Future Proofing Mining's Transition to Decarbonised Energy

Energy and Mines Australia 2023

Thomas Littlechild, Hybrid Engineer, JUWI

Wasiq Ghani, Portfolio Consultant, SIEMENS

Presented by

JUWI

With

SIEMENS

Key Hybrid Projects

Gruyere

13.6 MW Solar +
4.4 MW BESS +
Gas

DeGrussa

10.6 MW Solar +
6 MW BESS +
Diesel

Northern Goldfields

38.2 MW Solar +
10 MW BESS +
Gas

Agnew

4 MW Solar +
18 MW Wind +
12 MW BESS +
Gas

Greenough River

37 MW Solar

Esperance

9 MW Wind +
4 MW Solar +
5.5 MW BESS +
Gas

Perth Office

Jabiru

4 MW Solar +
4 MW BESS +
Gas

Weipa

5.2 MW Solar +
4 MW BESS +
Diesel

Brisbane Office

Heron Island

0.4 MW Solar +
0.6 MWh BESS +
Diesel

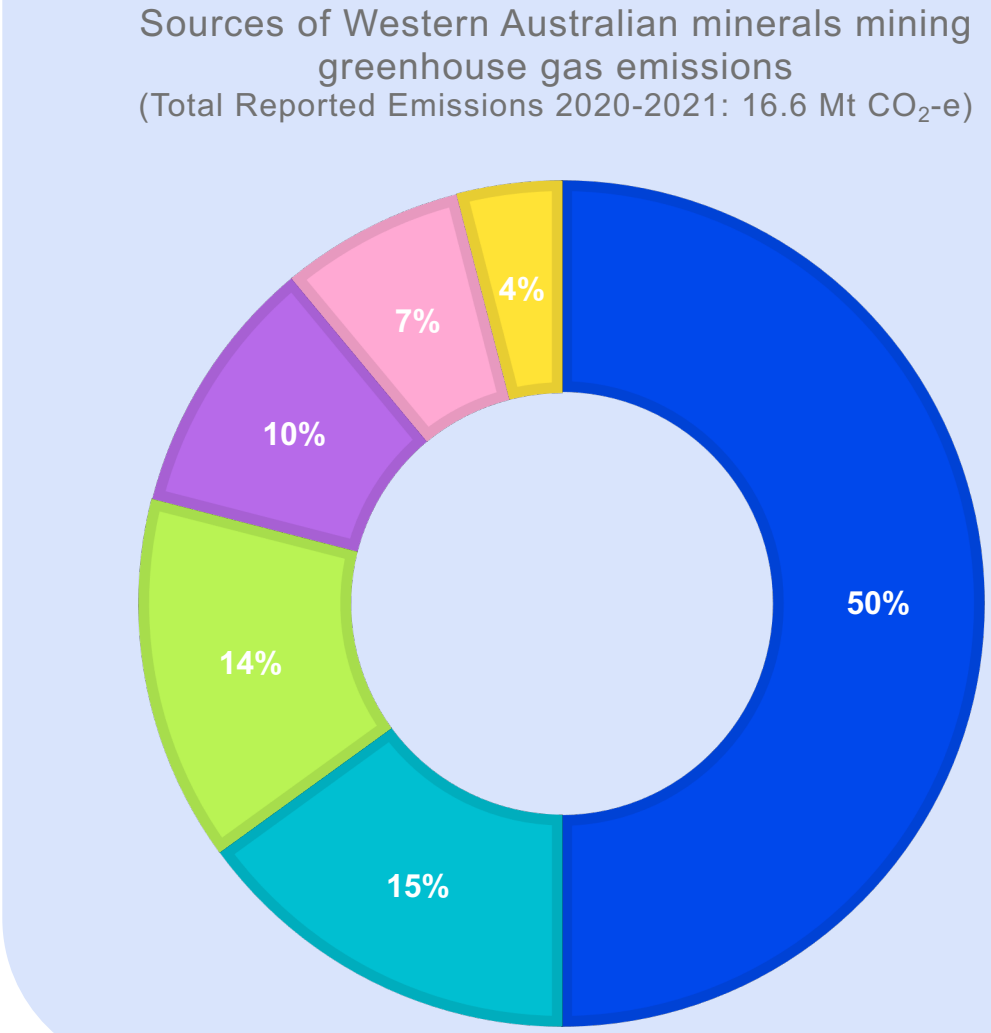
Jacinth Ambrosia

3.4 MW Solar +
Diesel

Emissions Sources

Can broadly be divided into two major categories:

