
ACCELERATING THE
TRANSITION TO NET ZERO
Jason Miles – Chief Executive Officer
quadrisefuels.com
BIOMSAR™
MSAR®
3RD DECARBONIZING SHIPPING
IN-PERSON FORUM
Hamburg, June 21-22, 2022

AGENDA

ACCELERATING THE TRANSITION TO NET ZERO

1

THE ROLE OF FUEL TECHNOLOGY TO DECARBONIZE SHIPS

2

RAPID SOLUTIONS FOR AFFORDABLE DEPLOYMENT TODAY

3

THE FIT WITH NEW MARINE REGULATIONS



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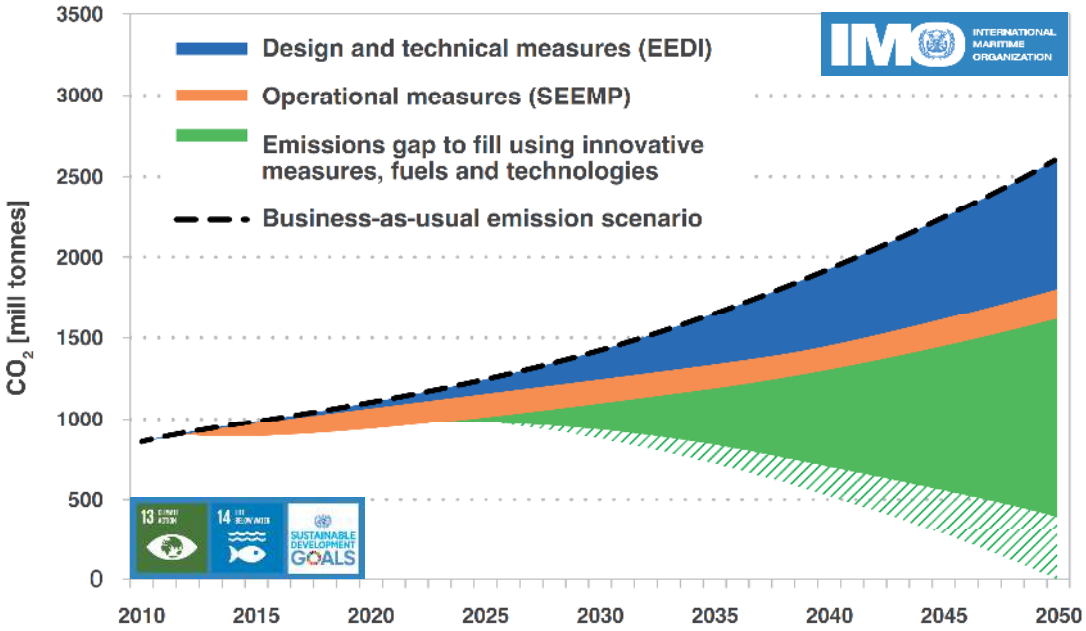
THE FIT WITH NEW MARINE REGULATIONS



ACCELERATING THE TRANSITION TO NET-ZERO

REGULATIONS

Pressure to accelerate decarbonization in the maritime sector



COURTESY OF THE INTERNATIONAL MARITIME ORGANISATION : IMO ACTION TO REDUCE GREENHOUSE GAS EMISSIONS FROM INTERNATIONAL SHIPPING

New global IMO regulations are looming:

