EuroSciCon

International Conference on
Metal, Mining and Magnetic Materials

November 01-02, 2018
Paris, France

J Mat. Sci. 2018, Volume:6
DOI: 10.4172/2321-6212-C7-033

CRITICAL METALS AND THE CIRCULAR ECONOMY: KEY ISSUES AND OPPORTUNITIES

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There is considerable focus on the circular economy in academic, industry and government sectors, although very little of this truly understands the place of mining in a circular economy. The circular economy, in theory, aims to maximise resource efficiency and minimise environmental impacts. In reality, mining is responding to the continually growing demands of modern society for raw materials and energy to meet technological, infrastructure and other needs (e.g. military) with most metals largely still in use or disposed of and only moderate recycling is undertaken. The extent of consumption is often closely linked with economic activity (e.g. consumption per capita), and the patterns of consumption differ between metals. Although recycling is a noble objective for various reasons, it can never be perfectly efficient, and there are still large populations around many parts of the world which aspire to modern standards of living, meaning that mining will still have a role to play in supplying raw materials and energy for decades to come. The real questions come simply to what we mine, where, how and ensuring all costs are taken into account (e.g. avoiding externalities such as accidents or long-term pollution risks). Increasingly, many metals are being viewed as so crucial to modern technology, such as indium and LCD screens or neodymium and permanent magnets, that they are labelled as critical; any disruption to supply could have serious implications for society. These critical metals include indium, rare earth elements, tellurium, gallium, cobalt, platinum group elements, lithium and many others; although most of these are typically by-products and not the primary target of mining. This leads to the situation whereby critical metals are mostly dependent on their primary metal cousins for their supply but very little is known about the flows of critical metals from mineral resources through ore processing, smelting and/or refining and their subsequent use in products. In many cases, significant financial value could be realised from a greater focus on critical metals. For example, PGEs are now reported from Glencore's Sudbury operations or the giant Olympic Dam project in Australia also contains rare earths which are equal to the combined Cu-U-Au-Ag value currently extracted. In the public policy sphere, poor information on many of the critical metals is often (and all too easily) confused with a lack of mineral resources (or reserves) and an inability to meet future consumption or demand patterns but nothing could be further from the truth. In reality, markets for critical metals have historically been small and niche only but with the growth in consumer electronics and renewable energy (especially solar photovoltaic panels and the rapid rise occurring in battery storage systems), critical metals will play a greater role in meeting future societal needs. Based on detailed resource case studies from primary metals, combined with specific case studies of indium, rare earths, lithium and cobalt, this presentation will justify the case for optimism that mining will continue to play a key role in providing the raw materials needed for a circular economy.

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