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Questioning the effectiveness of the Maritime Industry's sustainability initiatives in the age of Black Friday

Executive Summary:

This piece aims at highlighting the intensified trade flows between China and the US during the Black Friday period, and the environmental consequences it has. Specifically, it looks at the Yantian-Los Angeles trade route and the environmental profile of a typical containership on that journey.

Key findings:

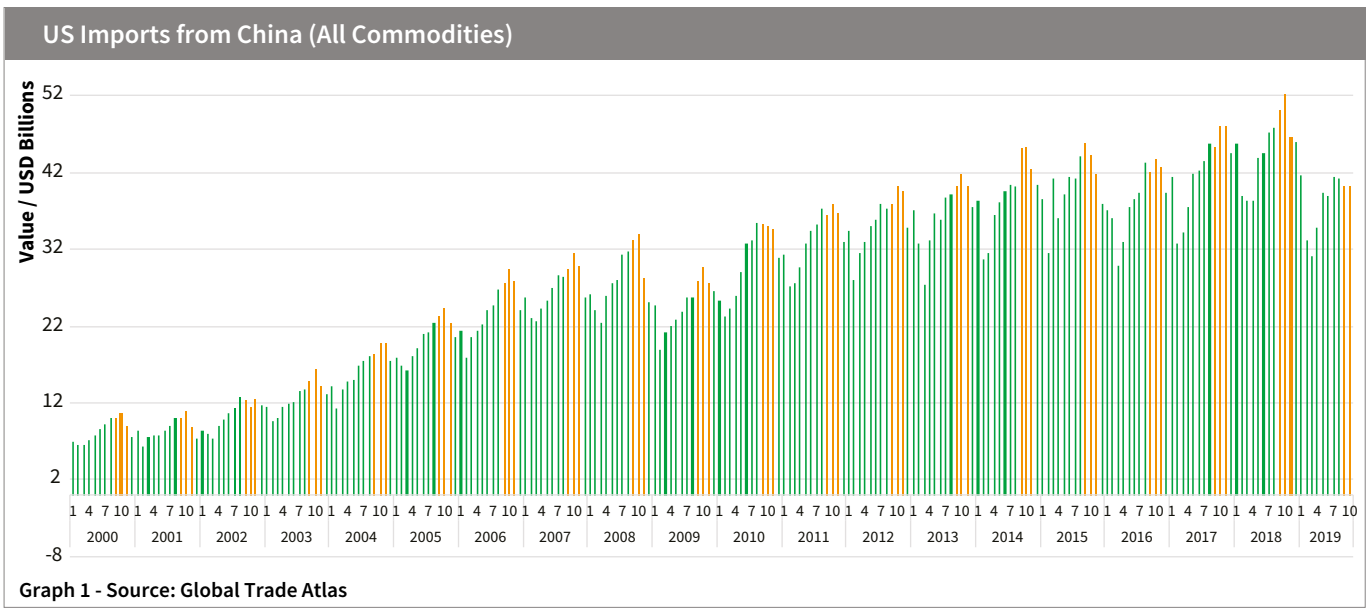
- Examining the characteristics of a typical containership used during a Black Friday trade between China and the US proves to be at odds with sustainability initiatives
- Only 2% of the distance covered by ships in the Yantian – LA trade route is under Emission Control Areas (ECA) status, which means that for most of the journey ships are not required to minimize airborne sulphur emissions
- Such journey ran on residual fuel releases 5,374 tonnes of CO_2, or the equivalent of running 1,141 cars or 620 houses for a year

Sustainability has increasingly been on retailers' agenda in the last decade, but their rising initiatives may be counterproductive as they're missing a key consideration: transportation. Consumers have also been increasingly conscious of the environmental impact of shopping, with 'shopping with a purpose' becoming the norm rather than the exception. Indeed, a 2019 KPMG survey[1] found that nearly two-thirds (61%) of consumers are thinking more carefully about

