



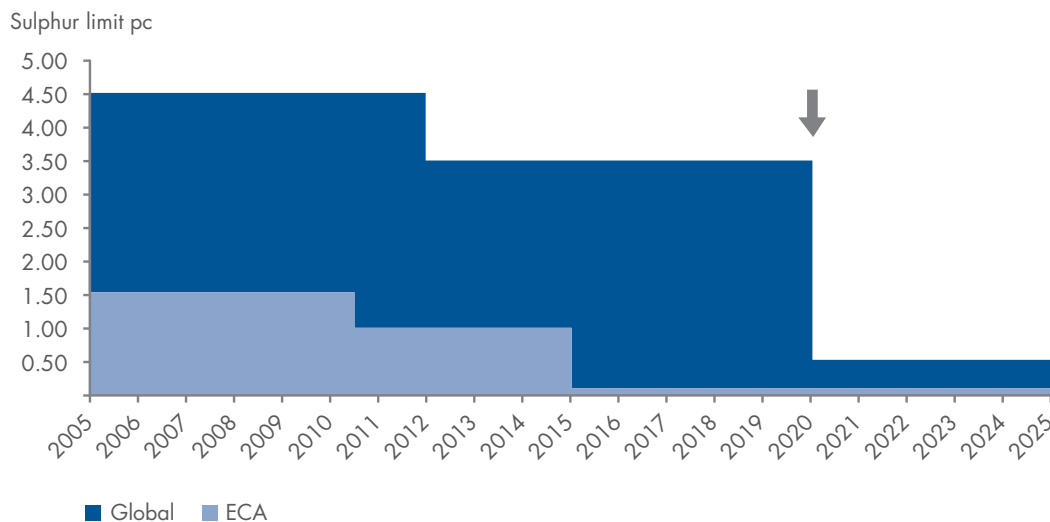
IMO 2020: WHAT'S NEXT?



Shell can offer a wide range of marine fuels, lubricants and services to be your partner in providing low sulphur marine transport.

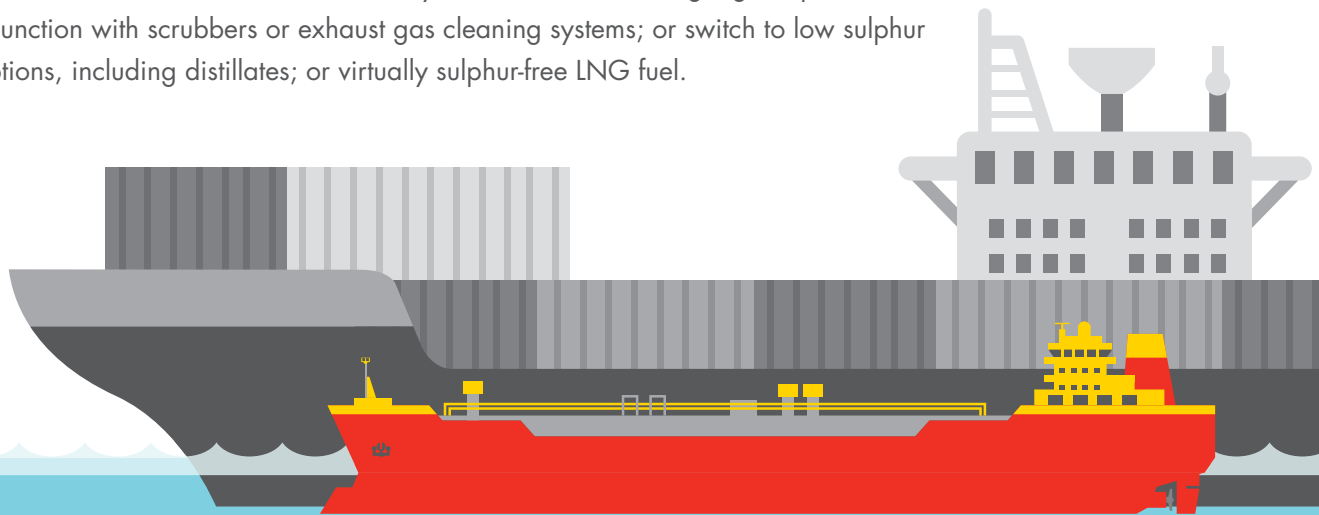
IMO 2020: WHAT IS CHANGING?

