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# Hazer Group

Redefining clean hydrogen

**Bell Potter Unearthed Conference** 

Thursday, 13 February 2025







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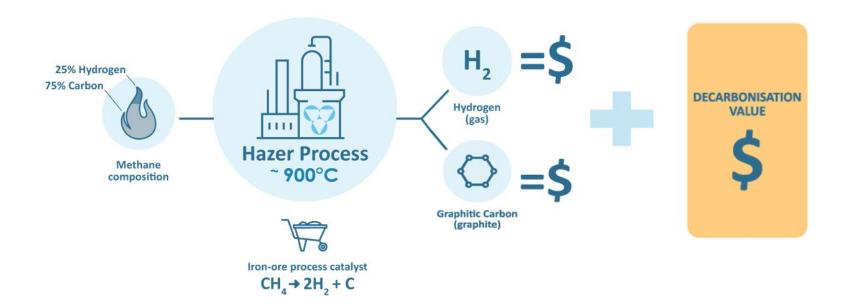
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# Hazer's technology advantage

Innovative low emission, low-cost methane pyrolysis technology producing clean hydrogen and graphite

- Hazer Group Limited is a technology development company undertaking the commercialisation of the Hazer Process
- The Hazer Process enables low temperature conversion of natural gas and similar methane feedstocks, into hydrogen and high-quality graphite, using iron ore as a process catalyst





# Hazer's unique market advantage

Hazer has a distinguishing competitive edge that sets us apart in the clean hydrogen arena



### **Advanced TRL**

Ready today with commercialisation underway



### **Low Cost**

Driven by low energy intensity enabling attractive project economics & LCA



### **Proven Scalability**

Fluidised bed reactor adopted from refining / metal industry accelerates scale-up



### Graphite

Unique, advanced carbon material with broad use-case & diversified value upside



## "Plug-in" Ready

Utilising existing value chains & infrastructure (e.g LNG). No transportation risk and cost



## First Mover Advantage

Tier-1 partners in key global markets and industries. Extensive customer pipeline

Provide a unique climate technology to transform industry and contribute to a sustainable future for the next generation



Q2 FY25 Highlights





Commercialise



# Q2 FY25 Highlights: Focus on commercialisation

## CDP test program successfully completed, de-risking technology and commercialisation

- Process performance data validates scalability; confirms economic viability
- FortisBC 2500tpa project advances following successful reactor pilot rig testing
- Extended graphite strategic partnership with Mitsui following positive market feedback
- Robust funding position strengthened by \$5.1mln R&D cash refund and \$6.2mln Government grant
- Maintained strong IP protection; key patents awarded in Japan & EU for Hazer technology



CDP Site at dusk – Perth, Australia

## Executing scale-up strategy in hard-to-abate sectors



### Hazer's Vision

Provide a unique climate technology to transform industry and contribute to a sustainable future for the next generation

Achieved In Progress

Technology Readiness (CDP)







# Advanced technology readiness - TRL 7

Rapid development since company founding and advancing Tech Readiness Level (TRL)

(100tpa H<sub>2</sub> continuous)





**Project Development** 

**Pipeline** 









(~1Kg\* batch)



(~<2 kg/hr\* semi-continuous)



2007-2013

(<1g\* batch)

2016-present

(<100g\* batch)

2017

2017-2021

### 2022-2024

## Bench scale testing

- University of Western Australia
- Concept evaluation

### Scaled up bench test

- University of Sydney
- Catalyst kinetics and process research

### Bench scale fluid bed

- University of Sydney
- Conceptual testing of fluidised bed concept

#### **Pilot Plant**

- Sydney and Perth
- Fluidised bed with optimised conditions and catalyst injection

### Commercial **Demonstration Plant (CDP)**

- Perth. Australia
- End-to-end continuous plant with biogas feed
- Operational in 2024

2025+

### **Key Projects**

- Canada
- Chubu, Japan
- France
- Korea

\*Combined product scale

**Strategic Focus** 



# CDP test program successfully completed

## Worlds first fully-integrated demonstration of Hazer's technology

- Technology scale-up & commercialisation de-risked
- Over 450 hrs continuous operation achieved
- Campaign production uptime over 99% underpins the resilience of technology and reactor materials
- Solids handling design validated at multi-tonne scale
- Gas conversion and graphite purity consistent with large scale commercial design basis
- CDP graphite application product development and testing activities commenced



