

How is the shipping industry progressing when it comes to the introduction of alternative energy carriers in general? Without claiming to have a systematic or numerical overview of the worldwide introduction of alternative fuels, some general trends can be seen following the high uncertainties regarding the definite choice of fuels, the availability and the pricing of these energy carriers of the future. These uncertainties lead to a variety of approaches to cope with the increasingly more demanding decarbonisation regulations.

There is agreement on the general picture of what the future of decarbonisation looks like. This involves a diverse set of multiple decarbonisation solutions based upon effective combinations of energy carriers and technical energy conversion solutions. Eventually, this will lead to multiple energy carriers being produced and new infrastructures (supply and storage). Each solution will be suitable for a specific transport demand defined by its transport distance, transport volume, transit speed requirement, sea environment, and so on. So far all very typical for shipping!

And as a prerequisite for all these solutions, high propulsion efficiency should be sought, either by design (Energy Efficiency Design Index (EEDI)) or in the operation of the vessel (Carbon Intensity Indicator (CII)) or perhaps even logistics. These solutions are slowly, but steadily developing through new propulsion devices, wind assist options (getting traction!), improved voyage planning, vessel cleaning regimes, forms of air lubrication, et cetera.

Main trends

Further to this common ambition, three main trends on decarbonisation are visible. They are:

1. Filling transport niches with specific energy carrier/conversion solutions: These solutions match well with the particular combination of commercially viable or locally enforced, and technically feasible transition frame. Often, availability of the chosen energy carrier is part of this frame. Here, numerous examples exist ranging from battery-electric ferries and tugs to dedicated zero-carbon offshore operations like dredging or installation using locally produced methanol. With the increasing battery capacity per tonne weight, the operating ranges of these electrified solutions will grow. With the quest for "green and clean" operations within public and sustainable energy projects stepping up, the application of methanol will also grow.
2. The growing number of (networks of) "green" corridors: Strategically located hubs connecting large liners' transport flows will start to set up the first corridors supported by selected fuels and then develop them further into corridor connections (networks). The larger hubs with either larger volumes or more strict regulations are the first that are capable of organising (attracting, investing, facilitating) production, storage and the infrastructure of these selected fuels. See also in this magazine the contribution from the Port of Rotterdam. In later stages, the network will extend, the selection of fuels will grow and ultimately smaller ports and other trades will follow.
3. The smart "dual-fuelers" wait and see group: Shipowners facing new investments are highly uncertain about which future

onboard power energy system to invest in. Their assets last long and making the wrong choice could easily lead to stranded assets due to either non-availability, high pricing or both of the chosen energy carrier. Their no-regrets choice for dual-fuel internal combustion engine (ICE) solutions seem to offer two (relative) advantages. It offers the flexibility of using as long as possible the still widely available fossil fuels (including liquefied natural gas (LNG), and marine gas oil (MGO)), which further in time will automatically be mixed with a growing percentage of fossil-like bio-based green fuels. See elsewhere in this magazine the contribution on "Het investeringsspad voor groene scheepsbrandstoffen". The (world) market for these bio-fuels is steadily developing based upon available feed-

stock and a pretty predictable growth in demand (known to be accelerating in 2035), hence a relatively ascertained availability. Of course, price development is much less certain, but will hurt all now following that track in the same way, thus, supporting the level playing field. And secondly, with these dual-fuel engines, shipowners can ultimately change to the alternative e-fuels if their pricing becomes more attractive. Still, the latter does require provisions for the future (higher) bunkering volumes. Of course, another part of the "wait and see" group is not even investing in dual-fuel solutions and is watching and waiting for the silver bullet to hit them...

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Regulations and level playing field

The above underlines the importance of two key drivers; regulations and a level playing field, next to the key of alternative fuels availability. On the latter, recent news items illustrate an ongoing battle with large investors lowering their investments (Norske Hydro, Neste, Shell, and so on).

Continued research and development on sustainable technologies certainly is worth the effort to enable a diversity in tracks and well-founded decisions on new technologies.



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