

Technology makes its mark

BY SANDRA ARGESE

As the fourth industrial revolution continues to make waves across the international mining sector, new life has been breathed into a range of commodities, as revealed through research by Boston's Massachusetts Institute of Technology (MIT).

Presented in a 2018 forecast by Rio Tinto, the research detailed the metals likely to be most impacted by new technologies.

Tin took out top spot, with lithium second. These were closely followed by cobalt, silver, nickel, gold, tungsten, vanadium, graphite, niobium, zinc, platinum and palladium and salt.

Advanced computation and information technology was highlighted as the most significant technological sector to influence tin, followed by automatic and electric vehicles and advanced robotics.

The results fell in line with the International Tin Association's (ITA) *Tin for the Future* global tin market overview, which predicted that energy and technology would drive future tin demand through computing and robotics, energy generation, energy storage, energy infrastructure and electronic and autonomous vehicles.

Recently executing an agreement to acquire Spanish tin project Oropesa, Australian small-cap explorer Elementos is one company seeking to take advantage of the commodity's apparent uptick in popularity.

Speaking to *National Mining Chronicle*, Elementos Non-Executive Director Chris Dunks said the supply and demand fundamentals for tin "just made sense".

"There is not really a lot of supply of tin coming on in the next five to 10 years and there's been almost no exploration for tin in the past 25 to 30 years," he said.

"There are very few new projects coming, but demand is growing, albeit at a slow pace. We see those fundamentals as working in our favour in pursuing tin as a commodity."

The ITA overview revealed solder comprised 47 per cent of global tin usage in 2017, followed by chemicals (17 per cent), tinfoil (14 per cent), batteries (eight per cent), alloys (five per cent) and others (nine per cent). Overall, 360,000 tonnes of refined tin were produced in 2017.

Mr Dunks said given the non-existence of an alternative to tin, the commodity's future looked bright.

"Up until 10 years ago it was predominately all about lead-tin solder, but lead has been phased out, so it's really now about looking at tin as the fundamental material that is used," he said. "There are other alternatives which have been explored such as bridged circuit boards replacing solder, but that really requires a whole change in manufacturing processes and billions of dollars.

"The next best material is silver, which is far more expensive. Tin really is going to be the only material choice for solder over time. There are amazing innovations in solder paste that are coming in for solar installations, and that will grow over time as solar does the same."

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Mr Dunks said he was unsurprised information technology was playing such a crucial role in impacting tin.

"That comes back to the use of solder," he said.

"If you look at a circuit board in any computer or piece of electronic equipment, all the electronic materials are connected into the circuit board and the solder is present everywhere. As the use of computers and devices grow around the world, there's a significant amount of tin being used, with mobile phones a significant example of this. It's that acceleration of use of technologies around the world, and tin is a big part of that."

Lithium Australia Managing Director Adrian Griffin said while he was surprised tin came in first in the MIT data, lithium coming in second as one of the top-ranked metals was anything but unexpected.

"Lithium is driven by lithium-ion battery production, but

you can break that into two sectors. There's power backup and there's mobile power. Mobile power looks at phones, laptops and motor vehicles, while power backup talks about power storage for areas like renewable energy," he said.

"It's the sector that is driven by mobile devices, and there's little possibility that there's going to be a substitute for that sector of the industry"

Looking forward, the internal combustion engine, is soon to be on its last lap. A raft of countries and cities/states, including China, India, Rome (Italy), Norway and Paris (France) have announced goals of eliminating the dated, conventional automation offering.

According to the MIT forecast, automated and electronic vehicles are expected to be the second most influential technologies for lithium, making their rise due to legislative pushes and environmental considerations a significant factor.

"Those countries will all ban internal combustion engines for new vehicles, not old ones, they'll be able to die gracefully," Mr Griffin said. "The new ones will have to be electric vehicles and it's inevitable they'll be powered by lithium-ion batteries.

"If you look at the number of new vehicles that have been produced in those countries alone, by about 2030 it'll be about 50 million new vehicles a year the batteries have to go into. Considering the amount of lithium that's required to produce the batteries to go in those, that's something like 15 times the amount of lithium currently produced on a global basis.

"As a result, you've got an attractive product that people want for environmental reasons, high prestige levels, and for legislative reasons.

"You're looking at mining equipment manufacturers trying to improve their environmental footprint and many of those go into batteries.

"You will see an overlap there over time where those large mining fleets will - in addition to everyday domestic vehicles - phase out internal combustion engines and use batteries too, so that will combine things like artificial intelligence, robotics and other technologies." **NMC**