Addressing critical material and rare earth demand; the case of First European Minerals

First European Minerals Ltd. (FEM), a British company headquartered in London has launched a Rare Earths and Strategic (or critical) Metals storage program in cooperation with German companies. FEM identifies prospective areas and then works in conjunction with established mining firms to share its expertise in order to develop mining projects. It is not a stand-alone miner; rather, it offers support for early-stage mining project, contributing to resource localization, sample analysis and economic viability studies.

Both private and institutional buyers have the option of buying, storing and managing these rare elements, in accordance to German Industrial Standards. The Company has found an opportunity in the fact that more than 90% of rare earths are still being produced in the People's Republic of China. These elements are crucial in the production of the newer high-performance electric motors, semiconductors, photovoltaic systems, fiber optic cables, lasers and LEDs.

While Chinese growth projections have dropped in the past year, and as it constrains rare earth production through consolidation and regulation, there is a risk to Western industry that China will be restricting exports of these critical metals in order to address internal demand exclusively – relying on 100% of production by 2020. Recycling of rare earths is unrealistic and, perhaps, if research continue in a linear fashion, some 30 % of the demand by 2020 will be recovered through recycling in the most optimistic of cases while it is far more realistic to expect that new

resources will be needed to address some 50% of demand.

This scenario risks producing a supply shortage, which will need fresh funding and new resources. The latter will have to confront what are, typically, extremely long exploration and production times, given the processing requirements and mineralization analysis while separating rare earths from its ore can be a very complicated affair, given both the difficulty of identifying the right ore and the need to increasingly confront environmental issues and restrictions. The latter will have to confront what are, typically, extremely long exploration and production times, given the processing requirements and mineralization analysis while separating rare earths from its ore can be a very complicated affair, given both the difficulty of identifying the right ore and the need to increasingly confront environmental issues and restrictions.

First European Minerals has heard the urgent call to action while International, and domestic, politics has led to debates discussing whether governments should play a role in producing or, perhaps, accumulating critical metals. Nevertheless, the current economic thinking in the EU is not to interfere with industry through regulation, even as it has to deal with the impending shortage. Meanwhile, the European demand for rare earths is huge and it continues to grow. First European Minerals has been looking for partners to push its project. One of these is Frankfurt based Tradium, one of the largest rare earths and metals in Europe. Tradium is ISO 9001 certified and it has gained a reputation for consistent quality. Metlock is another such company based in Frankfurt. To address this need, First European Minerals, has used an old air raid shelter from the Second World War, converting it to a security storage area to ensure German rare earth needs are met in consultation with advice and support from the Dusseldorf based Institute of Rare Earths and Metals.

First European Minerals processes demand and supply

information about Rare Earths and their availability and requirements for the near future, filling the 'baskets' accordingly. More specifically, FEM aims to fill the baskets with dysprosium, gallium, germanium, indium and terbium. These five elements have one thing in common, they are rare and they have typically suffered from supply shortages. Dysprosium is mainly used in high-power electric motors; because it helps to maintain magnetic pull even at very high temperatures, their magnetic effect, yet annual production of dysprosium is 500 tons – worldwide. Gallium is used in semiconductors, solar panels, electronics and LED industry. Worldwide increasing use of LED, a rapidly growing photovoltaic industry and the rapidly growing demand for mobile devices such as smartphones , tablet computers and game consoles have caused gallium demand to rise. Gallium is very rare today, given that the current global consumption of 280 tons derives from actual mining production (78 tons), recycling operations (90 tons) and reserves (112 tons).

Germanium is one of the rarest metals on earth. Without germanium, there can be no fiber optic cables or infrared optics. The annual production of germanium is only 140 tons per year, 70% of which comes from China. At the same time, the Fraunhofer Institute has predicted that there will be an eight-fold increase in demand for germanium by 2030, in response to fiber optic cable usage. Indium is used in display technology and thin-film photovoltaic technology. At present, 1,000 tons of indium are produced annually, half of which half comes from recycling operations much of the rest from China. The EU Commission has set indium supply shortages as a critical issue in the technology metals space. Terbium is used in semiconductors and as an activator for fluorescent phosphors. The U.S. Department of Energy has predicted a terbium supply gap in medium term.

Accordingly, FEM arranges for the purchase and storage, on contract, of the requisite amounts of rare earths in the

Tradium market in Frankfurt, which then brings the goods to be stored in the high- security Metlock storage facility, also in Frankfurt. After a minimum holding period of two years, the metals can be stored, sold or picked up. In 2013, FEM, for example, announced a Product sharing agreement (PSA) with the Suhut chrome mine in the south of Turkey at a 90:10 profit distribution agreement, whereby FEM would get 90% of eventual sale of the materials. The mine is said to have a capacity of 8,000 tons/month and reserves of 650,000 MT in Phase I.