

# Prospects of Alternative Bunker Fuels



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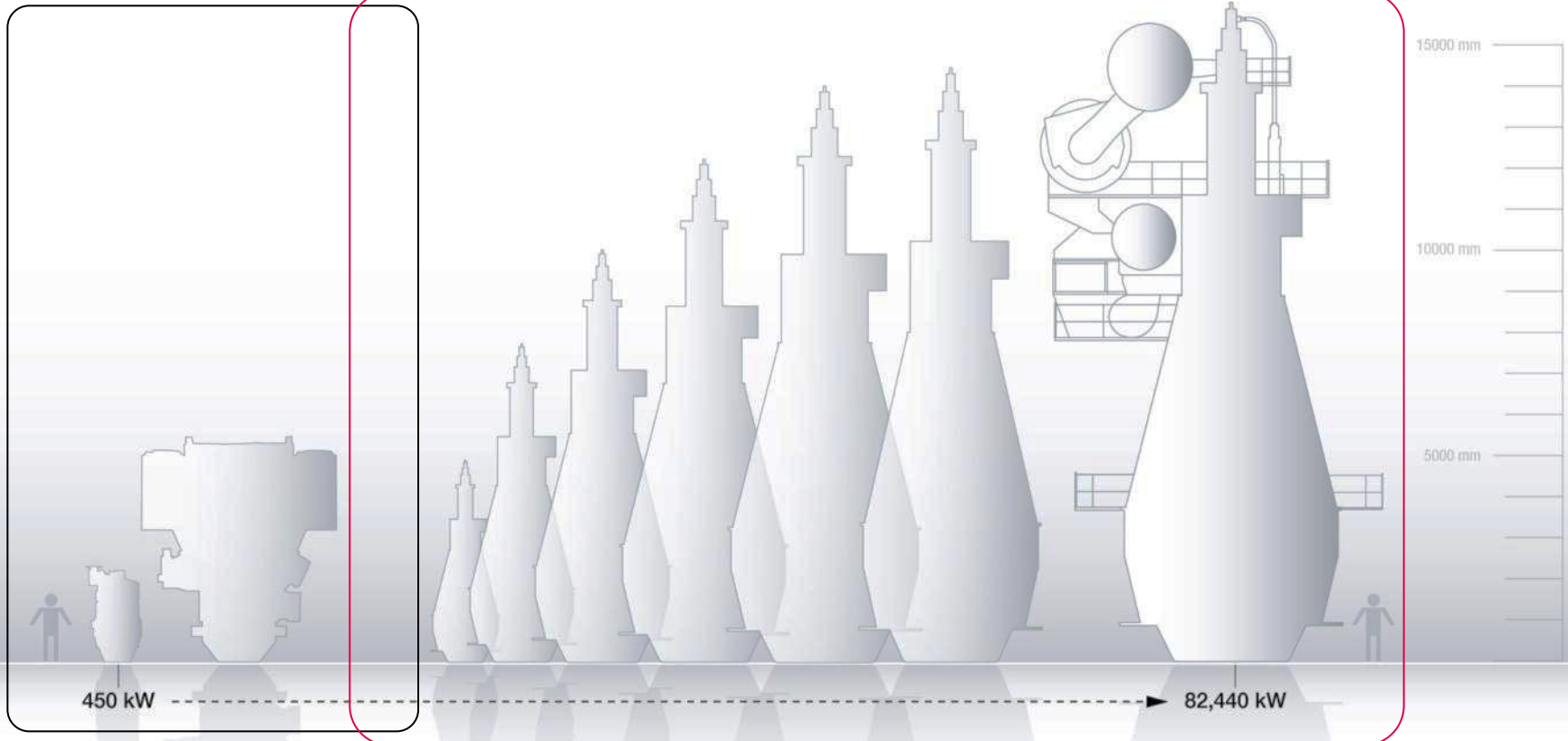
# Most comprehensive engine programme

Diesel engines from 450 kW to 82,440 kW



**Four-stroke engines**  
450 - 21.600 kW

**Two-stroke engines 3.200 - 82.440 kW**



**Comparison 4**

29

195

747

(number VW Golf TDI)



# Disclaimer



All data provided in this document is non-binding.  
This data serves informational purposes only and is especially not guaranteed in any way. Depending on the subsequent specific individual projects, the relevant data may be subject to changes and will be assessed and determined individually for each project. This will depend on the particular characteristics of each individual project, especially specific site and operational conditions.

