplary social responsibility by addressing employees' social issues in a transparent manner. I am even more thankful that they were able to do all this even when the price of copper fell 2.2 times.

Thus, the joint Mongolian-Russian Erdenet Mining Corporation has been a pillar industry of Mongolia's economic and social development, and its further

expansion and economic significance is reflected in the development plan developed in 2013. Over the past period, the team at EMC has successfully fulfilled the tasks set before them to become a modern factory fully equipped with high performance technologies, excellent management, facilities and professional staff.

In the first eight years after the factory was established and started selling its products, the average annual export revenue of the factory was RUB 117 million and profit RUB 60 million.

It has been 37 years since the beginnings of the joint Mongolian-Russian Erdenet Mining Corporation. During this period, it has processed a total of 760.3 million tonnes of ore and produced 15.5 million tonnes of copper concentrate and 120.8 thousand tonnes of molybdenum concentrate to contribute a total of MNT 9.0 trillion to the national and local budgets. This is equal to enough money to build seven factories like EMC and three like Oyu Tolgoi if estimated by the rates of 1978. Thus, its value is undeniable.

The internal and external conditions were not that great over the past period up to today's situation. EMC has experience overcoming the unstable nature of the market. The company has faced three market price decline crises. Although prices dropped in 1997-1998 and 2008-2009, it did not exceed its cost of concentrate production per tonne, and the factory was able to overcome the crises by pledging their products for many years, even though the crises did not last very long relatively. However, the current price drop of copper which began in 2011 was from USD 10,106 (annual average price in 2011 was USD 8,821) and is still continuing to fall today. In other words, the price has more than halved over this five-year period. At the same time, the sale price of per tonne copper concentrate began to be set lower than the consumer price of copper concentrate melting due to



▶ the price drop. On top of this, the mineral royalty tax set the condition for more losses. This situation is related only to the state-owned EMC, as private companies receive more support and discounts.

Therefore, the new management team started to successfully implement a tactical strategy to increase income and tighten the belt to save costs. As for Mongolia, which has made mining its primary sector, it can be said that economic growth depends on the price of minerals. Growth was at 17.3 percent in 2011, leading the world when the price of copper was USD 8,821, while economic growth declined along with the falling prices of copper. For example, growth was 12.3 percent in 2012 when the price of copper had dropped to USD 7,950, 11.6 percent in 2013 with copper at USD 7,326, 7.8 percent in 2014 with copper at USD 6,859 and 2.5 percent in 2015 when price of copper had fallen to USD 5,502. The actual result of being dependent on a single sector is such. Many other copper businesses around the world, such as Chile's Salvador and Ministro Hales, Zambia's Fist Quantum, New Guinea's Ok-Tedi, South Africa's Palavora and Canada's Lockerby, have ceased their operations due to the price decline. Likewise, many Mongolian mining companies have become unable to pay their employees, as they do not have any profits, being forced to close down. However, EMC is fulfilling its obligations before the state and stakeholders and has

not cut any jobs. It is striving to turn the crisis into an opportunity by increasing the income of employees by 10 percent over the last three years.

EMC has not cut social welfare and pensions and is still continuing to spend funds for pensions, benefits, workers' vacation and recreation, cultural and sports events, children's summer camps and clubs, financing for orphanages, construction of socio-cultural facilities, procurement of fixed assets and food discounts for workers. It is spending substantial amounts to solve the issues of factory workers' housing, organising professional training, cultural, arts and sports events and investing in the education of workers' children. In addition, the factory is taking the children of the retired employees to work in their place.

In order to achieve these objectives, EMC cooperated with its labor union to make an agreement comprising 12 chapters and 116 articles, and 98 percent fulfilled this agreement in 2013 and 99.1 percent in 2014-2015. In order to implement these measures, MNT 220 billion is spent per year, which is a fifth of the total production costs. Today, EMC is the only enterprise in Mongolia that takes on such big obligations under a collective agreement and fulfils them.

Although the factory utilises Russian equipment and technology, the per-tonne ore extraction and processing costs of the factory was lower than the global average

under the policy to increase income and reduce costs, which was implemented over the last three years. This shows that the factory is close to becoming one of the leading global industries in terms of technology and management.

Although EMC's mining and geological conditions were worsening and copper content in ore was declining year by year, its objective was not reducing the output of copper and molybdenum in concentrate, the core product of the company, and maintaining efficiency levels. In order to achieve this objective, a new expansion with a capacity to process six million tonnes of ore was commissioned in 2015. As a result of increased capacity and newly introduced modern equipment, the factory reached record high production levels.

The success of the factory over the past period is thanks to the hard work of all the skilled staff and employees, safe operation of the factory, newly introduced technologies and bright ideas.

EMC is a factory that not only produces things but is also a base for mining science and a core of skilled staff. The administration of EMC is emphasising expansion of this factory, which has already become one of the largest factories of the world by increasing sales, ensuring efficient operations, training and preparing engineering and technical personnel and resolving the social issues of employees. ■



Erdenet Mining Corporation's total contribution to the state budget through its 38 years of operation (1978-2015)

**MNT 5trillion**

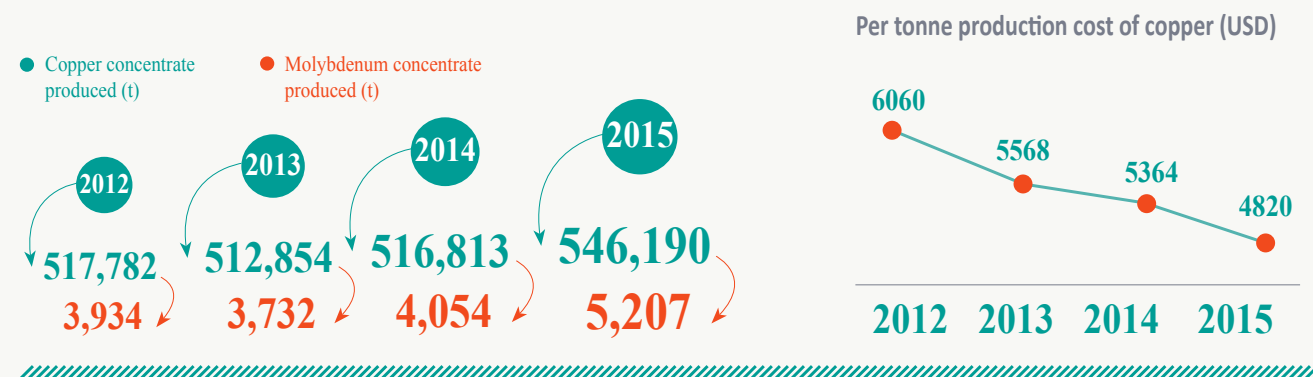


Over this period  
**4 MILLION TONNES** of pure copper were produced and exported

