

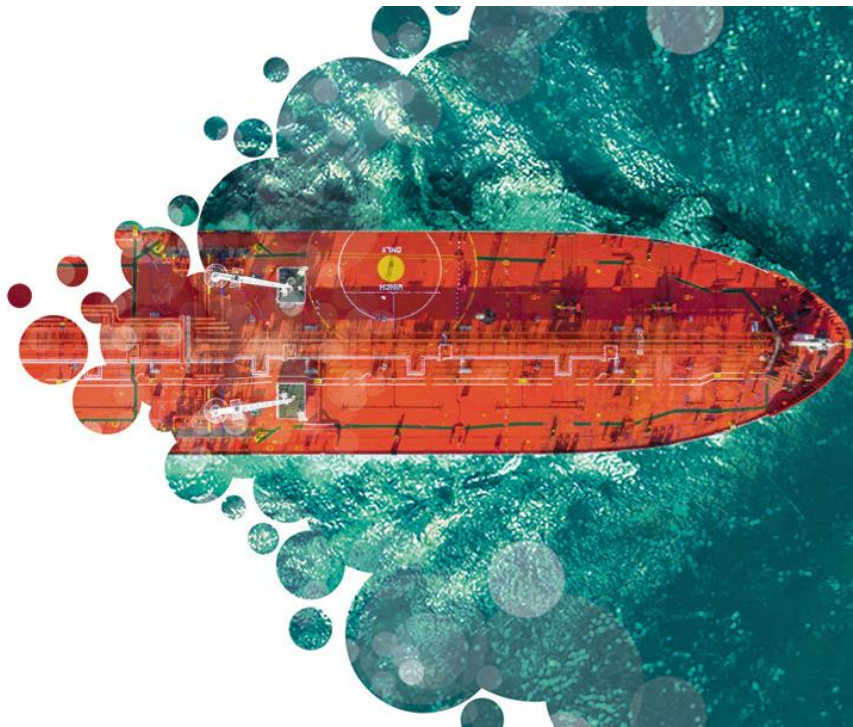


WHEN TRUST MATTERS

Fuel Options Today and Tomorrow

NAMEPA Annual Conference, November 2, 2023

Jan Hagen Andersen Business Development Director - Region Americas



DNV celebrates 125 years in the US



Hans Johansen, Surveyor -New York 1898



- In 1898, Hans Johansen, an experienced surveyor, arrived in New York City.
- He was to provide surveys to the growing “iron and steam” fleet which called at North American ports from the St. Laurence River to the Gulf of Mexico.
- The US office was the first for DNV outside Europe after just 33 years of operation.

WELCOME TO DNV'S ALTERNATIVE FUELS INSIGHT PLATFORM

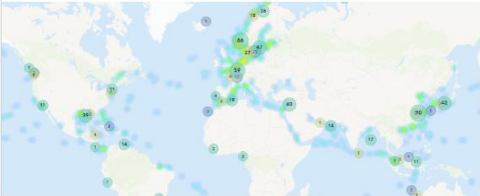
PREMIUM ACCESS >



● LNG ● LPG ● Methanol ● Hydrogen

Map

Explore the development of bunkering infrastructure for alternative fuels. You can also see where ships using alternative fuels and technologies are already operating.



Explore

Statistics

Get detailed insights to the uptake of alternative fuels and technologies on ships. Filter on ship types, region, technology and more to create your own graphs.



