

IMO 2020 Compliance Challenges

An Overview of the Market



With only months to go until the IMO 2020 regulation on sulphur limit kicks in, many vessel owners are opting to install scrubbers. This paper looks at the challenges and risks of managing multiple concurrent scrubber projects. For instance, project delays of vessel installations disrupt the value chain and hit revenues. We conclude by looking at how scrubber manufacturers and installation companies can successfully mitigate the risks.

The International Maritime Organization (IMO) is pursuing cleaner and more environmentally friendly solutions. From 1 January 2020, new regulations from IMO will require international transport vessels globally to reduce their sulphur oxide (SOx) emissions from 3.5% to 0.5%. Vessels built once the new regulations come into effect will also be subject to stricter regulations on nitrogen oxide (NOx) emissions¹.

As reputation matters, especially for public companies, the major oil companies will insist on compliant vessels. It's estimated that 90% of the global fleet will comply by the start of 2020. What does this mean for the oil and gas industry?

How are vessel owners, operators, and the supply chain gearing up for IMO 2020? Are there any project risks and future pitfalls?

How can ship owners comply with IMO 2020?

With only a few months left before the rules IMO 2020 comes into force, ship owners and operators are rushing to comply with the new regulation. The stakes are high for the ship owners who aren't willing to comply (i.e. fines and some jurisdictions such as Singapore are threatening possible jail time).³

The ideal solution would be to switch fuel to liquified natural gas (LNG) which is better for the environment and cheaper than marine gasoil which also complies with the sulphur limits. However, converting a vessel to LNG requires major capital expenditure. It may be cheaper to commission a new vessel than modify existing engines and make space for additional gas tanks. The upfront cost of LNG modification can be offset by significant savings in fuel costs over a unit's lifetime. Currently, though, the biggest deterrent to switching to LNG is its availability⁴. Major ports in the world have yet to develop full-scale LNG bunkering facilities.

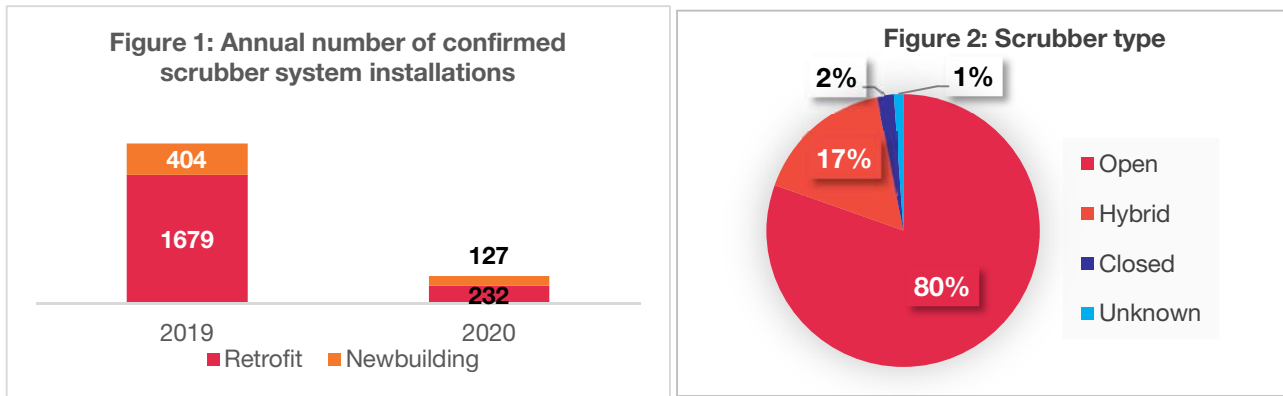
A pragmatic alternative is to install Exhaust Gas Cleaning Systems (EGCS)—commonly referred to as *scrubbers*—which are less costly to retrofit than LNG. Companies that choose scrubbers believe they would gain an advantage over the competition as they will be able to continue using regular heavy fuel oil versus compliant fuels that are projected to be much more expensive. As figure 1 shows, most of the scrubbers that are being installed are retrofitted on existing vessels rather than on new vessels. Most of the scrubbers that are being installed are open-loop because they are the cheapest to install and most straightforward to operate (see figure 2).

