
IMO-2020 IS COMING TO TOWN

WILL SPIKING COST OF FUEL CAUSE YOU PAIN?

THE IMPACT ON THE COST OF
DOMESTIC FREIGHT TRANSPORTATION
IN NORTH AMERICA



Logistics
MANAGEMENT

About 90% of global trade moves in the approximately 51,000 ships¹ composing the world fleet. The insatiable demand for the fuel that drives maritime global trade is estimated at 2.1 billion barrels (88.2 billion gallons) annually, or 244 million gallons per day.

The noxious emissions, largely sulfur oxides, as well as nitrous oxides and particulate matter, have become a major environmental concern and have been proven to adversely affect global health as they're discharged into the atmosphere. According to a Goldman-Sachs study, burning standard bunker fuel (Heavy Fuel Oil or HFO) accounts for almost 90% of sulfur emissions globally, with the largest 15 vessels producing more sulfur than the combined total of all the world's automobiles.²

The International Maritime Organization (IMO) Marpol Annex VI ("Prevention of Air Pollution from Ships") regulations limiting sulfur content of bunker fuel to 0.5% (down from 3.5%) will take effect on January 1, 2020. A small portion of the 51,000 ships in the global fleet already burn compliant fuel, but the remainder will have only three viable options, and one temporary "hall pass" to comply with the law:

- 1 **CONVERT** to low-sulfur (e.g., MGO, VLSFO, diesel) or a blend of HFO and low-sulfur that meets the emission standards.
- 2 **INSTALL** expensive scrubbers³ so they can continue to burn HFO, which is the cheapest grade of fuel.
- 3 **CONVERT** to LNG by replacing HFO-burning ships with new LNG vessels, as many of the cruise ship lines are doing. Peter Keller, Chairman of SEA/LNG notes: "LNG is the only available and safe fuel that negates all sulfur oxides as well as particulate matter, reduces nitrous oxides by 90% and also contributes to carbon reduction."
- 4 **OBTAIN** Waivers/Non-compliance: IMO-2020 provides a system wherein ships can seek waivers in a situation where compliant fuel is not available. In such situations, ships would have to present a record of the actions taken to attempt to achieve compliance.

¹Source: UNCTAD, "Handbook of Statistics - Fleet Ownership and Registration, Main Economies, 1 January, 2018 (Commercial ships 1,000 GT and above)"

²Source: Goldman-Sachs, "The IMO-2020: Global Shipping's Blue Sky Moment" (05/30/18); also *The Guardian* (04/09/09) "Confidential data from maritime industry insiders based on engine size and the quality of fuel typically used by ships and cars shows that just 15 of the world's biggest ships may now emit as much pollution as all the world's 760m cars. Low-grade ship bunker fuel (or fuel oil) has up to 2,000 times the sulphur content of diesel fuel used in US and European automobiles."

³Source: Wartsila. "The current cost per scrubber system is around €2.5mn per vessel, although it can vary between €1mn and €6mn depending on the vessel size."

While this regulatory change was decided more than 10 years ago by the IMO, ship owners have been slow to plan for this transformation, creating a dramatic environment for rapid implementation and compliance. This transformation is among the most significant and dramatic fuel regulations ever, and will impact both the maritime and refining industries, with inevitable ripple effects across global supply chains. One cruise line executive said: “This is the marine industry’s Y2K.”

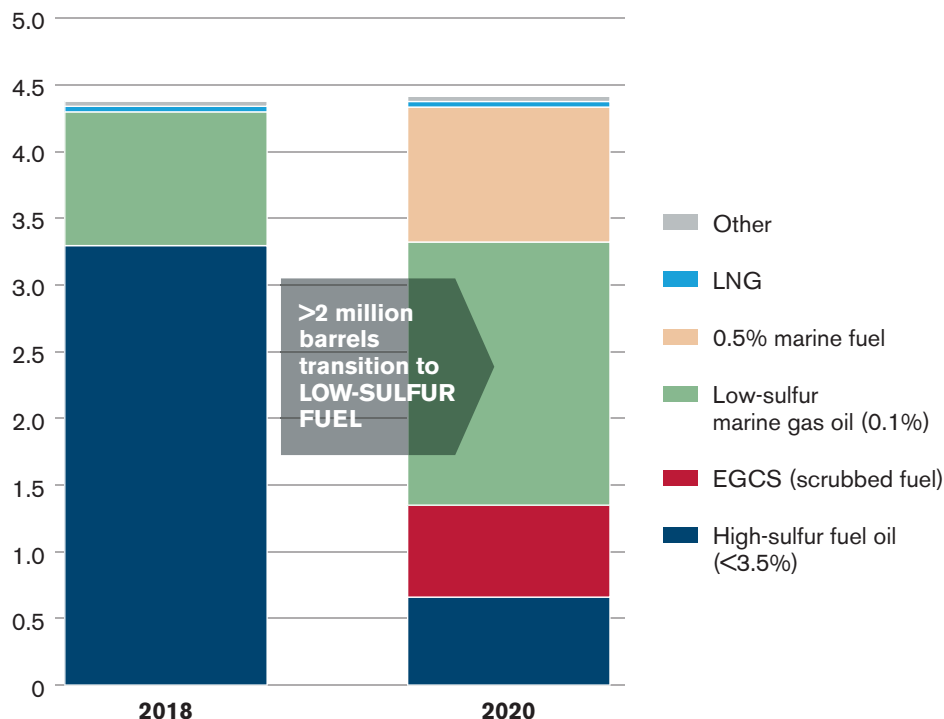
Goldman Sachs estimates that the overall impact on consumers in 2020 could be as much as \$240 billion, as the added costs cascade across global supply chains and throughout the world’s economies—adding approximately \$40 billion in increased shipping costs. “This is the largest regulatory change in the oil space ever, and it will have a massive effect far outside of shipping,” said Svelland Capital portfolio manager Kenneth Tveter.

