17/10/2024

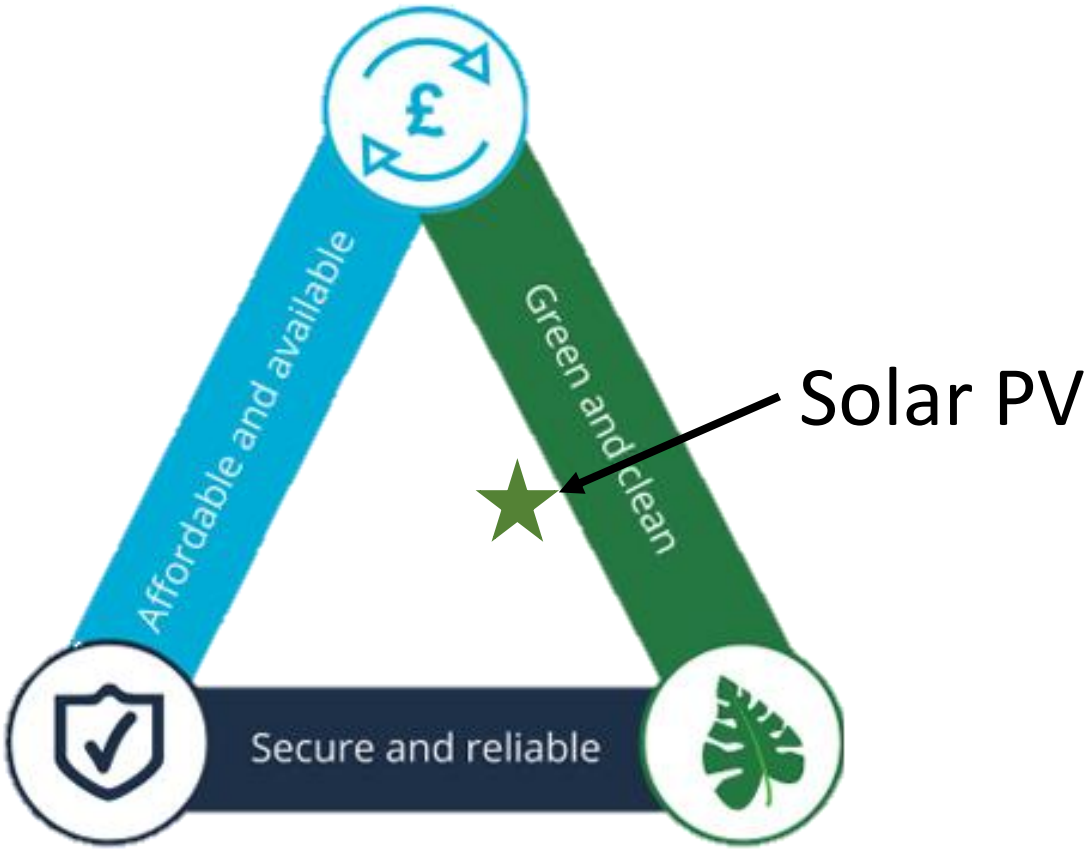
SAIMM: ESG in the Minerals Industry - Challenges And Opportunities

The Cost of Carbon Neutrality – A Weighted Average Cost Approach

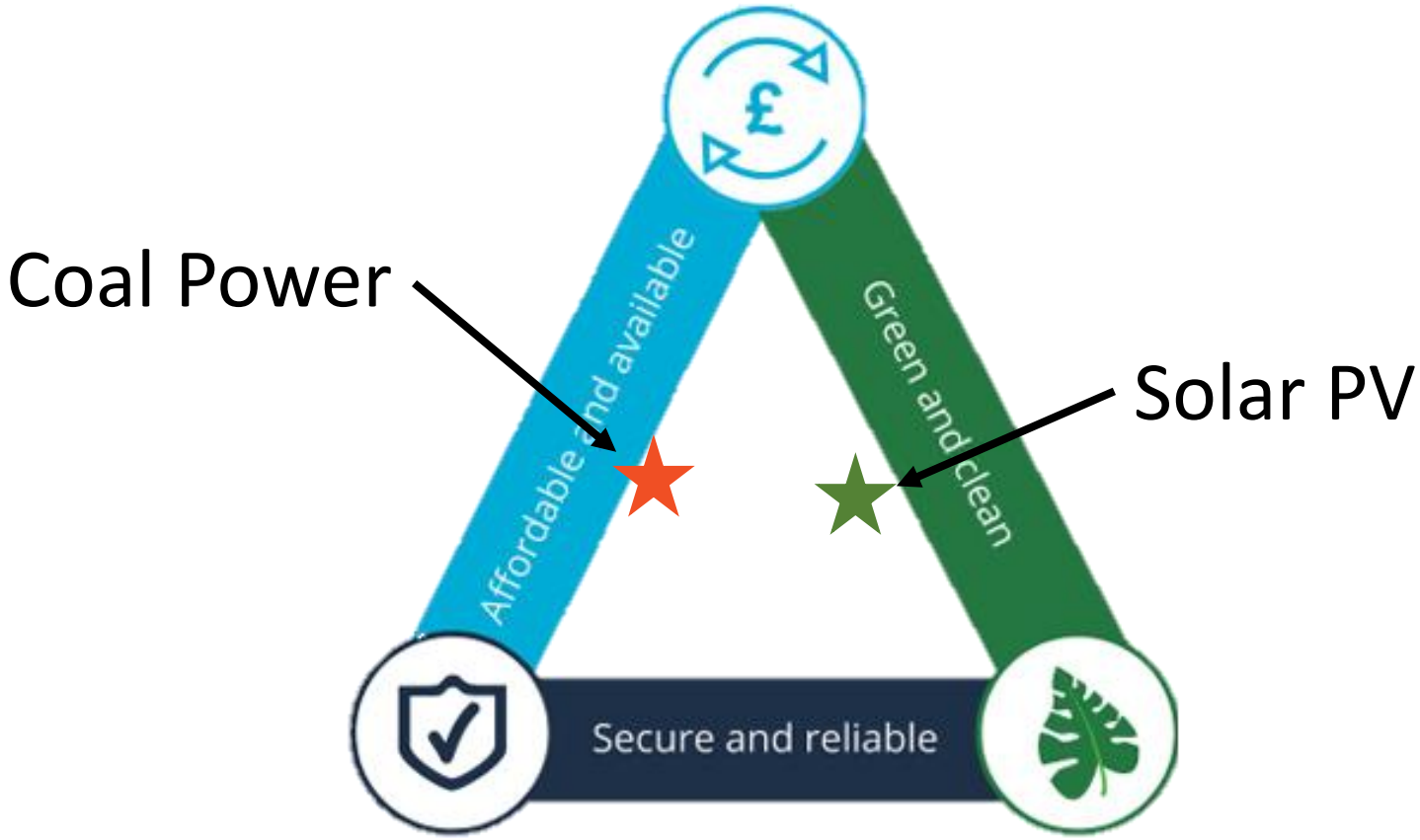
Presented by: James W. C. Browne, *Carbon Neutral Energy Systems (C-NES)*

