

MPS Submission – Marine Spatial Planning Section, Dept. of H,P & LA.

13 Dec 2018

National air quality standards must be augmented in the realisation that air pollution from commercial shipping is a major cause of death and disease throughout coastal, navigable estuaries and port communities of the world. This augmentation may be realised by:

Dept. of Environment, Community
& Local Government

14 DEC 2018

Wexford

- (a) Government of Ireland declaring a Total Emissions Control Area around the Territorial Waters of Ireland.
- (b) All commercial shipping must change over from Heavy Fuel Oil [HFO] to Low Sulphur Distillate fuel [MDO] or Liquid Natural Gas [LNG] or electric propulsion prior to entry into Irish Territorial Waters.
- (c) All commercial shipping, whilst in port, must plug in to shore supplied electrical energy and maintain a zero emission state whilst berthed – a marine “Cold Iron” state.
- (d) Major commercial Irish ports must make provision for the bunkering of LNG for commercial shipping, in line with conventional maritime bunkering developments in EU ports and world wide.

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Reasoning:

According to a report¹ published by Lancet Public Health, 2016, air pollution is one of the great killers of our age. Polluted air was responsible in 2015 or 4.2 million deaths from ambient air pollution. In the absence of aggressive controls, ambient air pollution is projected by 2060 to cause between 6 million and 9 million deaths per year. Air pollution was responsible in 2015 for 21% of all cardiovascular deaths worldwide, 25% of ischaemic heart disease deaths, 24% of stroke deaths and 27% of lung cancer deaths. Additionally, ambient air pollution appears to be an important although not yet quantified risk for neurodevelopmental disorders in children and neurodegenerative disease in adults. With specific reference to shipping, the Telegraph² [Marine Industry monthly magazine] reported in 2016 that research carried out by Dr. Sara De Matteis, of Imperial College London, suggests that exposure to particulate matter [PM] in ships exhaust emissions and fuels on board ships may account for Chronic Obstructive Pulmonary Disease [COPD] rates being 2.64 times the industrial average for seafarers, the highest recorded amongst 350 occupations analysed. Further research carried out by Lund University in Sweden estimated that nanoparticles, including soot particles from ship emissions in the North Sea and the Baltic contribute to some 10,000 premature death a year.³ Commenting on these findings, the Nautilus senior national secretary, Alan Graveson, [The seafarers officer's union] commented *“This Union has consistently, over recent years, drawn attention to the dangers of SO_x, NO_x and Particulate Matter in heavy fuel oil [HFO]. These findings should be considered alongside the high incidents of cancer in port areas associated with the burning of diesel oil. It is disappointing that ship owners have consistently argued against a change to cleaner fuels on cost grounds, despite the evidence that burning such fuels is injurious to health and cost countries billions”*.

¹ Lancet Public Health 2016. Published online Nov. 25, 2016. [http://dx.doi.org/10.1016/s2468-2667\(16\)30023-8](http://dx.doi.org/10.1016/s2468-2667(16)30023-8)

² Telegraph, Jan 2016, “Industry must act on emission risks” Front page. “UN climate change talks focus on ship emissions”, page 11.

³ Ibid.

In the same edition reporting on ongoing UN Climate change talks focusing on ship's emissions⁴ it was stated that *"most importantly for seafarers and the general public are the issues of damage to health caused by the SO_x, NO_x and Particulate Matter in heavy fuel oil [HFO]....with the largest 15 ships emitting the same as every car on the planet."*

It was reported in the Nov. 2015 edition of the Telegraph⁵ that Mr. Michael Cramer, chair of the European Parliament's Transport Committee, stated *".....The (shipping) industry has to do better. Most vessels are like hazardous waste incinerators because they burn heavy fuel oil [HFO] which should be processed as toxic waste but is usually exhaled without sufficient filtering. Some 70% of global maritime emissions come within 400km of coastlines and vessels operating in the EU account for up to 30% of worldwide shipping emissions. Recent studies suggest that this is causing around 50,000 premature deaths per year within the EU, with an annual cost to society of €58bn."*

