

# Shipping Solutions for the Energy Transition



Compression | Simplicity | Efficiency



**Global Energy Ventures**  
Shipping Solutions for the Energy Transition

Corporate Update | February 2021

(ASX.GEV) | [gev.com](http://gev.com)

# Corporate Overview

## Capital Structure

Ordinary Shares on Issue (GEV.ASX) *	450m (75%)
<b>Market Capitalisation at \$0.125/share *</b>	<b>\$56.3m</b>
<b>Cash Balance (pro-forma 22 Feb) *</b>	<b>\$8.1m</b>
Listed Options on Issue (GEVOA.ASX) <sup>1</sup>	96.7m (19%)
Performance Shares <sup>3</sup>	14m (3%)
Performance Rights <sup>2</sup>	16.5m (3%)
Fully Diluted Shares	577.2m (100%)

\* Pro-forma for \$6.3 million Capital Raising announced 17 February 2021

## Shareholder Summary (Undiluted)

<b>Board and Management</b>	<b>~13%</b>
Institutional & HNW <sup>4</sup>	~45%
Top 20 shareholders <sup>5</sup>	~51%
Top 50 shareholders <sup>5</sup>	60%

Notes:

1. Listed Options GEVOA, expiry 26 May 2023, exercise \$0.12
2. Performance Rights issued to Maurice Brand, Garry Triglavcanin, Paul Garner, Martin Carolan and consultants
3. Refer to the 30 June 2020 Annual Report for full details of the Milestone Conditions
4. Excludes share held by the Board & Management
5. Including shares held by the Board & Management

## Board & Management Team



**Maurice Brand**  
Executive Chairman &  
Chief Executive Officer  
**Ownership: 22.3M shares**



**Garry Triglavcanin**  
Executive Director &  
Chief Development Officer  
**Ownership: 11.9M shares**



**Martin Carolan**  
Executive Director,  
Corporate & Finance  
**Ownership: 10.9M shares**



**Andrew Pickering**  
Non-Executive Director  
**Ownership: 2M shares\***



**John Fitzpatrick**  
Chief Technical Officer  
GEV Canada  
**Ownership: 0.9M shares**



**David Stenning**  
Chief Operating Officer  
GEV Canada  
**Ownership: 0.8M shares**



**Experienced team in value creation and material ownership of equity aligned with shareholders**

\* Subject to shareholder approval

# Global developer of integrated compressed shipping projects

Advancing regional green marine transport solutions for natural gas and hydrogen



## CNG Optimum

Ready for Commercialisation

Patented design for 200 MMscf of natural gas  
Full Design Approval for Construction  
CNG full cycle low CO<sub>2</sub>e emissions



### Brazilian Pre-Salt & CNG to Power

- > Multiple development projects backed by global oil majors seeking a commercialisation strategy for associated offshore gas.
- > **Targeting FEED level acceptance in 2021**



### US Gulf of Mexico

- > Offshore site selected, adjoining existing infrastructure to export US Henry Hub gas. Discussions on market off-take underway.



