



ASX ANNOUNCEMENT

19 March 2021

GEV RECEIVES APPROVAL IN PRINCIPLE FOR ITS C-H2 SHIP CONTAINMENT SYSTEM

HIGHLIGHTS:

- **GEV has received Approval in Principle (AIP) from American Bureau of Shipping (ABS) for its C-H2 Ship containment system, based on a cargo capacity of 2,000 tonnes of hydrogen.**
- **The engineering review undertaken by ABS confirmed that the C-H2 Ship can meet the high standards of safety required by shipping classification societies.**
- **Extensive HAZID scenarios were also assessed with ABS concluding "That there were no unresolvable or unmitigable risks identified during the HAZID that would prevent further successful development of the compressed hydrogen ship design".**
- **GEV can now confidently progress through to final detailed engineering design and testing to obtain Full Class Approval for the construction of the C-H2 Ship.**
- **Commercial and technical discussions for the development of GEV'S C-H2 supply chain are being advanced via:**
 - **Partnerships with renewable energy projects targeting hydrogen export; and**
 - **Development of GEV's own pilot scale renewable energy project for the export of hydrogen.**

Global Energy Ventures Ltd (ASX: **GEV**, the **Company**) is pleased to advise the American Bureau of Shipping has issued its Approval in Principle for the C-H2 Ship containment system, based on a cargo capacity of 2,000 tonnes of hydrogen. The hydrogen containment system (patent pending) is the most critical component of the Company's C-H2 Ship.

Maurice Brand, GEV Executive Chairman & CEO, commented: "GEV is pleased to report that it has received Approval in Principle from American Bureau of Shipping, a critical milestone in the continued development of the C-H2 Ship. This has been the result of significant effort by the Company's management team, lead by Martin Carolan, and GEV's technical and engineering team in Canada. The team delivered this critical milestone several months ahead of schedule and under budget. The Board is delighted with the outcome."

Martin Carolan, GEV Executive Director & Head of Hydrogen further commented: "This approval results from our team's engineering efforts over the past year and is a major step forward in the overall approval process for our C-H2 supply chain. This unique compressed hydrogen containment system provides a low-cost solution for the marine transportation and export of large volumes of hydrogen.

GEV advises shareholders that ABS undertook extensive Hazard Identification Analysis (HAZID) prior to issuing the Approval in Principle. It is important to note that as a result of the ABS work there were no unresolvable or unmitigable risks identified that would prevent further successful development of the C-H2 Ship. The receipt of AIP and accompanying road map to Full Class Approval has materially de-risked the path forward technically and commercially.

GEV is now in discussions with parties to evaluate the C-H2 supply chain for future hydrogen export projects, while also identifying suitable sites for the development of its own pilot scale renewable green hydrogen project for a fully integrated green C-H2 supply chain."

SUCCESSFUL RECEIPT OF APPROVAL IN PRINCIPLE (AIP)

The engineering and design of the C-H2 Ship benefited from the Company's long-standing history and experience in developing shipping solutions through to final construction approval, including GEV's CNG Optimum ship.

Since hydrogen has significantly different chemical properties to natural gas, a new design approach was required. In early 2020, GEV's engineering team began the process of developing the optimal ship design to safely carry compressed hydrogen at the lowest unit cost. The result was the design of a C-H2 Ship capable of transporting 2,000 tonnes of compressed hydrogen at 250 bar and at ambient temperature.

In November 2020, GEV submitted this C-H2 Ship design with its twin 1,000 tonne C-H2 tanks to ABS seeking their Approval in Principle in accordance with their New Technologies Qualification program. The prime focus of the approval was the design and safety of the compressed hydrogen containment system.

To achieve AIP, ABS reviewed the engineering documents submitted by GEV that included structural engineering analyses focused on the critical aspects of the design, process simulation (loading and unloading), ship stability analyses, and an overall technical specification of the ship.

In addition to these studies, a HAZID and "What-if" analysis was carried out. The purpose of this analysis was to review the design features in light of all potential operational procedures and hazards as well as accidental situations. The objective was to identify and classify (where possible) all of the risks associated with the ship's design and operations. It is through this process that any unresolvable issues may be identified that could compromise the overall viability of the ship.

ABS concluded "That there were no unresolvable or unmitigable risks identified during the HAZID that would prevent further successful development of the compressed hydrogen ship design". On this basis, ABS issued their Approval in Principle. This is a major milestone and allows GEV to proceed with further technical and commercial development.

