Cyan is Blue-Green

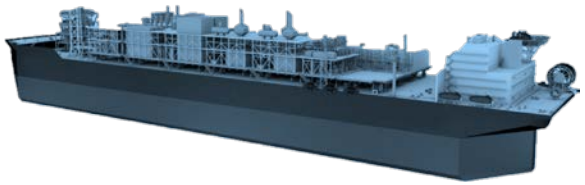
CyaNH3™

CyaNH3 FPSO Ultra-Brief

Executive Summary

- Environmentalists are promoting green energy
  - Green kinetic energy is difficult to store, so some are promoting Green H_2, which is also difficult to store, so
  - AEA and others are promoting NH_3 as a carrier for H_2
- While the world flares 3.2 tcf per year, which is
  - 263,000 tpd of GHG Carbon Credits => $21 million /day
  - 265,000 tpd of NH_3 => $159 million /day ($600 /tonne)
- CyaNH3 LLC was conceived to develop and promote:
  - Solutions for monetizing flared /stranded gas to H_2 to NH_3, which can morph in future to Green H_2 /NH_3 production

CyaNH3™

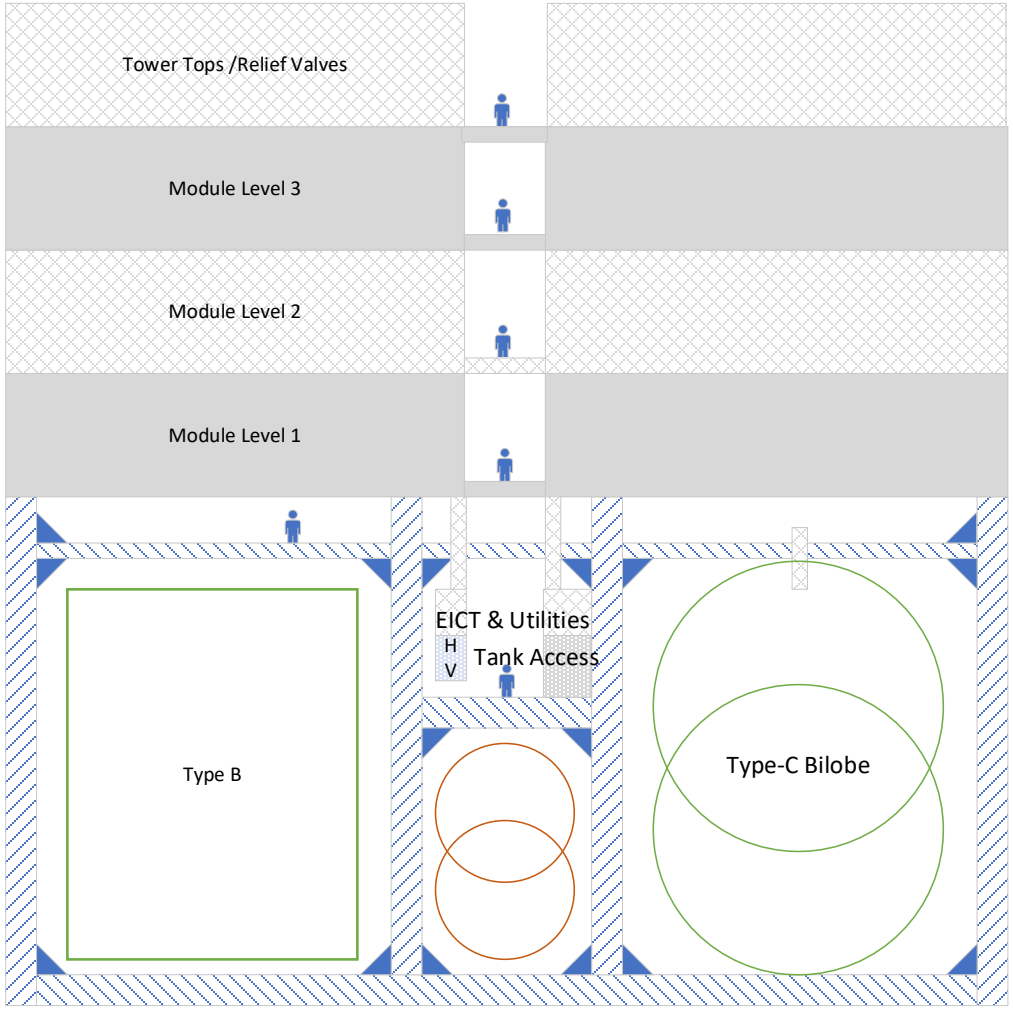


AMMONIA ENERGY ASSOCIATION

Cyan is Blue-Green

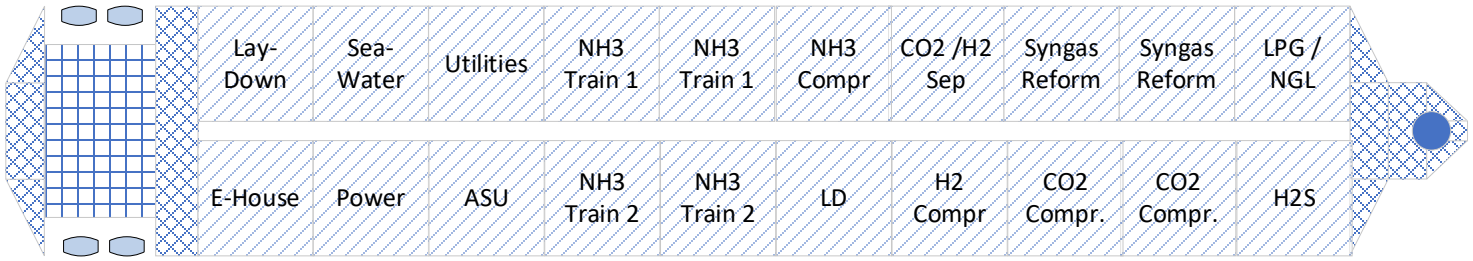
	Green H2 -> NH3	Gas -> H2 -> NH3
Energy Source	Green	Blue-Green
Sea Water Purification	Source of H_2	Source of Steam
H_2 Production	Electrolyzer	Steam Reforming
H_2 /CO_2 Separation	N.A.	PSA
H_2 / N_2 Storage	Address Green Energy Availability	Process Stability
N_2 from Air	Same	
H_2 -> NH_3 Process	Same	
