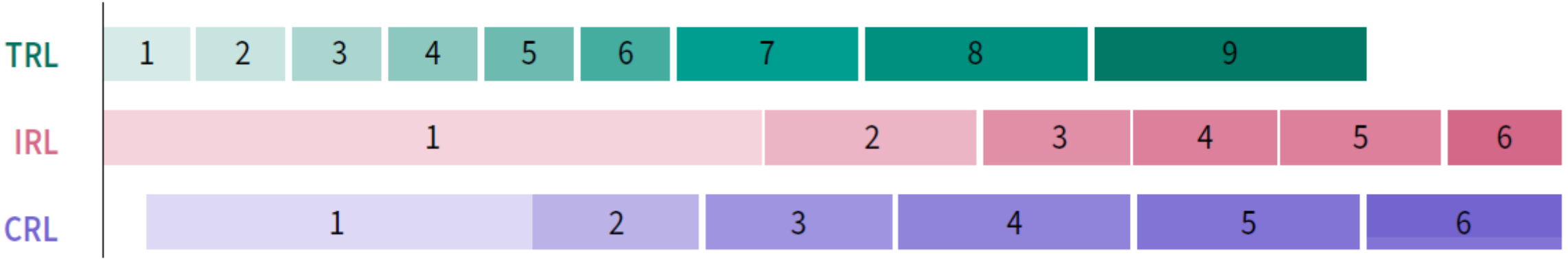
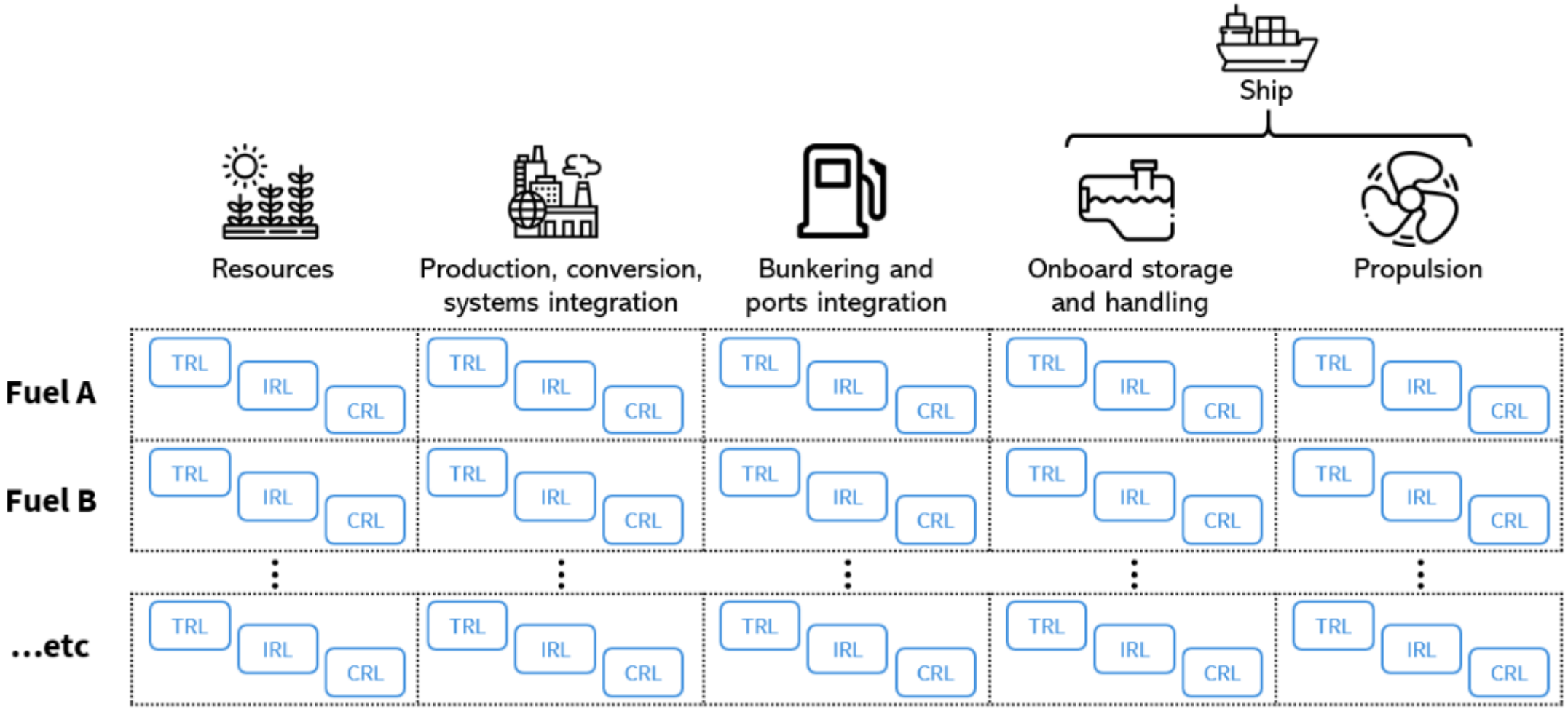


