

# Alternative fuel producer perspectives

*IMO - ISWG-GHG 15 - June 2023*



**IBIA**  
INTERNATIONAL BUNKER INDUSTRY ASSOCIATION



# Background for ISWG-GHG 15/3/5

- **The International Bunker Industry Association represents members globally across the entire industry value chain**
- **As a member-led organisation, we engage with our members to understand their concerns and encourage input to our work**
- **IBIA partners with other industry stakeholders to achieve mutual goals**
- **Shipping is the engine of global trade; engines need fuel – now and in the future!**
- **IBIA members are increasingly involved in the supply of alternative fuels or preparing to do so**



**ISWG-GHG 15/3/5**

# Key messages in ISWG-GHG 15/3/5

- **IMO's GHG emission reduction targets must be supported by regulations to guarantee steady growth in the uptake of low and zero emission fuels and technologies, otherwise progress will be too slow**
- **The supply side needs a clear demand signal to make the necessary investments in the production and distribution of low and zero emission fuels and technologies**
- **GHG emission reductions must be on a Well-to-Wake basis to be truly sustainable**
- **Default Well-to-Tank emission values can form a baseline, but should be sufficiently conservative to encourage producers to demonstrate better performance through relevant certification and verification schemes**
- **The IMO's LCA framework should enable fuel producers to make use of relevant and credible GHG intensity certification schemes**

# Presenters & panellists



**Conor Fürstenberg Stott**  
Maritime Director  
Ammonia Energy Association



**Matthías Ólafsson**  
Chief EU Representative  
Methanol Institute



**Cailean Macleod**  
Technical and Regulatory Affairs Director  
European Biodiesel Board (EBB)



**Ed Glossop**  
Head of Sustainable Operations  
Bunker Holding Group



**AMMONIA ENERGY**  
ASSOCIATION

# Low-Carbon Ammonia Production

Conor Fürstenberg Stott  
Maritime Directorship, Ammonia Energy Association

ISWG-GHG 15  
IMO – June 26, 2023

# Ammonia Sector Transition



AMMONIA ENERGY  
ASSOCIATION

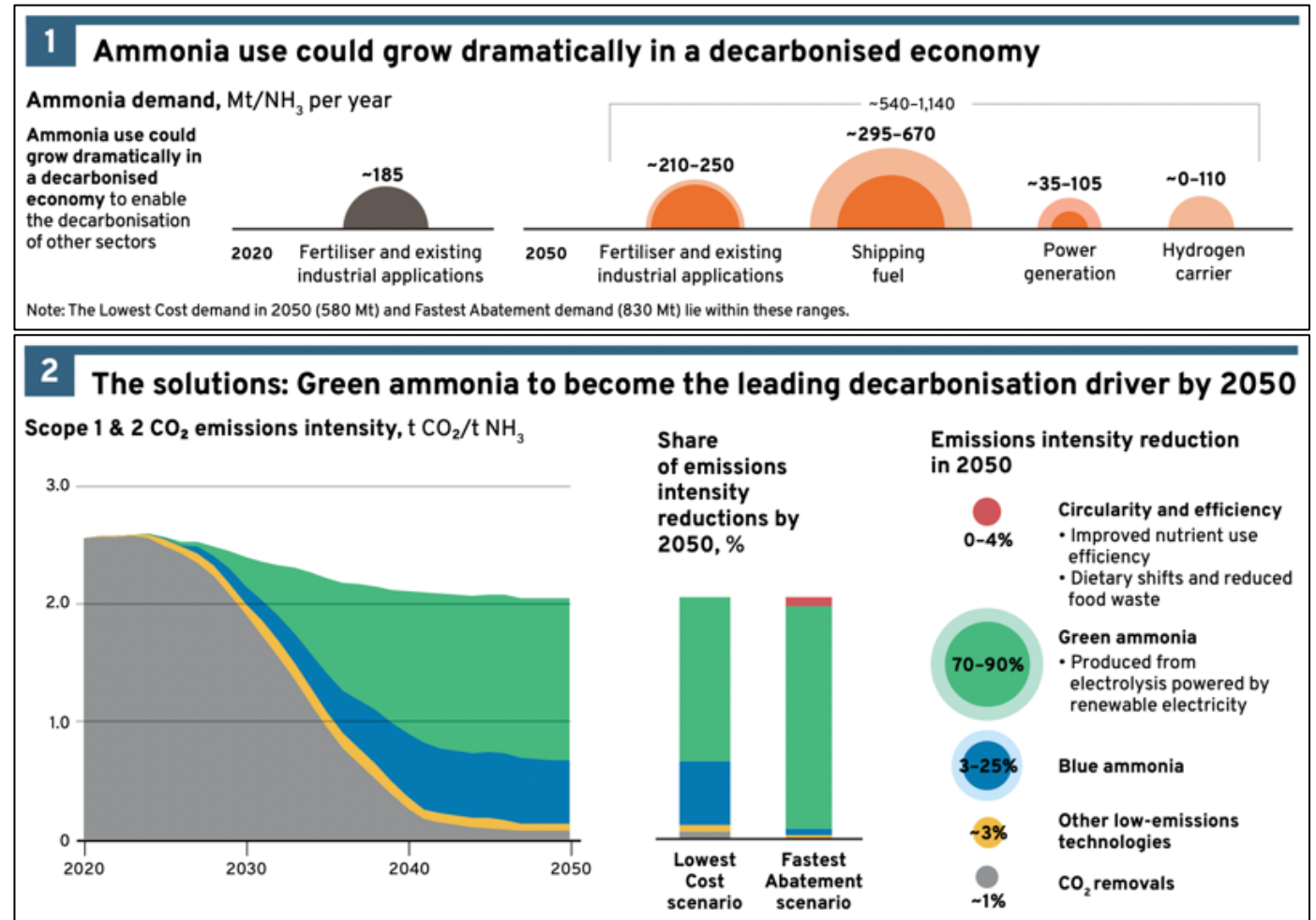
Mission Possible Partnership published its *Ammonia Sector Transition Strategy* in Sept 2022, with the support of the AEA and endorsed by many AEA members.

Ammonia is unlike other commodities:

- We need to decarbonize ammonia for existing applications, including fertilizer
- But decarbonized ammonia can be used to displace fossil fuels in new applications.

While existing markets for ammonia will see growth, even bigger markets are developing: as a carbon-free fuel for shipping and power sectors, and as a hydrogen carrier.

These future markets will not materialize at scale if production of ammonia is not decarbonized.



*Making Net-Zero Ammonia Possible*, Mission Possible Partnership, September 2022.

<https://missionpossiblepartnership.org/our-approach/sector-transition-strategies/>

# Supply can rise to meet demand



Massive volumes of new / revamp low-carbon ammonia have been announced: more than 170 million tons of capacity.

By 2030, this includes:

