Biofuels: entering the maritime fuel mainstream

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Part of
Marine Fuels
Webinar Week

23-27 November 2020

marine propulsion
& auxiliary machinery

riviera

Panellist documents:

Page 2: Stuart Hall, Forecast Technology
Page 12: Jakob Steffensen, DFDS
Page 16: Naeem Javaid, Lloyd's Register EMEA

BunkerTrace

Stop guessing. Start knowing.

bunkertrace.co



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BunkerTrace Product Suite



Product 1

Fuel Assurance

Proof of quality of deliveries and fuel authenticity thoughout the supply chain.



Product 2

Quantity Assurance

Digital loss control tool to trace fuel variances between suppliers and receivers.

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Solution

Combining synthetic DNA tracers with blockchain technology.

This bridges the physical and digital to create a chain of custody that follows the fuel and its components throughout the supply chain.







Tag

Data related to any fuel, origin, grade and specification is linked to a unique synthetic DNA tag code known as a tag, added at 2 parts per trillion. This effectively “fingerprints” the fuel as it travels through the supply chain.

Flag

Once the fuel has been proven to be compliant and in spec, a highly sensitive molecular label known as a flag is added, the presence of which can then be instantly tested for in the field as it travels through travels throughout the supply chain.

Trace

All the data points associated to tagging, transferring and testing of any fuel are stored in an immutable and secure blockchain digital platform for full traceability.

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Biofuel Use Case

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Tracing Biofuels

Our tagging and tracing system can be used to verify origin and source of products at any point in the supply chain to:

- Authenticate certified feedstock flow
- Improve supply chain controls and chain of custody management
- Demonstrate regulatory and sustainability compliance

Producers and consumers can have confidence that they are sourcing and buying sustainably produced biofuels.

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BunkerTrace Example Process

FEEDSTOCK SUPPLIER

Suppliers to add DNA tags to the fuels and feed-stocks. These unique tags are linked on batch level to origin and quality information.

FUEL PRODUCER

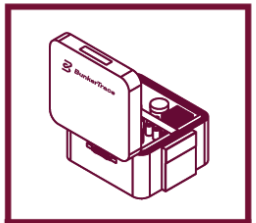
Tag & Flag added.
This is linked to blend specifica-tion.

BARGE

Paperwork trail including COQ, BDN, BQS uploaded to digital platform.

VESSEL

Field Test to identi-fy the flag to a chosen level of confidence. If 'Pass' they accept fuel and sign BDN.



FIELD TEST

PASS

FAIL

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Value Propositions

Benefits to Shipping Companies and Carriers

Insights

Provides ship owners, operators and charterers visibility of bunker fuel metrics and enables instant bunker specification testing.

Efficiency

It avoids time delays in ports while waiting for lab results and prevents the bunkering of fuels that do not match ordered specifications/metrics.

Compliance

Instant and cost effective reporting for compliance and local regulations.

Reputation

Proves authenticity for branded fuels and provides evidence for rating differentials with the Protection & Indemnity (P&I) clubs as well as hull and equipment insurance.

