

# Investment insight

## Decarbonisation – the shift to a ‘copper economy’

### Executive summary

- The world is beginning to substitute hydrocarbon-based energy sources for renewable energy and electrification.
- This decarbonisation transition is very positive for a range of minerals and metals.
- Copper is one of the largest beneficiaries because of its importance in an electrified world.
- Why copper? Suitability for electrification projects and surging demand.
- Demand is coming from electric vehicles, solar power, wind power and battery storage.
- However, a lack of investment in new copper supply means that production will struggle to keep up.
- This will support copper prices going forward.
- Copper and other commodities form part of our intelligent investment approach as we look to build long-term wealth for New Zealanders.

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### Copper price (US\$ per tonne)



Source: Bloomberg

The world is starting on a decarbonisation journey where our reliance on hydrocarbons and carbon (coal) is being replaced by electrons and renewable energy. While some of the initiatives to address climate change can arguably be described as aspirational, others are legally binding.

New Zealand is a signatory to the Paris Agreement – the global agreement on climate change. This sets the goal to limit global warming to below 2 degrees (preferably 1.5 degrees) above pre-industrial levels. In New Zealand’s case we have committed to reduce greenhouse gas emissions by 30% below 2005 levels by 2030.

Unless there are some very significant technological breakthroughs in carbon capture/storage, the heavy lifting to achieve these goals will have to come from renewable energy and electrification as energy is currently

the largest emitter of carbon globally, accounting for 73% of emissions in 2017. Hence the move from hydrocarbons to electrons.

This transition means big changes for some minerals and metals as these are the figurative ‘picks and shovels’ of the low carbon world. Metals such as nickel, cobalt, lithium and the rare earths that go into battery technology are obvious beneficiaries. However, in many ways, the shift from a high carbon economy to a low carbon economy is effectively a shift to a ‘copper economy’ because of the important role this metal plays in an electrified world.

Why copper? Suitability and demand.

### Suitability

Copper has a range of properties that make it indispensable for an electrified world. These include:

**Conductivity:** Copper has the highest conductivity of any industrial metal, perfect for electrical generation and transmission, as well as for heat exchange applications.

**Price/Availability:** There are other conductive metals – the most obvious examples being gold and silver. However, these alternative conductors are not available in required industrial quantities and not available at a reasonable price. As a result, copper has a much better conductivity per \$/t than silver or gold.

**Flexibility:** Copper can be formed – rolled, stretched and heated – without breaking. This naturally makes it the go-to material for wiring in electrical and electronic components.

**Recyclability:** Copper can be recycled without loss of performance.

**Low reactivity:** Copper is naturally corrosion resistant. This means that it is a long-life asset.

#### **Demand**

The transition to renewable energy and electrical energy demands significantly more copper. Examples of this are:

**Electric vehicles:** Plug-in electric vehicles (EV) need up to four times as much copper as an internal combustion vehicle (60-80kgs vs 15-20kgs). Added to this, the requirements for charging stations, EV's and associated services are likely to be the largest additional demand components for copper.

**Solar power:** Photovoltaic systems rely on copper in order to collect, store, and distribute solar energy. Solar panels also need to have a long usable life so copper's durability is critical.

**Wind:** Wind turbines are heavy copper users through items such as the electrical generators, the grounding

cables and the power cables to connect to the electricity grid. Compared to fossil fuel generated power, renewable power generation from solar and wind requires four to six times more copper per installed megawatt (MW).

**Battery storage:** Battery storage is evolving quickly however at this point there is still a requirement for copper in these systems and this is likely to continue for some time.

**Electric grid:** Existing electric grids will need to be strengthened to meet the growing demand.

All this suggests that over the next eight to ten years the demand for copper is likely to surge and this raises the question of how this demand will be met as the copper market is unprepared for the surge in demand.

The emergence of China as a global economic force in the early 2000's drove a commodity boom and eventually lead to an oversupply. The last decade has been characterised by poor returns and little to no investment in new supply. Unlike the technology industry which can scale almost instantaneously, it takes six to eight years to move a copper mine from the initial planning stage to full production. This sets up the copper market for a sustained period of high demand, lacklustre supply and higher prices.

NZ Funds believes that we are in an environment where simply investing in traditional shares and bonds will not deliver the returns required for our clients. Demand and supply dynamics mean the price of commodities, such as copper, will increase irrespective of the outlook for traditional assets such as bonds and shares. Commodities form part of our intelligent investment approach as we look to build the long-term wealth of New Zealanders.



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Mark is responsible for management of the Income portion of clients' portfolios at NZ Funds. This encompasses both New Zealand and Global fixed income securities.

After beginning his career with NZ Funds, Mark spent five years during the early 2000s in London managing a portfolio for a European credit hedge fund.

Since re-joining NZ Funds in 2007, he has built a strong track record of performance for clients across both local and global income.

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