



Marine Biofuels Workshop

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Leading the future of fuel
Quadrise.com



Introduction to Quadrise

- Quadrise plc is an energy technology provider. Its solutions enable production of **cheaper, cleaner, simpler** and **safer** alternatives to fuel oil and biofuels, proven in real world applications.
- The management team has collectively over 70 years' experience in commercial emulsion fuels supply, having been instrumental with the BP / PDVSA Orimulsion business, 60 million tons globally.
- Quadrise developed MSAR® alongside major companies such as Maersk, Cepsa, GE Alstom, Wärtsilä & MAN/Everllence. bioMSAR™ technology provides a lower cost B20-B100 marine fuel.



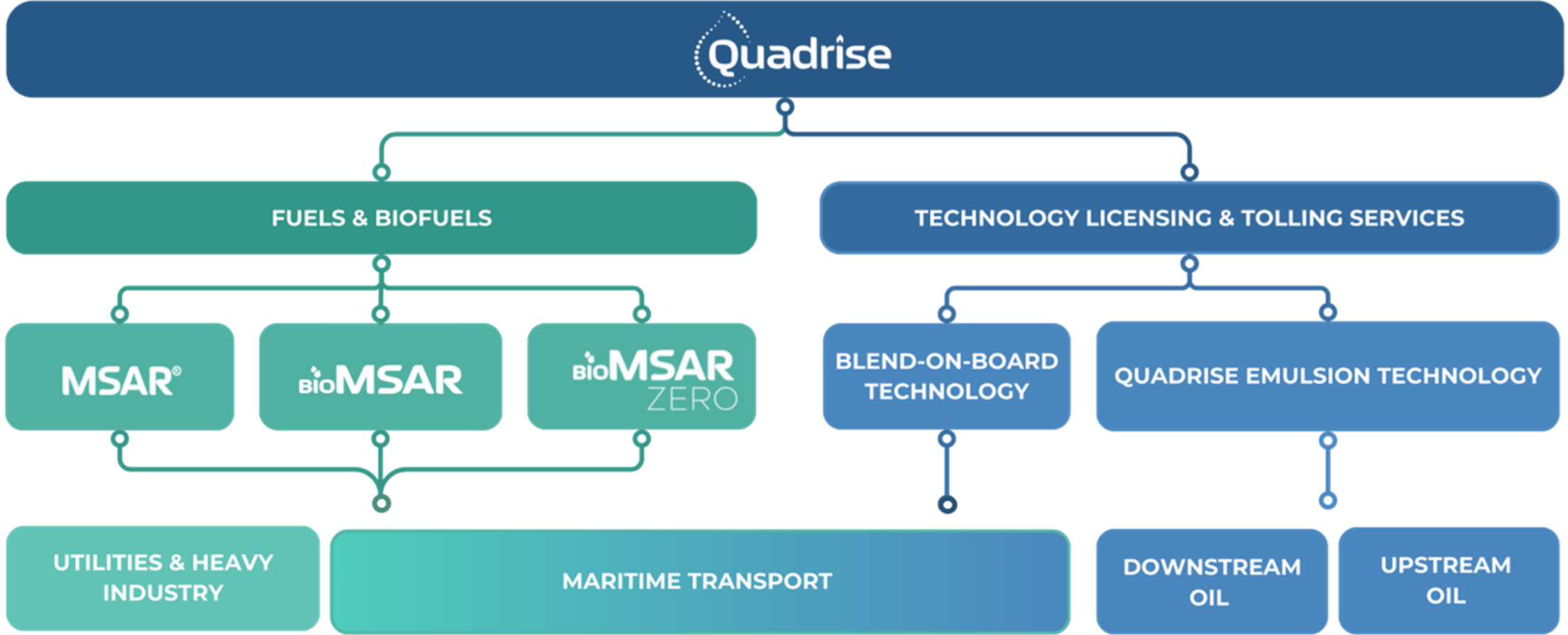
We collaborate with industry majors and technology leaders...