CDP Site - Perth, Australia

The Commercial Demonstration Plant has successfully validated the Hazer Process, de-risked commercialisation, and paved the way for large-scale hydrogen production





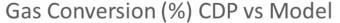
# Strong results provide confidence in scalability

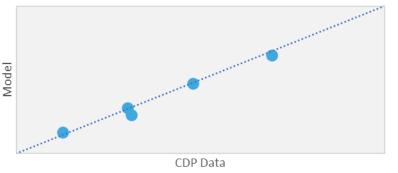
CDP data and early reactor modelling validate commercial design basis

- Hazer proprietary reactor kinetic model developed
- Model response matches pilot & CDP data
- Performance predictions consistent with design
- Economic basis sound with upside potential

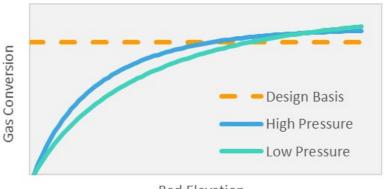


Hazer Graphite collection sample





## Commercial Performance

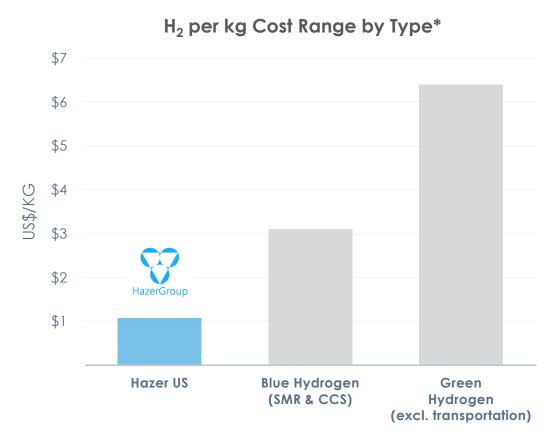






# Confirmed economic viability and competitiveness

Hazer's technology costs are very competitive when compared to all other hydrogen production types



- Hazer is cost-competitive with clear path to further optimisations at scale; built-in graphite upside
- "Blue" hydrogen (SMR+CCS) is technically feasible, but constrained to specific locations
- "Green" H<sub>2</sub> economically challenged by high energy intensity (before other complexities, e.g., transportation)

<sup>\*</sup> Company aspirations that should not be read as forward-looking statements.

Commercial Projects & Partnerships







# Solid progress on first commercial project in Canada

Partnership with FortisBC to develop a 2,500tpa hydrogen facility in Canada



FortisBC test rig site in BC, Canada

Project supported by upfront C\$8mIn of CleanBC Government funding package

- FortisBC 100% project owner; Hazer technology licensor
- Binding agreement for commercial scale plant; license fee framework agreed
- First revenues received and ongoing to FID
- Successful reactor pilot rig tested completed
- Initial FEED study completed. FID targeted for 2025











# Overview of key scale-up development projects







Nagoya, Japan

Existing LNG import

H<sub>2</sub> as fuel for power

terminal or power station



Montoir, France



Pohang, Sth Korea

Description	<ul> <li>Project Development Agreement Signed</li> <li>New site selection in progress</li> <li>Likely H<sub>2</sub> to be used at site location</li> </ul>
Partners	FORTIS BC

## FORTIS BC



generation, industry

feedstock and mobility

## Existing LNG import terminal site identified

- H<sub>2</sub> as fuel for power generation, industry feedstock and mobility
- Integration into existing plant
- H<sub>2</sub> and graphite to be used in the steel making process





## posco

## Expected H<sub>2</sub> **Production**

- Phase 1
- Phase 2

2,500 tpa 100,000+ tpa

2.500 - 10.000 tpa Up to 100,000 tpa 10.000+tpa 50,000+ tpa Medium scale demonstration Large scale deployment

## **Hazer Operating** Model

Targeted Start-up (phase 1)

2026-2027

Licensing

2027-2028

Licensina

Licensina

2027-2028

Licensina

2030+



# Hazer's global partners & projects

Tier-1 partners developing commercial projects in North America, Europe and Asia-Pacific



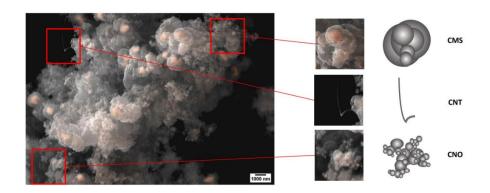




# Graphite production diversifies earnings

A synthetic, low emissions product with differentiated morphology and properties

- Highly structured vs amorphous carbon black
- Iron inclusions produce magnetic graphite
- Low production emissions
- Up to 95% graphite purity
- High thermal & electrical conductivity
- Low sulphur & low ash content



