



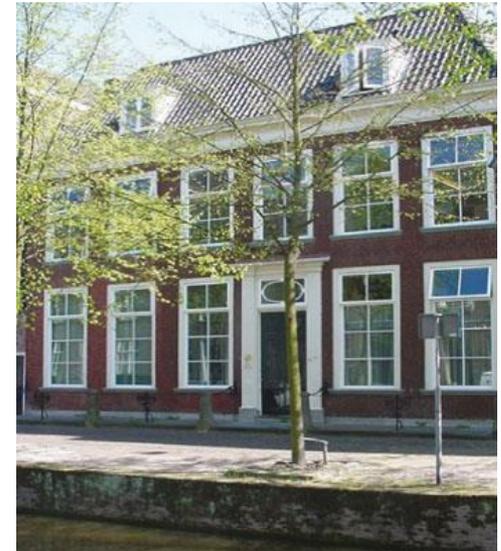
# Availability of low-sulphur fuels for shipping

Jasper Faber, Beijing, 25 July 2019



# CE Delft

- Independent research and consultancy since 1978, focusing on environmental policies
- Transport, energy and resources
- More than 20 years of experience in the shipping sector
- 60 employees, based in Delft, the Netherlands
- Clients: IMO, European Commission, German, UK and Dutch government, shipping companies, ports, trade associations and environmental NGOs.



# Presentation outline

- Introduction
- Impact of CHN ECA on demand for fuel oil
- Specification of the main question of this presentation
- 2016 “Assessment of Fuel Oil Availability”
- Interim conclusion
- Developments since 2016
- Overall conclusions



# Introduction

- This workshop is about a Chinese ECA where ships are required to use fuel with a sulphur content of 0.10% m/m or less.
- The possible implementation of a Chinese ECA would increase demand for marine fuels with a sulphur content of 0.10% m/m or less.
- This presentation addresses the question whether the refining sector can supply those fuels.
- We will first estimate the additional demand for 0.10% fuel after the possible introduction of a Chinese ECA, assess the amount of sulphur that needs to be removed, and then assess whether the refining sector has the capacity to provide these fuels.



# Impact of CHN ECA on demand for fuel oil

- Fuel oil demand

	2012	2020	>2020, CHN ECA
	Million tonnes of fuel		
3.50%	260	36	34
0.50%	-	233	218
0.10%	32	39	59
LNG	8	12	12

- Source: CE Delft et al., 2016, CE Delft ad-hoc estimates.
- Assumption: Chinese ECA increases global demand for 0.10% fuels by 50%.
- 2020: remove ~4.7 million tonnes of sulphur.
- CHN ECA: remove ~0.1 million tonnes of sulphur.
- Will there be sufficient sulphur-removal capacity?



# Main question of this presentation

- Given the implementation of the global sulphur cap, will there be sufficient sulphur-removal capacity for the introduction of a CHN ECA?

## Caveats:

- The assessment is based on the existing literature. We did not do any modelling.
- The additional demand of the CHN ECA was not modelled but estimated to be 50% of the fuel consumption in the existing ECAs.
- The main source is CE Delft et al., 2016: [Assessment of Fuel Oil Availability, London: IMO](#)
- Additional sources are studies and press reports about the 2020 fuel switch.



# Context of “Assessment of Fuel Oil Availability”

- MEPC 58 (2008) amended MARPOL Annex VI, Regulation 14.
  - The sulphur content of any fuel oil used on board ships outside ECAs shall not exceed the following limits (14.1):
    - 3.50% m/m from 2012;
    - 0.50% m/m from 2020,
- Regulation 4 specifies that these limits can also be achieved by alternative compliance methods that are ‘at least as effective in terms of emissions reductions’,
- Regulation 14.8 specifies that the 0.50% limit shall be subject to a review to be completed in 2018, taking into account:
  - the global market supply and demand for compliant fuel;
  - trends in fuel oil markets; and
  - any other relevant issue.