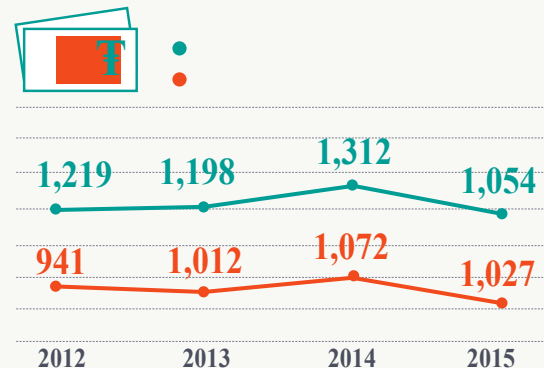
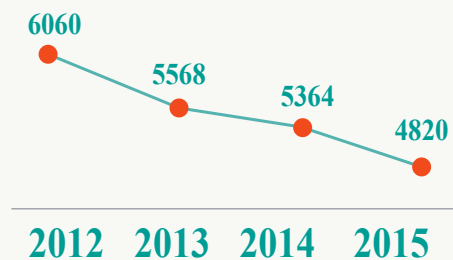
Taxes paid by EMC to the state budget, 2013-2015 (MNT billion)



Key statistics on EMC over the past four years



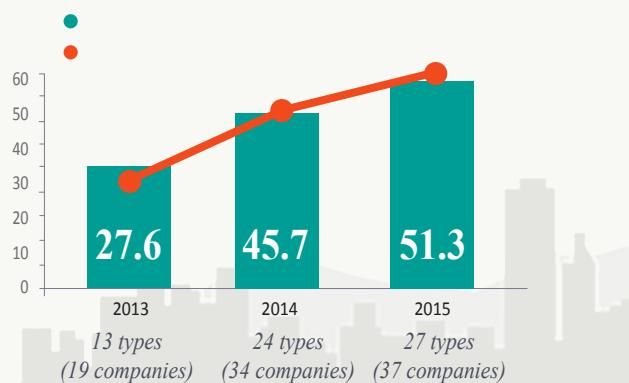
Per tonne production cost of copper (USD)



{ 35-43%

{ 127.9  
131.6

The share of import-substitutive products in total procurement



ISO14001

250

12000 In 2013, the company planted 12,000 trees of 19 types within the framework of the "Green Grove" project

11766 In 2015, the company conducted environmental testing on air, water and soil the most amount of times, 11,766 times in total

SOCIAL RESPONSIBILITY (2013-2015)

MNT 9.4B

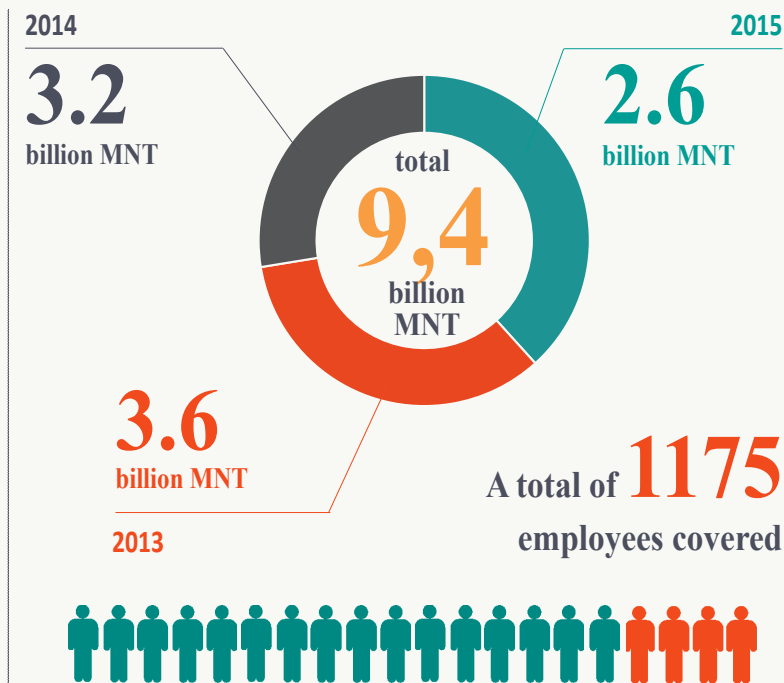
Supports and incentives for the elderly

MNT 18.3B

Grants to employees

MNT 6.3B

Medical treatment, care and compensation for employees who lost their ability to work due to occupational illnesses



MNT 6.6-7.3 billion per year on food for 4,300 employees

710 employees received MNT 352 million in transportation discounts, 7,608 employees received MNT 228.5 million in coal discounts, and employees received tuition discounts of MNT 851.1 million under the collective agreement

334 mothers received child benefit money until the child reaches the age of three

The company allocates and spends about 7 percent of its total expenditure on social development Income and expenditures of social undertakings in the last three years

2013 70.7 billion

2015 69.5 billion

EMC provides 24 types of discounts to heavy industry workers of the mining sectors including, discounts, supports, grants and a strong social security policy.