Analysis by the commercial maritime and refining industries indicate about 2 million barrels per day (84 million gallons/day) of shipping fuel will transition to low-sulfur alternatives, with some estimates reaching as high as 4 million bbl/day (168 million gallons/day). This tectonic shift means significant additional demand for middle distillates, the fraction of the refined barrel that includes ultra-low-sulfur diesel for truckload, ltl, intermodal and rail carload freight, as well as domestic barge operations.

DEMAND FORECAST⁴

Marine bunker fuel demand forecast, 2018 to 2020 market transition

Million barrels per day



Source: IEA

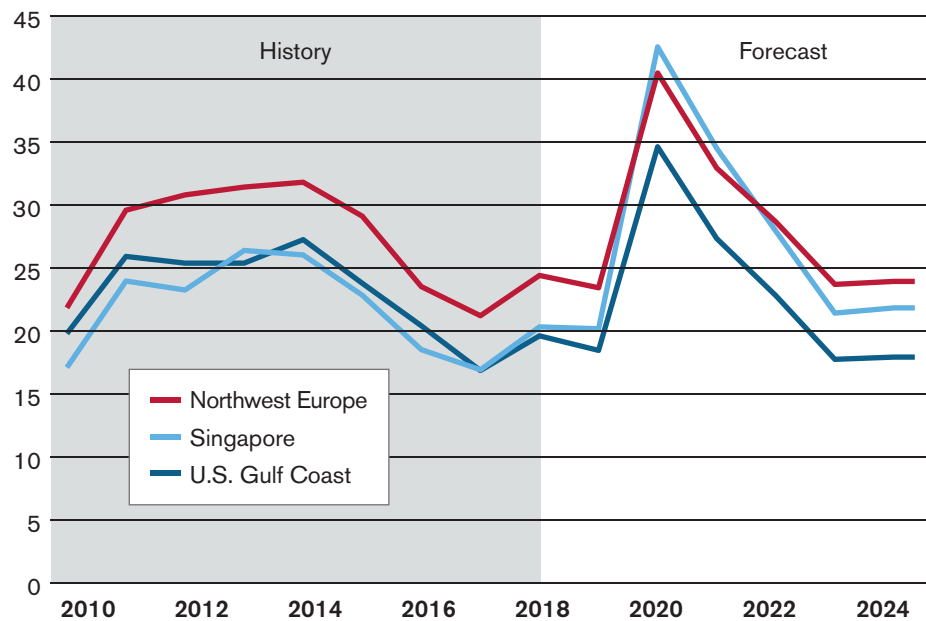
⁴Source: International Energy Agency. “Oil Market Report” (2019)

The impact on ocean carriage will be significant. Take a rudimentary example of a liner vessel that's currently burning IFO-380 Bunker Fuel (Heavy Oil). According to Ship & Bunker, IFO-380 at LA/Long Beach on June 21 was \$394.00 per ton. Converting to low-sulfur MGO would take the price to \$625.50 per ton, or an increase of \$231.50 per ton (59%). Burning 150 tons per day on average and operating 200 days a year at sea, yields a cost increase of just under \$7 million per year in operating costs for a single vessel.

FUEL PRICE FORECAST⁵

Light-heavy differentials are expected to spike in all major markets in 2020, due to MARPOL implementation

Light-heavy product differentials, ¹ \$/barrel



¹ Average light product (diesel, gasoline) prices minus fuel oil (3.5% sulfur, 380 centistokes)

Source: International Energy Agency, "Oil Market Report" (2019)

One strategy, first deployed on a significant scale during the excess capacity of the last downturn, was slow steaming. It saved much in fuel cost and used up a portion of the idle capacity, filling out vessel strings that needed more ships due to slower speeds.

⁵ Source: McKinsey Energy Insights, "Global Downstream Model" (September, 2018)

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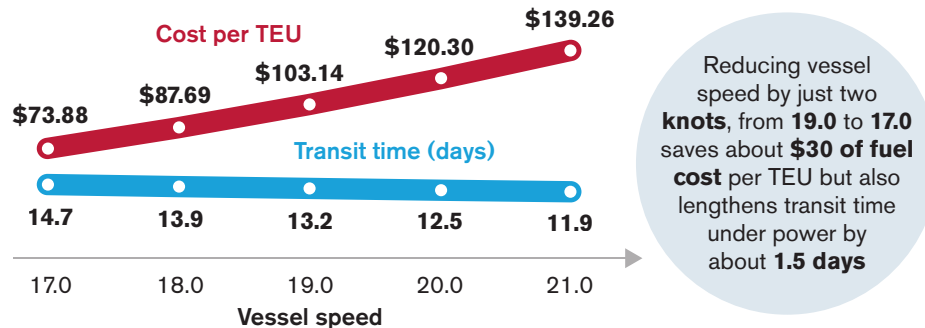
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With operating costs such a vital element for vessel owners, slow steaming and super-slow steaming will invariably arise again. The impact on cost is undeniable.