[1] https://home.kpmg/uk/en/home/media/press-releases/2019/11/black-friday-and-cyber-monday.html

the environmental impact of their Black Friday and Cyber Monday[2] purchases. However, ethical consumers have failed to question the means by which their purchases are being transported. Analysing trade data between the US and China during the Black Friday period shows that the era of sustainability and environmental consciousness is at crossroad with the era of fast shopping. **When considering the environmental impact of intensified trade flows due to Black Friday, one can't help but question the value of retailers' green initiatives and consumers' growing environmental consciousness…** Sustainability efforts may reveal counter-productive if they are offset by intensified seaborne trade and increased air pollution at sea and in shores.

Although considered the most sustainable mean of transport, almost 90% of world trade is transported by sea, which comes at a serious environmental cost. The International Maritime Organisation[3] estimated that international shipping emitted 796 million tonnes of CO_2 in 2012, accounting for about 2.2% of the total global anthropogenic CO_2 emissions for that year, and that emissions from international shipping could grow between 50% and 250% by 2050 mainly due to the growth of the world maritime trade. Leveraging IHS Markit Maritime & Trade data has allowed to specifically assess the environmental impact of intensified shipping flows during the September – November period between China and the US due to Black Friday and Christmas peak in retail demand.



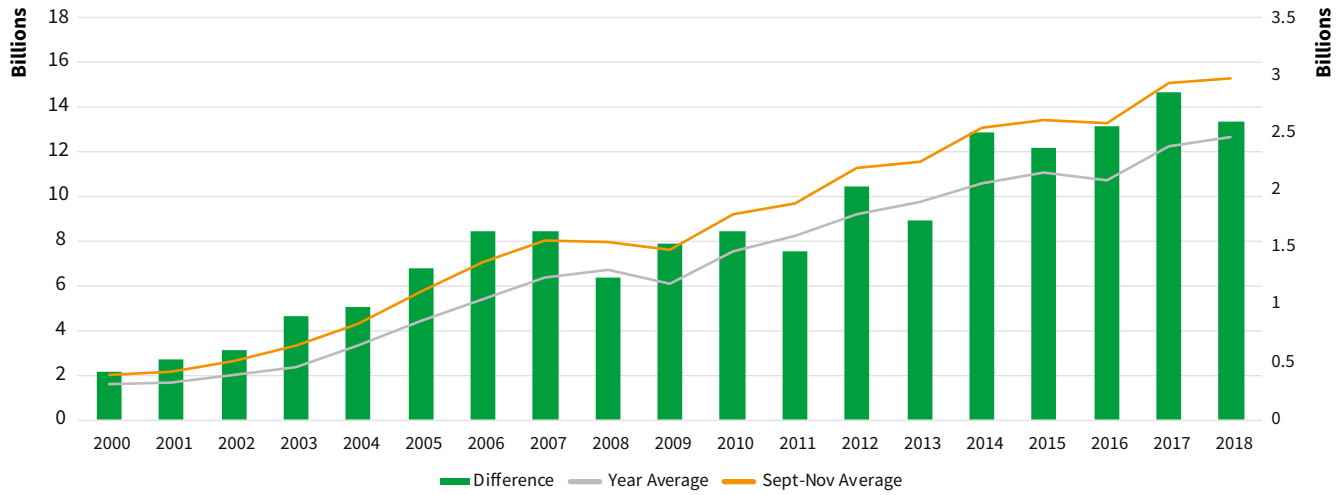
Graph 1 - Source: Global Trade Atlas

Data sourced from IHS Markit's Global Trade Atlas demonstrates the clear peak in US imports from China between September and December (graph 1), with a significant uptake in the last five years with the growing popularity of Black Friday and Cyber Monday.

[2] Traditionally, Black Friday is the Friday following Thanksgiving, when retailers begin the holiday shopping season. Retailers make impressive discounts, getting customers to go on a buying frenzy. Although originally an American practice, retail giants have spread the tradition across the globe, with international crowds and smaller retailers participating as well. In recent years, Black Friday morphed into an online shopping phenomenon coined 'Cyber Monday', or the Monday following the Black Friday weekend.