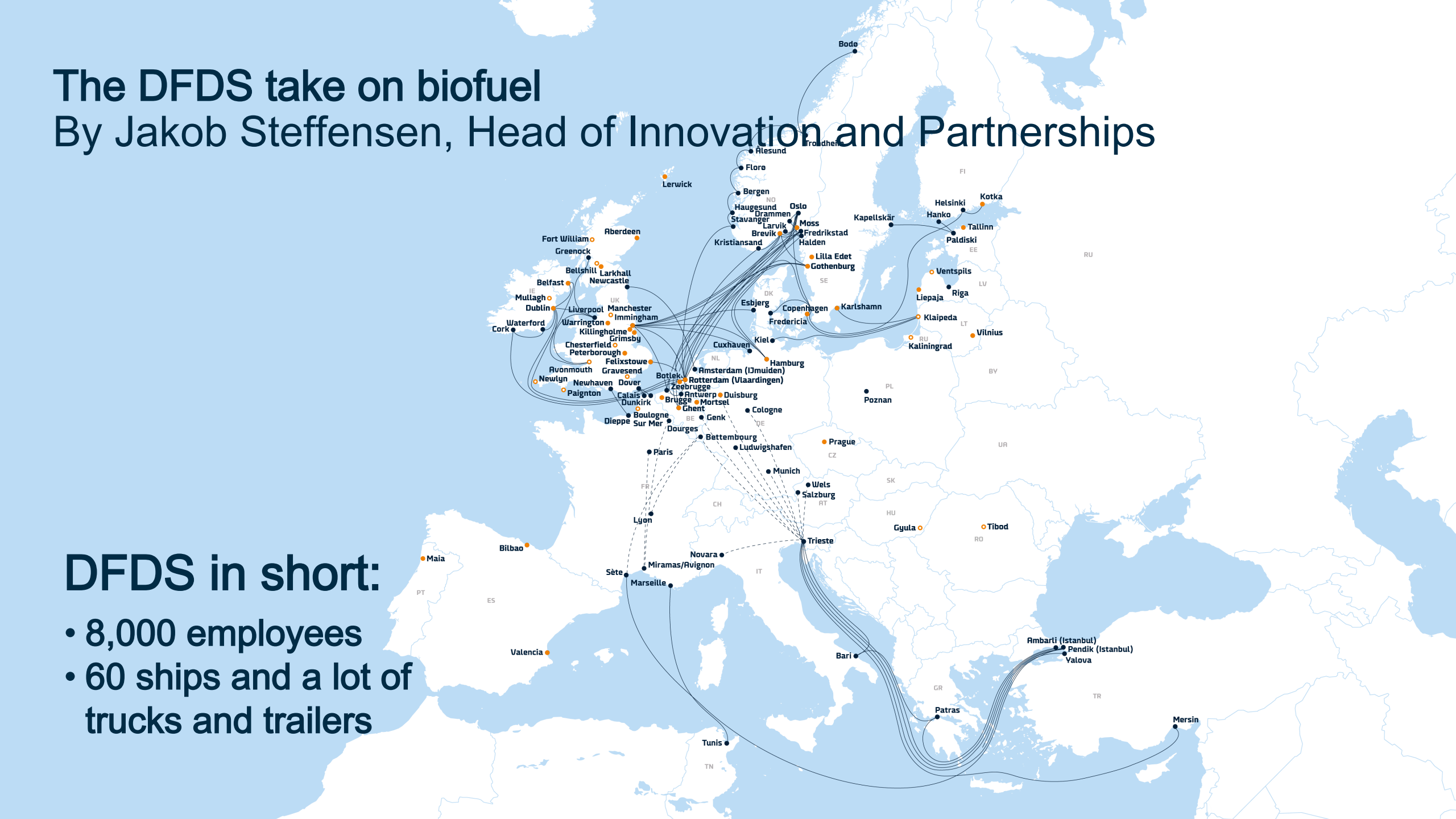
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Thank you.

