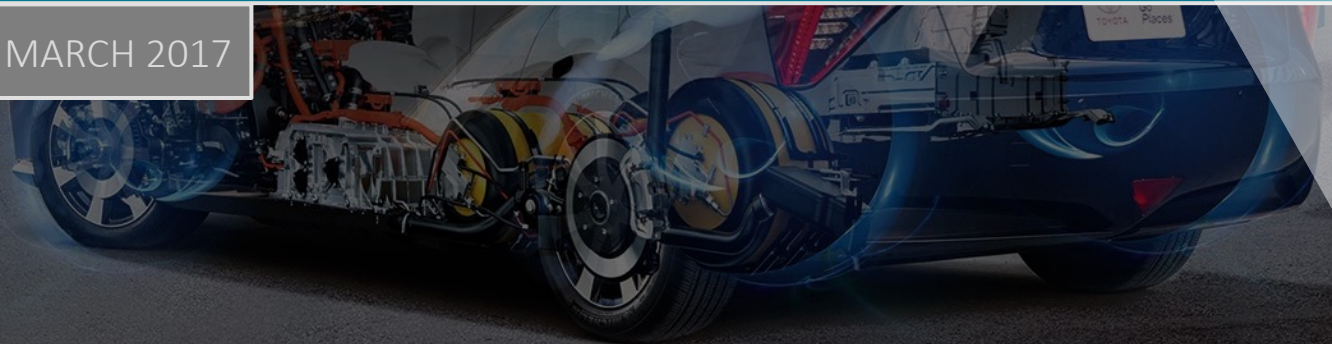


# HAZER GROUP LTD

## LOW COST - LOW EMISSION HYDROGEN & GRAPHITE PRODUCTION

COMPANY OVERVIEW MARCH 2017



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# HAZER GROUP LIMITED

## **LOW COST LOW EMISSION HYDROGEN & GRAPHITE** PRODUCTION PROCESS



Founded in 2010 to commercialise technology initially developed at the University of Western Australia



Listed on ASX since Dec 2015 after oversubscribed IPO



Over 8 years development, collaboration with leading Australian universities



Currently undertaking scale up development work (pre-pilot plant)

# CORPORATE AND MARKET SNAPSHOT



(ASX: HZR, HZRO)

## Capital Structure

Current Shares on Issue	64.6m
Restricted Securities	10.2m
<b>Total Tradeable Shares</b>	<b>54.4m</b>
Market Capitalisation @\$0.60	\$38m
Cash @ 31 <sup>st</sup> December 2016	\$3.0m
Options	48.3m
<b>Cash From Option Exercise</b>	<b>\$20.0m</b>

## Substantial Shareholders

Mr Geoff Pocock (MD)	4.2m
Dr Andrew Cornejo (CTO)	3.8m
Mineral Resources Ltd	2.0m
UWA	1.5m
<b>Total Top 20 (ASX Listed Shares)</b>	<b>32%</b>