PERSONAL DEVELOPMENT

School fees (MNT billion) } 7.5

Category	Count
Abroad	355 people
Domestic	226 people

Number of people who participated in sports events } 94,000

OUTPUT Products produced in 2015

31.6 million tonnes of surface mining extracts	546,190 tonnes of copper concentrate
28 million tonnes of ore processed	5207 tonnes of molybdenum concentrate

In 2014-2015, the company performed 46,875 metres of drilling work and exploration on 172 boreholes in short order at the northwestern and central areas of the deposit

## Procurement

# Business that follows business

BY B.ENKHTSETSEG

Four young engineers hailing from Erdenet Mining Corporation banded together to establish “Erdenet LED,” the first LED factory in Mongolia. Last year, they made waves last year, as the media heaped praise after locals as well as some major companies started buying their products. This factory is only one of the many domestic manufacturers supported by the Erdenet Mining Corporation.

In the scope of their policy to support import-substitutive and export-supportive businesses and diversify the economy of Orkhon province, EMC supports many small- and medium-sized enterprises: the molybdenum concentrate processing factory Shim Technology, pure copper factory Achit-Ikht, mask factory Tsagaan Jim, Beren Group’s Metallurgical Complex Plant, rubber product factory Mainspring, the nano-technology texture factory of Erdenet Carpet LLC and the above-



The Erdenet LED factory

mentioned LED factory. These are the simple examples of businesses affiliated with the factory. The seven companies in Orkhon province are now successfully operating after being launched in 2014. Nearly all of them are supplying their products to EMC, as these businesses relied on EMC’s to get off the ground. However, nothing is stopping them from

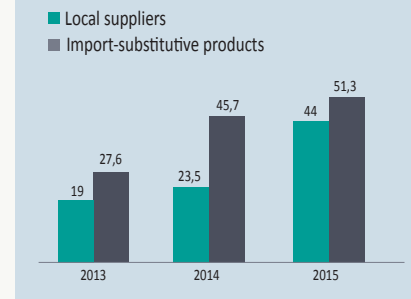
expanding operations and cooperating with other companies.

Last year, EMC signed 394 agreements with manufacturers, and procurements amounted to almost MNT 300 billion. The company purchased products worth MNT 51 billion from 37 manufacturers of import-substitutive products in 2015 – six times the amount purchased in 2012. Currently, there are 27 types of products being purchased from domestic producers, although some companies do supply the same types of products.

Considering that each of the 37 businesses that made an agreement with EMC last year has at least 10 employees, and if we say each employee has four family members, it means the livelihoods of almost 1,500 people are depending on EMC. EMC itself has 6,000 employees. Many more family members are in the city of Erdenet behind those employees. There

is no one in the city that does not have some sort of relative working at EMC. The reserves of the deposit are not everlasting. The city’s people need different a way to live and different economic pillars when the mine is exhausted. The solution may be the domestic producers that have capacity to substitute for imports and boost exports.

## Procurement of import-substitutive products and procurement from local producers 2013-2015



In 2012, EMC purchased import-substitutive products amounting to MNT 8.3 billion from domestic producers, which accounted for just three percent of the company’s total procurement expenses. The above figure has been increasing ever since, as the company implemented a policy to support domestic producers. Last year, the company made procurements of MNT 51.3 billion from domestic producers, making procurement from domestic producers rise to 17.3 percent of the total procurement. That amount was MNT 23.7 billion higher than in 2013, an 86 percent jump. Enterprises in Orkhon province made 130 contracts with a total worth of MNT 44 billion with EMC in 2015. They make up 15 percent of all domestic suppliers, a 4 percent increase from its previous year.

Basic technological materials, used daily to make concentrates, account for 70 percent of the products purchased by EMC. The company tries to purchase these basic tech materials from domestic enterprises. For example, the company has been purchasing steel ball blooms, which account for three-fifths of the products purchased from domestic producers, from the Darkhan Metallurgical Plant since 2013. About 60 types of products belong to the category of basic technology material, while the company purchases about 30 thousand types of products. This figure includes products such as pens, paper and soap. From the 394 contracts made last year, 73 contracts are allotted for foreign companies as the company imports necessary products unavailable in Mongolia from countries such as Russia, China and Australia.

“Since the current administrative team was formed in 2013, nepotism in business was tackled and the company has reduced expenses by purchasing products

and materials based on the real needs of the factory,” stated S.Erdenebilegt, an economist who works in supply and procurement.

Due to advanced payments for purchases, EMC’s debts receivable was USD 40.8 million in 2010, while it was reduced to USD 18 million over the past three years. Before 2013, there were cases of companies supplying goods of poor quality, not fulfilling the contractual requirements and neglecting to deliver after taking the advance payments. Such instances caused complications to the company’s finances. However, in recent years, measures were taken to abolish the advanced payment method, as non-advanced payment contracts accounted for 32 percent of the total contracts in 2012, while today it is 80 percent. This in turn makes suppliers more accountable and incentivises them to put more quality into products. It is also useful because it became a way of evaluating the next businesses to cooperate with EMC.

While domestic entrepreneurs are starting to stand on their own two feet by depending on EMC, there are subsidiaries of EMC which have the potential to become major players in Mongolia’s mining sector in the future. One of them is the Mechanical Foundry Plant, which has a broad operational scope, including maintenance service and manufacturing of parts. This plant can produce parts weighing up to eight tonnes, and managed cost-savings of MNT 5.3 billion last year. It is producing import substitutive-parts for EMC for reasonable prices, allowing the latter to also save on expenses. A policy to turn the Mechanical Foundry Plant into Mongolia’s machinery manufacturing centre has been drawn up. This is a gateway for many people and businesses. The operation of this plant has the possibility to exceed even EMC in supplying their services and products to other mining firms.