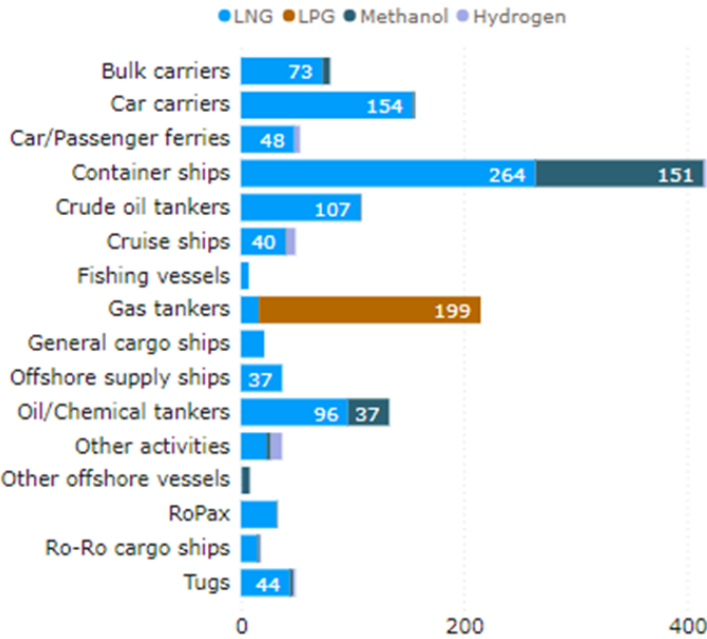
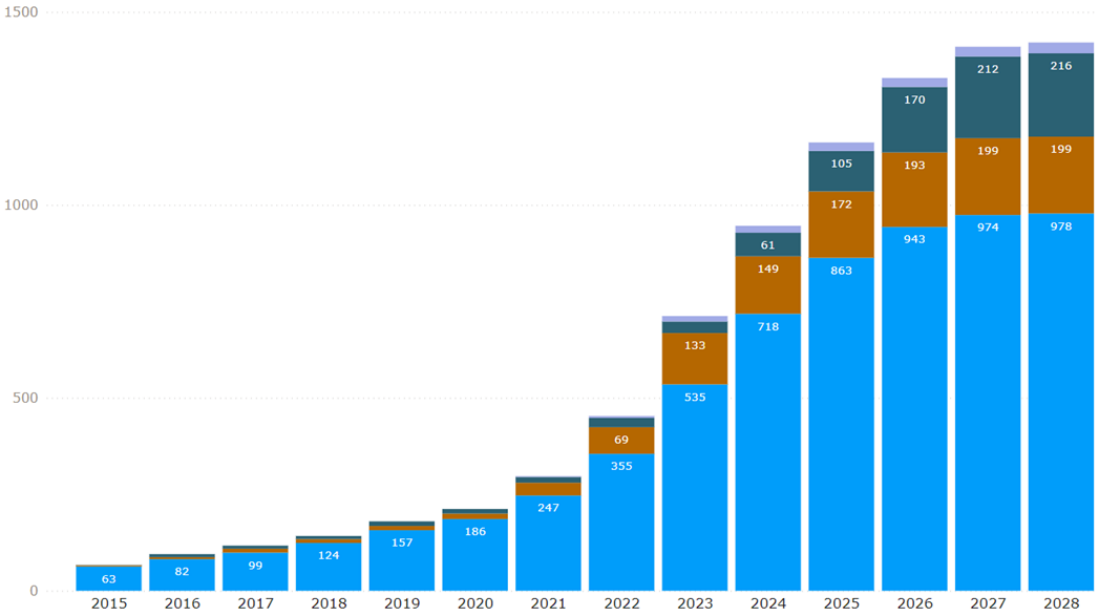
Explore

Fuel Prices

Explore prices for Ammonia, Methanol, LNG, biofuels, and more in your preferred unit, and benchmark against conventional fuels.