## Share Price & Volume

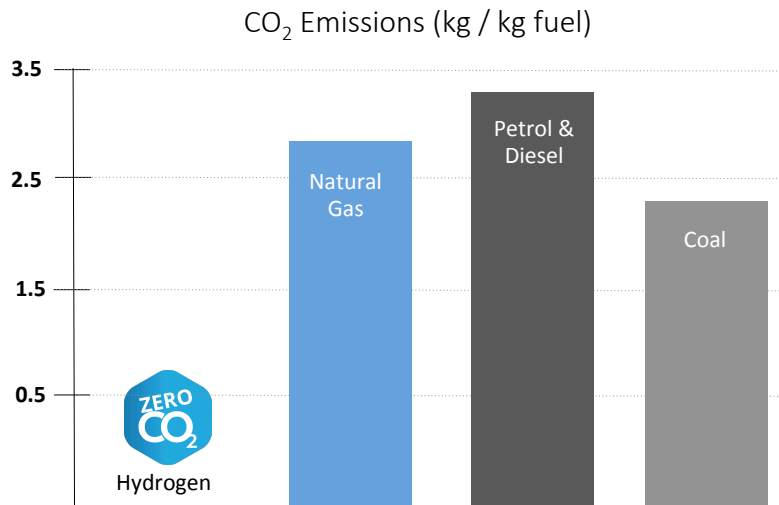


# HYDROGEN & ENERGY MARKETS

## HYDROGEN OFFERS THE IDEAL CLEAN ENERGY SYSTEM

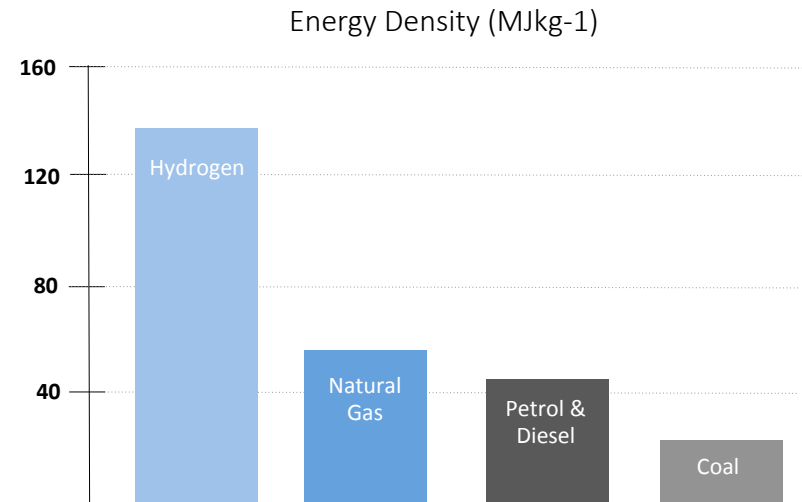
### TRUE CLEAN ENERGY

Unlike fossil fuels, hydrogen represents a truly clean energy fuel, as combustion generates energy without CO<sub>2</sub> or other emissions



### ENERGY DENSE

Hydrogen is exceptionally “energy dense” – 1 kilogram of hydrogen can generate significantly more energy than a kilogram of other fuels



# SIGNIFICANT INDUSTRY, INVESTMENT TAILWINDS

## AUTOMOTIVE

### GM and Honda team up for cheaper hydrogen fuel cells



Scott Collie | January 31st, 2017



GM Executive Vice President Global Product Development Mark Reuss (left) and President Honda North America Toshiaki Mikoshiba announce a manufacturing joint venture to mass produce an advanced hydrogen fuel cell system (Credit: GM)

[VIEW GALLERY - 3 IMAGES](#)

Hydrogen has long been thought of as an ideal alternative to fossil fuels in cars, because it fits in with our current driving habits. Although range is improving, battery electric vehicles still take a long time to recharge, whereas fuel-cell vehicles can be topped up in a matter of minutes. Even so, traditional electric cars tend to dominate the headlines, with few appealing hydrogen options on the market. That could change soon, with GM and Honda investing a combined US\$85 million in the mass production of fuel cells.



### Toyota, Shell Among Giants Betting \$10.7 Billion on Hydrogen

by John Lippert

18 January 2017, 08:00 GMT+11 Updated on 18 January 2017, 11:23 GMT+11

- Auto and oil companies among 13 members of hydrogen council
- Toyota sees fuel cells as more acceptable among consumers

Toyota Motor Corp. and four of its biggest car-making peers are joining oil and gas giants including Royal Dutch Shell Plc and Total SA with plans to invest a combined 10 billion euros (\$10.7 billion) in hydrogen-related products within five years.

In all, 13 energy, transport and industrial companies are forming a hydrogen council to consult with policy makers and highlight its benefits to the public as the world seeks to switch from dirtier energy sources, according to a joint [statement](#) issued from Davos, Switzerland. The wager demonstrates that batteries aren't the only way to reduce pollution from cars, homes and utilities that are contributing to climate change.

ost important market news day.