H_2 Compression & Export	Same	
NH_3 Storage & Export	Same	
Utilities	Similar	

Cyan$NH_3$60 FPSO functional specification

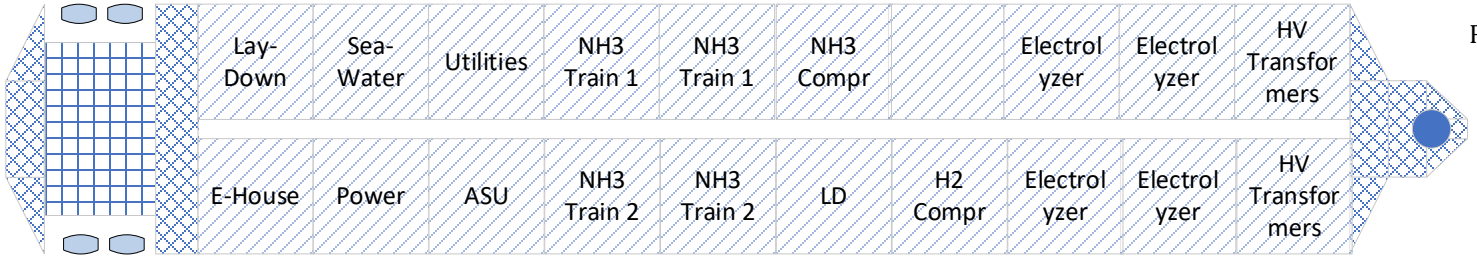


Principle Particulars	New Build Hull Design Parameters
Design Water Depth (m)	100 – 3000
Design Life	25-30 years
Fatigue Life	40-60 years
Length B.P. (m)	~ 360 (not to exceed)
Beam (m)	~ 65 (not to exceed)
Depth (m)	~ 36 (not to exceed)
Design Draft (m)	TBD
Deck Camber (m)	1-2%Beam
Topside Weight (t)	~ 60,000 (TBD)
Dead Weight (t)	TBD
Cargo Deck Area (m^2)	~19,000 - 23,000
Hull Configuration	Double with two inner bulkheads
Complement (P)	160
Storage NH_3	Type B or C @ > 100,000 m^3 NH_3
Mooring Type	Spread Mooring or Turret
US Geographical Areas	Lower US 48 Coast & Hawaii
International Areas	Australia, Brazil, Lower GOM, West Africa
Hull Design	API, ANSI, ABS, ISO
Life Boats	Free-Fall or Davit Launch
H_2 & NH_3 Export	Pipeline (H_2) & Tankers (NH_3)
Green H_2 to NH_3	Capacity TBD
Blue H_2 to NH_3	Likely Capacity ~ 5000 tpd

Cyan$NH_3$60 FPSO (Patent Pending)



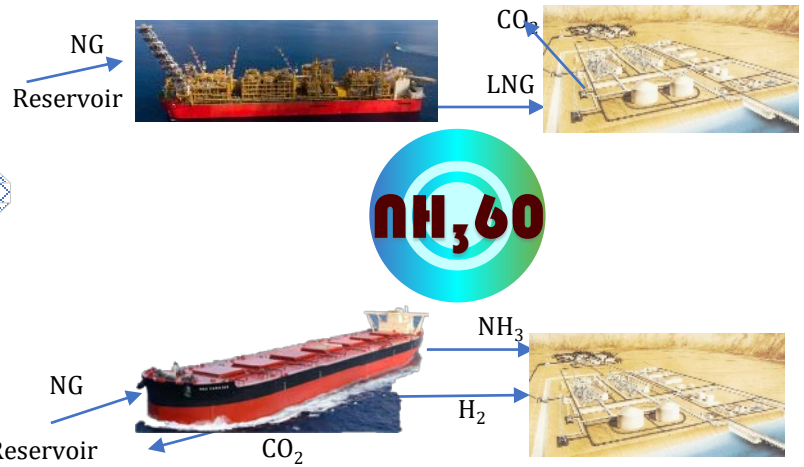
Elevation: 34 meters (Blue)



Elevation: 34 meters (Green)