## Compressed H<sub>2</sub> Ship

In development – World First

2,000 tonne hydrogen capacity  
US Patent Filed



### Hydrogen Export

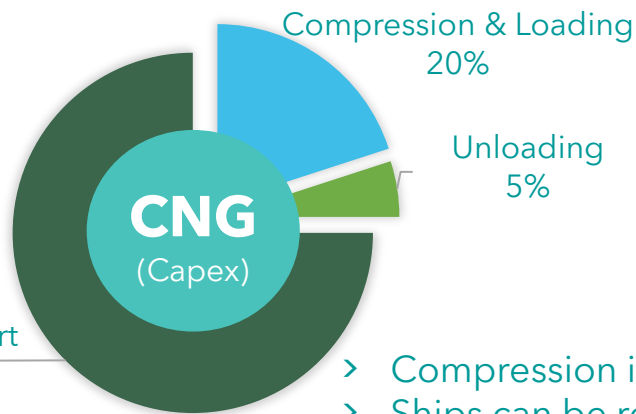
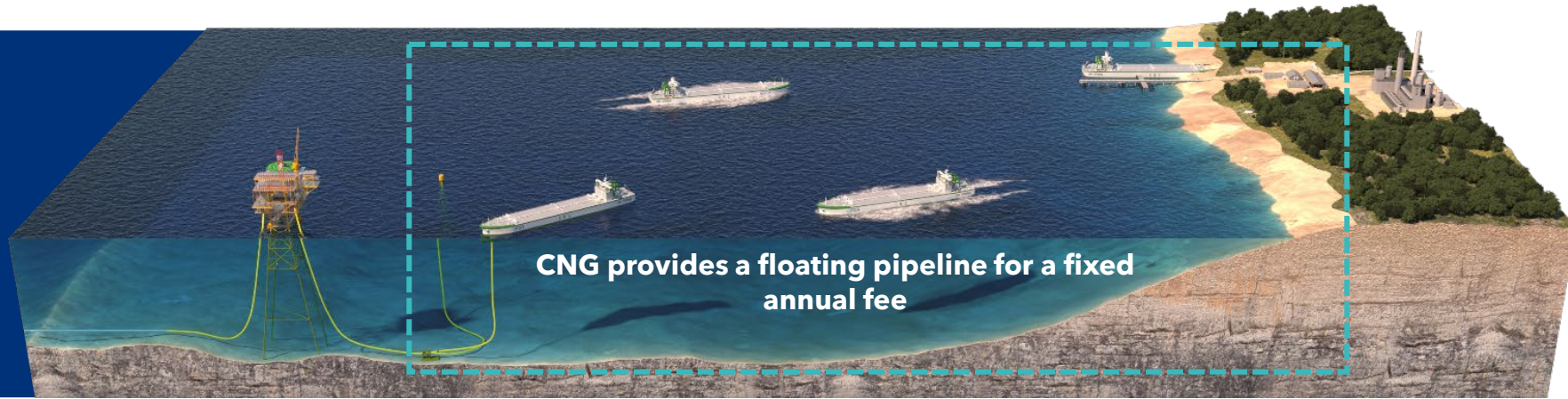
- > Development of a new C-H<sub>2</sub> Ship and patent protection to deliver a solution for transporting hydrogen to regional markets.
- > GEV well positioned to rapidly deliver a marine transport solution the market requires.
- > Simple, efficient and low technical barriers to commercialise.
- > Significant industry support towards GEV's entrance into sector.



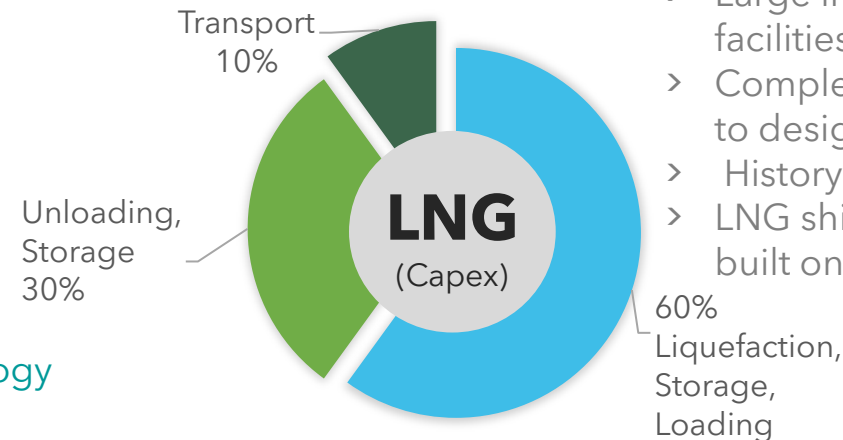
# CNG offers a competitive and efficient pipe-to-pipe energy supply chain

Material upfront capital of a pipeline vs fixed tariff provided by CNG is a compelling benefit to operators

## Regional floating gas pipeline solution



- > Compression is simple & proven technology
- > Ships can be re-deployed
- > Reduced investment & scheduling risk
- > Low-cost financing for ships
- > Construction contained to single shipyard
- > Materially lower CO2e emissions than LNG (full cycle basis)



- > Large investment in onshore facilities
- > Complexity in liquefaction process to design and build
- > History of cost overruns
- > LNG ships benefit from history of built on time and on budget

# Multiple CNG opportunities in the Pre-salt Brazil

GEV's CNG Commercialisation Plan (2020) concluded no technical 'show-stoppers'

- > CNG established as a viable alternative to a gas pipeline or reinjection.
- > Gas is compressed on FPSO and loading via flow line to the dual STL system.
- > Fleet of up to 5 ships to match the gas export design rate. Dual loading systems and redundancy in ship fleet required to satisfy continuous operating reliability.
- > Base design CNG Optimum ship upgraded to include DP2 & STL capability (increases cost of base ship).
- > **Proposal is for a 15+ year charter** for gas delivered to a dedicated CNG unloading terminal
- > **Next stage of engineering (FEED) to recommence in early 2021.**
- > **Second Brazilian operator now confirmed to evaluate CNG transport for producing and in-development Pre-salt fields.**

## ✓ Technical Acceptance

The ability of the proposed export solution to load, store, transport and unload the gas specification provided, by maintaining the gas in single phase throughout each of these processes.

