PIONEERING **SUSTAINABLE GREEN ENERGY METALS PRODUCTION** THROUGH UNWAVERING INNOVATION

TRINITAN GREEN ENERGY METALS

Established in 2020, **Trinitan Green Energy Metals (TGEM)** is a deeptech company with over 50 years of combined expertise in energy solutions and is at the forefront of sustainable **Class 1 nickel** processing services. With a strong focus on efficiency, sustainability, and social responsibility, TGEM is committed to delivering high-quality products while making a positive impact on global customers.

Class 1 Nickel – Mixed Hydroxide Precipitate (MHP)

Mixed Hydroxide Precipitate (MHP) is a critical intermediate product in the Class 1 nickel supply chain. Produced through hydrometallurgical processing, MHP typically contains 30%–40% nickel content and and serves as a key input for producing high-purity nickel compounds used in diverse industrial applications—including energy transition technologies, aerospace and defense, catalyst manufacturing, and nickel plating. **Utilizing its proprietary STAL Technologies, TGEM produces MHP with an industry-leading nickel content of over 50%, while adhering to the most environmentally responsible production practices in the industry.**

TGEM's Proprietary Innovative Technologies – STAL Technologies

Primary Source

Mining

***Lateritic Ore** (Limonite to Saprolite)*

Secondary Source

Nickel-based Industrial Waste

Spent Catalyst, Fly Ash, Electroplating Industry Waste** and **Electronic Parts Waste

Recycled Battery

Rejected Batteries, End-of-Life Batteries

STAL TECHNOLOGY — Step Temperature Acid Leach (STAL) Technology

- Hydrometallurgical process yields Class 1 Nickel in the form of MHP, as well as several by-products.
- Invented and developed as proprietary technology for 16 years (since 2007).
- Validated by independent technology evaluators (ESDM, BPPT, JGC Japan).
- Patents registered in five strategic countries: Indonesia, Japan, Canada, the Philippines, and New Caledonia.
- Commercialized production of MHP began in Q3 2023.
- Advanced R&D capability to unlock future midstream products.

STAL LOOP — STAL Loop Technology

- Hydrometallurgical process yields Class 1 Nickel in the form of MHP, as well as several by-products.
- Further development of STAL Technology, designed to process alternative feedstocks, including nickel-based industrial waste and recycled battery materials.
- Enabling circular economy principles by facilitating material recovery for EV batteries and industrial nickel applications.

TGEM's Commercial-scale Demonstration Plant – **Go STAL**

GO STAL

Go STAL is TGEM's **commercial-scale demonstration facility** in Bogor, operating since Q3 2023 and validating process performance and economics under real operating conditions for both **laterite ore** and **alternative-material feedstocks.** Its batch-model operations provide critical learning for TGEM's future modular Ecopark. With an **annual capacity of 3,200 tons of MHP, Go STAL produces industry-leading MHP with >50% nickel content,** with shipments delivered to customers **in Korea, Japan, and other markets.**

TGEM's STAL Technology Key Advantages

Modular
Faster ramp-up time and suitable for a variety of mining profiles.

Feedstock Flexibility
Ability to process a variety of feedstocks

Zero Waste
100% of residues converted into valuable by-products

Effective
Up to 95% nickel and cobalt recovery (yield).

Efficient
Significantly reduced net acid consumption from initial usage

Closed-Loop Ecosystem
Creating a sustainable & ESG-compliant outcome

TGEM's R&D Center – TINDAC

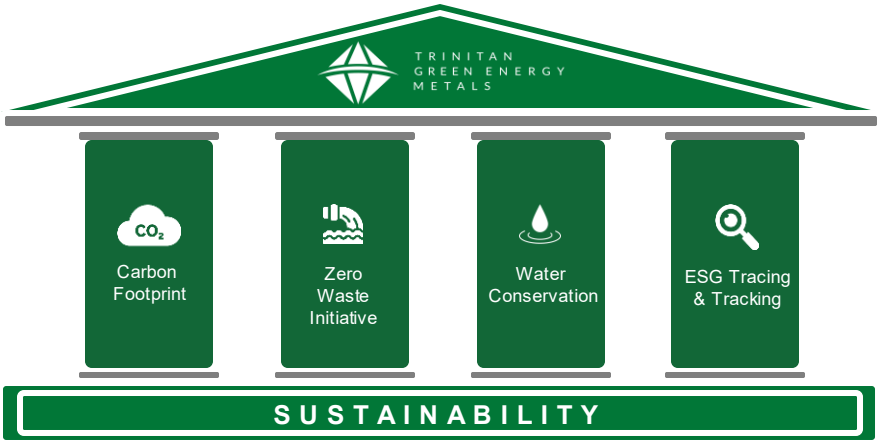



TIND AC

Trinitan Industrial Development & Assessment Center

TINDAC (Trinitan Industrial Development and Assessment Center), TGEM's R&D Center, began as a pilot plant established in 2019 and started operations in 2020. TINDAC plays a key role in **advancing innovations for industrial commercialization** by ensuring that new innovations are practical, scalable, and aligned with technical, industrial, and commercial requirements.

TGEM's Pillars of Sustainability



0 ZERO WASTE

TGEM's Zero Waste initiative eliminates the need for long-term residue management and provides an environmentally-friendly alternative by **converting residues into valuable by-products.**

TGEM's Project Highlights

ignite ECOPARK

IGNITE Ecopark is TGEM's scaled STAL Technology Ecopark under development in the Sorong SEZ (Sorong, Southwest Papua), designed as a modular platform for responsible Class 1 nickel production.

The project will begin with **one STAL module in its first phase** with scalable capacity that can grow toward 50,000+ tpa nickel equivalent through a clustered modular system, subject to market demand and supporting infrastructure.

Supported by SEZ infrastructure, IGNITE integrates a planned closed-loop ecosystem with the goal of Zero Waste and is designed to meet emerging ESG and traceability requirements for US and allied markets.