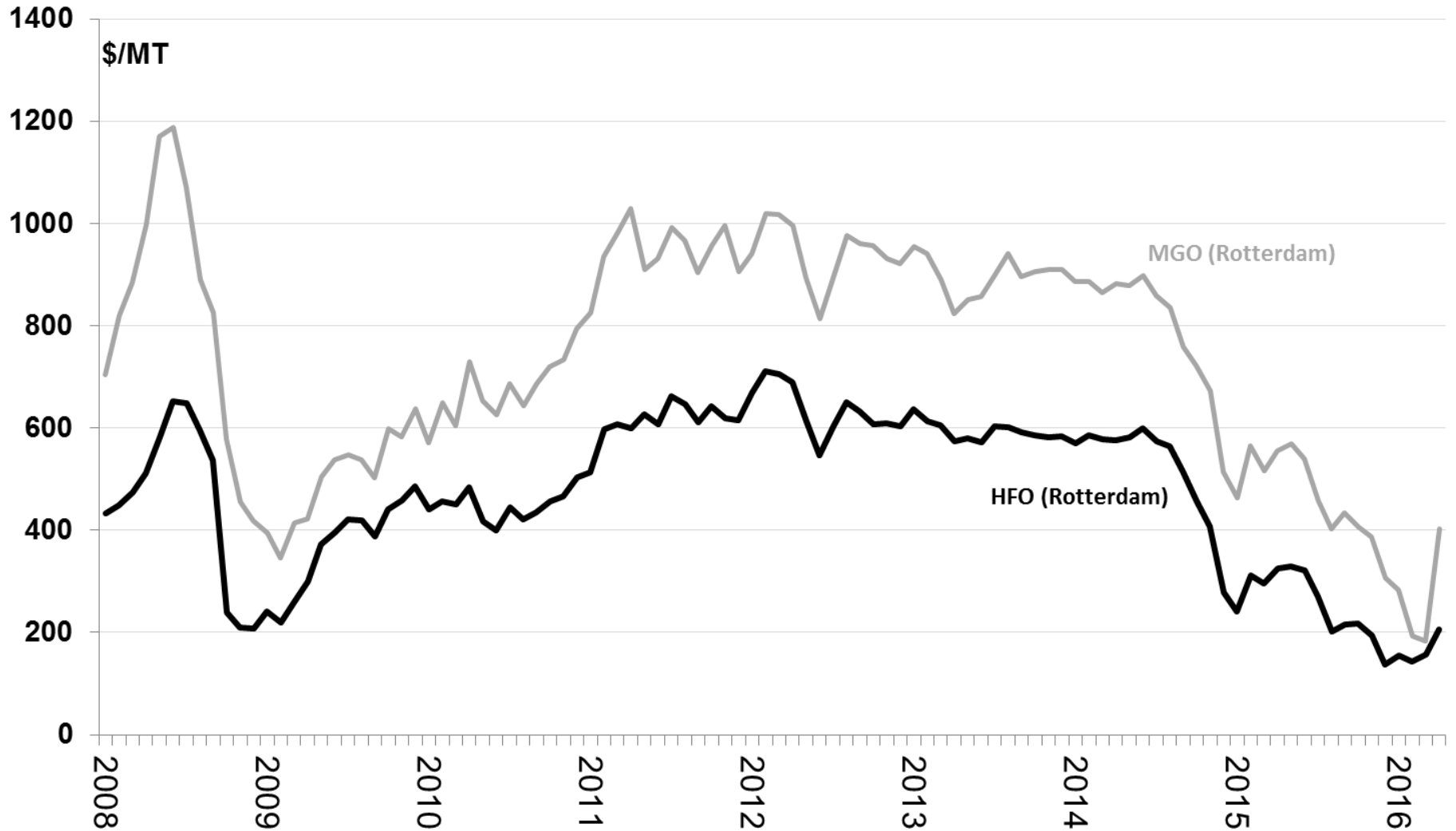
# Why fuel alternatives?



