

Maritime Decarbonization Monthly

November 2021

Thought of the Month:

“China says it aims to reach peak emissions of carbon dioxide — which is produced mainly through burning coal, oil and natural gas for transportation, electric power and manufacturing — before 2030.”

The Big Picture

Decarbonizing shipping is not an easy task, but it will define future investment decisions in the global maritime space for decades to come. It is estimated that shipping will require **\$1-\$1.9 trillion of new investments**, ~85% of which will go towards land-based infrastructure and production facilities for the zero emission fuels.

What's New

The Japanese Shipowners Association is ready for a hefty number of annual investments as it relates to decarbonization. It was recently reported that **Japanese shipowners** are going to spend about **\$10 billion per year** over the next three decades to support a national zero-carbon policy goal by 2050. Owners will proceed with **the construction of 100 new ships per year** to meet the zero-coal target. Three main fuel options are being considered for the newbuilds: carbon-recycled methane, hydrogen, and ammonia.

Our View

Naturally, there is a hesitancy towards incorporating **new technologies** in ships, as the long useful life of a ship combined with the uncertainty over the dominating low-emission technology has made owners more sceptical of the capital investment towards shipbuilding projects. Engine technology is a critical component to achieving decarbonization in shipping, and proof of concept is necessary to convince shipowners and operators of the reliability and efficiency of this new class of power.

The geographic diversity and participation by major shipping and energy companies amongst green ammonia pilot projects demonstrates **the dominance that hydrogen and ammonia** have as a future fuel choice. But it is important to note these projects are still fully in the ‘pilot’ stage and green fuels remain years away from being operational.

Finally, following the news from Japan relating to **newbuilds**, we anticipate that the trend of new, energy efficient vessels will only increase in the years ahead, although the technology of such vessels continues to vary based on owners’ preferences, innovative new products, and naturally the additional capital and operating costs required on such projects.

Industry Trends

Fuels

Some recent investments in green ammonia and hydrogen production underline the prospects of these two as the dominant alternative fuel for shipping. Since the beginning of this year, production projects for green ammonia and hydrogen chain have emerged in different areas of the world:

- Northern Europe: **Statkraft**, **Yara International** and **Aker Horizons** to start production of green hydrogen and green ammonia at one of Yara's plants in Porsgrunn.
- Spain: **Repsol** recently stated that it is going to invest €2.5 billion (\$2.9 billion) in the entire hydrogen value chain by 2030.
- Russia: **Gazprom** has signed an agreement of intent with the government to advance the development of green hydrogen.
- Japan: **Yara** is also collaborating with **JERA** and **Idemitsu** on clean ammonia bunkering and distribution in Japan.
- Australia: **Global Energy Ventures** is proceeding with its expansion plans to establish a hydrogen supply chain with the development of a green hydrogen export project.

Technology

While batteries and fuel cells get plenty of attention for their potential to decarbonize ships, combustion engines can also be designed to use green ammonia and hydrogen as a fuel.

More recently, some early trial using ammonia as a fuel have been quite promising:

- Japanese shipping company **NYK Line**, together with its partners **Japan Engine Corporation**, **IHI Power Systems**, and **Nihon Shipyard**, will soon begin a trial project for the commercialization of vessels equipped with a domestically produced ammonia-fueled engine.
- In July, Finnish technology and engineering group **Wärtsilä** performed full-scale engine tests using hydrogen and ammonia