1. **SEEMP III & CII**
2. **EEDI and EEXI**

Coupled with new regional rules, such as EU Fit for 55

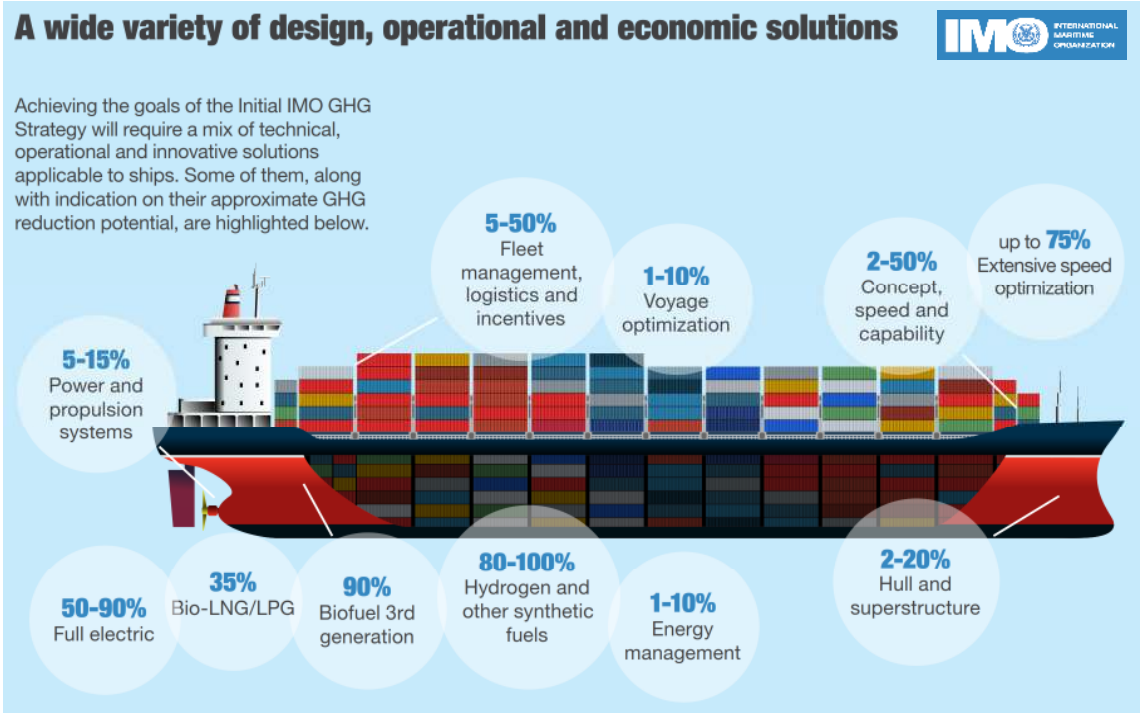
With particular implications for existing vessels over 10 years old…

ACCELERATING THE TRANSITION TO NET-ZERO

SOLUTIONS

Some of these are not practical or commercially ready today, and may not materialize in future…

Decarbonization solutions – there are many!



COURTESY OF THE INTERNATIONAL MARITIME ORGANISATION : IMO ACTION TO REDUCE GREENHOUSE GAS EMISSIONS FROM INTERNATIONAL SHIPPING

At Quadrise we are focusing on what can be done today to:

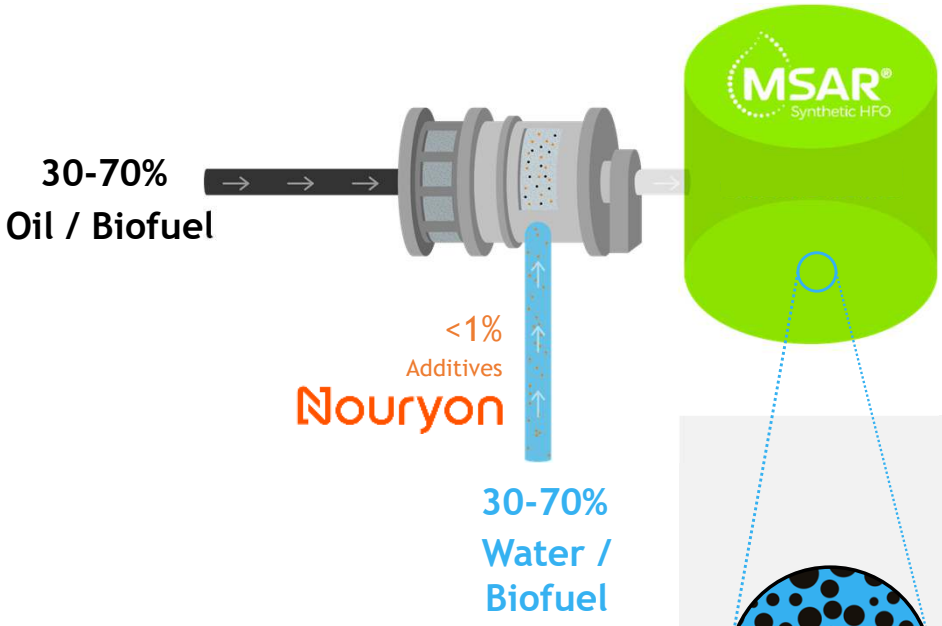
1. **Improve energy efficiency / SFOC**
2. **Lower emissions of CO_2 NO_x PM**

