IMO SULPHUR LIMIT 2020 GUIDANCE
Global Emissions
85% SOx Decrease

Compliance
26% Average Fuel Price increase

Energy
2.5% Average energy increase (scrubbers)

P&L
13% Average OPEX increase

Note: Data obtained through SSA members survey and consultation.

ANNUAL BUNKER TONNAGE SUPPLIED IN SINGAPORE ACCORDING TO TYPE IN 2018 & PREDICTED SUPPLY IN 2020

Singapore Actual Supplied Tonnage (million tonnes) in 2018
Singapore Predicted Supply Tonnage (million tonnes) in 2020

- MGO/LSMGO
- Very Low Sulphur Fuel Oil (VLSFO)
- High Sulphur Heavy Fuel Oil (HSHFO)

MGO/LSMGO
Very Low Sulphur Fuel Oil (VLSFO)
High Sulphur Heavy Fuel Oil (HSHFO)

No. of Suppliers: 12*
No. of Suppliers: 30**

* MGO/LSMGO product only
** VLSFO & HSHFO products

Note: Data obtained through SSA members survey and consultation.

This list is non-exhaustive.

1 https://safety4sea.com/imo-sets-2020-as-implementation-date-for-0-5-sulphur-cap/
2 http://www.mpa.gov.sg/web/portal/home/port-of-singapore/services/bunkering/bunkering-statistics
2020 GUIDANCE

6 Months (M) Planning

**FUEL OIL SYSTEM READINESS**
Segregation modifications for fuel oil tanks system completed, system lines tested, and crew familiarization training conducted, action plan agreed with manufacturers completed.

**OIL TANKS READINESS**
Tank cleaning for designated fuels storage arranged, lubricant spare tank arrangement for dual fuel carriage, additional containment system for the possible overflow of sludge volume due to tank cleaning requirements.

**PROCUREMENT READINESS**
Procurement contracts and quality procedure/certification to purchase compliant fuels from bunker suppliers along vessel routes negotiated and agreed, disposal of non-compliant fuel with buyer(s) arranged and permit obtained.

**ON-BOARD READINESS**
Fuel switch-over requirement arranged and full training on the utilization/switch-over operation as well as handling unavailability of compliant fuel for crews completed, issuance of reminder that non-compliant fuel needs to be disposed.

**SAMPLING READINESS**
All sampling points identified and appropriate sampling valve installed, procedure for onboard and in-use samples completed and crew familiarization training conducted.

**COMPLIANCE**
Ship maintenance regime to include mitigating compatibility issues, carriage ban arrangement, emission monitoring, equipment inoperability, CEM malfunction etc.

**5 What-If Scenarios**

- **Compliant Fuel not available at port**
  - Submit Fuel Oil Non-Availability Report (FONAR) to next port of call & inform Port State/Flag State
  - Report to IMO MARPOL Annex VI GISIS module
  - Submit evidence to support efforts to obtain compliant fuel
  - Arrange to lift compliant fuel at the first available port of call

- **Scrubber System not in operation**
  - Inform Flag & Port State for non-functional scrubber
  - Make arrangement to repair scrubber at nearest port of call
  - Update SSEP Log Book
  - Inform port state for non-availability and make arrangement for bunkering of compliant fuel
  - If repair duration is uncertain, consult the administration

- **Analysed VLSFO results have uncertainties**
  - Raise Bunker Dispute Form
  - Run additional purification/filtration with low throughput for fuel with high cat-fines
  - Adjust heater or use chiller to improve fuel viscosity and to maintain viscosity within the Engine Maker’s Recommendation limit
  - Commingle with compatible fuel/or use appropriate additives to improve stability
  - For high sulphur content exceeding limit, make preparation to debunker non-compliant fuel

- **Carriage of Non-Compliant Fuel on-board**
  - Make arrangement to dispose non-compliant fuel (HSHFO) by 1st March 2020 due to “Carriage Ban”
  - Clean system & tanks to bunker compliant fuel
  - Obtain a Carriage of Non-Compliant Fuel exemption letter from Flag State, to be produced to Port State Control from 1st Jan 2020 onwards

- **Ports & sea areas prohibit scrubber discharges**
  - Perform change-over to compliant fuel using the fuel change-over calculator prior to entering prohibited areas
  - Switch to closed loop system, if available
  - Make arrangement with reception facilities to collect scrubber effluent discharges for closed/hybrid scrubber
<table>
<thead>
<tr>
<th>Types of Risks Assessed</th>
<th>Recommended Mitigating Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Risk: Vessel Collision</td>
<td>Configure alert/alarm system when switching fuel. Familiarisation of fuel change over sequence with in 3 months prior to regulations kick in.</td>
</tr>
<tr>
<td>Compliance Risk: Vessel Detention</td>
<td>Delivered MARPOL LSFO has 0.47% Sulphur or less documented (+5% confidence level).</td>
</tr>
<tr>
<td>Operational Risk: Damage to Critical Assets</td>
<td>Perform CLO Scrape Down Analysis every 3 months to maintain desired TBN/FE ratio. Use purifiers at low throughput and test purifier efficiency of removing catfines by testing before/after.</td>
</tr>
<tr>
<td>Commercial Risk: Onboard Fuel Contamination</td>
<td>Test for compatibility prior to any commingling. Drain water from fuel tanks to avoid settling of catfines.</td>
</tr>
<tr>
<td>Operational Risk: Incorrect combustion affecting emission values</td>
<td>Use new type of nozzles and adjust Air/Fuel ratio for boiler. Ensure appropriate Low TBN CLO/LO to avoid fouling of M/E, A/E rings/grooves.</td>
</tr>
<tr>
<td>Commercial Risk: Supplied Fuel Quantity &amp; Quality Disputes</td>
<td>Install mass flow meters with correct viscosities range. Install new fuel pump plunger/barrel and injection nozzles for low viscosity LSFO.</td>
</tr>
</tbody>
</table>

**Recommended Mitigating Actions:**
- Additional watch-keeping when performing fuel change over.
- Avoid performing fuel switch over in Port and Areas of restricted navigation, such as ESS, Rivers, Channels etc.
- Perform fuel change over well in advance in order to ensure smooth transition to avoid any blackout situations.
- Configure alert/alarm system when switching fuel.
- Develop correct Purification Procedures, based on fuel bunkered i.e. correct use of gravity disc/purification temperatures.
- Ensure all logs are properly maintained and recorded.
- Monitor for sludge in tank & clean bunker tank residues frequently.
- Use portable sulphur meter to test onboard and in-use fuel samples sulphur content.
- Ensure all logs are properly maintained and recorded.
- Delivered MARPOL LSFO has 0.47% Sulphur or less documented (+5% confidence level).
- Ensure all logs are properly maintained and recorded.
- Install acceptable micron backwash filter to reduce sludge accumulation.
- Install acceptable micron backwash filter to reduce sludge accumulation.
- Use portable sulphur meter to test onboard and in-use fuel samples sulphur content.
- Test for compatibility prior to any commingling.
- Avoid mixing & do not use fuel without knowing its specifications.

**Disclaimer:**
All information is provided in good faith for guidance and reference purposes only. This guidance does not constitute legal advice and are offered based on the member’s knowledge and experience.