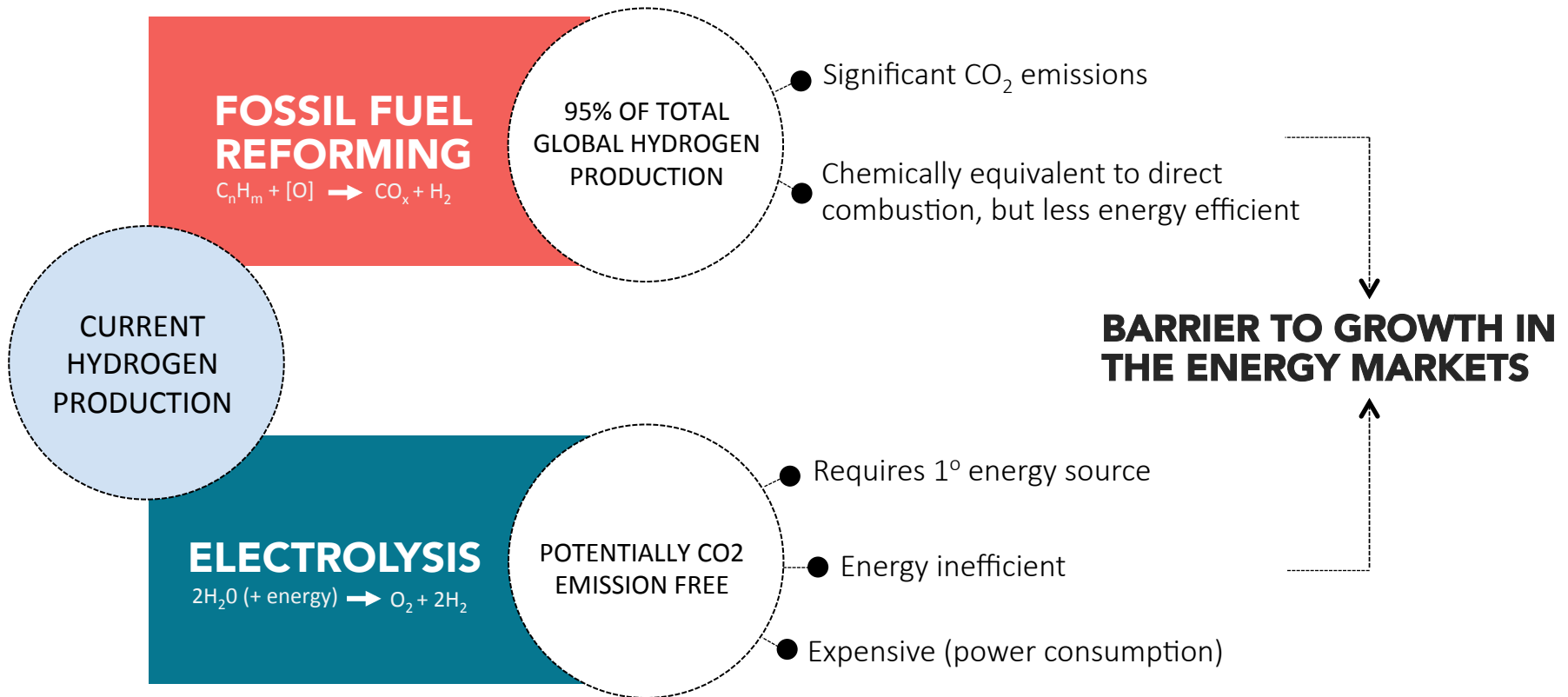
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# THE PROBLEM WITH HYDROGEN

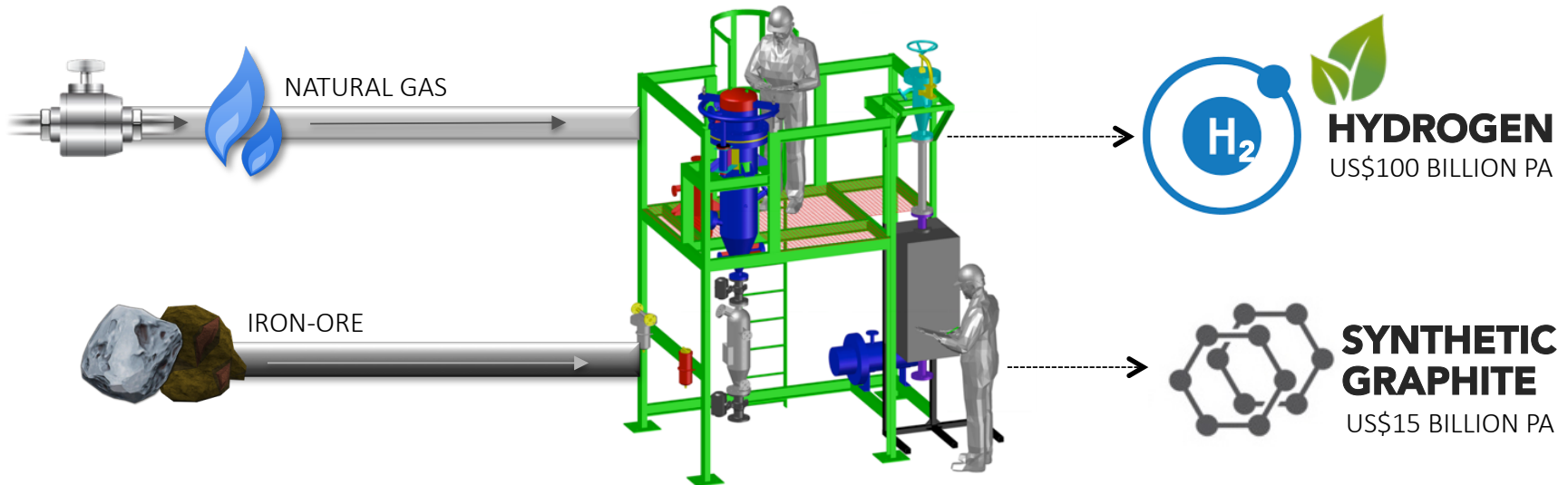
PRODUCTION IS HIGH IN GHG EMISSION OR EXPENSIVE





