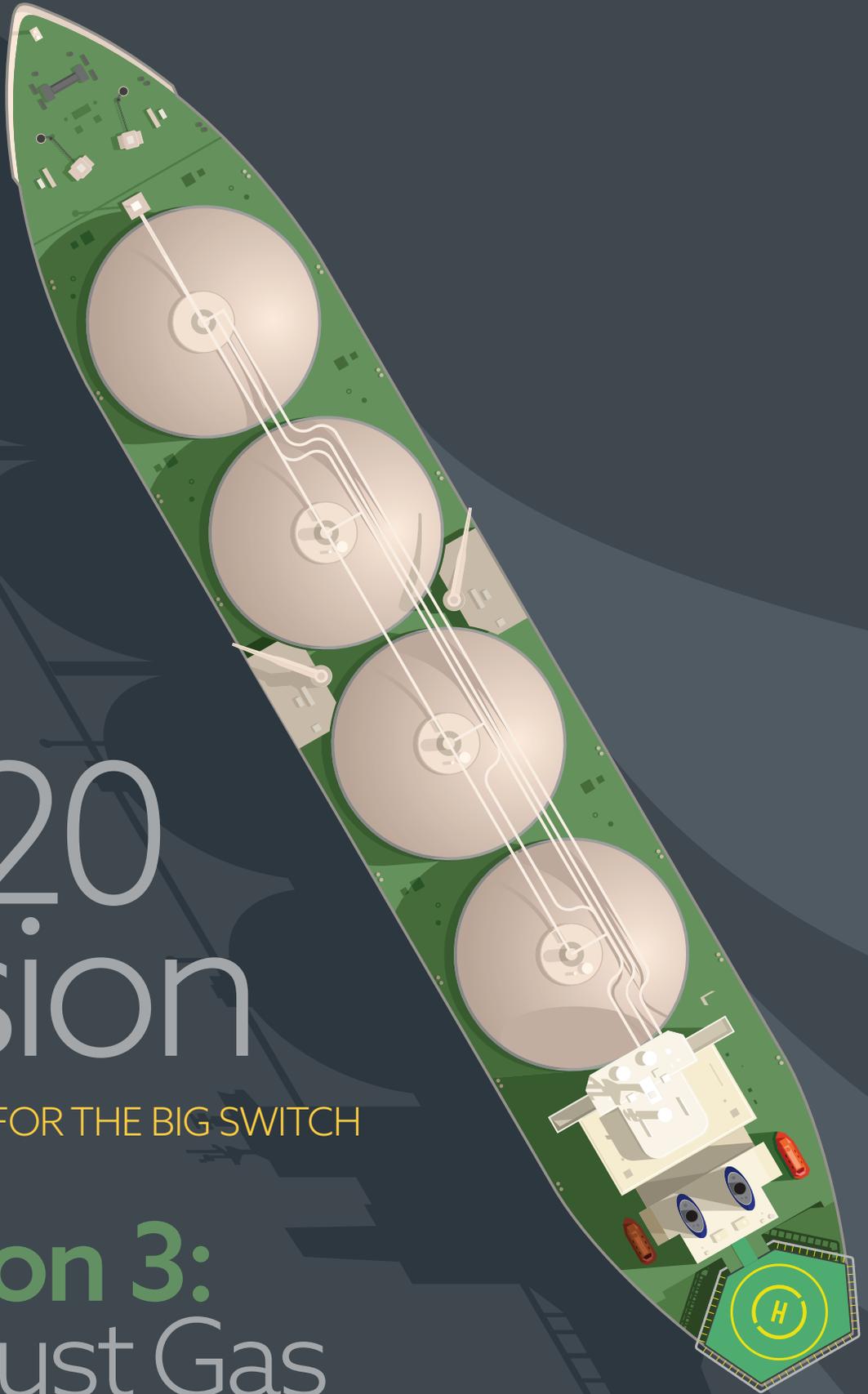


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SERVICE, STRENGTH, QUALITY



2020 Vision

PREPARING FOR THE BIG SWITCH

Option 3: Exhaust Gas Cleaning Systems

2020 Vision

Option 3: Exhaust Gas Cleaning Systems

The reduction of the MARPOL Annex VI global fuel sulphur cap to 0.50% will come into force on 1 January 2020.

There will be no transition phase or grace period after this date. Shipowners and charterers need to act now and make the transition to compliance before 1 January 2020 and remove any non-compliant fuel before 1 March 2020.