COST OF SPEED⁶

Vessel speed impact on fuel cost, using lane example and prices shown



Figures represent cost for 8,000 TEU vessel at 85% utilization

Transit time represents days under power

Fuel costs may not represent client calculations due to assumptions in this example

Source: Breakthrough Advisor, "Maritime Markets," Q-2, 2019. This example represents direct transit, Shanghai-LA using an HSFO price of \$400/mt and MGO price of \$600/mt

While the cost savings for a single voyage and over the course of a sailing season is substantial, particularly when spread across a large vessel fleet, adding transit time will have other effects on the supply chain. Vessel strings will require more ships to accommodate the longer sailing times and the impact on shipper supply chains will be felt end-to-end. Shipper order management processes will need to be adjusted, as will inventory planning and distribution center operations, as well as inland transportation capacities and schedules.

This will also drive further examination of alternative supply sourcing (i.e., near-shoring or on-shoring.) For supply chain professionals, this is a bit like navigating into a traffic circle in the dark, in the rain, with no lights, no signs and trying to ascertain the best way out. Derek Leathers, CEO of national trucker Werner Enterprises posed an interesting question: "Does this do anything broader, i.e., impact near-shoring verses off-shoring. Will it tip the balance?" For supply chain professionals, this is an insightful comment to consider.

The new world order will produce a significant ripple effect, especially when combined with rising labor costs in China, increasing tariffs and longer cycle times.⁷ A significant shift in manufacturing to more favorable total cost of ownership (TCO) options will be on the table. Planning for potential impacts and outcomes can't start soon enough.

⁶ Source: Breakthrough Advisor, "Maritime Markets," Q-2, 2019. This example represents direct transit, Shanghai-LA using an HSFO price of \$400/mt and MGO price of \$600/mt.

⁷ Source: Goldman-Sachs, May 30, 2028. "Since 2008, vessel speeds have already come down ~25%. Given the exponential relationship between fuel consumption and vessel speed, an incremental slowdown would thus imply fewer fuel savings vs. the first wave of slow-steaming. Moreover, voyage times would become too long. For instance, by reducing a container ship's average speed by a further 10% from ~12 knots today, the sailing time between Shanghai and Rotterdam would increase from ~36 to 41 days."

There is little question costs will rise. The key question is where the hammer will fall and who will bear the additional cost.

The world's two biggest container shipping lines—Denmark's Maersk and Swiss headquartered MSC — say they face annual extra costs of over \$2 billion each. Twenty-five logistics company executives told Reuters they would pass along any IMO-related costs, such as ship upgrades or more expensive fuel, to customers.

“The sulphur cap will further put pressure on ocean freight rates and we... will have to pass those costs on to remain competitive,” Peder Winther, global head of ocean freight with Swiss transportation company Panalpina Group said.⁸

But that's not all, as the ripple effect is predicted to wash ashore in North America and impact domestic land transportation:

Trucking companies will also suffer. The IMO rules do not apply to them but they will face new competition from ships for lower sulfur fuel. This is expected to push up the price of diesel fuel for trucks by as much as 100 percent.⁹

For marine operators, there are limited alternative courses for those faced with compliance.

“As part of the preparations we have decided to invest in new scrubber technology on a limited number of vessels in our fleet of around 750 container vessels. While we will continue to explore how to best comply with the 2020 sulphur cap, we still believe the best solution remains with compliant fuels from refineries on land. It is important to underline that the vast majority of ships in the global fleet, as well as the Maersk Line fleet, will have to comply with the global sulphur cap through the use of compliant low-sulphur fuels in 2020 given the short time frame.” (Neils Henrik Lindegard, Maersk Oil Trading)

This is indicative of the pragmatic approach large liner companies will likely pursue, given the short time horizon, largely created by inaction on the part of many marine operators. The net effect of this will be a shift in demand away from HFO to low-sulfur alternatives, which will inevitably impact the price and availability of conventional diesel fuel, not only for vessel operators, but also for motor carriers, rail and barge operators. In turn, we can expect disruptions in global supply chains as the upheaval in the fuel markets takes root and carriers scramble to comply.

⁸ Reuters, June 25, 2019

⁹ ibid

Of course, one key unanswered question is the long-term effectiveness of scrubbers. While they will allow vessel operators to continue burning HFO, the problem of pollutants doesn't go away, it just gets shifted to ocean waters or land disposal sites. According to many environmentalists, and what we've already seen from some of the larger ports, carriers with scrubbers will eventually lose the battle with respect to pollutants being discharged into the water.

Time will tell how the regulatory climate evolves, but the broader adoption of ultra-low sulfur-emitting fuel oils and LNG seems to be a key part of the long game. One of the alternative markets for what will be surplus HFO is seen by some refiners to be the power generation industry. In reality, this is an unlikely scenario, given the current trends in power generation.

"The superior cleanliness, current low price and lower maintenance cost associated with natural gas has impelled many power plants to convert," says John Keenan, former president of Horizon Lines. "And the EPA rollback in emission requirements is not driving energy producers to change back as there is an expectation that the regulations may change again."