# THE HAZER SOLUTION

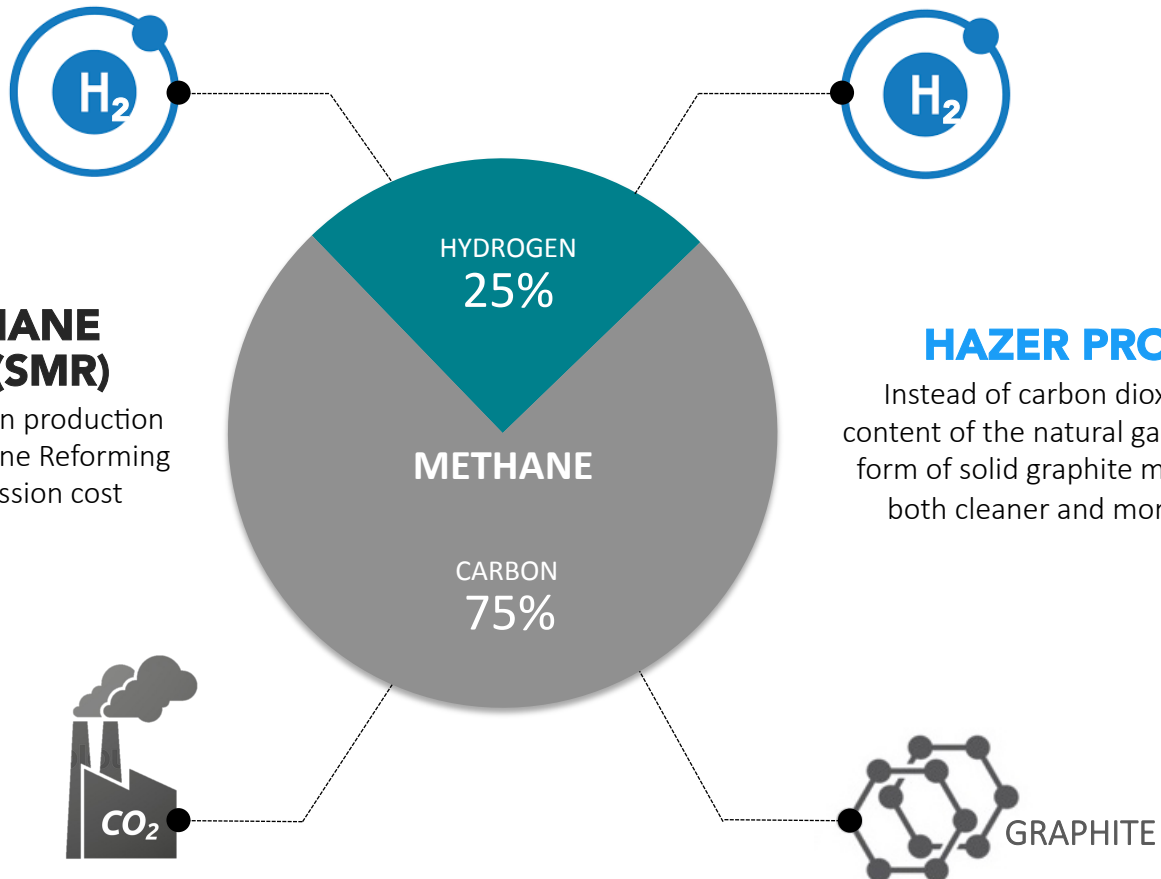
## HYDROGEN AND GRAPHITE FROM NATURAL GAS