The positive conclusions of the HAZID and achievement of Approval in Principle provides a solid foundation for progressing the engineering to advance GEV's hydrogen export opportunities.

As highlighted in GEV's C-H2 Scoping Study ASX announcement dated 1 March 2021, a key conclusion was that the C-H2 supply chain had minimal technical barriers to achieve commercialisation, with the AIP and Full Class ABS approvals being a key requirement. The receipt of AIP and accompanying road map to Full Class Approval has materially de-risked the path forward.

GEV will now work with ABS to progress the various engineering steps towards Full Class Approval (i.e. approval for construction, similar to that achieved by GEV for its CNG Optimum ship). Further details will be provided over the coming quarters when material milestones are achieved.

Further details on the C-H2 Ship specification are available in Appendix A.

FRAMEWORK FOR AIP BY ABS

ABS is the world's premier classification society for carriers with more than 50 years of experience building and classing gas carriers of every type and size and specializing in the transport of liquefied natural gas (LNG), liquefied petroleum gas (LPG) and compressed natural gas (CNG). GEV's engineering team worked with ABS to progress the CNG Optimum ship from concept Approval in Principle to design Approval for Construction.

To achieve AIP, ABS reviewed the engineering documents submitted by GEV that included structural engineering analyses focused on the critical aspects of the design, process simulation (loading and unloading), ship stability analyses, and an overall technical specification of the ship. These documents were reviewed considering the following codes and standards:

- ABS Rules for Building and Classing Steel Vessels
- ABS Guide for Vessels Intended to Carry Compressed Natural Gases in Bulk
- IMO International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)
- ABS Guidance Notes on Qualifying New Technologies

- END -

This ASX announcement has been authorised by the Board of GEV.

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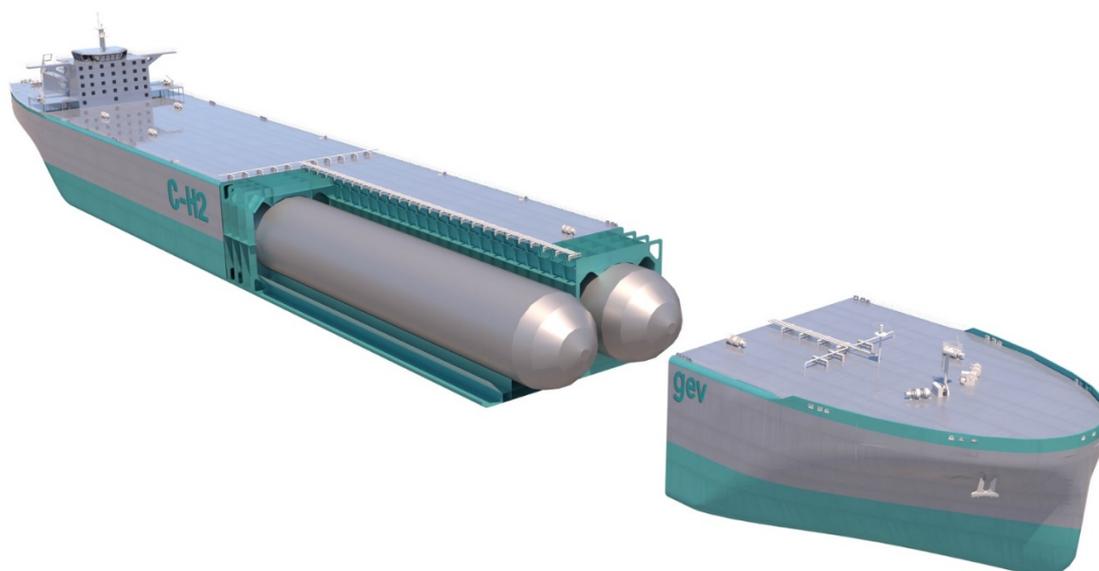
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APPENDIX A - C-H2 SHIP SPECIFICATION & ZERO EMISSION SHIPPING SOLUTION

GEV's unique C-H2 Ship has a large hydrogen carrying capacity of 2,000 tonnes. This vessel will be key to establishing an economic and energy efficient shipping link between hydrogen producers and customers given it represents a significant allocation of the overall cost of the supply chain. Figure 2 is an illustration of GEV's C-H2 general arrangement.

