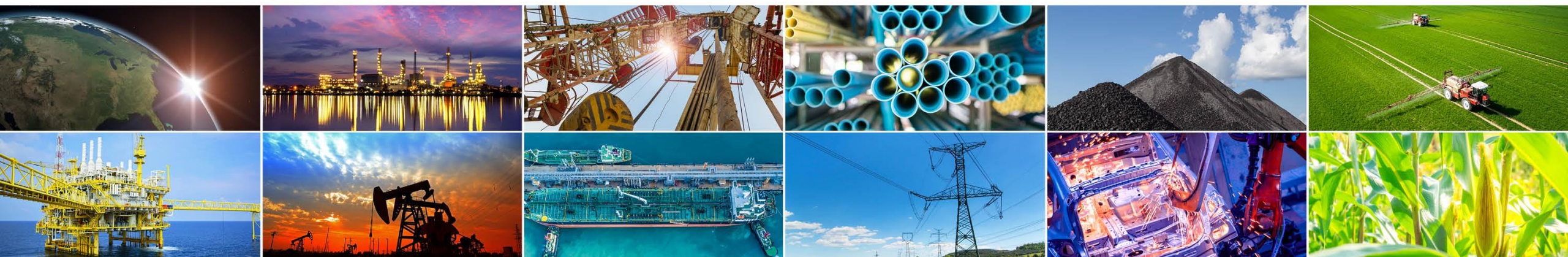




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Pricing considerations of low and zero carbon marine fuels

IMO Symposium on alternative low and zero carbon fuels for shipping, 21 October 2022



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Argus Marine Fuels: a daily, global report

Includes conventional and alternative marine fuel:

- Global spot prices
- Market commentary
- Fundamentals data
- News
- Analysis

Existing markets where Argus has price assessments

	NW Europe/Baltic	Mediterranean	SE Asia	Middle East	North America	South America	Caribbean	Africa
Ammonia: grey	x	x	x	x	x	x	x	x
Methanol: grey	x		x		x			
Biomethanol	x							
LNG	x	x	x	x	x	x	x	x
Biofuels	x		x		x	x		

Emerging markets where Argus calculates prices

Ammonia: green	x							
Hydrogen: blue, green	x	x	x	x	x	x	x	x



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Argus Marine Fuels

Issue 22-203 | Thursday 13 October 2022

OVERVIEW

- Independently-held gasoil stocks in ARA dropped sharply by 10.3pc, likely in response to steep backwardation and refinery closures in France caused by strikes.
- Barge availabilities will remain tight until next week in Piraeus.
- Shanghai lacked spot trade discussions because of short-term supply shortages.
- VLSFO prices rose in Tokyo because of tighter availability.

Key conventional bunker assessments, midpoint				
Delivery	0.5% fuel oil	MGO	3.5% fuel oil	
Singapore S/t cargo, fob	682.00	-	353.75	
bunker, dob*	722.14	1,068.00	375.50	
Zhoushan S/t bunker, dob*	714.00	1,071.00	395.00	
Fujairah S/t barge, fob	685.00	-	-	
bunker, dob*	695.00	1,267.50	370.00	
ARA S/t bunker, dob*	627.00	1,077.00	-	
Rotterdam S/t bunker, dob	-	-	379.25	
NW Europe S/t barge, fob	623.00	1,085.75	351.50	
US Gulf S/t barge, fob	98.07	-	56.75	
US Gulf S/t barge, fob	660.41	-	-	
Houston S/t bunker, ex-wharf	657.50	1,245.00	427.50	
Houston S/t bunker, dob	669.50	1,251.75	-	
New York S/t barge, dob	103.07	-	-	
New York S/t barge, dob	694.08	-	-	
bunker, ex-wharf	720.00	1,270.00	392.50	
bunker, ex-wharf	796.25	1,343.50	355.00	
bunker, dob	809.50	1,372.50	375.00	
bunker, ex-wharf	697.50	1,287.50	397.50	

* US Gulf fuel oil prices in the New York and US Gulf are assessed independently correlated by blend conversion factors due to density variations. See methodology in the Argus database.



Regulatory landscape tightening

	Location	Year	2023	2024	2025	2026	2030	2035	2040	2045	2050
IMO	International waters	from 2008 base levels					CO2 40%				CO2 70% & GHG 50%
IMO TBD in 2023	International waters										100%
EU proposal Inclusion in EU ETS combustion emissions*	100% EU territorial waters & Voyages arriving/departing the EU:	from 2020 base levels	20% of emissions	45%	70%	100%					
EU proposal FuelEU Maritime GHG intensity life cycle emissions*	50% of emissions through 2026 100% of emissions from 2027	from 2020 base levels			2%		6%	13%	26%	59%	75%
EU proposal Energy Taxation Directive on bunkers	Bunkers sold in the EU for use within the EU		- FO/MGO : €0.9 per GJ - LNG/LPG : €0.6 per GJ	LNG/LPG : €0.9 per GJ							