1. Machinery/Haulage
2. Electricity Production



Source: [DMIRS WA minerals sector GHG emissions and energy use factsheet – September 2022]

Electricity Consumption

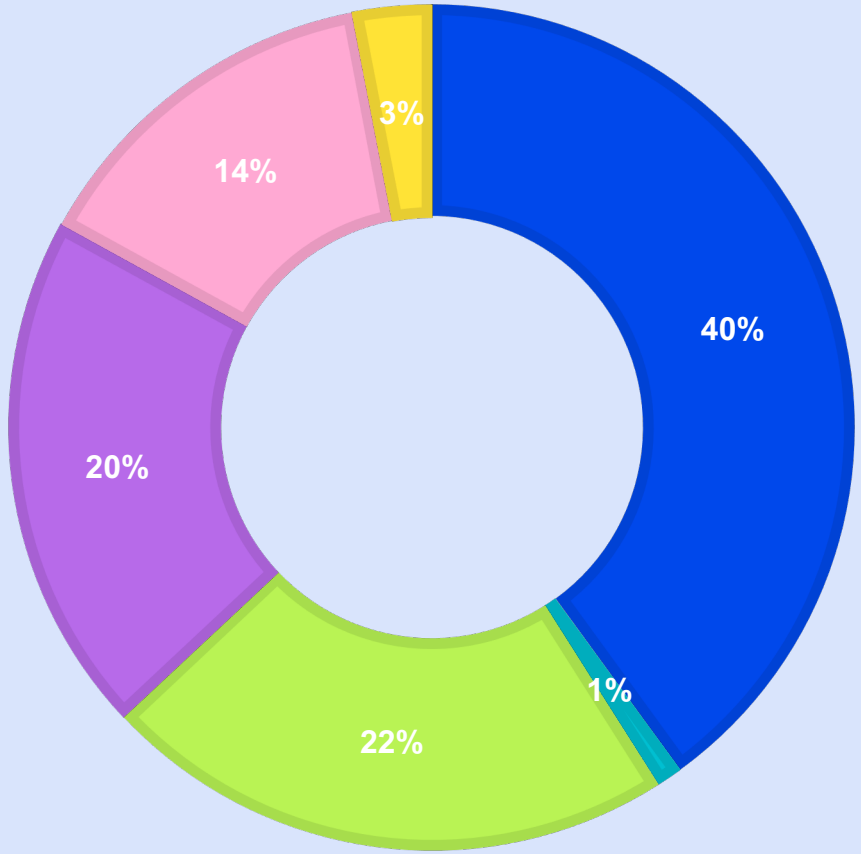
Currently, the majority of electricity from mines is produced from gas via:

- On-site gen-sets

or

- Indirectly through the electrical grids

Western Australian minerals mining energy consumption, by source.
(Total Reported 2020-2021: 12.6TWh)



Source: [DMIRS WA minerals sector GHG emissions and energy use factsheet – September 2022]