# Aim and scope of “Assessment of Fuel Oil Availability”

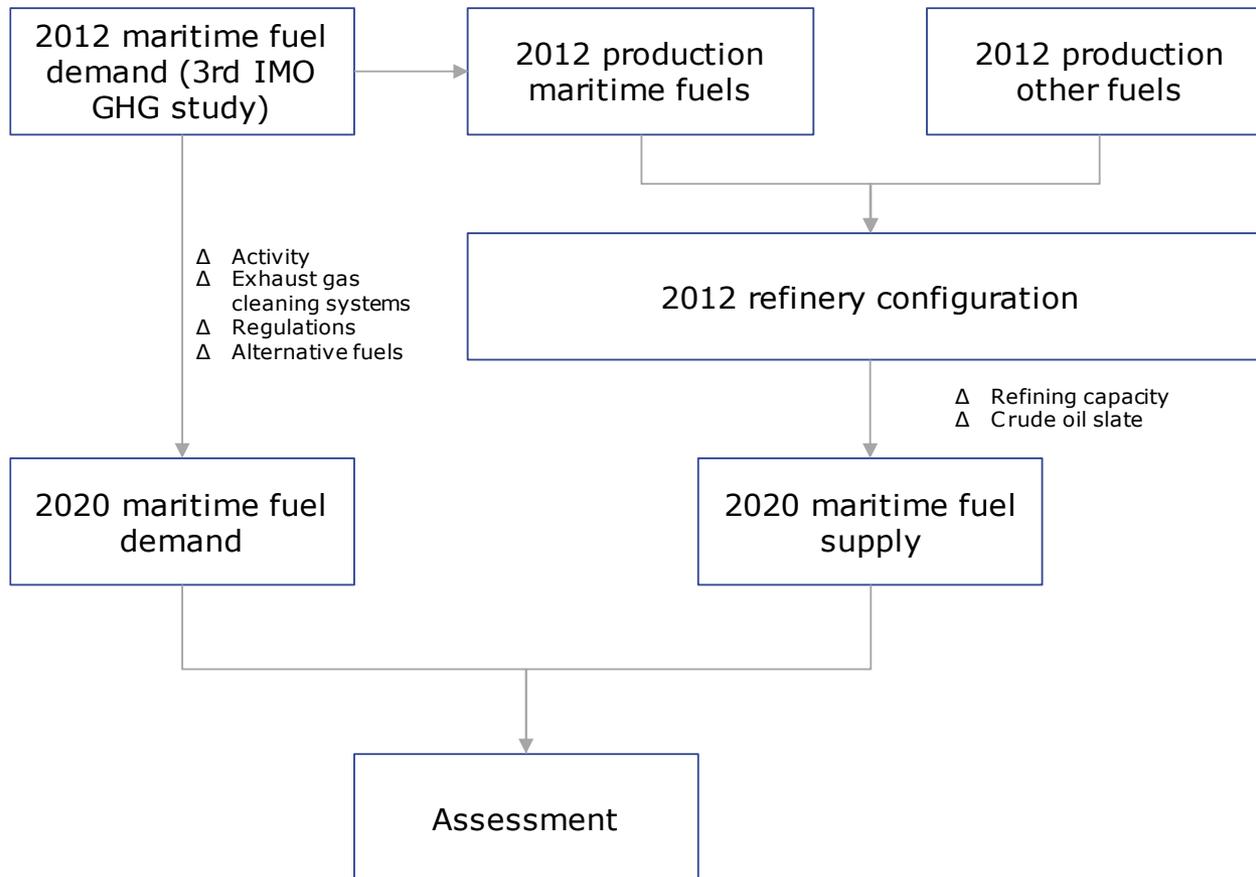
## Overall objective:

- to conduct an assessment of the availability of fuel oil with a sulphur content of 0.50% m/m or less by 2020.

## Specific objectives:

- develop quantitative estimates of the demand for fuel oil meeting the global 0.50% m/m sulphur limit, both globally and for different world regions;
- assess the ability of the refinery industry to supply the projected demand; and
- compare the demand and supply scenarios to assess their implications with respect to the availability of compliant fuels.

# Methods, models and data sources



# Main Conclusion of “Assessment of Fuel Oil Availability”

- Sufficient amounts of fuel oil of the required quality can be produced to meet demand in all plausible demand projections.
  - Although crude distillation capacity increase lags the demand increase between 2012 and 2020, hydrocracking, middle distillate and residual hydrotreatment capacity increases are higher than demand increases.
  - This creates capacity to produce low sulphur marine fuels, provided that:
    - the sulphur content of the crude does not increase too much; and
    - the road diesel and road gasoline sulphur limits are not tightened more than in current legislation.
- These fuels can be hydrotreated residual fuels, unconverted oil from hydrocrackers, and lighter oils.



