MINING NEW VALUE
from the circular economy
With economies seeking to tap into the $4.5 trillion opportunity from eliminating waste through the circular economy, how can established mining and metals companies safeguard their market share while also tapping into a rich new value source?

In this era of epic disruption, circular business models are challenging the status quo, increasing pressure on mining companies to adapt fast, embrace change and stay relevant. Shifting downstream demand is creating risk as more innovative players capitalize on emerging opportunities to monetize circularity. But by taking the right steps today, mining and metals companies can reposition for success to create sustainable new revenue streams in the circular economy.
The future in flux

The shift to the circular economy is impacting all aspects of the mining and metals industry.

Take gold, for example. At today’s prices, the gold in one mobile phone is worth about $1 and 41 mobile phones can yield as much gold as one tonne of gold ore.¹ So, should mining companies switch their attention from tried and tested traditional exploration methods to focus instead on urban mining in electronic waste dumps? Let’s run a quick fact check.

Annual gold production was just over 3,000 tonnes in 2017,² so to get the equivalent volume from urban mining would require 95 billion discarded phones.³ ⁴ Considering there are ‘only’ about five billion mobile phones in circulation,⁵ it looks like we’ll be mining gold ore for a while to come. However, across the entire mining and metals industry, as in gold, supply chains are changing—raising questions as to how future-ready incumbents are to respond as markets move.
Rising to the recycling challenge

As the global recycling market for metals matures and grows, mining and metals companies must adapt accordingly. Today, ferrous scrap is the most recycled material worldwide. According to the Bureau of International Recycling, 40 percent of steel production is made from scrap and the size of the metals recycling market is projected to grow from $277 billion in 2015 to $406 billion by 2020, at an estimated CAGR of eight percent.6 It’s a similar picture for aluminum and copper. And for precious metals, the rates are even higher. The issue for mining and metals companies is twofold: Firstly, they’re not always well positioned to monetize the recycling flow and secondly, increased circularity will impact primary demand. Furthermore, as waste and material losses are eliminated over time—for example, as we move to additive manufacturing—the knock-on effect on primary demand will likely be significant.
Manufacturers taking the lead

In the last five years, the consumer goods, retail and automotive sectors have blazed a trail for circular ambition, setting new standards in innovation.

Many of us are familiar with car-sharing schemes such as Lyft, lighting as-a-service pioneered by Philips, and Nike’s Flyknit shoe. The 2019 Circulars Awards, held in Davos in January 2019, showcased more than 450 examples of circular economy leadership.

But in the mining and metals sectors, such examples of circular innovation are comparatively scarce. Industry attention to date has largely focused on the circular economy as a route to operational efficiency, for example, recycling water or monetizing waste streams such as slag or used tires. The bigger question—and opportunity—of how to drive value from changing market demand, remains largely untapped.
Mining and metals companies at risk

As circular models are increasingly adopted by innovative companies further down the materials supply chain, failure to get to grips with the circular economy puts mining and metals companies at risk.

Manufacturers are getting better at recovering their investment in natural resources in ‘closed-loop’ cycles. What’s more, these new circular business models are disrupting historical links between ownership and sales growth.

In the automotive sector, for example, ride-sharing models mean that by 2035 the global inventory of passenger vehicles in use may be 25 percent smaller than historical models would suggest. In shipbuilding, Maersk’s ships reuse 95 percent of their materials and parts thanks to tracking with a resource ‘passport’. And construction and mining equipment manufacturer Caterpillar takes back over 80,000 tonnes of product from customers annually and remanufactures it into a good-as-new condition.

If all the innovation is happening downstream, mining and metals companies risk losing market share.
Changing demand patterns

These changes are converging against a backdrop of potentially slowing demand for many metals as economies move to a post-industrial model.

China is pivoting from infrastructure and manufacturing toward services and consumer spending. Some emerging economies may leapfrog the resource-intensive stage of industrialization altogether.