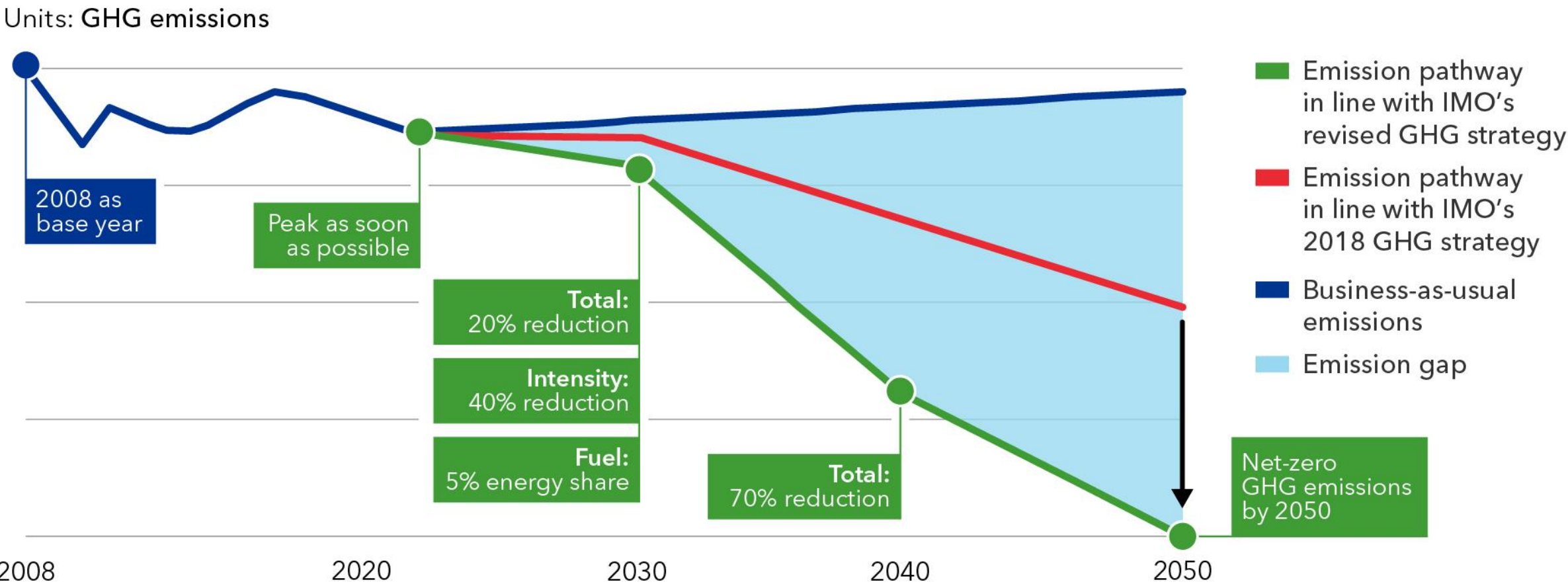
Explore



What is the best fuel option?

	Availability	Infrastructure & Storage	Maturity of technology	Energy density	Price	Green credentials
VLSFO/MGO						
LNG						
LPG						
Methanol						
Biofuels			drop-in fuel			
Hydrogen						
Ammonia						

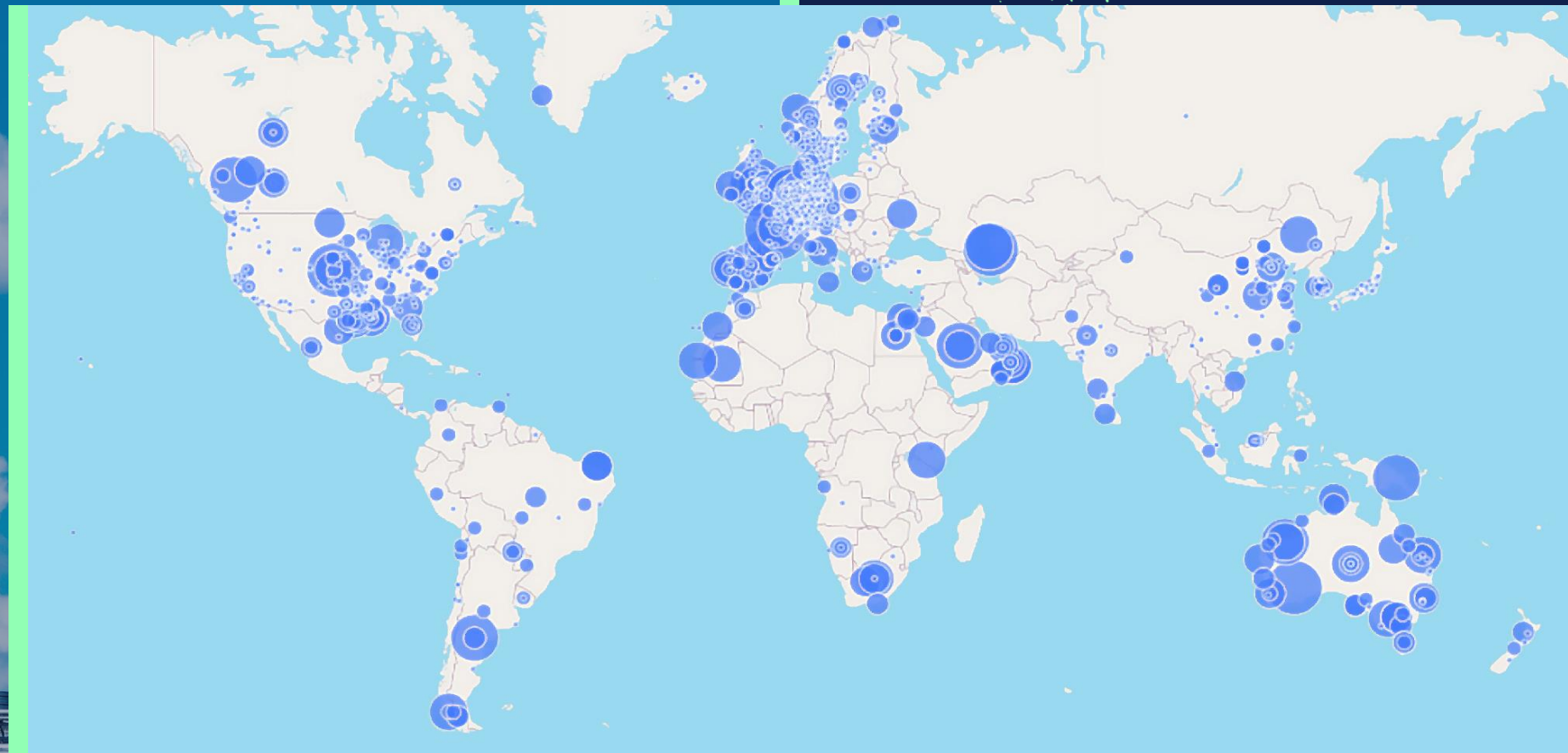
Strengthened IMO strategy on GHG reductions