Yara Clean Ammonia

source: Lloyd's Register Zero Carbon Fuel Monitor July 2022

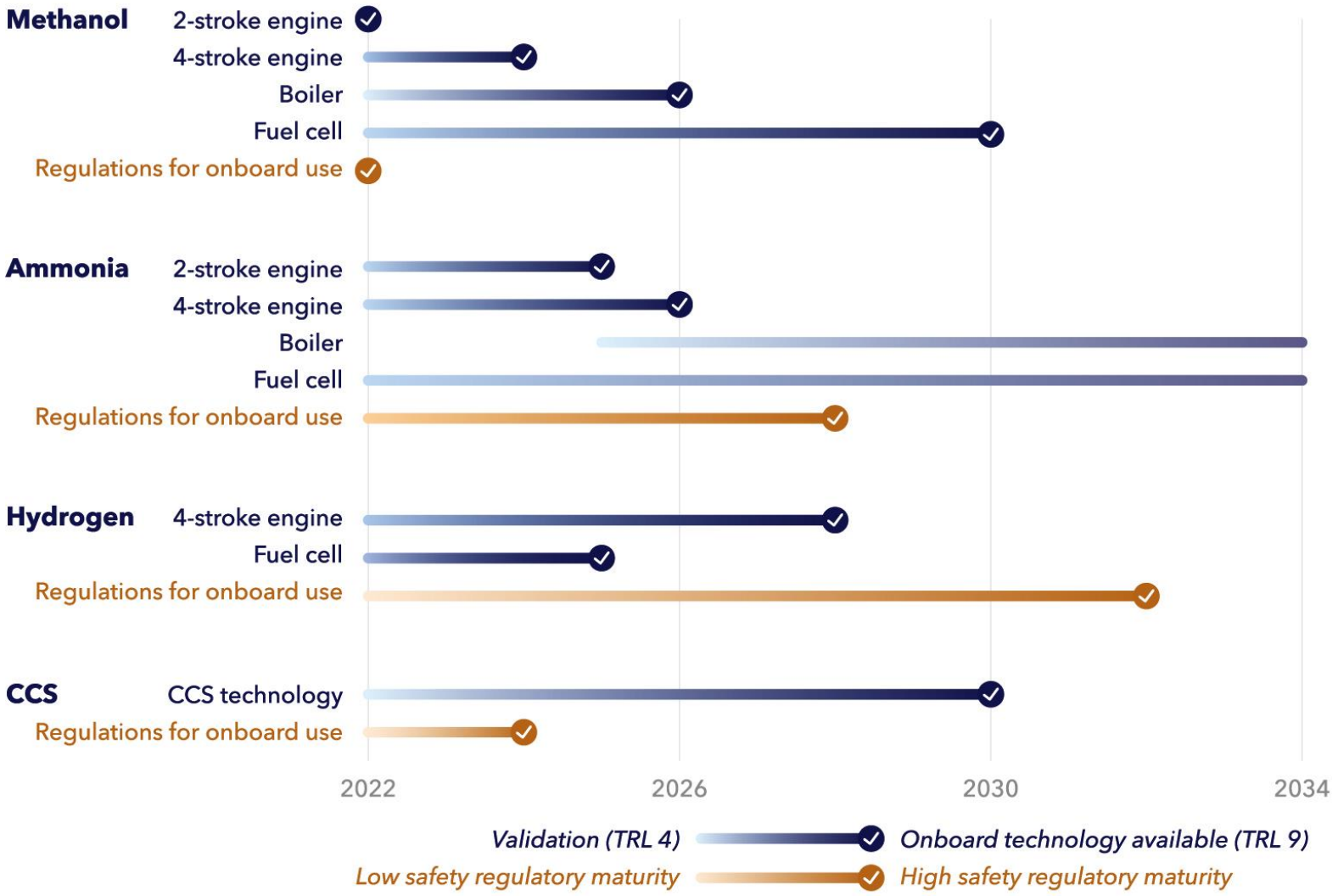


source: Lloyd's Register Zero Carbon Fuel Monitor July 2022

	TRL					IRL					CRL				
	Resource	Production	Bunkering	Ship storage	Ship Propulsion	Resource	Production	Bunkering	Ship storage	Ship Propulsion	Resource	Production	Bunkering	Ship storage	Ship Propulsion
ng-Ammonia	4	4	3	3	3	2	2	1	1	1	2	4	1	1	1
re-Ammonia	7	5	3	3	3	2	2	1	1	1	5	4	1	1	1
ng-Hydrogen	4	4	4	4.3	5	2	2	1	1	1	2	4	1	1	1
re-Hydrogen	7	5	4	4.3	5	2	2	1	1	1	5	5	1	1	1
ligno-Methanol	7	3	7	8	8	2	2	2	2	2	2	2	3	4	4
ng-Methanol	4	4	7	8	8	2	2	2	2	2	2	4	3	4	4
re-Methanol	7	5	7	8	8	3	3	2	2	2	5	5	3	4	4

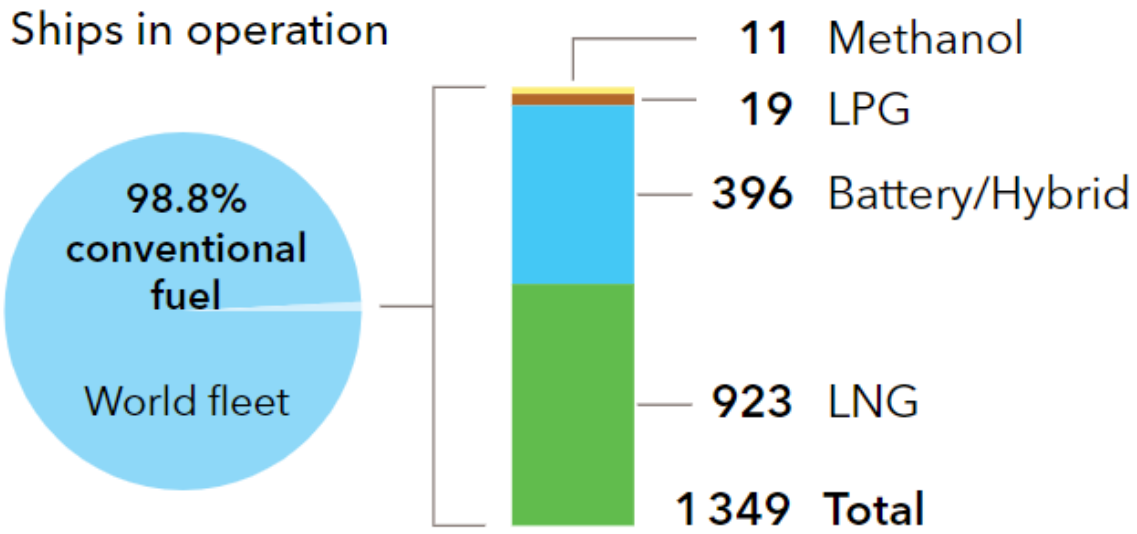
source: Lloyd's Register Zero Carbon Fuel Monitor July 2022