Figure 2: C-H2 Ship General Arrangement



Source: GEV

The key specifications of the C-H2 ship are as follows:

- > The proprietary design for the containment system is made up of two large (20 metre diameter) tanks, contained within the hull of the ship, that will store ambient temperature hydrogen at an operating pressure of 3,600 psi (250 bar) and will have a combined containment capacity of 2,000 tonnes of hydrogen.
- > The design of the C-H2 Ship will also allow for the evaluation of smaller capacity ships, which would be optimised to scale of the demonstration / pilot export project.
- > One of the key considerations in designing a steel tank for storing hydrogen, is that the hydrogen molecule is so small it can enter the steels molecular structure and over time can cause the steel to suffer from embrittlement.
- > A practical way to avoid hydrogen embrittlement is to provide a liner that prevents migration of hydrogen into the steel.
- > Technical requirements for such a large tank mean that it needs to be constructed in layers. Stainless steel will be used as the innermost layer, being resistant to hydrogen embrittlement, with six surrounding layers of ductile high-strength alloy steel to meet strength and fatigue requirements.
- > One significant advantage of a tank made from multiple discrete layers is that should a crack form in one layer it will not naturally proceed through to the adjacent layer. This greatly improves the safety of the tank.
- > With the rapid advancements in hydrogen fuel cells, GEV intends to fuel the ship with hydrogen from the storage tanks, providing a 'zero-carbon' shipping solution.

US PROVISIONAL PATENT FILED FOR THE C-H2 SHIP

In December 2020, GEV filed a provisional US Patent application relating to the apparatus for the marine storage and transport of hydrogen. The provisional application has been made to protect multiple ideas that arose during the design work undertaken in support of the American Bureau of Shipping (ABS) approval process. The inventor is GEV Canada's Chief Technical Officer, John Fitzpatrick. The Company will now work with its advisors on the detailed filing over the coming 12 months. The Company has a successful track record of patent applications with two granted for the CNG Optimum vessel.

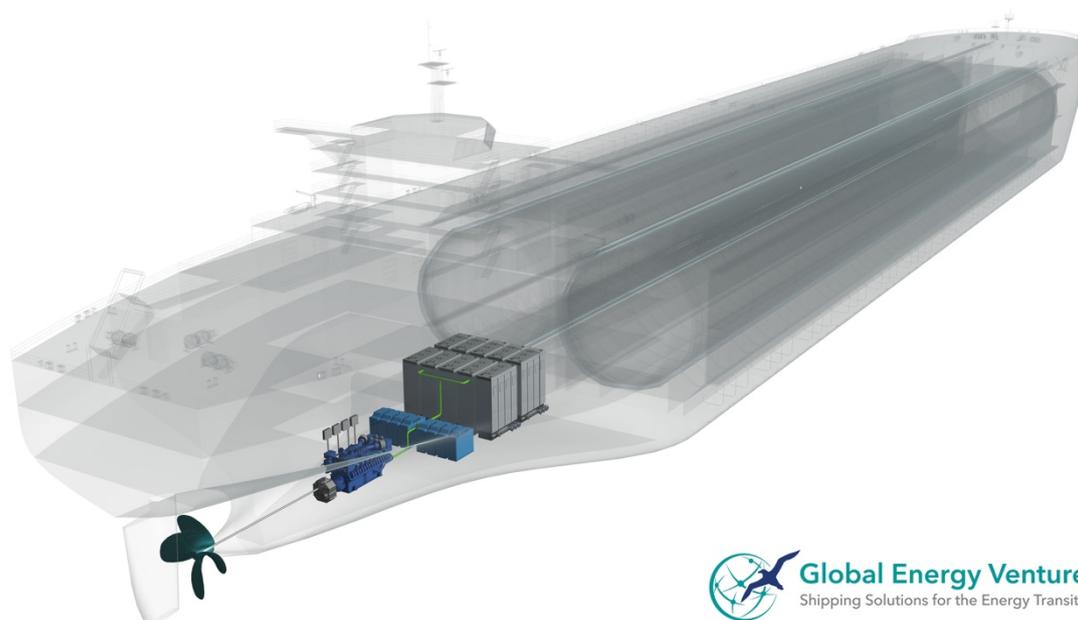
MOU WITH BALLARD POWER SYSTEMS TO DEVELOP HYDROGEN FUEL CELL SYSTEMS

In February 2021, GEV and Ballard Power Systems Inc. (Ballard) executed a Memorandum of Understanding (MOU) to design and develop a hydrogen fuel cell system for GEV's C-H2 Ship.

