



Picture from Boliden

Mines Procurement Process

A report about the procurement process of three mining companies in Västerbotten, Sweden

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Mines Procurement Process

A report about the procurement process of three mining companies in Västerbotten, Sweden

This report will look closer into the procurement process of three mining companies in the region Västerbotten, located in northern part of Sweden. The report is written on behalf of *BusinessOulu* and *Norrbottnens Chamber of Commerce* as an internship task of International Business Program at *Umea University*. The purpose of the assignment is to map and understand the need of external expertise of large mining companies in Västerbotten. The goal in the long term is to increase collaboration between the Nordic countries and make it possible for local smaller companies to gain the opportunity to export and obtain business offers. The report will bring up some interesting views on companies investments to be able to forecast the need for external expertise in the future.

Sweden has a long history of mining and has had a geological advantage for several years. It is an excellent country for mining investment, with low tax rates, good infrastructure and low political risk. Sweden's ambition is to develop the mining industries while maintaining and protecting the natural environment. Mining is accepted as socially responsible and necessary contributor to the local economy. More and more countries in the world and with greater extent are raising their standards of living, the demand for the products of mining will keep increasing in the future. Today Sweden has eighteen mines operating and is by far the biggest producer of iron ore in the EU, and among the leaders in production of copper, zinc and lead.

The procurement process is interesting since the mining companies themselves cannot provide for the human capital and competence needed in all parts of their operations. Growth in the mining sector today comes from many fields outside the mines such as consulting and environmental services. To perform mining is activities that affect the environment and unfortunately the unwanted side affect are the cleanup costs, several companies in the Västerbotten region has been forced into bankruptcy. This leaves the taxpayers and society left to pay the bill. According to *Lennart Gustavsson* from *Georange* there is a lot of money to make in cleaning up and dealing with ecological compensation.

The mines are large employers for the small societies, not only the direct employees but also all the indirect business opportunities the mine create and the support for the entire surrounding society. The mining companies possess core competencies for their businesses but are in need of outsourcing large

parts of their operations. By understanding what kind of products and services the companies need in the future, we can create a broad base for new business opportunities and employment in the Nordic region.

Description of mining companies

According to SGU (Geological Survey of Sweden) there are six mines currently operating in Västerbotten.

Björklidsgruvan owned by Mandalay Resources Corp.

Kankbergsgruvan owned by Boliden AB

Kronobergsgruvan owned by Boliden AB

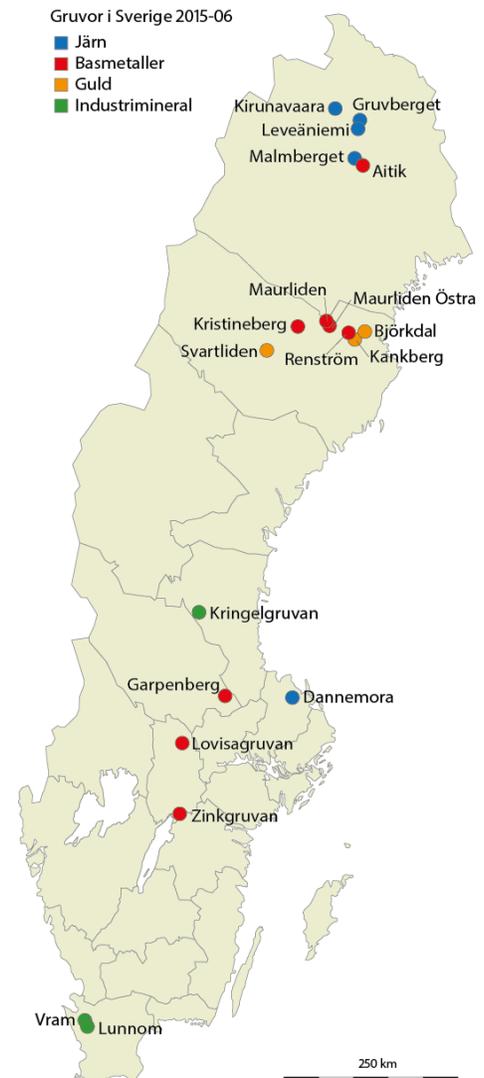
Kristineberggruvan owned by Boliden AB

Maurliden and Maurliden Östra owned by Boliden AB

Renströmsgruvan owned by Boliden AB

In Norrbotten there is one mine of interest for this report:

Aitik owned by Boliden AB



Picture from SGU

Mines in Västerbotten

Björkdalsgruvan	Västerbotten – Kåge	Gold	In operations since	Mandalay Resources Corp.
Kankbergsgruvan	Västerbotten - Skellefteå	Gold, Tellurium	In operations since 2012	Boliden AB
Kristineberggruvan	Västerbotten - Kristineberg	Sulphide (Copper, Lead, Zinc, Gold, Silver)	In operations since 1940	Boliden AB
Maurliden	Västerbotten - Norsjö	Lead, Gold, Copper, Zinc	In operations since 2000	Boliden AB
Maurliden Östra	Västerbotten – Norsjö	Lead, Gold, Copper, Zinc	In operations since 2010	Boliden AB
Renströmgruvan	Västerbotten - Skellefteå	Sulphide (Copper, Lead, Zinc, Gold, Silver)	In operations since 1948	Boliden AB

Fäbotjärn	Västerbotten – Vindgransele	Gold	Exploration Concession	Botnia Exploration AB
Vargbäcken	Västerbotten – Vindgransele	Gold	Mining Concession	Botnia Exploration AB
Fäboliden	Västerbotten – Lycksele	Gold	Mining Concession 2015	Dragon Mining
Barsele	Västerbotten – Barsele	Gold	Mining Concession 2007	Orex Minerals Inc. Canada
Rönnbäcken	Västerbotten - Tärnaby	Nickel, Cobalt, Iron	Exploration Concession until 2037	Previously owned by Lappland Goldminers AB

Svartlidengruvan	Västerbotten – Pauträsk	Gold, Silver	Completed operations 2013	Dragon Mining
Ersmarksberget - Blaikengruvan	Västerbotten - Sorsele	Gold, Silver, Zinc, Lead	No operations	Previously owned by Lappland Goldminers AB
Svarträskgruvan	Västerbotten - Storuman	Silver, Zinc, Lead	No operations	Previously owned by Lappland Goldminers AB
Storstjärnhobben	Västerbotten – Storuman	Gold	No operation Mining concession in 2007	Previously owned by Lappland Goldminers AB
Vindelgransele	Västerbotten- Vindelgransele	Zinc, Lead, Copper, Gold, Silver	No Permit 2015	Niili Mineral

Mine of interest in Norrbotten

Aitik	Norrbotten – Gällivare	Gold, Copper, Silver	In operations since 1968	Boliden AB
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Boliden AB

Description of company

Boliden located in Skellefteå is the largest mining company in Västerbotten and have had operations in Sweden for over 90 years. Their core competencies are exploration, mining, smelting and metal recycling. They operate in five mining and smelter areas in Sweden, Finland, Norway and Ireland and are listed at NASDAQ Sweden. They sell their finished products to industrial customers in Europe and the automotive and construction industry, the byproducts are sold as raw materials to other industries. They have five mines in the Boliden area, three underground mines and two open-pit mines. Approximately 1,700 thousand tonnes of ore are mined and concentrated every year. The copper and gold concentrate produced at the concentrator is sent to their smelter at Rönnskär. The zinc concentrate is shipped to Boliden's smelters in Norway and Finland, as well as to other smelters in Europe.

They have an annual turnover of 40 billion and are approximately 4900 employees in total.



Pictures from Boliden

Kankberg

Kankberg is located in the Boliden Area with an expected life of mine until 2020. After an investment the Kankberg mine was reopened in 2012 after being closed down in the 1990s. 250 kg of gold was produced during the first year. The mine employs about 80 people and around 20 contractors.