# HYDROGEN PRODUCTION

HAZER CAPTURES ALL THE VALUE OF FEEDSTOCK GAS



## STEAM METHANE REFORMING (SMR)

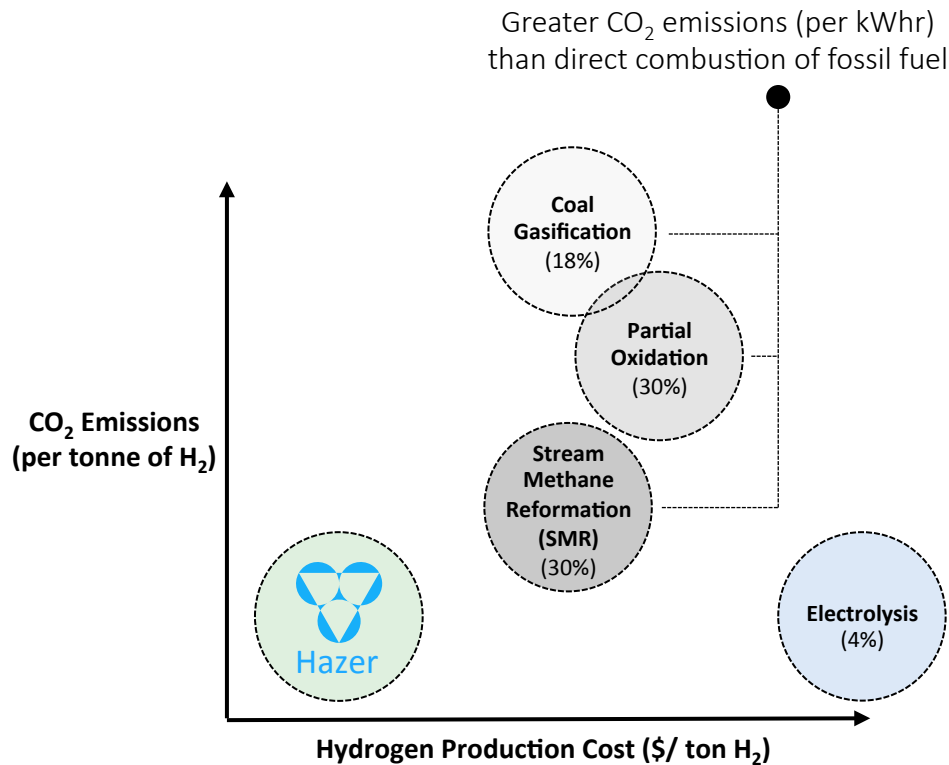
Current large scale hydrogen production processes like Steam Methane Reforming come at a huge CO<sub>2</sub> emission cost

## HAZER PROCESS

Instead of carbon dioxide, the carbon content of the natural gas is captured in the form of solid graphite making the process both cleaner and more cost effective

# HAZER HYDROGEN

## CLEANER AND CHEAPER ALTERNATIVE



- **‘Clean’ and economically competitive hydrogen**
- At least 50% emissions reductions anticipated over alternative fossil fuel based hydrogen production (SMR)
- Emissions can be reduced further by harnessing clean energy options as power source for process energy
  - Process energy (per kg of hydrogen) is significantly lower than electrolysis
- Executed MoU with Pan American Hydrogen, a US-based global supplier of hydrogen production infrastructure
- Lower operating cost through graphite sales to enable access to US\$100 Billion Industrial hydrogen market
  - Market growing to US\$151 Billion in 2021

# HAZER HYDROGEN

## MULTIPLE CLEAN ENERGY APPLICATIONS



- **Current focus for Hazer** - targeting prototype refuelling-scale production unit in 2018
- Major vehicle manufacturers developing FCV models
- Fundamental cost, energy and GHG emissions barriers for existing hydrogen production in this market
- Hazer offers highly competitive alternative