¹ Source: IMO (2019). *Sulfur 2020 – cutting sulfur oxide emissions*. Retrieved from International Maritime Organization: <http://www.imo.org/en/MediaCentre/HotTopics/Pages/Sulfur-2020.aspx>

² Source: WorldMaritimeNews. (2018, August 30). *Clarksons: A Quarter of Ships on Order to Be Fitted with Scrubbers*. Retrieved from World Maritime News: <https://worldmaritimeneeds.com/archives/259806/clarksons-a-quarter-of-ships-on-order-to-be-fitted-with-scrubbers/>

³ PacificGreenTechnologiesGroup. (2019, April 29). *How To Choose The Right Scrubber For IMO 2020*. Retrieved from Pacific Green Technologies Group: <https://www.pacificgreentechnologies.com/articles/how-choose-right-scrubber-imo-2020/>

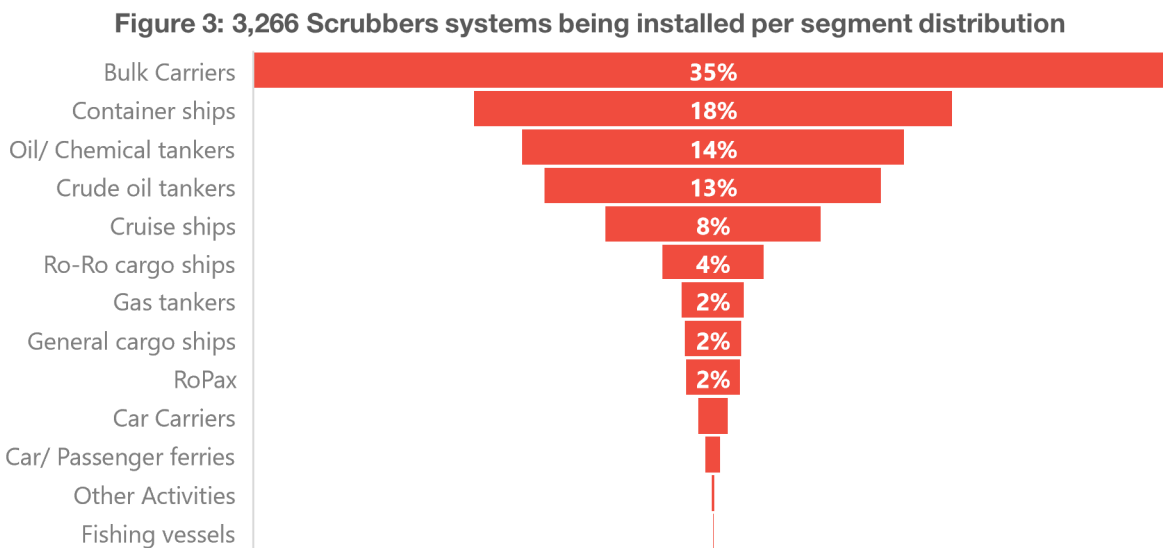
⁴ Source: Billing, E., Fitzgibbon, T., & Shankar, A. (2018, September). *IMO 2020 and the outlook for marine fuels*. Retrieved from McKinsey & Company: <https://www.mckinsey.com/industries/oil-and-gas/our-insights/imo-2020-and-the-outlook-for-marine-fuels>



Source: DNV GL data, Epeus analysis, snapshot of 23 May 2019

Scrubber installation once required months in drydock, but turnaround times have reduced dramatically. For instance, in July 2018, Keppel Shipyard retrofitted a scrubber installation on a Very Large Crude Carrier in under 30 days⁵. However, ahead of 2020, increasing demand for scrubbers is leading to shortages. For instance, Alfa Laval, one of the largest scrubber manufacturers stated in October 2018 it was sold out into 2020⁶.

Bulk carriers, container ships and various tankers lead the demand for scrubbers, with a combined share of about 82% (see figure 3).



Source: DNV GL data, Epeus analysis, snapshot of 23 May 2019

Although shipyards are doing brisk business due to the increased demand for vessel modification, the main challenge for ship owners wishing to install scrubbers isn't the availability of drydock space. The main challenge is having available and competent resources to carry out the work. Multiply this constraint by a whole fleet and the complexity, and risks, start to stack up (see 'challenges of multiple scrubber installations' below).

⁵ Keppel. (2018, December 26). *Keppel secures marine contracts worth around S\$300m*. Retrieved from Keppel Corporation: https://www.keppcorp.com/en/news_item.aspx?sid=8274

⁶ Source: Oil&GasJournal. (2019, January 7). *Ship compliance will determine IMO 2020 market impact*. Retrieved from Oil & Gas Journal: <https://www.ogj.com/general-interest/government/article/17222857/ship-compliance-will-determine-imo-2020-market-impact>

Do the new rules affect drilling rigs and speciality vessels?