Introduction

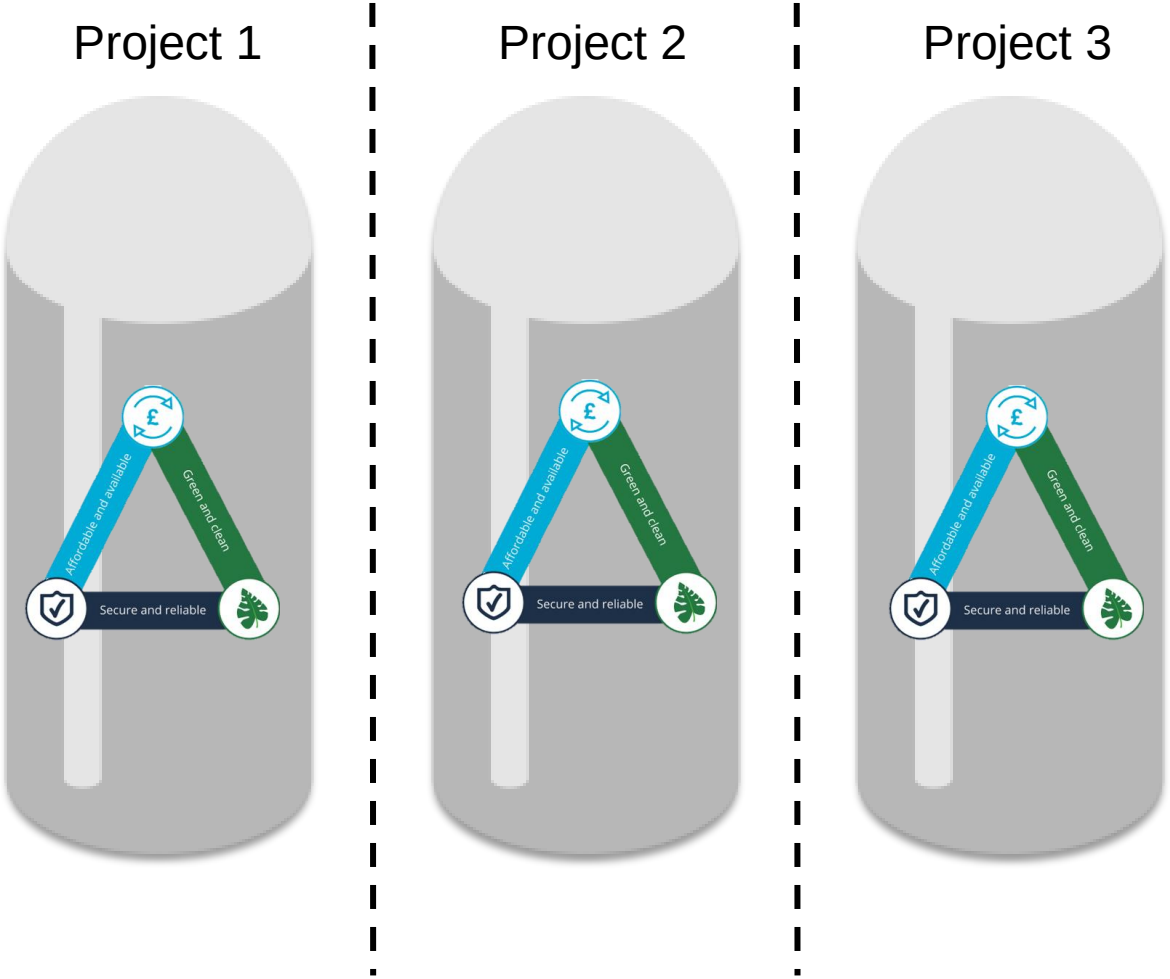
Introduction



Introduction

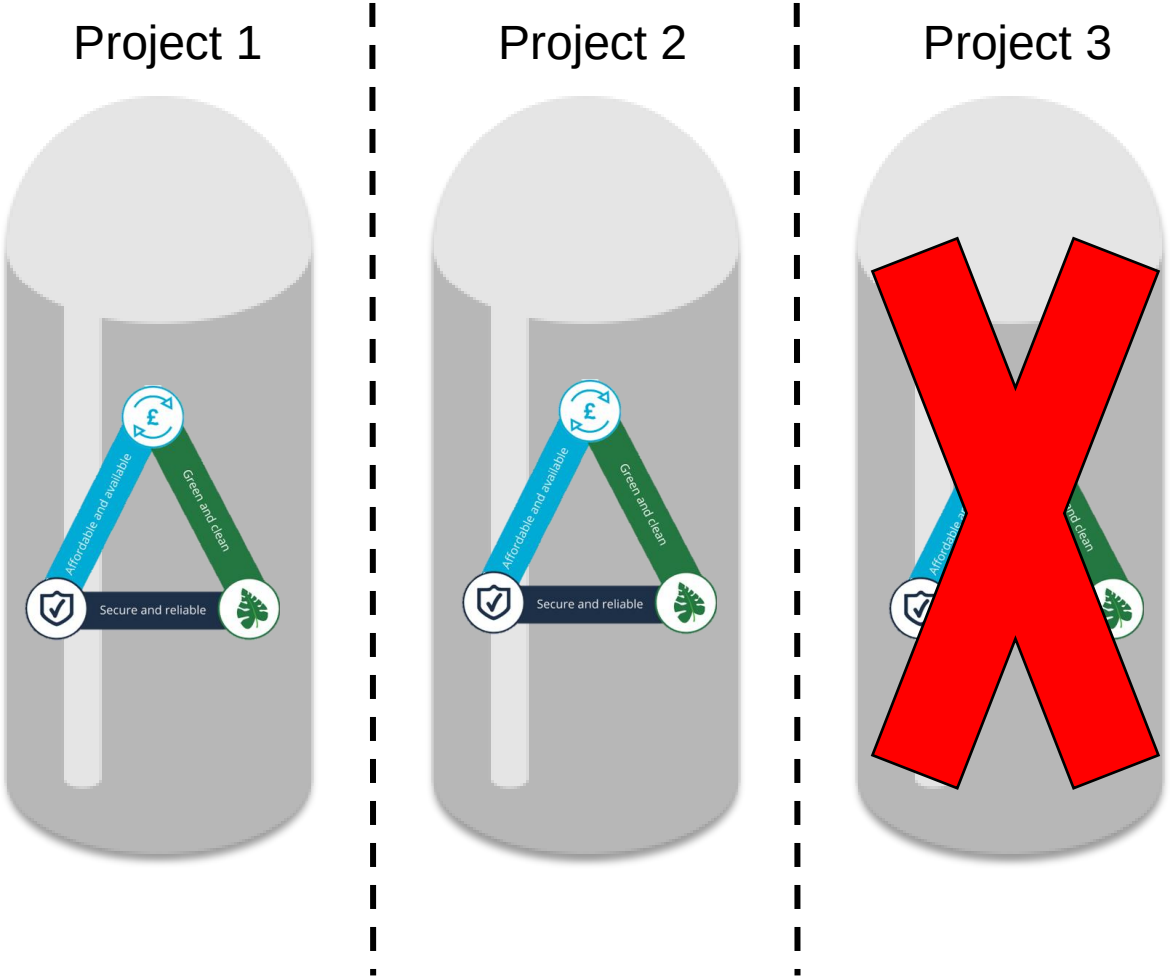


The Problem