In 2010, EMC contributed MNT 624 billion to the national and local budgets, its highest amount paid in its history. A quarter of this money goes to Orkhon province. Businesses that will make up this budget in the future are starting to be established today. Even if none of them reach the heights of EMC, at least they have the future to make up the local budget on the same level as EMC collectively and compete internationally. ■

## Investment

# Effective reforms



The expansion of the autogenic grinding circuit

Photo by B. Tsetsee

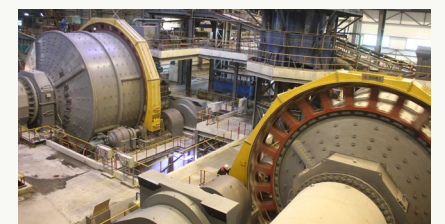
BY TS.BADRAL

Noise sputters in the huge hall encircled by iron walls, stairs, doors, fences and massive machinery. We have come to the grinding mill of Erdenet Mining Corporation’s mineral processing plant. There are four crushers spinning to process ore. The two crushers installed in the rear are a little larger than the other two and were installed last year. With the expansion of the autogenic grinding section, the total capacity of the factory was increased by six million tonnes to become capable of processing 32 million tonnes of ore annually.

With the price of copper falling sharply over the past few years on the global market, EMC has been emphasising cutting costs and boosting efficiency. Although the company’s administration has been implementing a cost saving policy for the past three years, they have also been making important investments required to increase the efficiency of its technology and factory productivity. As a result of taking step-by-step measures against financial instability by reducing costs and increasing revenue, the company has earned extra income amounting to MNT 128 billion while saving costs amounting to MNT 132 billion.

Factors such as copper price plunge and declining ore content of the mine are having a significant impact on revenues. Last year, the company earned revenues amounting to MNT 54 billion, but this is a decrease of MNT 79.9 billion from the year prior.

In addition, the company contributed MNT 381 billion to the national and local budgets last year, which was a 27 percent decrease compared to 2013 and 18 percent decrease compared to 2014. As a result of expanding the autogenic grinding mill section, the factory is producing 104 thousand tonnes of copper concentrate and 664 tonnes of molybdenum concentrate per year, and profits from copper concentrate increased by MNT 240 billion. This in turn meant that an additional MNT 3 billion would be paid. This year alone, it is expected to earn additional income amounting to nearly a hundred million dollars.



This developmental work was equivalent to constructing 10 nine-storey buildings. Investments totalling USD 155 million were made for the undertaking, and it will raise the net profit of the factory to USD 12 million annually. The two newly installed crushers require less human handling, saving time as it automatically carries out the process of sifting and re-crushing. About 30 new jobs were created by this expansion. The factory

▶ plans to increase its ore processing capacity to 35 million tonnes in the future.

Also last year, several of the copper and molybdenum flotation enrichment machines of the grinding and processing section were upgraded. As a result, extraction of copper from ore has reached 86.4 percent, and extraction of molybdenum from ore has increased by 5.5 percent. In addition, the capacity of section 6 of ore processing was increased to five million tonnes. With these improvements, sections 1-6 of the processing plant is now fully equipped with modern technologies, setting the conditions to process 35 million tonnes of ore per year.

A new pressure filter (M1500 FBM-77-PP) was assembled at the copper and molybdenum filtration and drying circuit and was put into operation in 2013. As a result, the reliability of the equipment was increased, moisture content of copper

reduced and safeguards improved. Next year will mark the 40th anniversary of Erdenet city. It means that in general, the equipment and machinery of the factory are of the same age, meaning that there is a need to upgrade and replace obsolete technology.

One of the most effective investments made last year was the instalment of a two-stage coal gasification boiler at steel ball mill section. Previously, the heating boiler was heated using diesel fuel. By installing and commissioning the coal gasification boiler for MNT 1.1 billion, MNT 2 billion on diesel fuel and 33 percent of the costs associated with the steel balls were saved. This amount invested will be recovered in just a year, and total production costs are to decrease by MNT one billion. In addition, 16 new jobs were created. Furthermore, production was expanded last year and started to mill 100mm diameter steel balls.

Thus, it has become possible to domestically satisfy 90 percent of the processing plant's needs.

Another important task completed in recent years was the upgrade on the waste collector. MNT 7.7 billion was spent on upgrading the second water harvest collector, which includes 4.1 km of piping, four water harvest wells, four restriction dams and four water transfer channels. Now there is no longer any need to worry about the reliable operation of the disposal section for 25 years.

By making such timely investments, the operational stability of EMC's factory can be ensured for the coming years. It is all part of the company striving to overcome the economic difficulties and constraints. There is no doubt that its future operations and benefits will make significant contributions to the economy of Mongolia and Russia. ■

## Report

# At the future machinery production centre

BY TS.ELBEG

Work is carrying on intensely at the Mechanical Foundry Plant of Erdenet Mining Corporation. Large parts, excavator buckets, iron objects and all kinds of planer machines can be seen everywhere. The head of the Mechanical Processing Plant, D.Galbyamba, was introducing the mechanical foundry plant to us who paid a visit. He was a rather friendly individual.

The Mechanical Foundry Plant has 622 employees and consists of two parts, mechanical and moulding. Everyone was focused on their tasks at hand, as no one had the time to notice us. The plant has the capacity to handle 2,200 tonnes of mechanical processing, 100 tonnes of rubber parts and 5,000 tonnes of moulding per year. It is producing about 3,000 types of products ranging from small screws and threads to large parts weighing about eight tonnes. The plant is fully providing for the needs of the crushers of the Mineral Processing Plant, armature and pumps of

the grinding mill. The most noteworthy thing is that they are producing import-substitutive products. They were able to save MNT 3.7 billion in 2014 and MNT 5.3 billion in 2015 by working in accordance with the objective to increase the production of import-substitutive products. The figure was calculated by the difference between the cost of import products and cost of production. According to this year's plan, they will also save about MNT 5.6 billion. For instance, instead of purchasing new Liebherr excavator buckets due to broken teeth, they are producing the teeth at the plant and repairing it by welding the teeth to the buckets.

Our study tour began at the mechanical plant. The plant has the base capacity to process parts weighing up to 20 tonnes and five meters in diameter and to grind out parts up to 12 tonnes. The plant is equipped with iron cutters capable of cutting 30 mm thick iron and a modern laser cutter. The final procedures of the production process take

place at this plant. This plant is essentially capable of producing and repairing all parts of mining machinery.