In 2016, the IMO announced that the effective date for the reduction of marine fuel sulphur will be 2020. Under the new global cap, ships will have to use marine fuels with a sulphur content of no more than 0.5%S against the current limit of 3.5%S in an effort to reduce greenhouse gas emissions. The Emission Control Areas (ECAs) will remain at the 2015 standard of 0.1%S content.



WHAT DOES IMO 2020 MEAN FOR SHIP OWNERS?

Ship owners will soon need to decide if they want to continue using high sulphur fuel oil, in conjunction with scrubbers or exhaust gas cleaning systems; or switch to low sulphur fuel options, including distillates; or virtually sulphur-free LNG fuel.



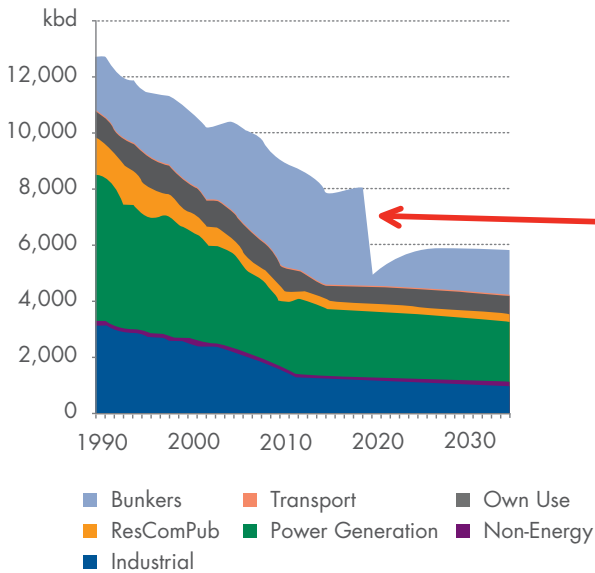
“Over 200 LNG powered vessels in operation and on order.”

– LNG World Shipping, March 2017

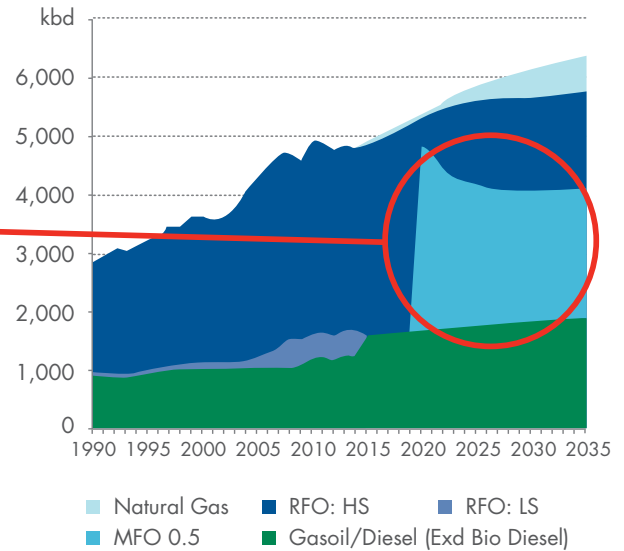
WHY IT MATTERS?

- The transition to 0.5%S will cause more changes to global marine industry than the switch to the 0.1%S fuel in the ECAs. The impact of this transition represents approximately 75% of global marine fuel demand when compared to the demand of ECA.