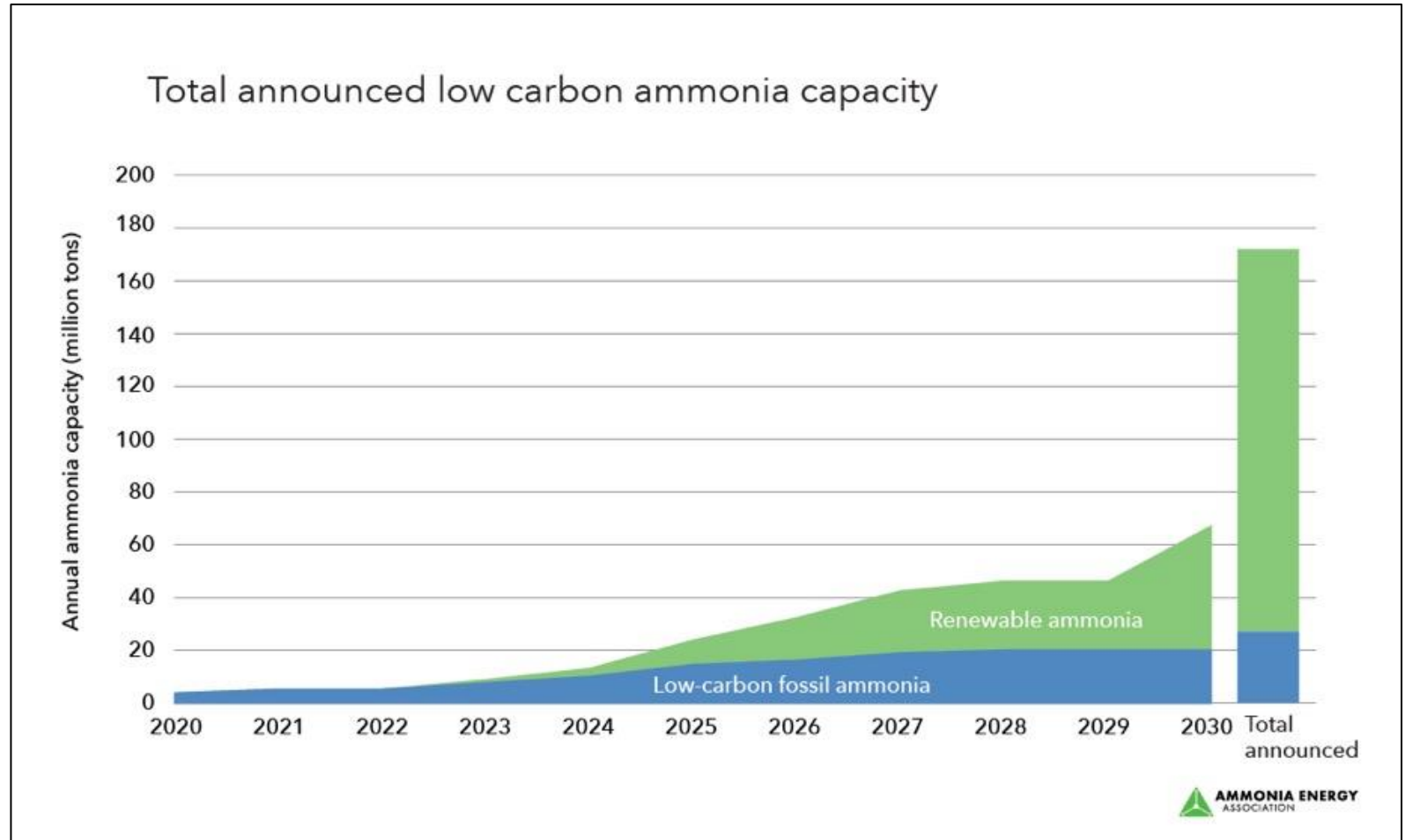
- 20.6 million tons of fossil-based
- 47.2 million tons of renewable

Total announced capacity includes:

- 27.1 million tons of fossil-based
- 144.7 million tons of renewable

**Key conclusions:**

- Supply can meet demand and does not represent a bottleneck, but
- **Clear demand signals will be required to move these projects to final investment decision (FID).**



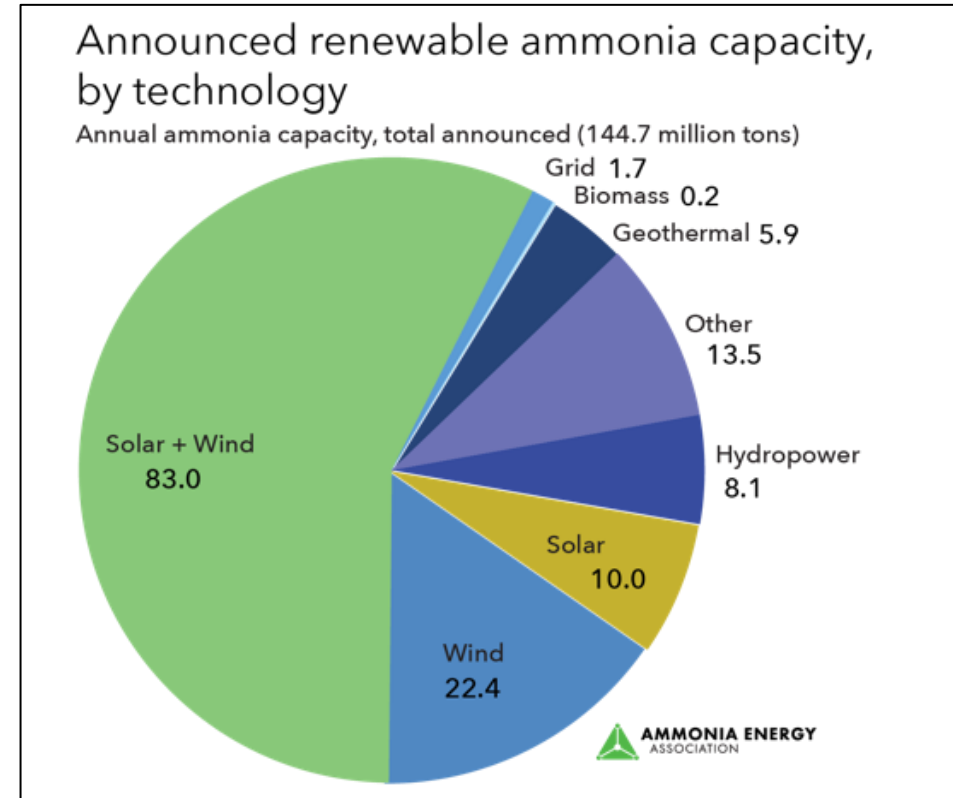
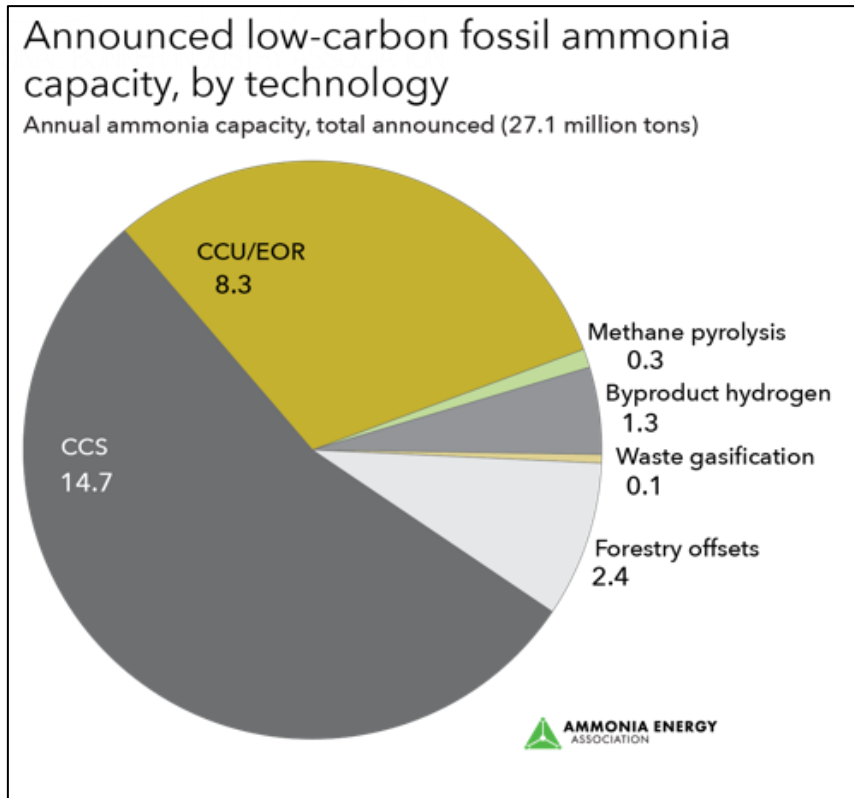
Global Project List: Low-Carbon Ammonia Plants, Ammonia Energy Association (forthcoming 2023), [ammoniaenergy.org](https://ammoniaenergy.org)

# Many technologies will be used



A broad range of technologies are set for deployment, in both stand-alone and hybrid plants.

- Standards and regulations in development may limit CCU/EOR or offsets as viable pathways for low-carbon markets.
- Early renewable projects use just one input but then bigger projects combine wind & solar to increase capacity factor.





# Ammonia Certification



The AEA is developing a certification scheme for ammonia, to account for the GHG emissions associated with production.