The Mechanical Foundry Plant of EMC is the biggest heavy machinery and equipment repair service centre in Mongolia. It was initially established to ensure the reliable operation of equipment and produce



The moulding plant received orders for 5,200 tonnes of material this year

▶ basic parts of the factory. It is almost the same age as the mine. The monstrous moulding plant first began melting things on December 30, 1980. The huge cranes, equipment and thick walls of this section are little bit unnerving. Compared to the mechanical foundry plant, very little sunlight enters the moulding plant. Head of the moulding plant Ts.Zorigoo showed us around the plant. He is an upper-middle age man who has worked at this plant for about 20 years. When we first entered the plant, a pounding noise could be heard. The floor was shaking with every instance of the noise, which was due to the process of shaping the moulds.

The moulds are made of sand, because it is resistant to fire and easy to shape. Just a few people can strengthen a small one, or several moulds can be quickly done by inserting it into the machinery. However considering this noise, this mould must be for quite a large product. Everything from little screws and bucket teeth to excavator buckets get moulded here. As for mould designs, they are crafted by wood. Previously, it required an entire fortnight of milling by human hands, but now it requires just three days thanks to a 3D milling machine that was introduced to the plant.

EMC's Mechanical Foundry Plant has been the biggest pillar for the industry of

Mongolia. Not only does it supply products to other EMC plants, but to about 40 domestic companies as well. However, it is only one percent of the total products. Since the transition to a market economy, the plant has rarely operated at full capacity. In the past, major thermal and power plants used to place orders to purchase their products. Ts.Zorigoo explained that the reason why it has stopped now might be connected to nepotism in business. Everyone says that the main reason why EMC was able to cut production costs by administering a cost-saving policy over the last three years is because the company was able to get rid of a culture of nepotism.

As for this year, the plant has received moulding orders amounting to 5,200 tonnes. The plant is aiming to increase the number and range of import-substitutive products in the future, which will require that it work at full capacity. In addition, work for the plant will increase since the Mineral Processing Plant is aiming to increase capacity and process 35 million tonnes of ore per year. However, the most important thing is quality. "The key feature of an import-substitutive product is that it must satisfy current market and technical requirements," said B.Chinzorig. "Otherwise, it can't be called an import-substitutive product if it does not meet quality standards, even if it

is cheap."

Today, a very important job is folding at the mechanical foundry plant. A production line for rollers is going to be introduced in Mongolia for the first time. The assembly is scheduled to be completed in July. It has the capacity to produce 10 thousand rollers per year, which is enough for not only EMC's needs but also Mongolia's. One major technological change made was the production of rubber. The mining sector, especially the global processing technology trend, is turning to rubber harnesses inside equipment. As it has many economic benefits, such as having a longer period of depreciation, making the equipment lighter, reducing power consumption, ensuring smooth operation of equipment and reducing the load on other mechanisms. The first rubber harnesses have been made, and processing works are on-going. The plan is to fit all the small grinding mills with rubber within this year and start to produce rubber for bigger grinding mills.

This plant is reducing imports by producing import-substitutive products as well as reducing the outflows of their professional skills and practices. Last year, they repaired the armature of the Mineral Processing Plant's crusher on the spot, saving USD 500 thousand. Previously, foreign companies used to carry out this task. It is evident that they are capable of performing such maintenance works in the future. It is important to handle equipment properly, as the cost of importing mining equipment from abroad is very high. Therefore, maintenance is crucial. Learning the latest method of on-the-spot repair is more efficient. Thus, they are working in this direction.

The plant has also started producing outdoor furniture and other things such as fences, chairs and lighting. They have even started making souvenirs. The "Mine Closure and Development Plan" reflects that this plant's goal is to become a machinery manufacturing centre in the future. Even when the mining operations end, the plant will continue on and become a major self-sufficient factory. Therefore, they will implement a policy to maintain the quality and standard of products, increase product range, make them competitively priced and find its position on the market. B.Chinzorig stated that research will be conducted in this regard and that they are ready to cooperate with other companies. ■

# 10 highlights of EMC's activities

## 1. Reforms

The autogenic grinding circuit of EMC's Mineral Processing Plant was expanded, and its capacity to process ore was increased by six million tonnes. As a result, ore processing has increased by 5.38 million tonnes this year, enabling the company to produce 101.4 thousand tonnes of copper concentrate and 664 tonnes of molybdenum concentrate, which translates to additional revenues of nearly USD 100 million.

Copper and molybdenum flotation enrichment machines 82, 84 and 85 of the grinding and processing circuit were upgraded. As a result, extraction of copper from ore has reached 86.4 percent, and extraction of molybdenum from ore has increased by 5.5 percent. A new pressure filter (M1500 FBM-77-PP) was assembled at the copper and molybdenum filtration and drying circuit to be put into operation. In addition, the capacity of section 6 of ore processing was increased to five million tonnes. By doing so, sections 1-6 of the processing plant is now fully equipped with modern technology, making the plant capable of processing 35 million tonnes of ore per year.

## 2. Efficient solutions

In 2015, the steel ball grinding mill section successfully introduced technology capable of milling 100mm diameter steel balls. Furthermore, a coal gasification boiler was installed within the undertaking to introduce new technology and reduce expenditures. By replacing the diesel gasification boiler with a coal gasification boiler, MNT 2 billion was saved on fuel, and steel ball costs by fell by a third.



## 4. Small- and medium-sized

More than 600 residents of Erdenet city have gotten jobs and income thanks to EMC's initiative to support new development. Cathode copper companies such as Achit Ikht and the molybdenum processing company New Technology are operating based on non-balance stockpiles of EMC, while Beren Metal, the first steel smelting plant on raw materials from Mongolia, held its opening ceremony in Orkhon province. Such initiatives are contributing significantly to the development of Mongolia. In 2014, many developments have flourished in Orkhon province with the support of EMC, including the establishments of a mask factory, an LED factory and a raw rubber and rubber products factory. In addition, Erdenet Carpet LLC started its production of nano-technology textiles.

