

Add cobalt to your list of technology (and critical) metals

☒ If you're reading this and attending PDAC in Toronto, it might pay to swing by the stall operated by Formation Metals (TSX:FCO), a company that has what it claims is the "sole, near term, fully environmentally permitted, cobalt project in the United States".

That is, if you have read John Petersen's superb article on InvestorIntel looking at the three critical metals that go into the lithium-ion batteries. His conclusion: the one to worry about most, in terms of security of supply, is cobalt.

It is a useful reminder. Others have issued alerts about cobalt, but the situation has become worse with the marked fall in copper and nickel prices, the metals mined with cobalt as a by-product. Glencore's decision to close mines in the Democratic Republic of Congo and Zambia will remove 5,000 tonnes a year from cobalt supply, important when 2015 global demand for this metal stood at 90,150 tonnes. Another copper miner in the Congo, Eurasian National Resources, is laying off 1,300 workers and cutting back mining. On top of that, Amnesty International is mounting a campaign against the employment of children as young as seven years of age to work mines in the Congo that produce cobalt, the lobby organization targeting 16 multinational companies it says uses cobalt in lithium-ion batteries that is mined by these children. (The DRC produces half the world's cobalt.)

According to Formation Metals, demand growth for cobalt is running at 5.4% a year but supply growth is running at just 2.4%. Cobalt is expected to go into deficit this year; Formation expects mine closures and other factors to mean

global output will decline 11% this year. (The biggest threat may be that the nickel prices stay depressed, which will put pressure on nickel laterite mines around the world, and therefore further reduce cobalt by-product.)

The last big cobalt deficit, in 2008, (the result of political unrest in the Congo) saw cobalt prices go above \$50/lb. Now cobalt is sitting around \$10.50/lb. It was long an unloved metal: for about 50 years up until the early 1970s it rarely traded higher than \$2.50/lb.

Cobalt became a publicly traded metal in 2008 when contracts were available through the London Metal Exchange.

Then came the report from an expert committee set up by the European Commission. It raised the alarm that the European Union was facing a critical shortage of fourteen critical raw materials, most of them vital to mobile phones and other modern technologies needed for such developments as solar panels and synthetic fuels. The EU report cited the critical raw materials it needed as antimony, beryllium, cobalt, fluorspar, gallium, germanium, indium, magnesium, niobium, platinum group metals, rare earths, tantalum and tungsten.

After molybdenum and cobalt contracts began trading on the London Metal Exchange, analysis out of London's Libertas Capital found a growing and stark price trend disparity between the exchange-traded metals and the minor and esoteric ones. They figured speculators were proceeding with care, wanting to bet only on liquid markets just in case things get worse. In other words, you can get out of copper, not so easy when you're holding antimony. 'As underlying demand for metals and minerals is still very subdued, and as price visibility and market liquidity in the esoteric metals is poor, (investors) are not bothered with them,' the note said. While many of the minor metals bounced (for a while) after that note was published, when market conditions go sour you want to be able to sell your position. Not always easy if it is a non-

traded metal.

If you looked at the charts for copper, nickel, tin, zinc and lead when that note was issued, you would have seen that the prices had all kicked up significantly over the preceding month. What was noteworthy was that both molybdenum and cobalt, although being minor metals, benefited by being traded on the London Metal Exchange through the rush of liquidity into these newly tradable metals.

But here at InvestorIntel we have also alerted readers to the cobalt issue.

In May last year, I reported that London's *Daily Telegraph* was saying Telsa and its battery manufacturing could require up to 10,000 tonnes a year of cobalt. That would add about 10% to the size of the cobalt market. But what was really at stake was that cobalt's consumption for batteries was on a steep growth path, from 20,000 tonnes a year in 2010 to 50,000 tonnes in 2024.

There were reports at the time that Chinese refiners were gearing up to lift production. But the concern was that the world still depended to a large extent on the Democratic Republic of Congo and Zambia for the mined metal; any disruptions there could impact the price significantly, just as it did in the late 1970s when the DRC (it was then called Zaire) saw internal disruptions that impacted on cobalt exports. The price went to \$50/lb. (With the return of Zaire exports and development of substitutes in permanent magnets, cobalt plunged again, going as low as \$3.79/lb in 1986).

It is no wonder, therefore, that undersea mining plans have figured in cobalt's future.

Cobalt crusts are rich in iron and hydroxide deposits containing significant concentrations of cobalt, titanium, nickel, platinum, molybdenum, tellurium, cerium and other metals and rare earth elements. Polymetallic sulphides contain

base metals that include copper, lead and zinc, as well as gold and silver.

In December 2013, *China Daily* reported that China was accelerating its efforts to tap what it sees as vast metal deposits on the ocean floor. The *Jiaolong*, carried by its mother ship *Xiangyanghong 99*, was to spend forty days in the northwest Pacific and forty to fifty days in the southwest Indian Ocean. The China Ocean Mineral Resources Research and Development Association had won the right (from the International Seabed Authority) to explore for cobalt crusts in these areas.