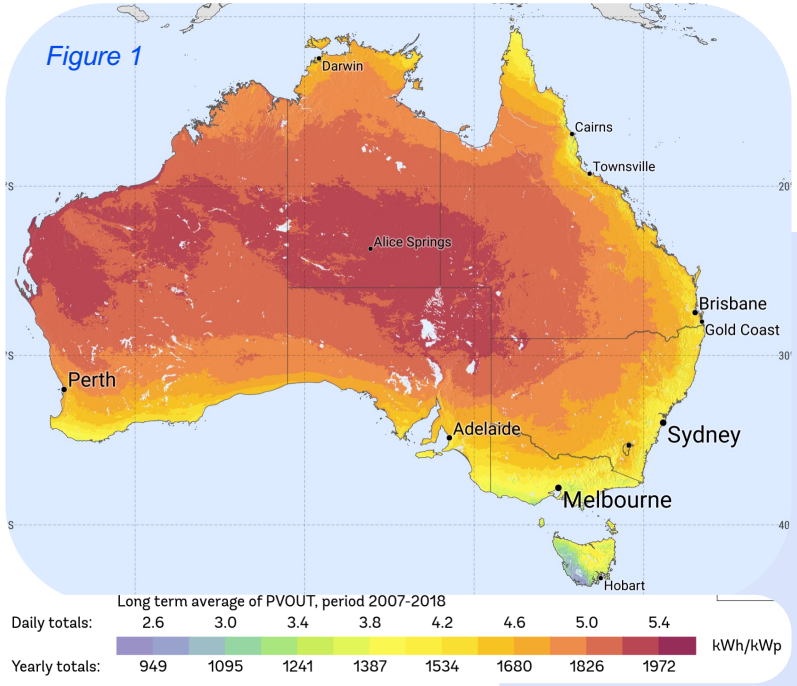
Context for Australian Projects

Australia's benefits:

- Good Solar Resource
- Good Wind Resource
- Available Land Area

Potential challenges:

- International competition for resources
- Increasing pressure on component supply chains



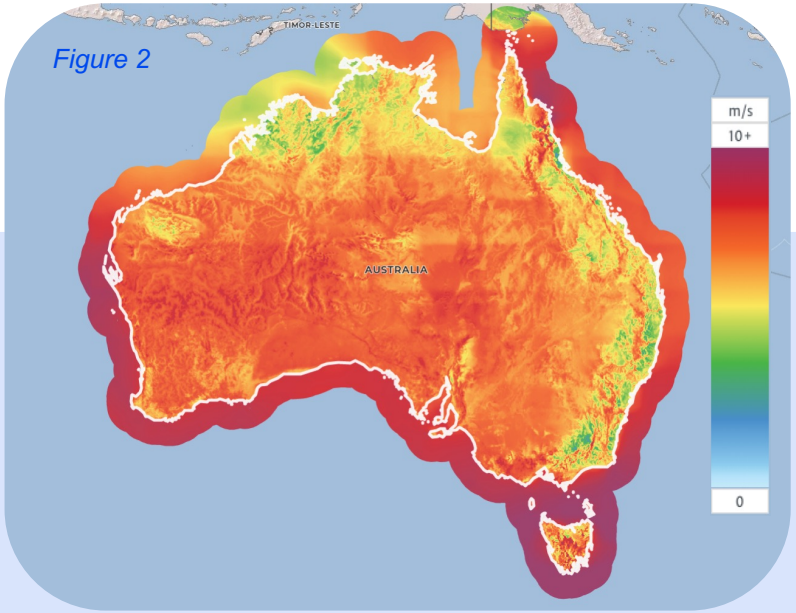
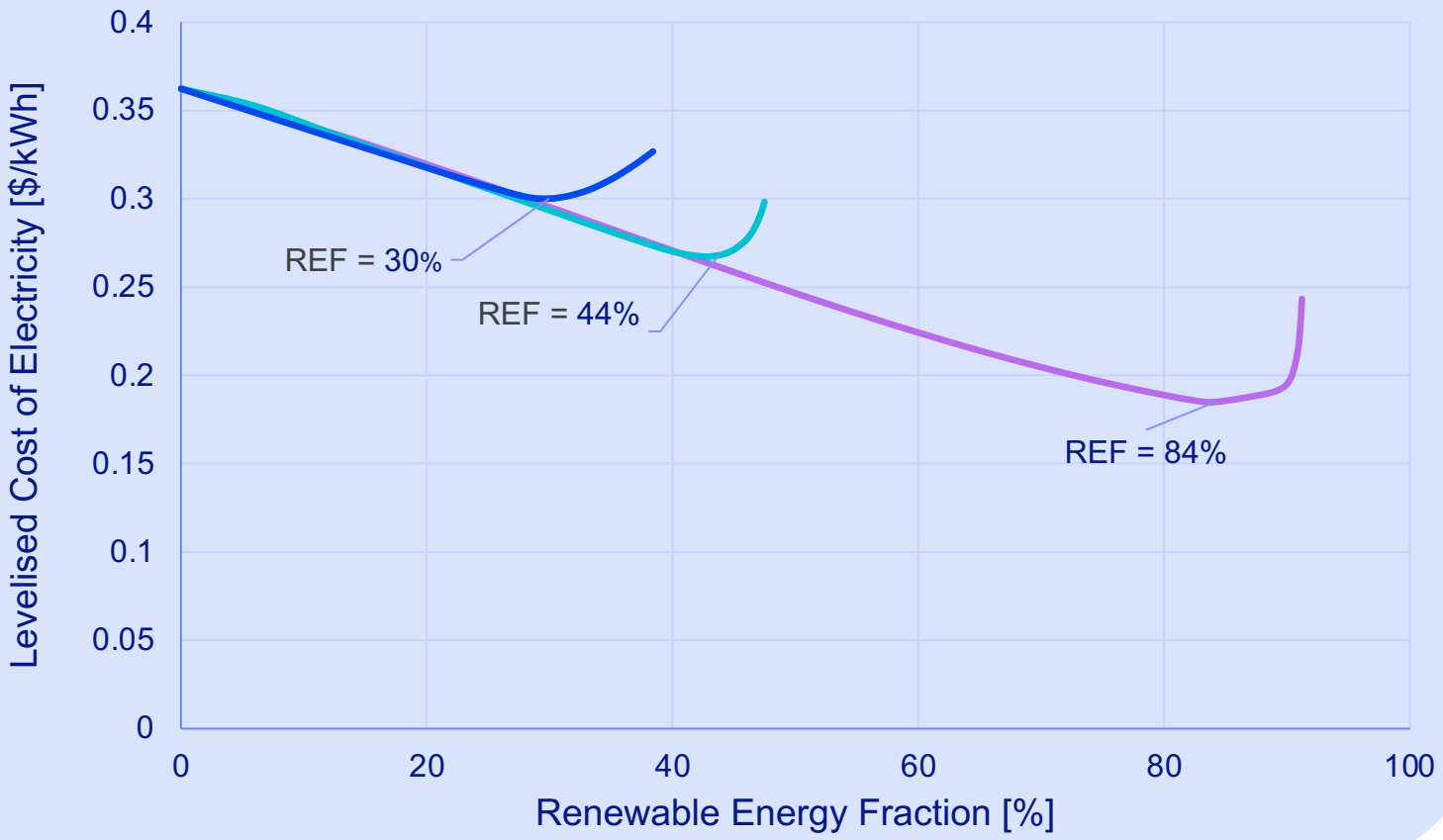


