Hazer Group Ltd ASX:HZR

March 2019

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INVESTMENT SUMMARY

Hazer is a low cost, low emission hydrogen and synthetic graphite production technology

- Low cost, low emission hydrogen and synthetic graphite production process
- Low emission hydrogen and graphite are both key products in a de-carbonizing economy
- The Hazer technology offers high value through production of two products:
 - hydrogen; 99.99% + purity
 - synthetic graphite; 80 95% TGC
- Hazer is a low or carbon negative technology that does not release greenhouse gas emissions



Illustrative 3D Realisation of 2.5 ktpa Commercial Scale Hazer Plant



THE POTENTIAL FOR LOW-COST, LOW EMISSION HYDROGEN IS COMPELLING



Potential uses for hydrogen. CSIRO, Author provided

HYDROGEN - A GLOBAL FOCUS

There is significant global focus on developing a hydrogen economy as part of a transition to low carbon environment

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National Hydrogen Roadmap* targets: 6.2 million hydrogen vehicles and 1200 filling stations by 2040 with 2000 Fuel Cell Buses by 2022 & 800 police use Fuel Cell Buses by 2021



California Fuel Cell Partnership - active roll–out of hydrogen refueling network



Refueling networks under development; H2 trains operational in Germany



Prof. Alan Finkel – launched National Hydrogen Roadmap (CSIRO) – August 2018 COAG December 2018 – National Hydrogen Strategy to be developed by October 2019*



CURRENT HYDROGEN PRODUCTION

Current production technologies are either high in emissions or expensive

use only **Significant CO**₂ **Fossil fuel** emissions reforming • 95% of total global $C_nH_m + [O] \triangleright CO_x + H_2$ hydrogen production or dersonal • Chemically equivalent to direct combustion, but H_2 less energy efficient **Barrier to Current** growth in hydrogen energy production markets **Energy intensive** process -4 + Electrolysis • Requires renewable energy source $2H_20$ (+ energy) > O_2 + $2H_2$ Expensive (power consumption)

THE HAZER ADVANTAGE

Capture full value of feedstock by producing two valuable products without creating CO₂ in the process

Iron-ore process catalyst

TECHNOLOGY

The Hazer Process is based around a novel, proprietary reaction system





SUSTAINABILITY

The Hazer Process has outstanding sustainable development attributes



- renewable fuel based (biogas)
- low CO2 emissions
- de-carbonisation of transport
- distributed energy
- domestic energy source
- maximise use of local resources
- "waste-to-resources"
- circular economy

OPPORTUNITIES IN GLOBAL MARKETS

Hazer has opportunities in major existing and developing global markets



or personal use

Industrial hydrogen US\$130 billion*

Low emission alternative

Currently primarily addressed by fossil fuel reformation processes (high CO₂ byproduct)

Industry is beginning to turn toward cleaner solutions.



Clean hydrogen and energy US\$12 billion^a by 2023 (FCV)

Multiple applications

Clean (low carbon) hydrogen has price or value premium to standard hydrogen.

Key component of clean energy future ($H_2 => H_2O + energy$).

Potential to be a lowest cost clean producer.



Synthetic graphite US\$14 billion^

High quality, low cost graphite source

Graphite has a wide range of desirable properties and is used in a range of industrial materials applications.

Current methods of graphite production (natural or synthetic) are costly and have significant environmental impacts.

- ^a "Hydrogen Fuel Cell Vehicle Market Overview", Allied Market Research
- ^ "Global Market Study of Graphite Market", Persistence Market Report, Feb 2015, pg14



HYDROGEN & GRAPHITE SYNERGY

Potential to be a major part of the revolution in future mobility





HAZER GRAPHITE

Versatile properties – many opportunities

- Current graphite market value in excess of US\$ 14 Billion per annum^
- Hazer graphite structure and properties can be altered to potentially suit different market by changing the process conditions
- Graphite purity ex reactor can range between 80-95% wt, and can be purified to 99.9% > with standard purification techniques
- Promising preliminary results in using Hazer Graphite in Li-ion batteries



^ "Global Market Study of Graphite Market", Persistence Market Report, pg 14



HAZER GRAPHITE IN LI-ION BATTERIES

Preliminary testing of Hazer graphite in coin cell Li-ion batteries show equivalent performance to commercial synthetic spherical graphite



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STRONG PROGRESS IN 2018

Successful pilot plant program in 2018 has given sufficient confidence to progress to FEED Study for first commercial plant





COLLABORATION WITH ASX:MIN

Investment and Commercial Partner



March 2017 MIN made a A5M strategic investment in HZR (current holding ~11%.)