Total: Well-to-wake GHG emissions; **Intensity:** CO₂ emitted per transport work; **Fuel:** Uptake of zero or near-zero GHG technologies, fuels and/or energy sources

What will be available where of carbon-neutral fuels?

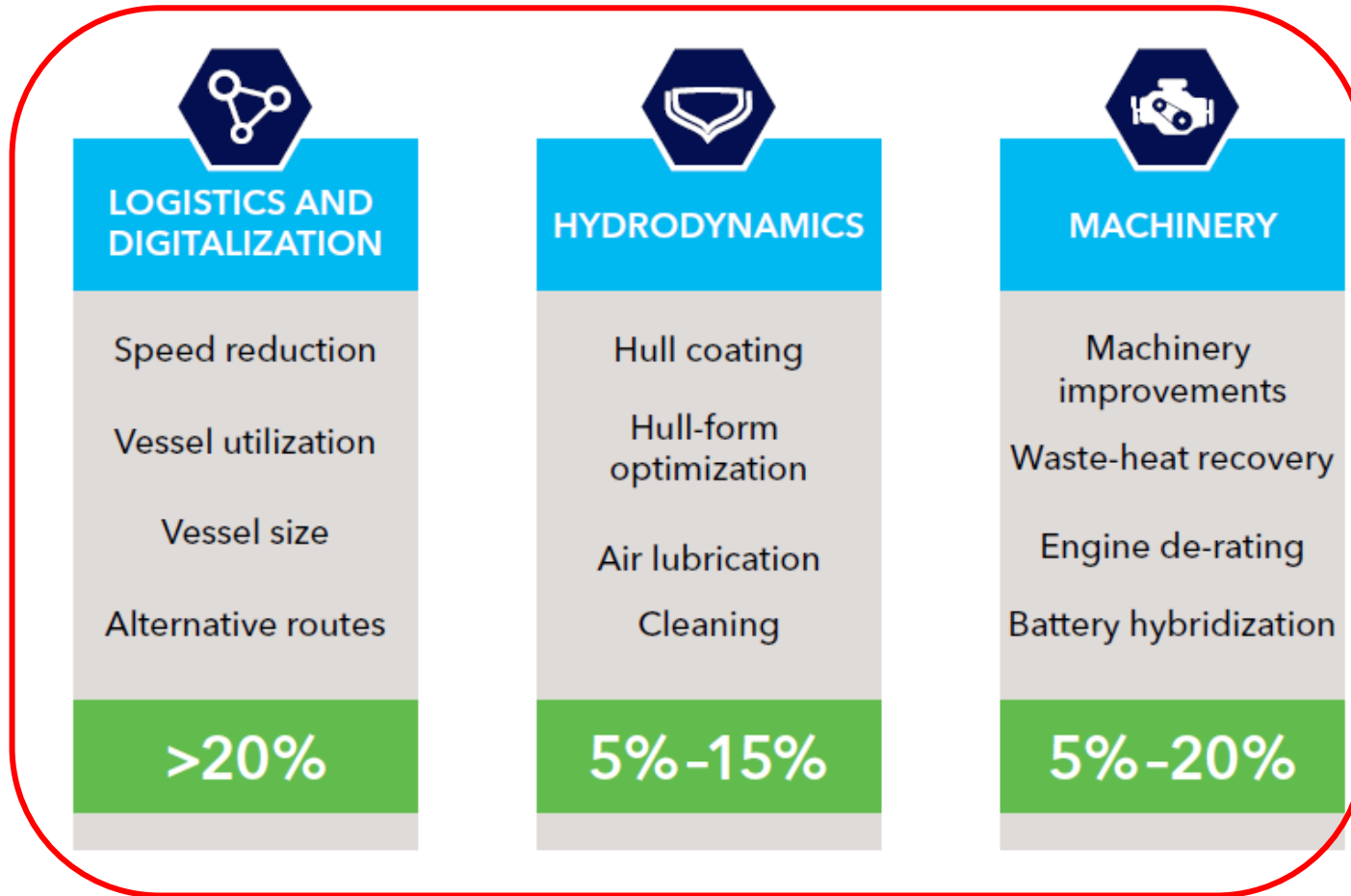
30-40% of estimated
global carbon-neutral
fuel supply by 2030



