

The Halion Loop™



US\$0.18* /lb Cu concentrate to metal

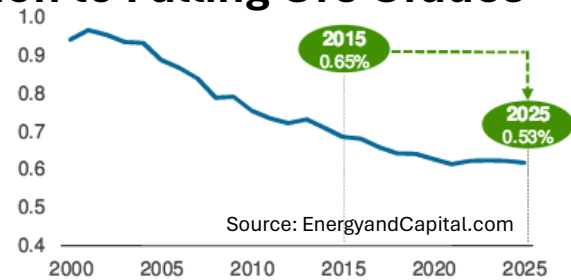
*Independent estimate, 2021

Think & Act Differently Ingenious Extraction Challenge

Low Cost Processing

- Significant power savings
- No oxygen plant
- Atmospheric pressure
- <100°C
- No roasting or autoclaves. No gas controls.
- Closed loop cyclic process

The Solution to Falling Ore Grades



Breakthrough Halion™ Electrowinning Cell

- Direct recovery of copper from the Cu⁺ state
- Only one electron required per atom of copper
- Continuously produce and recover copper, 24/7, up to 12 months**
- Up to 80% saving in tankhouse footprint
- **Closes the loop for cyclic halide processing**

**To be confirmed during Halion Cell scale up

Up to **70%**

Power Saving

vs conventional E/W

Copper Made Green



... not this kind of green copper

Versatile

Low Grade – Polymetallic – Arsenic Contaminated

- Concentrates, tailings & industrial residues
- Maximise metal recovery at the mill
- Prioritise recovery over grade or separation
- Scale from 5,000tpa Cu production

TRL 7 (Most Process Steps)

- Leaching and purification proven and market-ready
- Commercialisation program for breakthrough Halion™ electrowinning cell

Broad Range of Minerals

- | | |
|--------------|------------------------------|
| Chalcopyrite | Nickel sulphides |
| Covellite | Nickel laterites |
| Chalcocite | Sphalerite |
| Bornite | Galena |
| Tennantite | Pyrite (latest breakthrough) |
| Enargite | |



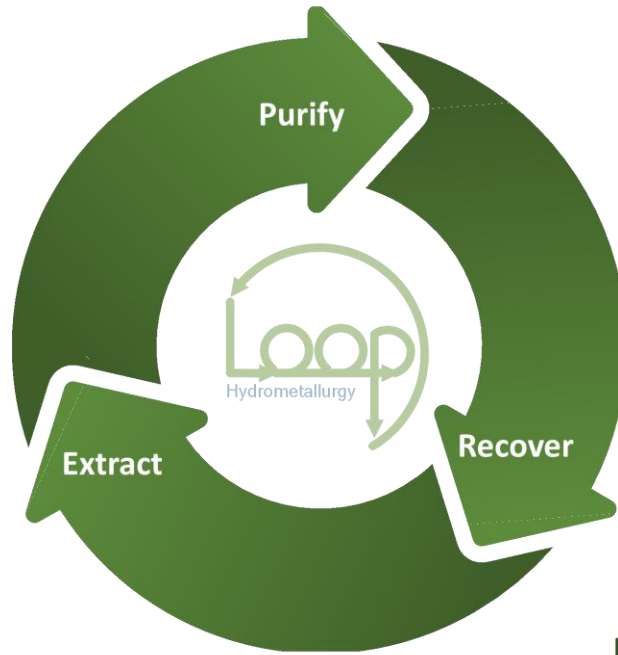
PURIFY → NI, CO, REES, AU



NO NOXIOUS GASES
NO LIQUID EFFLUENTS
NO TRANSPORT



↓
EXTRACT

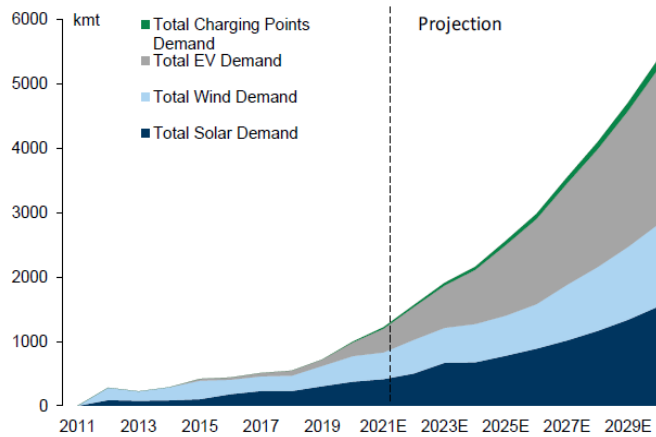
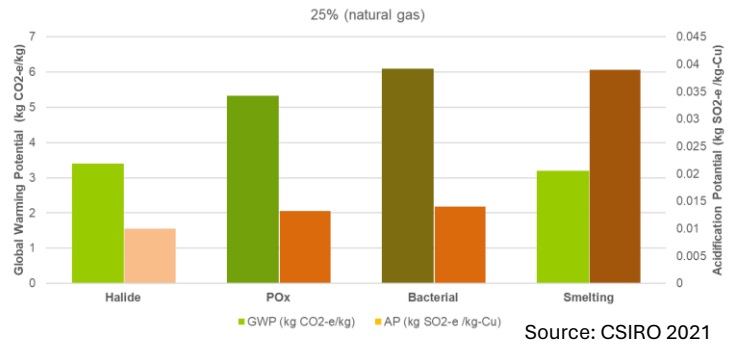


RECOVER → COPPER

Low Emission

Lowest CO₂ emissions of any technology

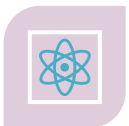
- Up to 70% power saving in electrowinning
- No noxious gas emissions
- No liquid effluents
- Solid residues hematite and elemental sulphur
- Arsenic stabilised for safe disposal



Source: Goldman Sachs Global Investment Research

Clean Copper for Clean Technology

24 million tonnes p/a of new copper produced
Growing by 500,000tpa
Green applications represent 60% of new growth



BREAKTHROUGH
TECHNOLOGY



CRITICAL
METAL
PRODUCTION



SIGNIFICANTLY
IMPROVED
ECONOMICS



SIGNIFICANTLY
IMPROVED
ENVIRONMENTAL
OUTCOMES



SIGNIFICANTLY
REDUCED
CARBON
FOOTPRINT



FAST PATH TO
MARKET