Or

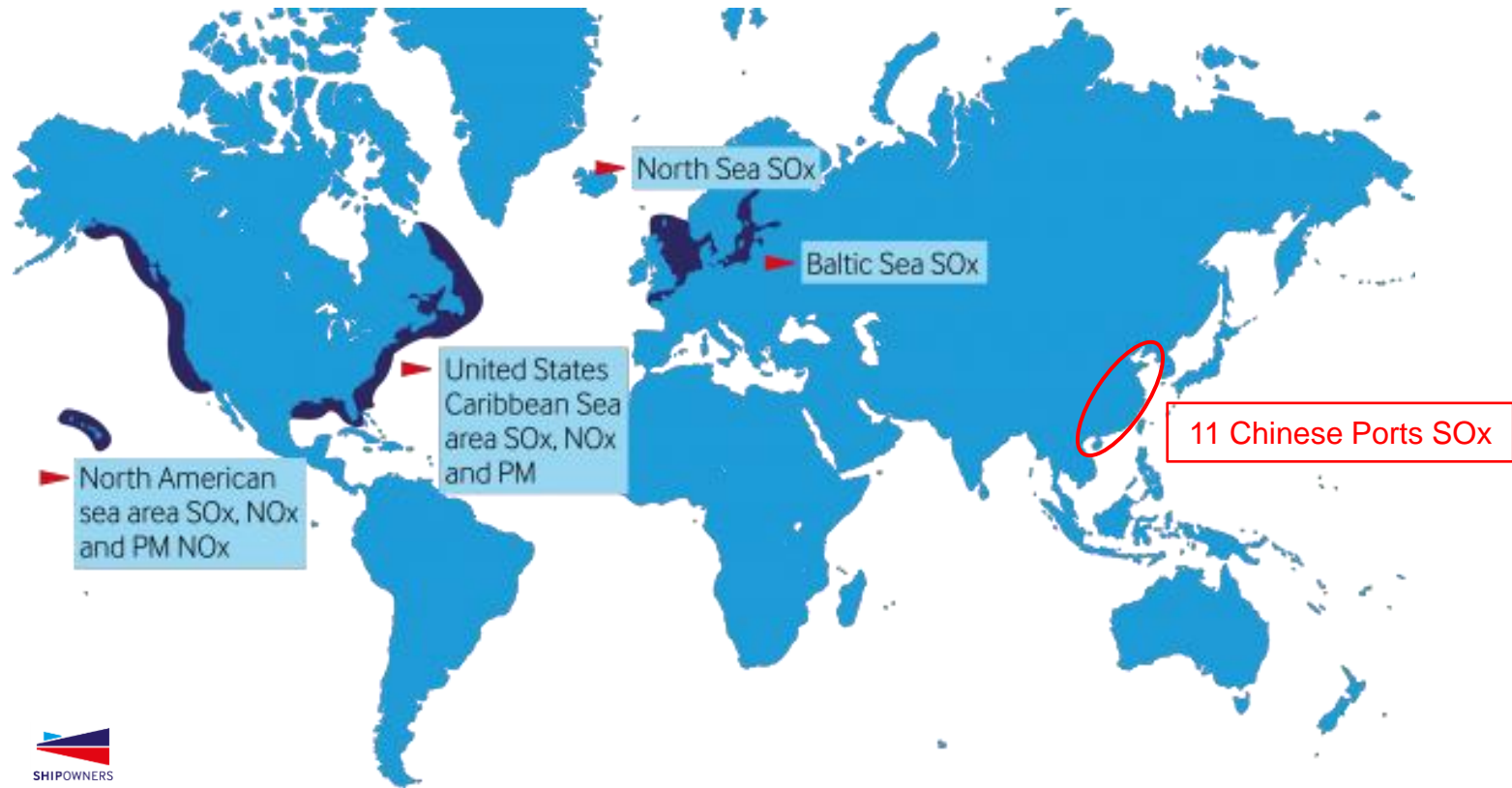


# Conventional Bunker Prices