*Emissions include CO2, methane and nitrous oxide

“Alt” marine fuels: ensuring a fair price comparison

	Energy content, million BTU*/t	CO2 emissions from combustion, outright	CO2 emissions adjusted for ton VLSFO-equivalent	% drop in emissions
VLSFO	~40.4**	3.15	3.15	-
LNG	52.5	2.76	2.12	-33%
methanol, grey	18.9	1.38	2.94	-7%
B30	36.9	2.21	2.42	-23%
ammonia***	17.6	0	0	-100%
hydrogen***	113.7	0	0	-100%

*BTU: British thermal units

**VLSFO emissions vary depending on the blend and feedstock

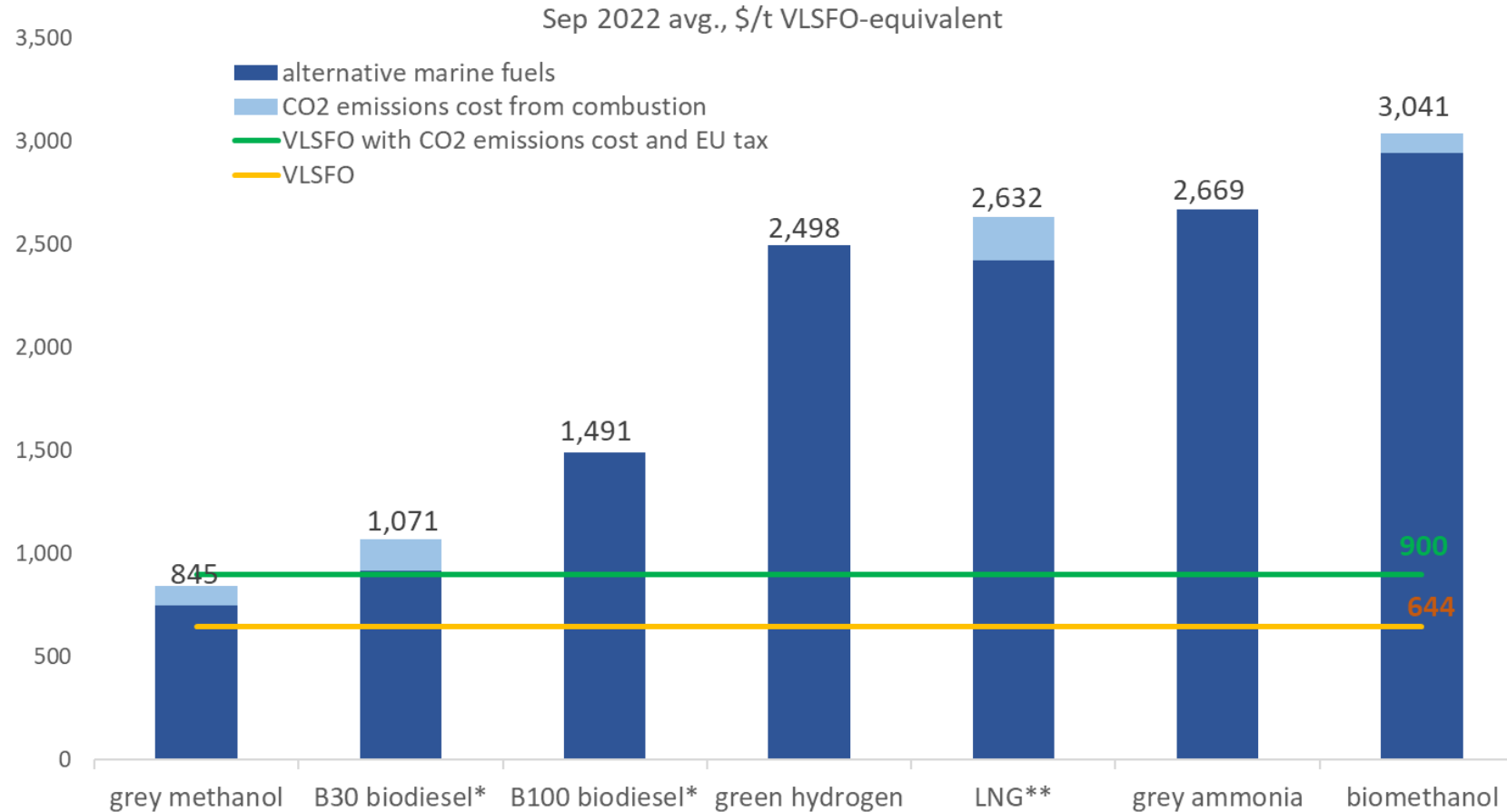
***ammonia and hydrogen do not emit CO2 during combustion

Presently, the IMO considers emissions from combustion (tank-to-wake), and not lifecycle emissions (well-to-wake)

1t of VLSFO has:

- **2.2 times** more heat content than 1t of ammonia
- **2.1 times** more than methanol
- **1.1 times** more than B30