Renström

The Renström mine was opened in 1952 and is currently Sweden's deepest at 1340 m. Renström employs about 115 people and around 10 contractors.

Kristineberg

The mine was opened in 1940 and is the oldest in operation in the Boliden Area. The mine employs about 240 people and around 50 contractors.

Maurliden

Production was started at Maurliden in 2000. The ore is extracted from an open pit mine, which has been deepened at intervals. A new level was started in 2008. The final depth of the pit is planned to be approximately 180 m.

Maurliden Östra

The expansion of the Maurliden Östra copper-zinc deposit started in 2009. The mine's maximum depth will be approximately 65 meters. Operations are coordinated with Maurliden, located two kilometers away.

Smelter - Rönnskär

Boliden is the largest operator in the world in the electronic recycling sector. Electronic scrap increase globally but only a few smelters can process it, therefore Boliden's smelters enjoy a strong market position in Europe. Electronic scrap must be processed and recycled in a way that it has minimal environmental impact. Before the scrap arrives at Rönnskär smelter, material such as glass and plastic are sorted out. What remains and that are of value for the smelter is copper, silver and gold. Rönnskär also process and smelt the material from Boliden's own and external mines.

Concentrator

The concentrator was built and commissioned in 1953. Ore from more than 30 mines has been enriched there. The concentrator consists of three sections, one for slag beneficiation and two for ore. It has been modernized over the years and was expanded with autogenous grinding lines in 1991, a leaching plant in 2000 and a new tellurium plant in 2012. The concentrator employs about 95 people and a varying number of contractors.

Aitik

Located outside of Gällivare and is Sweden's largest copper mine. An open pit mine that is 3 kilometers long, 1.2 kilometers wide and 450 meters deep with copper, gold and silver. The equipment in Aitik is some of the largest machines in the world such as trucks, shovels, wheel loaders and drilling machines. Aitik employs approximately 679 people and is the largest private employer in the municipality of Gällivare.

Investment plans

During the Capital Markets Day in March 2016 Boliden presented an updated investment plan for the company, with planned investments of 4 billion SEK in 2016 and of 4.5 billion SEK in 2017. One of them is to keep improving their increased automation. A number of mines have introduced underground positioning systems, creating the potential for remote vehicle control, improved logistics, and increased personnel safety. Boliden is also one of the first mining companies in the world to implement 5G systems for wireless data transfer.

Boliden's smelters are also a goal for investment, they need to increase recoveries and enhance their ability to handle complex raw materials to strengthen their market position.

Aitik

Aitik is one of Boliden's mining areas. The Aitik open pit mine produces ore containing copper, gold and silver. The expansion of Aitik, which will double the mine's ore production, is one of the biggest industrial investments in Sweden in recent years.

The investment in Aitik will total SEK 1 billion by 2018 and includes a new double surface crusher, a new water treatment plant, and the installation of a new power feed. A decision on additional investments in a new crusher for the open pit mine has been postponed until after 2020.

Investments in Aitik is about two things, one is the increase in production and the other is the infrastructure. Over SEK 6 billion have been invested to increase the production rate and extending the mine's lifespan. A new concentrator has been constructed, with new facilities for concentration, ore production and outward deliveries. Currently Aitik is working towards a new expansion where the production level is aimed to go from 36 million tonnes towards 45 million tonnes of ore per year.

Nautanen

Another investment on the table for Boliden is opening up Nautanen outside Gällivare, which is a closed old mine. Approximately the same copper level as their deposit at Aitik and will also be an underground pit, so far no mining is conducted but Boliden has the exploration concessions. Nautanen is a part of the investment plans for Boliden today but further numbers and timeline is unknown.

Laver

The road from identifying a deposit to opening a mine is a long one, and Laver, which is one of Boliden's development projects, is at an early stage in this process. A project concept study has been carried out in order to evaluate the project's potential of any future mine investment. Any future mining operations will take the form of an open pit mine that would utilize relatively large areas of land and today they are working on finding alternatives to the environmental impacts and coexisting.

