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BEFORE THE
U.S. SENATE COMMITTEE
ON ENERGY AND NATURAL RESOURCES

DECEMBER 10, 2019

Good morning, Chairman Murkowski, Ranking Member Manchin and distinguished Members of this Committee. My name is Neelesh Nerurkar. I analyze energy and climate policy at ClearView Energy Partners, LLC, an independent research firm that serves institutional investors and corporate strategists. Thank you for inviting me to be here today.

Earlier in my career, when I worked at the Congressional Research Service, I considered it a privilege to support this Committee's critically important energy and environmental policy responsibilities. In my current capacity, I am honored to be able to contribute to your discussion today regarding the International Maritime Organization's (IMO's) 2020 sulfur cap.

ClearView's clients look to our Firm to provide objective, transparent analyses of short- and intermediate-term market dynamics. Last year, we received many inquiries in the wake of media reports that cited alarming prognostications regarding the IMO 2020 fuel changeover, including oil market chaos and dramatic price spikes for middle distillate fuels such as diesel.

At the time, our Firm offered a contrarian perspective: we anticipated a more muted oil and products market result, and our current stance remains consistent with that analysis. Indeed, I might summarize the latest IMO 2020 outlook I prepared with my colleague Jacques Rousseau, who leads the Firm's oil and gas fundamentals coverage, by offering three simple points:

- First, the IMO adopted the sulfur cap more than a decade ago and remained committed to its implementation;
- Second, the global refining and shipping sectors have taken steps to mitigate potential low sulfur marine fuel ("bunker fuel") shortfalls; and
- Third, the IMO change is not taking place in isolation. Trade tensions and a global economic slowdown have dampened oil demand growth and offset what might have otherwise been a more significant low sulfur marine fuel shortfall.

IMO Committed to the 2020 Cap Adopted in 2008

The IMO is an agency of the United Nations, comprised of 174 Member States. The IMO sets safety, security and environmental standards for international shipping. The agency's sulfur restrictions were intended to produce health and environmental benefits, such as reductions in cardiovascular disease and acid rain. A 2018 study in the journal *Nature* estimated that ship emissions contribute to ~400,000 premature deaths from lung cancer and cardiovascular disease and ~14 MM childhood asthma cases a year. The study projected that these premature mortality and asthma rates could fall by 34% and 54%, respectively, after implementation of the 2020 sulfur restrictions.

In 1997, the IMO adopted a marine fuel sulfur content limit of 4.5% that took effect in 2005. It revised the limit in 2008, setting a 3.5% sulfur content threshold beginning in calendar year (CY) 2012 and 0.50% beginning in CY 2020. The IMO also adopted more stringent caps for so-called "emissions control areas" (ECAs), which include the U.S. and Canadian coasts; waters around Puerto Rico and the United States Virgin Islands; the Baltic Sea area; and the North Sea area. The IMO set the ECA sulfur cap at 1.5% until July 2010, when the cap declined to 1%. The ECA cap subsequently fell to 0.1% in CY 2015.

In 2016, the IMO reviewed its 2020 sulfur cap target to consider whether adequate fuel might be available or whether, as an alternative, the organization should delay the 0.5% limit until the start of CY 2025. The organization commissioned a study that found that fuel supplies would be sufficient, and the IMO agreed to proceed with the 2020 date. Last year, the IMO chose not to adopt a proposal for an "experience-building" period submitted by a group of small flag states, which we interpret as a leniency period. Instead, the organization has focused on preparing for 2020 sulfur cap implementation by issuing guidance to ships, fuel suppliers and port-state control authorities that will implement the cap. The IMO has also started planning how it might meet long-term greenhouse gas (GHG) targets.