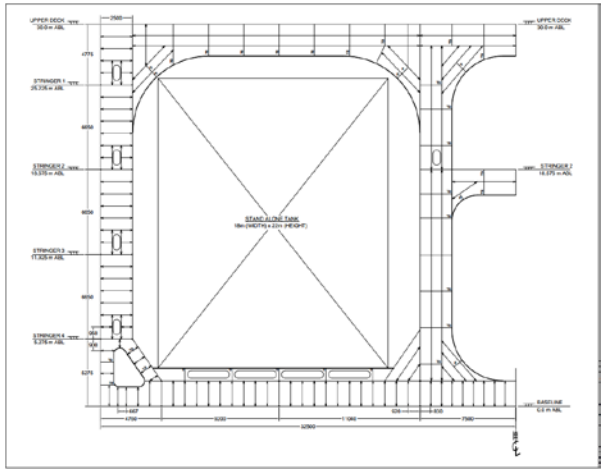
	FLNG	FNH3
Capacity (mmtpa)	1-2.5	0.7-1.5
Offloading Risk	High	Low
Products	LNG	H_2 / NH_3
CO_2 Sequestration	Min.	Max.
Thermal Eff.	65-80*	57%
Value Add	Min.	4X

* Not acct for CO_2 Sequestration



Current Status

- Concluded to Date
  - Green H_2 study offshore Scotland for J-DeEP
  - Identified flaring & stranded gas opportunities
  - Conceptual design and estimate for small mobile onshore and offshore floating production and storage solution
  - Patent application for Cyan NH360 FPSO Hull
- Ongoing
  - Onshore pilot 50 tpd EPC; online ~ March 2023
  - FPSO Hull Design
  - Grant funding application for FPSO Feasibility Study



CyaNH$_3$™

Back-Up

NH3 Supply and Demand

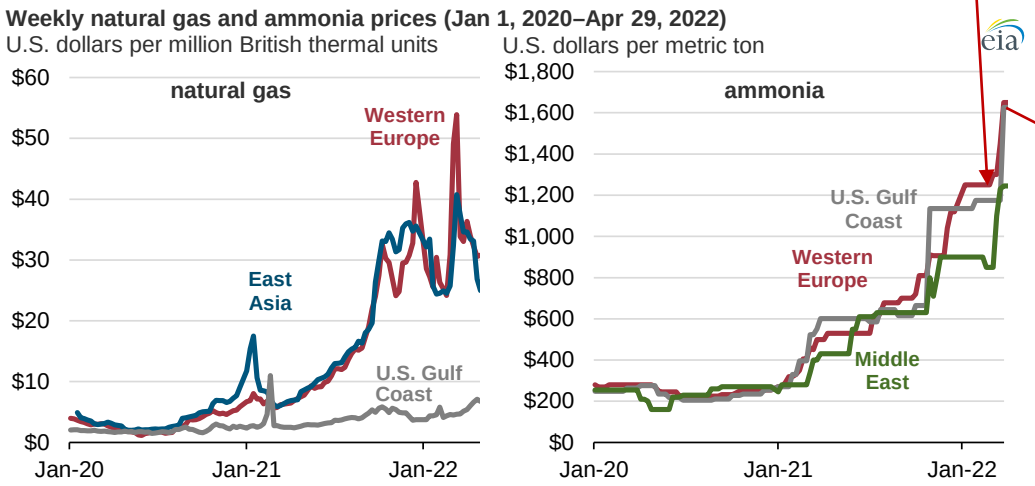
China	45,520
India	12,000
Russian Federation	10,300
North America	12,730
Indonesia	5,100
Trinidad and Tobago	4,466
Ukraine	4,160
Saudi Arabia	3,700
Egypt	2,950
Americas	2,139
AsiaPac	5,135
Europe	18,403
MENA	9,766

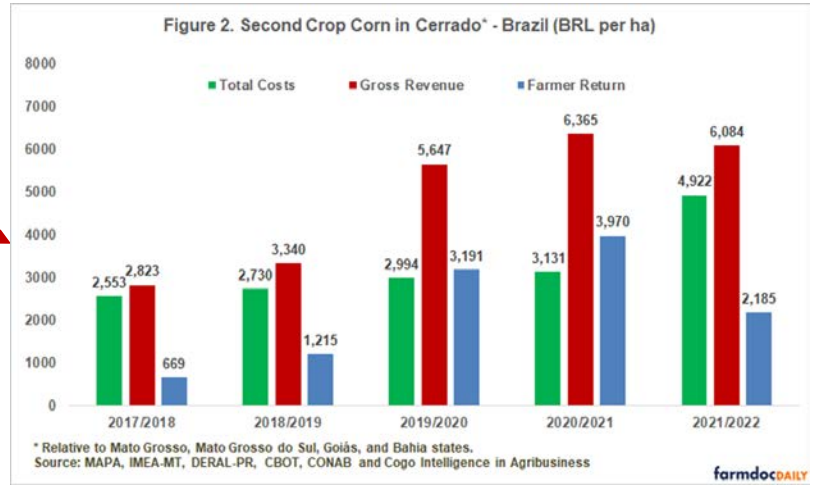
10%

13%

War -> Price

2023 ?





Value Add: @ $1200 /tonne, gas is worth $36 /mmbtu (4X Henry Hub)

Farmers globally reduce planting due to lower return

CyanNH3

What do Natural Gas Flares & Ocean Going Tankers have in Common?