## Mitsui MOU

- A leading international trading and investment group based in Japan
- Collaboration extended following positive feedback from several potential customers
- High confidence markets identified incl. steel making and chemicals industries
- Next phase includes testing of larger samples from Hazer's CDP



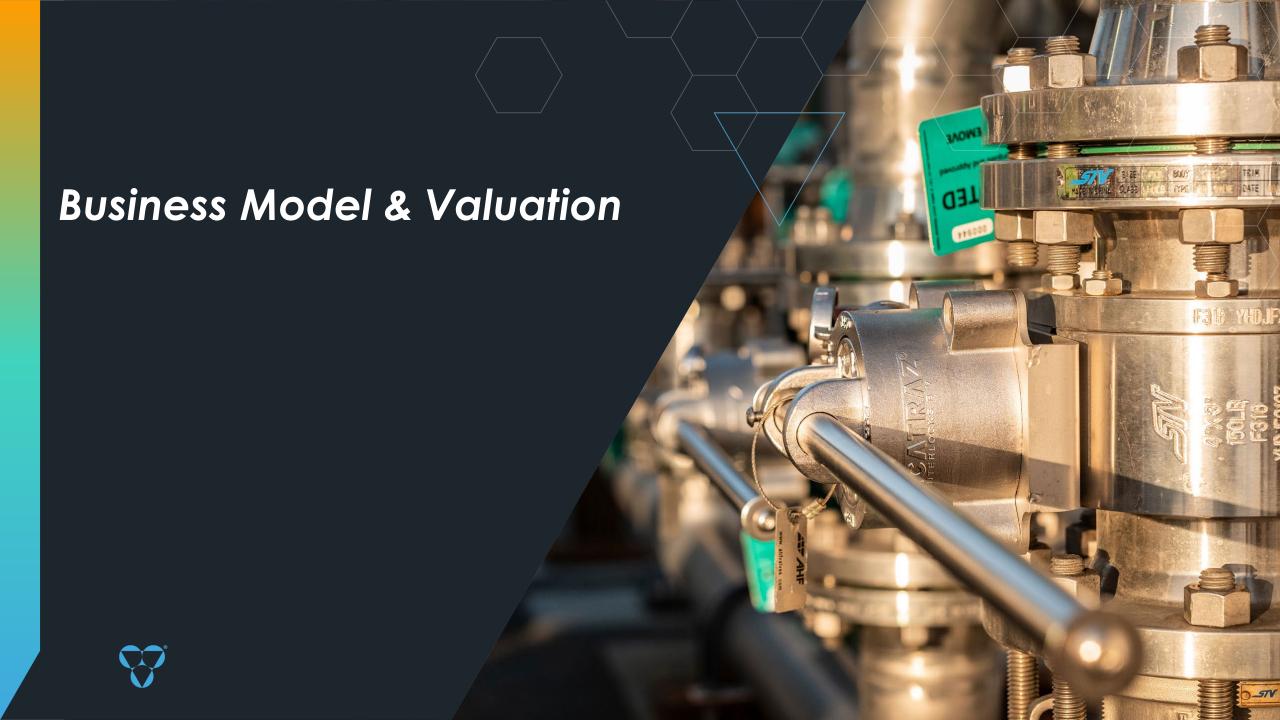


# Hazer graphite: multiple applications & high value

Initial focus on high confidence, high volume applications with no/minimal post-treatment

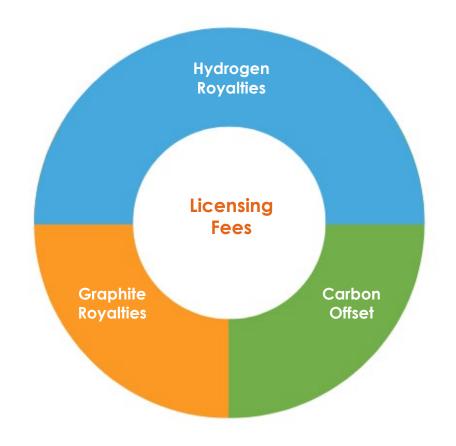
Application	Incumbent Material	Market Development Priority Score	'Drop In' Potential	Market Size	Price (USD/t)	Emissions Impact
Concrete	Carbon Black				100 - 800	
Steel	Pulverised Coal / Met Coal / Graphite				180 - 600	
Asphalt	Carbon Black				200 - 600	
Thermal Energy Storage	Graphite				400 - 700	
Conductive Carbon	Carbon Black				4000 - 10000	
Water Purification	Activated Carbon				700 - 2370	
Conductive Concrete	Carbon Black				700 - 2000	
Lubricant	Graphite				800 - 2000	
Biochar / Soil Enhancer	Organic Material				200 - 500	
Graphite Electrode	High Grade Graphite				2500 - 3600	
Lithium Battery Electrode	High Grade Graphite				2500 - 10000	
Power Generation	Thermal Coal				90 - 108	