What will happen on January 1? As Donald Rumsfeld famously said "...as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns—the ones we don't know we don't know." That seems to capsuleize the situational variables surrounding the implementation of the IMO-2020 regulations. The multitude and complexity of the variables makes prophesying particularly challenging. Some key elements to consider:

- **How many vessels will already be compliant prior to January 1?** Estimates are not very many presently (5% to 7%), but the expectation is most will be by the mandated deadline.¹⁰
- **What will carriers do to become compliant?**
 - Convert to distillate?
 - Utilize a blend of HFO and Low-sulfur to achieve the emission standards?
 - Replace vessels with LNG-burning capacity?
 - Install scrubbers (open-loop, closed-loop or hybrid*)?
 - What will be the availability and quality of compliant fuel blends?
- **While some testing has been done to confirm compatibility and function with vessel engines, this is much more complex than simply switching from 89 octane to 91 octane in your car.**
 - As yet, there is no standard spec, so blends will vary by location and producer, potentially causing operational problems at sea. Vessel operators will need to assure any blended fuels conform with manufacturer standards for the equipment they have installed, or risk voiding warranties.

¹⁰ **Source:** *Lloyd's List*, July 2, 2019 "Around 4,000 vessels to have scrubbers by 2020," based on an estimate by the Exhaust Gas Cleaning Systems Association. They state the "Associations latest estimate is considerably higher than a previous prediction of around 3,000." (*Lloyd's List*, 07/02/2019)

* Generally speaking, open-loop scrubbers discharge the pollutants captured from burning HFO into the seawater, after dilution with seawater. Closed-loop scrubbers capture the effluent and hold it shipboard until it can be disposed of ashore. Hybrids offer both options.

Fuel availability will be more challenging under the new rules, since blend specs and compatibility remain non-standardized. This may lead to spot shortages and detours to specific ports to acquire the right fuel. “At the moment, no one knows what types of fuels will be available or at what price, specification or in what quantity...We could be faced with an unholy mess with ships and cargo stuck in port,” says Esteban Poulsson of the International Chamber of Shipping.

Availability of compliant fuels is also remains unanswered. Some locations, such as Singapore and Fujairah, UAE, are already announcing they will have compliant fuel available:

Singapore, the world’s largest maritime refueling port, said it will have an ample supply of cleaner fuel to meet an increase in demand next year, when the global commercial fleet will be required to cut sulfur emissions.

Janil Puthucheary, the island state’s senior minister for transport, told a shipping conference that Singapore has been working with big oil refiners and ship owners and will have no problem procuring sufficient volumes of fuel that is compliant with new industry rules. (Wall Street Journal, April 10, 2019)

The challenge will be in producing blends that are consistent enough to function in any vessel seeking to refuel. To date, how that will work remains unanswered. There’s evidence that a number of vessel operators are already preparing for the shift by switching fuels now. Consider what’s happening in Singapore, the world’s largest bunkering port:

Oil product inventories in the Singapore storage and trading hub fell to an eight-month low in the week ended July 17, official data showed, in one of the latest signs that suppliers are gearing up for rule changes to make marine fuel cleaner.¹¹

Fuel oil inventories have registered five straight weeks of declines and are 6% below their year-ago levels, the data showed, raising concerns that tightening supplies could struggle to meet current demand.¹²

These are key indicators that the shift is already underway and that there is at least some recognition fuel availability may be problematic as the deadline approaches and implementation commences.

A reasonable hypothesis is this: All responsible marine vessel operators will be compliant with the IMO-2020 regulations. Some will convert (as some already have) to distillate fuels. Some (estimates say less than 5%) will install scrubbers. Some will resort to HFO/low sulfur blends. Some will replace aging vessels with LNG-fueled ships. The net effect will be a surge in demand for distillate fuels as both a source for burning directly and for blending. Refining capacity will not keep up with demand, leading to rising prices for diesel fuel in major markets, like North America.

¹¹ Reuters, July 18, 2019

¹² gCaptain, July 19, 2019

Some sources have speculated this could spike diesel fuel costs 20% to 50%, with the most draconian saying up to 100%. This may also impact availability in certain markets. Remember, we're talking about tapping an additional 240 million to 250 million gallons per day from the pool of available fuel.

Will the impact be this profound? Nobody knows for sure and few are willing to speculate with any degree of precision. "One of the biggest shake-ups in the product markets is right around the corner—the IMO-2020 regulation bans high sulfur fuel oil [HSFO] from the bunker pool," the International Energy Agency stated in a recent report. "Although the shipping and refining industries have been preparing for the new rules for several years, there have been fears of shortfalls when the rules come into effect."¹³

"Rarely (do) you see such a potentially massive disruption," said John Kartsonas, managing partner of Breakwave Advisors. "Delays, a reduced active fleet supply, slow steaming and port congestion can push freight rates to decade highs, and beyond."

Regardless of the magnitude of change and the ripple effect will have along the supply chain, it should be viewed seriously by those who use diesel fuel domestically—truck lines, railways and barge lines—and equally so by those who buy transportation services from these carriers.

NORTH AMERICAN DOMESTIC IMPACT

If I'm a North American freight carrier or domestic shipper of truck, rail, intermodal or barge freight, should this really matter to me?

It should command your attention: Predictions are that the wholesale conversion of the ocean-going vessel fleet will significantly increase the demand and competition for fuels used by all modes, with a consequential rise in price, *as noted above*, and possible constriction of availability.

