**Mining: a vital link in the transition to a net-zero economy**

Modern society is heavily reliant on metals and minerals and the demand is growing, driven by a combination of global trends. The rising urbanization and higher living standards are pushing up the requirements of construction materials, as well as the minerals used in the electronics and appliances that are part of our daily life. The pursuit of the United Nations’ Sustainable Development Goals (SDG) and the move away from fossil fuels are also driving a significant increase in the demand for the metals and minerals required by low carbon technologies – from Rare Earth Elements for wind turbines and quartz for solar panels to lithium for battery electric vehicles and copper for renewable energy systems. Even in agriculture there is an increasing need for minerals, such as the phosphates in the fertilizers used to produce crops to feed our planet’s growing population.

We are facing the challenge of meeting an unprecedented demand for metals and minerals, which are finite and scarce resources. Recycling rates for materials critical to the energy transition, such as Rare Earth Elements, lithium and graphite, are low and not expected to rise significantly for some time. Even then, recycling alone will be unable to meet the increasing demand, and mining will continue to play the key role in supplying necessary primary resources. It is becoming increasingly important to mine efficiently and sustainably using modern technologies such as sensor-based sorting

**Sustainable mining to support the energy transition: Lithium**

In October 2022, the European Parliament and Council have provisionally agreed that all new vehicles registered in Europe must be zero emission by 2035. This agreement is set to accelerate the adoption of electric cars: according to the European Automobile Manufacturers’ Association, in 2021, 20% of new cars sold in the EU were plug-in and by 2030 this set is expected to rise to 60%. Legislative actions such as this across the world will drive a fast growth in the demand for electric cars, which will require high volumes of lithium for their batteries.

The current production rates of lithium will soon be insufficient to meet this demand. In fact, according to the Benchmark Mineral Intelligence, it will require 78 mines by 2035 (the calculation includes projected volumes of recycled lithium) – this is around six times more production than today. It is essential that mining and processing this element is as sustainable as possible.

Sensor-based sorting technology can significantly contribute to reducing the environmental footprint of lithium mining and processing in different ways. On the one hand, it is able to selectively reject waste and low-grade ore upstream of processing. This means that less material is processed, resulting in significantly lower usage of energy, water and chemicals. A complementary environmental advantage of this technology is the reduction of wet tailings.

On the other hand, sensor-based sorting technology addresses effectively the challenge of basalt contamination, typical of lithium mines. Due to its high density – similar to that of spodumene – this high-iron, barren material is also concentrated by Dense Media Separation, contaminating the final product. With sensor-based ore sorting technology, it is possible to sort out the basalt and as a consequence to unlock value from existing stockpiles of contaminated materials, achieving a high-purity product.

This was the case at the Galaxy Resources Mt Cattlin mine in Western Australia, which had been stockpiling basalt contaminated material since 2016, while it searched for an effective solution. In 2021 it installed a TOMRA PRO Secondary Laser sorter, and in 9 to 12 months it processed the best part of the 1.2 million tons of stockpiled material, consistently achieving high purity with less than 4% basalt. As Matthew Bateman, Principal Metallurgist at Galaxy Resources said, “with the TOMRA sorter, we are using far more contaminated ore than we would previously have processed.”

**Sustainable mining for agriculture: phosphates**

Another excellent example of how sensor-based sorting can make a difference is in processing phosphates, recovering the valuable nutrient efficiently and more sustainably. The sorting plant at Wa’ad Al Shamal in Saudi Arabia, with a capacity of around 1900 t/h, is the perfect demonstration of this technology’s potential.

The run-of-mine material contains significant amounts of unwanted flintstone, or chert, which has to be removed before the phosphates are fed downstream for refinement processes. TOMRA’s X-Ray Transmission sorters remove flintstones from the phosphate to reduce silicon content, so that the downstream process can be significantly downsized. This results in much lower consumption of energy, water (as much as 45% less), and flotation reagents.

In addition, TOMRA’s sensor-based sorters are able to process larger grain sizes, extract value from materials which are often discarded as waste when using traditional sorting solutions such as Dense Media Separation.

**Collaborating for a sustainable future**

To achieve the Paris Agreement goal, countries around the world need to reduce their greenhouse gas emissions to 'net zero' by around 2050. This means that every sector must reduce the amount of carbon it puts into the atmosphere. For this to happen, legislation has a critical role to play in addressing market flaws, pushing for environmental compliance, drive investments and create favourable conditions for businesses to invest, and foster alignment of all stakeholders.

Collaboration will be key in all industries, and TOMRA is actively seeking opportunities to build partnerships with the big mining houses and other stakeholders across the mining supply chain. This is the path to achieving a circular economy where mining will play a vital role by supplying the minerals needed for the energy transition and the new low carbon technologies. Collaboration will enable the mining industry to operate sustainably, maximizing the opportunities to reduce its environmental footprint.

TOMRA Mining is already actively contributing to green mining with its sensor-based sorting technologies, enabling mines to maximize the efficiency of their operations, minimize the use of energy and other inputs, and reduce waste as much as possible. Today there are around 190 TOMRA sorters in operation across the world, delivering a reduction in CO2 emissions of 168,945 metric tonnes per year.

**About TOMRA Mining**

TOMRA Mining designs and manufactures sensor-based sorting technologies for the global mineral processing and mining industries.

As the world market leader in sensor-based ore sorting, TOMRA is responsible for developing and engineering cutting-edge technology made to withstand harsh mining environments. TOMRA maintains its rigorous focus on quality and future-oriented thinking with technology tailor-made for mining.

**About TOMRA**

TOMRA was founded on an innovation in 1972 that began with the design, manufacturing and sale of reverse vending machines (RVMs) for automated collection of used beverage containers. Today TOMRA provides technology-led solutions that enable the circular economy with advanced collection and sorting systems that optimize resource recovery and minimize waste in the food, recycling and mining industries, and is committed to building a more sustainable future.

TOMRA has ~100,000 installations in over 80 markets worldwide and had total revenues of ~10.9 billion NOK in 2021. The Group employs ~4,600 globally and is publicly listed on the Oslo Stock Exchange (OSE: TOM). For further information about TOMRA, please see [www.tomra.com](http://www.tomra.com)

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