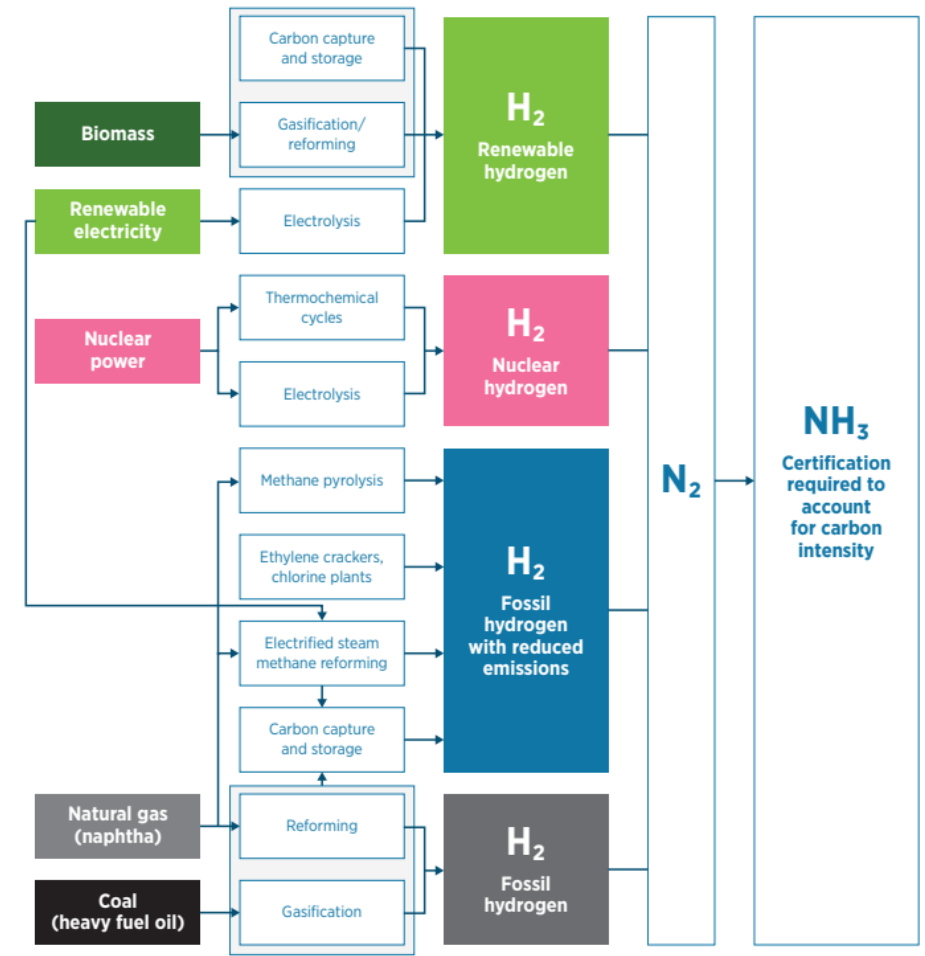
Our objective is to support **global harmonization**, across multiple regions and sectors. AEA is not defining colours (green/blue) or labels (clean/low-carbon) but collecting robust data, enabling producers to demonstrate relevant attributes to consumers of ammonia.

**Design Principles** include:

- **Technology neutral**, including fossil, renewable, bio, nuclear
- **Absolute GHG emissions**, site-specific, measured not modelled
- **Well-to-gate** boundary, including upstream Scope 3
- **Tradable**, enabling the low-carbon ammonia commodity market

Schedule:

- Methodology Document publication, July 2023.
- Design phase ends Q4 2023.
- Pilot scheme starts Q1 2024.



Ammonia pathways. IRENA and AEA (2022), *Innovation Outlook: Renewable Ammonia*, <https://www.irena.org/publications/2022/May/Innovation-Outlook-Renewable-Ammonia>

# Current workstream: Deconstructing international frameworks



**AMMONIA ENERGY**  
ASSOCIATION

**When:** April to July, 2023

**Objective:** To understand the different requirements for certification across international markets/regulations

- Define the purpose and requirements for specification of the AEA's ammonia certification scheme
- Create a foundation for global harmonization initiatives

**Partner engagement:**

AEA is working with other scheme owners to validate our analysis of their certification frameworks, identifying areas of (in)compatibility.

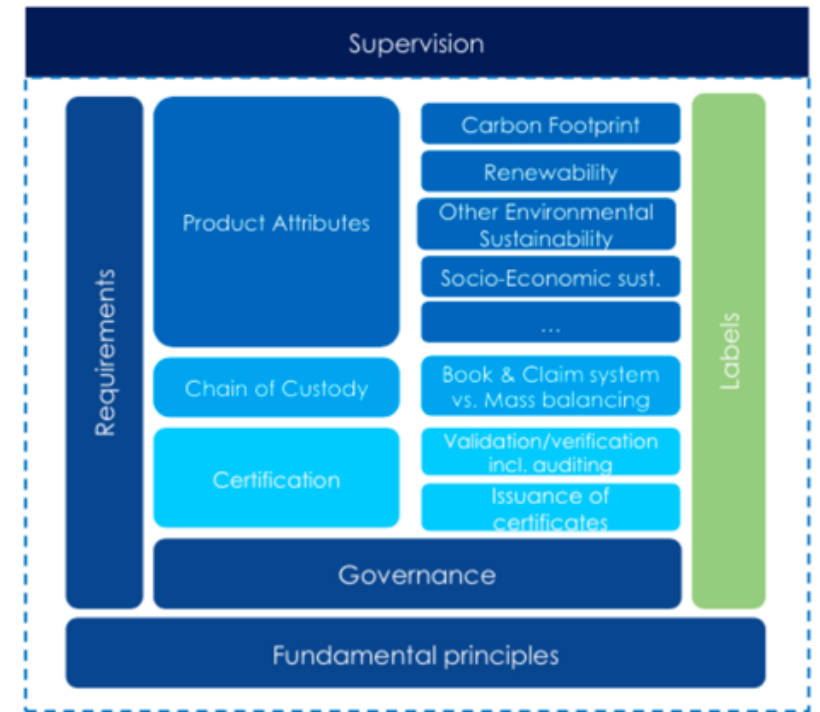


Figure 1. Building blocks for designing a certification scheme

# Current workstream: Deconstructing international frameworks



## List of schemes included in the analysis

Deconstruction of international certification frameworks, regulations & guidelines

EU Legislation						Americas					
Red II: Article 19 (GOs)	RED II: Article 25, 27 and 30 (RFNBOS)	Carbon Border Adjustment Mechanism (CBAM) (EU ETS)	EU Taxonomy	ReFuel EU Aviation	Fuel EU Maritime	Low Carbon Fuel Standard LCFS	US Clean Hydrogen Standard	45V PTC	45V ITC	The Fertilizers Institute (TFI)	Canada Clean Fuel Standard
EU Private & Voluntary Scheme						UK					
Fertilizers Europe	CertifHy (GOs)	CertifHy (RFNBOS)	TÜV Süd SCMS70	TÜVRheinland	International Sustainability and Carbon Certification (ISCC+)	Roundtable on Sustainable Biomaterials (RSB)	France Funding Ordinance No. 2021-167	Renewable Transport Fuel Obligation	UK Low Carbon Hydrogen Certification Scheme	UK Low Carbon Hydrogen Standard (LCHS)	UK Business Energy Industrial Strategy (BEIS)
Asia & Oceania											
Korean H2 Standard	Chinese Clean Hydrogen Standard (CCHS)	Japanese Organization for Metals & Energy Security (JOGMEC)	Clean Fuel Ammonia Association (CFAA)	Australian GO Scheme	Australia Zero Carbon Certification Scheme (Smart Energy Council)	India Renewable Consumption Obligation					
Global											
ISO/TC 197 - Hydrogen technologies	International Maritime Organization (IMO)	Climate Bonds Hydrogen	Climate Bonds Ammonia	H2Global	Green Hydrogen Organization (GH2)	Open Hydrogen Initiative (OHI)	Bureau Veritas	World Business Council of Sustainable Development			

**DRAFT GUIDELINES  
ON LIFE CYCLE GHG  
INTENSITY OF  
MARINE FUELS**

# Completed workstream Methodology Document



Draft document is under revision, for review and then publication.