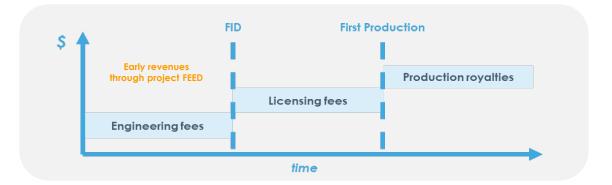


## "Capex-lite" business model enables early free-cashflow

Hazer business plan premised on licensing and royalty revenues avoiding large-scale capex exposure



- One technology, two valuable markets
- "Capital-lite" approach
- Flexible combination of license fees and royalties
  - Early revenues through engineering services
  - Fixed annual license fees commensurate with plant size
  - Royalties a percentage of H<sub>2</sub> and graphite revenues

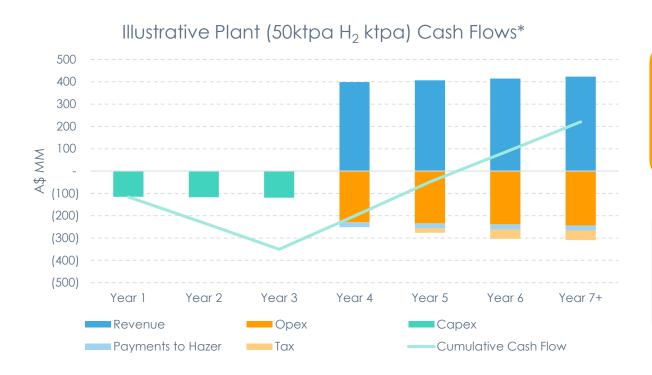






## Illustrative plant economic indicators

Licensing model delivers attractive returns for Hazer



### **Illustrative Hazer Returns:**

- "Capex-lite" No capital contributions / outlay
- Income from license fees and royalties
- NPV8 (20 years) ~A\$115mln (~U\$\$80mln)

### **Illustrative Plant Owner Returns:**

- 50 ktpa of H<sub>2</sub> production, 195 ktpa of graphite
- NPV8 at FID (20 years) ~A\$460mln (~US\$320mln)
- Project IRR ~27% (ungeared); ROI ~5.0x

<sup>\*</sup> Company aspirations that should not be read as forward-looking statements. See Disclaimer - slide 2 and Assumptions on slide 31. No assurance that actual outcomes will not differ materially from these amounts.

# Corporate Update





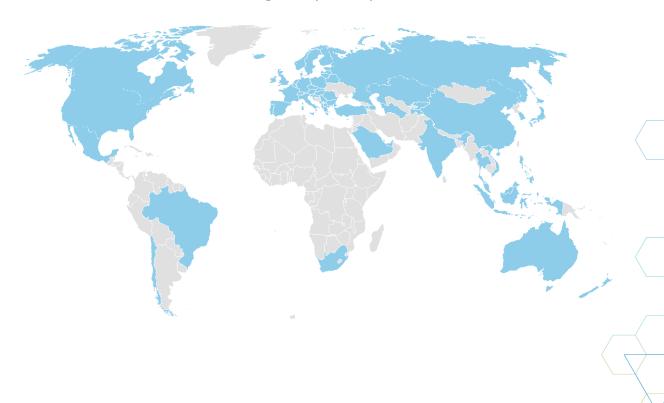


# Hazer's strengthening global IP portfolio

Strategic patents enhance our commercial opportunities globally

- Key patent awarded in EU for Hazer graphite morphology
- Significant patent in Japan granted for H<sub>2</sub>
   production using an iron-ore catalyst
- Strengthens global IP protection coverage for technology commercialisation

## Extensive global patent portfolio





## \$6.2M Government grant to accelerate commercialisation

The Lower Carbon Grants Program supports transformational technologies that reduce carbon emissions

- Administered by the WA Government, funded by the Gorgon Joint Venture - comprising Chevron, ExxonMobil, Shell, Osaka Gas, Mid Ocean Energy, and JERA.
- Funding enables Hazer to advance commercial reactor scale-up program and substantially supports 2025-2026 work program
- First milestone payment of \$2.2 million received in January
   2025



"Hazer Group is a key contributor to Western Australia's innovation sector and leverages local resources to develop a world-leading climate technology that has broad application for decarbonising industry in Australia and world-wide."