MAERSK



Our business



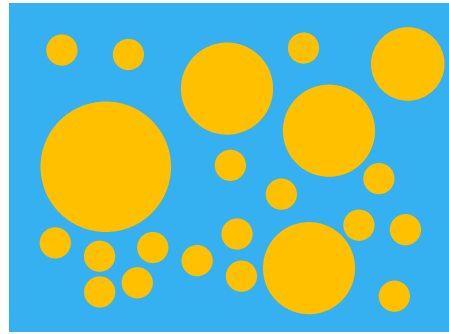
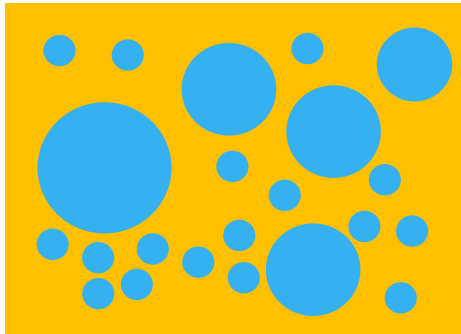
The science: Combining oil and water to improve future fuel performance and availability

Emulsions 101:



Water-in-oil

Oil-in-water



Water & Fuels:

Water power that leaves turbochargers in its wake

Water, not gasoline – Water injection is based on a simple principle: the engine cannot be allowed to over-heat. So before the fuel is ignited, a fine water mist is injected into the intake manifold to cool things down.

up to
13 %

lower fuel consumption
even with rapid acceleration or on long highway journeys



BOSCH
Invented for life

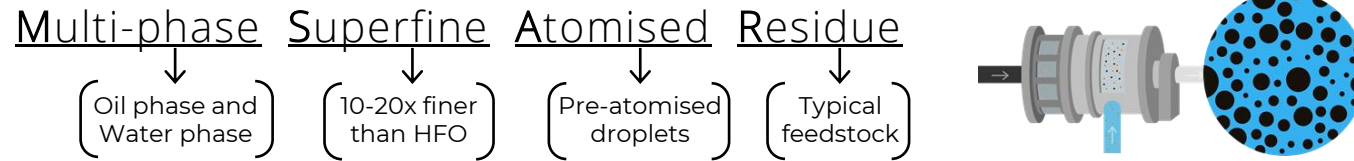
8% greater performance. 8% less consumption.



5 LITRES OF WATER FOR 500 HORSES.

Patented oil-in-water emulsion fuel technology

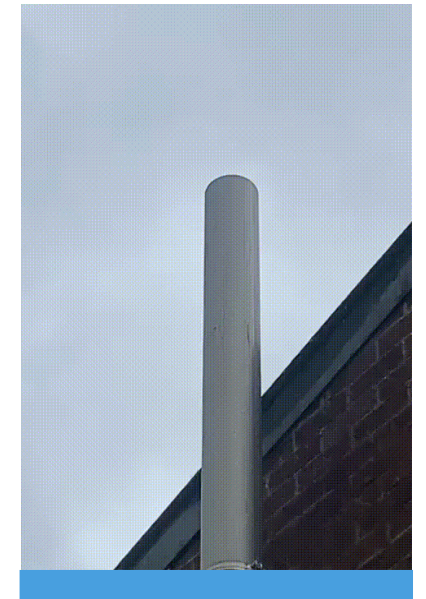
- The core technology is called **MSAR®** (pronounced 'em-sar').



- The MSAR® technology can **stabilise extra heavy oil** (<10° API) as 1-10 µm oil/biooil droplets in water/bioenergy to reduce viscosity.
- Superfine dispersion of **oil-in-water** creates a greater surface area and leads to more efficient combustion at lower temperatures, resulting in **reduced CO₂, NO_x and black soot emissions**.
- Based on the same core MSAR® technology, Quadrise also developed **bioMSAR™** incorporating renewable glycerine and other waste-based biofuels (both oil and water soluble).
- Both MSAR® and bioMSAR™ are water-based, safe and stable at ambient temperatures, anti-corrosive and bio-degradable.