Fuel supplied worldwide is standardised by the International Standards Organisation [ISO]. The standards attributable to petrol and diesel have enjoyed international compliance for many decades. However, ISO certification for HFO has been in vogue since the 1980s and today, ISO 8217 (Jan 2012) is the standard de jour. Unlike, the standards for petrol, which mandates an octane number for ignition quality, and similarly, diesel oil has a cetane number, HFO has no set standard for the ignition quality of the fuel. The main criteria for compliance with ISO 8217 is the liquid viscosity at 50°C and the minimum flash point of 60°C for safe storage on board ships. The standard also limits for the first time the quantity of used lubricating oil that may be present in the mixture. Typically, HFO is a mixture of any liquid waste with a calorific value blended in refineries to ensure the liquid can be pumped at elevated temperatures (50°C), atomised and combusted at the extreme temperature of 130°C. The streams of liquids are typically the wastes from the pharmaceutical, chemical, refining, and manufacturing industries blended with the waste oils from hydraulic and internal combustion engines. These wastes in many cases are toxic. The Telegraph reported in May 2012⁶ *"Bunker fuel sold in the Port of Rotterdam is being used to hide illegally disposed chemical waste, an investigation by the Dutch police has established. Tests conducted on bunker barges travelling from Rotterdam to Antwerp have shown the widespread presence of products not naturally present in fuel oils, such as chlorine and zinc."* It is irrefutable science that when chlorine is combusted dioxins (agent orange) are produced and their close relatives, PCBs and Furons. Metals chemically altered in the combustion process produce nanoparticles of heavy metals. Dioxins and heavy metals are the most toxic nanoparticles known to man, nanoparticles that infiltrate vital organs and the human DNA. The full extent of the nano damage to human health is not yet fully quantified. We do know however, that conventional research concludes that cancers, neurodevelopmental disorders in children and neurodegenerative disease in adults are the result. The dangers associated with the maritime use of HFO is manifest in the necessity for every bunkering operation of HFO in the maritime world to have a representative samples of the liquid to be taken and analysed to protect the ship owner from potentially very expensive damage to the main propulsion engines because of the HFO's toxic constituents. There is no such protection afforded to human health.

Evidence of HFO combustion and the resultant contamination in Ireland may be found in vicinity the now decommissioned ESB power stations of Poolbeg, Tarbart, Aghada and Great Island, Co. Wexford. HFO was used exclusively to power these generating station from the 1960s to 2000s. PhD research in the 1980s proved Gt. Island, Campile, Co. Wexford to have the highest contamination of Dioxins in the country. Subsequently, at the oral hearing on the establishment of a new CHP on the old Gt. Island

⁴ Ibid.

⁵ Telegraph, page 11. Nov. 2015 *"Shipping faces calls to cut its emissions"*.

⁶ Telegraph, page 12, May 2012 *"Probe finds chemicals in Rotterdam bunkers"*

power station site by Endessa, the HSE Environmental unit reported that measurements in the mud banks of the Waterford estuary, in proximity to the site, were contaminated with heavy metals such as cadmium, lead, mercury, etc. Modern electrical generation in Ireland has evolved from HFO to LNG and renewables for the country's power requirements eliminating all but the damaging CO₂ component of the emissions.

Recognising the harmful effects of sulphur component of HFO the EU created an SO_x Emissions Control Area [SECA], the extent of which is depicted in the figure 1 below.