## 3. Erdenet's Got Talent

In 2013, EMC was awarded with the Order of the Red Banner of Labour by the decree of the President of Mongolia, recognising the company's many years of contribution to the nation. Between 2013 and 2015, one miner, six industrial workers, one coach and one athlete of EMC were honoured and awarded by the decree of the President of Mongolia.

## 8. Investment

Erdenet Medical, a diagnostic and treatment centre, equipped with modern Japanese equipment was transferred to Japan's Medipass Inc. This medical center came about through investment by EMC, and relevant parties signed an investment agreement under terms to introduce Japan's health management system. Thus, citizens of the region can now receive high quality medical services with EMC's significant investment in the nation's health sector.

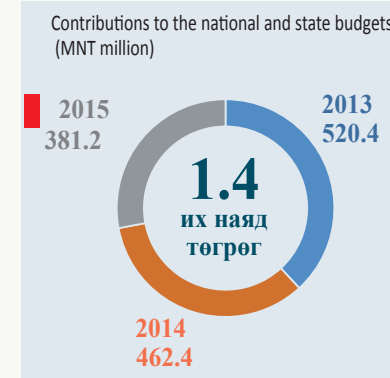
## 9. Development

In order to ensure the consistent operation of production technology at the waste collector of the Mineral Processing Plant, a collector that receives the water from factory processes was built at the M3 dam along length of 1100 metres of piping for water distribution.

## 7. The owner of the blue notepad

EMC has led the Top 100 enterprises continuously for 13 years and was selected as the best taxpaying and socially responsible company.

The company has contributed MNT 124 billion the local province's budget, equal to 45 years' worth of current salaries of Orkhon province's public employees. In addition, the company has paid MNT 1.1 trillion to the state budget, MNT 32.6 billion to the social insurance fund. This amount is the equivalent of the costs of 28 residential complexes for 1,000 households.



## 6. The first factory with an intellectual property

In 2015, EMC developed and approved a comprehensive document outlining the company's intellectual property policy in order support specialists' intellectual inventions and implement an incentive system based on results in accordance with international acts and Mongolian law. Furthermore, works to patent the inventions by the engineers and technical staff of EMC's Mineral Processing Plant began under the company's intellectual property policy after submitting a statement to the Intellectual Property Office of Mongolia.

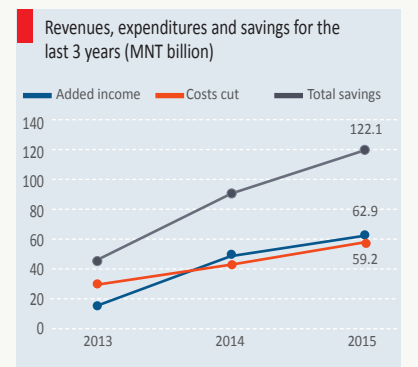
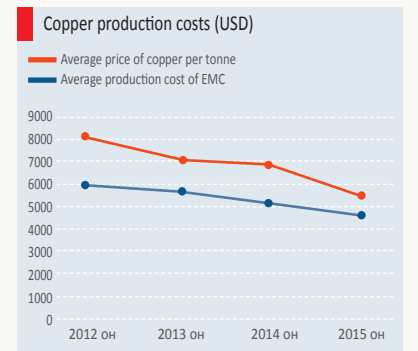
## 5. Social responsibility

From 2013 to 2015, EMC spent MNT 9.4 billion on support of the elderly; MNT 6.3 billion on the medical treatment, health-care and compensation to employees who lost ability to work due to occupational illnesses; and MNT 18.3 billion on grants to employees. In addition, the company provided assistance amounting to almost MNT 10 billion to support over 1,300 households of workers of EMC to resolve housing issues. Furthermore, residential apartments such as the Zaluus-600, Moscow-300 and the residential complex Eco-400 are planned to be built in Erdenet within its "Housing" programme supported by the joint factory council.

## 10. Costs down, revenues up

EMC has taken step-by-step measures to reduce expenditures and boost revenues, as the company has entered into a cost saving mode as a way of overcoming the impact of the falling prices of copper on the global market and unstable economic and financial situation.

As a result, the company made a total of MNT 127.9 billion additional revenues and saved MNT 131.6 billion. As a result of implementing a comprehensive plan to cut costs in 2015, the company was able to reduce total expenditures by MNT 94.1 billion, including an MNT 83.7 billion decrease in expenditures for commodity products. In recent years, the company has been administering a policy to constantly reduce the estimated cost of per tonne pure copper. In 2015, the estimated cost of one tonne of pure copper fell to USD 4,820, which 20.4 percent, or USD 1,241, less than in 2012.



## 11. Cooperation

From 2013 to 2015, a total of MNT 58.6 billion in developmental works were performed in cooperation with Orkhon province in areas of manufacturing, technology, transportation, communications, health and environment and ecology. For example, the Erdenet Medical diagnostic and treatment centre was commissioned on top of contributions to the expansion of Orkhon province's treatment facility, street lighting and expansion of roads. In addition, funds were spent on the renovation of "Nairamdal Undurlug" festival area, improvement of residential districts and car parking, environmental remediation and administrative management.

## Corporate social responsibility

# Father of the city, eldest son of the state

BY B. ENKH

It is common to hear residents of Erdenet ask, "Have you visited the swimming pool and new hospital? Why don't you relax at Selenge resort?" Erdenet city has the longest bicycle path in Mongolia with a length of 5.6 kilometres, and the residents of the city take pride in having built it with their internal resources and labour without making any requests from any budget. Now the factory workers and residents walk and bike on this road, getting exercising in fresh air.

The five-storey apartment buildings from the socialist era are much shorter than the modern ones, but they do not fall short in the looks department, which is the result of the past three years of cooperation with Orkhon province authorities. Around MNT 5.6 billion in investments were made not only for the exterior paintjob of the city's apartments, but also for upgrades on roads and street lighting.