Global Residual Fueloil Demand by sector



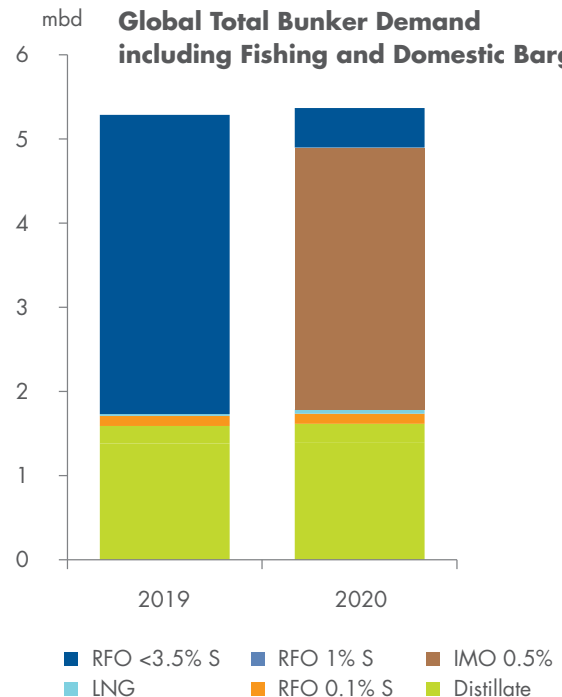
Bunker Demand



Shell can offer expertise and operational best practices from its ULSFO 0.1%S launch.

- In total 3 million barrels per day (mbd) of High Sulphur Fuel Oil (HSFO) Bunkers will need to switch to 0.5%S fuel through blending with gasoil, plus improved logistics segregation.
- Higher production costs and increased use of gasoil in the 0.5%S blend may effectively drive up the fuel cost. At the same time, a lack of demand for HSFO will drive down its price.
- There will be a need for a larger variability in fuel quality. Shell can help by sharing expertise and operational experience from the 0.1%S ECA launch to manage this variability.
- There could be key price drivers depending on the spread between GO-FO and LNG-oil.
- LNG fuel can help ship owners and operators meet emissions regulations, as it contains virtually no sulphur, and offers reduced NOx and PM emissions. Shell LNG can also help reduce GHG emissions in shipping.
- Shell LNG can be a cost competitive marine fuel choice versus conventional fuels. LNG can be priced off of oil markers to reduce risk and ensure a level playing field.

Global Total Bunker Demand including Fishing and Domestic Barges





WHAT IS SHELL DOING?

- Shell is developing a variety of fuel product offerings to the shipping industry that include marine gasoil (MGO) and low sulphur fuel oil (LSFO) supply in key bunker ports; high sulphur fuel oil (HSFO) supply for ships with on-board scrubbers; and liquefied natural gas (LNG).
- Shell is preparing for the implementation of a 0.5%S blend using similar analysis for the 0.1%S launch.
- Shell offers a global marine bunker network, and is developing key supply locations to serve customers who have chosen Shell LNG fuel as their bunkering fuel.
- Shell has lubricants designed specifically to protect engines burning low sulphur fuels from wear and deposits.

Technology for the development of 0.5%S is similar to what Shell used to develop 0.1%S.

Shell will continue to offer solutions across the spectrum including: residues, distillates and LNG at selected ports.

SHIP OWNERS WILL HAVE A NUMBER OF CHOICES OF HOW TO COMPLY WITH THE NEW SULPHUR SPECIFICATIONS

0.1/0.5%S Fuel Oil	MGO/DMA	Scrubber New/Retrofit	LNG New Build/Retrofit
			
<ul style="list-style-type: none"> ■ Minimise operational difficulty and cost ■ Variability of quality of blends per supplier ■ Only a few suppliers can offer reliable supply 	<ul style="list-style-type: none"> ■ Convenient and widely available ■ Operational experience in industry ■ Higher cost ■ Thermal shock and lubricity issues 	<ul style="list-style-type: none"> ■ Cheaper fuel and quick payback ■ Limited operating experience ■ Ship stability and space ■ Safe sludge handling and disposal necessary 	<ul style="list-style-type: none"> ■ Proven technology and reduction SO_x, NO_x and PM ■ Lower GHG emissions ■ Growing availability ■ Cost advantage to MGO/DMA
Shell will supply differentiated LSFO	MGO/DMA will remain key products for Shell	Shell can supply HSFO 3.5%	Shell holds industry leadership in LNG