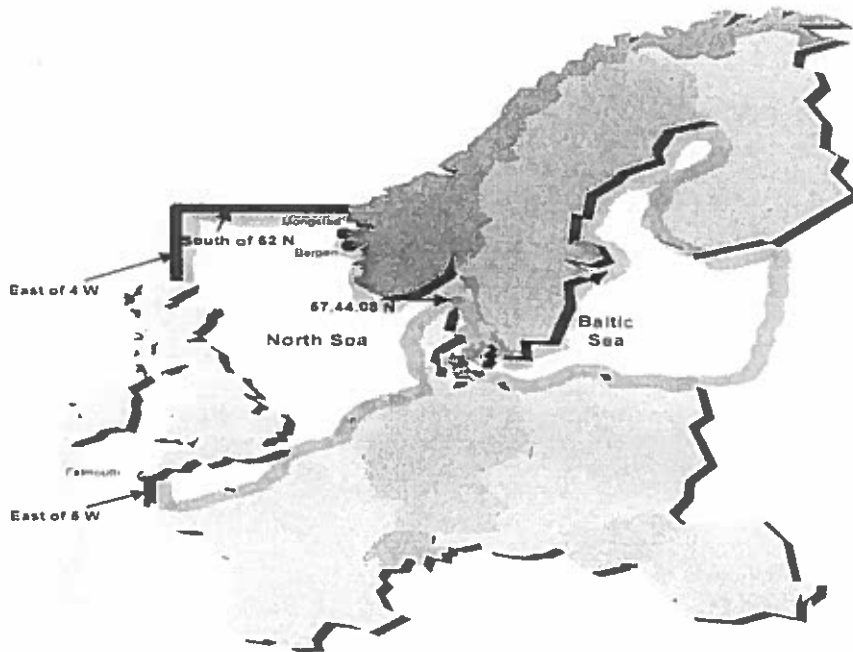


Figure 1. Marpol Annex VI SO_x Emission Control Areas (SECA).

It is noteworthy to realise that Ireland, with all its marketing of a pure and pristine environment, has excluded herself from this protection.

Legislation governing pollution from ships is determined by the UN's Convention on Law of the Sea, 1982, and given effect by the UN's International Maritime Organisation [IMO] in its Marpol 73/78 Convention, with amendments. This convention was ratified into Irish law by the 1991 Sea Pollution Act. The regulation governing air pollution from ships is determined by Article VI of the Marpol legislation, given effect in Irish Law by Regulation SI No. 313 of 2010, amended by SI No.383/2011 and SI No. 596/2011. The European Union also legislates the sulphur content of Marine Fuels and these regs are given effect in Irish Law by SI No. 361 of 2015 which states, inter alia, that ships at berth in EU ports are restricted to consume fuel with a 0.1% max sulphur component, as of the 1st Jan. 2015. However, navigating littoral seas, estuaries and waterways or at anchor within ports, commercial shipping is exempt from this obligation in Ireland. This regulation permits the burning of toxic HFO within our coastal and portal areas until berthing is completed.

The State of California, USA has legislated through its California Air Resources Board [CARB]⁷ that all commercial shipping must change over to 0.1% DMA distillate Marine Gas Oil before entering Regulated Californian waters, i.e. 24 nautical miles from the Californian baseline, after 1st Jan 2010.

⁷ Title 13, California Code of Regulations (CCR) §2299.2 and Title 17, CCR §93118.2

This eliminates the combustion of HFO anywhere near its populated coastal and port areas. Moreover, California mandates all shipping whilst in port to "Cold Iron" – i.e. all shipping must plug in to shore electrical supply and shut down all internal combustion engines whilst in port, a zero emissions tolerance.

Why should Ireland hesitate to provide the same protection to her citizens? The revised Annex VI of Oct. 2008 Marpol amendments allows for an Emission Control Area to be designated for SO_x, NO_x or Particulate Matter or all three emissions from ships, subject to a proposal from a Party or Parties to the Annex, which would be considered for adoption by the Organization, if supported by a demonstrated need to prevent, reduce and control one or all three of those emissions from ships. What are we waiting for?? Irish governmental policy is to comply with accepted EU and UN international standards while addressing specific Irish concerns. The serious and insidious nature of the concern addressed herewith must involve consultation within the Dept. of Transport, notably the Marine Survey Office, the Coast Guard, the Dept. of Environment, Heritage and Local Government, the Attorney General and the Marine Institute. Let's hope our politicians can start the ball rolling.