## ✓ Competitive Charter Rates

The commercial model to be reviewed includes competitive charter rates for the proposed fleet of CNG ships.

## ✓ Continuous Gas Export

GEV considers the proposed CNG ship fleet provides the FPSO, with a reliable, available and maintainable solution for continuous gas export.



# CNG Optimum - Energy efficient & low emission solution

Supports net-zero carbon targets

CNG Optimum's carbon footprint is expected to be at least 50% lower than that of LNG for the full cycle

Global oil & gas producers increasing their focus on 'low emission' solutions whilst maximising the economic value of oil and gas fields

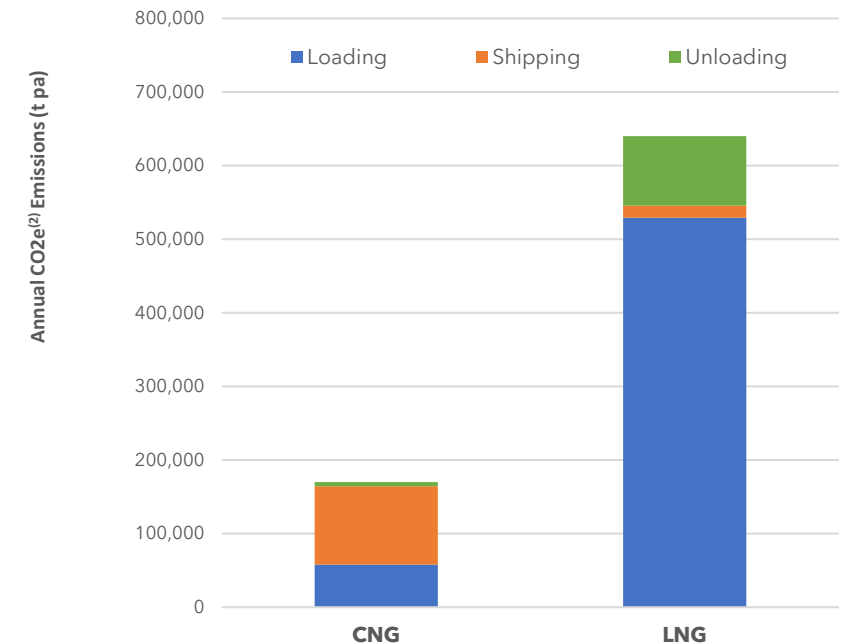
Gas consumed as fuel for "full cycle"  
CNG: 5%  
LNG: 15%

- **Case Example:** "LNG: liquefaction-shipping-regasification" versus "CNG: compression-shipping-decompression"
  - Based on the transportation of 200 MMscf/d (or ~1.5 mtpa LNG) of gas over a distance of 500 nautical miles (regional).
  - Assuming all compression/liquefaction facilities are fuelled by natural gas
- **GHD agrees that for the case presented, transporting the gas as CNG is a lower emissions intensive process than transporting the gas as LNG by a factor of approximately 3-4x<sup>(1)</sup>**

**CNG project could save 500,000 tonnes of CO2e emissions annually - equivalent to 110,000 passenger vehicles off the road per year**

**CO2e Footprint - CNG vs. LNG**

(based on 200 MMscf/d or ~1.5 mtpa)



<sup>(1)</sup> GHD | Report for Global Energy Ventures Ltd - GHG Emission Calculations, September 2020. For the case example presented by GEV below of a load of 200 MMscf of gas transported over a distance of 500 nautical miles, GHD agrees that the approach for calculating GHG emissions is appropriate. <sup>(2)</sup> CO2e or Carbon dioxide equivalent or is a term for describing different greenhouse gases in a common unit.



# GEV's CNG program supported by global partnerships

Development partners also adapting their products for a hydrogen supply chain

Gas containment system integrated into the ship design.

Long horizontally stacked pipe minimises connections and optimises the gas containment system.

Optimum IP overcomes the gas storage pipes rubbing together in a marine environment.