CO2 Emission per mmbtu by Fuel Type		
	Lb CO2	Kg CO2
Propane	139	63
Distillate Fuel Oil	163	74
Kerosene	161	73
Coal (All types)	211	96
Natural Gas [CH_4]	117	53
Gasoline	156	71
Heavy Fuel Oil (HFO) [$C_{20}H_{42}$]	166	75
Ammonia [NH_3]	0	0

- CH_4 produces 30% less CO_2 than HFO. NH_3 produces none.
- Mar 20: Mann Developing Ammonia engine
- Sept 21: Wartsila/ SHI collaborate on NH3 Engines for Newbuilds
- Mar 21: Sumitomo promotes Ammonia as Fuel
  - Maersk actively looking for NH_3
  - MOL Building New NH_3 Carriers

In 2026 EU to Impose 75 /tonne CO2 emitted in manufacture, transport and sale of any good sold into the EU

Need to clarify if this is considered carbon-negative as H2 is produced from waste and resulting product reduces CO2 emissions from ships.

	Flare	HFO (ship)	Total
Tonne-CO_2 /mmscf (equivalent)	53	75	128
Gas Energy converted to NH_3	57%	(43)	
Future CO_2 emission (tonne) if vented	53	32	85
CO2 converted to Urea or Sequestered	(53)	32	32
Net Carbon Credit		43 – 96 tonne	
Environmental Social Governance Math			
Potential Net reduction in CO2 if vented			34%
Potential Net reduction in CO2 if CO2 sequestered			75%

Source: Carbon factors provided by the U.S. Environmental Protection Agency

CyanNH3

Offshore ammonia – part of the future

H2Carrier presentation

Presented by Sebastian Kihle

16. December 2022

P2XFloater™ at a glance

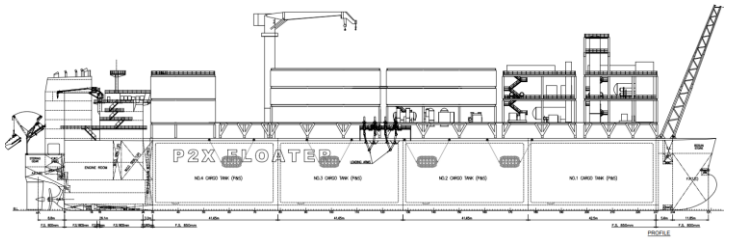
Input

Remote environments
Superior wind efficiency in places without/limited grid connection

Combined environments
Continuous advantage through combining wind, solar, hydro and tidal

Power rich environments
Utilizing surplus electricity from existing production infrastructure

Production & Storage



- Hydrogen and Ammonia production from renewable electricity
- Minimal costly onshore infrastructure
- Built-in export facility ready for ammonia feeder vessels
- Cost competitive solution based on effective construction and scalability

Output

Liquid green ammonia
Refrigerated or pressurized

Transport and Shipping
Global export infrastructure in place through the LPG shipping market or dedicated feeder vessels

Exploitable side streams
Such as oxygen and warm water

Proven technologies

Offshore energy production

FSRU-FLNG

By combining leading industry expertise from oil and gas sector with offshore renewables and hydrogen know-how we have developed a cutting-edge **Power-to-X** platform

The P2XFloater™ is an adaption and further enhancement of the trusted **FPSO** (Floating Production, Storage and Offtake) concept, a proven energy facility concept since the early 1970's and the later development of FSRU and FLNG units

