



interislander
NGĀ WAKA · NEW ZEALAND'S FERRIES



IEA Bioenergy ExCo78 workshop

Biofuel supply to Interislander

Peter Wells

Strategy Manager - Interislander

Biofuel supply to Interislander

Contents



Contents

1. Background
 1. Current Marine Fuels
 2. Regulatory environment
 3. Marine Engines and Shipboard Fuel Handling
2. Supply Issues
 1. Interislander
 2. Questions for Biofuels
 3. Requirements - Onboard
 4. Requirements - Ashore
 5. Summary of requirements

Current Marine Fuels

- Standards for marine fuels specified in ISO 8217:2012 covering distillate and residual fuels.
- Current marine fuels consumption globally estimated to be around 330m tonnes of fuel annually
- 80-85% estimated to be residual fuel oils and the balance is mainly distillate fuels
- As global trade increases overall fuel demand for marine transport is predicted to double by 2030
- Globally the biggest impact on marine fuel types used will be led by regulation of Sulphur content of fuels

Regulatory Environment

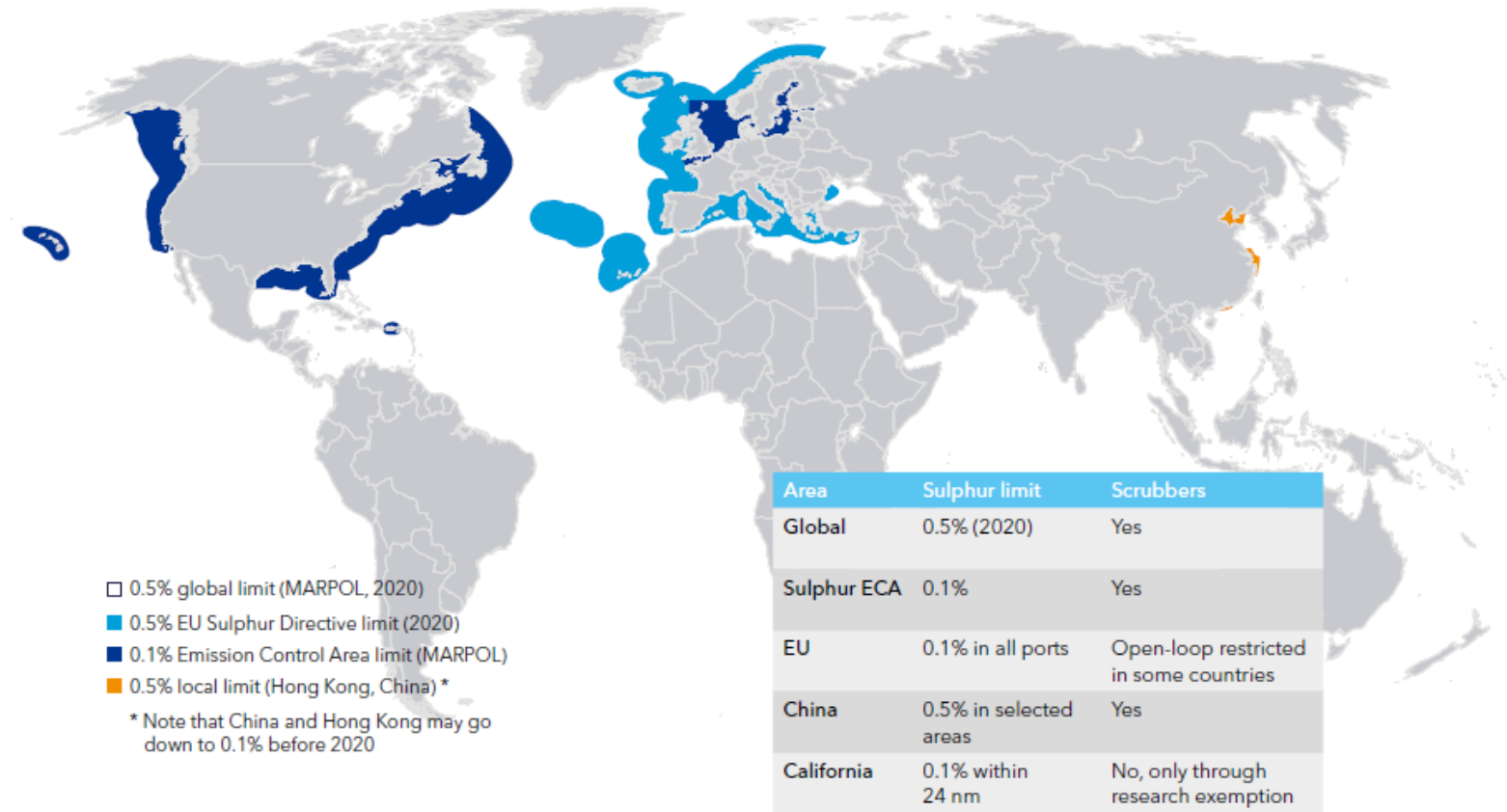
1. International Maritime Organisation (IMO) is principle forum for rule generation
2. MARPOL is the main set of rules affecting fuels
 - Annex VI specifically addresses air pollution effects from Sulphur Oxides (SO_x) and Nitrogen Oxides (NO_x)
 - Sulphur limits in Emission Control Areas (ECA's), restricted to 0.1% from 1st January 2015
 - Introduces limitations on Sulphur content of fuels progressively, currently 3.5% reducing to 0.5% from 1st January 2020
 - Estimated that 70,000 ships will be affected by this change
3. Ships also subject to local rules in different areas of world, such as:
 - European Union
 - US
4. New Zealand is not currently a signatory to MAPOL Annex VI
5. Future regulations affecting smoke / particulate matter?