Using advanced technology for fuels…

IMPROVING ENERGY EFFICIENCY

MSAR® technology is deployed at fuel production, or the vessel, to reduce fuel costs and emissions

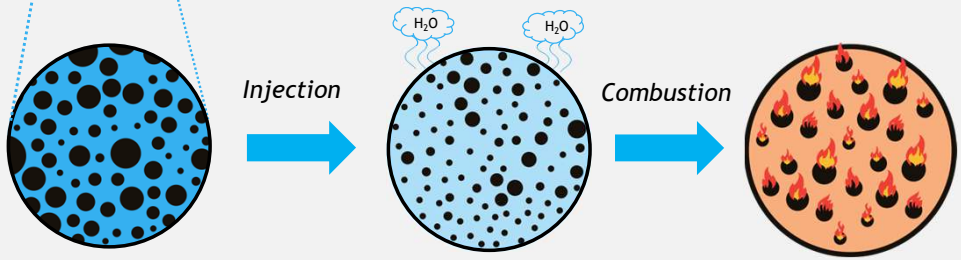
MSAR® Synthetic HFO Emulsion Fuel Technology



MSAR® and bioMSAR™ blending (at Refineries, Terminals, Vessels)

Can be used to blend a range of conventional fuels and biofuels, both oil and water-based to produce a stable marine fuel

MSAR® and bioMSAR™ combustion



Each water droplet contains tiny (5-10 microns) oil droplets

Water evaporates dispersing tiny oil droplets

Microscopic oil droplets combust in a flame, producing energy with complete combustion

IMPROVING ENERGY EFFICIENCY

MSAR® technology is deployed at fuel production, or the vessel, to reduce fuel costs and emissions

MSAR® Synthetic HFO Emulsion Fuel

- ✓ Improves engine efficiency, lowering energy consumption and fuel costs to achieve CO_2 savings of up to 9%
- ✓ Enhances fuel blending of lower value fuels and biofuels, the water lowers fuel viscosity and NO_x emissions by up to 45%
- ✓ Achieves complete combustion from the micro-fuel droplets produced, reducing black carbon emissions substantially



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Diesel & Marine Experience

- Quadrise has >60 million tons of emulsion experience
- 150,000 reliable running hours on 4-stroke Wartsila engines for base-load power generation
- Comprehensive 2-stroke marine MSAR® programme with Maersk on MAN and Wärtsilä engines, resulting in:
  - Trials on MAN D&T, Mitsui & Wärtsilä test engines
  - Proof of concept tests at sea on Maersk Bogor and Seago Istanbul vessels
  - Operational trial on Seago Istanbul (~1500 hours)
  - Interim LONO obtained on Wärtsilä Flex 96
- **Further operational experience and LONO trials are in the planning phase with MSC Shipmanagement**











Maersk Bogor 43,000 DWT (MAN B&W 7K80ME-C9)





Seago Istanbul 54,000 DWT (Wärtsilä 12 RT-Flex 96 C-B)

Niels H Bruus
Maersk Line A/S:

"…during the MSAR® trial programme Maersk has enjoyed a close and professional collaboration with our technology partner QFI … resulting in a smooth operation during which the MSAR® fuel has performed well."

MSAR® Synthetic HFO

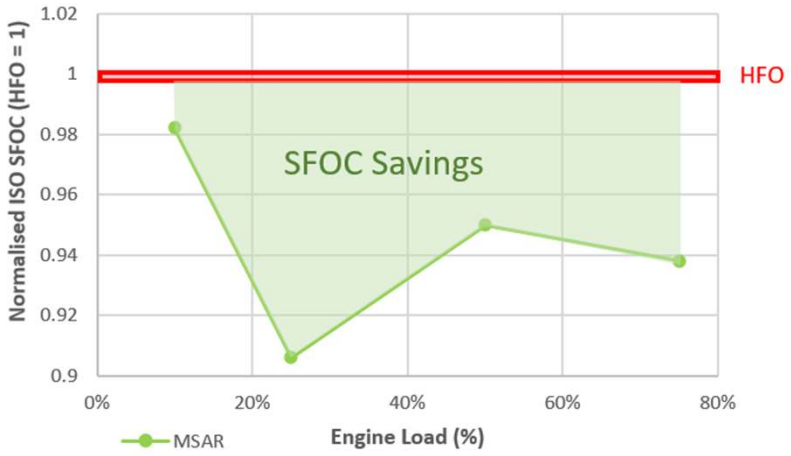
REDUCING FUEL COSTS & IMPROVING EFFICIENCY

