Energy solutions for the decarbonization of mining operations

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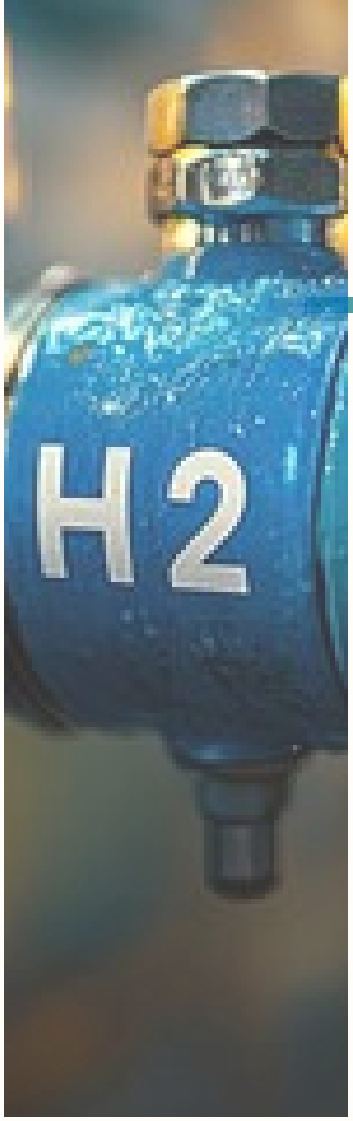
Versatile use of renewable energy for greater efficiency, resilience and local development

Globally, the mining industry is making progress in decarbonizing, reducing its dependence on fossil fuels (diesel, coal, and natural gas). In this context, green hydrogen stands out for its versatility in reliably supplying the high energy demands of mining operations—often located in remote areas—improving efficiency, reducing costs and exposure to price volatility, and strengthening local development.

Thanks to technological innovation and the advantage of being able to integrate production and consumption on-site, several hydrogen projects are already underway in mines. Some examples include:

- **Fortescue** (FMG) spearheaded green hydrogen in mining from its hub in **Australia** with solar electrolysis (700 kW), along with large-scale developments in **Norway** and trials on mining equipment (drills and trucks).
- In **Canada**, Glencore's Raglan mine implemented a hybrid **microgrid** with wind power (3 MW), fuel cells, and batteries for **remote operations**.
- In Antofagasta **(Chile)** a mobile green hydrogen plant (33 kWp solar and 20 kW **electrolysis with AEM technology from Enapter**) validated its operation under real-world conditions for the competitive replacement of diesel in off-grid mining operations.

Mining is moving towards decarbonization by combining clean technologies: renewables, hydrogen and carbon capture



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Why Green Hydrogen?

- Versatile: capable of meeting diverse needs in mining (high-temperature heat, energy, storage, input for metallurgical processes, and fuel for machinery and transport).
- Fossil fuel substitute: reduces emissions, fuel costs, and exposure to price volatility.
- Reliable supply: ensures continuous power in remote open-pit or underground mining areas.
- In its applications for machinery and material handling, it offers: high energy density, greater autonomy, fuel cell efficiency, and rapid refueling.

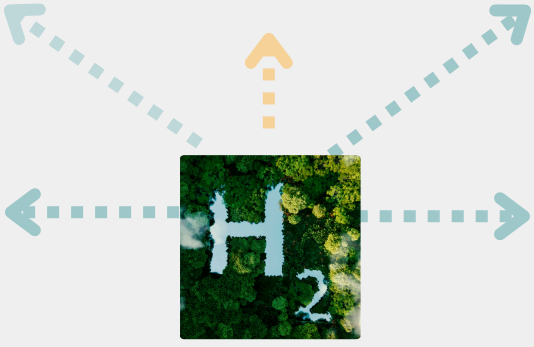
Multiple Applications:

Mining trucks
with fuel cells

Power generation - microgrids
Ideal for ensuring continuous power storage and supply in off-grid areas

Freight transport
(trains, long-distance trucks with fuel cells or dual hydrogen-diesel systems)

Mobile equipment
(excavators and drilling rigs)



Metallurgical processes
(heat or input in metal refining processes)

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Technological innovation that integrates renewable energies and hydrogen in multiple mining applications.

Renewable energy (solar or wind) – Various manufacturers

Enapter

Electrolyzer

H2

HYT

HYT

Nincatec Energy

Solid-state hydrogen storage

H2

H2

Hydrogen Dryer-Purifier (99.999%)

H2

hydra

Dual fuel system hydrogen - diesel

Hone

100% H2 generators + batteries

Electricity

Fuel cells from - various manufacturers

Heavy machinery, trucks and trains with fuel cells

Heat and/or input for metallurgical and metal refining processes

SOLARSTEAM

Solar thermal energy

Heat - Material drying processes and others

Engineering & EPC Associated Companies:

In Canada:

SACRÉ DAVEY

CH2NGE ENERGY

Local (LATAM)

Technologies integrated and commercially represented by:

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The optimal design is developed with engineering partners specializing in mining, considering key variables such as power, load type, voltage level, supply profile and duration, and other details of the machinery's operating level and transportation needs, as well as site conditions (altitude, temperature, solar radiation, etc.).

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Leading Cleantech to Market

Integra Cleantech is a **commercial integrator** of clean technologies. We integrate solutions into **complete, cost-effective systems,** resolving the supply-demand dilemma of hydrogen. These solutions also offer the **flexibility** to gradually scale capacity and extend to new applications.

We support the entire project cycle with comprehensive services: developing strategic alliances; coordinating technology manufacturers, engineering and construction firms (EPC), and local contractors; securing financing and subsidies; execution and implementation; and ongoing support, including training provided directly by manufacturers' specialists. We also strive for the best cultural fit for each project.

Our business model optimizes capital expenditure (CAPEX) by enabling direct billing from the manufacturer to the end customer.

100 years of combined experience in clean energy, telecommunications and systems, and business development

Sustainable and integrated energy solutions for data centers, logistics and distribution operations, ports and airports, islands and remote locations, mobile site projects, and industrial decarbonization.

Based in Vancouver with extended team in LATAM

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