Proposal (c) above promotes the provision of LNG bunkering facilities at major Irish ports. This is justified in the knowledge that most new marine propulsion engines delivered today are of dual fuel design (Liquid fuel and LNG). Ship owners realise that the writing is on the wall concerning air pollution and ships emissions with the expectation that regulations in this regard can only become more stringent, restrictive, but sustainable. Large LNG marine carriers are currently the fastest growing market in ship design and ship building. LNG ship bunkering barges are now accepted as a new maritime paradigm in many EU ports. It is incredulous that proposed major port developments in Dublin and Cork have no provision for the bunkering of ships in pollution reducing and more sustainable LNG fuels.

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29 Jan 14

Shipping: The final EU climate frontier

During the annual United Nations Framework Convention on Climate Change summit, it is worth remembering that there is one huge industry that has so far managed to evade any formalised efforts at emissions reductions. Every industry and transport sector in the European Union has greenhouse-gas emissions reduction measures in place, **except for the shipping sector**. The EU has established goals on the emissions reductions it wants to achieve from the sector, but seems to have no intention of enacting anything that will bring it anywhere near those goals, anytime soon.

Taking just those shipping emissions of carbon dioxide that are currently regarded as 'European' - the voyages from and to EU ports - the sector would be placed eighth in a list of European countries ranked by emissions. Worldwide, shipping emissions have been growing at an astonishing rate as well, up 90% since 1990.

The EU has long been aware of this, and had promised for years to include ship emissions in EU law. It seems as though what has happened in the skies has affected what will happen in the waters, however. The EU introduced a regulation to reduce emissions from aviation, the other international transport sector. But on aviation, the EU was badly burnt by the ferocious international opposition to its proposals for cutting emissions. That has led the EU to weaken its aviation policy by two-thirds, and to a loss of all ambition relating to shipping.

So, even though the European Commission was, for many years, under an obligation to propose a shipping emissions-reduction measure, it announced in October 2012 that it would limit itself to merely monitoring shipping emissions.

The monitoring proposal that was finally released in July 2013 requires nothing more than business as usual from the sector. Essentially, shipping companies will be required to hand over their fuel receipts to work out the amount of fuel used. This makes us wonder whether this was simply a box-ticking exercise. Why propose new laws at all if they do not improve the situation?

The main missed benefit from the proposal is that it could have been used to streamline monitoring of emissions and air pollution in the shipping sector. **From 2015** the shipping sector will gradually have to abandon the dirty residual fuels that it uses - in practice, the waste product of oil refineries. They will have to switch to fuels with much lower sulphur content in some coastal European waters, as the cost to human health from pollutant sulphur emissions is huge. However, the legislation is missing effective enforcement and it is clear that there will be massive non-compliance in 2015, unless something is done urgently.

This recent monitoring proposal could be the solution: monitor all ship emissions, such as sulphur oxides (SOx) and nitrogen oxides (NOx) - not just carbon dioxide.

The shipping industry complains constantly that it is 'foundering' in regulations. Here is the perfect opportunity to ensure that there is one simple law as a basis for cutting air pollution from shipping. But will the European Parliament and EU member states seize this opportunity? Or will they cave in to lobbying from industry to kill yet another law that would protect human health, because it might have a tiny cost for the industry?

With the science clear that man-made emissions need to be cut to avert sea-level rises and temperature increases, decision-makers must ensure **that shipping does not remain the last EU climate frontier**.

Aoife O'Leary

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Is this site useful? Please let us know

In brief

Philippines acts: the Philippines maritime authority says it has taken action to ensure its seafarer certificates continue to be recognised by the European Union. Officials said changes have been made to address almost 60 issues raised during a European Maritime Safety Agency audit.

Machinery decline: there has been a 'dangerous' decline in the standard of equipment being fitted to new ships, the International Technical Tanker Forum has warned. It says seafarers' lives are being put at risk because of quality problems with vital items of machinery such as windlasses.

