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# Annual General Meeting 2023

30 November 2023 | ASX.PV1

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**This presentation was authorised by the CEO for release on 30 November 2023**

*\$ refers to Australian Dollars unless otherwise indicated.*

# Board & Management

Global experience in energy infrastructure, utilities, ship newbuilds, operations, and capital markets

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**Martin Carolan**

Managing Director  
& CEO

Commercial  
& Capital Markets

**SYDNEY**



**Garry Triglavcanin**

Executive Director & Chief  
Development Officer

Engineer, LNG, Project Development

**PERTH**



**Greg Martin**

Chairman

Business Leader, Energy,  
Infrastructure, Governance

**SYDNEY**



**Andrew Pickering**

Non-executive  
Director

Shipping, Newbuilds,  
Tankers, LNG

**SYDNEY**



**David Palmer**

Non-executive  
Director

Shipping, Commercial, Financing

**LONDON**



**Per Roed**

Chief Technical Officer

Newbuilds, Tankers, LNG, Ports,  
Operations

**OSLO**



**Mats Fagerberg**

Business Development - Europe

Commercial, LNG, Infrastructure,  
Shipbroking

**LISBON**



**Norman Marshall**

Commercial Manager

Legal, Commercial,  
Project Finance

**PERTH**



**John Stevenson**

Group Financial Controller

Accounting,  
Finance

**SYDNEY**



**Dave Stenning**

GH2 Carrier  
Development

Class Approvals,  
Commercial

**CALGARY**



**John Fitzpatrick**

Naval Architect  
& Inventor

Ship Design,  
Class Approvals

**CALGARY**



# Positive strides made in 2023 advancing Provaris towards first-mover advantage in the delivery of green hydrogen in Europe

## 2023 Hydrogen Marine Transport Comparison Report

- > Highlights the cost-effectiveness and efficiency of compressed hydrogen
- > Underscores compression as the most compelling option for regional transport distances
- > Aligns perfectly with REPowerEU's green hydrogen import targets

## H2Neo World first design approval for bulk hydrogen carrier

- > Design approval on time & within budget from the American Bureau of shipping (ABS)
- > Leveraged IP, design & approvals to launch 300-600 tonnes H2Neo storage solution
- > Successful materials and welding procedure testing and planned Prototype Tank and testing Q1 2024

## Development of Compressed Hydrogen supply chains in Europe

- > Established two collaboration projects for the full value chain to Europe
- > Completed Fjord H2 prefeasibility study (PFS) development of 270MW FjordH2 export project progressing
- > Undertaking the PFS of the Afjord Project with Gen2 Energy AS and progressing a joint project study
- > Advancing downstream partners with the first MOU with German utility to review compression in portfolio for import of hydrogen and derivative products

## Design Concept Study for Tiwi Completed

- > Design Feasibility completed for Solar Farm and transmission pre-FEED and Owners Engineer appointed
- > Ongoing discussion on suitable land agreements and benefit packages with the Tiwi Land Council
- > JV partner process underway to 'farm-in' and maximise shareholder value



# Awareness of Provaris as a developer of low-cost, simple, energy-efficient green hydrogen supply chains for regional markets

Accelerating innovation to bridge the gap with safe, simple, efficient and economic solutions

## Energy Efficiency First Principle



Shapes energy policy and investment decisions.

Embedded in EU regulation.

- Energy Union and Climate Action
- Energy Efficiency Directive

- > Reduce dependence on fossil fuels, security of supply and the use of renewable energy.