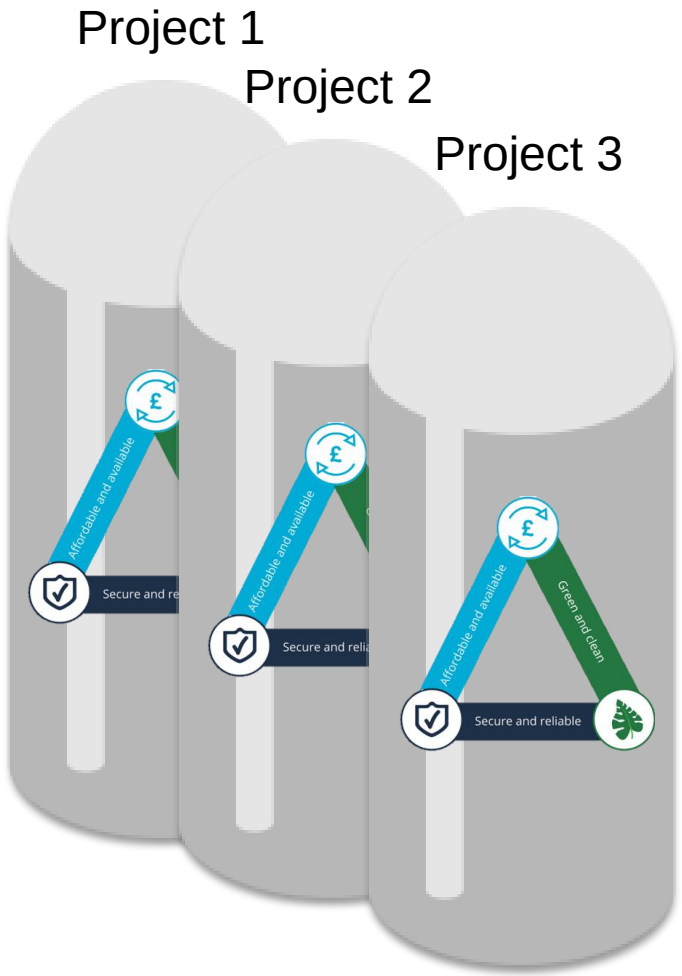
- Projects treated in silos
- Viewed in isolation
- Individual costs and benefits
- Loose connection to the overall strategy and impact