AEA Methodology will be revised for:

- Case study input
- Pilot phase input
- Ongoing improvement and alignment

## Design of CI calculation methodology

### Summary of decisions made regarding content of NH<sub>3</sub> CI methodology

1. **Coprocessing (green + gray):** Producers may choose methodology based on target market
2. **Inclusion of CAPEX emissions:** Not included
3. **Using default values and materiality:** Materiality of 5% or 0.035 tCO<sub>2</sub>e/tNH<sub>3</sub>; actual values are preferred but default values allowed
  - List of acceptable databases
4. **Allocation: Coproducing Steam:** Producers may choose methodology based on target market
5. **Allocation of credit for CCS;**
  - Application of the straightforward LCA approach
  - Allow dynamic plant splitting in specific cases, namely for plants with carbon utilization and storage, as well as plants with a fluctuating CO<sub>2</sub> capture rate over time
6. **Conditions and emissions reductions from CCS and EOR:** Apply applicable regional framework
7. **How to claim origin and CI of electricity:** Members suggest scheme and a list of eligible schemes will be compiled
  - Procedure of cancelling certificates
8. **How to claim origin and CI of biogas:** Same procedure as for electricity
9. **Allocation to the co-products of natural gas pyrolysis:** Look at it in more detail within a case study
  - Decision on allocation methodology (e.g., energy based or mass based)

# Ammonia Certification Scheme

## Next steps



### Specification of the AEA's certification scheme

**When:** July to November, 2023

**Objective:** To generate the set of information detailing the AEA certification scheme (Scheme Documents) that will be required by producers, traders, consumers, certification bodies (auditors), and other stakeholders.

**Partner engagement:**

AEA will be building relationships with certification bodies (auditors), other scheme owners, and regulators, so that we can share our scheme documents effectively upon completion. Scheme implementation may require partners in:

- Certification authority (scheme ownership)
- Certification bodies (certificate issuance and auditing)
- Regulators (recognition)
- Other schemes (mutual recognition)

# Ammonia Certification Scheme

## Next steps



### Application of Scheme Design (case studies)

**When:** September to December, 2023

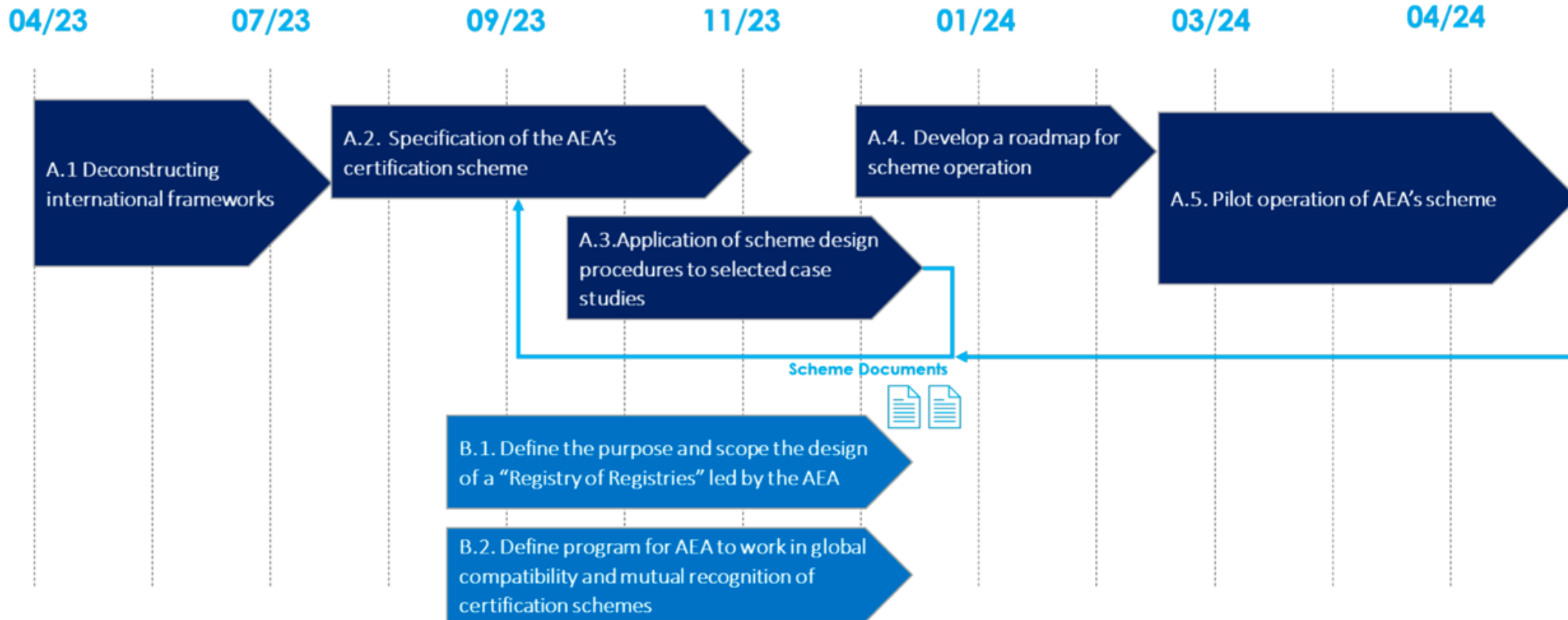
**Objective:** A series of 10-15 case studies, each demonstrating the application of the scheme with specific production plants/pathways, defined chains of custody, and specific consumers operating under various regulatory contexts.

- To prepare plant operators for verification (Task A5: Pilot operation)
- To identify synergies and dysfunctional areas so that scheme documents can be further improved
- To show how the AEA scheme does (or doesn't) enable producers to meet market requirements (especially, one plant producing under multiple regulatory requirements might yield interesting results)

**Partner engagement:**

AEA will be collaborating with other scheme owners and regulators on each of these case studies, to learn to what extent the scheme is fit for purpose in their region / market and make necessary changes or recommendations.

