

# White Paper: IMO 2020 Impact on The Base Oils Market

## What are the main changes to the Marpol Annex VI?

From 1 January 2020, ships must use fuel oil on board with a maximum sulphur content of 0.5pc by weight, down from the previous 3.5pc limit. The maximum sulphur content in bunker fuel used in the Emissions Control Areas (ECAs) remains at the 2015 standard of 0.1pc. An additional carriage ban, which prohibits ships from carrying fuel oil with more than 0.5pc sulphur unless scrubbers are equipped, will go into effect on 1 March 2020.

## Who are affected?

- Shipowners, as they decide how best to comply with the new rules
- Refiners, as they upgrade and optimise output streams
- Blenders and additive producers, as lubricant requirements change
- The general public, as the cost of freight increases

## What strategies have shipowners adopted?

- Using compliant fuels
  - Low-sulphur distillates like marine gasoil (MGO)
  - 0.5pc compliant fuel oil blends
  - Existing ECA blends
- Installing exhaust gas cleaning systems, or scrubbers, to be able to run high-sulphur fuel oil (HSFO)
- Using alternative fuels, such as liquefied natural gas (LNG)

Most vessels are using low-sulphur fuel oil (LSFO) and other compliant fuels. The use of fuels with a 0.5pc sulphur content remains the dominant strategy for now.

Major fleet owners have largely adopted a mix of strategies to ensure compliance.

Maersk Line have relied on compliant fuels despite investing in a limited number of scrubbers. The company in 2018 announced an agreement with Royal Vopak to launch a 0.5pc sulphur fuel bunkering facility in Rotterdam. The joint venture will meet about 20pc of Maersk's global demand for compliant fuels.

MSC is using low-sulphur fuels to propel its fleet. Its strategy also includes the use of exhaust gas cleaning systems and biofuels.

CMA CGM is favouring the use of 0.5pc fuel oil. The company has also made investments to equip 20 of its container ships by 2022 with LNG systems. Several scrubbers have also been ordered.

Even with the new rules, HSFO is expected to account for about 35pc of bunker fuel consumption in 2020 because of the installation of scrubbers and some level of non-compliance. Although scrubber technology has improved, most shipowners prefer to hold off on installing exhaust gas cleaning systems until there is more clarity on the price difference between HSFO and LSFO and their potential savings.

Marine engine manufacturers, including Mitsubishi Heavy Industries and Wartsila, have their own proprietary exhaust gas cleaning systems.

Cummins has chosen selective catalytic reduction to meet the new emissions requirements. Hyundai Heavy Industries has teamed up with Hyundai Global Services to retrofit the medium-sized LPG carriers owned by KSS Line with exhaust gas cleaning systems.

MAN Diesel and Turbo said that its engines can run on fuels that meet the IMO's stricter requirements without any need for engine modifications. But it cautioned against operating engines with a lubricant that has an unmatched total base number (TBN). The company expects that scrubbers will present a realistic solution for ships operating in coastal areas and, in the long term, for merchant vessels as well.

## What have refineries done, and are expected to continue doing?

- Changed focus from converting heavy petroleum fractions to light petroleum fractions, to removing the sulphur compounds from petroleum fractions
- Simple refineries will opt to pay a premium for very-low sulphur crudes since they can be used to produce a high proportion of compliant bunker fuel or bunker blendstock
- Simple refineries processing crude with a sulphur content above the IMO's set level for compliant bunker fuel will likely sell their residue as a cracker feedstock
- Refiners with the ability to either destroy or remove sulphur from fuel oil and residue will demand more sour crudes; prices for these crudes are forecast to trend to a wider discount to sweeter crudes, according to the Argus Crude and Refined Products Outlook
- Prioritise the production of distillates and gasoil, depending on price differentials

## What are additive producers saying?

- Lubricants are expected to be more complex because of the variety of fuels that might be used
- Lowering just the lubricant feed rate or TBN would be insufficient to prevent side effects. These could include a poorer level of dispersancy, corrosive wear control, detergency or adhesive and abrasive wear control
- Lubricants must address new challenges, such as cylinder liner lacquering, liner wear through cold corrosion, increased deposit formation and oxidative stability
- Marine cylinder lubricants with 25-40 TBN are expected to be dominant post-2020 for two-stroke engines
- Trunk piston engine oils with 15-25 TBN are expected to be dominant post-2020 for four-stroke engines
- Effectiveness versus older lubricant versions, and concerns regarding contamination and incompatibility between fuel blends, remain to be seen