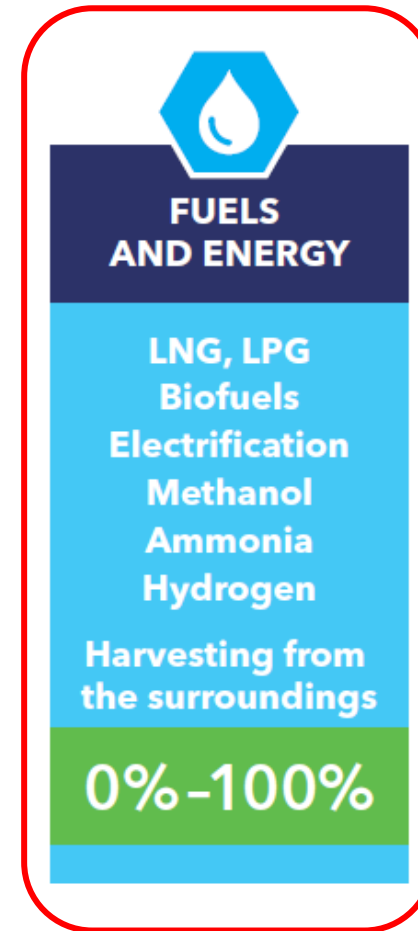
Decarbonization options

What are our options?