Consequently, we’ll likely reach peak demand for steel earlier than past trajectories of the mature economies’ development paths would suggest. With some estimates now anticipating that world population will peak between eight and nine billion by mid-century, mining and metals companies could face three concurrent trends that suppress demand below forecast: post-industrial economies; population decline; and increased circularity.
New threats, new opportunities

On the flip side, the new technologies that are defining the fourth industrial revolution are also driving demand for new commodities.

According to the World Bank, the transition to a low-carbon economy will see increased demand for a wide range of base and precious metals, including cobalt, lithium and rare earth elements (REEs), silver, nickel, lead and zinc. Glencore, the world’s largest cobalt producer, has found that meeting the Clean Energy Ministerial target of 30 million electric vehicle sales by 2030 would require 314kt of cobalt per year by 2030—more than triple the demand in 2017. At this rate, current reserves would last for only 23 years, so innovative alternatives will be required.

The challenge, therefore, for mining and metals companies is to work out where best to focus in this shifting marketplace and how best to take advantage of both the circular economy and cleantech trends.
Innovation in action

The good news is that an emerging cohort of leaders is innovating and collaborating to capture value. These visionary mining and metals companies are beginning to anticipate and act on the circular economy shifts underway. Some are starting to develop new circular models to support customers and respond to their changing requirements.

**Innovation in action**

**Codelco**
Codelco is seeking to price copper based on the carbon footprint and social impact of production, de-commoditizing the material and seeking to respond to customer and societal demands for lower-impact products. Together with BMW, it has established the Responsible Copper Initiative.17

**ArcelorMittal**
ArcelorMittal is extending product lifecycles by leasing sheet piles for short-term projects, partnering to develop and scale carbon capture and utilization technology.16

**Novelis**
Novelis has set out to increase the recycled content in its products from 33 to 80 percent by 2020. It has partnered with Jaguar Land Rover to recover and recycle their aluminum scrap, so reducing the cost of aluminum and waste disposal.18

#CircularMining
To succeed in the circular economy, mining and metals companies must reposition. Fast.

To keep pace with the front-runners and downstream disruptors, mining and metals companies must start looking at their portfolios to assess where the risks of decreased demand or substitution loom largest. It’s vital to understand which materials can be recovered most effectively, and where new circular business models downstream could present threats or opportunities. They then need to innovate their business models to accelerate their transition to the circular economy. The following three steps offer a good starting point.
Three steps to embrace circularity

1. **Develop circular operations**

   Start by accelerating circular initiatives across your mining and metals operations, for example:
   - Partnering with suppliers to extend the life of capital equipment through real-time monitoring, analytics and predictive maintenance, e.g. of trucks, conveyors, etc., while promoting remanufacturing and end-of-life recycling, e.g. of tires.
   - Selling production waste to other industries, e.g. construction.
   - Sharing ownership of heavy-duty equipment with low utilization rates, i.e. between sites and/or with other local industries.

2. **Innovate new circular products and services**

   Secondly, engage with downstream users of your materials to co-create innovative circular products and services, which might include:
   - Leasing materials, enabled by advanced track-and-trace systems.
   - Supporting certification of customer products, to enable reuse and easy remanufacturing.
   - Improving processes for scrap recovery, reprocessing and reuse.

3. **Collaborate with customers and build a circular partners’ ecosystem**

   Finally, collaborate proactively up and down your supply chains to create industry momentum by:
   - Working to create favorable regulatory regimes for improved circularity.
   - Establishing cross-industry partnerships to develop the mining and metals roadmap to extend product life and retain ownership.
   - Developing cross-industry standards to validate the integrity of products/materials for end-of-life take-back and repurposing.
With mining and metals poised for epic disruption, can you afford to be a fast follower?

Or will you embrace the circular economy at speed, take the lead and reshape the future of the industry—on your terms? As a first mover, you’ll have the potential to build closed-loop systems, lock-in downstream ecosystems and drive sustainable value, competitive advantage and future growth.

Join the conversation:
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References

3. A typical iPhone is estimated to house around 0.034g of gold.
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