December 2017 HZR & MIN executed a binding collaboration agreement for the potential development of a commercial scale synthetic graphite facility – Key Terms:

- MIN to fully fund all stages of the commercial development.
- Hazer to receive royalties from graphite sales
- Stage 1 Pilot Plant commissioned March 2019
- Stage 2 Demonstration Plant target 1,000 tpa (graphite)
- Stage 3 Expansion target production of 10,000 tpa







PILOT PLANT OPERATIONS

The Hazer FBR Pilot Plant & Mineral Resource's PTR Pilot Plant were commissioned on-site in Kwinana in March 2019

- Hazer Pressurised Fluidised Bed Reactor (FBR) Pilot Plant re-commissioned at Mineral Resource's Kwinana site in March
- Ongoing test program will provide further engineering data to optimize CDP FEED and Concept Studies
- Mineral Resource's Paddle Tube Reactor (PTR) Pilot Plant commenced commissioning in March 2019
- Test Program for PTR Pilot Plant will be undertaken over next 3-6 month period
- PTR Pilot Plant is focused on production of higher purity graphite product with desire to target higher value end markets







DEVELOPMENT PATHWAY

Hazer is focused on securing a commercial demonstration plant (CDP) by mid 2019 with commencement of operations in 2020



INVESTMENT SUMMARY

Hazer process is a low emission, low cost, flexible hydrogen & graphite production process



Successful pilot program completed in 2018; engineering and concept studies to up-scale to commercial operations underway



Producing clean, cost competitive hydrogen and graphite



Working with potential partners and customers to secure contracts for first large scale commercial plant through 2019 / 2020



Hazer Group is the first listed Australian clean hydrogen company

TIGHTLY HELD REGISTER

Top 20 own 39%

	Capital Structure	
	Current Shares on Issue	97.26m
	Market Capitalisation @\$0.22	\$21.4m
	Cash @ 31 December 2018	\$6.6m
\bigcirc	Total Options (ex prices from \$0.40 to \$1.20)	42.42m
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*includes\$0.9m of option exercise proceeds held in trust at 31 December 2018

Share Price & Volume



Substantial Shareholders

For personal



Top 20 ex substantial shareholders holding >5%

- % Mineral Resources Ltd
- 5.8% Geoff Pocock Entities

Mandrew Cornejo

% Other

18



STRONG MANAGEMENT TEAM WITH PROJECT EXP.

Engineering, Technical, Marketing & Corporate expertise



Mr Geoff Ward

Chief Executive Officer

- 25 years experience in senior executive roles in the energy sector, covering operations, commodity marketing, strategy and planning, development and execution of major capital projects.
- Specialised experience leading transactions in capital markets, financing, M&A and joint ventures.
- B.E Chem (Hons) and MBA. Member of the Australian Institute of Company Directors.

Mr Mark Edwards Chief Operating Officer

- Mechanical engineer with 25 years experience in project management, site maintenance and operation.
- Former AUA Regional Director for Light Metals division at Hatch Pty Ltd.
- Technical specialist with focus on delivery of complex technical projects.

Ms Emma Waldon

CFO & Company Secretary

- 20 years experience in finance and corporate advisory roles including ASX listed companies.
- Specialist in risk management.
- Member of the Australian Institute of Chartered Accountants, a Fellow of the Financial Services Institute of Australasia and a Certificated Member of the Governance Institute of Australia.



Dr Andrew Cornejo **Co-Founder and Chief Technical Officer**

- PhD; inventor of the Hazer Process.
- Co-Founder of Hazer Group Limited.
- 15 years technical engineering experience in R&D, advisory and resource development roles.
- B.E (Mech) (Hons), B.Comm, Grad Cert (Research Commercialisation).



Mr Luc Kox

Business Development Manager

- 20 years' experience in engineering and clean tech industries, including energy recovery from biogas.
- Extensive experience in international business development, including project finance and contract development, in particular throughout Asia Pacific region.
- Master of Science plus post grad Qualified Export Marketing Manager (The Netherlands).

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EXPERIENCED, INDEPENDENT BOARD

Commercial, Technical, Contract & Regulatory expertise



Mr Tim Goldsmith Chairman

- Over 20 years as Partner with global professional services group PwC.
- Leader of PwC's Mining Group, and National China Desk Practice
- Over 30 years corporate and • commercial experience across international mining and industrial business operations.

Ms Danielle Lee NED

- Corporate lawyer with more than 23 years' experience shared between private law firms and the ASX
- Main practice areas are corporate advisory, governance and equity capital markets; regularly advises on issues relating to the Corporations Act and ASX Listing Rules.





Mr Simon Rushton NFD

- Executive General Manager -Corporate Development at Mineral Resources Limited
- 18 years global corporate experience in financial, advisory and legal roles.
- Corporate contracts including M&A expertise within the mining sector.

Dr Andrew Harris NED

- Lead Director of the Engineering Excellence Group, Laing O'Rourke.
- Professor of Chemical and Biomolecular Engineering at the University of Sydney.
- Previously the CTO of Zenogen, a hydrogen production technology company, and a co-founder of Oak Nano, a start-up commercialising novel carbon nanotube technology.

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Hydrogen

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