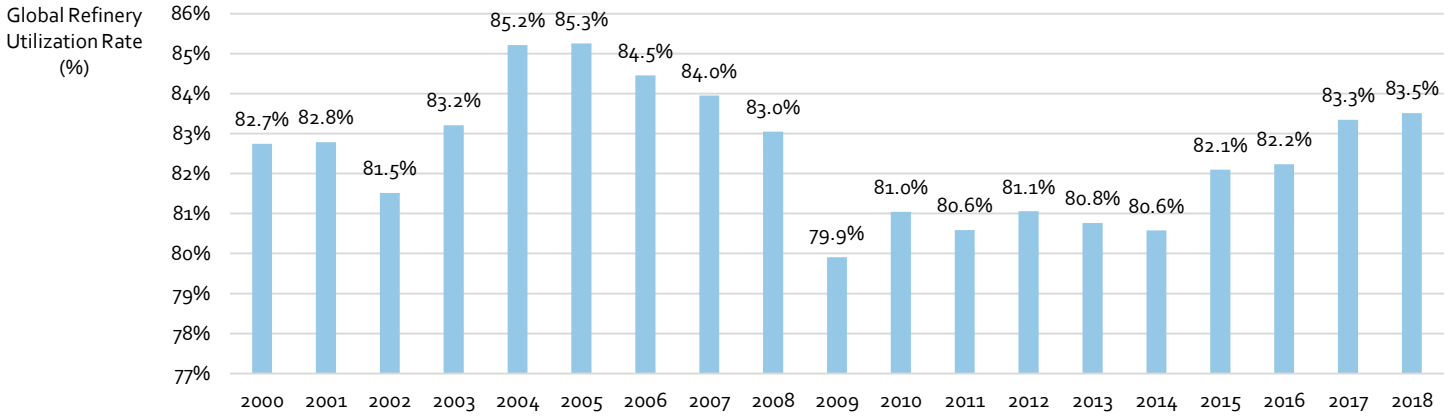
Refining and Shipping Adjustments

The International Energy Agency (IEA) estimates that the global shipping industry used ~3.4 MM bbl/d of high sulfur fuel oil (HSFO) during CY 2018. In our analysis, we reviewed nine global refining and shipping variables to assess the potential CY 2020 shortfalls of low sulfur marine fuels; middle distillates and very slow sulfur fuel oil (VLSFO). In our calculations, we compared supply and demand impacts between known CY 2018 data and projections for CY 2020. Let me begin by describing each of these variables. I will then describe how we considered them collectively to arrive at our relatively benign, base-case assessment of potential shortfalls.

Capacity expansions. Between CY 2018 and CY 2020, based on IEA and OPEC data, we expect global distillation capacity to increase by ~2.7 MM bbl/d; upgrading capacity to increase by ~2.2 MM bbl/d; and desulfurization capacity to increase by ~2.5 MM bbl/d. We estimate that these global refining industry distillation, conversion and desulfurization capacity expansions could augment low sulfur marine supply by ~0.9 MM bbl/d.

Capacity utilization. Data from BP's June 2019 *Statistical Review of World Energy* show that global average refinery utilization rates exceeded 85% in several years during the mid-2000s (Figure 1). Rates averaged 83.5% in CY 2018 and could fall to 82.3% this year. In our view, global refiners could increase low sulfur marine fuel production by ~0.8 MM bbl/d by raising utilization rates to 84.5%.

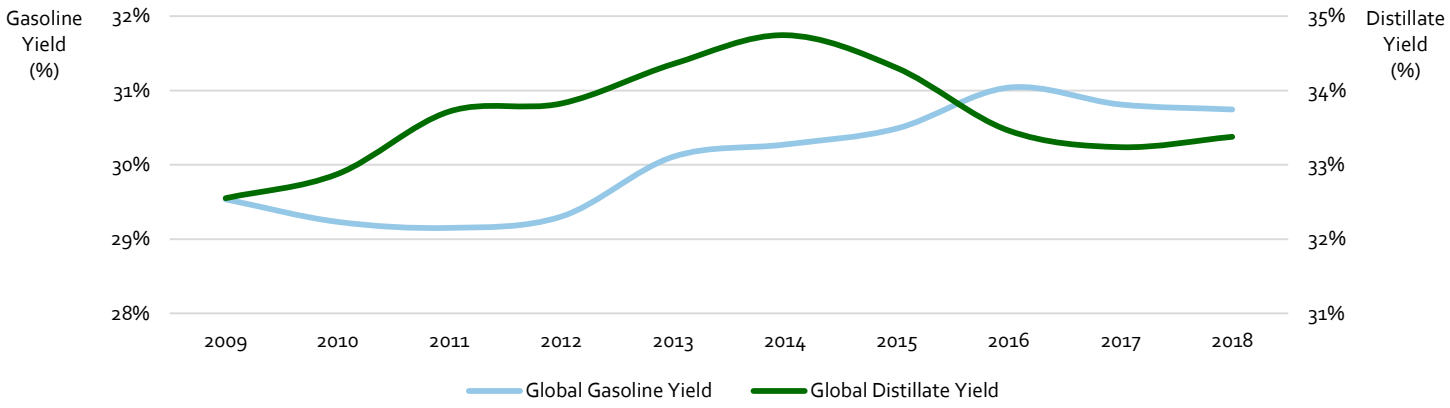
Figure 1 – Global Refining Capacity Utilization Below Peak Levels



Source: ClearView Energy Partners, LLC, using BP data

Maximum distillate. Global refiners could also slightly adjust their product slates (the mix of the fuels they produce). Our assessment of BP and IEA data indicates that global distillate yields swung by ~2% over the last decade (Figure 2). Were refiners to revert to prior maximum distillate production levels, we estimate that they could increase global distillate supply by ~0.4 MM bbl/d.