We were curious about how shippers viewed IMO-2020: Was it high on their radar or buried in the back-scatter? *Logistics Management* partnered with Breakthrough, a leading transportation energy management firm, in creating a simple survey to assess the attitudes and readiness of shippers to cope with the impending changes:

1. How would you rate your awareness/knowledge level of the planned commercial maritime emissions regulations that will commence on January 1, 2020?
2. Has your organization conducted analysis on the potential impact on domestic transportation costs when these regulations take effect?
3. What is the extent of the potential impact on domestic transportation costs you expect?
4. What do you expect the impact will be from Q4 2019 to Q1 2020 for the over-the-road diesel price per gallon increase as a result of these regulations?
5. Has your organization considered a strategic approach to mitigating the impact of these regulations?

¹³ Source: International Energy Agency (IEA), "Oil 2019"

More than 90% of the respondents have little or no awareness or knowledge of IMO and the impending regulations, and 80% have done no analysis or forecasting relating to impact on their domestic transportation cost. While the IMO sulfur cap was announced more than 10 years ago, vessel operators said little or nothing to their customers until recently (Q4, 2018). This gave a false sense of security, even to those who have been actively monitoring progress.

SURVEY RESULTS¹⁴

QUESTION 1

How would you rate your awareness/knowledge level of the planned commercial maritime emissions regulations that will commence on January 1, 2020?

Highly knowledgeable

9.7%

Somewhat knowledgeable

35.7%

Not very knowledgeable/Have only heard of this

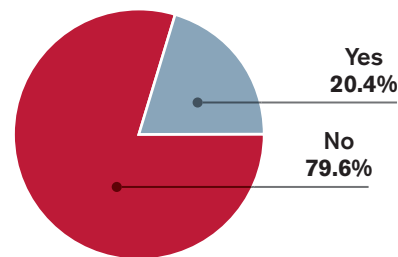
40.6%

Not at all knowledgeable/Never heard of this

14.0%

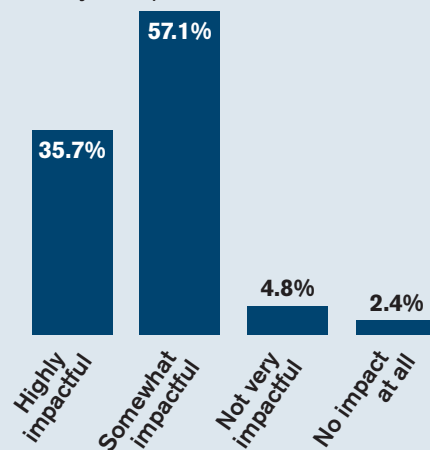
QUESTION 2

Has your organization conducted analysis on the potential impact on domestic transportation costs when these regulations take effect?



QUESTION 3

What is the extent of the potential impact on domestic transportation costs you expect?



QUESTION 4

What do you expect the impact will be from Q4 2019 to Q1 2020 for the over-the-road diesel price per gallon increase as a result of these regulations?

\$0.01-\$0.10 per gallon

9.7%

\$0.11-\$0.20 per gallon

23.3%

\$0.21-\$0.30 per gallon

16.0%

\$0.31+ per gallon

7.3%

No impact

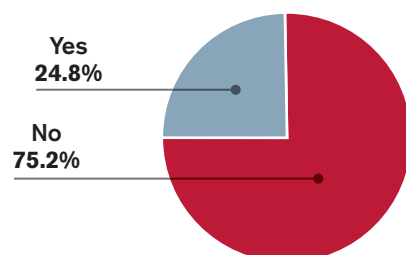
2.4%

Unsure at this time

41.3%

QUESTION 5

Have you considered a strategic approach to mitigate? Q5



Alternative energy 29.2%

Risk management (hedging) 35.4%

Mode conversion 35.4%

Other 31.3%

¹⁴ Source: Survey developed jointly by *Logistics Management* and *Breakthrough*

Our going-in presumption was, for North American-centric shippers (meaning those spending the bulk of their transportation dollars on truck, rail and barge freight), the level of awareness was *not high* and the impact not viewed as either relevant or of great magnitude. This is largely because the news focus was aimed solely at the impact on ship owners and operators, without considering the impact across the broader supply chain.

Bolstering the survey, we interviewed a cross-section of senior-level executives from the ocean, rail, truck and shipper communities, as well as several from the refining and energy markets. A consistent theme was people were “generally aware” of the new IMO-2020 regulations, but hadn’t really done any significant analysis to assess effect on their business.

BNSF Railway burns more fuel than anyone in North America, except the U.S. Navy. Railroad veteran Matt Rose, recently retired chairman of BNSF, shepherded the railroad through a drastic rise in fuel costs during the past 20 years. “Fuel went from about \$770 million in 2000 to a peak of \$4.6 billion,” he said. “At one point, fuel was 10% of operating cost, and at its peak it equaled labor cost at 32%. Railroads will have to make choices on fuel for the longer term. Going to LNG is billions of dollars in infrastructure and equipment cost. The net price of fuel would have to go up \$0.75 to \$1.00 per gallon before it would drive a major shift.”