Floating production, storage and off-take

Transfer utility and **storage tanks**

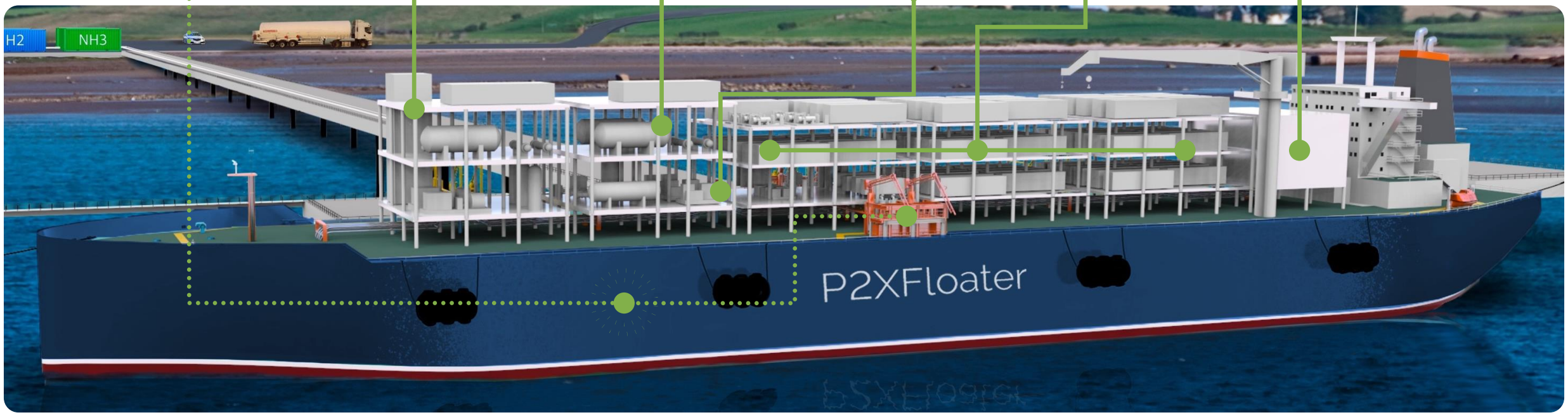
Ammonia production

Nitrogen production

Desalination unit

Skid-mounted **electrolyzers**

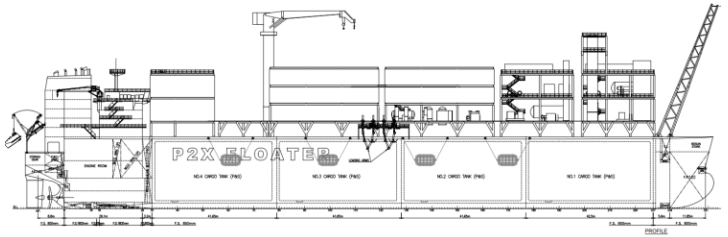
Power distribution and **automation**



P2XFloater advantages

Time and cost	Public and regulatory affairs	Mobile asset	Environmental footprint	Decommissioning
P2XFloater™ has a significant cost advantage due to a **fast track** centralized EPCI process with an **optimized design** and construction period	The P2XFloater™ is designed according to pre-defined **classification standards** to ease regulatory requirements	The P2XFloater™ is able to **relocate** if circumstances regarding the power source should change	**Upcycling** of an existing VLGC vessel utilizes **existing resources** with **no permanent structural foundations**	The P2XFloater™ has a **positive terminal value** as opposed to decommissioning costs

We design, build, install and operate Power-to-X infrastructure that turns renewable energy into globally, tradable commodity: green ammonia



P2X value chain

H2Carrier´s End-to-End management

Development	EPCI	Operation	Decommissioning
Power supply and feasibility studies	EPCI contract	O&M services	Ship recycling contract
Offtake aggreement	H2&NH3 plant planning	Distribution	

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Terminals for New Energies

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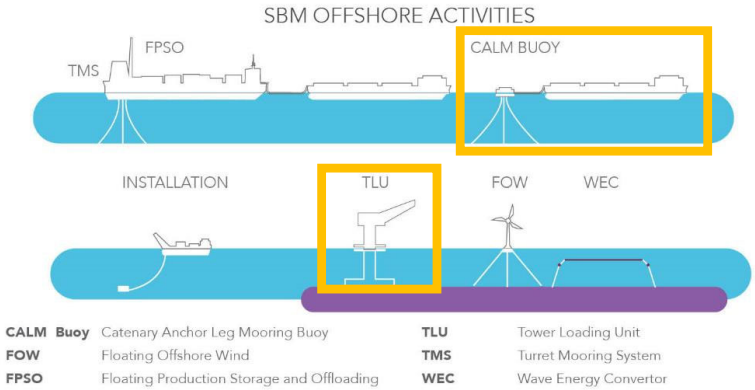
Imodco, An SBM Offshore Company.

Imodco is the Marine Terminals **product line of SBM Offshore**, capitalizing on over 60 years of experience and over 450 marine terminals sold (more than 300 still in operation).



0.06
TOTAL RECORDABLE INJURY FREQUENCY RATE (per 200,000 hours)

6,426
PEOPLE

7
EPCI projects currently under execution

15
Floating units currently in operation

99%
Oil production uptime

>50
Floating production systems executed and delivered

>350
Cumulative years of operating experience

2 million
Tonnes per year of CO_2 captured and reinjected

US$ 29.5 b
Record Backlog half 2021

US$ 8.7 b
Net cash from L&O in 2020

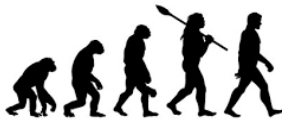
60%
R&D investments dedicated to non-carbon technologies

Offshore Industry Experience

For Green Hydrogen,
Use of Experience will be
Key to its Success

Life Cycle Cost

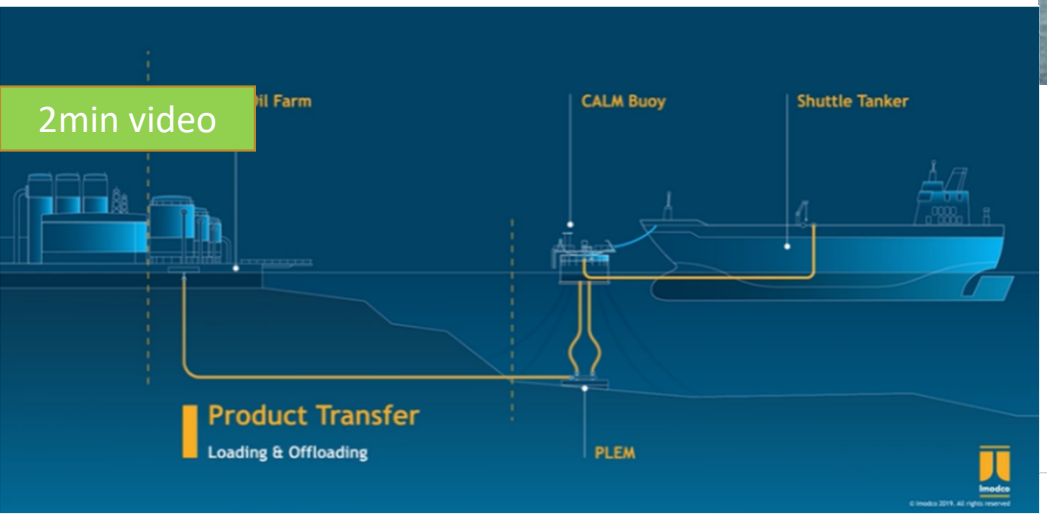
Improvement is Lower LCC & higher uptime