Figure 2 – Estimated Global Refinery Distillate Yields Have Varied By ~2% over the Past Decade



Source: ClearView Energy Partners, LLC, using BP and IEA data

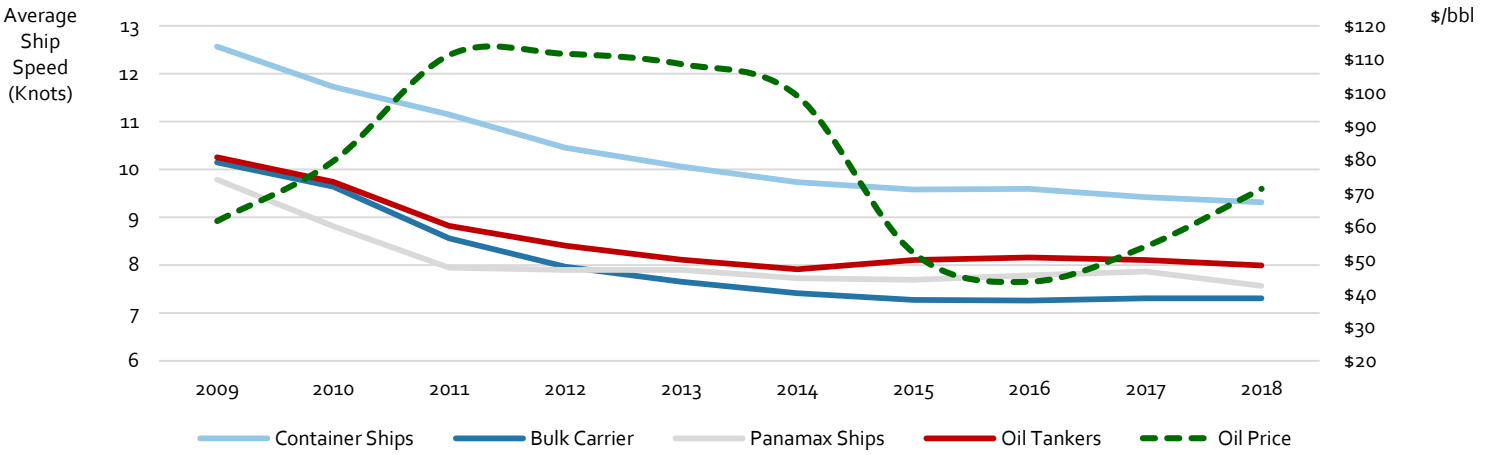
Scrubbers. The shipping industry has been preparing for IMO 2020, too. As an alternative to switching to low sulfur marine fuel, ships can install exhaust gas cleaning systems or "scrubbers" so that they can continue using HSFO. Based on data from the Exhaust Gas Cleaning System Association (EGCSA) and the IMO, we estimate that for every 1,000 ships that install scrubbers, another ~0.2 MM bbl/d can remain in the high sulfur fuel oil market.[1]

According to data from consulting firm DNV GL, more than 3,700 ships could install scrubbers by CY 2020. If that projection is borne out, our models imply that ships could continue using ~0.5 MM bbl/d of HSFO during CY 2020.

LNG. DNV GL also estimates the delivery of 60 liquefied natural gas (LNG) fueled ships this year and another 44 ships next year. We estimate that this LNG bunkering could displace another ~0.1 MM bbl/d of potential low sulfur marine fuel demand in CY 2020. In the long-run, we believe the shipping industry could expand use of both scrubbers and LNG.

Slow steaming. Our understanding is that ships lowered their fuel consumption in response to high fuel prices earlier this decade by reducing speed ("slow steaming"). Bloomberg data suggest that many shippers continued operating at reduced speeds even after fuel prices declined (Figure 3). The IMO has been debating speed limits as part of its maritime GHG emissions reduction protocols, and we think ships could consider slow steaming as a response to fuel market changes. Although our Firm does not model maritime fuel consumption, our literature review and assessment of historical market data suggests that additional slow steaming could cut marine fuel demand by another ~0.1 MM bbl/d from CY 2018 to CY 2020.