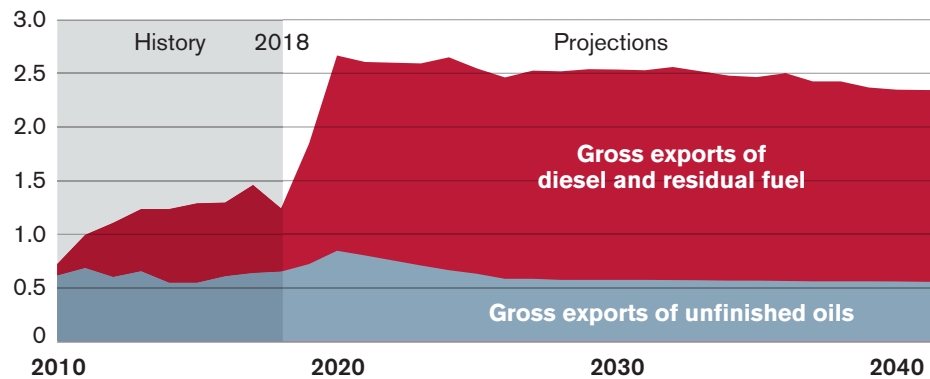
While a 50% increase in the cost of diesel would achieve this, the timing and capital to convert would be large in scale and likely need to extend to most, if not all, the Class I railroads, due to interoperability of equipment.

Derek Leathers runs one of the nation’s largest motor carriers. As CEO of Werner Enterprises, Leathers has his eye on the ball. “We very much have this on our roadmap and have discussed at the Board level. It will put more demand on refining capacity, which will have more impact in our space. Diesel will have more homes to go to, so our best response is to push the envelope on MPG.” He commented that the reaction of many shippers is that: “It’s closer to another version of ‘the sky is falling.’ But, as a trucker, we’re ahead of this.”

One of the oft-overlooked outcomes of this major energy shift, in addition to the rising demand for distillates, is the anticipated increase in U.S. exports, predominantly to Europe, in meeting their requirements for producing low-sulfur fuel. As Ted Prince, former K-Line executive and co-founder/COO of TigerCool Express says: “Domestic production is also part of the global market. The U.S exports to other areas, such as the EU, so there’s a potential for a 20% to 50% increase in the demand for diesel.” This will further impact supply and price.

U.S. DIESEL, RESIDUAL FUEL AND UNFINISHED OILS TRADE ¹⁵

Million barrels per day



Source: U.S. Energy Information Administration, AEO2019 Reference Case

U.S. refining capacity has remained relatively static for the past 10 years, increasing slightly from 17.6 million barrels per day in 2010 to 18.8 million barrels per day in 2019, according to the U. S. Energy Information Administration. Utilization has also remained basically static, hovering around 90% for the past 5 years.

Disruptions can be expected, such as the recent closing of the largest refinery on the East Coast, Philadelphia Energy Solutions' 335,000 bbl/d facility in Philadelphia, after a large explosion in June of this year. "With major refinery capital projects requiring notionally five years for engineering, permitting and construction, it is too late for a refiner to initiate a capital project aimed at capitalizing on market changes driven by IMO-2020.¹⁶" This begs the question around availability, if exports spike upwards and capacity is static, what happens to supply and price?

The inevitable outcome will be substantive pressure between supply and demand, destined to increase prices on domestic fuel. How are shippers going to react and what are they doing? The survey results indicate not much, if anything at all, beyond 'wait and see.'

Domingo Amunategui, vice president of supply chain for building materials producer Arauco North America, says: "We're following the main headlines, and we're talking about this issue. It's one of the variables creating volatility, and this is just adding to the mix. Our use of leading-edge fuel management technology gives us good visibility to the true cost of fuel. Knowing we have the right fuel recovery program is very helpful enabling us to focus on maximizing the efficiency of moving freight and reducing empty miles."

¹⁵ Source: U.S. Energy Information Administration, AEO2019 Reference Case

¹⁶ Source: *Ship & Bunker*, July 8, 2019

According to Michelle Livingstone, vice president of transportation at The Home Depot: “We’ve taken proactive steps to mitigate impact to our business and our ocean carriers under the new IMO-2020 regulations, as well as making sure we’re paying our appropriate share. On the domestic side, we’re watching it closely until better data becomes available.”

Domingo added that uncertainty is the most often used word to describe the present environment, which rings true. “It is so complex, with so many variables.”

The deadline is quickly approaching, and while some carriers have already converted to compliant fuel, others are stockpiling reserves. There are also expectations that other carriers will start shifting to compliant fuel as early as October, so getting ‘smart’ about IMO-2020 now and planning for the future is a sound strategy.

SCENARIO VISIONING

Consider this possible scenario: When IMO-2020 regulations take effect on January 1, the bulk of the ocean vessel operators will comply with the new rules and convert to blends (HFO/ULS/VLSFO) or middle-distillate fuels, such as diesel. Since less than 2% of the current fleet operates on alternative fuels (e.g., LNG) and current estimates say only about 2,000 vessels (3% to 4%) will have scrubbers (open or closed-loop) installed by 2020, this leaves roughly 48,000 ships (about 94%) that will not meet the new standards without changing their fuel source.

According to Charles Kemp of Baker & O’Brien, one of the leading authorities on the energy industry, there are a number of key challenges facing the producers and users of fuel. “There is no magical instant fix,” he says. “There is insufficient fundamental analysis that supports the asserted positions of expected supply and pricing,” which leaves a large gulf between where we are today and what’s likely to unfold.