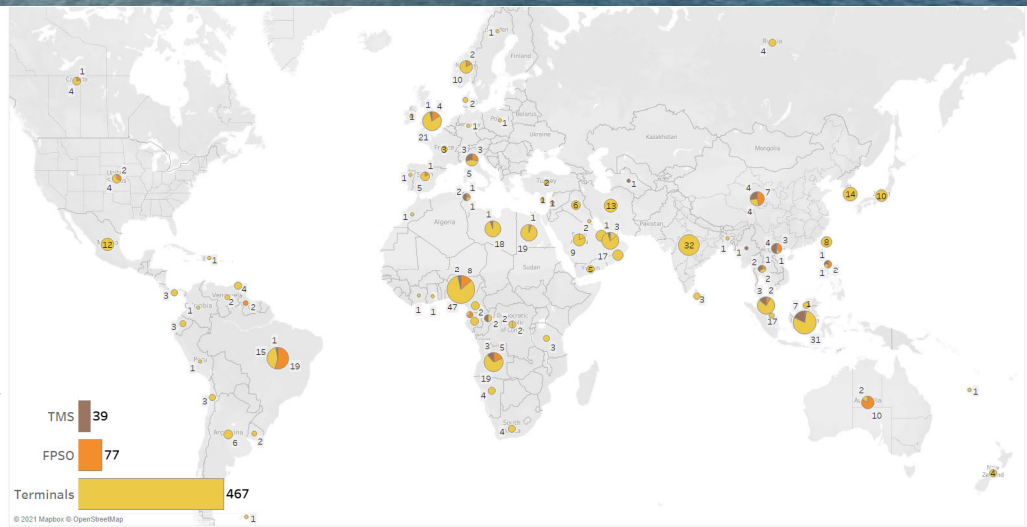


Uptime

60 years of Fluid Cargo Transfer at sea

- From/to Shore to/from vessels
  - First Transfer via CALM buoy in 1959
  - 470 out of 620 CALM delivered by Imodco
  - Over 400 CALM in operation today
- Standard operation for most fluid
  - Applicable to Ammonia and any LOHC





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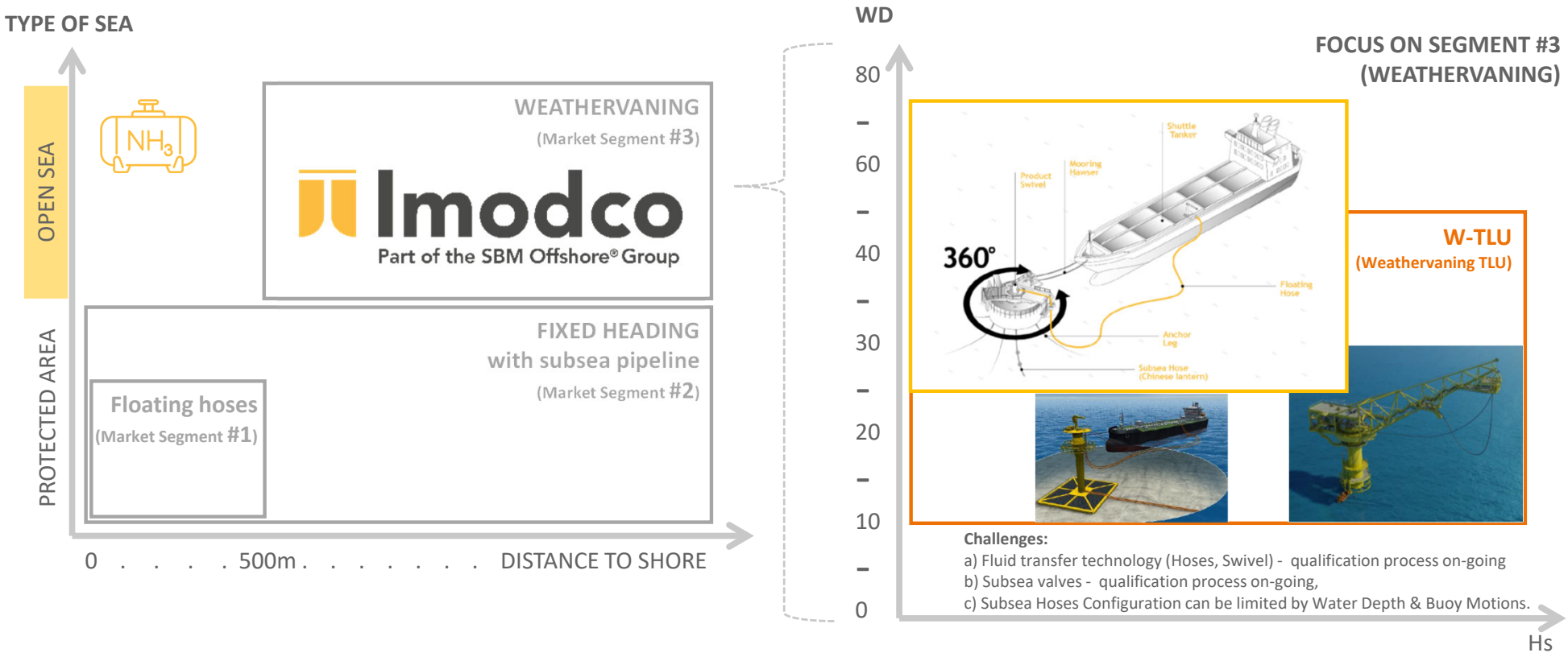
Jetty-less Terminals for Ammonia – Technical Segmentation