LOWERING EMISSIONS

Up to 9% fuel consumption savings (Wartsila Flex 2S)

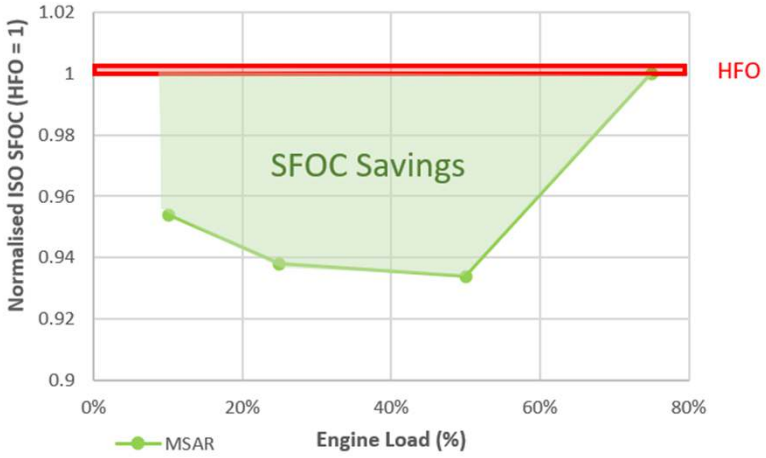
Stationary Engine Test

Wartsila Winterthur (4RT Flex 60C)



Seaborne Commercial Vessel

Seago Istanbul (12RT Flex 96C-B)



MSAR® results in up to 9% lower CO_2 & GHG emissions well-to-wake plus up to 45% NOx reductions and less Black Soot

MSAR® Synthetic HFO

REDUCING FUEL COSTS & IMPROVING EFFICIENCY

LOWERING EMISSIONS

Fuel consumption & resulting GHG/CO_2 emissions are reduced, NO_x emissions are reduced substantially…

How?