# Ammonia Certification Scheme 2023-2024 Workstreams



## **Methanol as a Marine Fuel**

**Matthías Ólafsson, Chief EU  
representative**

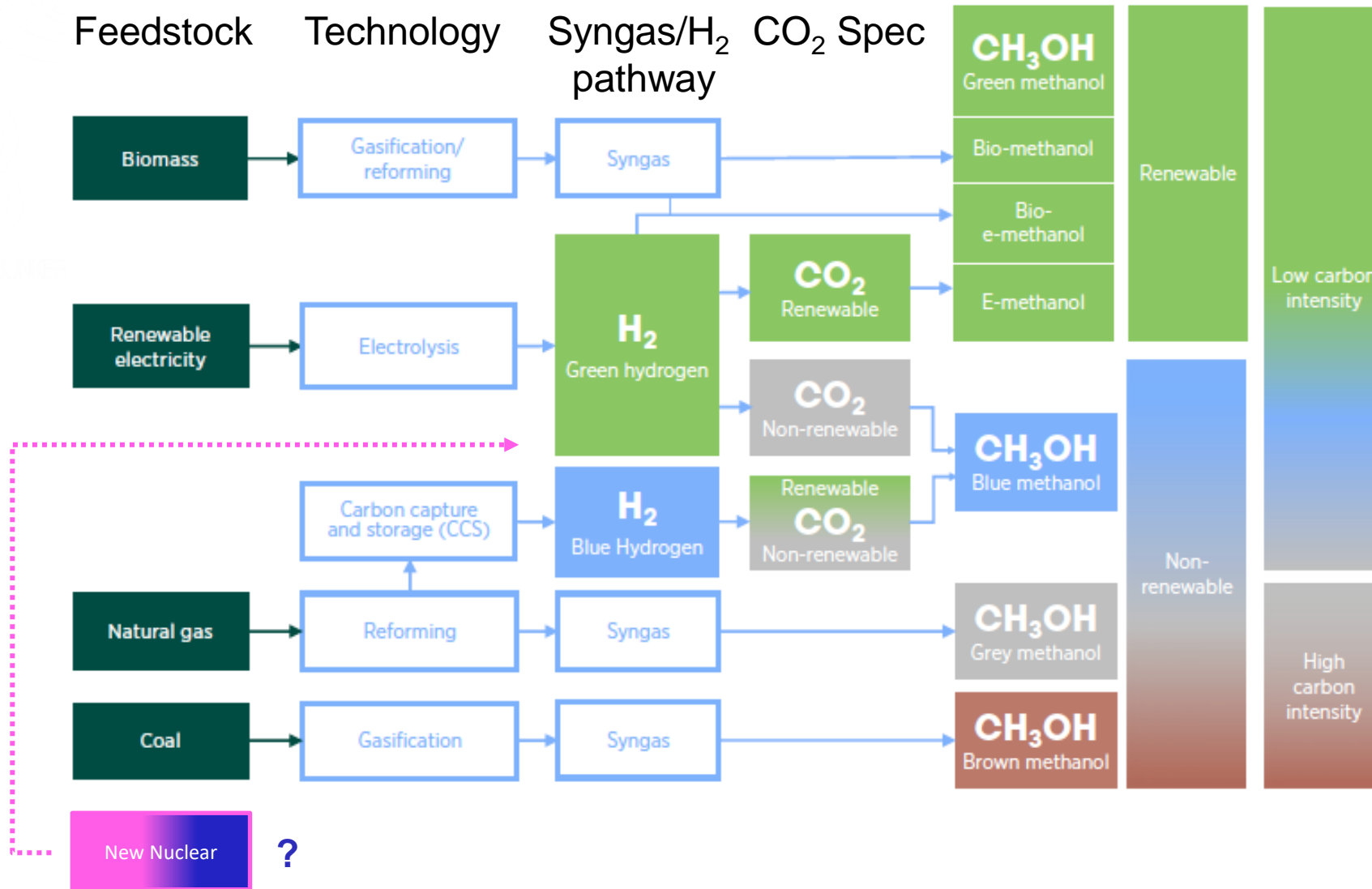
**IMO**

London, UK

Singapore | Washington | Brussels | Beijing | New Delhi



# Transitional benchmarking & scaling



2050



# 2050: Potential 5-Fold demand increase

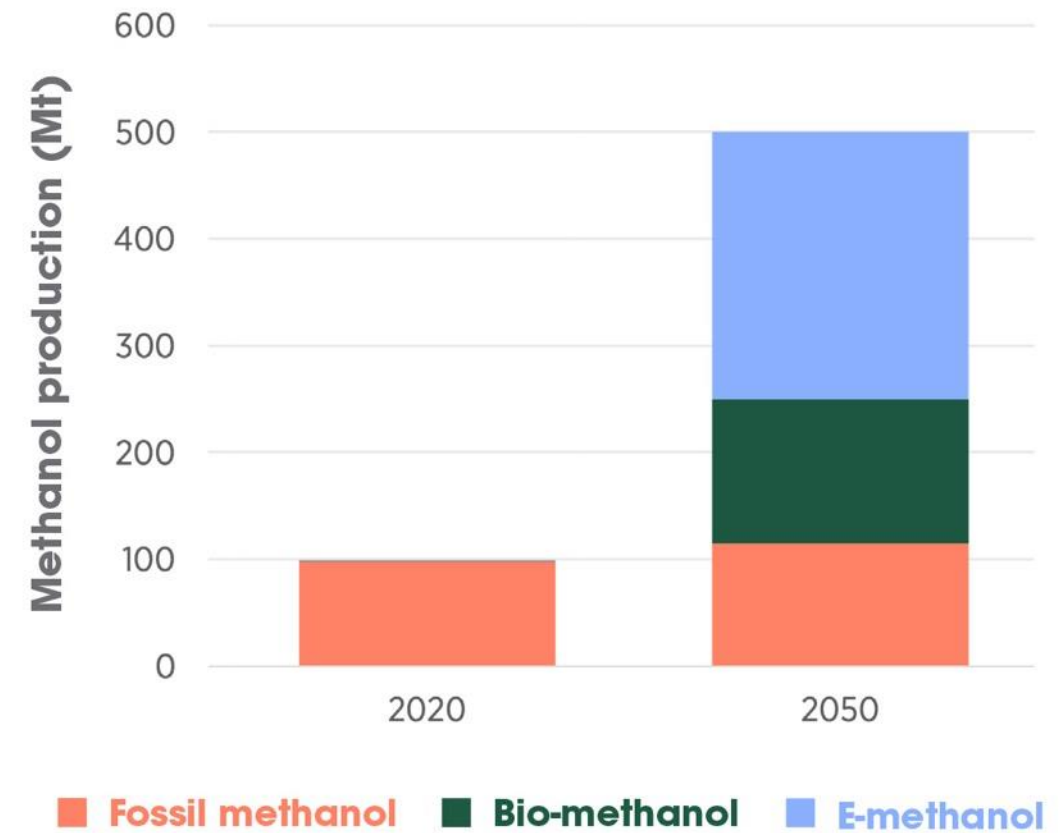
## Conventional Methanol Emissions Reduction



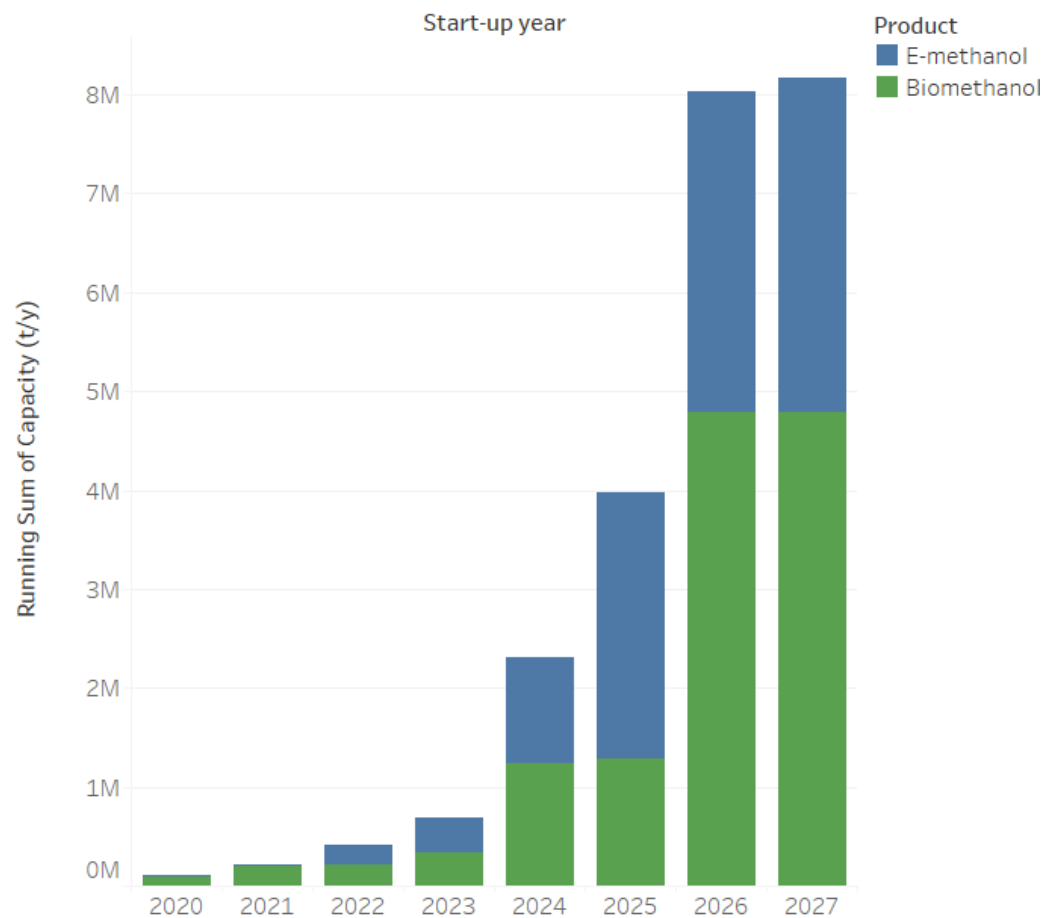
- According to IRENA, the uptake for both bio and renewable methanol is set to increase substantially, by a factor of 5x compared with conventional methanol, from approximately 1mln mtpa in 2023
  - Existing infrastructure can be repurposed
  - Waste feed and CO<sub>2</sub> streams are readily available, allowing harder to decarbonize sectors to de-leverage
  - Cost effective and supports transition to carbon neutrality

<https://www.irena.org/publications/2021/Jan/Innovation-Outlook-Renewable-Methanol>