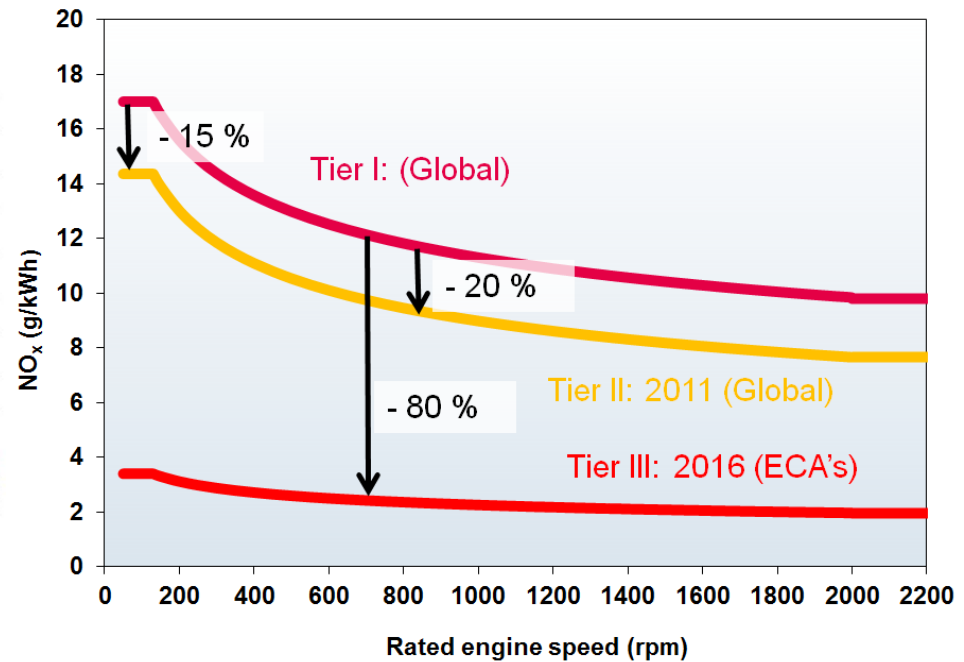
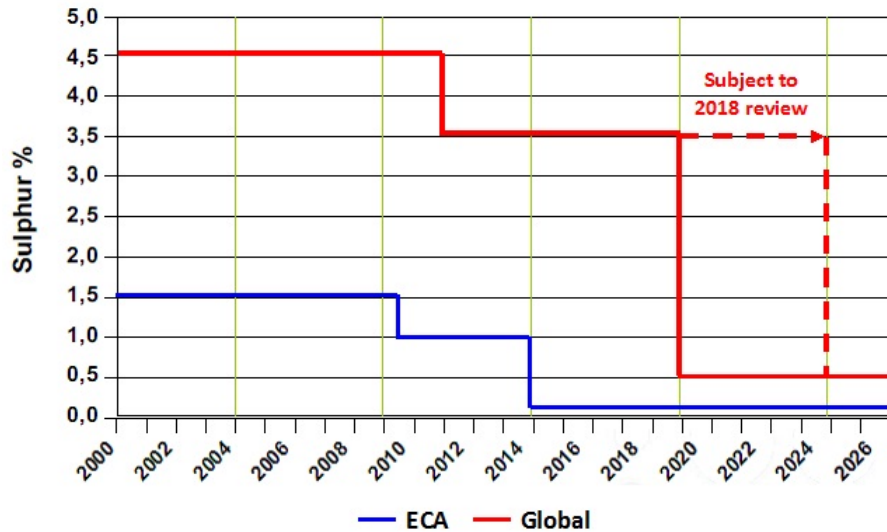