Kemp questions the mechanism for the market to fix it. “There are not enough capital projects underway that will consume all the high-sulfur fuel oil that is being produced today,” he said. “It appears that the refining industry globally does not have the expansion plans in place to build the very expensive equipment necessary for upgrading high sulfur fuel oil. At roughly 3 million bbl/day output of high sulfur fuel oil, upgrading this volume would require the equivalent of 60 coking units being built. We may be heading into an infeasible dilemma. Heavy oil refining margins have not been good enough to justify an investment of \$1 billion each to build these new coking units. Plus, the time required to build a new coker is three to five years.”

Kemp's conclusion in terms of impact on domestic transportation is simple: "Because on-road diesel has almost zero percent sulfur, it will be used as a sulfur diluent in bunker fuel. Since diesel is already priced higher than other refinery products, it will force other high-sulfur blending stocks to be priced much lower. Ultimately, if the IMO-2020 regulation is enforced globally, this divergence in prices will not be resolved until adequate ship scrubbers are in place or significant new refinery capacity is built."

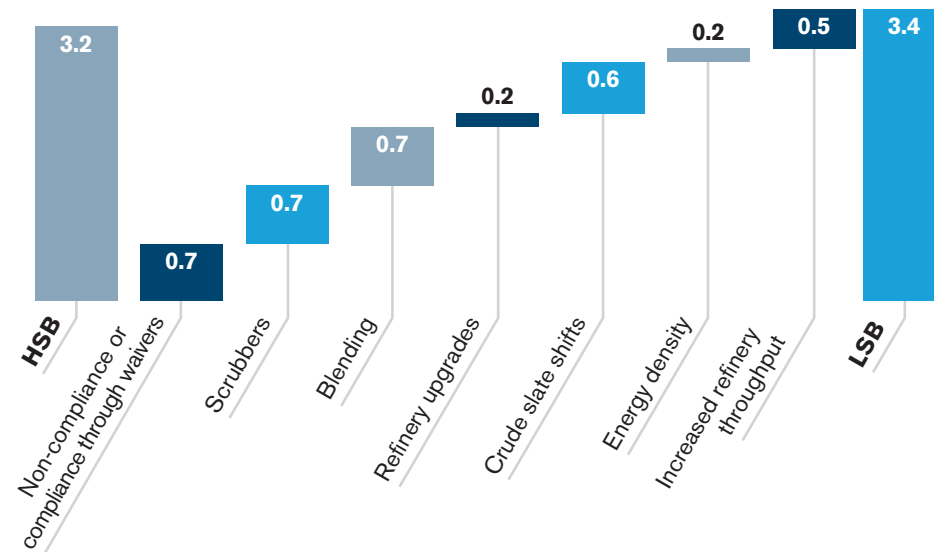
Since scrubbers are in place on a very small percentage of the global fleet presently and the capacity for adding scrubbers is limited by fleet availability and yard capacity to conduct the work, this presents a large-scale conundrum. "While some ship owners have installed cleaning systems, others see them as potentially high risk as some ports have already banned or restricted scrubbers that pump waste water into the sea, and more may follow suit."¹⁷

Compliance with IMO-2020 regulations will be accomplished across a spectrum of alternatives. As shown in the table below, Baker & O'Brien estimated multiple paths from the global consumption of 3.2 million barrels per day of high-sulfur bunker fuel (HSB) to the equivalent demand of 3.4 million barrels per day of low-sulfur bunker fuel (LSB).

Managing compliance will be an elemental part of enforcing the IMO-2020 regulations. This will involve port authorities, Coast Guard services and other governmental agencies.

ROUTES TO COMPLIANCE¹⁸

MMB/D



¹⁷ Source: *gCaptain Maritime News*, 07/08/2019

¹⁸ Source: *Baker & O'Brien*

Technology has already been developed, such as “Sniffer Drones,” to aid the agencies tasked with compliance and enforcement. The majority opinion, across a broad spectrum of sources, says compliance will be at a very high level from the outset among all responsible carriers.

Non-compliance will prove problematic. According to *Hellenic Shipping News*: “The final choice for the shipping industry is not to comply with the regulation. This non-compliance may be intentional, while there may be a segment that has tried to unsuccessfully procure a compliant fuel, in which case they receive a waiver. We do think that compliance will be strong, with ship owners not wanting to risk fines from flag states or imprisonment of ship’s officers. Furthermore, breaching the regulation would class the vessel as unseaworthy and therefore, uninsurable.”¹⁹

Clearly, uninsurable vessels become inoperable until the defect is cured.

STEPS YOU CAN TAKE TO PREPARE (OR AN OUNCE OF PREVENTION MAY BE WORTH A TON OF FUEL)

IMO-2020 will diversify the fuel portfolio and intensify the maritime industry’s focus on fuel efficiency. Informed shippers that understand the impact of such trade-lane factors as vessel speed, size and utilization will have a better ability to manage and control reimbursement costs.

Shippers actively managing their fuel spend, regardless of mode, will achieve a stronger competitive position than their peers, who are slower to adapt to changing market conditions. Taking things at face value, responsible shippers will plan for a potentially radical shift in the cost of moving product inbound from vendors and suppliers and outbound to customers.