Conventional Diesel

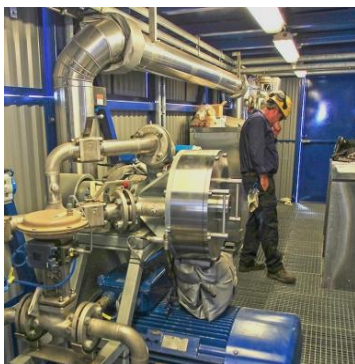


BioMSAR

Modular blending solutions

A. Physical bunkering

Good for regular routes.
Uses lowest cost feedstocks
including ISCC biofuels



MSAR® technology

blends residual oils, water and additives to make a lower cost synthetic fuel oil.

bioMSAR™ technology

blends residue, renewable glycerine, water and additives to make a cleaner, cheaper synthetic biofuel.

MSAR = Multiphase Superfine Atomised Residue

Quadrise supplies commercially proven blending technology & expertise

B. Blend-on-board

Good for tramping vessels.
Uses conventional fuels (RMK)
plus biofuels (FAME/Glycerine etc)

In-situ blending solutions

blend conventional fuels and biofuels inline with water and additives to reduce energy costs and emissions at the point of use.



Power, utilities, industrials

Upstream

Refineries

Shipping

Stable water-based fuels

can be transported & used in the same way as fuel oil/biofuel.

bioMSAR

MSAR®
Synthetic HFO

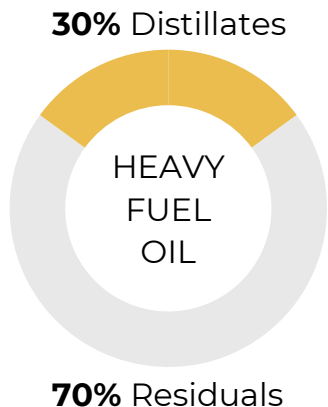
Cargill
MAC²



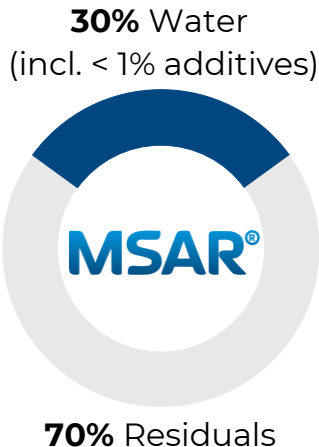
m
sc

AURA
MARINE 50 years

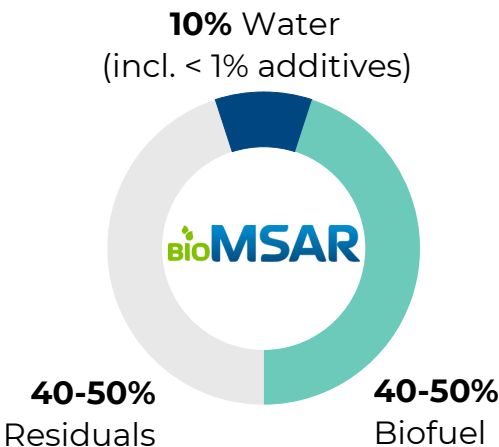
Our fuel and biofuel solutions for the energy and marine sectors



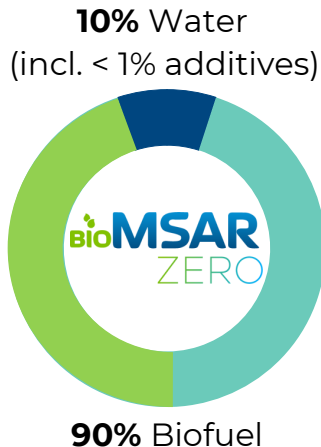
Conventional **Heavy Fuel Oil** (HFO or #6) uses up valuable distillate fuels to reduce residuals viscosity.



MSAR® oil-in-water emulsion technology blends residual oils, water and additives to make a lower cost synthetic fuel oil that's more efficient.