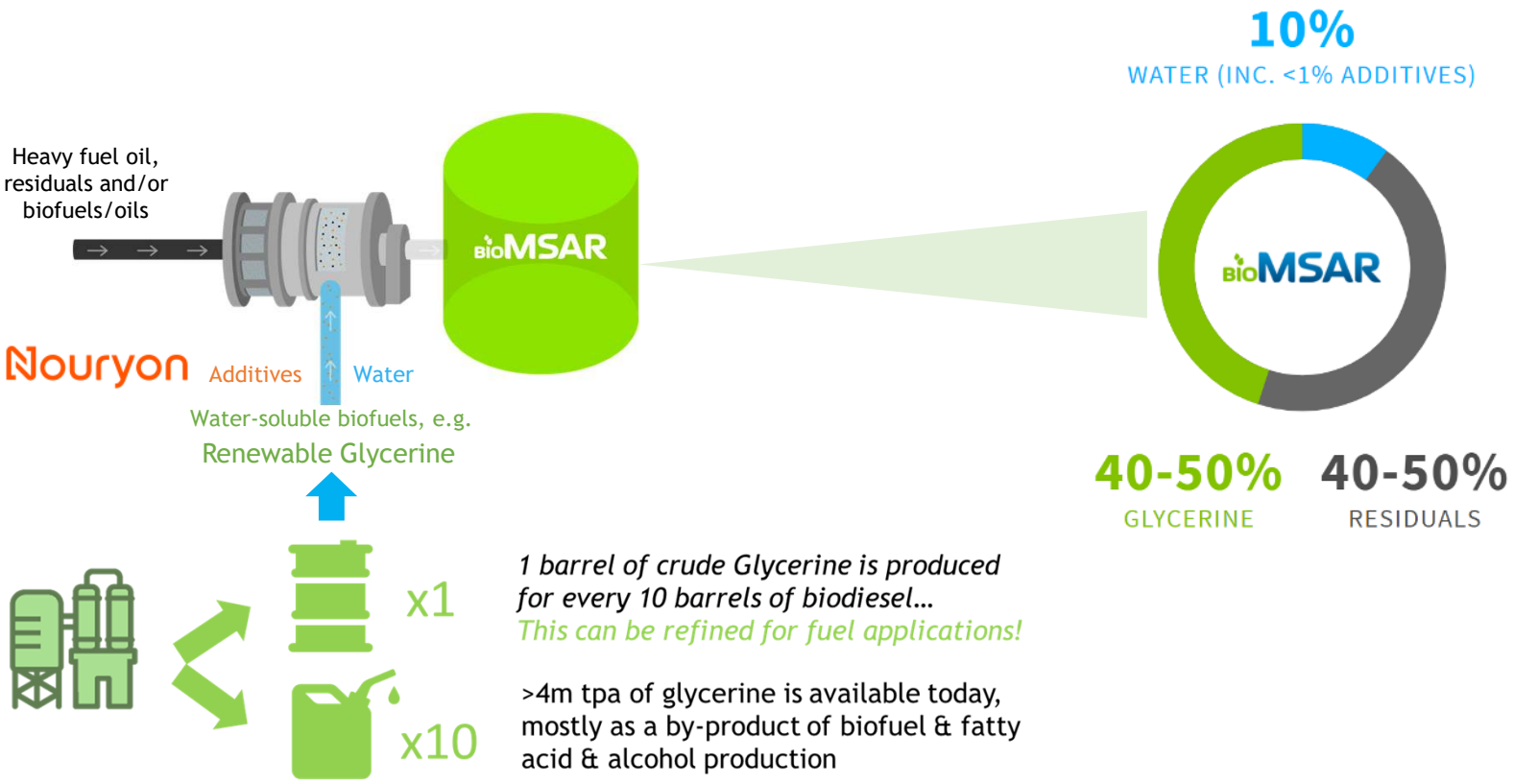
1. MSAR® technology reduces the viscosity of marine fuels, which reduces fuel injection duration times to compensate for water addition.
2. The oil/biofuel droplets are 5-10µm in size, which is much lower than achieved by conventional fuel injection systems, hence they burn quickly and completely for efficient energy conversion.
3. Fuel injection & combustion temperatures are lower, improving engine energy transfer, overall efficiency & reducing NOx.

bioMSAR™

ACCELERATING THE TRANSITION TO NET-ZERO

Focusing on new biofuel solutions for marine use

Launched at the end of 2020, bioMSAR™ combines the benefits of MSAR® fuel & proven technology to blend renewable fuels (both oil and water based).



1 barrel of crude Glycerine is produced for every 10 barrels of biodiesel…
This can be refined for fuel applications!

>4m tpa of glycerine is available today, mostly as a by-product of biofuel & fatty acid & alcohol production

Quadrise is also enhancing its technology solution to blend conventional and next-gen biofuels today to offer a net-zero solution by 2030