There are several options on how to comply, the most common being distillates (MGO/MDO), blended very-low-sulphur fuel oils (VLSFO) or installing exhaust gas cleaning systems (scrubbers).

Whichever method of compliance is chosen, the switchover and future operation has to be carefully planned and managed. The risks that threaten safety or impact compliance must be identified and controlled.

This guide looks at the third option: **exhaust gas cleaning systems** or scrubbers. It is designed to assist you with the transition process and ensure safe and compliant continued operation.

Plan the Switch

Whatever the method of compliance, it constitutes a major change in vessel operation. Each method of compliance also presents unique risks – and these risks need to be managed.

The Technical, Chartering and Operations departments of the shipping company should meet together as early as possible to discuss planning and what is achievable.

It is important to avoid a scenario where the technical department makes transition arrangements that conflict with agreements already made by the chartering department.

Ship Implementation Plan

IMO is helping shipowners develop a 'Ship Implementation Plan'. MEPC.1/Circ.878 "Guidance on the development of a ship implementation plan for the consistent implementation of the 0.50% sulphur limit under MARPOL Annex VI" outlines how a ship may prepare in order to comply.

This provides a template for a vessel-specific implementation plan. The IMO guidance is focused on vessels that intend to use compliant fuel rather than those operating with scrubbers. But a number of the principles are transferrable and could assist vessels using scrubbers with their planning, particularly on what to do in the event of a scrubber failure.

The ship implementation plan guidance covers:

1. Risk assessment and mitigation plan (impact of new fuels)
2. Fuel oil system modifications and tank cleaning (if needed)
3. Fuel oil capacity and segregation capability
4. Procurement of compliant fuel
5. Fuel oil changeover plan (conventional residual fuel oils to 0.50% sulphur compliant fuel oil)
6. Documentation and reporting requirements

Although a ship implementation plan is not mandatory, it could assist in satisfying visiting Port State Control officers when verifying compliance.

It is not the intention of this document to replicate the advice provided by IMO. As such, the guidelines, complete with template plan, can be downloaded at www.nepia.com/insights/2020-vision/articles-resources

Scrubber Installation and Maintenance

Exhaust gas cleaning systems operate in a harsh environment. If the installation is not correctly matched to the vessel's engines, or is poorly executed, inferior materials used or is not properly maintained, problems are likely to arise.

At the time of writing, open-loop scrubbers are the most popular EGCS option. They are generally much cheaper than closed-loop and hybrid systems and are relatively simple to operate and maintain.



Installation

Installation is a significant project and must not be underestimated. It requires several months of planning and the careful selection of the right equipment and materials as well as the right contractors to perform the work.

Although scrubber technology isn't new – inert gas systems on tankers have long operated on a similar principle – the maritime industry is still learning about what works well and what needs to be improved.

Some aspects to consider:

- Safe access to equipment and sensors, and any other areas that may require regular attention
- If chemical dosing is used, safe positioning of drums and equipment
- Choose high-quality, corrosive-resistant materials. Some installations now use glass reinforced plastic/epoxy (GRP/GRE) piping instead of steel because of its superior corrosion characteristics.
- Capability of power generation plant to meet the increased power demands from high-capacity water circulating pumps
- Impact on fuel consumption rates – scrubber use is estimated to increase consumption up to 5%. If so, the performance warranties in the charterparty may need to be reviewed.
- If the vessel is under charter then the charterparty will need to be reviewed to determine whether there is a right for the shipowner to dry dock/take the vessel out of service for scrubber installation

Plan the Switch (cont.)

Scrubber Installation and Maintenance (cont.)

Maintenance

The vessel's planned maintenance system will need to be updated to allow for the installation of the scrubber and any associated equipment, with manufacturer's guidance used as a minimum. Scrubber technology will be new to many shipowners and seafarers so planned maintenance should evolve based on experience and 24/7 operation. When deciding on maintenance strategy, take into account the following:

- Sensor faults have been reported on numerous vessels. This may be due to mechanical or electrical failures and some are prone to fouling by residues – keep spare sensors in stock and ensure crew are able to change them, to avoid delays or possible enforcement action due to failure to show scrubber effectiveness.
- Ensure sensors undergo periodical cleaning and calibration to prevent false readings and risk of failure in-service.

Operation

Inefficient combustion can lead to an increase in soot generation in the uptakes and can lead to fouling within the scrubber, significantly increasing backpressure.

