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The mining contribution to regional growth examples from the arctic region

Göran Bäckblom

LKAB SA, 150 Chaussée de la Hulpe, 1170 Bruxelles, Belgique
goran.backblom@lkab.com

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Abstract – There are many examples world-wide how mining contributes to sustainable regional development. The LKAB mining and processing of iron ore in the north of Sweden, in the Arctic Region, is such an example. The definition of sustainable mining is however not clear-cut and further studies are necessary to fully understand the impacts on economy, society and environment.

The reduction of global poverty over the last decades is striking. Studies by OECD [1] indicate that poverty will be further reduced in the next 20 years when 3 billion people will enter the middle class. This wealth-increase will go hand in hand with increased steel consumption as developing countries build roads, railways, harbours, houses and citizens purchase cars and household appliances.

LKAB looks back at more than 120 years of successful, sustainable mining in the Arctic region. An overriding ambition is to operate in harmony with the environment and society. Today, LKAB produces about 90% of the iron ore mined in the EU and specialises in high-grade iron ore pellets for steel producers. LKAB commands a market position as Europe's largest and the world's third-largest producer of iron ore pellets.

How will LKAB act within the mining sector to promote sustainable development defined as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" [2]?

Sustainable mining is as other types of sustainable endeavours linked to three domains – the economic, the societal and the environmental feasibility that are elaborated below.

1 Economy

No business can survive without being profitable and LKAB is profitable by focusing on value-creation to the customers. Profit is a prerequisite for necessary investments in new and smarter technology that makes the operation more efficient and with less environmental impact. With a clear long-term commitment to investments in research and innovation LKAB has a technological leadership in the iron-ore pellets market. The technology for underground mass mining, pelletising and transportation of the products to the harbours in Sweden and Norway are world-class. LKAB is successfully mining iron ore underground, safely and with unmatched productivity.

2 Society

Regional growth in the most northern part of Sweden started with mining. Two new municipalities, a railway between Narvik and Luleå and associated ports were constructed after mining started in year 1890. The need for power supply to the railway and the mines resulted in a pioneering construction project – the Porjus Hydropower Station. Porjus was the first of many power

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Fig. 1. When mining first started in the late 19th century, it spurred an enormous development of the region.

generation facilities to be constructed along the Lule river. Today, this river generates somewhere in the range of 10% of the total Swedish electricity production. The presence of the LKAB mines and railways, later led to the construction of a steel plant in Luleå. SSAB is now a leading producer of high-strength steel.

The founding of Luleå University of Technology (LTU) in 1971, due e.g. to the steel industry, has been a tremendous success for the region. LTU is now a top academy in mining, material science and internet and communication technology (ICT). Over the years, LKAB has donated €25 million to LTU to build centres of excellence and expertise related to mining. LTU, SSAB and LKAB – with the world's only experimental blast furnace – constitute, together with the Swerea Mefos steel research institute in Luleå, a world-class steel cluster that is prepared to meet current and future challenges.

The cold climate, reliable power supply and competent ICT resources were key factors behind the location in Luleå, by Facebook, of its first major server hall outside the United States.

The availability of a developed infrastructure in Kiruna also led to establishment of advanced space research facilities and the only European rocket launching site. The world-famous Ice Hotel, which is popular with tourists from all over the world, is a clear manifestation of the inventiveness of people in the region, which is in fact one of the foremost innovation leaders in the EU. But it all started with mining (Fig. 1).

Due to the evolving mining operations in Kiruna and in Malmberget, large parts of the municipalities have to be relocated. This enormous urban transformation poses both challenges and opportunities. The expansion of the mining operations is managed in close cooperation with local communities, where different interest are balanced through constructive dialogue. Thereby, the rights of local communities and the native Sami people with their relationship to the land and their reindeer herds are safeguarded. LKAB maintains a proactive relationship with stakeholders locally, regionally, nationally as well as in the EU.