Figure 3 – Shippers Reduced Speed to Conserve Fuel When Oil Prices Increased and Maintained Lower Speed Levels



Source: ClearView Energy Partners, LLC, using Bloomberg and EIA data

Noncompliance. Some ships may not consistently adhere to the IMO restrictions. Using data from the United Nations Conference on Trade and Development (UNCTAD) and other sources, we considered a number of variables that we believe to be associated with compliance, including: shares of international shipments from and/or to advanced economies; the share of trade handled by the largest 10 shipping companies; and container port volumes handled by the 20 largest ports. Based on this assessment, we have assumed a ~20% non-compliance level in our base case, which amounts to about ~0.7 MM bbl/d of bunker fuel demand that remains in HSFO.[2]

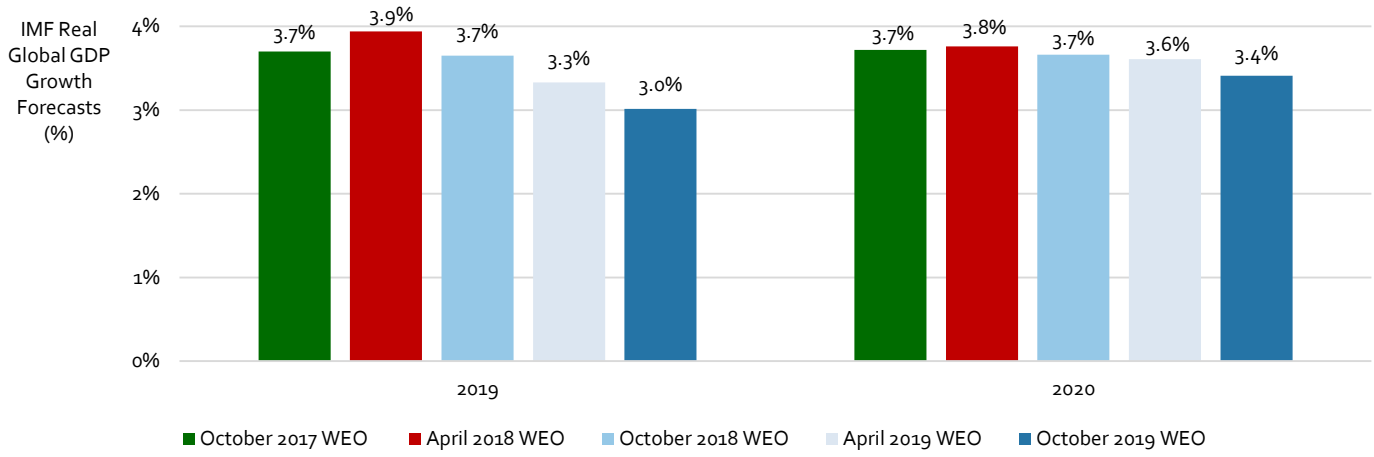
Broader Market Conditions

Economic growth is a key driver of fuel demand. In April 2018, the International Monetary Fund's (IMF) *World Economic Outlook* (WEO) report predicted global GDP growth of ~3.9% during CY 2019 and ~3.8% during CY 2020. As of the IMF's most recent WEO, published in October 2019 (Figure 4), these forecasts had declined to ~3.0%/CY 2019 and ~3.4%/CY 2020. We think non-marine distillate demand may increase by 0.3 MM bbl/d between CY 2018 and CY 2020, this is down from expectations mid-last year of 0.6 MM bbl/d growth.

[1] Our calculation is based on the average daily fuel usage of the ships types scheduled to install scrubber by CY 2020.

[2] According to media reports, Russian officials said in October that they were considering delaying implementation of IMO requirements for certain regional shipping. Such a development would comfortably fit within our our non-compliance base case.