The area around Laver is designated as an area of national interest for the Semisjaur-Njarg Sami village. An impact assessment of any mining operations in the area has been conducted in cooperation with the Sami village in question. The water around Laver are part of a nature protection area. Boliden will, while the exploitation concession application is under review, continue to work on the development of the project by finding mining alternatives and performing deeper environmental investigations.

Need for external expertise

The need of external expertise is recognized by the mine manager / site managers as they continuously revise their operations, then they address the question with the procurement department. The procurement department then designs teams for further evaluation and finding the right supplier segments.

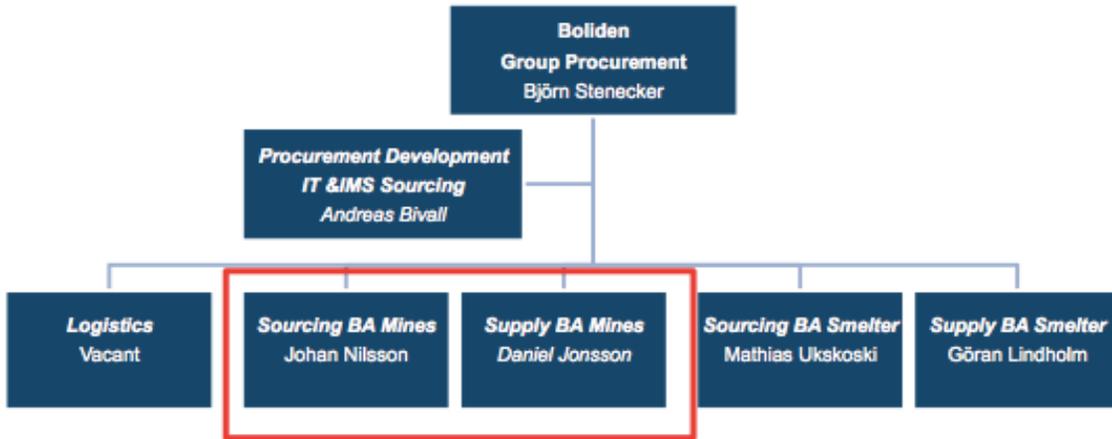
The need for external expertise that Boliden sees today is to keep receiving a good stream of skilled labor and external contractors that can perform the maintenance services needed in their mines in the future. As mentioned previously their mine Aitik is the home of some of the largest equipment in the world. The need for providing service and maintenance on a regular basis is important to keep production smooth and receiving a good return on investment by a longer depreciation time.

They have seen a negative trend lately on availability and knowledge of staff to be able to provide for their current and future need. Their maintenance necessity will always be important for their operations.

Procurement process

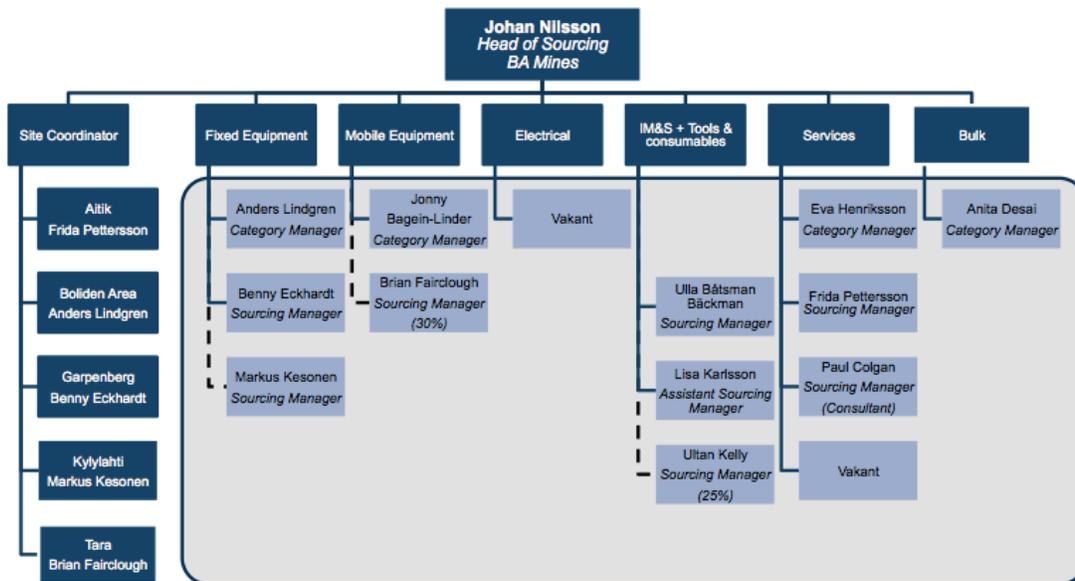
Boliden's procurement department is currently divided in two different categories – Mines and Smelters.

