

The Chrome Dinner



Chrome Dinner Awards 2026 Nomination

Environmental Award Category

Tharisa Minerals Battery Energy Storage System (BESS) Project

Driving Decarbonisation Through Chrome-Enabled Energy Innovation

Executive Summary

Tharisa Minerals proudly submits its Battery Energy Storage System (BESS) Project for consideration in the Chrome Dinner Environmental Award category. This pioneering project represents a significant advancement in sustainable mining, renewable energy integration, chrome beneficiation and applied industrial innovation. It demonstrates how the chrome industry can contribute meaningfully to South Africa's energy transition while reducing the environmental footprint of mining operations.

The project combines renewable energy generation, innovative energy storage technology and local mineral beneficiation into a fully integrated solution that showcases the future of sustainable mining. At its core is the planned demonstration deployment of an **Iron-Chromium Redox Flow Battery**, developed through collaboration across the Tharisa value chain. This creates a unique example of how chrome mined in South Africa can be transformed into advanced energy storage technology that supports decarbonisation and energy security.

Project Overview

Tharisa plc has committed to reducing the carbon footprint of its mining operations as part of its broader sustainability and operational decarbonisation strategy. To support this commitment, Tharisa has developed a comprehensive energy plan for Tharisa Mine that prioritises energy security, operational resilience and the diversification of energy sources. The strategy recognises the importance of reliable, low-carbon energy solutions in the mining sector and the critical role these solutions play in enhancing sustainability while maintaining operational performance.

As part of this vision, Tharisa is implementing a photovoltaic (PV) solar power system to provide clean energy to the Administration and Training Centre facilities at Tharisa Mine. To maximise the effectiveness of this renewable energy investment, the Battery Energy Storage System (BESS) is designed to store excess solar energy generated during daylight hours and make it available during periods of peak demand, ensuring a reliable and efficient supply of renewable energy.

Innovation Through Chrome Beneficiation

What makes this project truly exceptional is its innovative integration across the Tharisa value chain.

The project moves beyond conventional renewable energy deployment by linking mine-sourced chrome, local beneficiation, advanced battery chemistry and operational energy resilience into one integrated solution. It demonstrates how a mining company can use its own value chain to create a practical clean-energy technology application with relevance beyond a single site.

The selected technology is a **Redox One RFB 625 Iron-Chromium Redox Flow Battery**, an advanced energy storage system that demonstrates the potential of chrome-based energy technologies. The patented iron-chromium electrolyte used in the battery is

manufactured by **Arxo Metals** using minerals sourced directly from **Tharisa Mine**, creating a tangible example of local beneficiation and value addition from mineral extraction through to advanced energy technology manufacturing.

This integrated approach demonstrates:

- Beneficiation of South African chrome resources into high-value technology products.
- Development of locally relevant clean-energy solutions.
- Advancement of next-generation battery technologies.
- Demonstration of innovative applications for chrome beyond traditional markets.
- Support for South Africa's critical minerals and beneficiation objectives.

By transforming chromium from a mined commodity into an enabling component of renewable energy infrastructure, Tharisa is helping redefine the role of chrome in a low-carbon future.

Environmental Benefits

The BESS Project delivers measurable environmental benefits through the integration of renewable energy and energy storage technology.

Key environmental outcomes include:

Reduction in Greenhouse Gas Emissions

The project increases the utilisation of solar-generated electricity, reducing reliance on conventional power sources and supporting Tharisa's broader decarbonisation objectives.

Improved Renewable Energy Utilisation

By storing surplus solar energy for later use, the system maximises renewable energy efficiency and minimises energy losses associated with intermittent generation.

Enhanced Energy Security

The BESS provides reliable electricity during morning and evening peak demand periods, strengthening operational resilience and reducing vulnerability to external energy supply disruptions.

Responsible Environmental Planning

The project is located entirely within the existing Tharisa Mine footprint on previously disturbed land behind the Administration and Training Centre, avoiding unnecessary land transformation and minimising additional environmental disturbance.

Sustainability

The Iron-Chromium electrolyte supports circular resource use by enabling reuse within company processes and recycling at the end of its useful life. By converting locally mined chrome into a reusable energy-storage medium, the BESS Project extends the value of the resource, reduces waste and reinforces responsible beneficiation across the Tharisa value chain.

Safety and Environmental Resilience

The non-flammable aqueous Iron-Chromium electrolyte improves safety by reducing fire and thermal runaway risks, while its thermal stability and low corrosivity allow for management through standard containment and operational controls. The BESS also strengthens operational resilience by supporting a more stable energy supply during peak demand periods and potential grid disruptions.

Supporting National Priorities

The project directly supports South Africa's growing focus on critical minerals, clean energy technologies, and industrial innovation.

The BESS Project aligns with the objectives of South Africa's **Critical Minerals and Metals Strategy (2025)** by promoting:

- Local beneficiation.
- Advanced manufacturing opportunities.
- Renewable energy innovation.
- Technology development linked to critical mineral resources.
- Support for implementation of the South African Renewable Energy Masterplan.
- Creation of future job opportunities through electrolyte production, battery-system manufacturing, technical maintenance and the development of specialised skills within South Africa's green industrial economy.

By demonstrating advanced battery technology at a mining operation, the project contributes to the development of local knowledge, technical capability, and future industrial opportunities within the green economy.

Industry Significance

The Tharisa BESS Project is more than an energy project—it is a proof of concept for the future of sustainable mining.