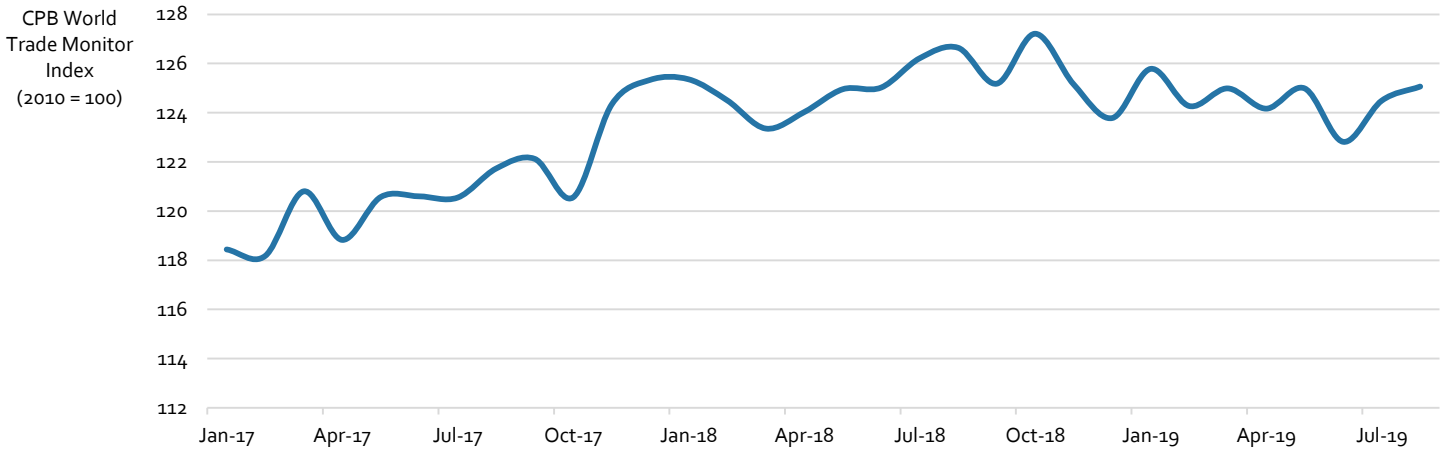
Figure 4 – The IMF Lowered its CY 2019-2020 Global GDP Growth Forecasts in Each of its Last Four WEO Reports



Source: ClearView Energy Partners, LLC, using IMF data

Trade war. Furthermore, the October 2019 WEO estimates current trade barriers between the U.S. and China could reduce global GDP in 2020 by ~0.8% relative to the foregoing baseline. As one might anticipate, global GDP growth and global trade correlate closely (R^2=0.95, based on IMF data and the CPB World Trade Monitor Index, Figure 5). Based on a strong relationship between trade activity and marine fuel demand, we project that the U.S-China trade war could reduce CY 2020 low sulfur marine fuel demand by ~0.2 MM bbl/d relative to CY 2018 levels.

Figure 5 – The CPB World Trade Monitor Index Peaked in October 2018

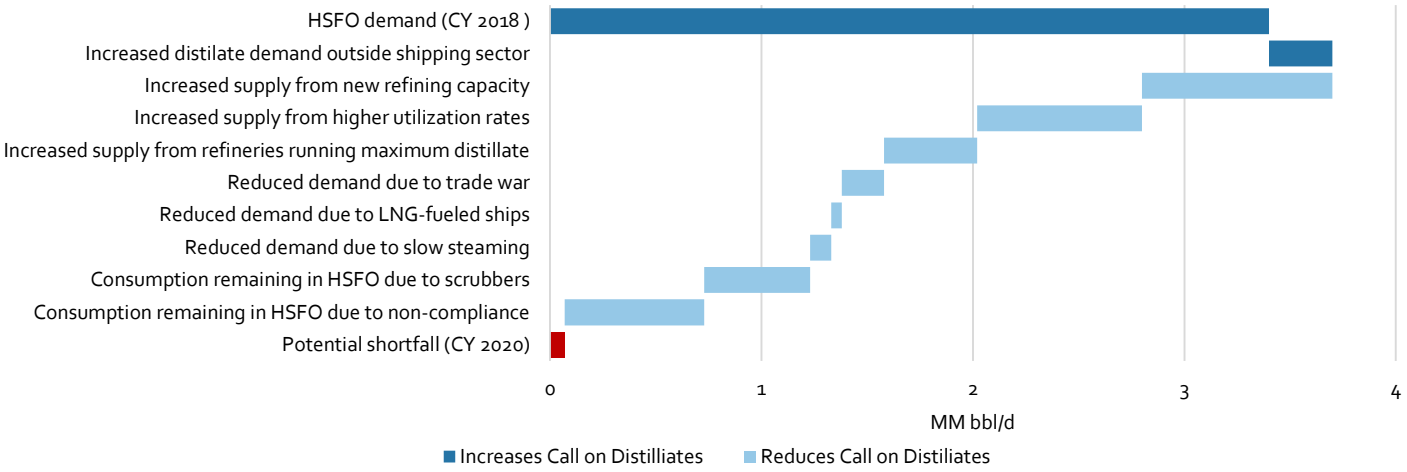


Source: ClearView Energy Partners, LLC, using CPB World Trade Monitor Index data

Synthesis

Adding up our base case assessments of the foregoing nine factors implies a potential CY 2020 low sulfur marine fuel shortfall of ~0.1 MM bbl/d (Figure 6). We would acknowledge several risks to this baseline scenario. In a high compliance scenario, for example, our models imply a ~0.5 MM bbl/d shortfall. By the same token, trade war, greater than expected supply and lower global economic growth could also potentially result in a distillate surplus next year.