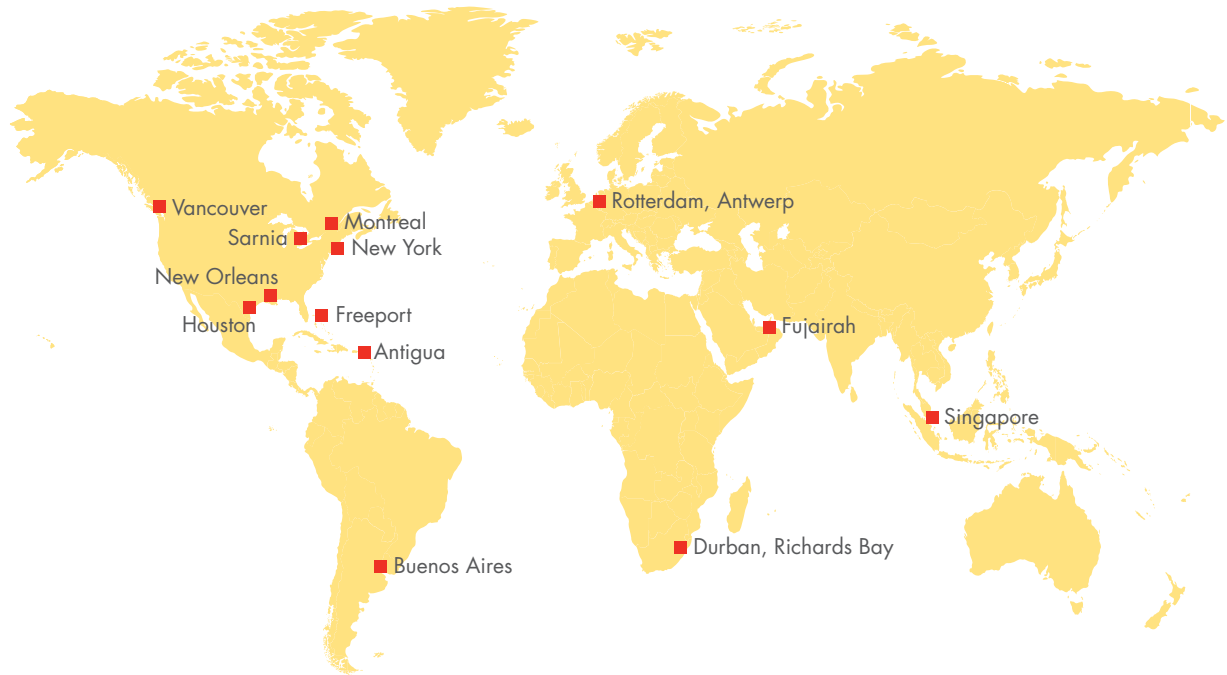
LUBRICANTS FOR CROSSHEAD DIESEL ENGINES (2 STROKE)

- Alexia S3, 40*
- Alexia S3
- Alexia S3
- Alexia 50 (70*), S6 (100*), 140*

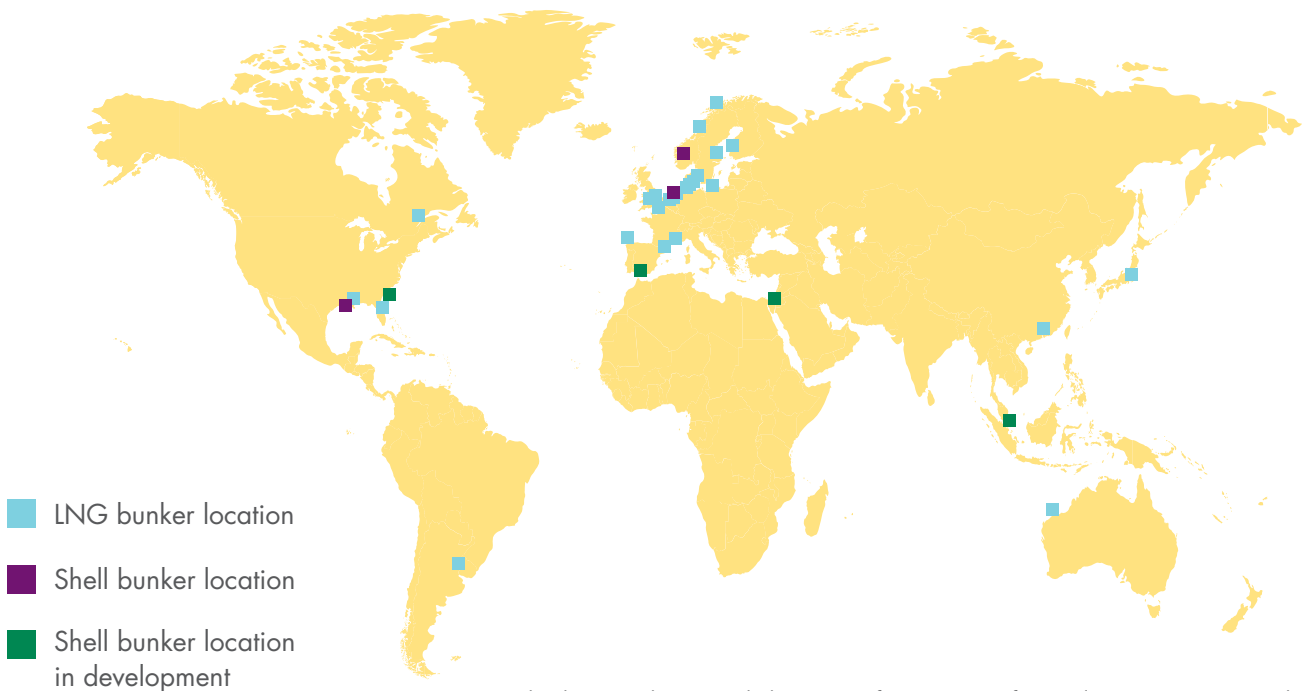
LUBRICANTS FOR TRUNK PISTON ENGINES (4 STROKE)**