So what can be done in the face of a sea change in the way fuel is manufactured, sold and utilized? Best-in-class shippers will do some or all of the following:

- Optimize their transportation networks to improve supply chain performance and reduce operating costs. What does that really mean?
 - All transportation networks have latent inefficiency in them, which is largely driven by the way capacity is sourced and utilized. The traditional method largely revolves around annual “bids” that purport to get the best deal in terms of cost to serve. This seldom (i.e., never) works as intended. Transportation networks are simply too fluid, with too many variables—new vendors and customers coming on board, older vendors and customers leaving, carriers going and coming as market conditions shift, changes in shipper networks as DCs are added, closed or relocated, etc. This leads to a frustrating experience for all concerned.

¹⁹ Source: *Hellenic Shipping News Worldwide*, July 19, 2019

- Use advanced sourcing techniques and robust optimization technology. This can help solve the problem by making use of the power of the overlapping networks of shipper freight and carrier capacity, which drives out empty miles and makes both carrier and shipper networks more efficient, which in turn requires less fuel

- Annual events are only part of the answer, having become much less effective as networks become progressively more dynamic. Continually tuning the network through data-driven compliance management and mini-events during the cycle help to maintain the efficacy of service and network performance

- Be supportive and engage with carriers that have embraced the future and have moved – or are moving – to alternative fuels, such as LNG, as well as taking advantage of lower Fuel Surcharge costs offered by such carriers

- Take a more proactive role in managing fuel. “IMO-2020 is a transformative market event because it represents an entire industry’s fuel management practices being challenged by emissions policy. Stakeholders impacted by this change should be bearing in mind that other modes of freight transportation may produce fewer sulfur oxide emissions but produce substantially more greenhouse gases per freight ton-mile than maritime freight does. Moving forward, more challenges and costs will arise from the need to move freight with fewer emissions. This movement will further incent shippers to obtain transparency of fuel cost, consumption, and emissions. Data-driven approaches to fuel management enable supply chain efficiencies, especially as the portfolio of energy options for commercial transport continues to grow.”²⁰

- Most shippers act as bystanders in the fuel management process, being content with negotiating a fuel surcharge (FSC) formula with their service providers based on the DOE Fuel Price Index. Fuel is now simply too important to be handled in such a fashion, in some cases running close to 30% or more of total cost of moving freight.

- The DOE Fuel Price Index is an anachronistic hold-over from the Interstate Commerce Commission (ICC) from pre-deregulation days. It is fundamentally flawed in several respects:

- It is a weekly national average, which does not account for daily price fluctuations
- There are wide variations in fuel taxes around the country (e.g., \$0.80 per gallon in CA v. \$0.20 in TX), which are not reflected in the DOE Index
- It is based on retail cost of fuel at the pump, when most well-managed carriers are purchasing fuel at or close to whole sale, with a spread between wholesale and retail that can range from the low 30s in cents per gallon to the high 60s in center per gallon.
- It creates a profit-center for carriers on fuel, which muddies the water on understanding where margin for hauling freight lies, with some in the freight rates and some in the FSC. The FSC was authorized as a pass-through of an uncontrollable cost by the ICC during the regulatory era. The FSC was never conceived as being a separate profit center

- Push the MPG envelope. Tractor power is getting rapidly and progressively more fuel-efficient, in some cases approaching or even exceeding 10 mpg. Both carriers and shippers will need to continually drive greater efficiency as fuel costs rise

²⁰ Source: *Matt Muenster*, senior manager, applied knowledge, Breakthrough, July 9, 2019

There is game-changing technology in the market today for obtaining greater transparency, removing distortion and establishing fairness. Exploration and evaluation of alternative business models is key element of critical thinking when dealing with potentially major market-changing events

While Shippers will not have influence or control over what happens with fuel markets, they can take steps to plan for the evolving eventualities and be prepared as the ground shifts under them.

We will continue monitoring and reporting on the developments in this impending series of transformational events.

GLOSSARY

AGO	Atmospheric Gas Oil	Heavy distillate from an atmospheric distillation unit
ECA	Emission Control Area	Near coastal areas with tighter fuel specifications
FCC	Fluidized Catlytic Cracker	Cracks VGO and other intermediates into lighter components
HDT/HDS	Hydrotreater/Hydro-Desulfurizer	A refinery unit that removes sulfur
HSB/LSB	High/Low Sulfur Bunker	Heavy ship fuel with maximum 3.5%/0.5% sulfur
HSFO	High Sulfur Fuel Oil	Heavy fuel for any use with maximum 3.5% sulfur
IMO	International Maritime Organization	United Nations organization, no direct police power
LCO	Light Cycle Oil	Diesel range stream from FCC
LSVGO	Low Sulfur Vacuum Gas Oil	Virgin or hydro-treated VGO to cracking units
LVGO	Light Vacuum Gas Oil	VGO to diesel or cracking units, sulfur depends on crude
MARPOL	Marine Pollution	Related to IMO oversight
MCB	Main Column Bottoms	Heaviest, poor quality stream from FCC
MGO	Marine Gas Oil	Fuel for ships that is lighter than residual fuel
NYMEX	New York Mercantile	Market which trades ULSD futures
ULSD	Ultra Low Sulfur Diesel	Diesel with less than 15 ppm sulfur (10 ppm in Europe)
USGC	United States Gulf Coast	Location of many complex refineries
VLSFO	Very Low Sulfur Fuel Oil	Meeting 0.5% maximum sulfur specifications
VGO	Vacuum Gas Oil	A heavy distillate stream from vacuum distillation column