

Innovative Financing

Turning Nickel Tailings into Carbon Sinks

Tailings Piling → Carbonates Forming → Permanent CO_2 storage + Revenue loop

- Ultramafic rocks contain Mg-silicates that naturally react with CO_2
- When ground into tailings and exposed to air/water → form stable carbonates (hydromagnesite, magnesite)
- This is direct air capture built into mine waste, with 1,000+ year durability

CO_2 + Mg-silicate + weathering → Mg-carbonate (solid)





1. Wilson et al. 2014

Case Studies: Who Is Doing This Now?

Baptiste Nickel mine (British Columbia)

- Naturally sequesters **~17 kt of CO_2/year** at a rate of **3.5 kg CO_2/m^2/yr**
- Potential for 5x increase with engineered practices (19 kg CO2/m2/yr) when aerating the tailings and would offset **CO_2** emissions by **95 kt CO2/yr** (25%)
- Aerating w/ **CO_2** rich gas, (50%)

FPX Nickel (Canada)

- Field tests: up to 5.8 g CO_2 per kg tailings in 83 days.
- Created subsidiary CO_2 Lock to scale technology.



1. Wilson et al. 2014 (Mount Keith)
2. FPX Nickel technical reports
3. De Beers Carbon Vault field studies
4. Arca/Microsoft partnership

Benefits: Climate, Ecological, and Community

Climate



- Permanent, verifiable carbon removal
- Credits priced at ~$100–$600 per tonne in high durability markets

Ecological



- Tailings become chemically less reactive (less AMD risk)
- Carbonate formation improves stability, reduces erosion and dust

Community



- Credits can fund local monitoring, closure, and reclamation
- Long-term revenue streams for Indigenous or nearby communities
- Turns waste into a community-controlled asset rather than a liability

How This Changes the Future of Mining

Incentivizes better tailing design

- Mines earn revenue by making tailings more reactive and better managed
- Engineering tailings for CO_2 uptake → improved stability + reduced acid drainage
- Shifts tailings from “cost center” to environmental performance asset

Encourages Long-term Stewardship

- CO_2 uptake continues *after closure*, so companies must monitor tailings quality
- Incentivizes maintaining water treatment, covers, and community partnerships
- Creates financial structures that discourage abandonment

Community Engagement

- Carbon credit revenue can support Community Benefit Agreements
- Enables funding for water monitoring, reclamation, cultural site restoration
- Turns communities into equity partners, not passive stakeholders

Aligns Mining w/ Climate Action

- Nickel mines become dual-purpose: metal production + CO_2 removal infrastructure
- Mining moves from an extractive model to a regenerative or climate-positive model

Thanks!

Questions?



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