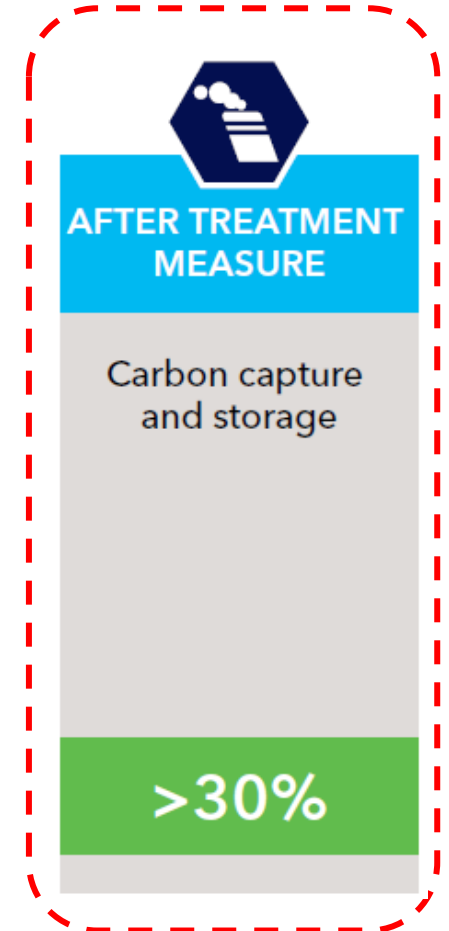
Reduce energy consumption



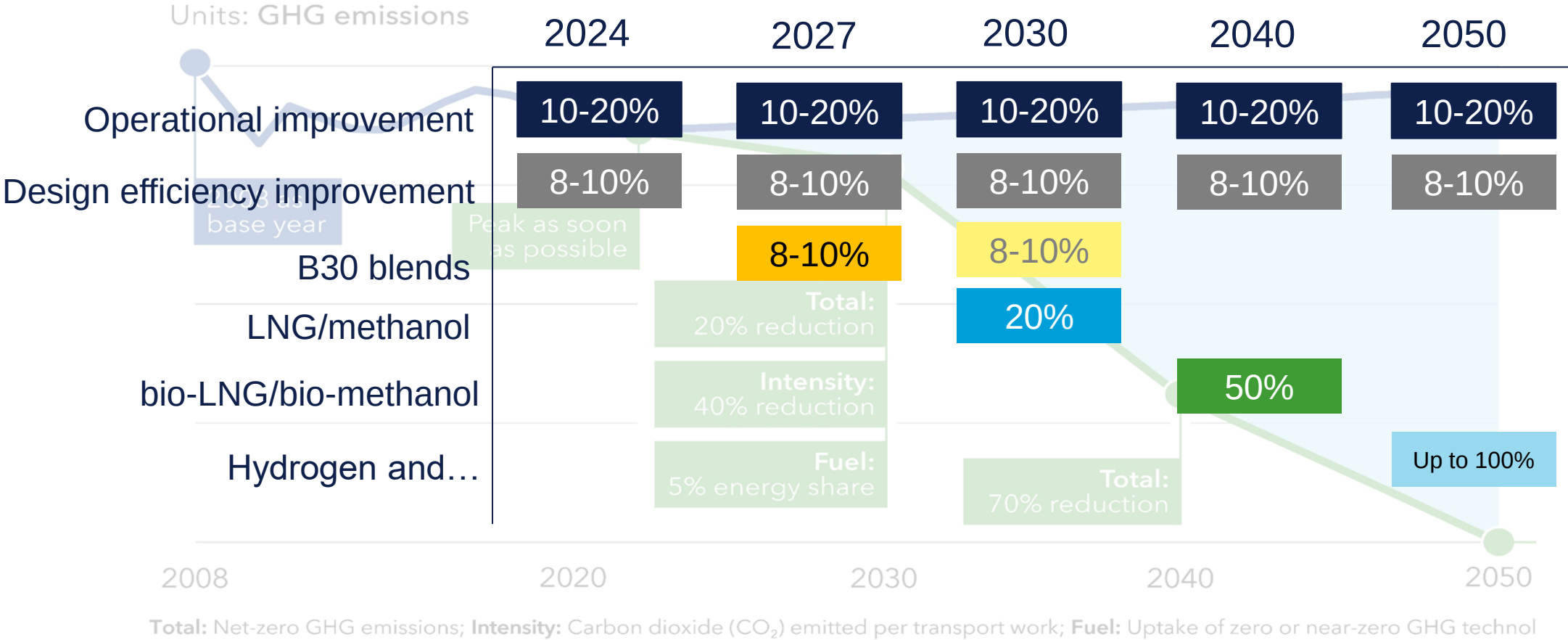
Low-carbon energy



Clean up exhaust



Following the requirements



What is the best fuel option?

	Availability	Infrastructure & Storage	Maturity of technology	Energy density	Price	Green credentials
VLSFO/MGO	Green	Green	Green	Green	Green	Red
LNG	Green	Yellow	Green	Yellow	Yellow	Yellow
LPG	Green	Yellow	Yellow	Yellow	Yellow	Yellow
Methanol	Yellow	Yellow	Green	Yellow	Yellow	Yellow
Bio-/e-fuels	Yellow	Green	Green	Green	Red	Light Green
Hydrogen	Yellow	Red	Yellow	Red	Red	Light Green
Ammonia	Yellow	Yellow	Yellow	Yellow	Yellow	Light Green

A possible picture in 2035

Key takeaways

More diversified fuel mix:

- Continued strong interest for LNG, increasing interest in Methanol and Biofuels
- Early developments in Ammonio and H₂
- CCS and Nuclear – is there a case?

Fuel & technology cost: main deciding factor

Focus on energy efficiency & digitalization

When facing uncertainty: build your options



By failing to prepare, you are
preparing to fail.

~ Benjamin Franklin

TURN UNCERTAINTY INTO CONFIDENCE

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