The project demonstrates how mining companies can:

- Reduce environmental impacts through renewable energy integration.
- Create value-added products from locally mined minerals.
- Support national decarbonisation objectives.
- Advance technological innovation within the mining sector.
- Demonstrate a replicable innovation model that connects resource extraction, local processing, advanced energy storage and practical decarbonisation outcomes.
- Strengthen operational resilience while improving sustainability performance.
- Reduce and manage the load required from the national grid by storing renewable energy for use during peak demand periods, thereby supporting grid stability and helping strengthen electricity availability for other industrial and community users.

Importantly, the project showcases a practical and scalable pathway for other mining companies seeking to transition towards cleaner energy sources while creating additional value from South Africa's mineral resources.

Alignment with the Sustainable Development Goals

The Tharisa Minerals BESS Project contributes to the United Nations Sustainable Development Goals (SDGs) by advancing clean energy use, supporting innovation and infrastructure development, promoting responsible beneficiation of mineral resources and contributing to climate action through reduced reliance on carbon-intensive electricity sources.

- **SDG 7: Affordable and Clean Energy** – The project supports increased use of renewable energy by storing solar-generated electricity for use during peak demand periods, improving the reliability and efficiency of clean energy supply at the mine.
- **SDG 9: Industry, Innovation and Infrastructure** – The deployment of Iron-Chromium Redox Flow Battery technology demonstrates industrial innovation and resilient energy infrastructure within the mining sector, while showcasing the potential for chrome-based technologies in the green economy.
- **SDG 12: Responsible Consumption and Production** – By beneficiating locally mined chrome into a high-value energy storage application, the project promotes responsible resource use, local value creation and more sustainable production pathways across the Tharisa value chain.
- **SDG 13: Climate Action** – The BESS Project supports Tharisa's decarbonisation objectives by enabling greater utilisation of renewable energy and reducing dependence on conventional electricity sources associated with greenhouse gas emissions.

Collectively, these SDG linkages reinforce the project's strategic value as an environmental innovation that delivers practical sustainability outcomes while supporting broader national and global development priorities.

Why This Project Deserves the Environmental Award

The Tharisa Minerals BESS Project embodies the principles of environmental excellence, innovation and sustainable development that the Chrome Dinner Awards seek to recognise. It is not only an environmental project, but also a practical example of innovation in action: converting a locally mined mineral into an enabling technology for cleaner, more resilient mining operations.

Through the research, development and deployment of cutting-edge Iron-Chromium Redox Flow Battery technology, powered by minerals sourced from its own mining operations, Tharisa has created a flagship project that:

- Advances renewable energy adoption.
- Reduces the carbon footprint of mining operations.
- Promotes chrome beneficiation and local value creation.
- Demonstrates technological leadership in the chrome industry.
- Supports South Africa's sustainable development and clean-energy objectives.
- Positions Tharisa as a leader in responsible and environmentally conscious mining.

Closing Statement

The Tharisa Minerals Battery Energy Storage System Project is more than an energy storage initiative; it is a powerful demonstration of how responsible mining can drive environmental progress, industrial innovation and long-term sustainable value. By linking renewable energy generation with locally beneficiated chrome-based battery technology, the project gives practical expression to a future where mining operations are cleaner, more resilient, more innovative and directly aligned with South Africa's decarbonisation and critical minerals ambitions.

Through this initiative, Tharisa has transformed chrome from a mined resource into an enabling component of the clean-energy transition, showcasing the value of local beneficiation while reducing reliance on conventional electricity sources. The project stands as a scalable example for the chrome and broader mining industries, proving that environmental performance, operational resilience and value-chain innovation can be advanced together.

For its clear environmental benefits, pioneering use of Iron-Chromium Redox Flow Battery technology, contribution to chrome beneficiation and potential to inspire cleaner energy pathways across the mining sector, Tharisa Minerals proudly submits the Battery Energy Storage System (BESS) Project for the 2026 Chrome Dinner Environmental Award.

 **THARISA MINERALS BESS PROJECT**

Transforming locally mined chrome into advanced battery technology that supports renewable energy, decarbonisation and operational resilience.

PROJECT AT A GLANCE

Project	Battery Energy Storage System integrated with solar PV at Tharisa Mine
Technology	Redox One RFB 625 Iron-Chromium Redox Flow Battery
Value chain	Chrome sourced from Tharisa Mine and beneficiated through Arxo Metals
Location	Existing disturbed mine footprint behind the Administration and Training Centre

WHY IT MATTERS

The BESS Project links renewable energy, energy storage and chrome beneficiation into one practical clean-energy solution. It demonstrates how South African chrome can move beyond traditional markets into high-value technology that supports a lower-carbon mining future.

KEY ENVIRONMENTAL OUTCOMES

☀️ Reduces emissions by enabling greater use of solar-generated electricity. ⚡
Improves energy resilience during peak demand and grid disruptions.

🔁 Maximises renewable energy use by storing surplus solar power. 🌿 Limits land disturbance by using an existing disturbed mine area.

🛡️ Improves safety through non-flammable iron-chromium electrolyte technology. ♻️
Supports circular resource use through reusable and recyclable electrolyte materials.

📱 CHROME-ENABLED INNOVATION

Mine-sourced chrome

Local beneficiation

Advanced electrolyte production

Iron-chromium battery technology

Cleaner and more resilient mining operations

🎯 SDG ALIGNMENT

SDG 7: Clean and reliable energy

SDG 9: Industrial innovation and resilient infrastructure

SDG 12: Responsible beneficiation and resource use

SDG 13: Climate action through decarbonisation

🏆 AWARD MOTIVATION

The Tharisa Minerals BESS Project deserves the Environmental Award because it delivers practical environmental benefits while showcasing innovation in the chrome industry. It reduces reliance on conventional electricity, supports renewable energy integration, advances local beneficiation and demonstrates how mining can contribute to South Africa's clean-energy transition.

🏆 **A flagship example of responsible mining, chrome innovation and environmental progress.**