## 2019

**ABS Approved for Construction & Letter of Intent with CIMC Raffles**

Globally recognised technical partnerships:



**American Bureau of Shipping**

Ship Classification & Approvals



**Clarksons Platou**

Ship Broker & Financial Advisor



**SeaQuest Marine**

Technical Advisor

**CIMC RAFFLES**

**CIMC Raffles**

Shipyard



**CIMC ENRIC**

CNG Engineering

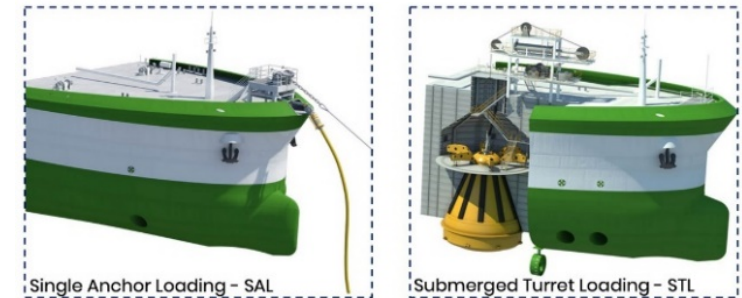
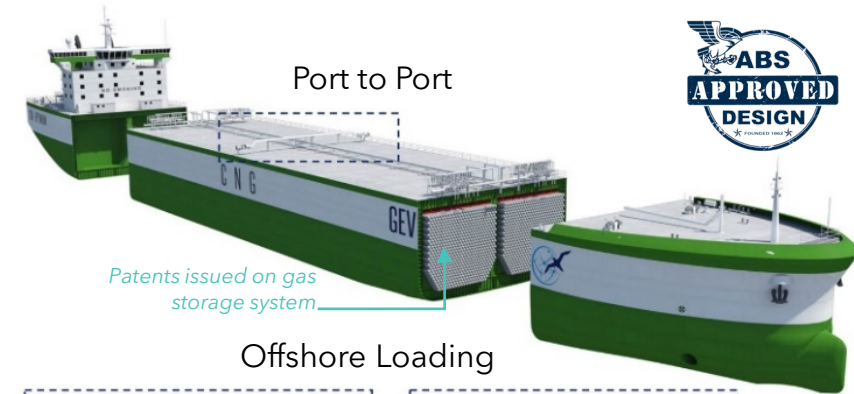
## 2020

**Design upgrade to include offshore loading**

With support from:



**KONGSBERG**



**CNG SHIP**

**OPTIMUM STORAGE SYSTEM**

<b>190m</b>	Length
<b>17.0m</b>	Depth
<b>31.8m</b>	Breadth
<b>9.4m</b>	Full Load Draft
<b>47,500 mt</b>	Displacement
<b>14 knots</b>	Service Speed
<b>200 MMscf</b>	Net Sales Volume
<b>3,600 psi</b>	Operating Pressure
<b>X80/ERW</b>	Pipe Grade & Weld Type
<b>20"</b>	Pipe Diameter
<b>100m</b>	Individual Pipe Length
<b>130km</b>	Total Length of Pipes

# Global market for hydrogen set to grow >10x through to 2050

Scale solutions for storage and marine transport the key to unlocking market demand

Hydrogen targeted to account for **~20% of primary energy consumption**, and represents a US\$2.5T addressable market  
(BP Energy Outlook 2020)

**+USD 30 Billion in stimulus** committed from France, Germany, US, China, Japan, South Korea & Australia to develop a hydrogen economy

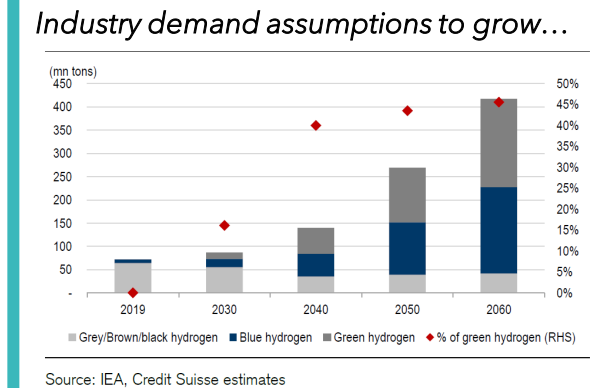
**ESG funds heavily investing in companies** with a technology or economic advantage across the hydrogen supply chain driving a re-rate in value

**Billions of upstream capital to be committed by energy majors** without a proven and scalable storage and transport solution