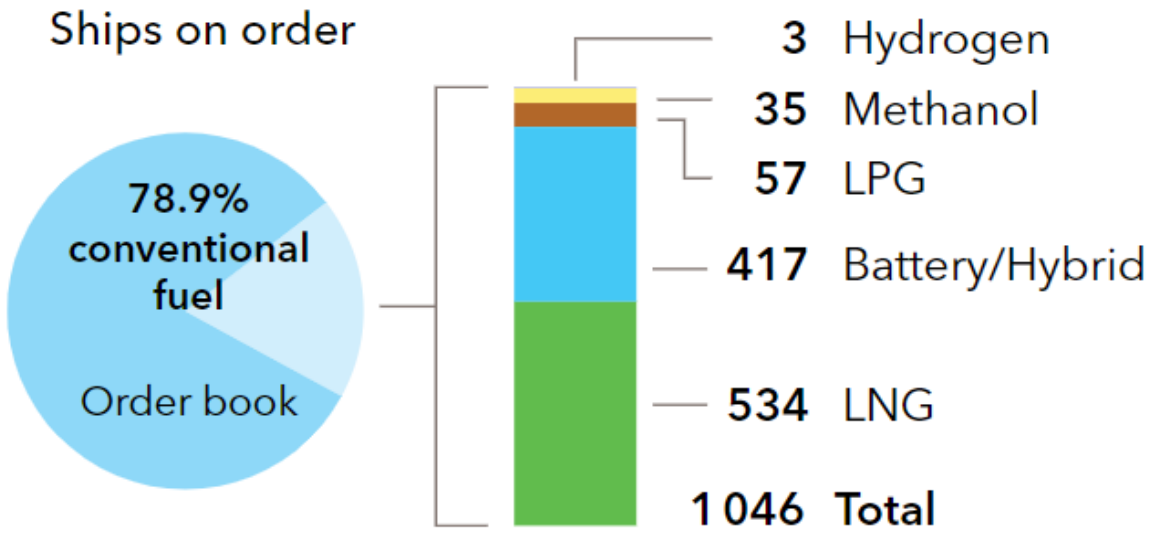
Estimated maturation timelines for energy converters, onboard CCS technologies, and corresponding safety regulations for onboard use