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The DFDS take on biofuel

By Jakob Steffensen, Head of Innovation and Partnerships

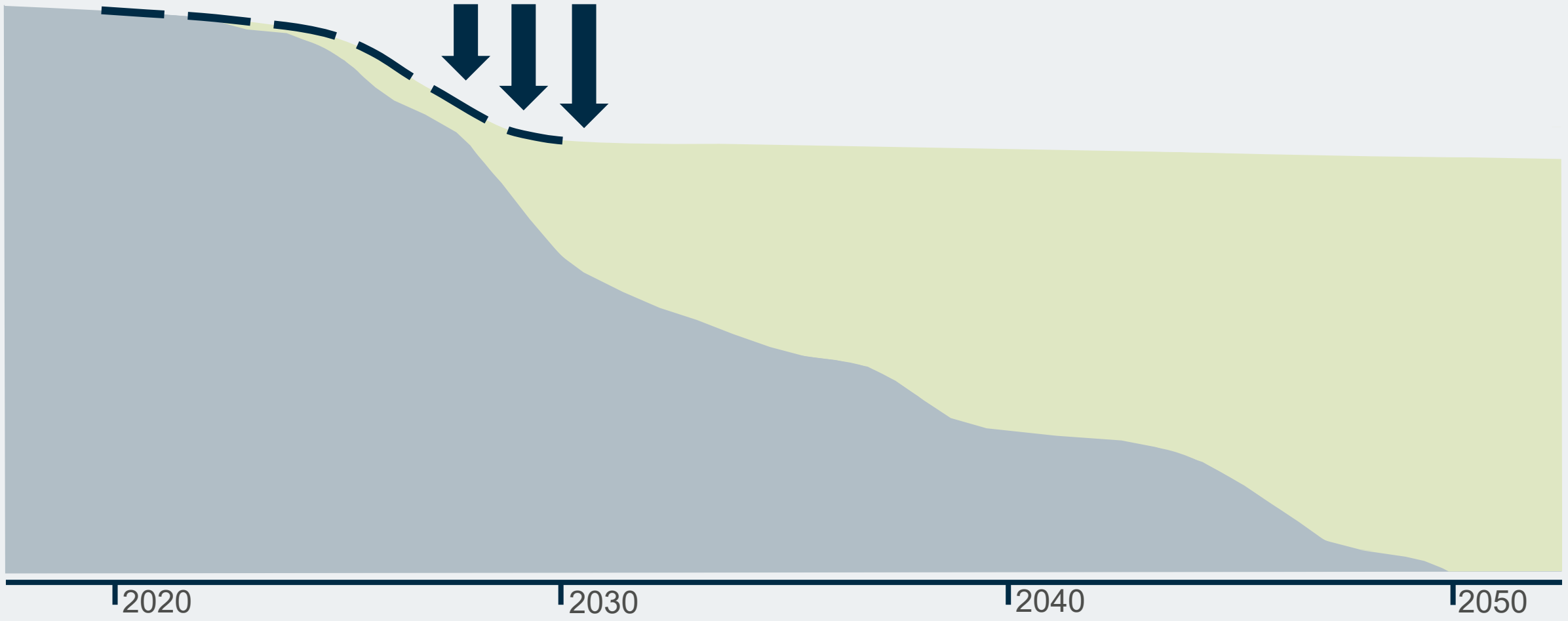


DFDS in short:

- 8,000 employees
- 60 ships and a lot of trucks and trailers

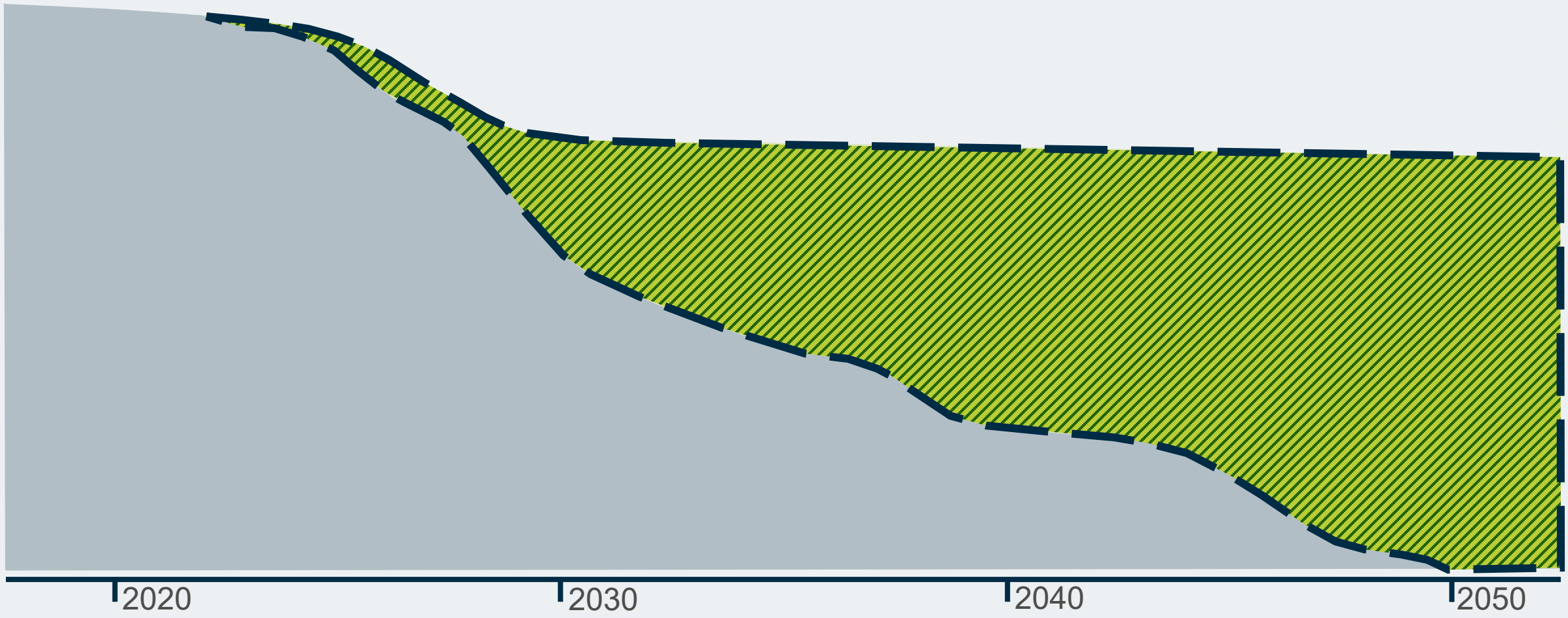
Short-term: Improve energy efficiency

Reduce CO2 emissions with 45% by 2030, biofuel for some older ships



Long-term: Replace fossil with zero emission fuels

Biofuel needed as pilot fuel for engines running on ammonia/methanol



DFDS has learned a lot from being involved in biofuel development

Scaling and availability of sustainable feedstock are the core issues

VeriFuel
Understanding Marine Fuel

BUREAU VERITAS

VERIFUEL BUNKER SAMPLE
ISO8217 REPORT
Mash Energy
(1000020)