Figure 47. Current and future methanol production by source



## Projected Renewable Methanol Production Capacity



Source : Methanol Institute Renewable Methanol Database of Current/Announced Projects

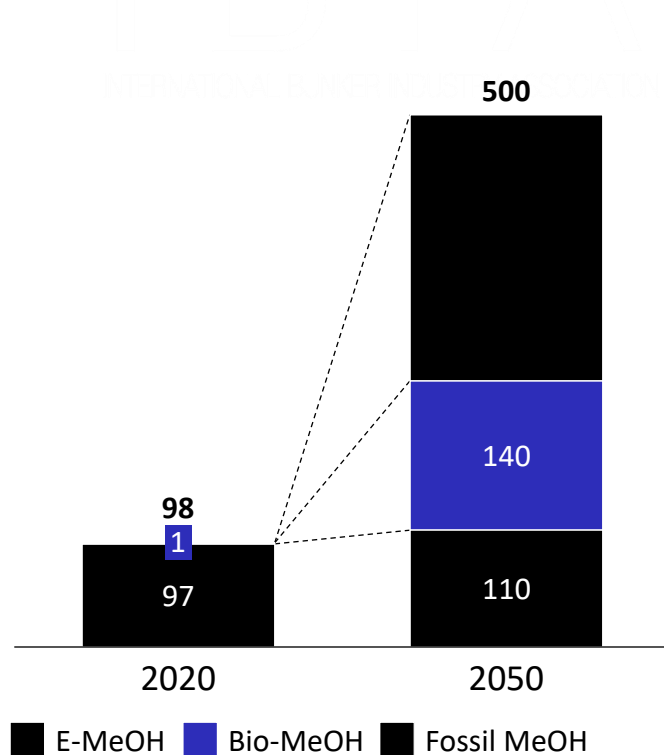


# Methanol and green methanol forecast

The outlook for methanol into 2050 is very promising. Strong additional potential in aviation and H2 long-distance transport – but only if key hurdles are mastered

Forecast by IRENA

[million t]

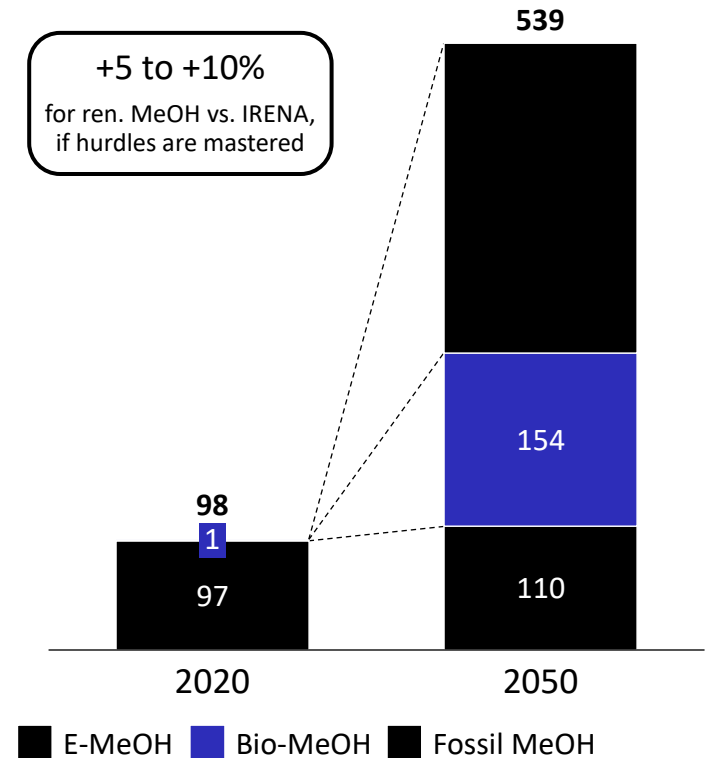


Growth drivers in key segments

Segment	Growth drivers	Outlook (vs. IRENA)
<b>Maritime</b>	<ul style="list-style-type: none"> <li>Decarb targets, e.g., IMO</li> <li>Safe, infrastructure easy handling</li> </ul>	
<b>Auto</b>	<ul style="list-style-type: none"> <li>FC-vehicles in PC limited use, but potential in long-haul HD transport</li> </ul>	
<b>Aviation</b>	<ul style="list-style-type: none"> <li>ASTM approval for MtJ required</li> <li>Potential for bio- and e-MeOH (PtL)</li> </ul>	
<b>Power</b>	<ul style="list-style-type: none"> <li>Use for off-grid power &amp; heat (direct or via FC solution)</li> <li>Competes with diesel, LPG, EtOH wind &amp; solar power solutions</li> </ul>	
<b>H2 chain</b>	<ul style="list-style-type: none"> <li>Build-up of H2 chains (US, EU, ME)</li> <li>MeOH robust and safe H2 carrier</li> <li>MeOH awareness fallen behind NH3</li> </ul>	
<b>Chemicals</b>	<ul style="list-style-type: none"> <li>Chemicals to decarbonize replacing fossil with green MeOH as feed</li> <li>CCS solutions in MeOH production drive robustness (blue-MeOH)</li> </ul>	

Updated forecast by Roland Berger

[million t]



Source: IRENA, Roland Berger

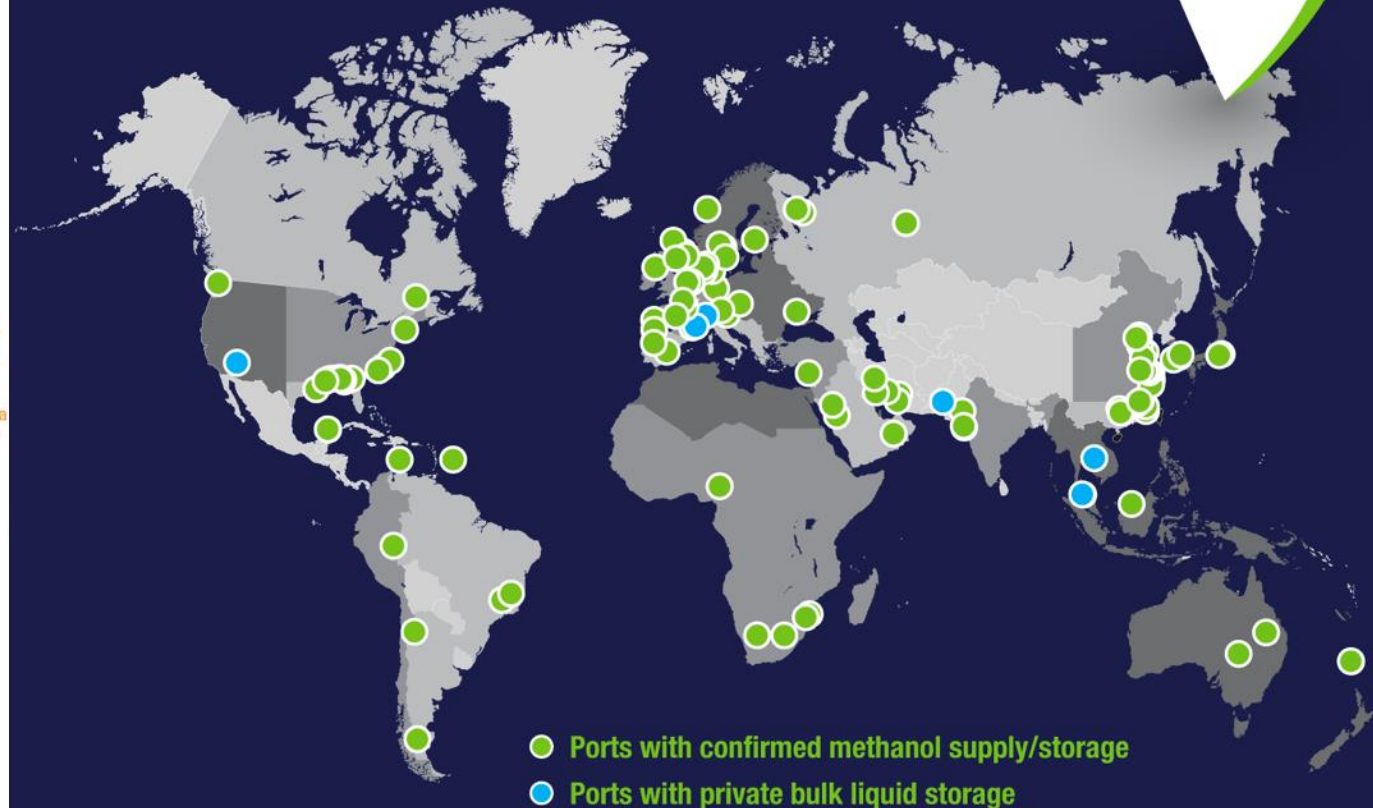
well covered by IRENA strong upside potential, but hurdles