Stress worry: stress is the biggest concern in UK workplaces, according to the TUC's 12th biennial survey of trade union health and safety reps. Bullying and harassment came second, followed by overwork, slips, trips and falls, and violence and intimidation.

Scrubber surge: scrubbers have now been fitted to or ordered for more than 1,850 ships in the world fleet, classification society DNV-GL has revealed. It warned owners still to commit to scrubbers that 'the decision to invest should be made yesterday'.

Collision probe: the UK Marine Accident Investigation Branch has launched a probe into a collision between the Red Funnel ferry Red Falcon and the motor cruiser Phoenix off Calshot, Hampshire, on 29 September.

Canal record: the Panama Canal has announced a record year, with traffic through the waterway rising 9.5% over the past 12 months to 442m tonnes.



Matt carries the standard at St Paul's

Recently-qualified navigating officer Matt Banks was chosen to carry the Merchant Navy standard at this year's UK Annual National Service for Seafarers. He is pictured with Nautilus general secretary Mark Dickinson, professional and technical officer David Appleton and Council member Thomas Cardy at the event, held at St Paul's Cathedral in London.

Matt was the first Trinity House/Jubilee Sailing Trust cadet. He trained at Warsash, qualifying in August this year, and is now keen to work in oceanographic research.

'It was a real privilege to carry the Merchant Navy standard,' he said. 'Seafaring runs through our family, and to represent them here is quite an honour.' **i**

Union sounds alarm over emissions case

Nautilus International has raised concerns over the prosecution of a cruiseship master by the French authorities on charges of breaching European air pollution legislation

In the first case of its kind, prosecutors have called for a €100,000 fine to be imposed on the Captain Evans Hoyt, master of the P&O Cruises vessel Azura, and the vessel's owners – with the company to pay €80,000 of the penalty. Judgment is expected on 26 November.

The case comes as Nautilus revealed the results of a new survey showing that criminalisation remains a major worry for maritime professionals, with nearly 90% worried about the risk of prosecution.

The Marseilles court heard that a spot check on the ship during a port call in March found that it was burning bunker fuel with a 1.68% sulphur content – and that this exceeded the 1.5% European limit. Prosecutor Franck Lagier told the court that the company had 'wanted to save money at the expense of everyone's lungs' and the master 'knew for a fact' that the fuel taken on in Barcelona was illegal.

But defence lawyer Bertrand Coste argued that the European environment rules unfairly distinguish between cruiseships and cargoships, which have higher sulphur limits. He sought to have the trial annulled on the basis of alleged procedural errors, with the company contending that the 15% limit applies only to passenger ferries providing regular services to European destinations.

Nautilus general secretary Mark Dickinson said he was concerned by the prosecution. 'As our new survey shows, criminalisation continues to be a significant concern within the industry and it would set a worrying precedent to hold a master responsible for fuel quality,' he pointed out.

'Whilst we support the drive to improve shipping's environmental performance, we do question the decision by the French authorities to target a cruiseship and its master in this way,' he added, 'and we will raise our concerns with the International Maritime Organisation, through the International Federation of Ship Masters' Associations.' **i**

The shipping industry

Feeling green

A wave of new environmental laws is worrying shipowners

THE shipping industry has encountered rough seas over the past decade. Between 1985 and 2007 trade volumes shot up at around twice the rate of global GDP but since 2012 their rate of growth has barely kept pace, leaving the industry with overcapacity. Freight rates for containers have plunged by a third since 2008. Worse may be to come. The industry does not regard as good news President Donald Trump's announcement on June 15th of tariffs of 25% on up to \$50bn of Chinese goods, which will slow trade growth further. Now a veritable hurricane of new environmental laws is about to hit.

Shipping accounts for only around 2% of global carbon emissions, but is quite dirty. Burning heavy fuel oil, the industry produces 13% of the world's sulphur emissions and 15% of its nitrogen oxides. And by 2050 ships will be producing 17% of all carbon emissions if left unregulated, according to research by the European Union.