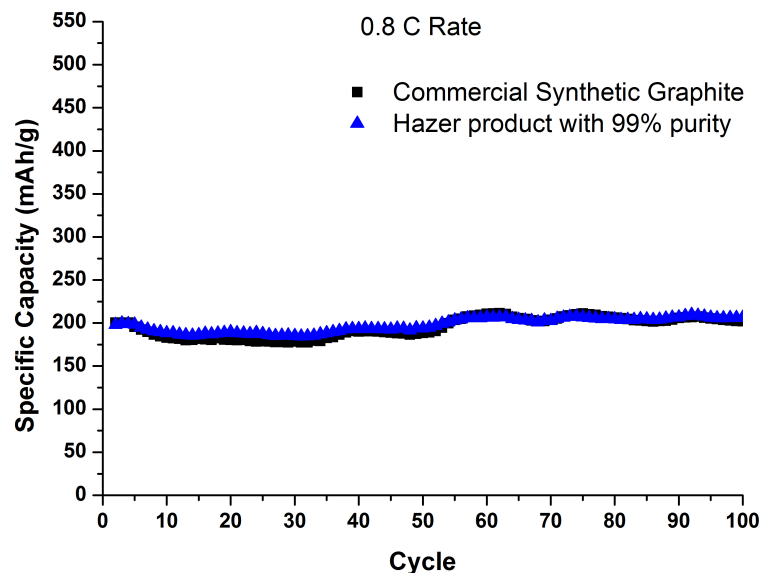
- Hazer can offer an alternative hydrogen-based grid smoothing option
- Potential to offer significantly enhanced energy efficiency over traditional electrolysis based hydrogen grid smoothing options
- Lower energy load per kg of H<sub>2</sub> so greater grid efficiency



- Low energy requirements potentially offers an option to leverage off traditional clean energy systems
- Use of wind / solar plus “self sequestering” natural gas has potential to address cost and consistency issues for renewable power generation
- Operating costs may be further reduced through graphite sales

