

Green Magnesium

Turning seawater into a magnesium supply chain.

Developed by Green Magnesium · Green Metals · Energy



THE PROBLEM

The Kingdom is rich in magnesium but produces none of the metal

Saudi Arabia is very rich in magnesium — its dolomite alone could supply three times the Kingdom's demand, and brine resources could meet several times world demand — yet it produces no magnesium metal. Global production is concentrated in China at over 90% of supply, creating a high supply risk for a mineral the USA, EU, Japan and South Korea all classify as critical.

THE SOLUTION

Solar-powered electrolysis from brine

Magnesium can be made by thermal (coal-powered) or electrolytic (electricity-powered) routes. The thermal Pidgeon process accounts for over 99% of China's primary magnesium and carries 5x more labor and 4x the CO₂ emissions. Powered by Saudi solar, electrolysis removes the fossil energy input that drives both the cost and the carbon of the incumbent route.

TECHNOLOGY · KEY SPECIFICATIONS

Resource	KSA dolomite ~39,000 t/yr MgO (3x Kingdom demand); brine (4x world demand)
Process	Solar-powered electrolysis (vs coal-powered thermal)
Feedstock scale	Saudi Arabia produces 22% of the world's desalination brine
Environmental edge	Thermal route uses 5x labor and 4x CO ₂
Process route	Brine → magnesium hydroxide → magnesium chloride → magnesium metal

IMPACT

01

Localizing a critical metal

Establishing domestic magnesium metal production to serve Kingdom and regional demand.

02

De-risking global supply

Offering an alternative to supply concentrated in a single country.

03

Lowest-cost, low-carbon

Using solar electrolysis to undercut thermal production on both cost and emissions.

04

Enabling the energy sector

Feeding storage, shipping, ammonia, solar, cement and catalyst technologies.