# Main Conclusion of “Assessment of Fuel Oil Availability”

- We find global shortages improbable. The maximum amount that can be provided by the refinery sector exceeds projected demand by 27%.
- Situations of regional oversupply and shortages, which cancel each other out on a global level, are likely to occur:
  - In several scenarios, oversupplies occur in Latin America, Europe, and the Middle East, while Africa, Asia and North America produce less than is sold there.
- Regional supply and demand can be balanced by:
  - transport of products.
  - changes in bunkering patterns.



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## Interim conclusions

- Based on the 2016 Assessment of Fuel Oil Availability, the global refinery sector should be able to meet the additional demand for 0.10% sulphur fuels arising from the introduction of a CHN ECA.
  - the additional desulphurisation capacity required for the CHN ECA amounts to ~0.1 million tonnes of sulphur;
  - the refinery sector can produce 27% more compliant fuels than projected, i.e. remove ~1.3 million tonnes of sulphur.
- Additional desulphurisation capacity exists in Latin America, Europe, and the Middle East, while Asia has a shortage of desulphurisation capacity



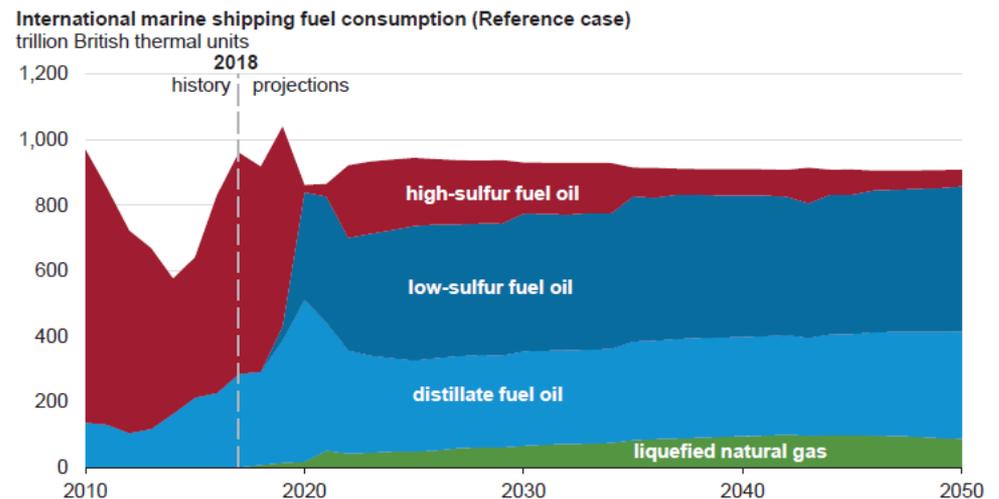
# Developments since 2016

- Fuel Oil Supply (from the press):
  - [ExxonMobil](#) has announced it will start supplying compliant fuels in Q3 2019 in 7 ports, including Singapore, Laem Chabang and Hong Kong;
  - [BP](#) has announced it will start supplying compliant fuels in several ports, including China, Hong Kong, and Singapore;
  - [Singapore](#) will have many bunker fuels suppliers that offer 0.50% fuels;
  - [Chimbusco](#) and [Sinopec](#) offer 0.50% fuels in Chinese ports.
- It appears that the lack of desulphurisation capacity in Asia does not result in unavailability of low-sulphur fuels in Asia.



# Developments since 2016

- Fuel oil demand:
  - the number of ships equipped with scrubbers nears 4,000 (Clarksons 2019);
  - the share of the fleet equipped with scrubbers is projected to increase from 11% (by GT) to 15% (by GT) in 2020 (Clarksons 2019);
  - [several experts](#) expect the number of scrubbers to increase even further after 2020.
- If the number of ships equipped with scrubbers increases, the demand for 0.50% sulphur fuel will decrease, freeing up capacity to produce 0.10% sulphur fuel



Source: [EIA 2019](#)

# Conclusions

- Compared to the 2020 global sulphur cap agreed by the IMO, a Chinese ECA will probably have a small impact on marine fuel demand (this will need to be confirmed by fuel consumption modelling).
- Based on the 2016 “Assessment of Fuel Oil Availability” and subsequent studies and press reports, there seems to be sufficient desulphurisation capacity in the refinery sector to produce more 0.10% fuels because:
  - the existing capacity in the refining sector;
  - a higher-than-expected uptake of scrubbers, which is projected to continue after 2020 (this will need to be confirmed by refinery modelling).
- Local shortages of compliant fuels do not appear to exist (this will become clear in 2020).



# Thank you for your attention!

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