[3] Third IMO GHG Study 2014

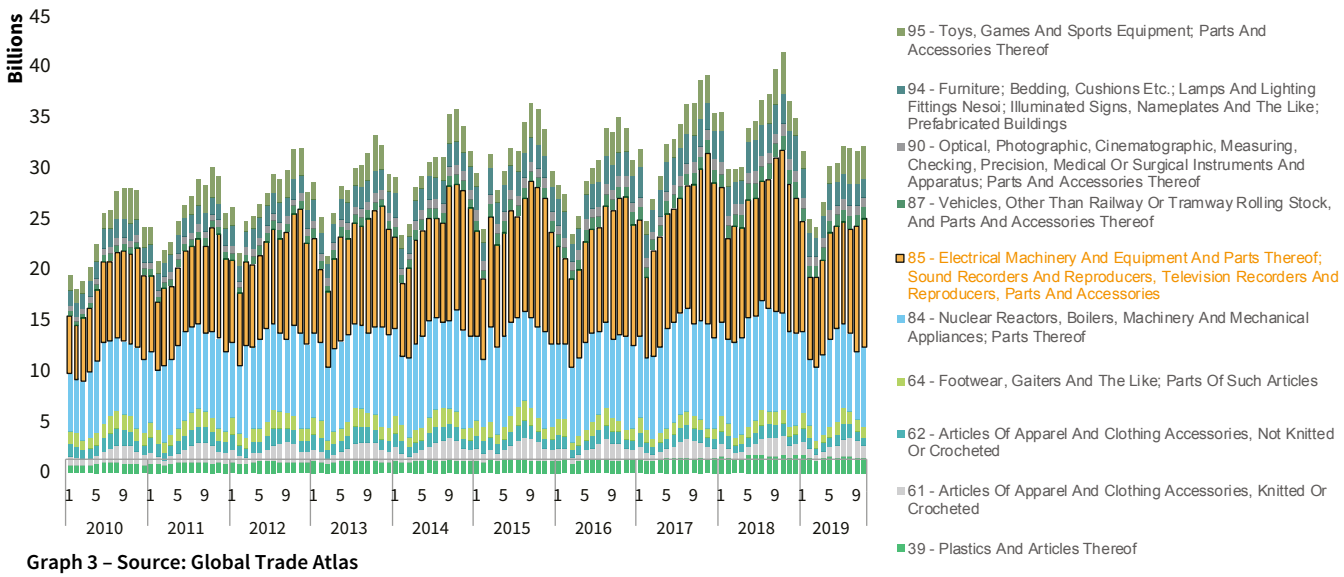
Comparison of the Monthly Average Imports over a year to the Sept-Nov Average Imports