**Hydrogen industry embracing new storage and transport solutions** to facilitate domestic and export markets for end-use applications

Cost of green hydrogen target of **A\$2/kg to reach pricing parity with fossil fuels** (cost of renewable power and electrolyser)

**End user markets now evolving**, with a focus on heavy emitting industries (cement, refining, power, heavy transport).



**Hydrogen now established as an investment thematic with significant tailwinds ...**



# Compressed Hydrogen (C-H<sub>2</sub>) Supply Chain

Emission free **green hydrogen** transport from Australia to Asia Pacific region



## Benefits of C-H<sub>2</sub> for a 100% green hydrogen supply chain:

- ✔ Simplicity of the supply chain (compress/transport/de-compress)
- ✔ Maintains hydrogen in a pure gaseous form from start to finish
- ✔ Energy efficient / low internal fuel use
- ✔ Few technology barriers to commercialisation in the next 5 years
- ✔ Compressors can load follow electrolyser's production profile



# First mover advantage using compression to store and transport

World first development of a large-scale zero emission marine supply chain for green hydrogen

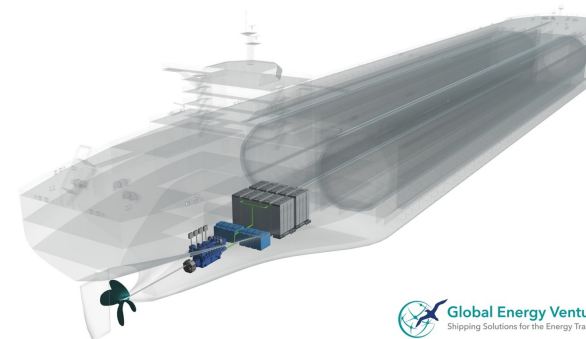
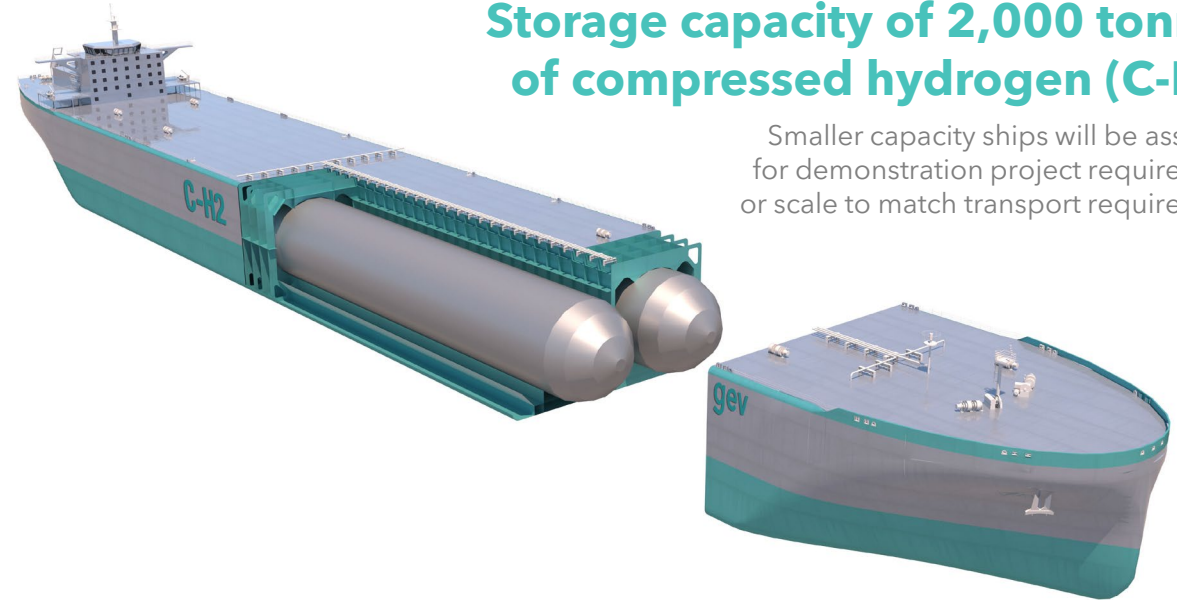
- > C-H2 Ship specification and general arrangement completed and US patent application filed late 2020.
- > American Bureau of Shipping and Capilano Maritime engaged to deliver 'Approval in Principle' (AIP) in 1H 2021.
- > Scoping Study underway to determine economic range for large scale marine transport to be delivered Q1 2021.
- > Engagement with Australian State and Federal Governments to support GEV's hydrogen export solution.