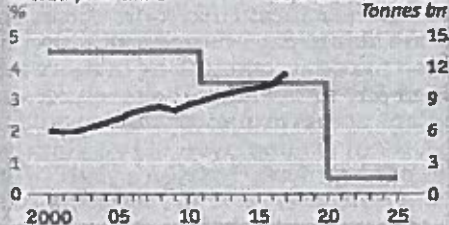
The International Maritime Organisation (IMO), the United Nations agency for shipping, last September brought in rules forcing owners to install equipment by 2024 to clean the dirty ballast water their ships suck in and discharge. That may cost the industry as much as \$50bn. In April the IMO agreed to halve the industry's carbon emissions from 2008 levels by 2050. The biggest worries are new rules that cut the global limit on sulphur content of marine fuel from 3.5% to 0.5% from January 1st ▶▶

Life on the ocean haze

Global shipping

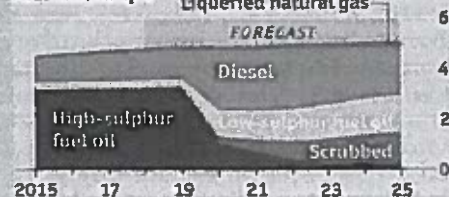
Fuel sulphur limit

Total seaborne trade



Fuel mix, m b/d

Liquefied natural gas



Sources: UNCTAD; Goldman Sachs

▶ 2020 to slash emissions from sulphur, which cause air pollution and acid rain. If everyone complies by buying dearer low-sulphur fuels, the bill could hit \$60bn, says Suresh Sivanandam of Wood Mackenzie, a research firm—roughly equivalent to the entire industry's fuel bill in 2016.

Given that either 2020 or 2025 had been agreed as possible dates for bringing in the sulphur cap, firms have had time to prepare, but have gone into panic mode in recent months. In part this is because 2020 was only recently chosen after a study by Finland found that without it there could be 570,000 more deaths from air pollution worldwide in the five years after 2020. Many firms have belatedly realised the huge sums involved. If they cannot pass them on in higher freight rates, "we're all going to go bust," Junichiro Ikeda, boss of Mitsui Osk Lines of Japan, has warned.

Neither are the technological choices in adjusting to the new rules easy, says Stephen Gordon of Clarksons, a shipbroker. Shipowners will have to switch to pricier low-sulphur fuels, invest in "scrubbers" which remove it from the smoke of dirtier fuels, or use greener alternatives such as liquefied natural gas (LNG). Although there are suggestions for how the 50% cut in carbon emissions can be achieved by 2050, such as batteries and hydrogen fuel cells, none has been tried on big ships yet.

For neither goal is it clear which option makes most sense financially. On meeting the sulphur cap, there is no consensus. Maersk, the largest container line, thinks low-sulphur fuel is the best choice, but France's CMA-CGM has opted for LNG and Mediterranean Shipping Company (MSC) for scrubbers. Shipowners worry that the rules will not be uniformly enforced, says David Vernon of Bernstein, a research firm. They fear being the only buyers of scrubbers and the like in an industry with tight margins, or losing money by picking a bad solution. So the industry is holding fire. Demand for low-sulphur fuel oil and marine diesel is expected to double overnight in 2020, sending prices soaring (see chart on previous page).

Eventually more shipowners will invest in scrubbers and LNG. Bigger lines such as Maersk and CMA-CGM, will not find this a problem. But smaller, more indebted shipowners will not be able to raise finance to pay for the conversions, says Basil Karatzas, a shipping consultant in New York. They may have to scrap their ships, which could help address the overcapacity that has crippled industry profits since the financial crisis. "Even this dark cloud has a silver lining," he says—if only for some. ■

Correction: In our briefing on American business, "A boom like no other", published in the edition of May 26th, chart 3 contained the wrong figures for investment by the top five firms in the S&P 500 for the first quarter of 2018. The figures shown were in fact for a year earlier. This has been corrected online. Sorry.