## Why Compression?

- > **Safe** and proven method for storage and transport
- > **Efficient** regional production & delivery to minimise losses.
- > **Flexible** to 'load follow' variability & volatility in renewable energy.
- > **Simple** process enables low capex design, build and repeat.
- > **Delivers gaseous H2** required for decarbonisation of industries.
- > **Regional model for green hydrogen production and transport that is 20-25% cheaper than alternative carriers.**

## Why Provaris?

- > Ambition to deliver 1Mtpa.
- > **Unique IP and approach to developing integrated supply chain**
- > Advancing **two collaboration export projects in Norway** with access to renewable grid connection
- > Norway supportive of regional projects for jobs and investment
- > **First mover advantage to capture green premium**

## Why Europe?

- > EU parliament approval of the Renewable Energy Directive (RED III) requires that **42% of the hydrogen used by industry must be green by 2030** (and reaching 60% in 2035)
- > **H2 Global & EU Hydrogen Bank** auctions dedicated to supporting a green premium (up to 4.50/kg subject to volume)
- > **Engagement with German industrials** confirm demand for gaseous green supply – market is 3-4mtpa by 2030
- > **Norway's proximity to Germany** and access to grid connected renewable power can deliver the lowest cost for green hydrogen.



# Fundamental shift in energy policy driven by goals for decarbonisation combined with energy security has reshaped EU's energy system

Resulting in an increasing reliance on hydrogen

## Mid-2021:

- > **"Fit for 55"** = 5.6Mt of H2 required to meet 2030 Net zero emission targets
- > Comprehensive set of legislative proposals aimed a 55% reduction in greenhouse gas emissions by 2030
- > **€100B Green Deal Industrial Plan to decarbonise industry**

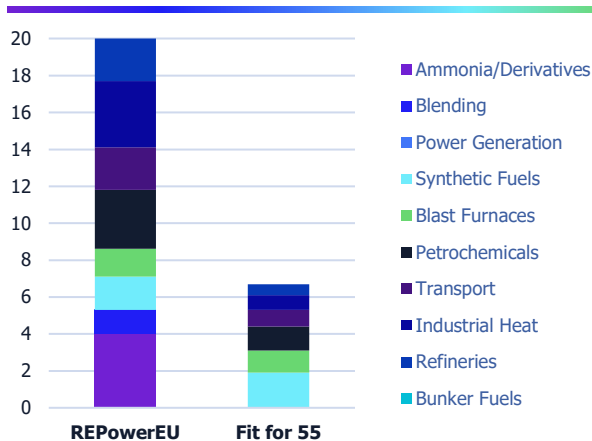
## 2022:

- > **Ukraine War:** focus on energy security and replace 50 bcm of Russian Gas (vs total 100bcm market)
- > **"REPowerEU"** = 20Mt of H2 required of which 10Mtpa imports
  - > Industrial heat applications = 4.5x increase
  - > Transport = 2.5x increase
  - > Focus on hydrogen infrastructure, setting demand targets, enabling incentives

## 2023:

- > **H2 Backbone & H2 ready ports** (collaboration of 33 operators to foster supply, security and cross-border collaboration) 53,000 km (60/40 new/repurposed costing 80-140B)
- > **Delegated Acts** define what is renewable fuels of non-biological origin (RFNBOs)
- > **Renewable Energy Directive (RED III)** requires **42% of hydrogen to be green by 2030**, increasing to 60% by 2035
- > **'EU Innovation Funding'** capital subsidy program € 2.9B 2021/22
- > **H2Global** auction & **EU Hydrogen Bank** to stimulate demand and provide subsidies for production green H2
- > **Direct capital subsidy programs:** DRI steelmaking projects "green steel"
  - Thyssenkrupp € 2 billion
  - Salzgitter € 1 billion

Hydrogen use by sector in 2030 (Mt H2)