To ensure the scrubber operates optimally and the plant runs efficiently, it's important to have good combustion in the main and auxiliary engines. This requires regular monitoring of engine performance (power cards or electronic equivalent), correctly set injector pressures and correct timing.

Fuel additives can be used to improve the combustion properties of the fuel.

Ship's engineers are likely to require training in the safe use and maintenance of the scrubber system installed on the vessel.

They must also be aware of the associated risks, such as safe isolation before carrying out maintenance or repairs, and the safe use and storage of dosing chemicals.

New Fuel Risks

Although the vessel will operate on high sulphur residual fuel most of the time, areas exist where open-loop scrubber operation is prohibited and the chosen contingency for some will be to burn compliant fuels.

It is expected that most shipowners will initially turn to compliant distillates, such as marine gas oil (MGO) or marine diesel oil (MDO) for such a contingency.



But it is likely that the popularity of hybrid/blended VLSFO products will increase as more products enter the market.

For more information on the use of compliant fuels, including their characteristics, risks, fuel system modifications, changeover procedures and tank cleaning requirements, refer to our associated guidance documents:

- Distillates: www.nepia.com/insights/2020-vision/planning-the-big-switch
- VLSFO Products: www.nepia.com/insights/2020-vision/planning-the-big-switch

Consult vessel's Flag State or Class on whether the fuel tanks for the vessel's emergency generator, emergency compressor and lifeboat engines need to be replaced with compliant fuel. If so, cleaning and flushing may be required to ensure compliance.

Ship's engineers are likely to require training in the safe use and maintenance of the scrubber system installed on the vessel.

Contingency Planning

There may be times when compliance cannot be achieved. Compliant fuel may not be available in a particular geographical area where scrubber use is prohibited or a scrubber may malfunction. It is therefore important to think about contingencies.

Scrubber Malfunction

Clear guidance has not yet been released on how Port States are to react in the event of a scrubber malfunction.

Industry sources are of the opinion that such malfunctions would be treated similar to fuel oil non-availability. Inform Flag State and the authorities at the next port, as far in advance as possible. The impact of non-compliance should be mitigated as long as the failure wasn't through a lack of good maintenance, and the shipowner can prove efforts to comply.

The charterparty should be reviewed so it is made clear who is to supply compliant fuel in the event of scrubber breakdown. It may be that the fair position will be that the shipowner provides compliant fuel if the scrubber breaks down due to a maintenance issue, but the charterer provides compliant fuel if the scrubbers break down due to a reason for which they are responsible.



Fuel Oil Non-availability

For vessels fitted with scrubbers, it will be necessary to use compliant fuel if the scrubbers can't be used (for whatever reason). However, what happens if compliant fuel is not available?

There are already existing provisions in MARPOL Annex VI Regulation 18. The shipowner must first notify the vessel's Flag State and the competent authority of the next port of call. They must then evidence reasonable efforts were made to acquire compliant fuel but without the need to deviate from the intended voyage.

FONAR

IMO is expected to release details of a fuel oil non-availability reporting (FONAR) system at MEPC 74 in May 2019.

A similar system is already in place for the US ECA and mitigates the penalties for non-compliance. This is not a waiver and the US authorities closely monitor any owner who submits multiple FONAR reports.

At this time it is not unreasonable to consider that an IMO FONAR would be based on similar principles – with a focus on achieving maximum compliance rather than facilitating easy exemptions.

How a Port State requires a vessel to achieve compliance upon arrival is less certain. If a vessel arrives with non-compliant fuel due to lack of availability, the local authorities are likely to impose the need to bunker compliant fuel as soon as practically possible. In the case of scrubber breakdown in particular, it is not clear if the authorities will require de-bunkering of any remaining non-compliant fuel, before allowing a vessel to sail after 1 March 2020.

It is likely that FONAR reports should be filed with Flag and the PSC (Port State Control) or relevant Port Authority, of the next port of call **in advance** of arrival or as soon as the non-compliance situation is known.

Information will most likely need to be given about why the vessel cannot comply and what steps have been taken or will be taken to try and remedy the situation. If the notice concerns non-availability of compliant fuel then it is likely that cooperation will be required from the time charterer to allow the shipowner to provide the required information. It may be sensible to include provisions in time charterparties to deal with such situations.

Contingency Planning (cont.)

Changing Regulations

The future is uncertain. Regulations will expand and market conditions continue to be volatile. Shipowners should continually monitor changes and review their compliance strategy and how their vessels operate.