source: DNV Maritime Forecast to 2050

NUMBER OF SHIPS

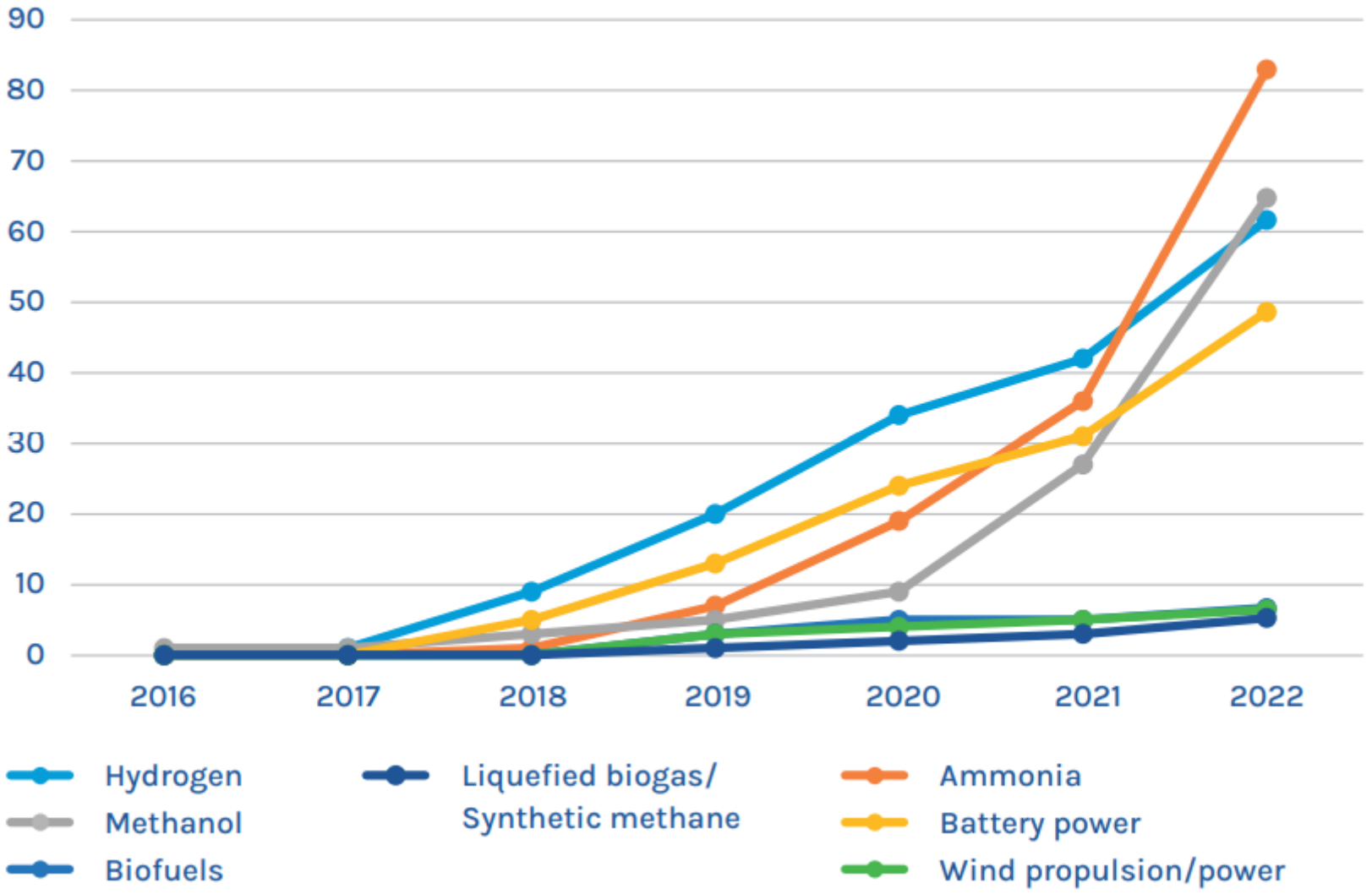




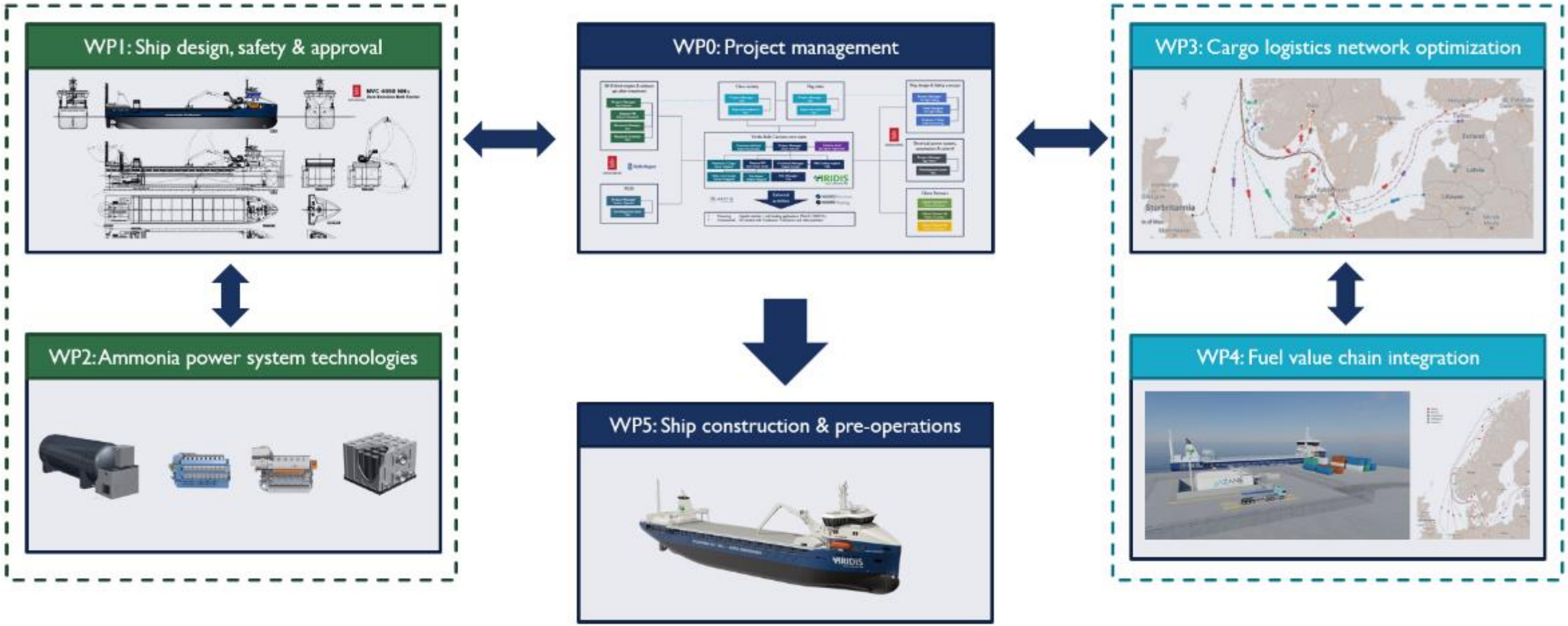
Confirmed orders only, not LoI's, MoU's or options. 130 ammonia-ready vessels are also excluded from these numbers.