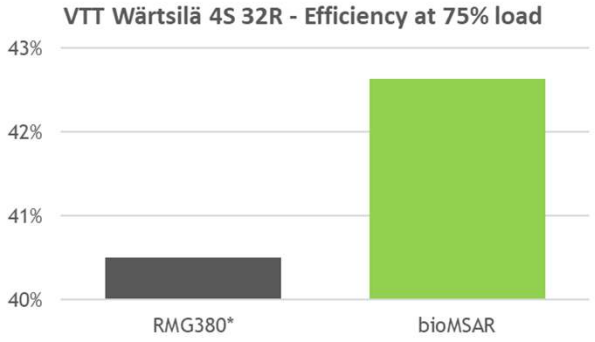
bioMSAR™

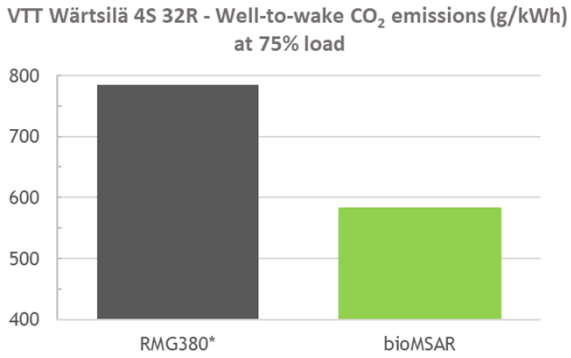
IMPROVING FUEL EFFICIENCY

LOWERING EMISSIONS

TRANSITION TO NET ZERO AT LOWER COST

Over 20% lower CO_2 & GHG emissions well-to-wake

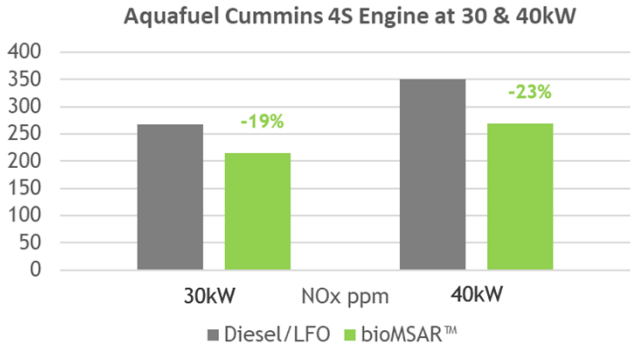




Energy efficiency benefits of up to 7% vs RMG (4S-32)



Wärtsilä Vasa 4R32 LN DF E



+ Low NO_x and smoke emissions, reducing black carbon

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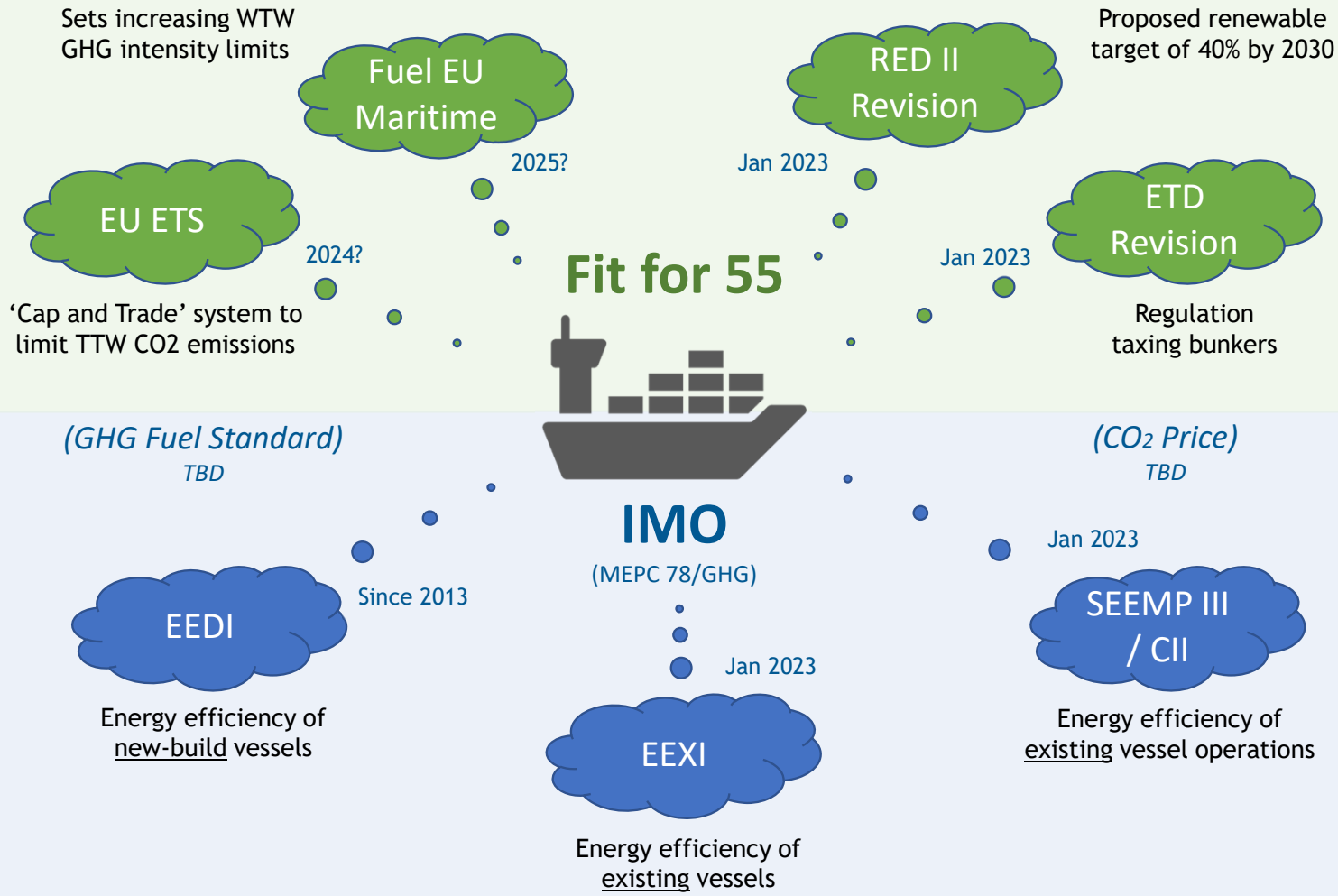
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THE FIT WITH NEW MARINE REGULATIONS