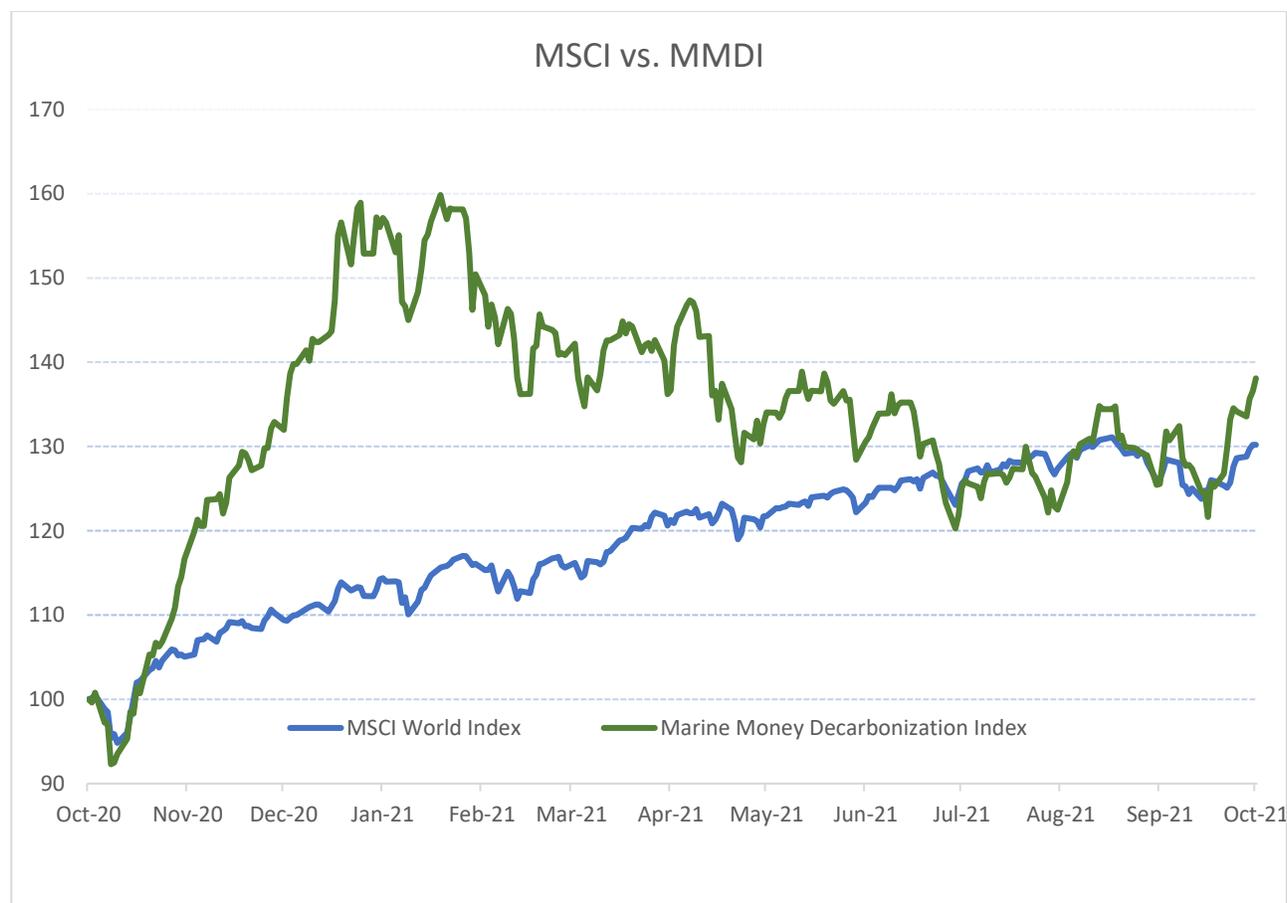
Both projects represent important steps in bringing an ammonia-fueled engine to the market, something that is not expected anytime soon.

Green Ships

The trend towards “green” newbuilding ships is already underway, with several new, low-emission vessels being recently delivered.

In October, one of the largest shipping companies in the world, **K Line**, took delivery of a new eco-friendly Capesize bulker which is equipped with energy-saving propulsion devices that are expected to reduce the resistance of drag caused by oncoming wind, and as a result, reduce fuel consumption.

In the tanker segment, Waterfront Shipping, a subsidiary of **Methanex Corporation**, has taken delivery of the fifth in a series of eight methanol dual-fuel tankers from South Korean shipyard Hyundai Mipo Dockyard.



Relevant Prices

Fuel Prices

	Price	YOY
Crude Oil, Brent	82.95 \$/bbl	108.9%
Natural Gas, Henry Hub	5.63 \$/MMbtu	84.1%
LNG, Korea/Japan	30.81 \$/MMbtu	440.9%
Coal, Rotterdam	135 \$/mt	160.6%
VLSFO, Rotterdam	421 \$/mt	67.5%
Methanol, China	45.30 \$/mt	50.0%
Palm Oil, Malaysia	52.44 \$/mt	62.4%

Stock Indices

Marine Money Decarbonization Index	434	43.6%
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Carbon Emission Allowances

EU Emission Allowances	69.38 \$/kt	145.7%
UK Emission Allowances	72.98 \$/kt	18.1%

Note: All prices as of last closing prior to the report; Sources: Bloomberg and Breakwave Advisors

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