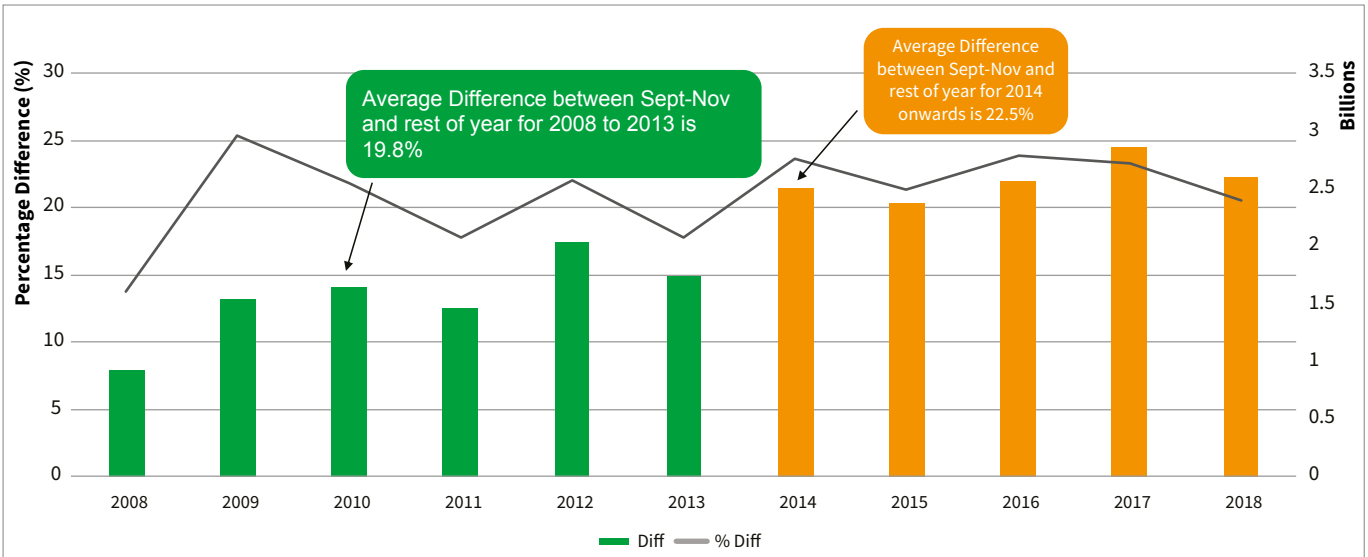
Graph 2 – Source: Global Trade Atlas

The average imports in September to November are 25% higher than the average monthly import value for the whole year (graph 2). Looking at the main commodities imported into the US from China, Electrical Machinery and Equipment is the dominant commodity (graph 3) and normalizing the Christmas effect reveals a 3.7% uplift in US imports of electrical goods due to Black Friday compared to the rest of the year (graph 4).

