



MRIWA CHALLENGE

GREEN STEEL

the question is not "is it possible" but rather "how to make it possible"

The Minerals Research Institute of Western Australia (MRIWA) has appointed lead adviser GHD Pty Ltd, in partnership with ACIL Allen, to investigate the iron ore-to-steel value chain and undertake the following scope of works:

1. **Scenarios**

Map iron ore-to-steel value chain to confirm scenarios against which further assessments will be undertaken related to infrastructure needs, market dynamics and policy frameworks. Matters to be taken into consideration include but are not limited to:

- (a) Characteristics of WA iron ore covering goethite, hematite and magnetite (grade, contaminants);
- (b) Value chain is to include raw material mining (drill & blast and extraction), processing (crushing, screening and beneficiation), transport to port (rail/road) and shipping, raw material preparation (sintering and pelletizing) iron making (blast furnace) and steelmaking;
- (c) Create a base case 'fossil fuels' value chain for typical WA goethite, hematite and magnetite ores, identifying differing opportunities for each ore type along the value chain;
- (d) Map changes in energy use and emissions profiles at each stage of the value chain identifying appropriate measures for each stage and cost/tonne of steel for each scenario;
- (e) Identify quantum and type of alternative lower carbon and renewable energy needs and back-up requirements to ensure ongoing operations for each scenario;
- (f) Identification of "biggest bang for the buck" opportunities to lower overall value chain emissions;
- (g) Alternative lower carbon and/or renewable energy solutions at each stage of the value chain;
- (h) Identification of barriers at each stage of the value chain constraining adoption of lower emissions or renewable energy solutions and key current and future prospective technology solutions; and
- (i) Identification of energy and processing risks and opportunities at each stage of the value chain, including an estimate of timeframe required to implement different solutions.

2. **Regional Attributes**

Assess existing and required regional attributes to identify the comparative advantages of the Mid West and Pilbara regions and future investment needs to enable delivery of the various scenarios developed under 1 - Scenarios. Matters to be taken into consideration when completing the assessment include but are not limited to:

- (a) Identification of barriers/constraints to deliver of the scenarios within the identified regions;
- (b) Taking into account minerals endowment, consideration of co-location of energy solutions with other industries to amplify viability;
- (c) Availability of renewable energy solutions and hydrogen production (existing and planned);
- (d) Land availability, environmental and heritage aspects impacted by land use and supporting services;
- (e) Infrastructure needs (port, rail, road, energy, water, aviation), order of magnitude capital costs and life of infrastructure, and opportunity for common-use; and
- (f) Supporting services requirements and workforce capabilities and availability.

3. Market Dynamics

The Contractor is required to assess future iron ore mining, ironmaking and steel market dynamics to evaluate the potential opportunity and risk to Western Australia from action or inaction for each scenario. Matters to be taken into consideration when completing the assessment include but are not limited to:

- (a) Identification of emerging green steel markets and assess impact on demand for low - high grade ores and low – high contaminant ores (covering goethite, hematite and magnetite);
- (b) Jurisdictional and mineral endowment differences, likely timeframes and drivers for change within each jurisdiction including identification as to who are likely to be first movers;
- (c) Energy cost and carbon price models against which to assess alternatives and establish sensitivities;
- (d) Renewable and hydrogen production costs to evaluate cost competitiveness;
- (e) Risk of action or inaction and impact on total Australian iron ore revenue and royalty revenue to the State Government;
- (f) Identification of how far down the value chain WA should go i.e. what is the “sensible point” for WA taking into account price, availability of inputs, technology and market demand for green steel;
- (g) Required impact of technology and price points for energy and technology solutions to enable Western Australia to be cost competitive; and
- (h) Compare cost/tonne of steel at each step in the value chain for each scenario against the base case (including amortised capital costs).

4. Policy Frameworks

Assessment of policy, regulation and planning frameworks to enable and incentivise scenarios developed under project 1 - Scenarios. Matters to be taken into consideration when completing the assessment include but are not limited to:

- (a) International initiatives, geo-political trends and policy commitments which have both direct and indirect implications on Western Australia, iron ore and steel markets;
- (b) Existing Federal and State Government Policy commitments and initiatives to leverage;
- (c) Existing regulatory frameworks (including State Agreement Acts) to incentivise activities and where appropriate, recommendations on how these can be better utilised or changed;
- (d) Land planning frameworks; and
- (e) Indicative timeframes for the cost of establishing industries based on new technology to become commercially viable without subsidies.

Project Contacts:

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