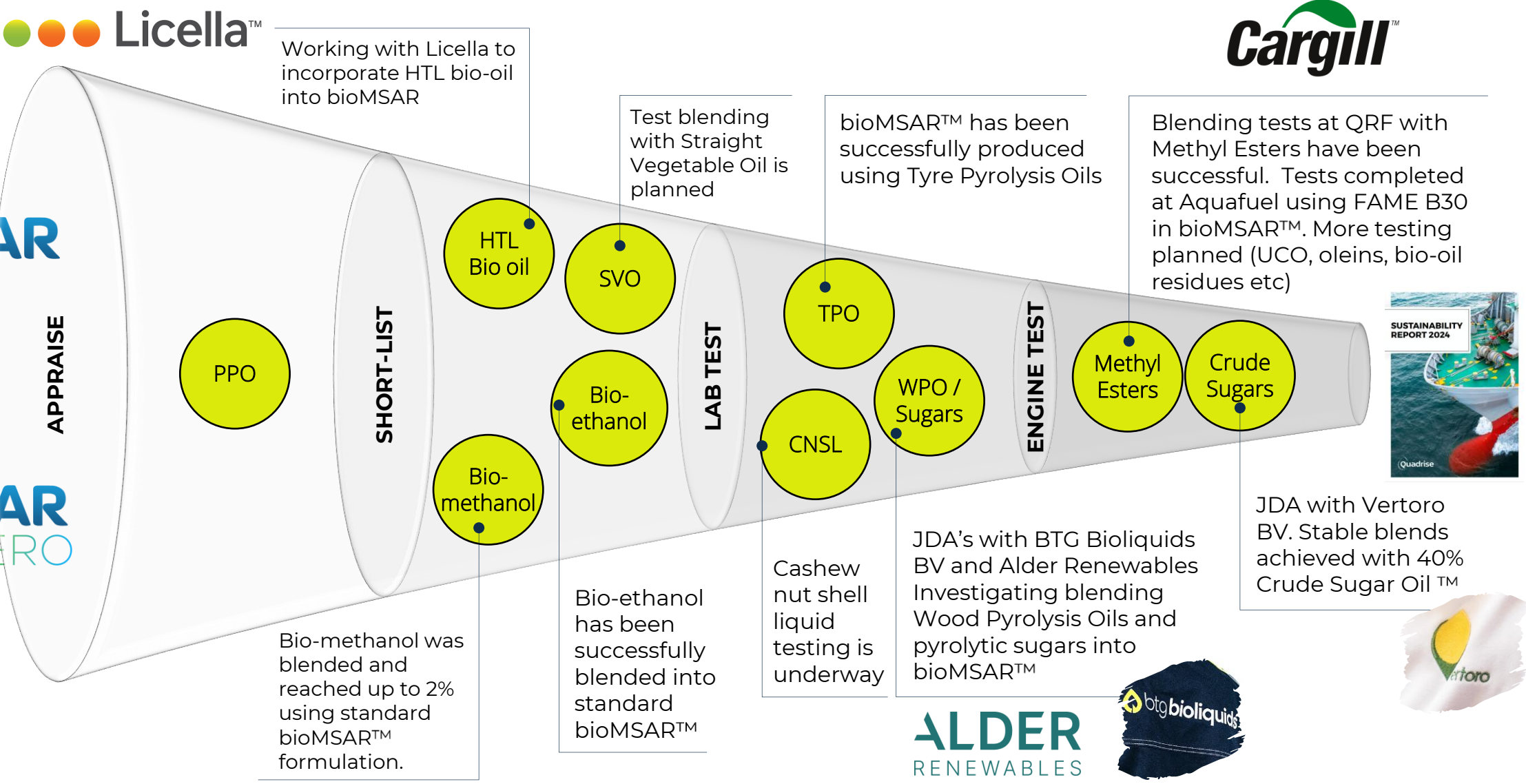
bioMSAR™ is a renewable B20-B50 biofuel alternative incorporating sustainable components such as waste-based glycerine.



bioMSAR™ Zero replaces the hydrocarbon components with sustainable substitutes to provide a B100 solution.