US Imports from China by Commodity Type



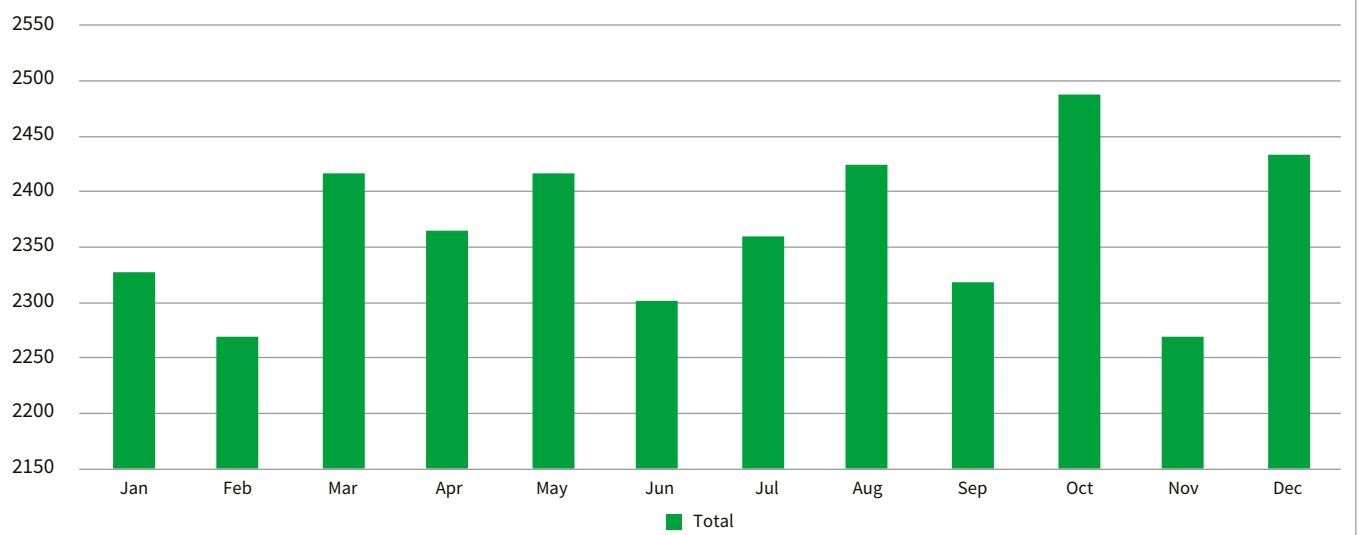
Graph 3 – Source: Global Trade Atlas



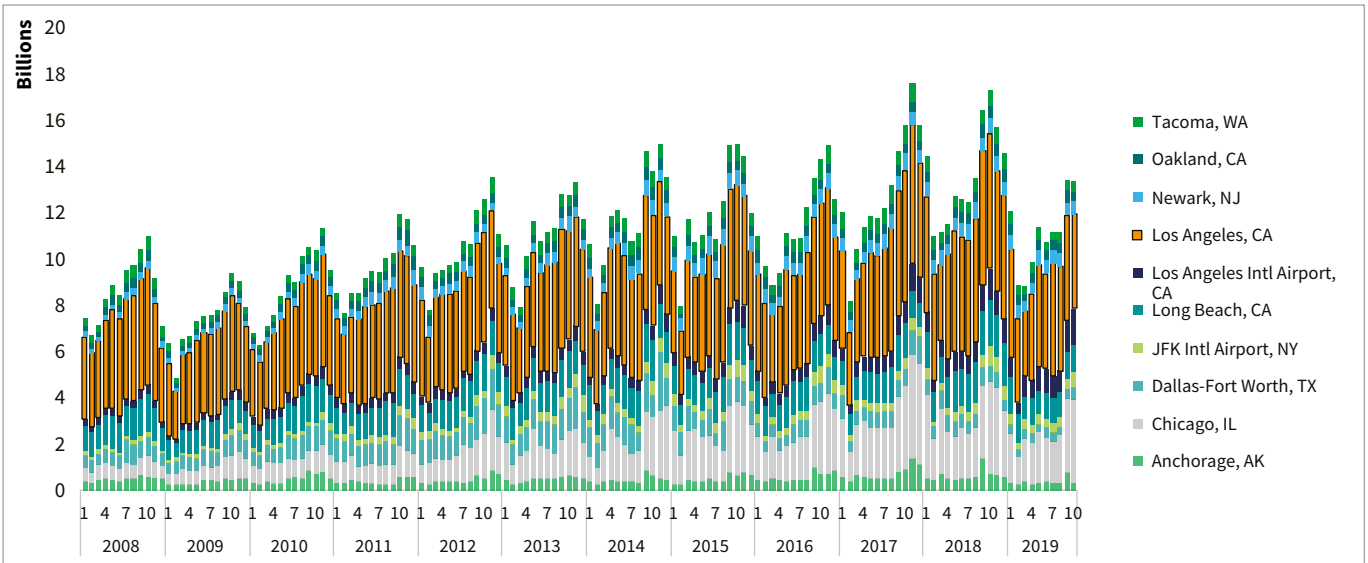
Graph 4 – Source: Global Trade Atlas

Having established that trade flows indeed intensify during the Black Friday period between China and the US, and specifically for electrical goods trade, it is imperative to study port callings data and assess the impact of trade uptake on air and shore pollution. IHS Markit Maritime Movements data show that as the value of trade entering the US increases, the number of port callings into the country also increases with a clear peak in October (graph 5). The Port of Los Angeles, CA, is the main port importing electrical goods from China, and trade value is at its highest during Q4, reaching $16 billion in October 2018 (graph 6). With the number of port calls into the LA port increasing year-on-year, the average hours spent by ships in the port also increased: while ships spent an average of six hours in the port in 2017, they spent an average of eight hours in 2019 (graph 7).