The Problem



- Projects treated in silos
- Viewed in isolation
- Individual costs and benefits
- Loose connection to the overall strategy and impact

The WACE Methodology



Unified Strategy

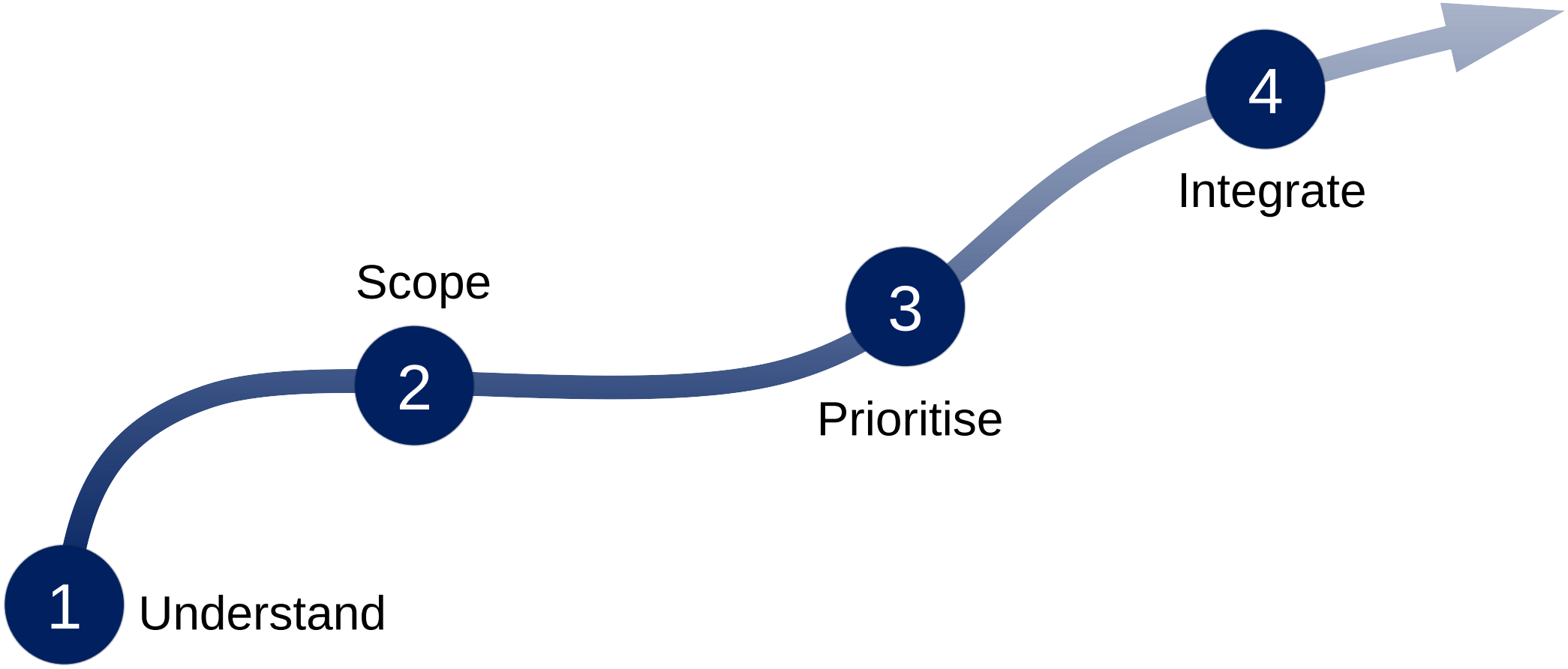
- Cohesive strategy
- Sight of bigger picture
- Optimised costs

$$Weighted\ Average\ Cost\ of\ Energy = \frac{EC_A * COE_A + EC_B * COE_B + EC_C * COE_C \ldots}{EC_A + EC_B + EC_C \ldots}$$

