Sustainability e-News Q3 2018 Edition

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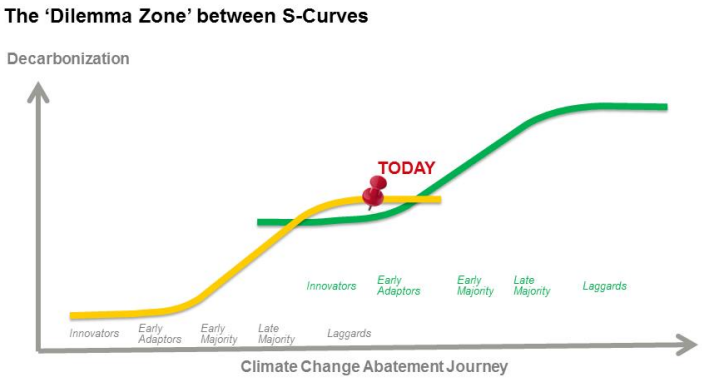
We are pleased to share the new edition of our Go Green Brief – DHL Global Forwarding's Sustainability Newsletter. With this quarterly newsletter we are aiming to share our insights and knowledge on carbon reporting, reduction approaches and climate change abatement trends as well as other related sustainability topics. We hope you find it of value and we welcome your comments and suggestions.

Between Two S-Curves

Despite improvements in both the air and ocean freight industries in terms of reducing carbon emissions, both will struggle to achieve significant future improvements if technological advancements and greater sustainability measures are not put into place.

The Clean Cargo Working Group just released its annual Clean Cargo Emissions Factors 2018 Report . The good news: since 2009, emissions per container per kilometer have dropped by about 37 percent. The bad news: year-over-year efficiency gains are slowing down rapidly. In fact, 2018 annual reporting indicates average CO_2 emissions per container per kilometer for global ocean transportation routes fell by 1 percent from 2016 to 2017. A similar effect can be observed in the air freight industry.

What is going on?



In essence, container shipping and the air freight industry are between two "S-curves," a mathematical model also known as a logistic curve that calculates the performance or growth of one variable in terms of another over time. In this case, the first S-curve is about efficiency gains and the second is regarding true decarbonization.

Efficiency gains for the existing fleet and with existing technologies have reached their limit on a global scale. The first curve is experiencing slow but steady improvement, but significant performance improvements on a global scale will only be achieved when new technologies and enhanced infrastructures become widely available.

However, on the trade lane level or in smaller scale operations, encouraging improvements have been observed. Clean Cargo data shows 5 percent the global container fleet's fuel used in 2017 was light fuel oil (LFO), while liquefied natural gas (LNG) was used on some vessels in the Intra-Northern Europe trade lane. In some trade lanes, such as Asia to North Europe, carriers continued to use their most efficient vessels, resulting in an efficiency gain of more than 6 percent for some ocean freight carriers.

The air freight market shows a modest carbon efficiency improvement as well, at around 2 percent. This is driven by increased utilization of operated aircraft, as well as the continuous replacement of older aircraft with newer and more efficient models. For example, the flown ton-kilometer on the new Airbus A350-900 has more than tripled compared to 2017.

Overall, it is fair to say the freight shipping industry is making progress, and both the air freight and container shipping industries have clearly committed to very ambitious climate goals. However, taking on this second S-curve will require innovation, funding and infrastructure, posing a new and important challenge for these industries to face.

LNG: A growing decarbonization strategy

It is widely known that the shipping industry's use of conventional fuels puts a strain on the environment. With its considerable CO_2 reductions, could liquefied natural gas (LNG) create a cleaner and more efficient sector?

After the International Maritime Organization (IMO) announced the Global Shipping industry's target of reducing emissions by 50 percent by 2050 (using 2008 as the baseline), discussions on how to achieve this goal have emerged. While the final strategy will not be finalized until 2023, short- and mid-term strategies to decarbonize maritime shipping are being examined

across the ocean freight carrier, freight forwarder and shipping sectors. Biofuels are one of the very few options for changing the maritime fuel mix now, as LNG is currently seen as a mid-term solution.

A clear, colorless and nontoxic liquid, LNG forms when natural gas is cooled to -162°C (-260°F). This enables an easier and safer storage and shipment process by shrinking the gas's volume 600 times. Furthermore, LNG will not ignite in its liquid state.[1]

LNG is the cleanest fossil fuel, emitting no soot, dust or fumes during combustion and achieving a 25 percent reduction in carbon dioxide (CO_2) emissions compared to traditional fuel oils. And, importantly, it is sulfur-free. With new global emissions standards on the horizon, the maritime shipping industry is considering LNG as an alternative to high-sulfur bunker fuel. New IMO rules have decreased the allowed sulfur content in marine fuel to 0.5 percent (down from 3.5 percent) by January 2020, boosting interest in sulfur-free LNG.[2]

In spite of LNG's high availability onshore, its usage in maritime shipping has been limited so far. This is mainly due to missing port infrastructure, referring to the lack of LNG bunker barges, nonexistent global security standards, high investment costs and capacity issues when equipping ships with LNG tanks—not to mention the cost associated with new ships suitable for LNG.

But this has not stopped many ocean freight container carriers from starting preparations for LNG use, such as CMA CGM's order for new LNG ships or Hapag-Lloyd's project to upgrade their existing fleet with LNG-ready ships. "LNG-ready ships" are vessels with engines that can burn both LNG and fuel oil. They only need an additional LNG fuel tank, as well as some additional piping and machinery. Then they are able to switch between LNG and fuel oil.

Even if some port infrastructures are adequate for short-sea shipping (e.g., by placing an LNG tank on top of a ferry), carriers struggle to use LNG on container ships larger than 10.000 TEU. Without LNG bunker barges, carriers would be forced to bunker LNG at different ports for LNG land use during their container loading processes, severely impacting transit time. While Norway is leading the way in using LNG for short sea shipping, the Ports of Rotterdam and Singapore are currently the only two ports worldwide with deep-sea container shipping LNG infrastructure

[1] Shell.com
[2] Reuters.com: "Marine shipping sector eyes LNG to meet clean fuel rules," June 28, 2018

ready in 2020. Other ports, including some in China, are only just starting to look into their LNG capacities.

One inevitably comes to the “chicken or the egg” dilemma here: without confirmed volume on the demand side, ports and gas companies will not invest in bunker barges. Meanwhile, carriers do not want to invest in LNG ships without confirmed infrastructure.

When it comes to sourcing, LNG critics highlight that, despite its clear CO_2 benefits when compared to Heavy Fuel Oil (HFO), natural gas extraction can negatively impact the environment. This is especially true in terms of fracking, whose impact on groundwater is not yet clear. Aside from causing air pollution and potential disturbances in wells, pipelines and the surroundings, natural gas exploration and drilling requires land clearing and engines, which detracts from LNG's benefits.

Considering the environmental benefits and assuming sufficient future infrastructure availability and greater regulatory certainty, LNG appears to be a valid mid-term solution for decarbonizing maritime shipping. Looking at the long-term goal, LNG will not be sufficient to decarbonize ocean freight shipping, but will most likely only apply for one generation of container ships. But with no definitive zero-emission solutions at hand, LNG should rightfully be pursued until the ultimate solution is discovered.