## ESTABLISHED TRADING HUBS

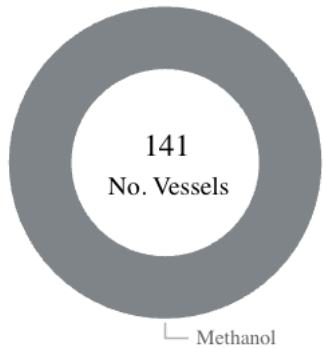


- Efficient break bulking, swaps, blending
- Transparent price assessments
- Standards and safe handling
- Lowers entry costs

METHANOL AVAILABLE IN  
OVER 100 PORTS TODAY



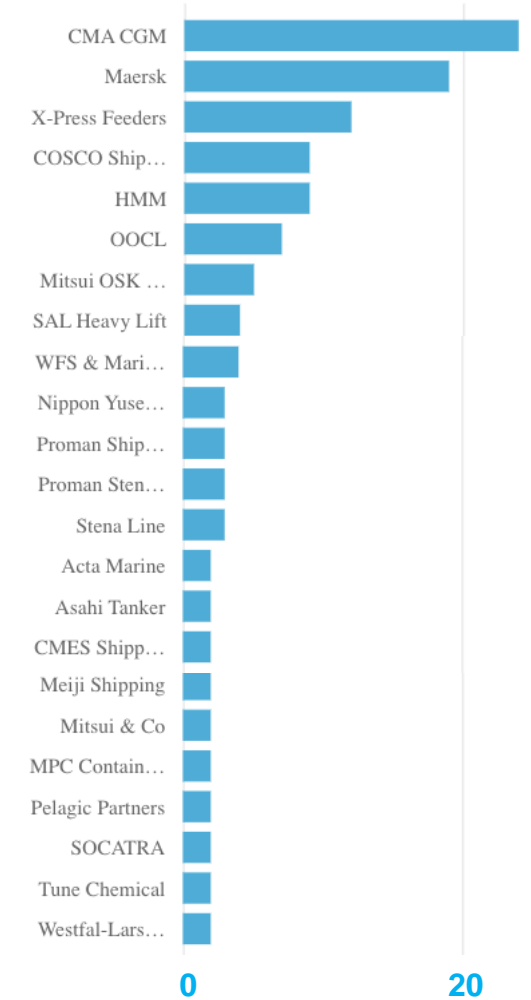
## Alternative Fuels Uptake



## Alt Fuel Uptake by Number of Vessels

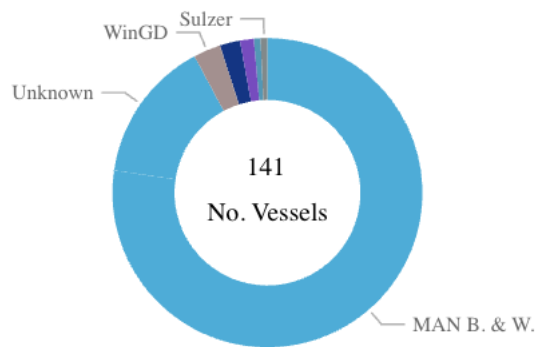
Alt. Fuels	Flt	% Flt	OB	% OB
Methanol	24.0	0.0%	117.0	2.4%
<b>Total</b>	<b>24.0</b>	<b>0.0%</b>	<b>117.0</b>	<b>2.4%</b>

## Top Owners

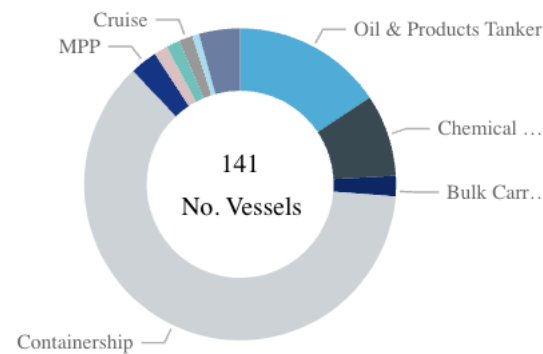


## Engine Designers

Top Engine Designers



## Uptake by Vessel Type



Source: Clarksons

*Introduction to*

**Methanol Bunkering**

*Technical Reference*

July 2020



ICS  
CCS

**T/CPCAS**

**Group Standard of China Petroleum  
Circulation Association**

T/CPCAS 1—2023

**Code of Practice for marine methanol bunkering**

(Exposure Draft)

**When submitting feedback, please attach the relevant patents together with the  
supporting documents of your knowledge.**

XXXX - XX - XX  
Issuance Date

XXXX - XX - XX  
Implementation Date

Issued by China Petroleum Circulation Association

T/CPCAS 1—2023

## GREEN MARINE

**SP** Singapore  
Polytechnic



- An urgent requirement for certified courses for crews has been identified by vessel owners and crew management groups
- Green Marine has established training hubs in Asia, with senior trainers, classrooms and onsite facilities as well as appropriate government networks for certification
- Training facilities are based on Norwegian flag
- Basic SOLAS/IGF/STCE requirement for the Basic and Advanced IGF trainings already in hand, modified to ensure they are methanol specific
- Courses lectures materials have been finalized with courses now on offer
- **Two pilots successfully completed by March and now looking at a 'train the trainer' approach with considerable external demand already**





## 1 Adopt a Well-to-Wake approach to GHG accounting

- Represents actual GHG reductions
- Reduces risk by enabling multiple energy carriers and support shipowners' capacity to deliver GHG reductions

## 2 Focus on the objective of reducing GHG emissions

- Emphasize desired outcome rather than selecting the specific path to getting there
- Do not wait for the silver bullet

## 3 Acknowledge through policy that the energy transition does not happen overnight

- Enable the GHG reduction contributions of low-carbon fuels

## 4 Leverage MBM revenue to scale-up supply of renewable and low-carbon fuels

- Ramping up production capacity of renewable and low-carbon marine fuels drives their integration into maritime transport



**Cailean Iain Macleod**

Technical and Regulatory Affairs Director

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# Biodiesel Use In Marine Transport