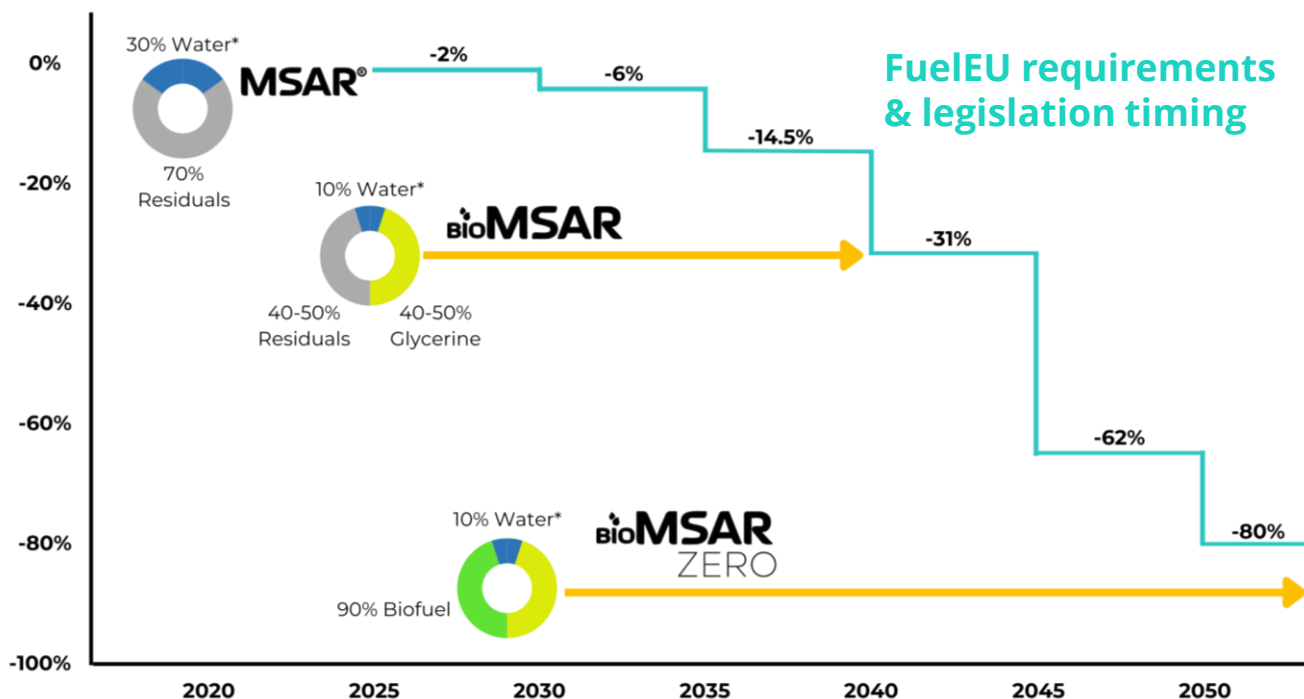


Our evolving biofuel development pipeline



How our fuels meet stringent regulations

Reduction in CO₂ compared to marine fuels, and FuelEU legislation timing



	EUETS	FuelEU Maritime
Benefits of MSAR® and bioMSAR™	Promotes energy efficiency and energy transition by introducing a carbon tax, focusing on the emissions in the use phase of fuels	Promotes the use of renewable and low carbon energy, focusing on the life cycle emissions of energy used onboard a vessel
✓ : Applicable		
Energy savings	✓	✓
Reduced TtW emissions	✓	✓
Reduced WtW emissions		✓

- ✓ Energy savings, due to **increased engine efficiency**
- ✓ **Lower Tank-to-Wake (TtW) emissions** from fuel use phase, due to the energy efficiency and the use of biofuel
- ✓ **Lower Well-to-Wake (WtW) emissions**, due to high content of biofuel components in bioMSAR™ formulation



Marine roll-out

Building on 150,000 hours of reliable base load powergen using oil-in-water emulsion fuel on 4-stroke Wartsila engines...