Biofuel supply to Interislander

Background



Regulatory

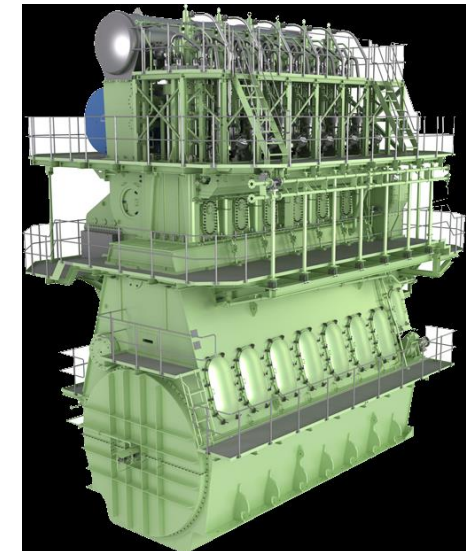
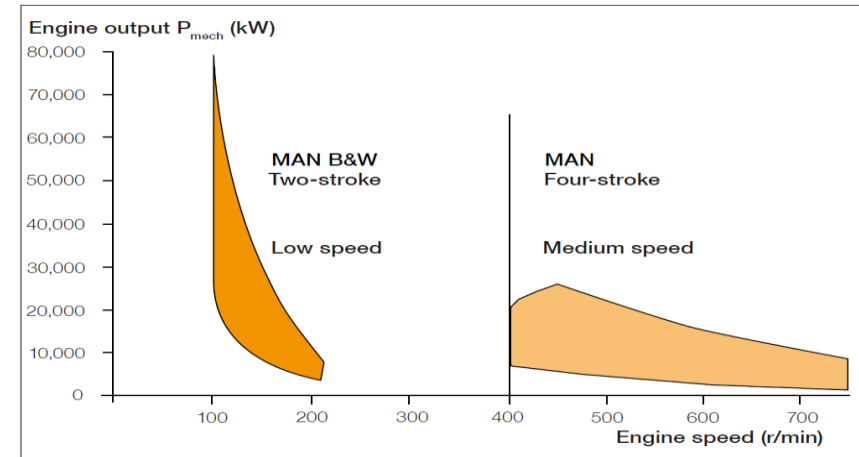


Future Fuels

1. As a result of the Sulphur restrictions, the industry is looking at what fuel options there are:
 - MGO (US \$398/mt vs. \$242/mt for HFO 380)
 - LSHFO (0.1% fuels not widely available \$386/mt for ULSHFO)
 - Biodiesel / Biocrude
 - LNG / Biogas
 - Methanol / Biomethanol
2. Alternative is to use abatement technology (ie. exhaust gas scrubbers)
 - Relatively expensive first cost and high running costs
 - Size and weight can be a problem
 - Restrictions on open loop type in some European and American ports

Marine Engines

- Large low speed (2 stroke) and medium speed (4 stroke) diesels are main form of propulsion in shipping
- Low speed engines from with cylinder bores from 300 – 950mm and outputs 4 – 85MW (4 – 14 cylinders)
- Medium Speed engines with bore cylinder bores from 200 – 500mm and outputs from 0.5MW to 20MW (4 – 20 cylinders).