Challenges:

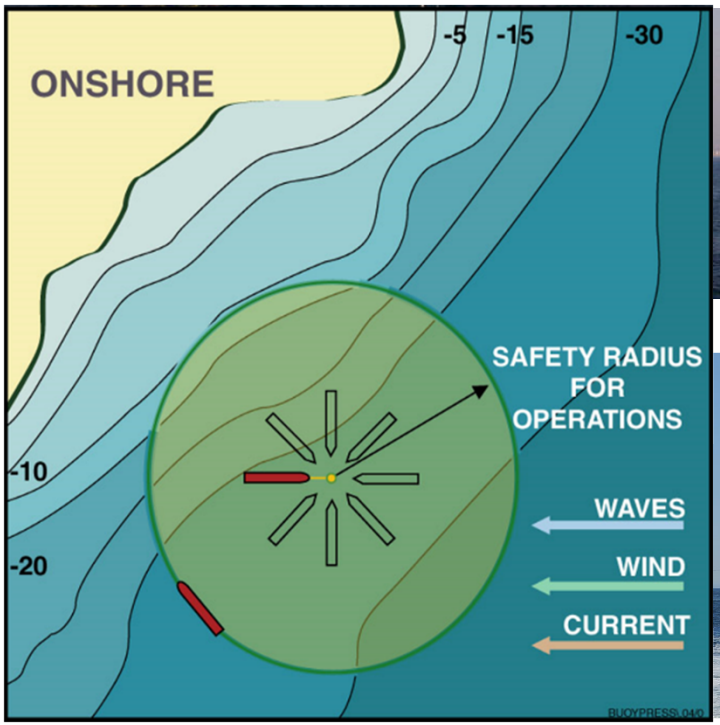
a) Fluid transfer technology (Hoses, Swivel) - qualification process on-going

b) Subsea valves - qualification process on-going,

c) Subsea Hoses Configuration can be limited by Water Depth & Buoy Motions.

Advantages of Jetty-less Terminals for new infrastructure

When a New Terminals is required and no jetty or quay is available, Jetty-less Terminals are most of the time, the "Best project NPV" – e.g. best CAPEX/Uptime compromise design option



Single Point Mooring (SPM) – weather-vaning systems

- ✓ No port
- ✓ Simpler construction permitting
- ✓ No dredging
- ✓ Lower cost
- ✓ Shorter delivery time
- ✓ High Uptime
- ✓ Simpler decommissioning

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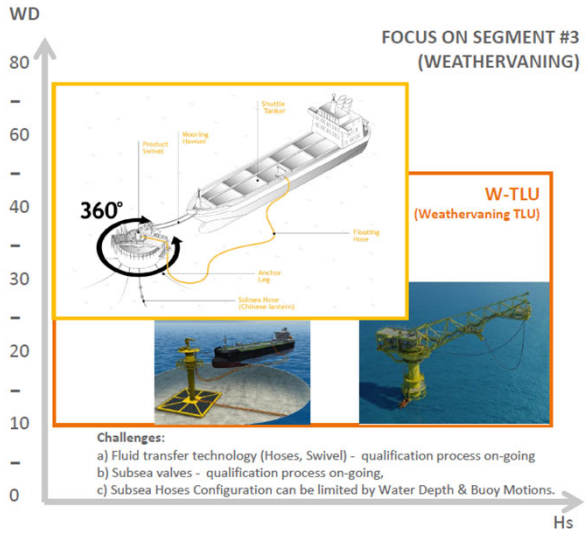
DnV and ABS: Approval in Principle of Ammonia SPM Terminals

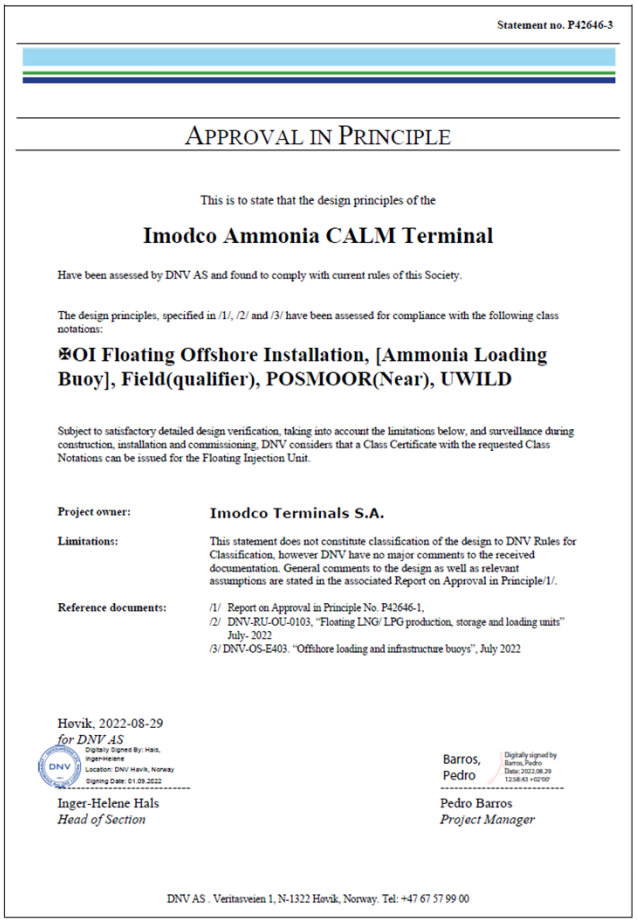
Ammonia SPM terminals:

- CALM Terminal
- TLU terminal



CALM AiP covers TLU AiP

as CALM has more elements to qualify



Statement no. P42646-3

APPROVAL IN PRINCIPLE

This is to state that the design principles of the

Imodco Ammonia CALM Terminal

Have been assessed by DNV AS and found to comply with current rules of this Society.