SPEC MET

Company	Mash Energy	**Laboratory**	Athens
Order Number	Blend with DMA 11:89	**Job ID**	1799423
Grade Ordered	RMG180	**Sample Arrived Date**	17 Nov 2020
Bunker Date	15 Oct 2020	**Sample Sent From**	
Bunker Port	Ahmedabad	**Courier Company**	By Hand
Fuel To Be Used On		**AWB No.**	
Sampling Point		**Quantity Ordered**	
Sampling Method		**Seal No.**	12345_1.0_20201015_0 + DMA (11:89)
Pumping Rate Per Hour		**Seal Condition**	Not Sealed
Fuel Tank(s) Used		**Retain Seal No.**	

Bunker Delivery Note (BDN) Information

Bunker Supplier	MASH Energy Aps	**Density @ 15°C (On Vacuum)**	
Installation		**Viscosity @**	
Installation ID		**Sulphur**	
Fuel Grade	RMG180	**Flash Point**	
Fuel Temperature at Delivery		**Volume @**	
Start Pumping Time		**Quantity (MT)**	
End Pumping Time			

Test Results	ISO 8217 - RMG180			Spec Met
Parameter	Method	Unit	Results	Specifications ISO8217-2010/2012/2017
Viscosity @ 50°C	ASTM D7042	cSt	3.724	Max. 180.0
Density @ 15°C	ASTM D7042	kg/m³	886.6	Max. 991.0
Sulphur	ISO 8754	% (m/m)	0.061	Max 0.50
Flash Point	ISO 2719 B	°C	>67	Min. 60.0
Acid Number	ASTM D664	mg KOH/g	1.26	Max. 2.5
Total Sediment Acc.	ISO 10307-2	% (m/m)	0.09	Max. 0.10
Micro Carbon Residue	ISO 10370	% (m/m)	0.14	Max. 18.00
Pour Point	INT 1001	°C	<21	Max. 30
Water Content	ASTM D6304	% (V/V)	0.10	Max. 0.50
Ash	INT 1002	% (m/m)	<0.010	Max. 0.100
Vanadium	IP 501 (mod)	mg/kg	<1	Max. 350
Sodium	IP 501 (mod)	mg/kg	<1	Max. 100
Calcium	IP 501 (mod)	mg/kg	<1	Max. 30
Zinc	IP 501 (mod)	mg/kg	<1	Max. 15
Phosphorus	IP 501 (mod)	mg/kg	<1	Max. 15
Aluminium + Silicon	IP 501 (mod)	mg/kg	1	Max. 60
CCAI	CCAI	-	831	Max. 870

* Note - A fuel shall be considered to contain ULO when either one of the following conditions is met:
- Calcium > 30 and Zinc > 15, or Calcium > 30 and Phosphorus > 15 (2012 Specification)
- Calcium > 30, Zinc > 15 and Phosphorus > 15 (2005 Specification)

- Initially (2015) focus was on Open Innovation, access to fuel specialists and enabling start-ups to develop sustainable fuels.
- 2016-2019 R&D ups and downs.
- In 2019 DFDS invested in MASH Energy.
- Joint project with Alfa Laval et.al. to reduce risk.
- From 100% (CCAI issue) to 89/11% blend.
- Q4 2020 all permissions for testing on Aux engines
- Biofuel can be produced cost efficient, - for now.
- Huge future demand for biofuel as a drop-in fuel and as pilot fuel for the new generation of ICE running on green ammonia, methanol and hydrogen.



DFDS

Biofuels for marine use

Marine propulsion marine fuels webinar week

Naeem Javaid
23 November 2020

Lloyd's Register



Any fuel produced from organic material … quite diverse?

- Variation in Feedstock
- Variation in Processes
- Products
- Social / Environmental



Functionally they are equivalent to petroleum-derived fuels and compatible with existing machinery and infrastructure.

lower- SOx, HC and PM; LCA - CO_2

But higher NOx

'Drop-In' Diesel fuel

Attractive LS blend

Cross Industry Experience

Functionally they are equivalent to petroleum-derived fuels and compatible with existing machinery and infrastructure.

- Lower energy density
- Hydroscopic
- Material compatibility
- Cold Flow Properties
- Oxidation Stability



Supporting uptake of Biofuels

Statutory

- MARPOL Annex VI Reg 18.3.2.2
- Impact on EIAPP certificates
- Providing Initial guidance
- Exemptions MARPOL Annex VI reg 3.2

Oil majors

- Producing biofuels for marine use
- Trialling products

ISO / CIMAC

- Updating guidance notes for Biofuels use in marine
- ISO looking to set standard for biofuels quality in marine use

Class

- Looking into implications of Biofuels on ship operations

Fuel Testing consultancies

- Biofuels quality testing
- Emissions monitoring projects

OEMs

- Building experience
- Supporting the trials

Biofuels : Knowledge and regulatory gaps

- Regulatory alignment
- Sustainability of feedstocks
- Incentivise early adopters
- Global quality standard



Thank you

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