- Argina S2, S3
- Gadinia S3
- Mysella S3 N, S5 N
- Argina S3, S4, S5

GLOBAL SHELL MARINE FUELS TRADING NETWORK



GLOBAL LNG MARINE BUNKER NETWORK



Bunker location data provided courtesy of DNV GL as of 3 April 2017 (in operation, bunker ship loading or local storage. Tank to ship bunkering or 'other bunker facilities'. Not including inland.)

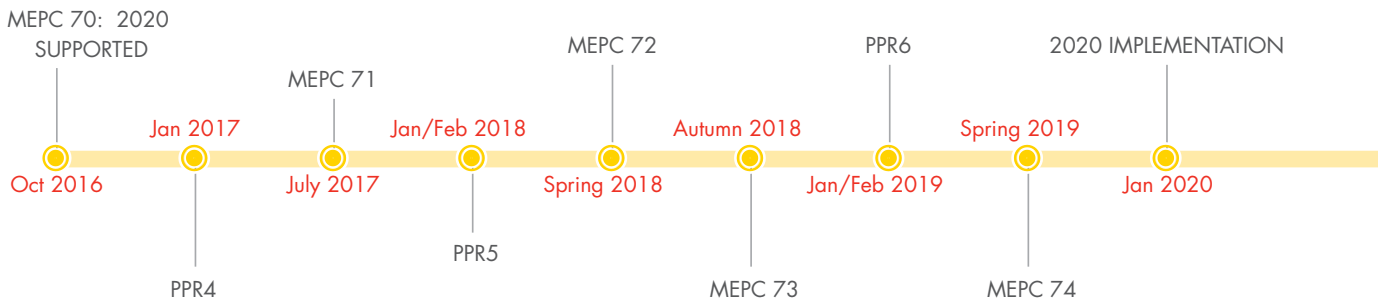
LNG as a marine fuel is expanding globally with bunker locations growing and LNG fuelled ship segments broadening.

WHAT'S NEXT?

IMO 2020 REGULATIONS

Below is a timeline of critical meetings where 2020 implementation items may be discussed.

2020 critical implementation plan meetings



As of April 2017

COMPLIANCE

There are still many uncertainties on how ship owners and operators are expected to comply with the 2020 regulatory framework. Shell can help support in determining the right fuel selection for you and your organization.

MOVING FORWARD

The shipping industry must prepare for a future with lower transport emissions.

An efficient and successful transition towards cleaner marine transport greatly depends on strong collaboration between governments, energy companies, engine manufacturers, charterers, fleet owners and many others.

You can count on Shell as your partner to supply marine fuels. As a worldwide and reliable supplier of various marine fuels and services, we can offer a complete portfolio and customised solutions.

For questions or more information please refer to our website

www.shell.com/marine

Information as of April 2017



Shell LNG can help meet current and future shipping regulations.

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