Port Callings into the US in 2018

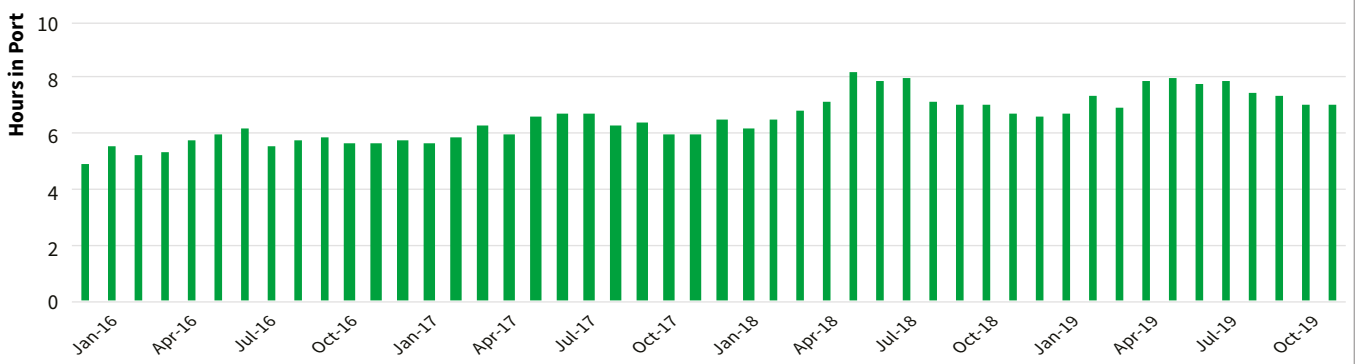


Graph 5 – Source: Maritime Movements



Graph 6 – Source: Global Trade Atlas EDF

Average Hours in Port



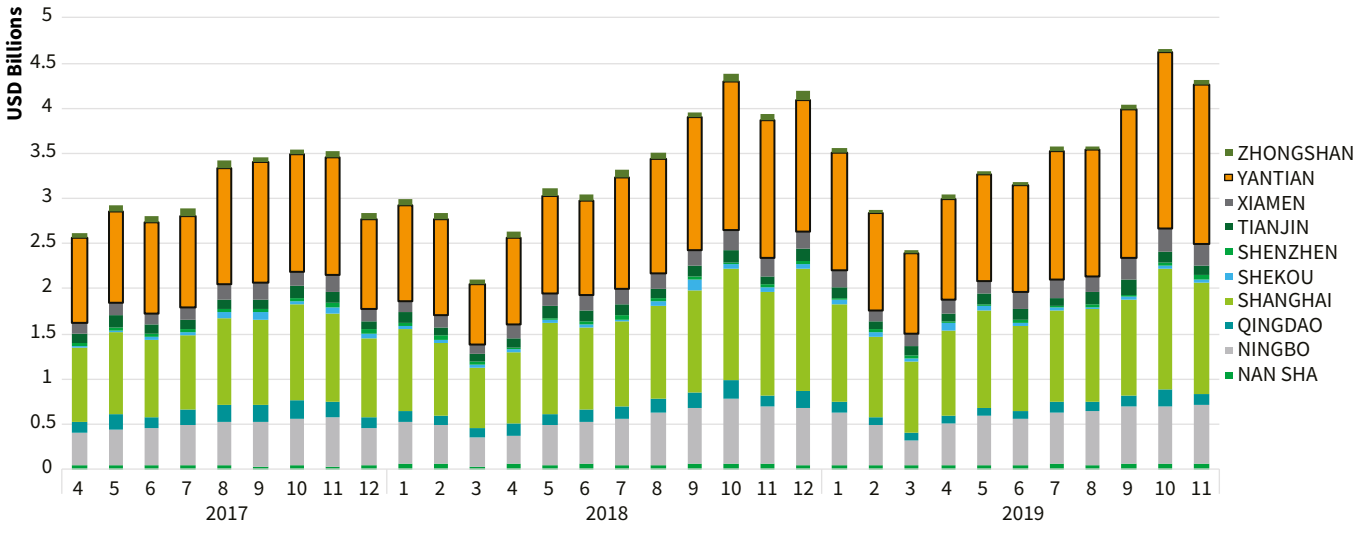
Graph 7 - Source: Maritime Portal

Although more time spent in ports doesn't necessarily translate into higher emissions and pollution, looking into the ships that called at Los Angeles port in the last four years calls for concern. Indeed, Maritime Portal data shows that out of the 1,840 unique IMO numbers called at LA's port between 2016 and 2019, only 160 were scrubber fitted – or less than 9%. This may be due to California's ban on open-loop scrubbers in its ports and inland waters. According to DNV GL[4], most scrubbers in the market are open-loop, hence restricting scrubber-fitted ships calling into California ports. Simply put and overlooking the controversies around their effectiveness, scrubbers pass sulphur oxides through a water stream and remove them from the exhaust gas of vessels. **The general tendency when thinking about pollution would be to evaluate Greenhouse Gas Emissions (GHG); but beyond carbon, maritime transportation emits other major pollutants including oxides of nitrogen and sulphur, which are considerable**

[2] https://www.dnvgl.com/article/finding-the-right-fit-70017

sources of local pollution in some ports. Through chemical reactions in the air, SO2 and NOx are converted into fine particles, sulphate and nitrate aerosols, and these can lead to severe illnesses such as asthma and cancer. **Poor air quality due to international shipping accounts for approximately 400,000 premature deaths per year worldwide, at an annual cost to society of more than €58 billion according to recent scientific studies** (Corbett et al. 2018[5]).