Figure 1 – Photovoltaic Power Potential
Source: https://globalsolaratlas.info/

Figure 2 – Mean Wind Speed at 100m
Source: https://globalwindatlas.info/

Levelised Cost of Electricity vs. Renewable Energy Fraction



Simulation based on:

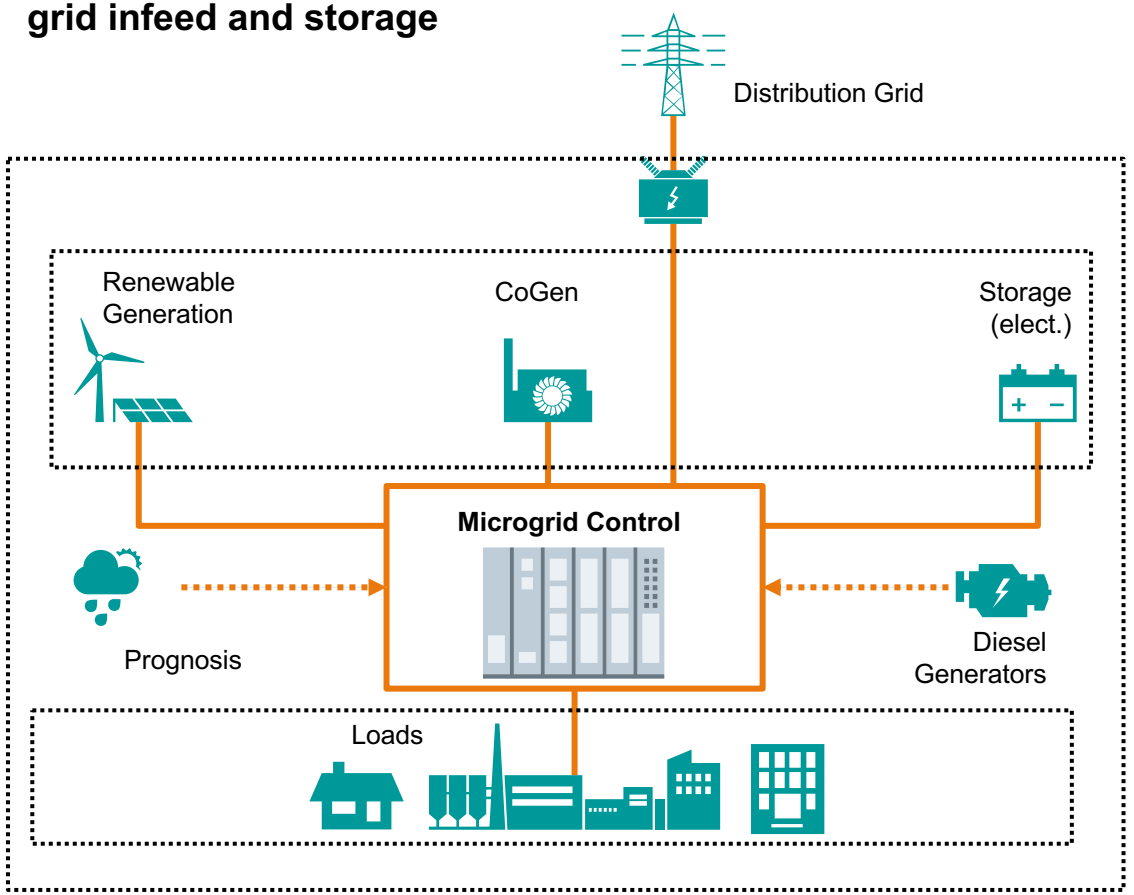
- Off-grid mine site in WA
- Diesel generators
- Diesel price of $1.30 per litre
- 15 year mine life
- Battery sized for spinning reserve

Siemens Microgrid Controller
Centrally Managing Energy Assets

- Coordinates with all the Distributed Energy Sources and Loads
- Ensures that Load and Generation are always Balanced
- Utilizes operational setpoints to achieve KPI Targets
- Monitoring and Controlling of facility electrical network

Utilizes the most optimal Energy Mix to ensure resilience and sustainability for the facility.

Microgrid – Distribution grid with renewable generation, grid infeed and storage



SIEMENS

Siemens Microgrid Controller
Features and Benefits

Flexible platform for versatile application options – One platform Multiple Applications

Multiple interfaces for simpler adaption and easier integration with various DERs

Modular Hardware for time and cost savings

Microgrid Control

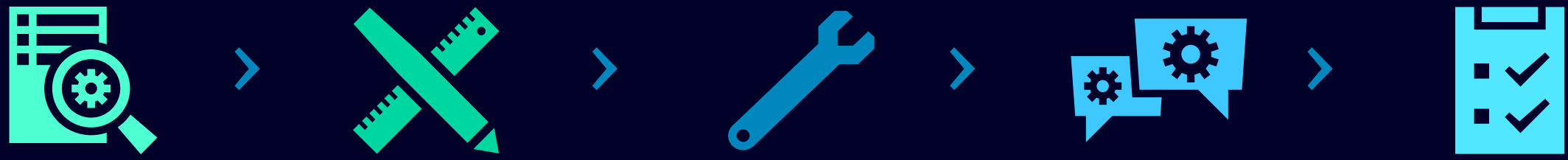
Small and Robust Hardware Design with full Redundancy options

Embedded Cyber Security Features

Pre-defined + custom functions for compliance to specific requirements

SIEMENS

Siemens Microgrid Controller
Partnering throughout Decarbonization Roadmap



Consultation

Design and Engineering

Configuration and Testing

Implementation and Commissioning

Continuous Improvement Support

Your Decarbonization Goals and Energy Requirements are in the Focus!

SIEMENS

Final Take Away

- Don’t delay decarbonization
- Up to 80% of current emissions from electricity could be removed today
- Future proof your system for introduction of new solutions and electrification of more site equipment

Become part of the energy transition

We are your reliable partner, with in-depth know-how and long-term experience.

Let’s chat about the support we can provide for your project.