SOURCE: DNV Alternative Fuels Insight platform, June 2022; Clarksons Research

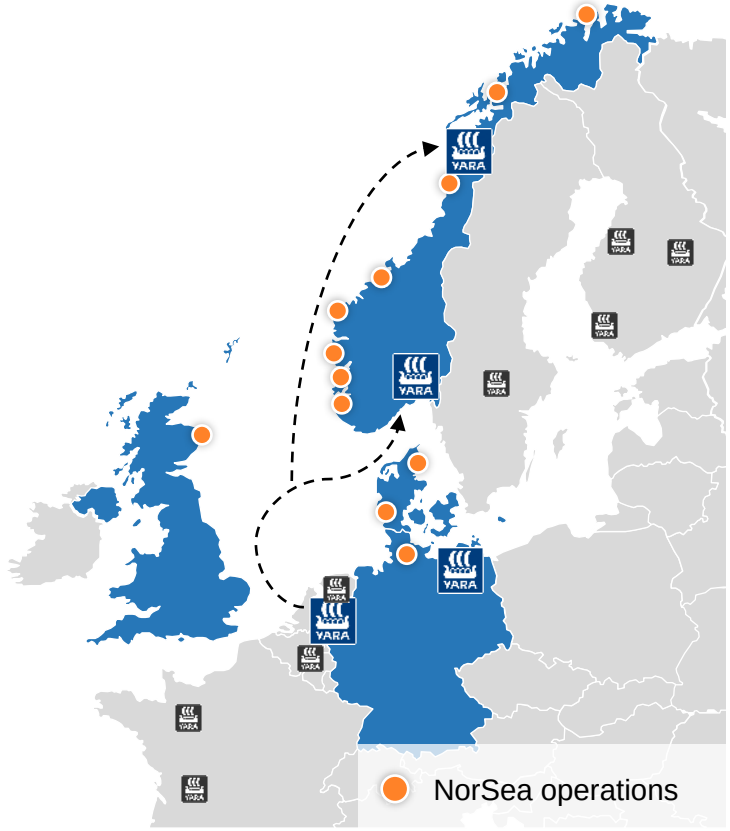
Figure 2: Total number of ship technology projects by fuel focus 2016 to 2022[6] (GMF, 2022b).




VIKING ENERGY
Powered by LNG



source: Flexbulk - NH3 power project



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source: Ammonia Fuel Bunkering Network project

Pilbara ports ammonia bunkering study

Market Study

- Market Overview + Economic Comparison
- NH3 Demand Estimate
- NH3 Demand Schedule
- Probabilistic estimate & schedule

Modality Study

- Basis of Design
- Ship to Ship Bunkering Concept Designs
- Multi-Criteria Assessment (MCA)
- CAPEX & OPEX

Safety Study

- Process Safety Study of proposed Ship to Ship Bunkering Concept Designs

Regulations Study

- Existing Stds Review
- Reg Overview + Gap Analysis
- Bunker Map
- Bunkering Procedures
- Licensing Scheme
- Training Matrix

Study to be completed **within 1 year**

Scaling technology

- Electrolysers to be scaled and demonstrated producing renewable energy for marine fuels
- Carbon sourcing technologies (direct air capture (DAC), biogenic source) for re-Methanol to reach maritime scale
- Demonstration of carbon capture and storage (CCS) at scale for production of natural gas derived fuels
- Demonstration of large-scale bunkering, particularly ship-to-ship

Stimulating investment

- Regulatory incentives to ensure price competitiveness of zero-carbon fuels
- Green corridors to demonstrate fuel requirements in specific locations and drive fuel needs
- Commercial scale-up fleets that enable economies of scale

Ensuring sustainability

- Lifecycle analysis of environmental impacts of zero carbon fuels
- Regulatory standards, certification and reporting requirements applicable to fuel producers and users
- Lifecycle analysis of socio-economic impacts of zero-carbon fuels
- Carbon sourcing certification in place for re-Methanol production

source: Lloyd's Register Zero Carbon Fuel Monitor July 2022