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Steel, Chemical, Refinery



Power Generation



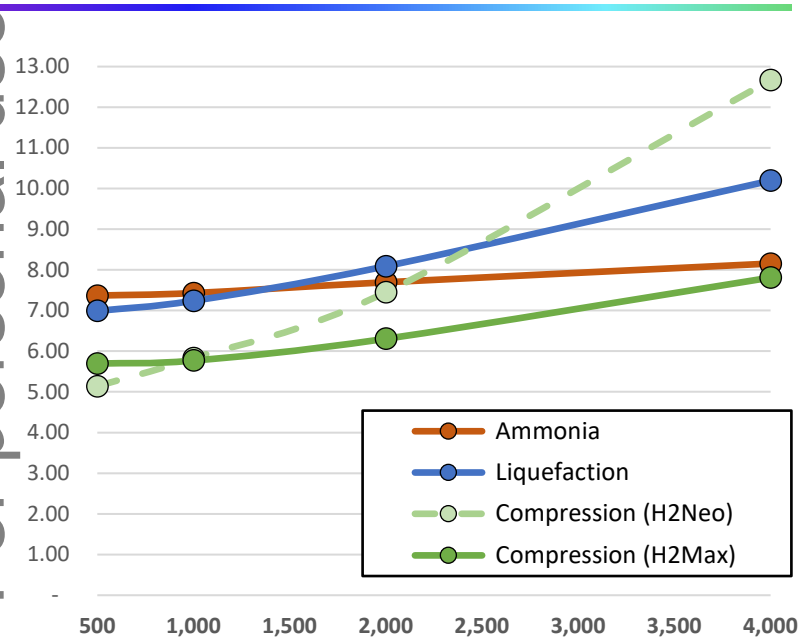
Heavy Duty Vehicles



# Compression's ability to load follow increased efficiency and flexibility, resulting in a lower delivered cost of green hydrogen

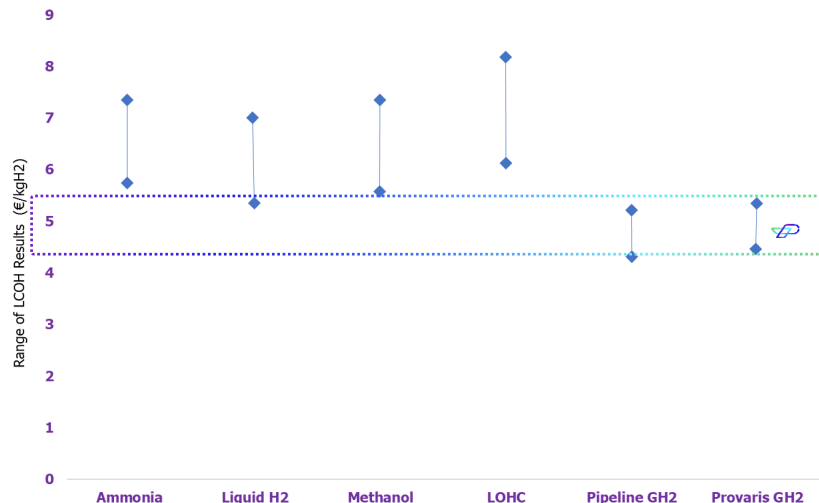
Realistic hydrogen supply chain analysis needs to account for the full value chain: RE curtailment, Vector capital & losses, Shipping, and Conversion back to gaseous hydrogen

Solar/Wind RE to Deliver 100,000 tpa as Hydrogen \*



Sailing Distance to Market (n.miles)

Key findings supported by German Federal Ministry Publications\*



**CATF (Sep. 2023):** "When hydrogen is transported by liquid carriers such as ammonia, this incurs a sizeable (and costly) energy penalty at the point of import when freed (ammonia cracking), and this will likely remain a challenge even if scale and technical improvements are made."

\* Agora Industrie and TU Hamburg (2023), supported by the Federal Ministry for Economic Affairs and Climate Action  
 Fraunhofer Institute for Solar Energy Systems ISE (2023) on behalf of the H2Global Foundation in cooperation with  
 Gesellschaft für internationale Zusammenarbeit (GIZ), supported by the Federal Ministry for Economic Cooperation and  
 Development.