To that effect, the port of LA is part of the San Pedro Bay Ports Clean Action Plan[6] which includes anti-air pollution strategies. Since 2005, port-related air pollution emissions in San Pedro Bay have dropped 87% for diesel particulate matter, 56% for nitrogen oxides, and 97% for sulphur oxides. Nevertheless, about 15% of children in Long Beach suffer from asthma compared to 9% of children in the United States. In communities near the Port of Los Angeles, including San Pedro, Wilmington, and the Harbor Gateway, asthma-related emergency department visit rates exceed the city average in half of the zip codes (San Pedro Bay Ports 2017 Clean Air Action Plan Update). Not enough is being done to tackle the impact of shipping pollution in the nation's busiest port. Incentive programs do not fully embrace all the methods available for vessel operators to reduce emissions rate. **IMO2020 is an opportunity for Port State authorities to enforce the low-sulphur fuel requirements, but it also a chance for ports to bring forward stricter and potentially more efficient emission reduction measures.** For instance, air quality officials want to expand the number of ships that, while docked, must either shut down their auxiliary engines and plug into shore power. At the moment, if not plugged in while docked, ships must keep their engines and boilers running. Depending on the engine type and fuel consumed, the ship's emissions footprint will vary. As exposed further below, **examining the characteristics of a typical containership used during a Black Friday trade between China and the US proves to be at odds with sustainability initiatives…**



Graph 8 - Source: US BoL

[5] https://www.nature.com/articles/s41467-017-02774-9.epdf?shared_access_token=zdv4XaDHZS6x19r_X6YC79RgN0jAjWel9jnR3ZoTv0Px8RutgA7iuV6ZM8RzZ7iaqYBGD8a47j9LNwEwIIzUznILKkm8PU-ZTJK413bybPUHBbHoQKfzgs9rjNos2FiNsXgvL_it_5p5LewsdP20AEWBJxbXKeW9uIwJmQLlGr8%3D

[6] https://kentico.portoflosangeles.org/getmedia/a2820d01-54f6-4f38-a3c5-81c228288b87/2017-final-caap-update

Journey Details	
Initial Port	Yantian, China
Destination Port	Los Angeles, US
Distance (nm)	6720
Distance (km)	12445.44
Distance in ECA (nm)	122
Average Speed (kts)	23.8
Journey Time	12.94 days