Organizational structure - Procurement



The next step is the structure for the mines procurement, they are organized using different responsibilities and focus areas. Several different areas with purchasing managers responsibilities such as fixed / mobile equipment / site coordinator etc.

BA Mines Sourcing Procurement Mines

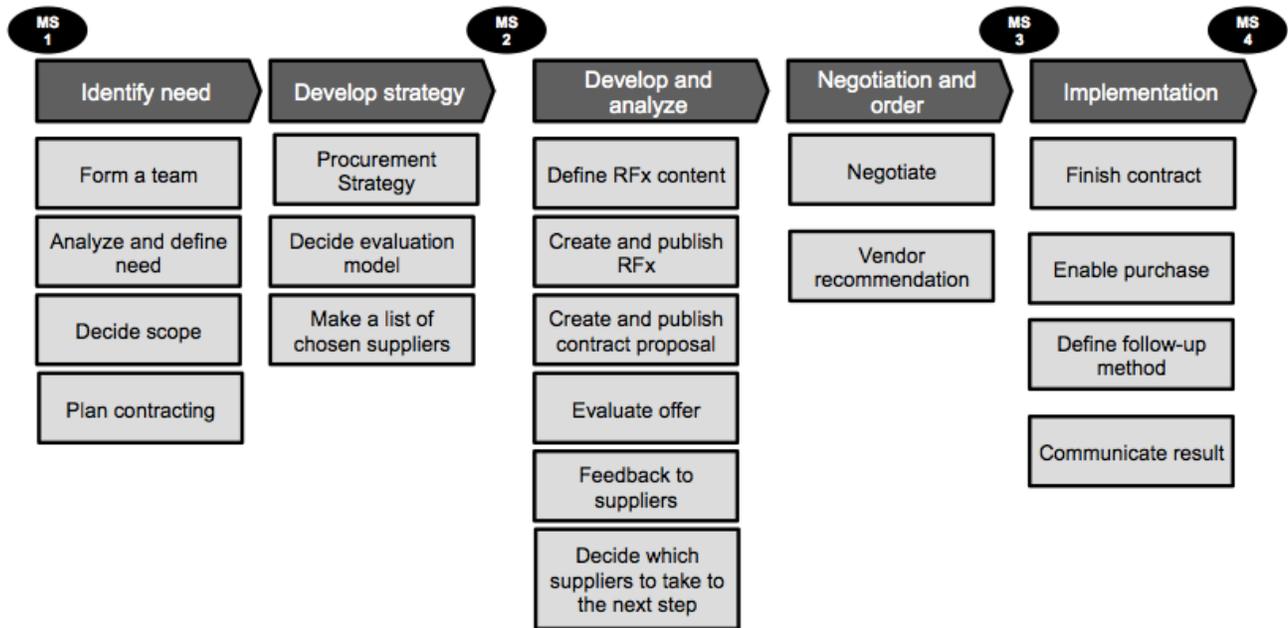


They have two approaches to the procurement process, one is to make use of the already existing network of their purchasing managers. Boliden is for example present at the international trade fair *Euro Mine Expo* in Skellefteå in June this year (2016) to network and meet external companies. Around 150-200 different external suppliers will be present this year.