SAIMM THE SOUTHERN AFRICAN INSTITUTE OF MINING AND METALLURGY

cnes

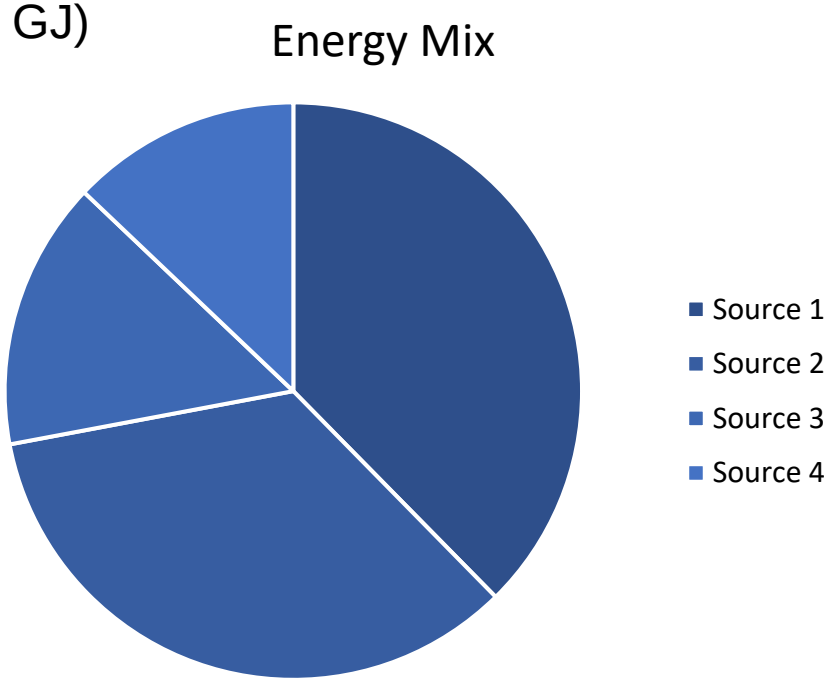
The WACE Methodology



The WACE Methodology

Step 1: Understanding the Current and Projected Energy Mix

- Treat all energy sources in common units (e.g. MWh or GJ)
- Gather data on current energy sources
  - Energy consumption
  - Energy costs
  - Emissions impacts
- Determine the current WACE
- Project the current WACE into the future to form the baseline (do-nothing) scenario

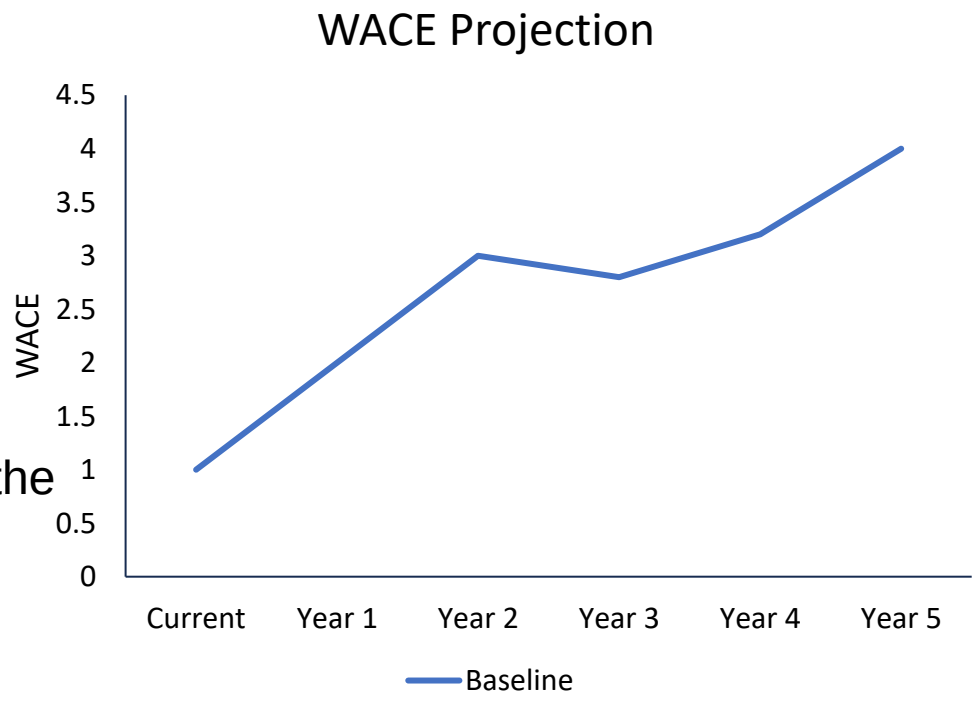


1 Understand

The WACE Methodology

Step 1: Understanding the Current and Projected Energy Mix

- Treat all energy sources in common units (e.g. MWh or GJ)
- Gather data on current energy sources
  - Energy consumption
  - Energy costs
  - Emissions impacts
- Determine the current WACE
- Project the current WACE into the future to form the baseline (do-nothing) scenario