"Looking at the past four decades, EMC sets the standard for social responsibility in Mongolia," stated S.Suvdaa, Deputy Director-General in charge of social issues. "Ever since its establishment, it has been the basis of the city and has provided significant support to this city's economy and community." For Erdenet city, EMC is like its father; for the state, it is like its eldest son.

In modern times, social responsibility is measured by the ISO-26000 international standard. This standard has many indicators on aspects such as economics, procurement and environmental protection. EMC is leading the country by the indicators prescribed in this guideline for standards. EMC was recently voted as the best of the best among taxpaying enterprises of Mongolia. In fact, this factory has carried a

significant chunk of the state budget on its back for many years. It would be difficult to imagine the state budget without EMC, just like Erdenet city without the Erdenet factory. At the same time, the company contributes to local development by directly purchasing the products of enterprises of Orkhon province.

Public service units, social discounts and support funds account for nearly

The company finances 12 social service units, including a cultural and athletics centre of the province, kindergartens, schools, technological institutes and hospital. They provide services for not only the employees of EMC, but for all the residents of Orkhon province. As such, the company's executives believe that they have no right to slash social service units due to economic difficulties. If major units operating in the province, such as a sporting complex, miner's cultural building, medical spa complex and Selenge resort, come to a stand-still, the residents of Erdenet would not starve, but it would definitely have negative consequences on the morale of the public.

The mining sector has more than 40 types of social support undertakings. These types of support create the conditions for employees to work with efficiently and diligently. EMC provides 24 types of



In the last 3 years, 44 deer, around 100 marmots and about 60 turkeys, geese and ducks were relocated and cared for at the "Selenge" resort

seven percent of EMC's total costs. The operating costs of public service units on their own account for nearly 2.5 percent. Under the cost-saving policy implemented during these times of economic difficulty, these units reduced their expenditures by 10-15 percent and increased revenues, saving about MNT 1.5 billion last year. In a nutshell, EMC adheres to a policy which holds that Erdenet city must develop along with the company, given that it operates using the local natural resources. In general, EMC has been implementing a comprehensive social protection policy for a long time.

support. This company is a shining example that proves employees' work becomes more steady and stable, and for longer, if employees are supported with more than just a paycheck. Another reason why employees are stable in this company is related to its compensation and incentives policy. While layoffs and salary shortfalls are increasing throughout the country due to economic difficulties, the employees of this company over the past three years have received salary rewards equal to the base salary on three occasions and bonuses ranging from MNT 350 thousand to MNT one million seven times. ▶

## ▶ 8,000 dependents, 100,000 stakeholders

It is the end of an era, as the staff of EMC who started working there almost four decades years ago are now retiring. EMC is providing social support activities for more than 8,000 people, including a total of 6,000 employees, 1,780 senior workers, about 500 people receiving pension due to occupational illnesses, employees of two subsidiaries and contractor companies. The company has spent a total of MNT 142 billion on social support in just the last three years.

When the generation of people who carried the operations of the factory on their backs retire, trained mining engineers, technical staff and a variety of professional workers must be ready to take over. A lot of effort is required to teach and train them. In the agreement made between the company

throughout the world. Although this sector strictly adheres to safety and security standards, cases of the loss of ability to work due to industrial accidents, poisoning and occupational illnesses do occur. In the last three years alone, EMC spent MNT 6.4 billion on compensation for employees who lost their ability to work. However, the company was able to improve the situation by increasing preventive medical examinations and implementing its "Health" programme, which is better than providing compensation for employees after the fact. In other words, the rate of the five predominant illnesses among its employees has fallen: one in 20 people had one of these illnesses in 2013, while it had become one in 70 last year. Erdenet Medical, a diagnosis and treatment centre built in Orkhon province through funding from EMC, has started its operations.



administration and labour union, it is stated that one child of a factory worker can take over their parent's job. About 30-40 percent of new employees are those taking over their parents' jobs, while the rest are selected through an open selection process. Over the last three years, EMC spent MNT 7.5 billion on training. As of last year, 355 people have studied abroad and 266 have studied domestically thanks to the factory's agreement. The factory has a technological institute that prepares future personnel of the sector. Even Oyu Tolgoi expresses interest in hiring the graduates of this institute.

The mining sector is considered one in which work conditions are harsh

It was decided that the hospital would operate under the management of Japan's Medipass International.

EMC negotiates and signs a collective agreement with the labour union every two years and evaluates its implementation. In 2014, the implementation of the collective agreement was 98 percent, while it increased to 99.1 percent in 2015. The previous agreement reflected many aspects, including transport and coal discounts, housing assistance, hot meals, toxin neutralising products, labour safety, hygiene supplies, health of workers and one-time financial support for retiring employees. One of the provisions proposed by EMC was "mothers with salaries."

They provide MNT 400 thousand every month for mothers who are taking care of their children until the kids reach the age of three. This amount of money is equal to some other sectors' actual base salary. "In Mongolia, EMC is the only company that makes such agreements with its labour union to bear and implement such responsibilities, maintaining jobs for women on maternal leave," said S.Suvdaa. In 2016, the collective agreement was made with a term of one year. Although the prices of products exported by EMC are falling on global markets, the company is trying not to cut back the provisions and implementation rate of the agreement made with the labour union.

Although around 8,000 people work for EMC and its related companies, 100,000 more lives are connected in some way. Therefore, EMC's involvement in family issues is a necessity. About 1,300 employees were able to resolve their housing issues in the last three years with the help of EMC's housing assistance. Furthermore, residential apartments such as Zaluus-600, Moscow-300 and the Eco-400 residential complex are planned to be built in Erdenet within the scope of the "Housing" programme supported by the joint factory council. In addition, employees of the company can now get assistance of up to MNT 8 million for the 30 percent down payment for mortgages, as changes were made to the guidelines and regulations of the housing assistance

programme. An initiative to restructure the social support fund into a unit of the housing project was proposed, and it is being studied at the moment. EMC did not just build residential apartments; they have successfully started works concerning environmental recovery, implementing a project to build a major park that will shelter endangered animals.