Image 1 – Source: Maritime Portal

US Bill of Lading Data finds Yantian as a key Chinese port exporting electrical goods to the US, with a clear peak in trade value in October 2017, 2018 and 2019. Yantian-Los Angeles is thus a frequent journey during the Black Friday period. Looking at the average journey details of ships frequently assigned this trade route is a good indicator of the environmental impact shipping electrical goods from China to the US is having. As PIERS and Maritime Data reveal, **only 2% of the distance covered by ships in the Yantian – LA trade route is under Emission Control Areas (ECA) status, which means that for most of the journey ships are not required to minimize airborne sulphur emissions.** Also having recourse to Maritime Portal data, a containership 'X' was identified as a ship that frequently transports electrical goods from Yantian to LA. Although having a Tier II certified engine (a NOx emissions reduction measure), the containership 'X' isn't scrubber fitted and runs mainly on residual fuel. Its fuel consumption per transport work (mass) is equal to 3.02 g/t-nm compared to 2.76 g/t-nm on average for its peers, and its CO2 emissions per transport work (mass) is equal to 9.45g of CO2/t-nm compared to 8.65 g/t-nm on average for its peers. With containerships such as vessel 'X' increasingly calling at the Port of LA during the Black Friday period, one can't help but wonder if today's anti-air pollution strategies are enough to prevent the consequences of intensified shipping in the face of growing consumerism. While the 2006 San Pedro Bay Ports CAAP plan was a landmark air quality plan, fourteen years later Black Friday and Cyber Monday practices have grown increasingly popular, and hence the increasing health risks associated with maritime transportation.

Travelling **6720 nm** and consumption of **255.69 kg/nm** → 1 Journey burns **1,718 tonnes of fuel** (Residual Fuel) → Average CO2 Emissions per distance are **799.9 kg / nm** → Total Journey Releases: **5.374 Million kg of CO_2** → Equivalent to **5,374 Tonnes of CO_2**

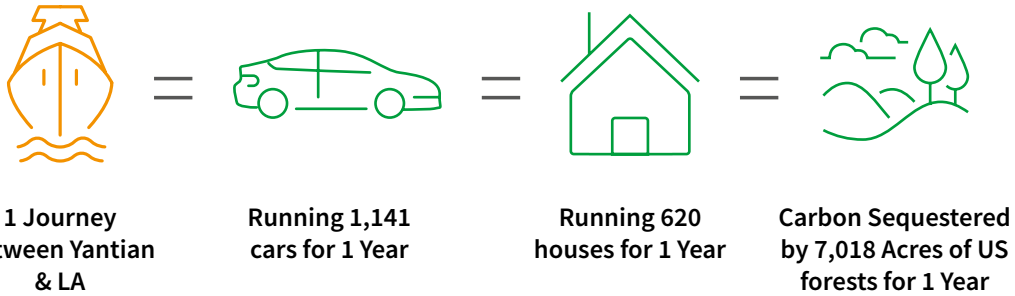


Image 3 - Greenhouse Gas Equivalencies Calculator | US EPA

Port State Control agencies have announced that any ship found not complying with the IMO2020 fuel sulphur limit as of March 1st risks being detained and faces serious fines. Since the introduction of IMO2020 on January 1st, the industry has been given a 'grace period' while it transitions to low-sulphur fuel compliance. If strictly and effectively enforced, will new fuel regulations be enough to curb the environmental effects of intensifying maritime transportation? Only time will tell. What is certain though is that environmentally conscious retailers and consumers must step up and investigate the ships being used to transport their goods. Vetting ships on environmental factors such as engine type, fuel consumption and GHG emissions can play a significant role in pressuring the maritime industry to find green long-term viable technologies and achieve substantial sustainable efficiency improvements.

Conclusion:

All in all, sustainability initiatives adopted by retailers and consumers must be revised to take into consideration the environmental cost of shipping. Exceptional sales such as Black Friday and Cyber Monday come at a serious environmental and social cost, mainly due to intensified shipping. Conscious retailers and consumers ought to assess ships involved in their supply chain on environmental factors, opting out of dirty ships and unsustainable shipping practices. By doing so, they would also be pressuring the shipping industry into accelerating its green transition and international organisations to better implement and enforce constraining environmental regulations.

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