1 Understand

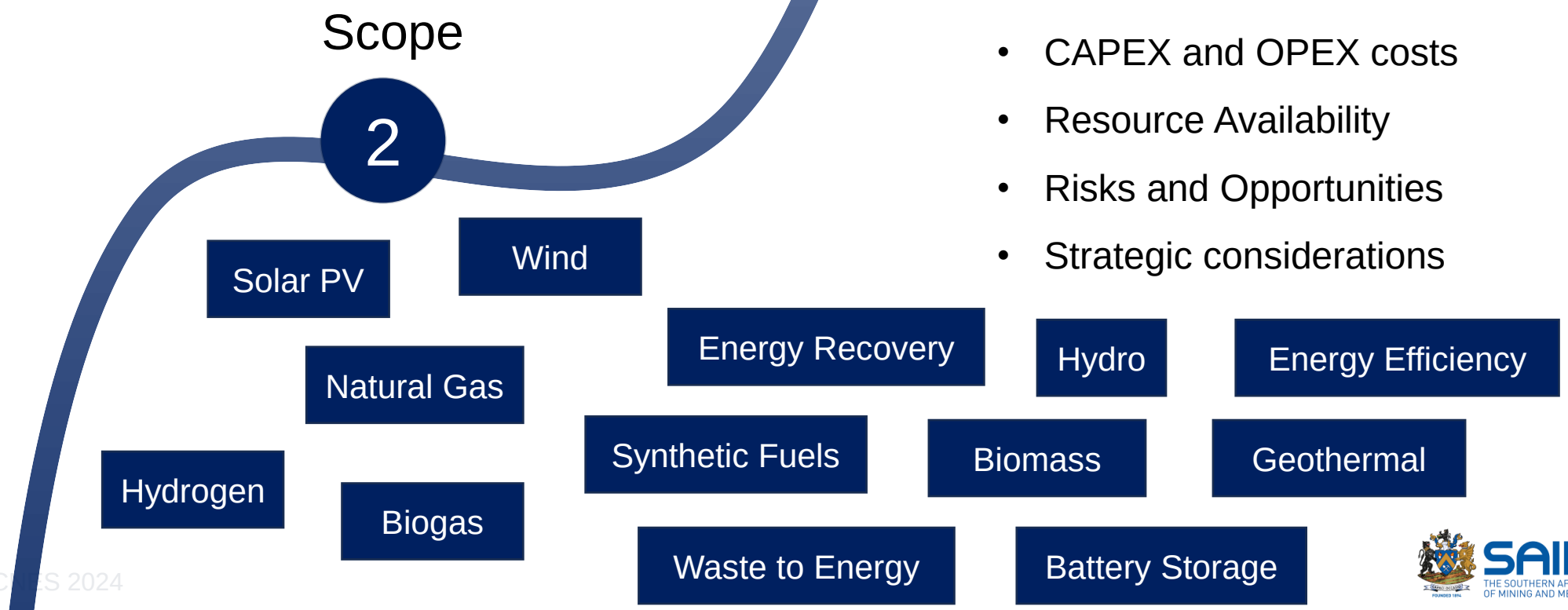
SAIMM THE SOUTHERN AFRICAN INSTITUTE OF MINING AND METALLURGY

cnes

The WACE Methodology

Step 2: Scoping Mitigation Options

- Gather data on potential mitigation options
  - Energy production/savings
  - Social and environmental benefits
  - CAPEX and OPEX costs
  - Resource Availability
  - Risks and Opportunities
  - Strategic considerations