Source: Bunkerindex

# Current Emission Control Areas



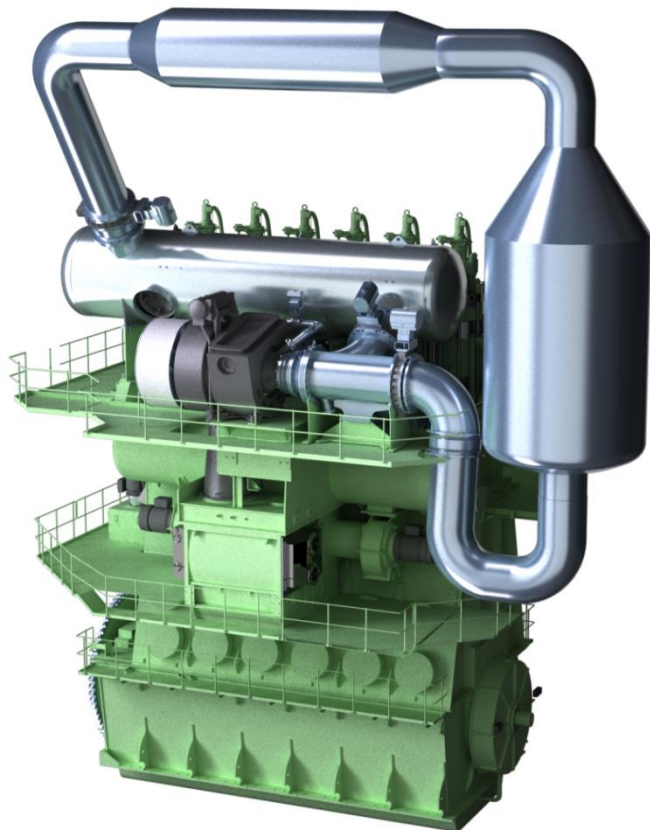
# IMO SO<sub>x</sub> & NO<sub>x</sub> Limits



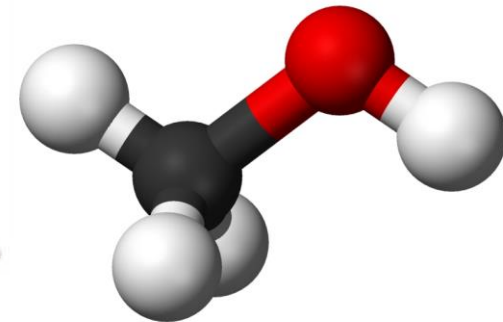
# Emission Compliance



## After-Treatment



## Alternative Fuel







1. Low-Sulphur HFO/Diesel

2. LNG

3. LPG

4. Methanol



## 1. Low-Sulphur HFO/Diesel

Convenient solution

Does not require DF technology

Availability could be an issue

2. LNG

3. LPG

4. Methanol



## 1. Low-Sulphur HFO/Diesel

## 2. LNG

The widely accepted alternative  
Still some scepticism  
Higher first cost  
Chicken-and-Egg dilemma

## 3. LPG

## 4. Methanol



1. Low-Sulphur HFO/Diesel

2. LNG

3. LPG

Niche market  
By product of the oil industry  
Abundantly available  
Easier handling