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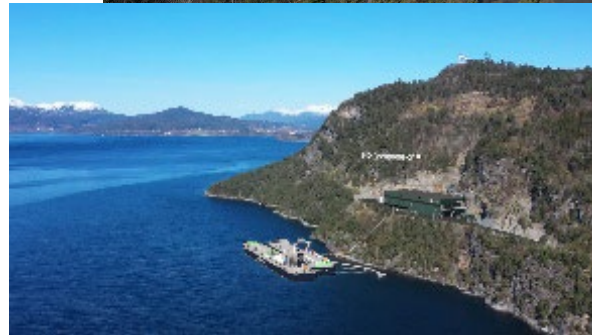
# Development activities in Europe progressing in 2024

Continued work on the agreed joint development activities for the 270MW FjordH2 export project in Norway

Collaboration **Norwegian Hydrogen AS**, located Ålesund region



- > **January 2023:** MOU signed investigate green hydrogen export projects in the Nordic region utilizing Provaris compressed hydrogen carriers
- > **April 2023:** successful PFS completion identified suitable export site located in Norway, with Provaris's compressed hydrogen transport cost of EUR 1.00-1.50/kg (compression, 1 H2Leo barge, 2 H2Neo carriers decompression)
- > **July 2023:** announced the joint development of the FjordH2 Project, a 270 MW electrolyser facility and compressed hydrogen export infrastructure to Europe
- > **Current focus on site permits, PFS optimization systemic quantitative risk assessment (QRA) site studies, and power reservation**
- > Fortescue recently became a 13% shareholder of Norwegian Hydrogen through a A\$13.5M investment
- > **2024: Commence detailed FEED studies including securing key partners and agreements for project investment and hydrogen offtake**



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# Continued development and R&D activity in Afjord project

Sharing a commitment with Gen2 Energy in green hydrogen production and exports using compression as the delivery vector

Collaboration with **Gen2 Energy AS**, located Trøndelag region



› **MOU announced in June 2030** to undertake Feasibility Study for a large-scale export supply chain from Norway to Europe based on the use of Provaris compressed hydrogen carriers and storage

› **Prefeasibility Study finalisation targeted for February 2024**

› Economic modelling and project site layout for Gate 1 highlights attractiveness of Provaris' supply chain, with economic models delivering positive results

› Remaining work areas including:

- i. Technical review of the H2 Neo cargo containment system and carrier
- ii. Preliminary review of all safety risks/hazards for the project site



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# Contractual agreements in finalisation stages for Tiwi H2 Project

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**Continued focus for upcoming year remains on achieving satisfactory outcomes with stakeholders and the Tiwi Land Council**

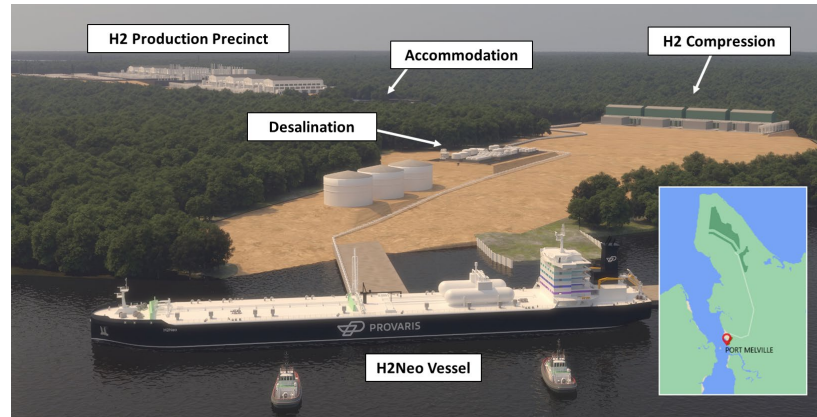
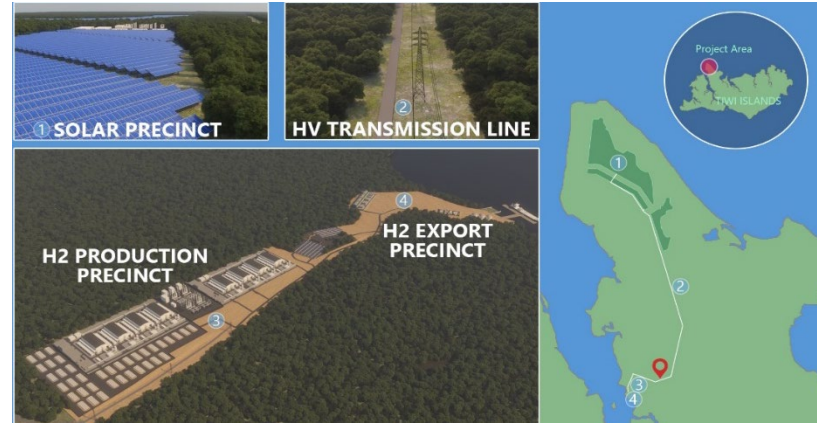
Focus remains on project agreements and secure land access required for the project development and construction activities