SAIMM THE SOUTHERN AFRICAN INSTITUTE OF MINING AND METALLURGY

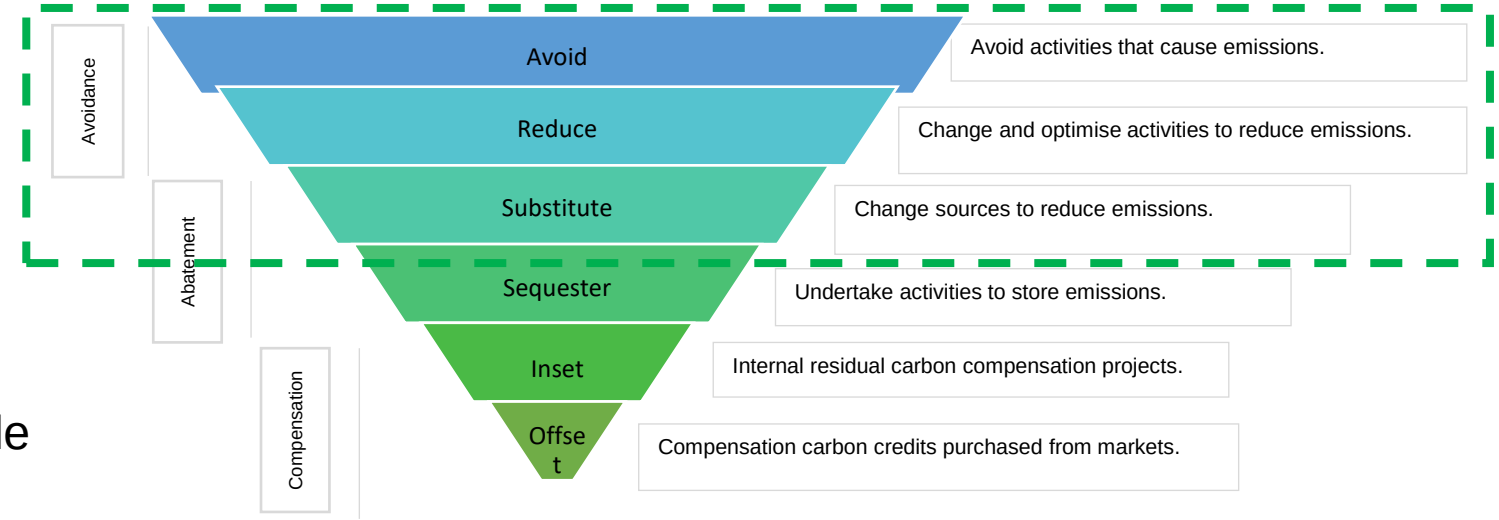
cnes

The WACE Methodology

Step 3: Prioritise Implementation

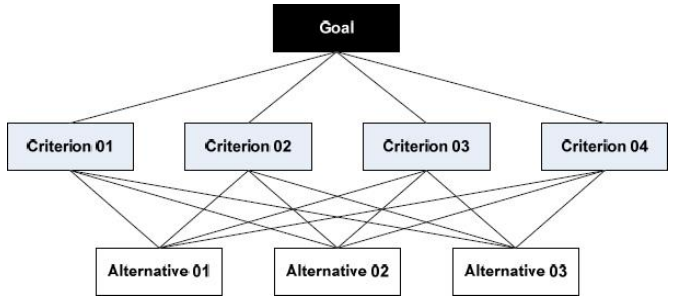
3 Prioritise

GHG Mitigation Hierarchy



80/20 Pareto Principle

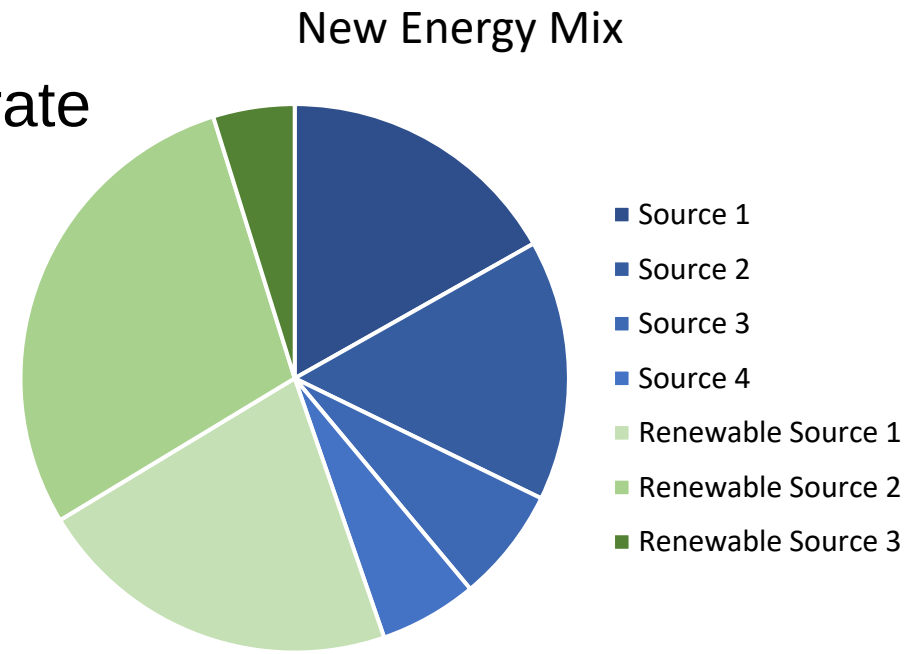
Analytical Hierarchical Process

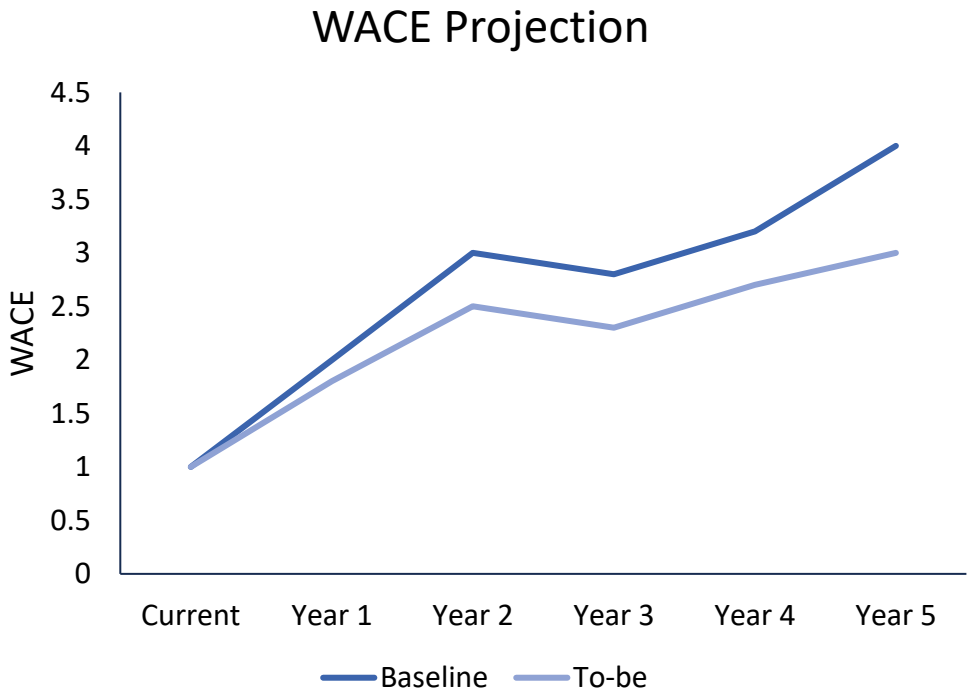


The WACE Methodology

Step 4: Integration and Projection

4 Integrate



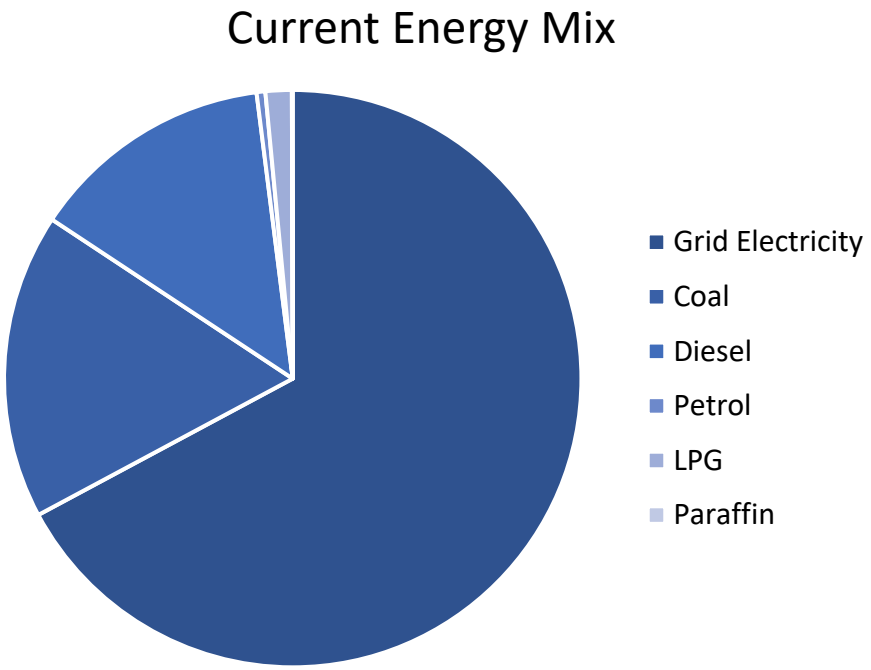


SAIMM THE SOUTHERN AFRICAN INSTITUTE OF MINING AND METALLURGY

cnes

Application of WACE Methodology: Case Study

- Large industrial entity with multiple sites.
- Current energy mix includes electricity, coal, diesel, petrol and LPG.
- Goals of including; solar and wind, hydrogen, renewable gas and synthetic liquid fuels into the roadmap.
- Face issues with motivating for projects other than solar and wind due to higher costs associated with ‘harder to reach’ mitigation options.



