FROM BUSINESS AS USUAL TO BUSINESS FOR THE FUTURE
The Case for Circularity in Metals and Mining
As 2020 begins, the world is at a crucial juncture. The “Decade to Deliver” in terms of meeting the United Nations Sustainable Development Goals has arrived.

This sense of urgency was keenly felt earlier this year at the 50th anniversary of the World Economic Forum’s Annual Meeting. Important discussions of the climate and environmental crisis were placed at the heart of the broader agenda, with environmental concerns accounting for all top risks identified in the World Economic Forum’s Global Risks Report for 2020. Across the many stakeholders present in Davos, there was broad accord that continuing to operate within a linear economic model is no longer viable in our resource-constrained world. Moreover, as the world looks beyond the current COVID-19 pandemic, the task of rebuilding for better, including the need for more resilient and sustainable supply chains, heightens the focus on circularity even further.

While some progress has been made in recent years, efforts have not been enough to curb impending planetary degradation. Continuing this linear trajectory will result in serious global consequences, including resource use doubling by 2050. Acknowledging that we as a society already consume 1.75 times the earth’s carrying capacity annually, this is a serious concern.

In addition, a rising global population and an expanding middle class (5.3 billion by 2030) are predicted to result in a 35 percent correlative increase in the demand for food, 40 percent increase for water and 50 percent increase for energy. The global value at stake if the world continues its linear trajectory is estimated at US$4.5 trillion by 2030 in the newly published book, The Circular Economy Handbook.

What is the circular economy?

In a circular economy, growth is decoupled from the consumption of scarce resources. Products and materials are kept within productive use for as long as possible, and when they reach end of use, they are effectively cycled back into the system. Circularity means rethinking and transforming full value chains to create a system in which waste is designed out entirely, with the goal of net positivity.
Enterprises must lead the transition to a circular future

The time for transformative, collaborative action is now. Research suggests that greenhouse gas emissions in the atmosphere can only be decreased by approximately 50 percent through carbon reducing operational efficiencies and widescale implementation of renewable energy solutions. The remaining 50 percent must come from a transformation in how we produce and consume resources.  

Therefore, transformation of the energy system, in conjunction with fundamentally altering how we rethink production and consumption, are both equally vital in carving out a “new normal.” More than ever before, businesses must play a leading role in this new economic structure, spearheading innovation for change to protect the planet and create new value.

The circular economy presents a framework for this change, a solution to planetary challenges and a significant business opportunity. Calling for a full reinvention of entire value chains, waste is designed out; products are looped back into the system; growth is decoupled from consumption; and materials are kept within productive use. Circularity is also an engine for opportunity creation across industries, where through innovative business models and enabling new technologies, the very concept of waste is redefined.
Opportunities for circularity in metals and mining

One industry where circularity is gaining ground as a solution to resource challenges is across metals and mining. Mined metal commodity production is predicted to jump to 250 percent by 2030 to satisfy demand, resulting in significant increases across extraction and waste generation activities (see diagram).

**WASTE ANALYSIS DIAGRAM**

- **Engineering & Design**: Design choices for upgradeability, repair and second life options
- **Reverse Logistics***: Not applicable
- **Consumer Use**: High volumes of waste from disposal of consumer products
- **Manufacturing**: Energy intensive processes, manufacturing waste
- **Extension & Extraction**: Asset inefficiencies, energy and resource intensive extraction (and resulting waste)
- **Processing**: Hazardous waste from operations, barren land after mining (known as mine-spoil)
- **Logistics**: Energy usage and transport

*Note: While the “Reverse Logistics” stage does not produce unique waste streams per se, it is included in the diagram as it is a key part of a circular value chain.

Source: Accenture Strategy

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Despite the challenges, the opportunities for sustainable value capture are vast.

Circular waste-to-value opportunities can be capitalized on upstream, through implementation of zero-waste-to-landfill initiatives, and downstream, through innovative metal recycling solutions, for example. Umicore’s effort to buy sustainably mined cobalt raw materials to manufacture rechargeable battery components is a leading example of resource reuse within the industry.

Finally, through implementation of innovative business models, such as secondary material marketplaces and collaboration in the form of material stewardship practices, a circular transition is possible in the metals and mining industry. The potential to scale solutions is now amplified by breakthroughs in renewable energy and disruptive technologies—from platforms, to the Internet of Things (IoT) and blockchain for traceability, to advanced analytics, machine learning and AI, in addition to many others.

**Learning from a mining company leading the charge**

Anglo American is an industry leader embracing circularity at pace with several key initiatives, including land rehabilitation through top-soil cultivation and water reuse. Anglo American also prioritizes the repurposing of end-of-life mines as part of a broader remit to support local communities. As Chair of Anglo American’s management board in South Africa, Nolitha Fakude outlines, “Conversations with local stakeholders are essential to determine how Anglo American can enable mining communities to continue to thrive at a mine’s end of life.”

Anglo American is also seizing the opportunity to unlock embedded value in material previously discarded as waste through its **FutureSmart Mining™** program. **FutureSmart Mining** is Anglo American’s innovation-led approach to sustainable mining. Technology, digitalization and sustainability are working hand in hand to transform the nature of mining. Through FutureSmart Mining, Anglo American is, for example, addressing some legacy challenges and identifying a way to clean up some of its old or closed tailings facilities, extracting the valuable residual metals and minerals. New chemistries are enabling the company to be more specific in how to target minerals through the leaching process, significantly enhancing recoveries (i.e., 80 to 90 percent) in lower grade ores.

Despite progress, primary demand for minerals and metals is unlikely to be fulfilled by secondary supplies as there is not enough accessible scrap or used material available. As a result, ingenuity and innovation have never been more critical to transition sustainably to circularity at scale.

As Mark Cutifani, Chief Executive of Anglo American emphasizes, “A shift toward a more circular economy presents a significant opportunity for mining companies that are willing to embrace it by reimagining their businesses and partnering with the intermediate and end users of the essential metals and minerals they produce. For Anglo American, as a leading producer of many of the products critical to a cleaner, greener, more sustainable world, this goes to the heart of our purpose. It is a challenge we are addressing directly through our **FutureSmart Mining** approach—coupling step-change innovations in technology and sustainability to transform the future footprint of mining across the entire value chain.”
Accelerate your journey to circularity

As this example shows, metals and mining companies are an essential part of the solution for a sustainable future. We welcome the opportunity to speak with you about the implications of circularity for your company. Furthermore, we recommend reading *The Circular Economy Handbook*, a practical how-to guide for societal and business leaders alike to support the transition to a circular economy.
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References


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Note: Figures and company mentions in this article come from The Circular Economy Handbook.

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