Figure 6 – Supply and Demand Factors Likely to Absorb Much of the Shift Away from HSFO

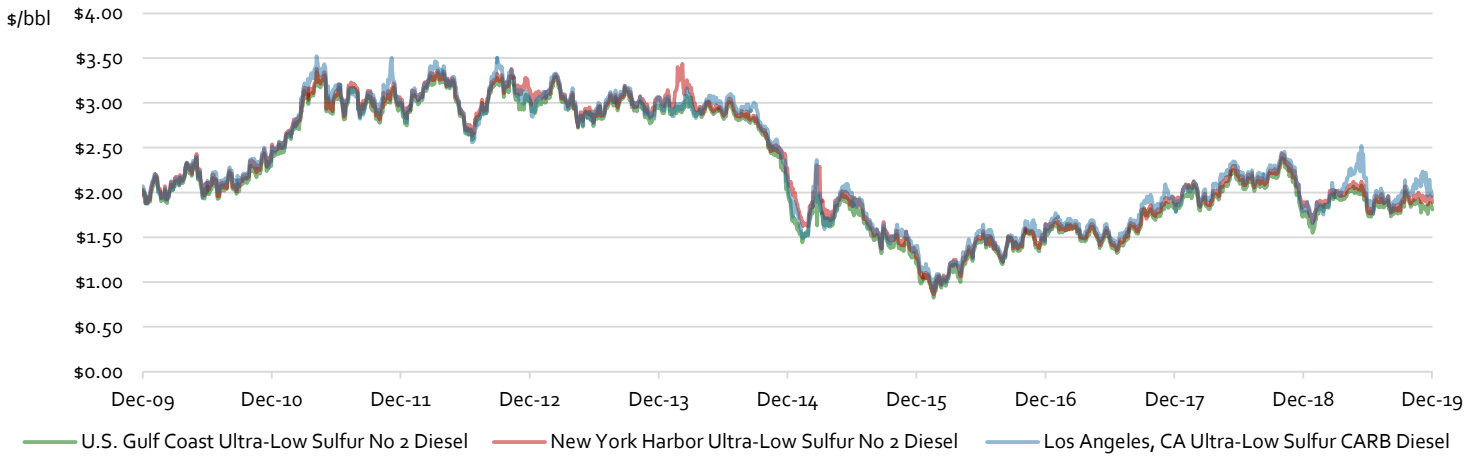


Source: ClearView Energy Partners, LLC, ClearView Energy Partners, LLC using BP, DNV GL, IEA, IMO, Oil and Gas Journal, OPEC and UNCTAD data

Missing barrels might come out of distillate inventories. A demand response to higher prices could close the gap, as well. Notwithstanding the tendency of commodities to price at the margin, we would note that our baseline ~0.1 MM bbl/d delta amounts to a mere ~0.3% of the 36 MM bbl/d global market for middle distillates, which suggests limited price impacts, in our view.

This outlook appears consistent with recent change in energy prices. We believe the shipping industry may be approaching the peak of the transition during 4Q2019 as ships convert from HSFO to low sulfur fuel to comply with the requirements that go into force on January 1, 2020. We would therefore look to one of the most straightforward metrics at our disposal for signs of market stress: spot diesel prices, which have remained relatively flat (Figure 7).

Figure 7 – U.S. Spot Diesel Prices



Source: ClearView Energy Partners, LLC, using EIA data

This is not to say that the change has been, or will be, easy. The maritime and refining industries have had to undertake vast preparation and considerable investment. Reports of uncertain fuel quality and limited fuel availability could still point to challenges, especially in smaller ports and during the early months of implementation. That said, I would suggest that data thus far do not appear to validate the dramatic dislocations that some market observers predicted last year.

Madam Chairman, this concludes my prepared testimony. I will look forward to answering questions you or your colleagues may have at the appropriate time.