Current WACE = USD 14.08/GJ

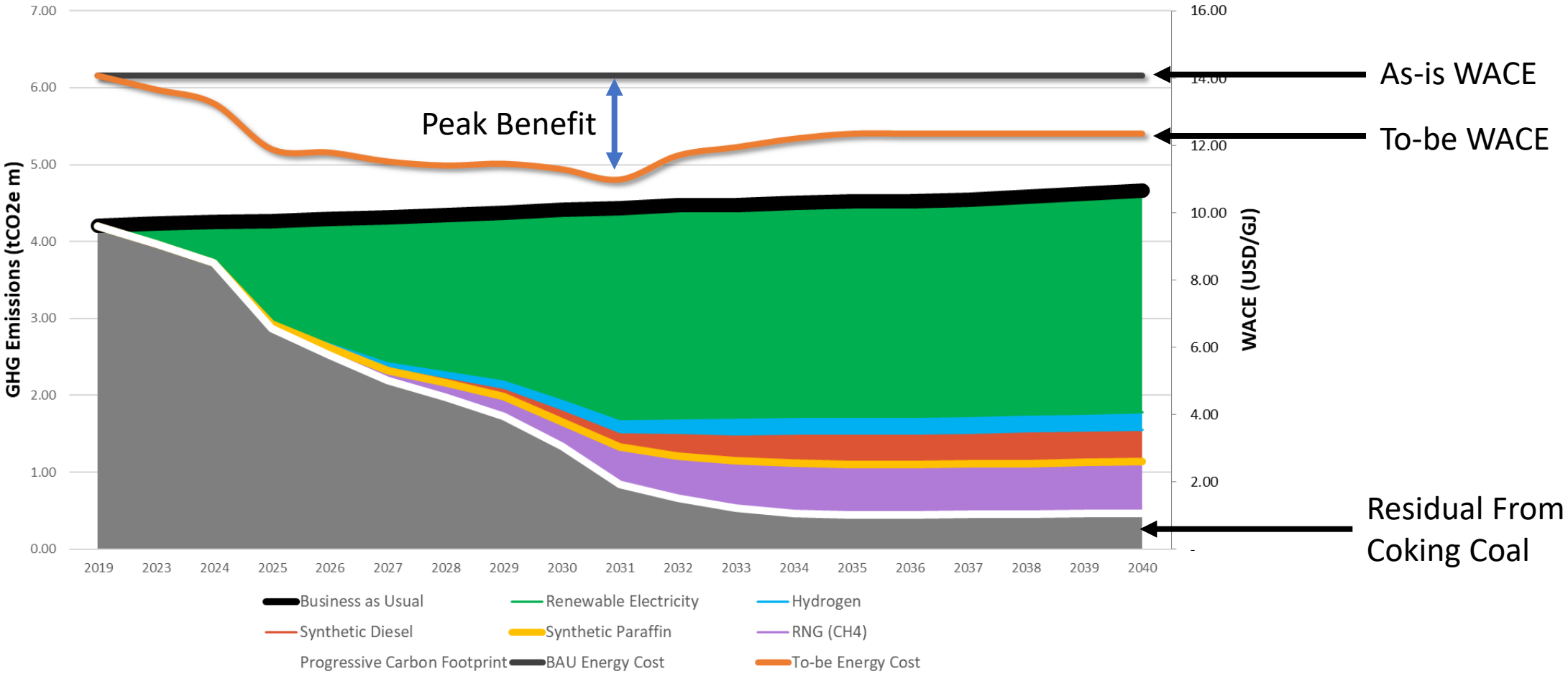
Application of WACE Methodology: Case Study

Current Energy Source	Mitigation Option	Energy Cost Outlook
Grid Electricity	Solar PV Wind Energy	Lower Energy Cost
Thermal Coal	Natural Gas Renewable Natural Gas	Lower Energy Cost
Diesel	Hydrogen	Short Term: Higher Long Term: Lower
Diesel & Paraffin	Synthetic Liquid Fuels	Higher Energy Cost

SAIMM THE SOUTHERN AFRICAN INSTITUTE OF MINING AND METALLURGY

cnes

Application of WACE Methodology: Case Study



SAIMM THE SOUTHERN AFRICAN INSTITUTE OF MINING AND METALLURGY

cnes

Conclusion

- Structured approach to planning GHG mitigation options
- Assists to navigate trade-offs between energy affordability, security and sustainability.
- Avoids project siloing by taking an integrative cohesive approach.
- Valuable tool to assist energy managers in communicating strategy with decision makers.

SAIMM THE SOUTHERN AFRICAN INSTITUTE OF MINING AND METALLURGY

cnes

Thank You!