It is very likely that more emission control areas will emerge – either as designated MARPOL Annex VI ECAs (achieving same status as North Sea, Baltic Sea or North America) or enacted through domestic legislation (e.g. China).

Vessels fitted with open-loop scrubbers are most vulnerable to the effects of changing environmental legislation.

Ban on open loop scrubber use

Ports around the world are looking at the impact of scrubber use in their waters.

To date, it can be argued that too little scientific research has been carried out on their use in confined waters. Existing IMO guidelines on scrubber discharges focus on pH and PAH levels whereas there is now increasing emphasis on the presence of heavy metals. This void of scientific information has contributed to the polarisation of the shipping community on this subject.

A number of ports and regions have already stated that they will not allow the discharge of wash-water from scrubbers. This list is likely to grow.

North has collated a table that summarises our understanding of the positions taken by ports that have or will prohibit the use of scrubbers, or have placed conditions on their use.

www.nepia.com/insights/industry-news/no-scrubs-more-ports-declare-ban-on-egcs-discharges-starupdatestar/

It is likely that it would be the time charterer's obligation to supply compliant fuel where the vessel trades to an area where open loop scrubber discharges are banned. However, it may be wise for the parties to address this specifically in the charterparty.

Processing wash-water

There is currently no international requirement to process or further clean wash-water discharge. However some systems are fitted with a means to collect soot and particles and this may be indicative of future movement in regulation.

Discharging closed loop/hybrid scrubber waste

Such waste will typically be stored on board in IBC containers until it can be discharged ashore. Not all ports will have suitable discharge facilities, and this will need to be considered as part of passage planning.

It would also be sensible to include provisions in the charterparty about who will be responsible for arranging and paying for the discharge of such waste, and providing fresh chemicals.

Non-availability of high sulphur fuel

The installation of scrubbers is a significant investment and the primary incentive of many subscribing shipowners is the projected low cost of high sulphur residual fuels post-2020. The forecasted difference in price between compliant distillates and high sulphur residuals is estimated between US\$200–400 per ton.

However, a risk remains that refineries may cease to produce these cheaper fuels if the market is deemed insufficient and the take up from shore-side power stations is not dynamic. This would result in shipowners having to use the more expensive compliant fuels in any event.

Shipowners opting for scrubbers as the method of compliance should satisfy themselves that the desired fuel is sufficiently available in the vessel's trading area.



Enforcement

Broadly speaking, the signatory countries to MARPOL Annex VI are free to decide how they enforce the regulation and how non-compliance will be penalised.

A Consistent Approach?

It is hoped that at the forthcoming MEPC.74 (May 2019), guidance will be provided to Port States on enforcement. This should allow for a consistent approach on Port State Control Officers to check for compliance.

Vessels fitted with scrubbers will be exempt from the carriage ban that will come into force on 1 March 2020, provided the scrubbers are operating effectively.

It is expected that vessels fitted with scrubbers will have emission records and operational data checked as part of any Port State inspection. Therefore, it will be important to be able to show that scrubbers have worked effectively, which will require fully-functioning sensors at all times.

Penalties

How non-compliance is dealt with will be wholly dependent on the jurisdiction. The usual methods include vessel detention (with the threat of banning orders for repeat offenders) and financial penalties.

The level of financial penalty is likely to vary significantly across the globe and may escalate with repeated violations.

North: Helping Our Members Trade with Confidence

North has published further information and guidance on the 2020 sulphur cap:

- North's dedicated Insights area on 2020: www.nepia.com/insights/2020-vision
- Signals Newsletter Special on 2020: www.nepia.com/media/927346/North-Signals-Issue-112-June-2018-Online.pdf
- North's loss prevention guide 'Marine Fuels: Preventing Claims and Disputes'

Charterparty Protection

Whether it will be shipowners or charterers who are liable for the time, costs, fines and other losses associated with non-compliance will depend on the facts of the case and the terms of the charterparty.

For vessels fitted with scrubbers, there will be additional considerations, including:

- Who is to provide fuel when scrubbers can't be used or breakdown
- Who is responsible for discharge of waste and supply of chemicals (for vessels with closed loop or hybrid scrubbers)
- Specifically what type and quantities of fuel should be supplied to the vessel
- If the scrubber system has any limitations for dealing with fuel above a certain sulphur content e.g. 3.5% S
- The effect of scrubber use on performance warranties, which might need to be amended.

The use of the BIMCO quality and BIMCO 2020 sulphur content clauses are recommended for use in all charterparties, including for vessels fitted with scrubbers.

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