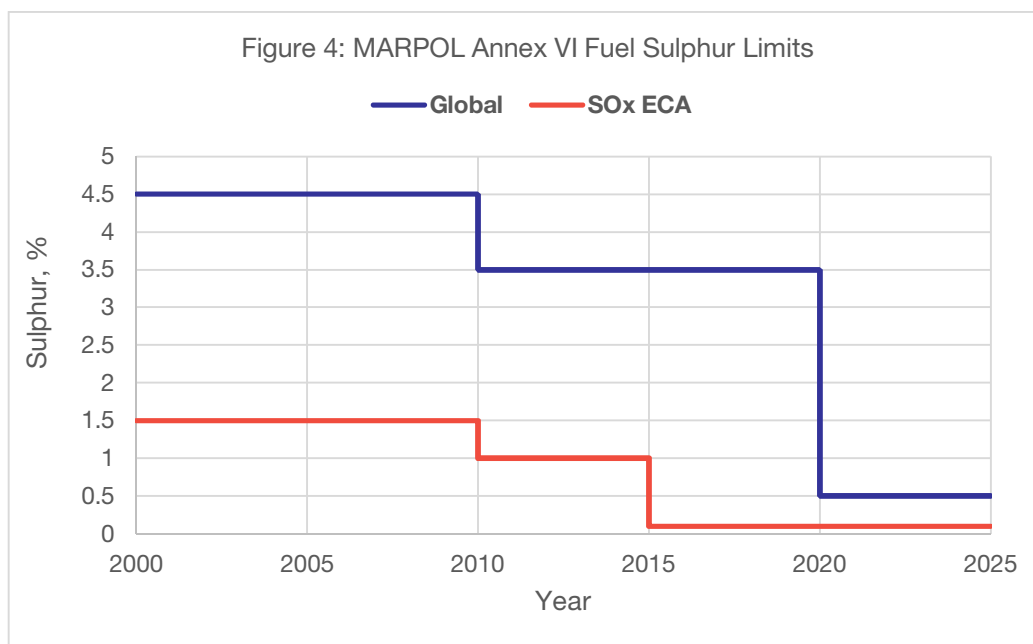
The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships.

Annex VI, “Regulations for the Prevention of Air Pollution from Ships”, sets limits on NOx and SOx emissions from ship exhausts. It was first adopted in 1997 and it came into force on 19 May 2005. The engine manufacturers have been constructing engines compliant with the regulation since 2000.

Since offshore units such as construction vessels, mobile offshore drilling units, speciality vessels (ie, FPSOs and FLNGs), seismic vessels, platform supply vessels/ anchor handling vessels, dive support vessels and pipe/cable laying vessels often operate in emission control area⁷ (ECA), they are required to comply with its regulations⁸.

Compliance of MARPOL Annex VI is determined by special periodic survey (SPS). Upon passing the SPS a vessel is issued an “International Air Pollution Prevention Certificate”, valid for up to five years.⁹

As figure 4 shows, the ECA zones are already complying with the IMO2020 regulations and have more stringent requirements compared to the global requirements. Since 1 January 2015, the sulphur limit has been reduced to 0.1% for all vessels trading in ECA zones.



Source: DieselNet data, Epeus analysis, August 2018

MARPOL Annex VI applies to all marine diesel engines with output power of more than 130 kW installed on vessels constructed on or after the 1st of January 2000, or which have undertaken a

⁷ Are sea areas in which stricter controls were established to minimize airborne emissions from ships. Includes: the Baltic Sea, the North Sea, the North American ECA, including most of US and Canadian coast and the US Caribbean ECA.

⁸Source: Lewis, J. (2017, March 30). LNG fuels up for marine role. Retrieved from Upstream Online: <https://www.upstreamonline.com/hardcopy/1230875/lng-fuels-up-for-marine-role>

⁹DieselNet. (2018, August). IMO Marine Engine Regulations. Retrieved from DieselNet: <https://www.dieselnet.com/standards/jinter/imo.ph>

major conversion after that date. This regulation applies to offshore drilling rigs because they mostly use engines with a capacity of more than 130 kW for their main power source.

