The mining industry propelled by hydrogen: a clean future is near

By Robert Mason and Alison Babbitt

Climate change and environmental sustainability have increasingly become issues of social concern, and many industries have been looking for opportunities to reduce their carbon footprint.

One such opportunity may be the use of hydrogen technologies, which many believe can play a crucial role in the global energy market's transition to a low-carbon economy.

Current hydrogen technologies could be employed to improve environmental sustainability at a mine site. Here's how:

Energy production and storage

Hydrogen technologies can offer a high percentage of conversion efficiencies, meaning significant savings in electricity costs and decreased CO_2 emissions due to reduced reliance on diesel.

Once aspirational, conversion efficiencies will continue to increase as this industry grows and R&D continues. In addition to improving site efficiency and reliability, the storage system can help to balance seasonal variations, save costs by deploying energy during peak hours and provide a secondary commodity that may be sold, including during a temporary mine closure or at the end of mine life.

Fuel cell electric vehicles

Another opportunity to implement hydrogen at a mining site is by replacing heavy-haul diesel or gasoline trucks with fuel cell electric vehicles that run on hydrogen gas. Recent larger hydrogen applications in heavy machinery by companies such as Alstom and Nikola Corp. demonstrate the industry's progression towards developing FCEVs in heavy-duty trucks that have the potential to yield horsepower. Hydrogen-powered mining equipment and vehicles are currently used by various mines in North America, and their use will increase as the technology is refined. With the global Hydrogen Council recently projecting that hydrogen is expected to contribute to 20% of carbon emissions reduction targets by 2050, using such FCEVs on a large mining site could go a long way in implementing and meeting the sustainability goals of such projects.

Hydrogen implementation challenges

Hydrogen's large-scale implementation faces roadblocks in terms of cost competitiveness and accessibility.

Technologies can only prove to be successful if they are implemented. Mine operators are experienced and comfortable in meeting financial and operational goals with current tools and technologies.

Without a solid and convincing business case for hydrogen, and the knowledge and impetus to consider a change, operators may have serious reservations about changing their working approach. At ground level, and particularly for the more junior operations, implementing hydrogen FCEVs and hydrogen power generation and storage would likely interrupt daily operations and require significant initial investment that might not yield the desired returns in the short term.

The most significant challenge to implementation at present seems to be the lack of cost-competitiveness in hydrogen technologies. However, it may be that with more R&D, hydrogen technologies could become more accessible and affordable.

Sustainable financing

Sustainability-linked loans allow borrowers to reduce their interest rates over time after achieving various environmental milestones. Mine projects are under increasing pressure from equity investors and debt providers to meet robust environmental, social and governance standards.

Could mine developers be incentivized by their lenders to employ hydrogen technologies to help achieve certain specified sustainability standards, which in turn could result in meaningful reductions in the cost of borrowing? Could mining companies employ such sustainable financing to offset the onerous initial investments necessary to implement hydrogen technologies on site? In this respect, sustainable milestones could include target ratios of FCEVs used on site relative to those using diesel or gasoline engines, as well as targets for reductions in the site's overall carbon emissions.

As Canada's interest in hydrogen technologies grows, those involved in the mining industry may benefit through awareness of hydrogen's potential to achieve these sustainability goals. Knowledge of sustainable finance options will likely become progressively relevant to lawyers active in the industry as mines increasingly face pressure to reduce their environmental footprint or risk losing their social licence to operate. Legal professionals should harness this opportunity to suggest innovative solutions to mitigate these challenges of integration, including sustainable financing and lending. **CMJ**

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