# HAZER GRAPHITE

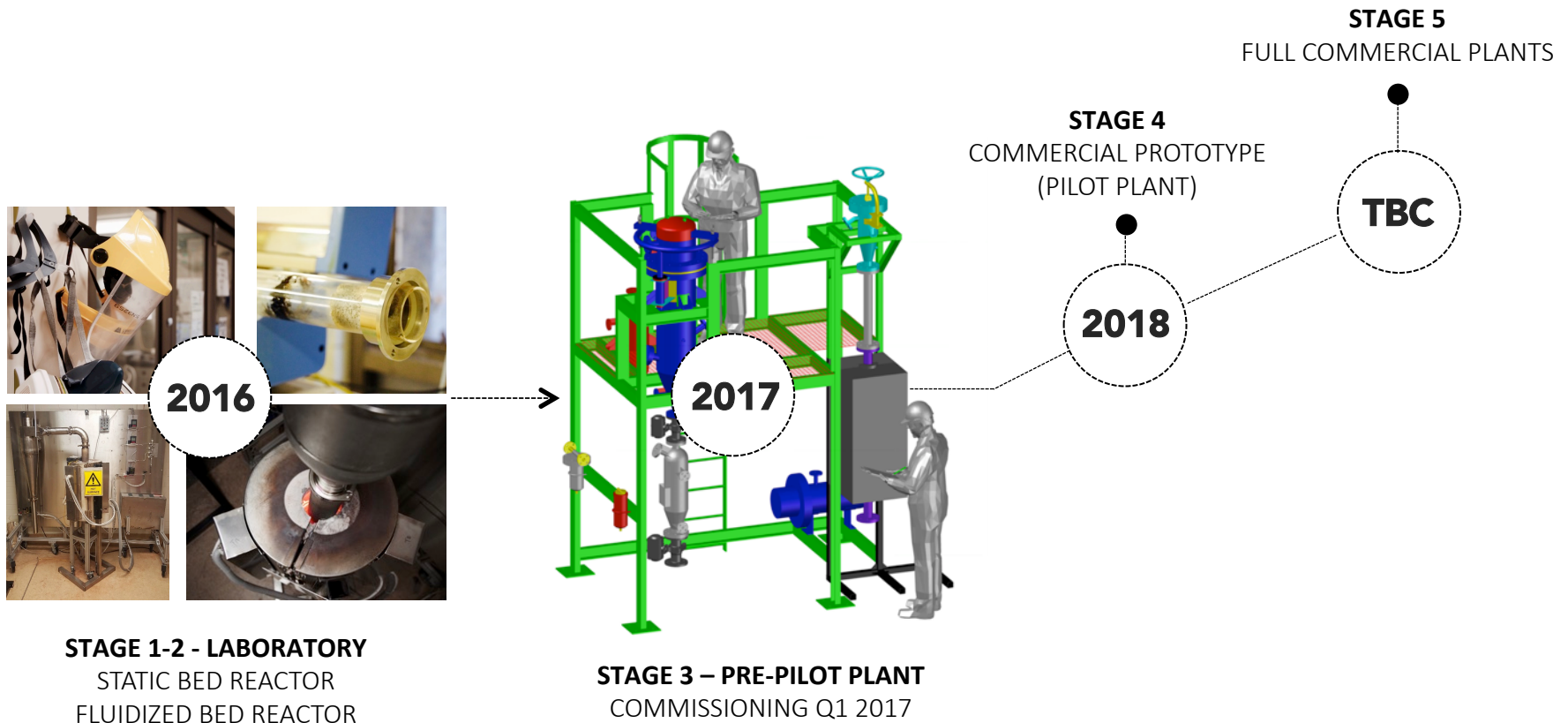
## HIGH QUALITY GRAPHITE FOR ENERGY STORAGE & OTHER MARKETS



- **Hazer graphite is high purity** (85-95% tgc as raw product), highly crystalline and low cost
- Purity can be enhanced through chemical processing to >99% tgc
- Excellent cycle characteristics against commercial reference material in lithium-ion battery tests
- Clean chemical production process;
  - No excavating mass areas of land
  - Less use of harsh chemicals
  - Less pollution vs. traditional synthetic graphite

# LABORATORY → PRE-PILOT PLANT

HAZER HAS MADE SIGNIFICANT PROGRESS SINCE IPO



# COMMERCIALISATION OPTIONS

BUILD DIVERSIFIED REVENUE THROUGH MULTIPLE COMMERCIAL OPTIONS



## BUILD, OWN & OPERATE

Hazer can construct & own plants and sell products



## PARTNERSHIP

Share capital & operating costs with hydrogen or graphite partners



## LICENSE

License IP to 3<sup>rd</sup> parties and generate high margin royalty

CURRENTLY INVESTIGATING MULTIPLE OPTIONS  
ACROSS DIFFERENT BUSINESS MODELS

# EXPERIENCED & CAPABLE TEAM

## STRONG CORPORATE, COMMERCIAL AND TECHNICAL EXPERIENCE



**Mr Geoff Pocock | MD**

- Founder, HazerGroup Ltd
- Over 17 years experience in commercialisation, corporate finance and strategy
- Ex Managing Partner mid tier strategy consulting business
- Tertiary qualifications in Chemistry, Law and Applied Finance

**Mr Terry Walsh | Director**

- Commercial lawyer with 20 years project development experience
- Former General Counsel, Hancock Prospecting Pty Ltd
- Previous roles with Rio Tinto, and leading law firms in Perth and Sydney, focusing on development of major projects.



**Dr Andrew Cornejo | CTO**

- PhD and key researcher on Hazer project
- Lead inventor on a number of patents.
- Commercial experience in engineering consultancy and resources project development.
- Bachelor of mechanical engineering and commerce (UWA), Graduate Cert in research commercialization (QUT)

**Ms Emma Waldon | Company Sec / CFO**

- Over 18 years global corporate experience.
- Company Secretary of MOKO Social Media Limited
- Diverse financial, corporate advisory and risk management roles at Ernst & Young, Euroz Securities, Lloyds Banking Group (London) and Deloitte.
- Member, AICA, a Fellow of the FINSIA and a Certificated Member of GIA.





# HAZER GROUP LIMITED

## INVESTMENT SUMMARY



- **Cheaper and cleaner alternative**
- Oil refining, ammonia production, other industrial chemicals
- Currently primarily addressed by fossil fuel reformation processes
- Hazer has potential to deliver significant cost savings and reduced GHG emissions for industrial hydrogen producers



- **Multiple clean applications**
- Key component of clean energy future ( $H_2 \Rightarrow H_2O + \text{energy}$ )
- Fuel cell vehicles, stationary power applications
- Fundamental cost, energy limitations for existing hydrogen production options



- **High quality, low cost graphite source**
- Range of industrial materials applications
  - Growth - energy storage (batteries)
- Currently addressed by mining, synthetic graphite production with significant environmental impacts

# HAZER GROUP LTD



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