Most drilling rigs already run on marine gasoil (MGO) which is a low-emission fuel. Therefore, the IMO 2020 regulations on reducing the sulphur limit will have hardly any impact on drilling rigs because they have been compliant since 2015 due to ECA SOx restrictions. The IMO 2020 is mainly targeting heavy shipping rather than the drilling sector.

Nevertheless, the offshore drilling sector has started taking the initiative to pioneer new technologies that will reduce emissions levels. For instance, in May 2019, Maersk Drilling said they were launching the first low-emission ultra-harsh environment rig. The Maersk Intrepid model reduces NOx and carbon dioxide (CO₂) emissions through installation of batteries, energy emission efficiency software to monitor energy use, and selective catalytic reduction systems to capture NOx exhausts¹⁰. Also, last year Equinor announced they are exploring floating offshore wind to power their North Sea oilfields in order to reduce their greenhouse gas emissions¹¹.

Challenges of multiple scrubber installations

With the IMO 2020 fast approaching, vessels owners who have been on the fence about their options are placing orders to scrubber manufacturers. For instance, in July 2019, Scorpio Group ordered 23 scrubbers for its bulkers and tankers to Pacific Green Technologies¹². In the same month, Valmet received an order from Cosco Shipping Lines to install scrubbers for ten of its fleet¹³. These two examples are a fraction of the sheer volumes of orders the scrubber manufacturers have received this year.

Scrubber technology has been around for a while, so the technical aspects of installation are well known. But with their order books bursting, scrubber companies are having to manage multiple projects. This turns project management into full-blown programme management. Complexity increases with multiple vessels spread across geographies. And ship owners will want to maximize drydock time and coordinate with other maintenance work and surveys. The challenge is to coordinate the projects and mitigate the risks across the whole order book.

Key challenges and risks:

- The difficulty of scaling up resources and processes to meet the demand—on time, on budget, and to the desired quality.
- Complexity of managing simultaneously multiple projects in limited time with increased risk of errors and delays.
- Managing labour costs from overtime to maintain margins.
- Coordinating with other maintenance contractors during the same drydock period.
- Contractual risks: Contractual fines if the installation work is poorly done.
- Logistics risks: Managing installation teams. How to get crews on and off? Will they remain on board for sea trials until the vessel reaches its next destination?
- Reputational risks: Reputation might be damaged if there are delays or corners were cut during the commissioning and installation phases. After 2020, the media will be sniffing for another #dieselgate

¹⁰ Ali, U. (2019, May 8). *Maersk Drilling to launch first low-emission rig*. Retrieved from Offshore Technology: <https://www.offshore-technology.com/news/maersk-drilling-low-emission-rig/>

¹¹ Adomaitis, N. (2018, August 28). *Equinor Explores Floating Wind Turbines to Power N. Sea Oilfields*. Retrieved from Offshore Engineer: <https://www.oedigital.com/technology/item/17001-equinor-explores-floating-wind-turbines-to-power-nsea-oilfields>

¹² World Maritime News. (2019, July 12). *Scorpio Unveils Scrubber Order for 23 More Vessels*. Retrieved from World Maritime News: <https://worldmaritimeneeds.com/archives/279996/scorpio-unveils-scrubber-order-for-23-more-vessels/>

¹³ Valmet. (2019, July 1). *Valmet to supply exhaust gas cleaning systems to COSCO SHIPPING Lines in China*. Retrieved from Valmet: <https://www.valmet.com/media/news/press-releases/2019/valmet-to-supply-exhaust-gas-cleaning-systems-to-cosco-shipping-lines-in-china/>

How to mitigate risks across your installation programme

According to experts from the Exhaust Gas Cleaning System Association (EGCSA), the key to successfully installing scrubbers is to have extremely professional project management and high-quality installation teams¹⁴. If a group of related projects aren't coordinated or managed effectively, then they are likely to run off course and fail to achieve the desired outcome.

The Project Management Institute (PMI)¹⁵ highlights six constraint factors for every project: time, cost, scope, quality, benefits, and risk. Change in one parameter impacts at least one of the other areas and might also impact stakeholder satisfaction. For multiple projects, complexity increases with higher probability of negative impact for each factor. For example, as shipyards compete for business with ever faster turnaround promises, pressure to deliver projects might lead to increased cost or decreased quality. To avoid this pitfall, vessel owners should include an installation oversight to avoid headaches during installation and prevent disputes between shipyards and vessel owners in the future.