Technical Partners Include:



**Storage capacity of 2,000 tonnes of compressed hydrogen (C-H2)**

Smaller capacity ships will be assessed for demonstration project requirements or scale to match transport requirements



**MOU with Ballard Power Systems** to design and develop a hydrogen fuel cell system to power the C-H2 ship using H2 from its storage tanks



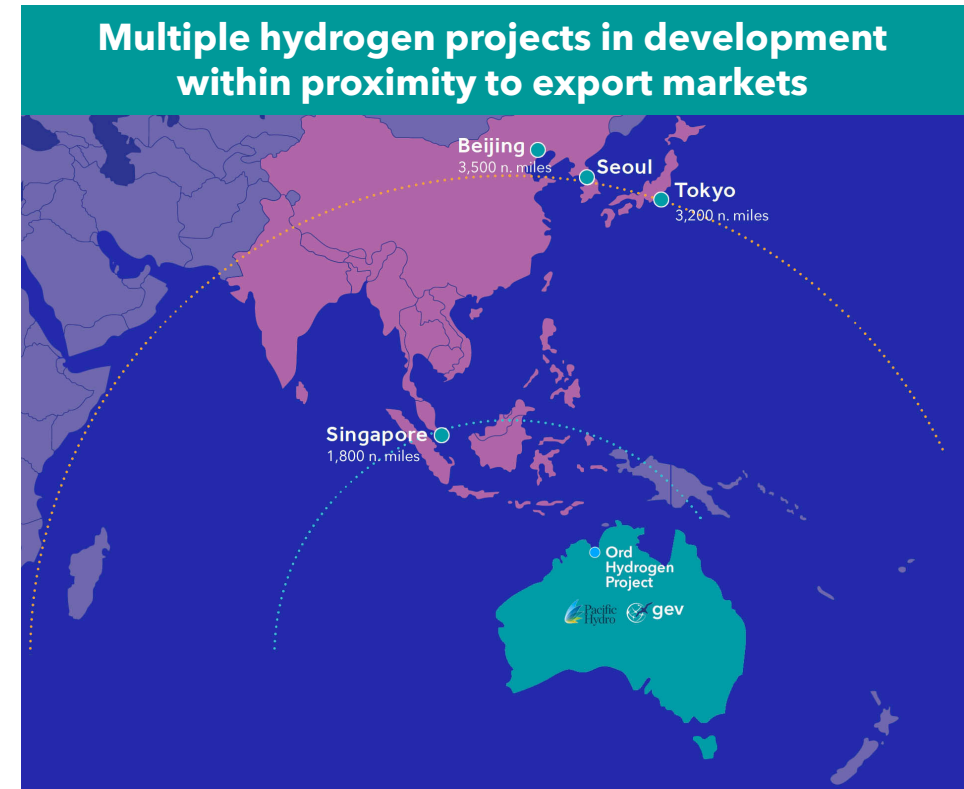
**Successful delivery of AIP to demonstrate there are no identified showstoppers that would prevent the ultimate classification of the vessel**

The containment system will store ambient temperature hydrogen at a pressure of 250 bar (3,600psi), matching the operating pressure of CNG Optimum.

# Why Australia ?

Australia leads the world with a national hydrogen strategy focussed on building hydrogen supply chains, large-scale export infrastructure and future export projects under development

- > 2019: National strategy to create a H2 industry to ship hydrogen to Asia Pacific customers who are already building a new hydrogen industry to replace natural gas.
- > 2020: Long-term funding and policy commitment in place with recently announced \$1.9 billion funding for renewable R&D over 10 years – hydrogen a key pillar.
- > Abundance of cheap renewable energy.
- > Track record for developing major energy infrastructure projects.
- > Resources and skills in place to build an economically sustainable domestic and export industry.
- > 56 hydrogen projects announced, with an estimated 1-2MT of hydrogen export capacity.
- > **First MOU signed with Pacific Hydro for the Ord Hydrogen Project.**



*Notable Project Participants in Australia Include:*





# C-H2 is an emission free transport solution for offshore green H2

Expression of interest received to evaluate C-H2 as an **emission free** transport solution for **green hydrogen** produced at "off-grid" wind farms