4. Methanol



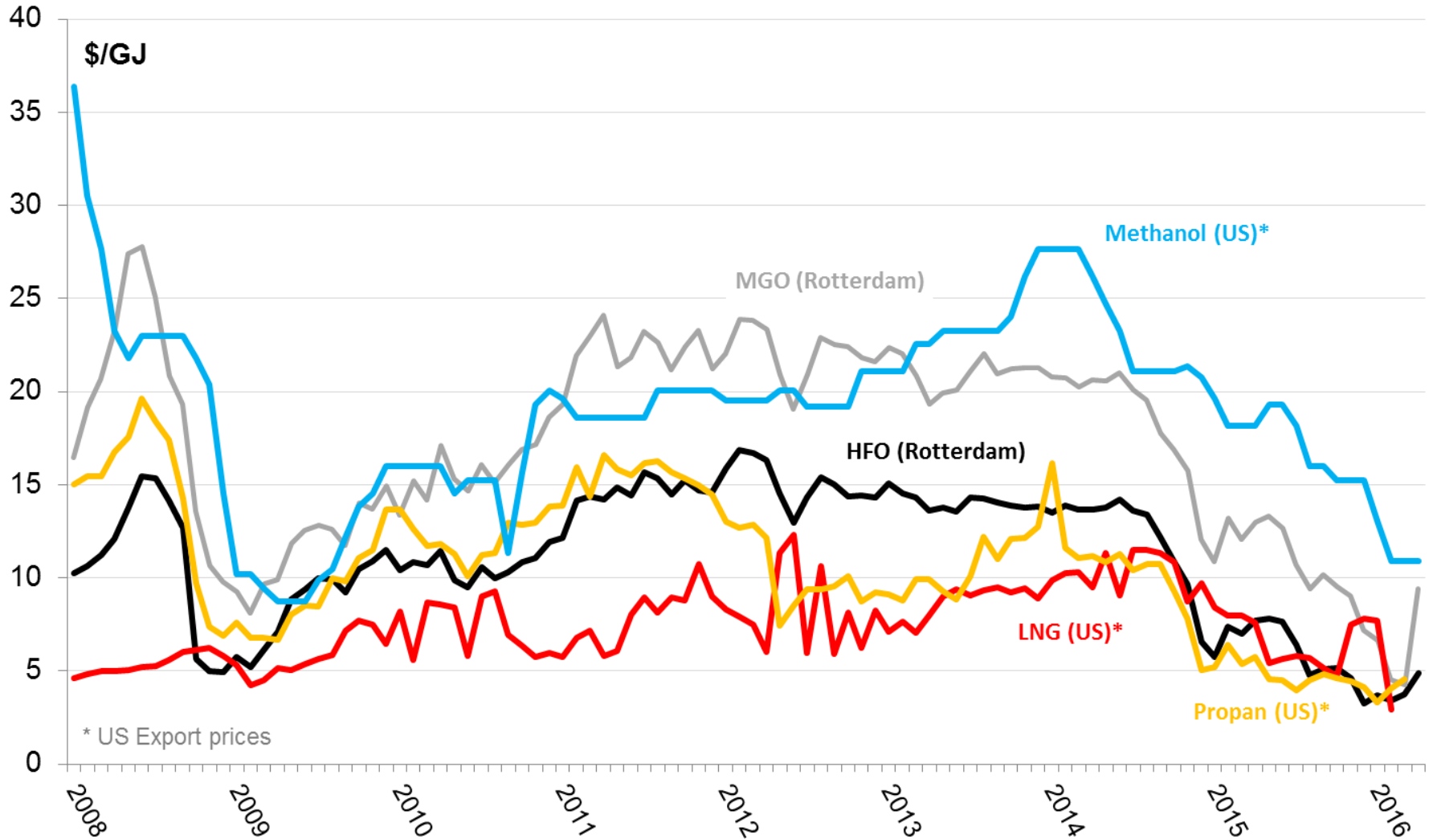
1. Low-Sulphur HFO/Diesel

2. LNG

3. LPG

**4. Methanol** Niche market  
Easier handling  
Price?  
Serious availability issues