“The key to successfully installing scrubbers is to have extremely professional project management and high-quality installation teams”

The EGCSA believes that, although there has been a surge in demand, yard capacity is not an issue going forward. However, other constraints such as the availability of laser-scanning specialists and experienced installation teams mean that it may not be possible to pick and choose an installation slot nor coincide a scrubber installation with an already scheduled drydock in the near future. These constraints increase the risk of late project delivery.

Uncertain future brings other project risks

The future of scrubbers is uncertain, especially for open-loop systems which release seawater back into the sea. Some port authorities and coastal states have imposed restrictions on wash water discharge or are planning to do so (i.e. China, Singapore, Belgium, Germany, Sweden and Norway).¹⁶

Closed-loop and hybrid systems are available for enclosed bodies of water with little water exchange or where discharges are restricted by local regulation. The ECGSA suggests that vessels equipped with open-loop scrubbers switch to low-sulphur fuel when staying in jurisdictions that outlaw the technology when in port. The cost impact of switching to low-sulphur fuel for the port stay is likely to be limited or minimal, as over 90% of fuel consumption occurs at sea.

Finally, there is the spectre of further changes to regulations. Global NO_x regulations could become more stringent¹⁷, and some vessels don't have enough space to install both NO_x and SO_x scrubbers. They might end up having to pay more or to uninstall their scrubber. This creates one more project risk that needs to be considered before opting for scrubbers.

¹⁴ Source: Forster, A. (2018, July 16). *EGCS: Do They Scrub Up Well?* Retrieved from NORTH: <http://www.nepia.com/insights/signals-online/ships/egcs-do-they-scrub-up-well/egcs-do-they-scrub-up-well/#.W1NIZW7nETo>.linkedin

¹⁵ Siegelau, J. M. (2007). Six (yes six!) constraints: an enhanced model for project control. Paper presented at PMI® Global Congress 2007—North America, Atlanta, GA. Newtown Square, PA: Project Management Institute.

¹⁶ Source: WorldMaritimeNews. (2018, October 15). *Over 1,000 Scrubber Installations Booked in the Past Six Months*. Retrieved from World Maritime News : <https://worldmaritimeweb.com/archives/262585/over-1000-scrubber-installations-booked-in-the-past-six-months/>

¹⁷ Source: Oil&GasJournal. (2019, January 7). *Ship compliance will determine IMO 2020 market impact*. Retrieved from Oil & Gas Journal: <https://www.oilandgasjournal.com/general-interest/government/article/17222857/ship-compliance-will-determine-imo-2020-market-impact>

Our findings and key takeaways

Having worked on more than 200 projects, from project review, assurance to rescue, we know how critical it is to have an embedded process that transfers knowledge from one project to benefit the next project. To reap the benefits of knowledge, and manage projects consistently across the organization, companies must implement a systematic approach and method.

For projects, the benefits are realised after project close through lessons learned. Whereas for programmes, benefits are realised during and after the programme, with a high emphasis on change management until benefits are fully realised. The main differences between projects and programmes—apart from the complexity and changing interrelationships in a dynamic environment of running programmes—is the benefit realisation.

Creating a Project Execution and Controls Plan (PECP) in readiness for project commencement, and adherence to it during execution, will reduce or eliminate risk factors that give rise to project failure. It will help projects succeed on cost, scheduling, and quality parameters. As a result, companies can standardise the way their projects are planned and executed and ensure that the approaches to key elements such as risk and issue management, planning and scheduling and cost control are consistently applied.

Summarized below are some critical success factors we gained from working on various vessel projects (modifications, upgrades, new builds, special periodic surveys). These apply equally to installing multiple concurrent scrubber projects:

- ✓ Having clarity and consistency of vision
- ✓ Having strong leadership in the management of transition
- ✓ Keeping the project as simple as possible
- ✓ Increasing the accountability of project delivery
- ✓ Defining the company's role and involvement in the project phase that includes integration, commissioning, start up, handover and operations
- ✓ Defining the overall interface management model for all project phases
- ✓ Designing team communication and engagement deliverables and events, which are focused on project goals and strategy
- ✓ Improving the cooperation between companies/stakeholders.

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For more details visit our website at www.epeusconsulting.com

Contacts



Mark Thompson
+44 7734 874749
mthompson@epeusconsulting.com



Claudette Gaius
+44 7519 116339
cgaius@epeusconsulting.com



Andrea Petrone
+44 7702 518339
apetrone@epeusconsulting.com



Samuel Smith
+44 7394 564231
ssmith@epeusconsulting.com

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