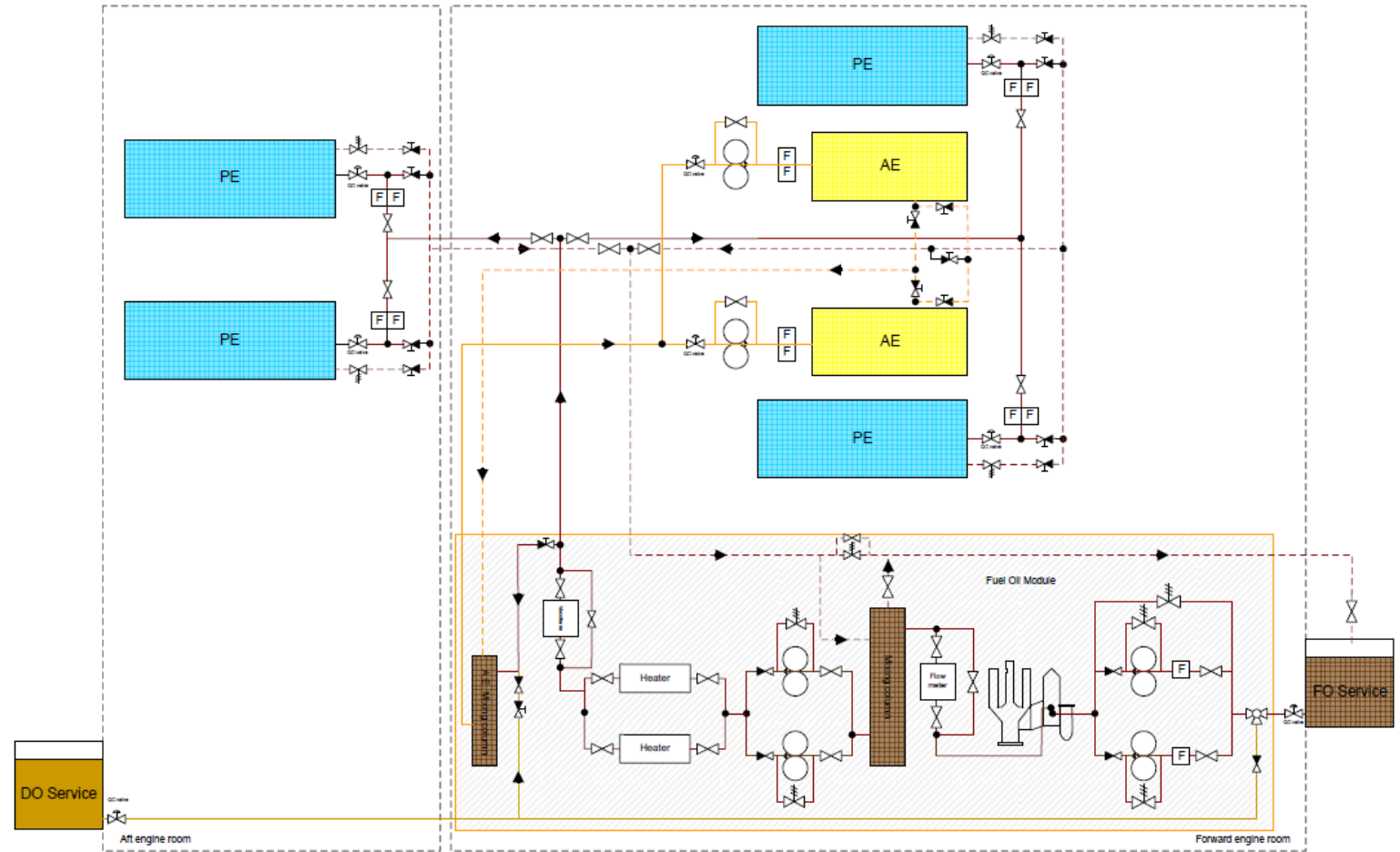


Biofuel supply to Interislander

Background



Shipboard Fuel Handling



Biofuel supply to Interislander

Supply Issues



Interislander

- Three ships
- Typical consumption is around _____ ltr / day / ship
- Bunkering between 1-2 times per week
- Fuel storage levels onboard, typically 200,000 – 500,000 ltrs
- Currently using LFO (RMD 80)
- Annual consumption is around _____ ltr / year
- Fuel is second biggest operating cost for the business after labour
- Direct competitor with lower operating costs