Hon Minister Stephen Dawson MLC



# 2025 strategic priorities – Accelerating to scale

Multiple near-term catalysts to unlock value creation

Commercialising Technology

- 1 Accelerate reactor scale-up to meet demand for large-scale commercial projects
- Unlock value potential in graphite product

Accelerate Scale-up

- Canada definitive license terms for Final Investment Decision
- 4 Progress existing commercial portfolio through FEED

Growth & Monetisation

- Secure strategic partnerships to accelerate project delivery
- 6 Continue to assess new licensing deals and other strategic opportunities

Lean organisation, continuous improvement culture and strong financial strategy



## Investment case



Low-cost, clean H2 technology with strong competitive advantage



Commercially ready today and co-locates with enduser infrastructure



Capex-lite" license model unlocks early cash-flow



Tier-1, global partnerships across strategic markets



Rapidly growing H<sub>2</sub> market with strong policy support



CDP Site - Perth, Australia





## Abbreviations and units used

ARENA Australian Renewable Energy Agency

CCS Carbon Capture & Storage

CDP Commercial Demonstration Plan

IP Intellectual Property

FID Final Investment Decision

KTPA thousands of tonne per annum

LCOH Levelised cost of hydrogen

LNG Liquified Natural Gas

MOU Memorandum of Understanding

MMBTU Million British Thermal Units (A thermal unit of measurement for Natural Gas)

MTPA millions on tonne per annum

PDA Project Development Agreement

SMR Steam Methane Reforming

TPA tonne per annum



## Assumptions and notes

#### Slides 13 - H2 per kg cost range by type and by market

Sources: Company analysis and projections, modelling a range of notional outcomes:

- 1. Feedstock gas North America ~US\$2.0/mmbtu, Asia Pacific US\$12/mmbtu, Europe ~US\$8.5/mmbtu
- 2. ~US\$500/tonne graphitic carbon revenue, offset against operating expenses.
- 3. Location-specific electricity pricing sourced from third-party market references.
- 4. ~US\$130/tonne company estimate for iron ore catalyst supply.
- 5. Other variables based on business judgement and company analyses.
- 6. No Government funding, tax incentives or debt funding upside benefit included.
- 7. Learning curve of 30% is applied to the low-end cost estimate to reflect process engineering, operating, maintenance, logistics and other expected efficiencies.
  - Rationale for inclusion: https://hbr.org/1964/01/profit-from-the-learning-curve
  - Learning curve applicable to construction projects (closest analogue). Supports ranges of 60-95% (inverse being 5-40%):
  - https://www.fgould.com/americas/articles/applying-learning-curve-theory-construction-cost/
- 8. Assumes that the Commercial Demonstration Plant demonstrates that the Hazer process technology is effective at producing graphitic carbon and high purity hydrogen consistently and reliably as has occurred in prior smaller size pilot projects

#### Slide 23 – Techno-economics analyses, including Illustrative Plant Economic Indicators

Sources: Company analysis and projections, modelling a notional plant outcome at an average US feedstock gas price of US\$2.00/MMBTU, ~US\$500/tonne graphitic carbon revenue, H2 revenue of ~US\$2.32/kg. No Government funding or tax incentives, or debt funding benefit, or learning curve to optimise plant outcomes included. NPV8 is after-tax and assumes a notional 3-year construction timeframe. License fees and royalty rates are notional as no license agreements transacted to date. Not adjusted to reflect any jurisdiction-specific operating conditions, economics and impact.

#### 3<sup>rd</sup> party reports:

- 1. Green hydrogen production cost: IEA Global Hydrogen Review 2022, p.92. 2021 Wind Onshore and Solar PV average price of US\$6/kg.
- 2. Blue hydrogen production cost: <a href="https://about.bnef.com/new-energy-outlook/">https://about.bnef.com/new-energy-outlook/</a>