FORTHCOMING REGULATIONS

Forthcoming regulations focus on decarbonization



These regulations are material to existing vessels >10 years old

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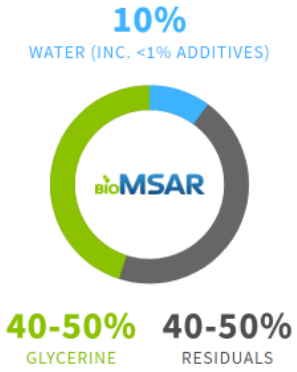
Embracing the opportunity provided by new decarbonization regulations…

Quadrise technology offers marine solutions that:

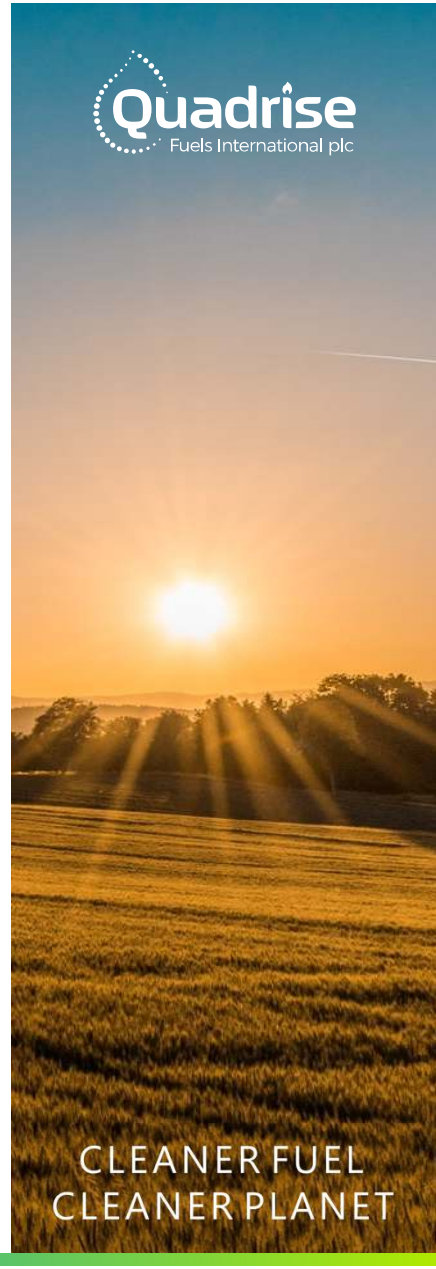
1. Improve engine efficiency, reducing fuel use & costs
2. Enhance the use of existing and future fuels/biofuels
3. Reduce emissions of GHGs, NOx and Black Carbon

We are proud to play our part in decarbonizing shipping!









Q&A

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1 THE ROLE OF FUEL TECHNOLOGY TO DECARBONIZE SHIPS

2 NEW SOLUTIONS FOR USE IN THE MARINE SECTOR

3 THE FIT WITH NEW MARINE REGULATIONS

ANY QUESTIONS?

info@quadrisefuels.com @QFIPLC

www.quadrisefuels.com/faqs

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