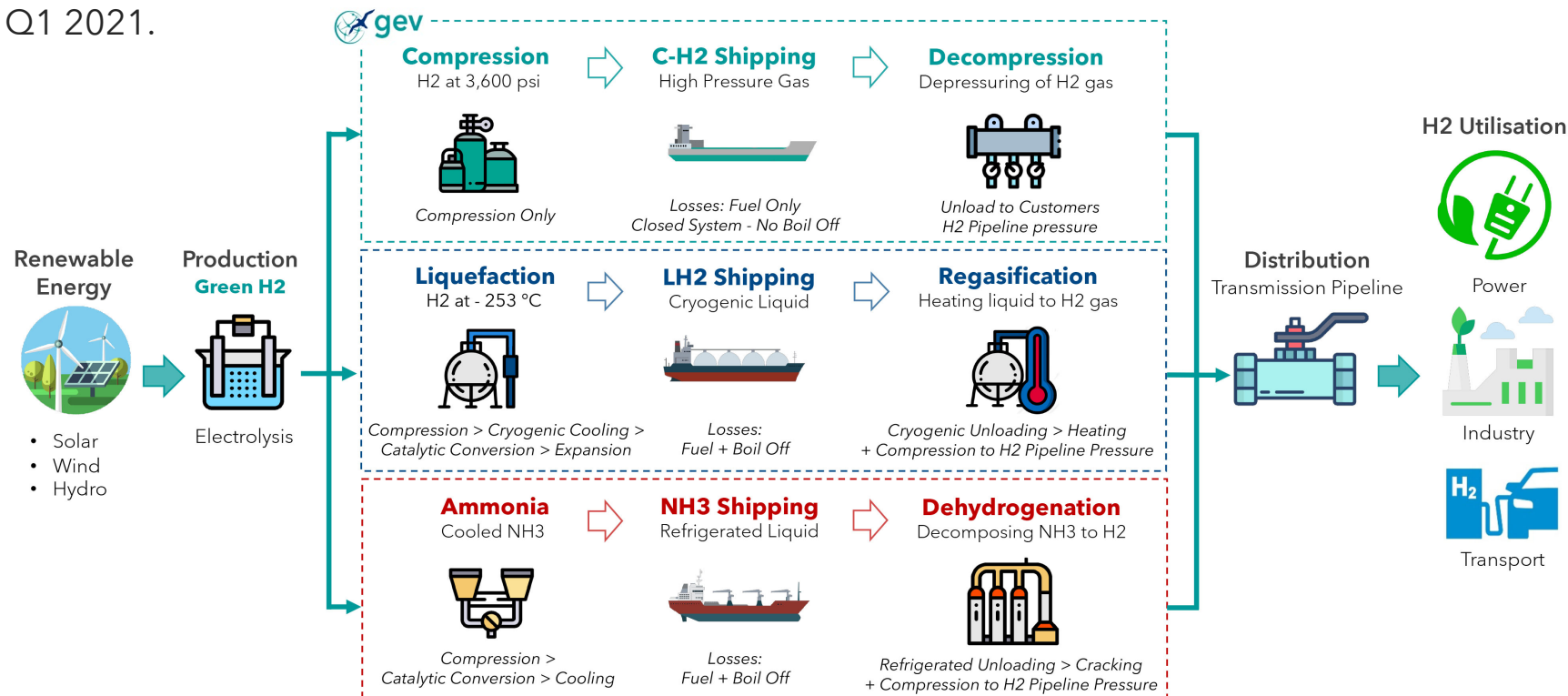


- > Significant build-out of offshore wind-farms across Europe, including the North Sea. Use case would apply in all distinctions contemplating offshore wind as the source of green energy.
- > Significant EU project funding schemes available to accelerate engineering studies - Discussions now underway to advance a foothold in this market.
- > **Project Example: AquaVentus (10GW), Germany, 1Mtpa H2 production sold to EU network. Various locations may exclude the use of grid connection. Consortium of 27 companies**

# Scoping Study underway to demonstrate C-H2's simplicity & efficiency

Techno-Economic assessment to compare the supply chain economics and energy efficiency of GEV's C-H2 transport solution against Liquefaction (LH2) and Ammonia (NH3)