To date, Erdenet Mining Corporation, with its nearly four decades of history, is not only taking care of its 8,000 employees, but is also tethered to the city and its 100,000 residents. Since natural resources are not limitless, the company's next objective is to make Erdenet city into a city that will carry on, even after the mines are exhausted. ■

# History of EMC in pictures



Geological exploration of the Erdenet-Ovoo deposit (1964)



The Vice Director of EMC, D. Lkhagvasuren, with the first generation of workers of the company



The first blasting of the mine (1978)



The first batch of concentrate headed for export (1978)



EMC awarded the Order of the Red Banner of Labour in 2013



Opening ceremony of the expanded Mineral Processing Plant



Signing ceremony of the cooperation agreement between EMC and the Governor's Office of Orkhon province (2016)

## Innovation

## Intellectual Erdenet

BY B. TUYA

The Mongolian-American joint venture on the “Erdmin” plant will produce 400 tonnes of pure copper per year. The copper will be used to manufacture construction wire, which is a part of the broader undertaking to produce more import-substitutive, export-oriented goods. Erdenet city has another plant aside from Erdmin with the capacity to process 10 thousand tonnes of copper cathode copper a year. These factories and plants are some of many examples of developing small- and medium-sized enterprises reliant on the Erdenet Mining Corporation. EMC’s taxes payable account for 90 percent of the province’s tax revenue. On top of this, its factory is the largest in Mongolia and serves as an example to the mining industry.

Established 38 years ago, EMC’s factory took bold steps few years ago in order to promote development and innovation. The company has developed a comprehensive policy document on intellectual property and considers it as one of the responsibilities they bear before society. The above mentioned document was approved in accordance with international treaties and Mongolian laws, as it was important to the reform management in order to ensure the relationships between the factors required to successfully innovate. Thus, the coordinator of the Innovation Centre of the Development Department of EMC, D.Enkhtungalag, said that the company’s intellectual property policy includes regulations pertaining to science, operational procedures for technology and innovation, ownership and usage procedures of intellectual property created by corporate funds, technology and innovation fund regulation and selection and awarding of the General Director’s “Innovator” Cup team.

From 1981 to 1991, 18,660 new inventions and utility model patents were registered with the Intellectual Property

Office of Mongolia, with three-fifths of the patents pertaining to manufacturing. Only 8,000 patents were registered from 1996 to 2016, with only 10 percent pertaining to manufacturing.



The Deputy Director-General for Development of EMC, B.Namkhainyambuu stated: “Although our company has been giving importance to intellectual property and scientific works, it has become relatively stagnant in recent years. However, we established the Innovation Centre under the Development Department in 2013. In addition, the EMC science and technology innovation fund’s regulations were approved within the framework of

special funds of the government. The centre was named the Innovation and Development Centre, and it operates in three main areas: intellectual property, innovation and productivity.” As a result, the company became an enterprise with intellectual property, the first in the Mongolian mining sector.

In many countries, know-how, licences and patents are factors that increase the value of a company. They foster innovation and productivity. In that sense, EMC has administered a policy of reducing imports and supporting domestic production. As a result, it

produced 98 types of products last year and saved about MNT six billion, according to officials. The factory’s submitted requests for patents include ones on a slurry injection pump and mechanical key.

Although Mongolia was ranked fifth in an index of international intellectual potential, there is a study which says that the country ranks fifth from the last by its usage. Since the establishment of EMC in 1978, a whole system has been working to

register new inventions and apt proposals, to introduce and implement them into production, to estimate efficiency and provide awards and bonuses. However, no single invention was protected by intellectual property rights. Therefore, the work to patent the inventions by the engineers and technical staff of EMC’s Mineral Processing Plant began under the company’s intellectual property policy, after submitting a statement to the Intellectual Property Office of Mongolia last year. Recently, the engineers of EMC developed the pre-feasibility study of a copper smelting plant. “It means that

more experienced in their profession. It will also reward employees on implementation and productivity results.

The company holds that employees’ knowledge, experience and mental capacity are the keys to development. Thus, the administration approved four basic rules to regulate broad multilateral relations, as they are prioritising engraining intellectual property: to create, protect, use and commercialise the intellectual property.

Besides supporting the specialists, engineers and technicians required to successfully implement innovative ideas, EMC’s administration has been providing support and financing for a research and analysis laboratory. Many things are planned for the future within the scope of the intellectual property policy; one of them is the issue of introducing transport technology in the cycle flow. It becomes unprofitable if a loaded vehicle goes more than five kilometres in open pit mines, so it is necessary to introduce a conveyor belt. Its implementation should bring savings. The company has already realised that it also needs to be one with an intellectual property policy based on innovation. The company has made investments in innovation project initiated by its engineers and technical staff for the first time in order to increase opportunities to use research and studies by the company’s specialists based on internal resources of the company. Thus, they were able to reduce the costs for contracted foreign workers engaged in introducing science and technological advancements to the factory.



The football field of EMC’s “Hangarid” sports club

The science, technology and innovation activity regulation covers the relations associated with activities to implement scientific, technological and innovative projects, introduce technological advancements, substitute imports, create knowledge to produce export-oriented products and conduct management.

The regulation to own and use the intellectual property created by the funds of the company regulates the relations associated with creating opportunities to insert new inventions into economic circulation by protecting the inventions with intellectual property rights and allocating the profits of the results.

The company’s science, technology and innovation fund regulation covers the relations associated with creating financial resources required to implement a project in accordance with the decision of the science, technology and innovation committee, rewarding the project proponents based on project results and supervising the fund’s capital expenditure under the intellectual property policy.

The regulation to select and reward the General Director’s “Innovator” Cup team regulates the relations associated with assessing the fulfilment of innovation based on the results of cooperation on knowledge, capability, experience and skills sufficient to be a factor in implementing the company’s intellectual property policy and rewards by calculating benefits. ■