3 Environment

The high quality of the LKAB iron ore pellets include many environmental advantages as they are one of the most climate and energy smart pellets on the market. The products are customized for their final use, also significantly improving performance in

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iron-making. Through our technological innovation in iron-making, we build a base for continued environmental sustainability. LKAB makes huge investments in the operations to reduce emissions to water and air. As an example, emissions of sulphur dioxide from all existing pelletizing plants will be reduced from about 2000 tons in 2011 to 1000 tons by 2015 and 500 tons by 2017.

Steel can easily be recycled to produce new steel. The End-of-Life recycling rate for iron and steel is estimated to be 70–90% [3]. No other metal achieves this high recycling rate. The notion that resources are "depleted" would not fit for metals being chemical elements. The metals are transformed but the atoms do not disappear or become depleted due to mining and hence mining of metals should not compromise the needs of future generations.

4 What is sustainable mining?

The way we comprehend sustainable development in general, as well as its meaning for the mining industry in particular is not clear-cut. Therefore, in January 2014 LKAB launched a new research programme to provide a broad scientific base and framework for a sustainable raw materials industry. The multi-disciplinary programme aims to meet the highest international quality, including renowned researchers linked to LTU as the main node. The program will last 5–7 years with an anticipated annual budget of around €1–1.5 million. The overall objective of the research is to increase knowledge about the economic, social and environmental footprint of the industry, and identify different ways through which increased sustainability can be achieved. The research involves comparative studies across countries as well as historically, the latter including the role of LKAB during its more than 120 years of operation in northern Sweden.

5 LKABS strategy for sustainability

LKAB has developed a 2013–2020 strategy for sustainable development, to underpin the overall objective that *"LKAB generates prosperity by being one of the most innovative and resource-efficient mining companies in the world"*. Every year, LKAB prepares a public report on the achievements related to sustainable development. Reporting is done in accordance with the Global Reporting Initiative (GRI) framework. The Annual Report 2013 is made on a level B+.

The LKAB sustainability strategy focuses on four elements:

- responsible operation;
- resource-efficient production;
- attractive LKAB and
- attractive communities.

Responsible Operation: Over the last 10 years LKAB has invested in two new pelletising plants with substantially lower air emissions and is making major investments to reduce emissions from its older facilities. The latest investments in the plants in Malmberget reduce sulphur, chlorine, fluorine and dust emissions by 90%. LKAB will continue to lower emissions to air and water through smarter production processes.

Resource-efficient Production: In its energy and climate strategy, LKAB is committed to be 20% more energy efficient by 2020 (1 TWh less energy). Use of coal and oil will eventually be phased out. By 2020, LKAB plans to grow production by 40% without any increase of CO_2-emissions.

Attractive LKAB: LKAB wants to keep and continue to attract talented people. By 2020, LKAB will employ close to 1500 new staff. The positions are diverse and covers 180 types of professions. The Arctic region already boasts very low unemployment rates, especially with the young generation. Operational safety is of absolute priority to LKAB that has a target to incur maximum five accidents with absence per million work hours by 2015. By 2020, the aim is to further halve accidents to a maximum of 2.5. More and more women find LKAB to be an attractive employer. LKAB aims to employ 25% women by 2020.

Attractive Communities: An attractive community offers competitive education and development for young generations. LKAB has e.g. invested €9 million in the LKAB Academy to establish top-class schools. Grants are given for teacher education, as well as for special equipment. In

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November 2013, a top-of-range Computer Numerical Control (CNC) milling machine was installed in the senior high school in Malmberget.

6 Concluding remarks

Already ten years ago Professor Susan Owens wrote: No conception of sustainable development can be adopted without making fundamental ethical and political choices, but the debate about such choices is nevertheless of great importance. It is argued that we should abandon our search for a singular, consensual definition of sustainability, but try as best we can to make progress in the absence of consensus [4].

LKAB has decided a way forward on sustainable development and will continue to base the future actions in constructive dialogues with the stakeholders.

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