## How will base oils be affected?

- Stronger bunker fuel demand provides support for crude prices
  - o Refinery throughput is expected to increase to ensure sufficient volumes of compliant bunker fuel are produced
  - o Opec+ output adjustments expected to take place amid weakening crude values
  - o Higher crude prices have, and will, provide a higher base for any base oil prices that move close to this level
- Rising alternative fuel values relative to crude to continue impacting supply availability of base oils
  - o Diesel prices are expected to rise more than crude prices in response to rising demand for distillates
  - o Base oil prices have, and will, likely face additional upwards pressure as more feedstock is diverted to the production of alternative fuels
  - o Firmer alternative fuel prices have already incentivised the sale of base oils into unconventional outlets such as the marine fuels market
  - o The price impact on each base oil grade will differ, depending on its substitutability for alternative fuels production and their suitability for use in other applications
- Compliant fuels to change lubricant formulations
  - o The TBN of marine cylinder lubricants is expected to drop from 70-100 to 25-40, since there are less sulphur compounds in marine fuel that require neutralising
  - o While Group I base oils have typically been preferred because of their aromatics content and solvency, this property is now of less concern because fewer alkaline compounds have to be dissolved in finished lubricants
  - o Most major marine additive companies have or are working towards the interchangeability of Group I and Group II base oils
  - o Should more Group II base oils be used in marine cylinder lubricants, more bright stock might be required for use as a viscosity modifier

## How can the base oils market reduce exposure to these risks?

- Keep abreast of latest market developments
  - o The Exhaust Gas Cleaning Systems Association estimates that the number of ships fitted with scrubbers by 2020 will be around 4,000, or about 11pc of the global fleet by tonnage. According to Argus data, about 500 more vessels are set to install scrubbers by 2021
  - o The smaller the number of ships installed with scrubbers, the greater the demand will be for 0.5pc sulphur bunker fuel and vice-versa
  - o The greater the demand for LSFO, the greater the impact on base oil prices and dynamics
- Keep abreast of price signals
  - o The introduction of the bunker fuel sulphur cap will affect different groups and grades of base oils differently
  - o The use and properties of each type of base oil differ across grades; substitutability also differs for alternative products and byproducts of each type of base oil

## Conclusion

Under the revised Marpol Annex VI, the global sulphur cap on bunker fuels has been reduced from 3.5pc to 0.5pc from 1 January 2020.

For now, most major fleet owners are opting to use compliant fuels to ensure compliance.

Diesel prices relative to crude have room to rise further in the first half of 2020 as demand for distillates and distillate-rich crude rises. The spread between marine gasoil and very LSFO has already narrowed. Firmer feedstock and diesel prices will likely place more upward pressure on base oil prices, especially if base oil premiums to diesel remain low.

Base oils availability has already been tighter-than-expected as some refiners place more emphasis on alternative fuels production or divert base oils into non-conventional outlets.

The magnitude of any price impact will continue to be dependent on the growth in demand for low sulphur bunker fuel and the adoption rate of exhaust gas cleaning systems.

For more information on prices and methodology, please contact:

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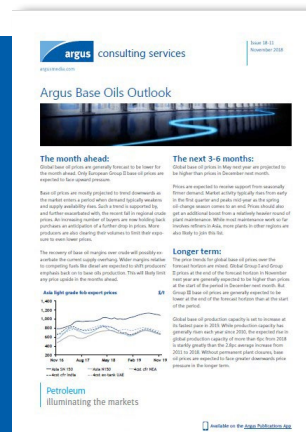
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## Argus Base Oils Outlook

A monthly forecast of key base oils prices spanning 12 months into the future

### Key benefits:

- ▶ Facilitates short-term planning/budgeting
- ▶ Provides third-party reference prices to measure against internal price targets
- ▶ Reduces exposure to spot volatility



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