

Metal Mining Innovation and the Global Climate Crisis.

Climate change is real. Most people accept that the rapid rate of change is related to the cumulative concentration of carbon dioxide (CO₂) in the atmosphere and agree that the most obvious consequences are the extreme weather events that are increasing in frequency and severity. Most people accept that if this accumulation continues, the social and economic consequences will become very serious, very quickly. The scientific community seems to agree that the best way to avoid these consequences is to gradually reduce and stabilize the accumulation of greenhouse gases in the atmosphere.

The way forward is to reduce the consumption of fossil fuels that generate CO₂ and this is often expressed as 'removing carbon from the economy'. Unfortunately, society cannot afford to reduce the material, people and ideas that fossil fuels currently move around the economy; what is required is to *replace* fossil fuels with low-carbon electricity, and to achieve this globally. This means reducing coal-fired power generation and replacing combustion engine cars with electrically powered vehicles. But dramatically increasing the use of electricity in the global economy, will need much more production of the various metals that enable the generation, transmission, storage and utilization of electricity. Too many people are unaware that power infrastructure and electric vehicles depend on copper, and that batteries will still depend mostly on nickel and lead, although other metals such as lithium are becoming increasingly important. The fact is, a lower-carbon future is a higher-metal future, and this means more mining of the metals that will make the transition possible within the next 20 years.

Unfortunately, the global metal mining industry of today is not capable of responding to a significant increase in demand for these metals without a significant increase in price. Fewer discoveries of large surface copper deposits have already forced increased production from higher-cost underground mines that are struggling to deliver, and all new mines are delayed by growing public concern over social and environmental impacts. Allowing increasing metal demand to further escalate prices is self-defeating; lower-priced carbon defeats higher-priced metals. If the industrial consumption of carbon is to be reduced significantly, the global metal mining industry needs to produce *more metals at lower cost and be more profitable* than it is now. A comprehensive transformation of the production and tailings technology platforms is now essential and urgent; but the current trend and pace of change within the mining industry is simply too little too late. The industry needs to embrace the absolute necessity of significantly increasing productive capacity and preventing long-term environmental impact.

Simply relying on conventional corporate objectives and supply-demand economics will not achieve this transformation. What is required is the mobilization of creative innovation on an unprecedented scale and on an extraordinarily short timeframe. The kind of transformation normally only seen during wartime - the war on climate change is the challenge of this age. Those who invest in these innovations will control the future of mining and its contribution to resolving the global climate crisis.

Douglas Morrison, CEO, CEMI