**Design Feasibility complete** for Solar Farm and transmission pre-FEED and Owners Engineer appointed

**Permitting advancing** with Federal and Territory EIS submission scheduled for Q4 2024

**JV partner process underway** to 'farm-in' and maximise shareholder value

Provaris acknowledges that its proposed Tiwi Islands Green Hydrogen Export Project is located on the traditional lands of the Munupi people. It is a privilege to have the support and such a close working relationship with the Tiwi Land Council and Munupi Landowners.



# 2024 prototype tank testing and final class approvals, a major milestone event for the company

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## Construction and testing of prototype tank undertaken in Norway Q1 CY2024

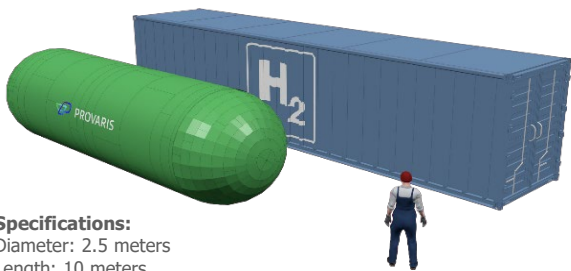
Awarded Norwegian based Prodtex AS a contract to design, construct and test a prototype tank alongside Norway's leading independent research organisation (SINTEF)

## Successful test will lead to final class approvals for the H2Neo

US and PCT Patent pending on containment tank.

Design of the prototype to verify the constructability of the full-scale tanks required for the H2Neo

**Construction Prototype:** Jan-Feb 2024  
**Cycle-testing:** Mar 2024  
**Final Class Approvals:** Apr 2024



### Specifications:

Diameter: 2.5 meters  
Length: 10 meters  
Capacity: 740 kg hydrogen at 250 barg  
Weight: ~33 tonnes.



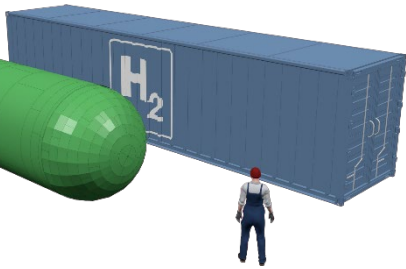
## > Proven application of robotic-laser welding

-  Increased productivity (~20x)
-  Reduced heat & energy costs
-  100% quality assurance (NDT)
-  Reduction in CO2 footprint
-  Reduction in construction costs
-  Extends IP to new applications

# 2024 will establish a platform for hydrogen development and commercialization of regional hydrogen supply chains

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## Prototype Containment Tank for Gaseous Hydrogen (Carbon Steel, 250 bar)



Construction Prototype: Jan-Feb 2024  
Cycle-testing: Mar 2024  
Final Class Approvals: Apr 2024

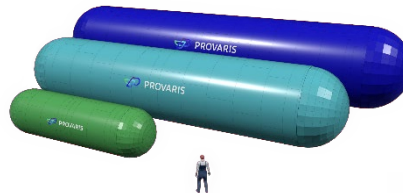
## H2 Carriers (H2Neo 430t & H2Max 2,000t)



## Barge Storage (H2Leo, bulk marine storage, 300-600 tonnes)



## Onshore Storage Solutions (1, 5, 10 tonne capacity for Buffer, Marine, Distribution)



## H2 Production (Norway to Germany)



FjordH2 Project 42.5ktpa export  
2 H2Neo + 1 H2Leo



Afjord Project 42.5ktpa export  
2 H2Neo + 1 H2Leo

## Tank Production



Production of storage tanks  
2H 2024



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# Q&A



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