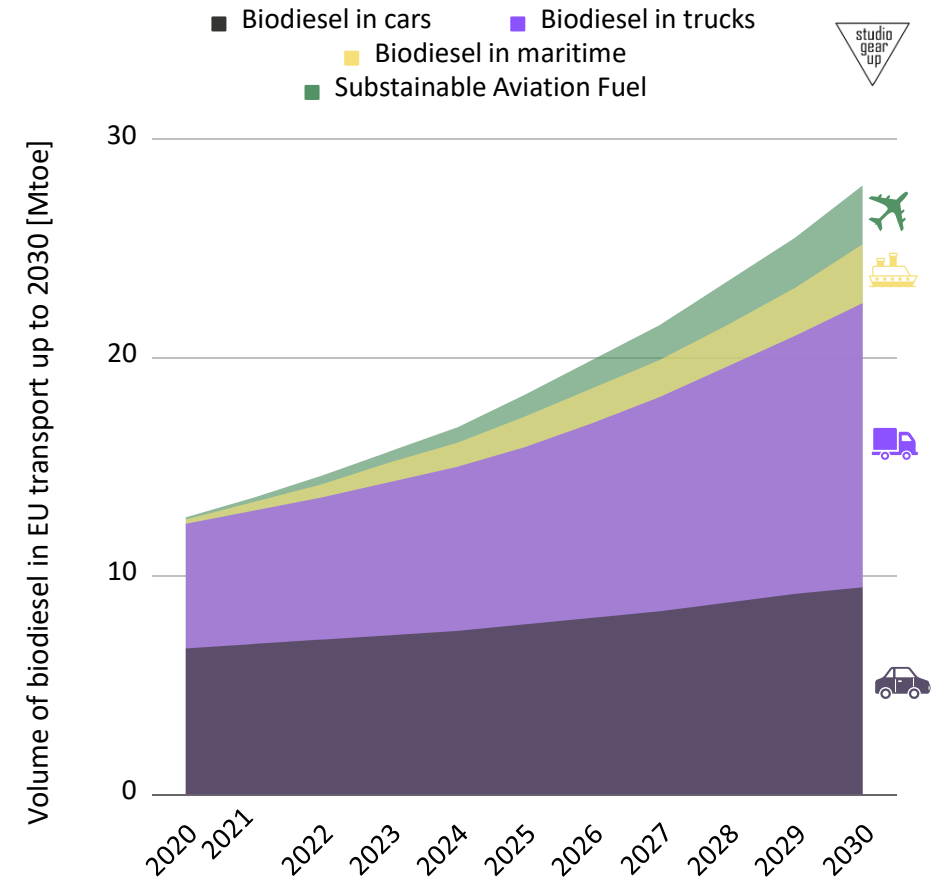
**Overcoming technical challenges**

# Biodiesel Use In Marine Transport



## The EU Biodiesel Industry

- Today, the EU is a world leader in the production and use of biodiesel (FAME, HVO and HEFA) in transport, with nearly 200 plants producing around 14 million tonnes of biodiesel per year.
- Growth in European biodiesel demand growth is triggered by the 'Fit for 55' package, which aims at reducing EU GHG emissions by at least 55% by 2030.
- The mandates are expected to double the demand for renewable fuels in transport, especially in hard-to-abate sectors.
- Globally, demand is expected to surge as countries attempt to decarbonise their transport fleets.



## Why biodiesel?

Biodiesel is a renewable fuel using all feedstocks: food/feed crops, waste, residues and other innovative biogenic materials. It can be blended with, or completely replace, fossil diesel. Additionally, biodiesel offers a range of cross-cutting benefits:

- It is *the main renewable energy* source in the European transport
- Leads to *emission savings up to 90%*, and with an average of 66%;
- Improves *diversity and security of fuel supply*.
- Is a true *“drop in” replacement for fossil fuels*.
- Increases production of *protein-rich co-products* while boosting and diversifying farmers revenues
- Supports *the circular economy* by recycling waste, used cooking oil, or animal fat, in modern biodiesel refineries;
- The co-products generated as part of its production offer *alternatives to fossil chemicals in several applications*, providing a clear example of the benefits of the bioeconomy.





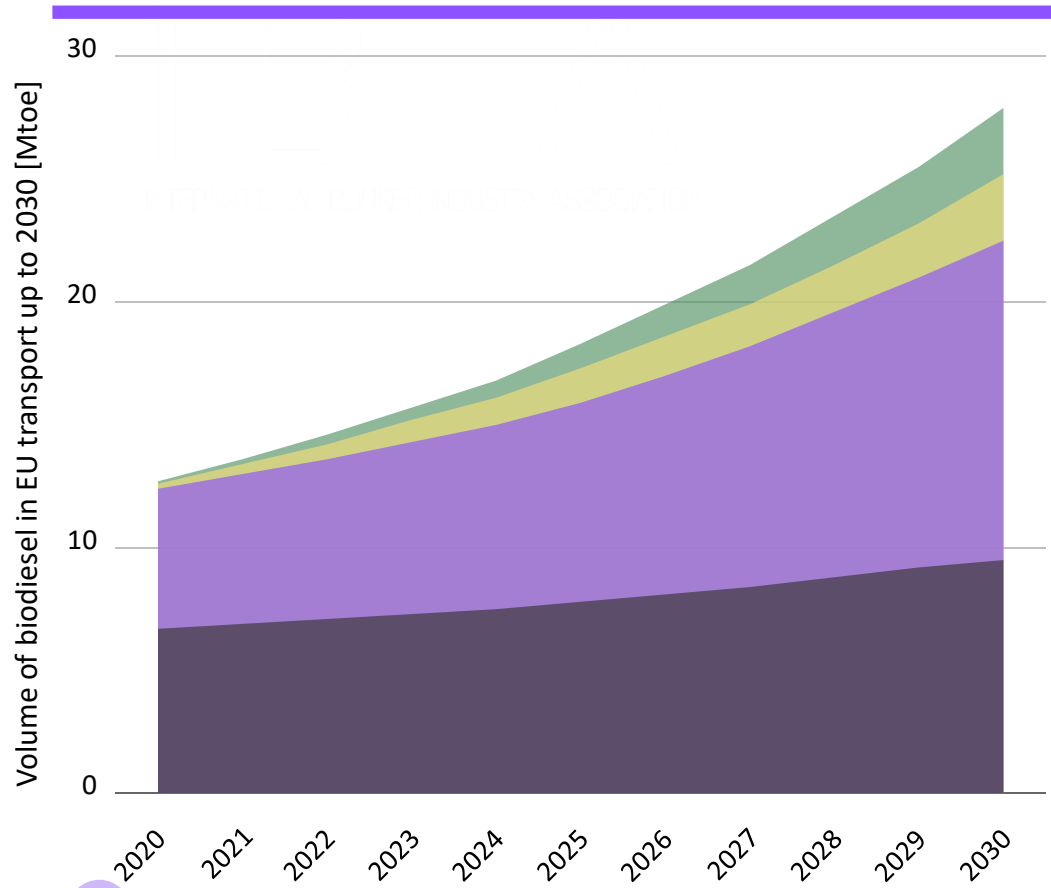
## Challenges for the future

- New markets for renewable transport fuel in:
  - Heavy-duty road transport
  - Aviation
  - Marine transport
- There are technical, economic, and political challenges.
- Competition from many “diesel-replacements”
- All fuels need:
  - Sustainability and scalability
  - Compatibility with legacy and future fleet
  - Fuel specification adaptation
- All these are possible with biodiesel.





## Challenges for marine biodiesel



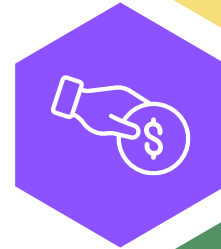
### Production

Can we produce enough fuel at specification?  
What are the technical challenges?



### Distribution

How to get fuel where it's needed, sustainably.



### Price

Meeting stricter technical requirements costs money!  
Feedstock price/processing paradox.



### GHG intensity

Higher GHG savings equals more value?



### Standards

How to future-proof ISO standards.



## Biofuels replace LNG as most popular alternative fuel, survey shows

*Shipping industry stakeholders see biofuels as the best transition fuel*

## HMM to trial marine biofuels on its mega containerhips as it partners with GS Caltex

COLLABORATION

April 26, 2023, by Jasmina Ovcina Mandra

South Korea's flagship carrier HMM has signed a Memorandum of Understanding (MoU) with GS Caltex to secure marine biofuels.

## MSC and DB Schenker sign biofuel shipping deal

## VPS-inspected marine biofuel samples surge amid push towards sustainable shipping

HIGHLIGHTS

Singapore develops national biofuels standard to assure quality

Code of practice for MFM to be amended to include biofuels

CII, other rules to make biofuels more cost competitive

ALTERNATIVE FUELS & LUBRICANTS

## Monjasa completes first biofuels delivery in the UAE

05/05/2022

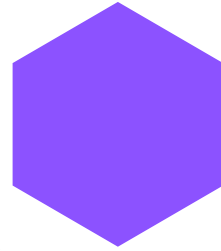
Oil and shipping group Monjasa has successfully completed its first blending and supply of marine biofuels in the UAE. The project was carried out in close collaboration with international energy company, Uniper and biofuel producer Neutral Fuels.



Source: Monjasa



## Conclusion



- Huge demand for biodiesel and HVO.
- Marine transport will face competition but see surge in use of biodiesel.
- Use of biodiesel will present (relatively minor) technical challenges.
- ISO standards will help address concerns of ship owners, operators, and fuel suppliers.
- Need appropriate IMO action!
- Cross-industry collaboration will facilitate increased use of biodiesel (and other sustainable fuels).







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**Working with our members to fuel  
the engines of global trade,  
now and in the future**

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**Thank you**

**Unni Einemo, Director, IBIA**