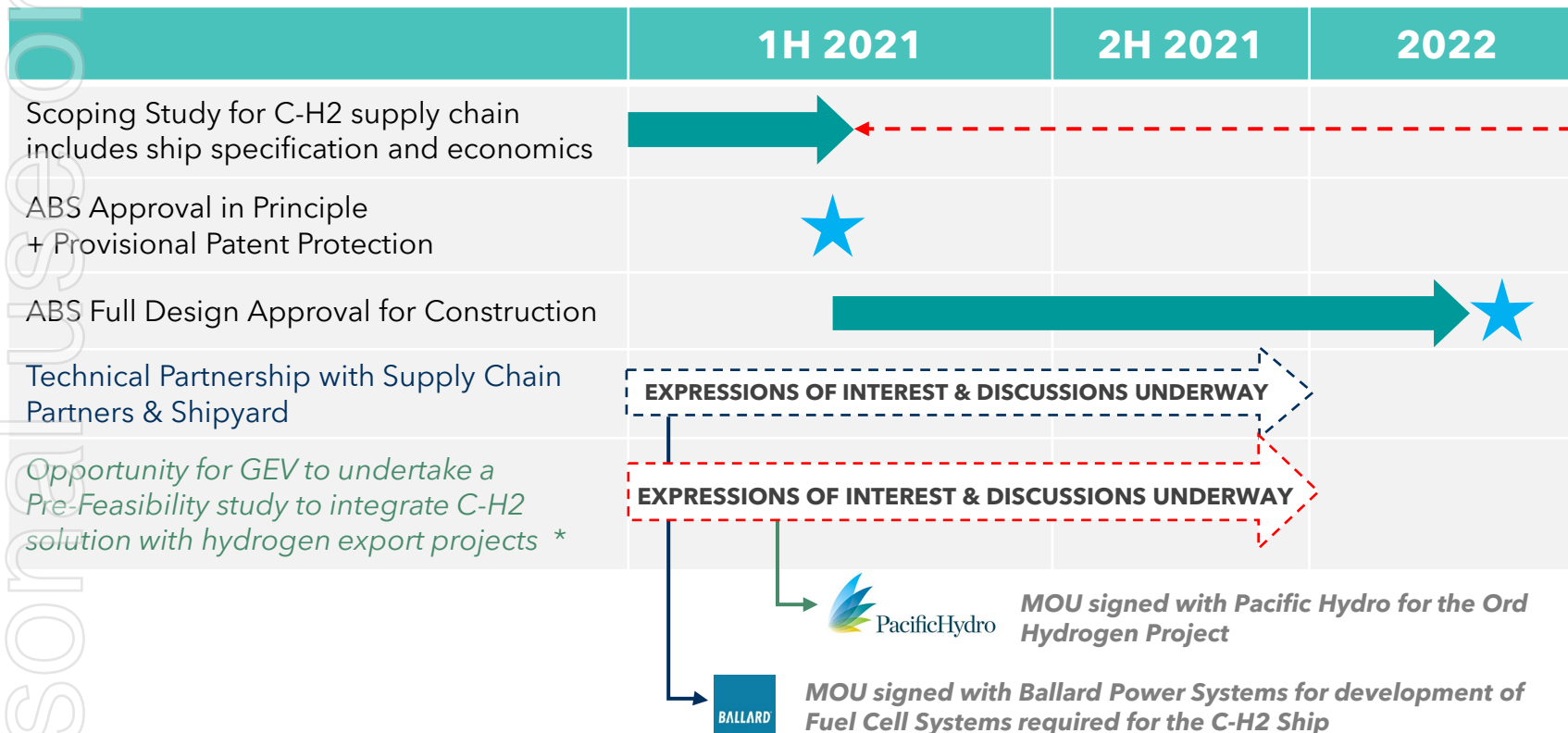
- Study will include 'levelized cost analysis' for annualised volume of green hydrogen (50,000 to 400,000 tpa) to market distances of 2,000, 4,000 and 6,000 nautical miles.
- GHD Advisory providing support on the analysis of Class 4 / Class 5 equivalent estimates for capital and operating costs for each supply chain alternative, along with the internal energy requirements.
- Completion Q1 2021.



# C-H2 development timeline & key milestones 2021

C-H2 replicates the key process steps and technical partners of the CNG supply chain providing GEV with fast-tracked development schedule

## Indicative development schedule of C-H2 supply chain



### Current Engineering Phase:

American Bureau of Shipping (ABS) and Capilano Maritime engaged to deliver 'Approval in Principle' (AIP) in 1H 2021.

- > Ship outline specification including the cargo containment and midship section
- > Process analysis to load and unload the H2 Ship
- > Preliminary HAZID analysis to demonstrate safety
- > US Patent application and filing
- > Techno-economic analysis of C-H2 for export volumes and distance





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