- Comprehensive 2-stroke marine MSAR® programme with shipping majors involving OEMs, resulting in:
 - Proof of concept on electronic engines, allows tuning of injection timing
 - No major changes to engine components or NOx technical code needed
 - Proof of concept tests at sea on Maersk Bogor (single cylinder MAN) and Seago Istanbul (Wärtsilä Flex 96)
 - Operational trial on Seago Istanbul (~1500 hours)
 - Interim LONO obtained on Wärtsilä Flex 96 with MSAR
 - MSC vessel trial planned to obtain bioMSAR LONO
 - Antwerp supply via MAC² terminal by Cargill BV for '26+



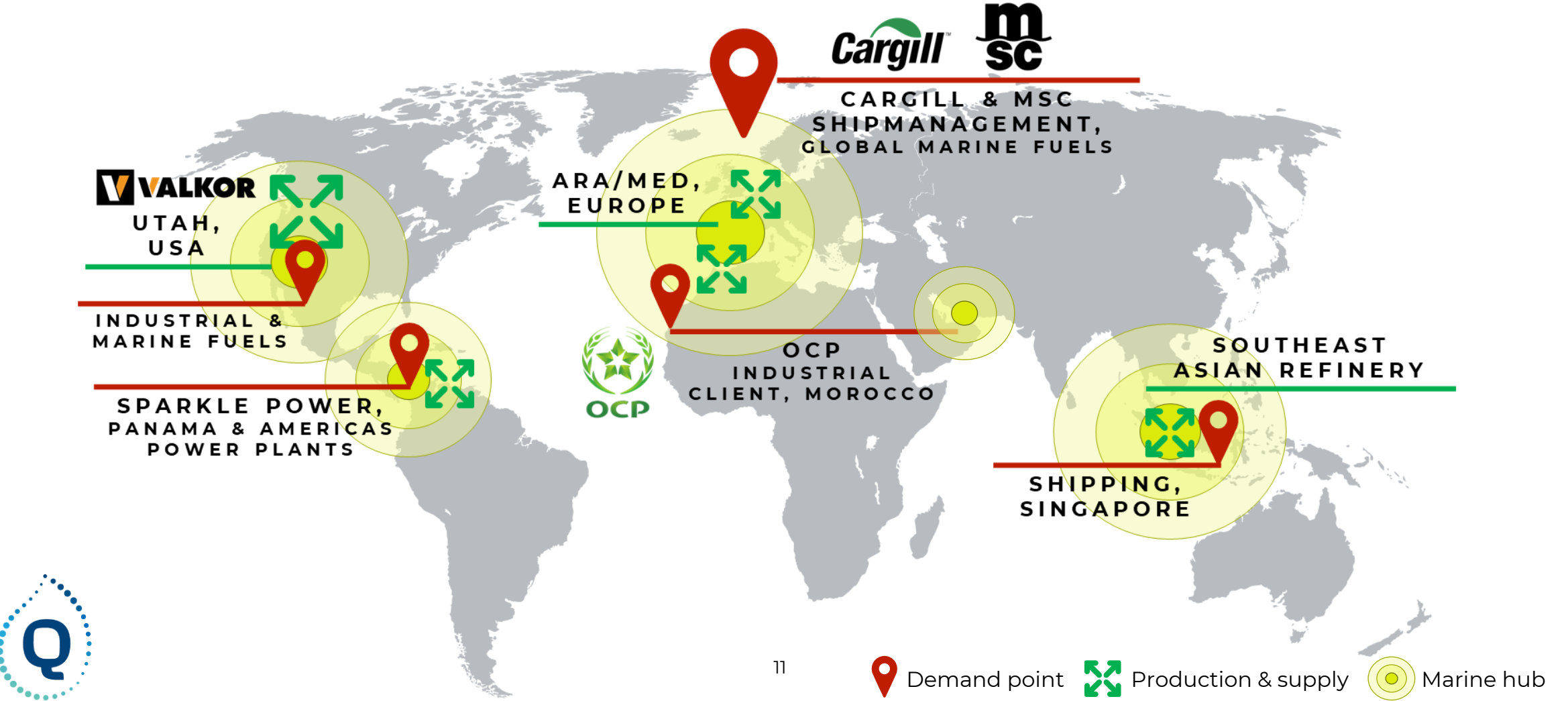
Maersk Bogor 43,000 DWT (MAN B&W 7K80ME-C9)



Seago Istanbul 54,000 DWT (Wärtsilä 12 RT-Flex 96 C-B). Now owned by MSC (MSC Leandra), testing Quadrise fuels in 2026

Commercial roll-out

Supporting demand and stimulating supply of our fuels around global marine bunkering hubs





Thank-you!

www.quadrise.com