# Fuel Price Development, \$/GJ

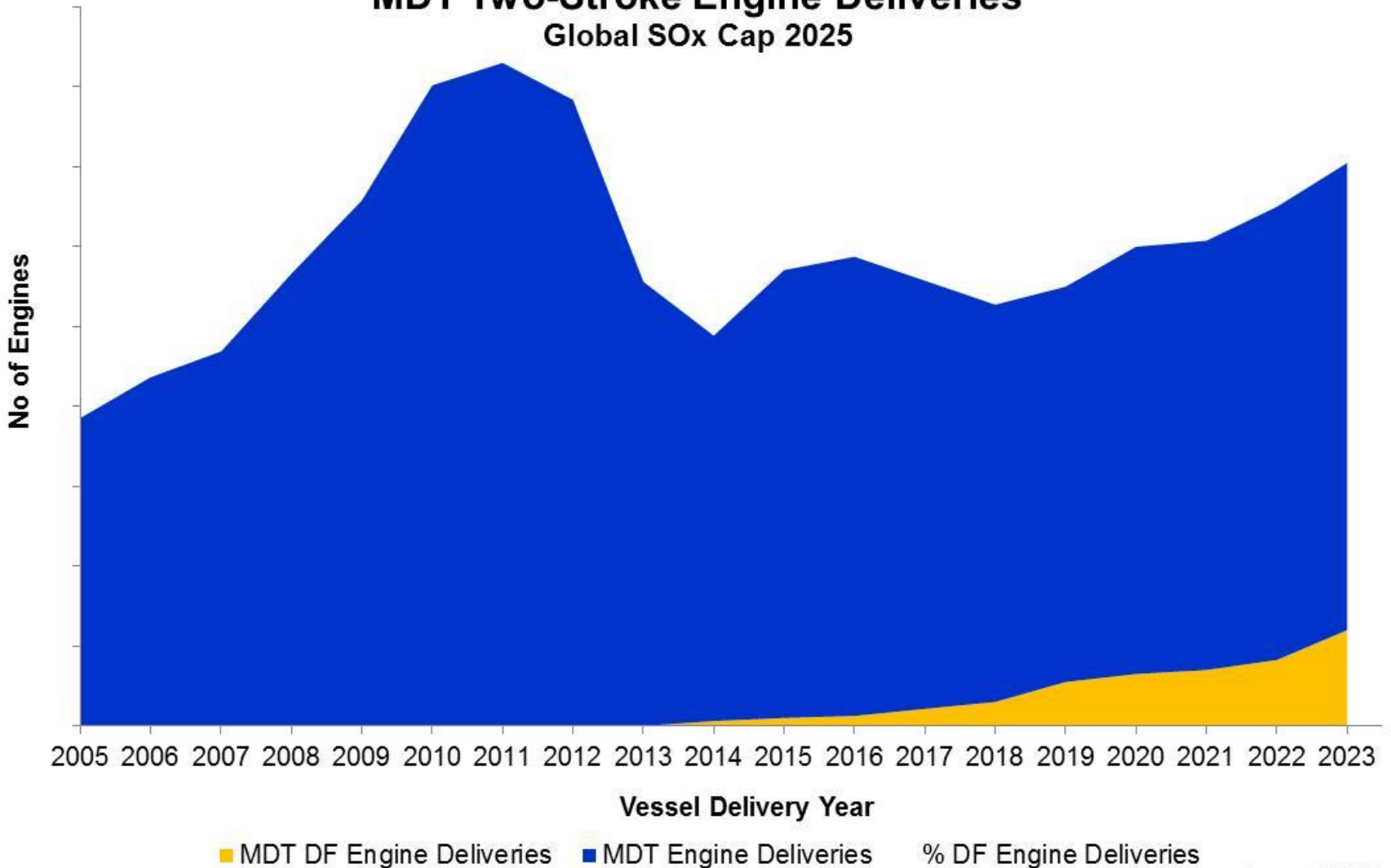


Source: Bunkerindex; EIA; Methanex

# Prognosis of DF Engines



## MDT Two-Stroke Engine Deliveries Global SOx Cap 2025

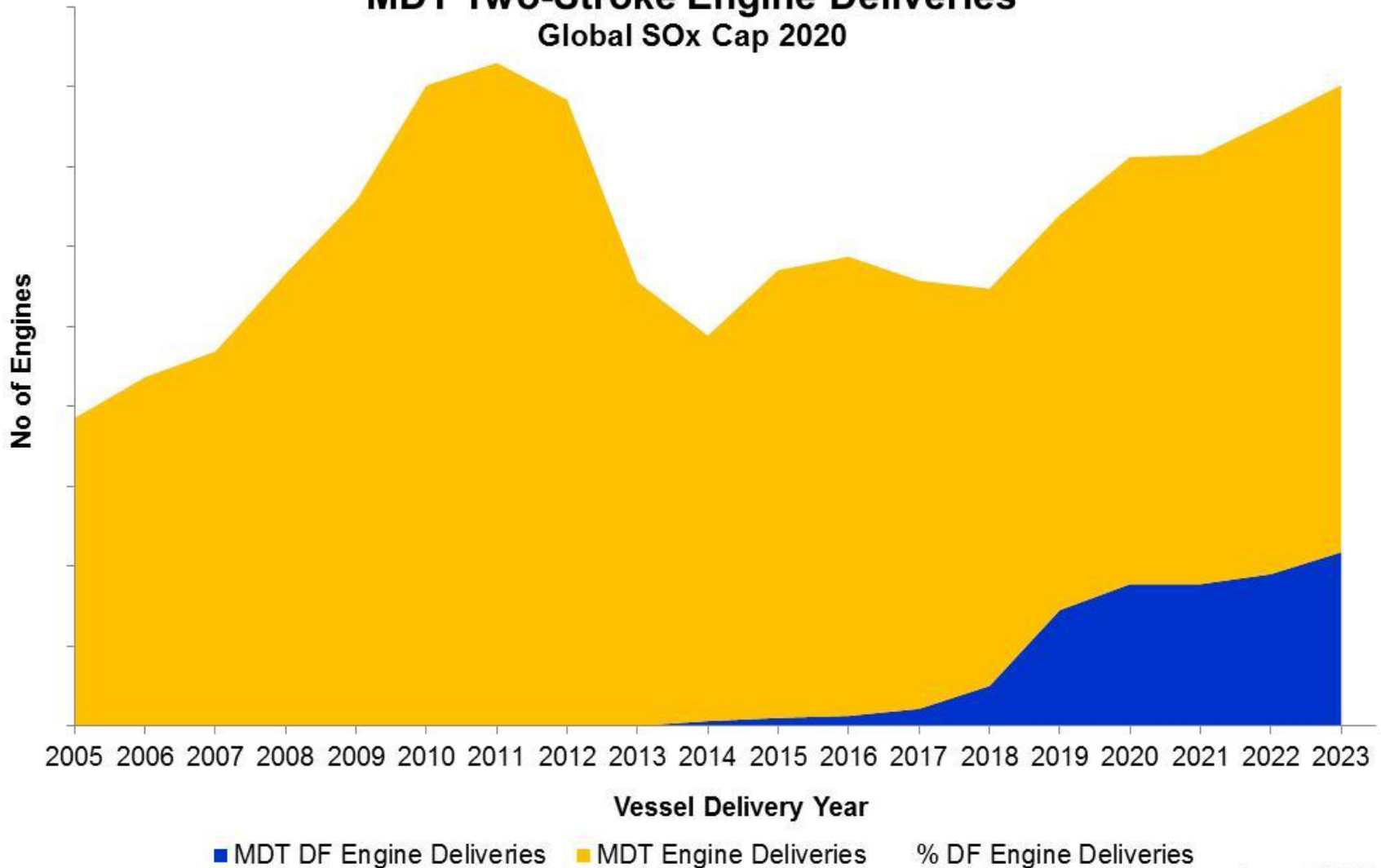


Source: IHS Ltd, MDT

# Prognosis of DF Engines



## MDT Two-Stroke Engine Deliveries Global SOx Cap 2020



Source: IHS Ltd, MDT



# Thank you

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