The other approach is a purchasing system called SAP Ariba. Ariba Network is a cloud-based community used for procurement by many companies. The platform makes it easy for buyers and vendors to come in contact with each other while minimizing costs and risks. Ariba enables for Boliden to come in contact with their suppliers and get in contact with a company that would serve them with the product or service they need. Ariba sends out the request and Boliden can thereafter analyze and assess the offers from trading partners.

Cooperation and dialogue are primary tools when it comes to working alongside their business partners since the choice of supplier affects not only Boliden's profitability but also the sustainability work. Boliden has the ambition to use local external contractors as far as possible, however, today they

purchase most from large companies such as Atlas Copco, Sandviken, ABB etc. In total today they have around 6300 suppliers of goods, services and logistics. Their top 100 suppliers stand for about 90% of what Boliden purchases in terms of products and services from other companies. When later on designing the contracts they want to work with contractors ranging from 1 up to 10 years at a time.



The system and network they have built up and implemented today is something that Bolides believes is difficult to step away from at this point. Although they recognize that it might not be easy for external companies to come in contact with them and they are self-aware that their procurement process is not that open to new input.

Further Contact information

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Mandalay Resources

Mandalay Resources is a Canadian based company that have production in Sweden, Australia and Chile. Acquired and operates the goldmine Björkdalen in Västerbotten, Sweden since 2014. Björkdalen is located 28 km north-west from Skellefteå. The Björkdal mine is fully permitted for current operations and they operate seven days a week all year round. The mine is a combined open pit and underground operation with approximately 60% currently delivered from the underground. For the full year of 2015 they produced 1,3 tonnes of gold in Björkdalen. The plant produces gold concentrates which are sold to smelters in Sweden and Germany. The mine has 165 direct employees and 65 contractors. Annual turnover is about SEK 500 million.

Björkdal Gold Mine: Overview

Land package	12,747 hectares
Ownership	100%
Number of Employees ⁽¹⁾	145 direct, 65 contractors: 210 total
Current throughput	3,500 tpd
Plant recoveries (2015)	Au: 88%
2016 Planned Exploration Budget	\$3 million



Picture from Mandalay Resources

Investment plans

The Björkdalen mine has previously had several owners over the years that all have been struggling to keep positive revenue. Previous owners had most of the operations on entrepreneurs but in recent years Mandalay has acquired more and more of the operations. Mandalay's focus is to keep developing the turnover and improve productivity, primarily try to mine ore with higher gold percentage before they are looking at any other investments in Sweden.

Need for external expertise

If the mine recognizes a problem or a needed skill they don't possess locally or in Sweden today, they try to get support and make use of the resources and expertise in their own company globally. An example is to fly in staff from their other operations in Chile and Australia, this can be done both short-term or for longer periods. In short term one example is to receive support and help to develop or streamline some parts of the operation. If the need for support is of greater extent their intentions are always to educate and develop their staff in Sweden for a long term solution.

Most of the external skills they use today are logistic services, loading and drilling. Also some occasional minor contractors for example ventilation technology.

Procurement process

When facing a need for external expertise they go out with a request to at least three companies in the specific supplier segment and providing them with information about the task and time commitment. Later on when they receive their offer they discuss the price and make further assessment between the companies. Important for Mandalay Sweden is to hire local contractors to the greatest extent, but of course with commercial terms.

The organization for their operation in Sweden lacks proper structure, for example they recently appointed a human resource manager and HR department. They don't have a purchasing department thus their procurement is decentralized. Different departments in the organization are responsible for their purchases. Today when they procure smaller jobs they use a process that is as simple and straightforward as possible and don't engage in open procurement. In order to do so Mandalay try to have accurate information about suppliers in different fields in close areas of Skellefteå where they operate. They keep track of vendors that performed jobs for other mining companies such as Boliden, LKAB and in the Svartliden mine. The procurement is communicated through direct contacts, the web or phone.

