XV CONGRESO GEOLÓGICO CHILENO
"Geociencias hacia la comunidad" CONCEPCIÓN
18-23 NOV 2018

The interconnected future of energy and metals

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Understanding the sources of energy, water, and the materials that make everything from planes to cars and mobile devices is challenging. For many people, the increasing global population and related demand for energy and metals suggests that shortages are imminent. For others, new technologies based significantly on the use of metals will help to mitigate climate change and will solve other global issues. Can these seemingly divergent views be rationalized?

The energy and transportation markets are changing rapidly, with the options and costs for renewables, grid storage and electric vehicles all moving with implications for metal demand. For example, a recent study by the World Bank concluded that significant increases in the production of major and minor metals would be required to produce sufficient renewable energy, battery storage and electric cars to minimize climate change-related temperature increases by 2050. Even with some uncertainty behind the assumptions in this study, significant increase in demand for metals seems likely.

Increasing the supply of metals over the next forty years will require more mines, and therefore the use of more energy and water, and the potential for more issues related to permitting, community support and the environment. Clearly, addressing energy sources and use in mining is fundamental to best practices and future supply. Similarly, water use is critical, and realistic long term supply also has implications for energy.

These issues are particularly important in the Andes of Chile and Peru. Copper, the key commodity in the region, is both an infrastructure and technology metal, and will therefore see ongoing increases in demand. Managing energy and water requirements will be vital for the copper mining industry in the region, and for all those who benefit from the resulting contributions to the economy locally and nationally.

Simply put, if we are going to produce more metals in order to make the world a better place for humans, we must do it more efficiently and responsibly, or else we will be no further ahead. Improved mining starts with the understanding of the ore bodies and the regional and local environment in which we propose to operate. Geoscientists play major roles in developing this understanding, but effective communication and collaboration with other disciplines are equally important. Increasingly, this includes the social dimension from early exploration to mine development and production. Delays to mine development as a result of inadequate community engagement, or lack of ways to produce real and lasting benefits, pose the greatest potential limitation for the timely supply of the metals that are most needed to change the world.