The design principles, specified in /1/, /2/ and /3/ have been assessed for compliance with the following class notations:

OI Floating Offshore Installation, [Ammonia Loading Buoy], Field(qualifier), POSMOOR(Near), UWILD

Subject to satisfactory detailed design verification, taking into account the limitations below, and surveillance during construction, installation and commissioning, DNV considers that a Class Certificate with the requested Class Notations can be issued for the Floating Injection Unit.

Project owner: **Imodco Terminals S.A.**

Limitations: This statement does not constitute classification of the design to DNV Rules for Classification, however DNV have no major comments to the received documentation. General comments to the design as well as relevant assumptions are stated in the associated Report on Approval in Principle/1/.

Reference documents:
/1/ Report on Approval in Principle No. P42646-1,
/2/ DNV-RU-OU-0103, "Floating LNG/ LPG production, storage and loading units" July- 2022
/3/ DNV-OS-E403. "Offshore loading and infrastructure buoys", July 2022

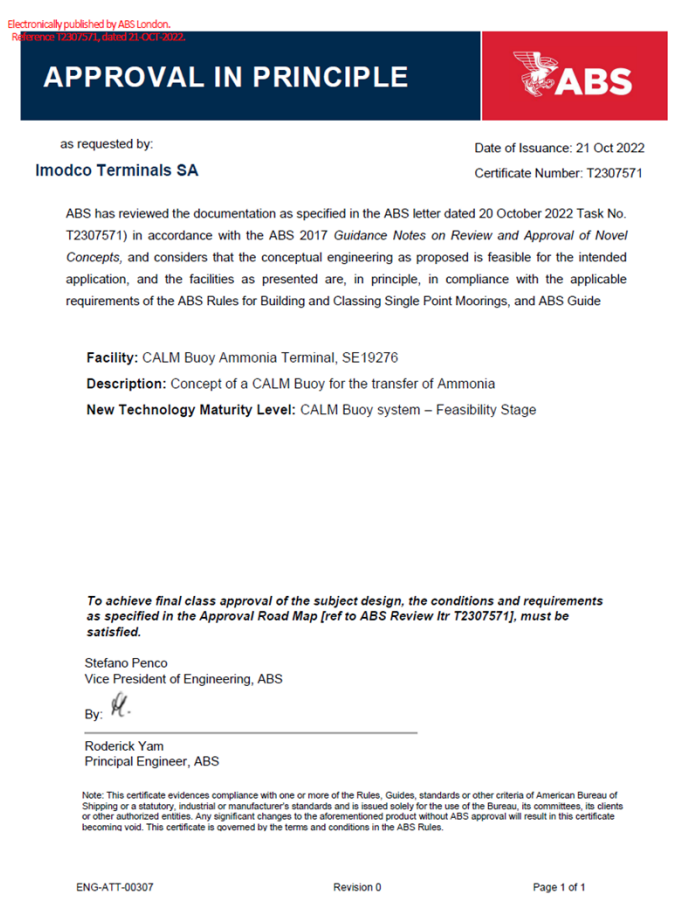
Høvik, 2022-08-29
for DNV AS
Digitally Signed By: Hals, Inger-Helene
Location: DNV Høvik, Norway
Signing Date: 01.09.2022

Inger-Helene Hals
Head of Section

Barros, Pedro
Digitally signed by Barros, Pedro
Date: 2022.08.29 12:58:43 +02'00'

Pedro Barros
Project Manager

DNV AS . Veritasveien 1, N-1322 Høvik, Norway. Tel: +47 67 57 99 00



Electronically published by ABS London.
Reference: T2307571, dated 21 OCT 2022.

APPROVAL IN PRINCIPLE

ABS

as requested by:
Imodco Terminals SA

Date of Issuance: 21 Oct 2022
Certificate Number: T2307571

ABS has reviewed the documentation as specified in the ABS letter dated 20 October 2022 Task No. T2307571) in accordance with the ABS 2017 *Guidance Notes on Review and Approval of Novel Concepts*, and considers that the conceptual engineering as proposed is feasible for the intended application, and the facilities as presented are, in principle, in compliance with the applicable requirements of the ABS Rules for Building and Classing Single Point Moorings, and ABS Guide

Facility: CALM Buoy Ammonia Terminal, SE19276
Description: Concept of a CALM Buoy for the transfer of Ammonia
New Technology Maturity Level: CALM Buoy system – Feasibility Stage

To achieve final class approval of the subject design, the conditions and requirements as specified in the Approval Road Map [ref to ABS Review ltr T2307571], must be satisfied.

Stefano Penco
Vice President of Engineering, ABS

By:

Roderick Yam
Principal Engineer, ABS

Note: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of American Bureau of Shipping or a statutory, industrial or manufacturer's standards and is issued solely for the use of the Bureau, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without ABS approval will result in this certificate becoming void. This certificate is governed by the terms and conditions in the ABS Rules.

ENG-ATT-00307 Revision 0 Page 1 of 1

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www.imodco.com

February 2019
The sole intention of this factsheet is to share general information.

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