Biofuel supply to Interislander

Supply Issues



Interislander Fleet

Kaitaki		
	<ul style="list-style-type: none"> - Age - Lease expiry - Economic life - Lane metres - Passenger capacity 	<ul style="list-style-type: none"> 21yrs 2020 25-30yr 1780 car and truck lane metres only 1350
https://www.interislander.co.nz/Files/Images/Kaitaki/KEATS_112-Aerial-Kaitaki-487.jpg		
Kaiarahi		
	<ul style="list-style-type: none"> - Age - Lease expiry - Economic life - Lane metres - Passenger capacity 	<ul style="list-style-type: none"> 18yrs 2020 25-30yr 1900 car and truck lane metres only 550
https://www.interislander.co.nz/Files/Images/Kaiarahi--In-Aotea-Quay-487.jpg		
Aratere		
	<ul style="list-style-type: none"> - Age - Lease expiry - Economic life - Lane metres - Passenger capacity 	<ul style="list-style-type: none"> 18yrs Interislander owned – budgeted end date 2025 25-30yr 32 rail wagons, 1050 car and truck lane metres 600

Questions for Biofuels

- Fuel System and Engine Compatibility
- Availability (and volumes)
- Logistics and Supply Infrastructure
- Pricing
- Transition Pathway
- Safety (volatility / toxicity / pollutant)
- Emissions and Regulatory compliance (NO_x / SO_x / Particulate)

Interislander Requirements - Onboard

- System and Engine Compatibility?
 - Engine modifications
 - Separate storage and piping
 - Additional processing
 - Flash point / Safety
 - Blending
 - Regulatory Approvals
 - Trials
- Crew Training requirements

Interislander Requirements - Onboard

- Supply proposal:
 - 1 engine vs. multiple engines
 - 1 ship vs. all ships
 - Straight Fuel vs. Blending?
- If blending, ashore or onboard?
- Stable under extended storage
 - Could be onboard for months
 - Kept at elevated temperatures
 - Mixed with other fuels
- Stable through processing and supply systems onboard?

Biofuel supply to Interislander

Supply Issues



Interislander Requirements - Shoreside

- Storage
 - Straight vs. Blended Fuel?
 - New storage required?
 - Limited land available in Wellington
 - Storage for minimum of 4 weeks supply
- Supply to Ship
 - Capability to supply fuels during turnaround time (ie. at rates of 75-100mt / hr)
 - Requirement for provision of new infrastructure (existing tank and pipeline infrastructure owned by incumbent supplier)
- Logistics
 - Reliable supply chain
 - Reliable quality (compatibility and stability)
- Transition
 - Supply risks, incumbent LFO supplier



Risk and Opportunities

- Interislander risks
 - Risk averse
 - Marine fuel prices are relatively low
 - Vessels on charter
 - Owner may not permit modifications
 - Short period for investment returns
 - Uncertainty over NZ regulatory requirements
- Interislander opportunities
 - Marine fuel standards relatively easy to meet
 - Marine diesels very tolerant of low quality and unusual fuels
 - Large consumer, single point of supply
 - Multi engine plants with levels of redundancy for trials
 - Skilled engineering staff onboard to monitor and supervise

Summary of features of a suitable Biofuel

- Sustainable pricing model
- Reliable supply chain
- Volume commitment (100% supply vs. Blending)
- Consistent quality
- Independent storage and supply infrastructure ashore
- Clear investment requirements
 - Modification costs to ships
 - Shore infrastructure
 - Term of commitment
 - Economic case

Biofuel supply to Interislander

Summary



In closing.....

- Changing regulations will require changes to existing fuel supply arrangements
- Some biofuels can be used with minimal changes to ships equipment
- Consistent quality and volume is critical
- Solutions need to address storage and supply infrastructure needs
- Pricing is a likely to be a considerable challenge
- But....KiwiRail / Interislander is ready and willing to Biofuels