If Mandalay has a need for a long time contractor the process is more structured and more open procurement.

Further contact information

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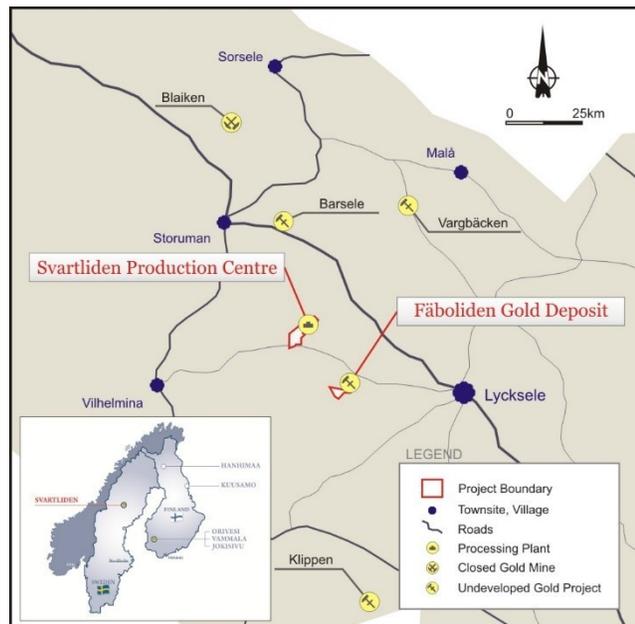
Dragon Mining Ltd

Dragon Mining is an Australian owned company with focus on being a Nordic gold producer with operations in northern Sweden and Finland. Currently operating two mine locations in Finland and an operation center. In Sweden they only run an operation center for the moment but have had production in the goldmine Svartliden which they closed in late 2013. They are keeping their plant and equipment and are still operating in processing material and future mine prospections in Sweden. In 2014 they had 38 employees.

In Svartliden they completed their operation in 2013. The result was 11 tonnes of gold worth 2,4 billions SEK and employed 130 people. Today Dragon Mining have two other mining findings in close areas. Those areas have low substances/content at the moment and the prevailing low gold prices is therefore not motivating enough for mining. The Carbon In Leach (CIL) Process Plant with its existing infrastructure and permits for tailings storage and water treatment is a key strategic asset positioned to unlock the potential of nearby mineral resources, including the Fäboliden Gold Project.

Fäboliden

Dragon Mining bought the right to the mine for 40 million SEK from Lappland Goldminers who went bankrupt 2014. Dragon Mining has applied for permission to perform test mining in 2016. They are also working on environmental permits to operate the mine long-term. The forecast is it will be at least two more years until they can open up for operation since the permit process is taking time.



Picture from Dragon Mining

Investment plans

Dragon Mining's production strategy is to continue to grow their land holding into multi-mine operations. The cash flow generated from these operations is used to further grow the company and fund exploration and development activities in the Nordic region.

They are interested in increasing their explorations near their already existing market and therefore interested in Sweden and Fäboliden mine. Their strategic production center that will process the material is 25 kilometers from the mine. Their future prospect for Fäboliden is to produce 94 tonnes of gold.

They have sent in permits for exploration work and environmental permit to operate the mine in the long term is in progress. In this case, the plan is to break 300 000 tonnes per year, that is, about the same as in the now empty Svartliden mine. Gold production from Svartliden will increase during the coming year as a result of the planned increase in processing concentrates.

Need for external expertise

Since they are in a process stage, the forecast is that they will not receive any permits in the next two years. The mining manager for Sweden says that in this stage they don't have any need for external expertise. The operations in Fäboliden will only be focused on pure mining. The gold will thereafter be transported to their old operations in Svartliden for a further process before its shipped out to customers.

Procurement process

They have a centralized organization at the moment in Canada where they handle all the procurement and today, as mentioned, they don't have much purchases in Sweden.

Further contact information

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Appendix

<http://www.boliden.com/About/>

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