GEV and Ballard will work to power the C-H2 Ship using Compressed Hydrogen from its storage tanks, providing a zero-emission marine transport supply chain. Ballard will be responsible for the design of the fuel cell system (FC System), utilising its FC Wave™ Technology and to assist GEV with the integration of the FC System into the design of the C-H2 Ship.

During 2021-2022, both parties will work collaboratively to complete a final design and procure all necessary approvals, and full costing for the C-H2 Ship, utilising a Ballard FC System.

Figure 3: GEV's C-H2 Ship fuelled by Hydrogen Fuel Cells (Illustrative example)



Source: GEV

ABOUT GLOBAL ENERGY VENTURES LTD

Global Energy Ventures Ltd was founded in late 2016, with the Company's mission to create shareholder value through the delivery of integrated compressed shipping solutions transporting energy to regional markets. The business model is to build, own and operate integrated energy transport projects for either natural gas or hydrogen.

The primary focus is the development of integrated Compressed Natural Gas (CNG) marine transport solutions with the Company's construction ready **CNG Optimum ship**. CNG is a well proven gas transport solution with design and commercial advantages along with being safe and a 'lower emission' solution for the transport of gas than in the form of liquified natural gas (LNG).

With the world's focus on Energy Transition to zero-carbon fuels, the Company has also introduced the world's first large-scale **compressed hydrogen Ship (C-H2)** design that will support the transport of hydrogen as a green energy fuel of the future. Hydrogen's role in the future energy mix will greatly assist governments and corporations with their respective 'net-zero carbon' targets through the decarbonisation of heavy emitting industries.

Value creation for shareholders will be achieved by:

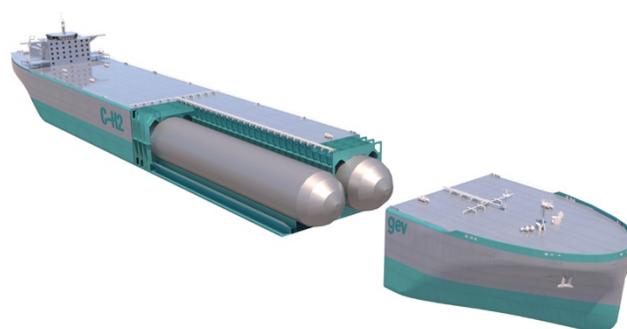
- Continue to maintain global leadership in marine pressure vessel designs and intellectual property.
- Pursue a portfolio of CNG Optimum projects to improve and mitigate against binary outcomes and offer CNG project stakeholders' flexible commercial arrangements.
- Advance the future transport of green energy through the development of the compressed H2 Ship.
- Employ world class management and staff that are leaders in their chosen discipline.
- Maintain the highest standards of efficiency, safety and environmental responsibility.

For more details on the Company please visit www.gev.com

CNG Optimum Ship Approved for Construction & Ready for Commercialisation



C-H2 Ship Approval in Principle Issued



Disclaimer: This announcement may contain forward looking statements concerning projected costs, approval timelines, construction timelines, earnings, revenue, growth, outlook or other matters ("Projections"). You should not place undue reliance on any Projections, which are based only on current expectations and the information available to GEV. The expectations reflected in such Projections are currently considered by GEV to be reasonable, but they may be affected by a range of variables that could cause actual results or trends to differ materially, including but not limited to: price and currency fluctuations, the ability to obtain reliable gas supply, gas reserve estimates, the ability to locate markets for CNG, fluctuations in gas and CNG prices, project site latent conditions, approvals and cost estimates, development progress, operating results, legislative, fiscal and regulatory developments, and economic and financial markets conditions, including availability of financing. GEV undertakes no obligation to update any Projections for events or circumstances that occur subsequent to the date of this announcement or to keep current any of the information provided, except to the extent required by law. You should consult your own advisors as to legal, tax, financial and related matters and conduct your own investigations, enquiries and analysis concerning any transaction or investment or other decision in relation to GEV.

\$ refers to Australian Dollars unless otherwise indicated.