

Green Metals

Green metals are required to decarbonise the global economy and address climate change. Large-scale deposits of these metals are extremely rare and Chalice's Julimar Project is one of the largest and most significant discoveries in recent history.



About Chalice

Chalice Mining is a Western Australian company with a track record of responsible and successful mineral exploration. Chalice has a clearly defined purpose to discover, define and deliver world-class sustainable green metal projects in Australia.

In March 2020, Chalice made a significant discovery of platinum group elements (PGEs), nickel, copper, cobalt and gold at the Julimar Project, located on private farmland near Toodyay, about 70 km north-east of Perth.

The Gonneville Deposit, the first discovery at Julimar, is the largest nickel sulphide discovery since 2000 and the largest platinum group element (PGE) discovery in Australian history.

What are 'green metals'?

Gonneville is host to a suite of 'green metals' - palladium, platinum, nickel, copper and cobalt. These green metals are required to decarbonise the world and address climate change.

As the world transitions to clean energy, we will require huge quantities of these metals for green technologies such as wind, solar, electric vehicles and green hydrogen.

Large-scale deposits of these metals are very rare, and Chalice believes it is vital that deposits like Julimar are appropriately explored and responsibly mined.

Chalice is focussed on finding a sustainable solution to deliver on these global environmental benefits, whilst also maximising positive impacts for the local community and protecting environmental values.

Green Metals 101

The green metals found at Julimar are:

- « **Platinum and Palladium (PGEs*):** used in catalytic converters to reduce greenhouse gas emissions in vehicles, as well as in green hydrogen production and hydrogen fuel cells.
- « PGEs* is the collective term used for the six platinum-group metals (platinum, palladium, ruthenium, rhodium, osmium and iridium). These metals are soft, flexible, resistant to corrosion and excellent in catalytic applications (facilitating chemical reactions).
- « **Nickel and Cobalt:** used in electric vehicle and other high-powered lithium-ion battery applications.
- « **Copper:** used throughout the electricity and consumer electronics sectors, including in renewable energy, energy storage and electric vehicles.

The role for Chalice and Julimar

Russia and South Africa currently dominate the world's production of PGEs and Australia has never had a major PGE mine. Julimar Project is one of the few major deposits outside of Russia and a potential sustainable future source. In order to strengthen supply chain resilience and ensure green technologies are affordable for future adoption, it is critical that Australia explores and develops new green metal mines.

The Julimar discovery also further strengthens Western Australia's potential to be at the forefront of the supply of these critical metals, generating significant economic benefits.



Platinum & Palladium



These rare metals are used in catalytic converters – a pollution control device which is in every petrol, diesel or hybrid vehicle. Palladium reduces greenhouse gas emissions from exhaust streams, including nitrogen oxides which are **300x more potent than CO₂ as a greenhouse gas**. These metals also have a future role to play in green hydrogen production and hydrogen fuel cells.

Global supply for palladium has been in deficit since 2012, with the world's reliance on Russia under increasing threat (~40% of supply). Platinum supply is dominated by South Africa, with significant political and operational challenges.

Nickel and Cobalt



Both nickel and cobalt are key materials required in batteries for electric vehicles (EV). **EV-driven nickel demand is forecast to increase 19x by 2040**, and a lack of new nickel-sulphide discoveries worldwide in recent years has created a significant forecast supply shortage.

Driven by short supply, battery manufacturers are becoming increasingly reliant on sources that do not meet sustainability standards – presenting a need to find new sources of lower-carbon density nickel.

Copper



Used extensively in the green energy industry including solar, hydro, nuclear, and geothermal energy, as well as EV and battery technologies.

The copper market is forecast to remain in deficit until 2026, again with a lack of new large-scale discoveries worldwide.