NW Europe “alt” and conventional bunkers price comparison



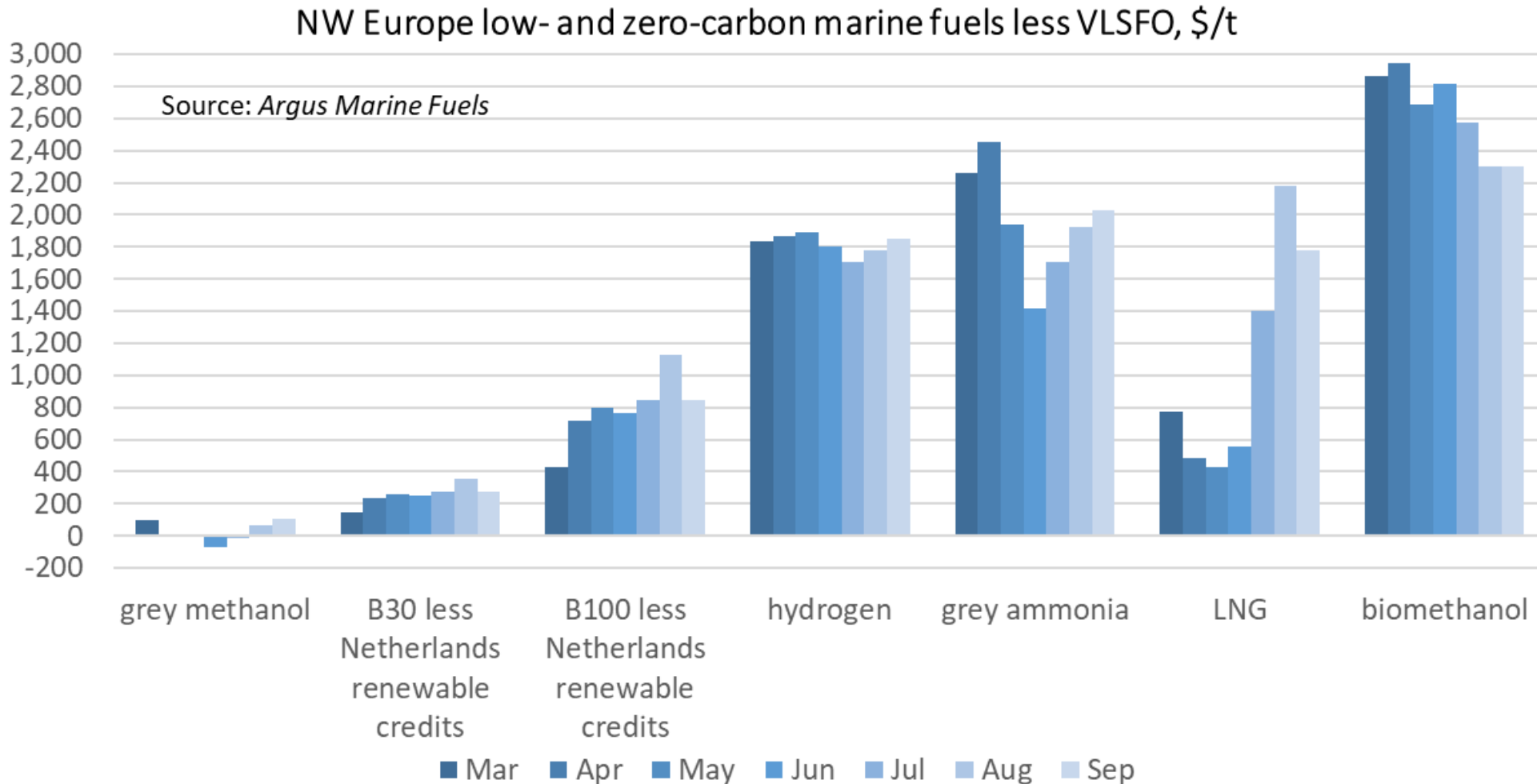
* biodiesel: Amsterdam-Rotterdam-Antwerp advanced FAME, less Netherlands renewable fuel credit, plus delivery and blending

**LNG price includes CO2 emissions cost and EU tax on LNG for bunkering

Source: Argus Marine Fuels

As it stands, grey methanol is at a discount to VLSFO

NW Europe “alt” and conventional bunkers, continued



Marine biodiesel: the low hanging fruit

Argus is developing low carbon, marine pricing solutions as markets emerge.

The index includes:

- ARA biodiesel (advanced Fame 0°C CFPP)
- **Minus** HBE-Gs (hernieuwbare brandstofeenheden), aka Dutch biotickets
- **Plus** very low sulphur fuel oil (VLSFO) ARA spot price
- **Plus** storage, barging, blending and throughput costs

RED marine biodiesel dob ARA range		
	\$/t	±
B10	711.74	▲
B20	769.22	▲
B30	826.71	▲
B50	941.68	▲
B100	1229.12	▲

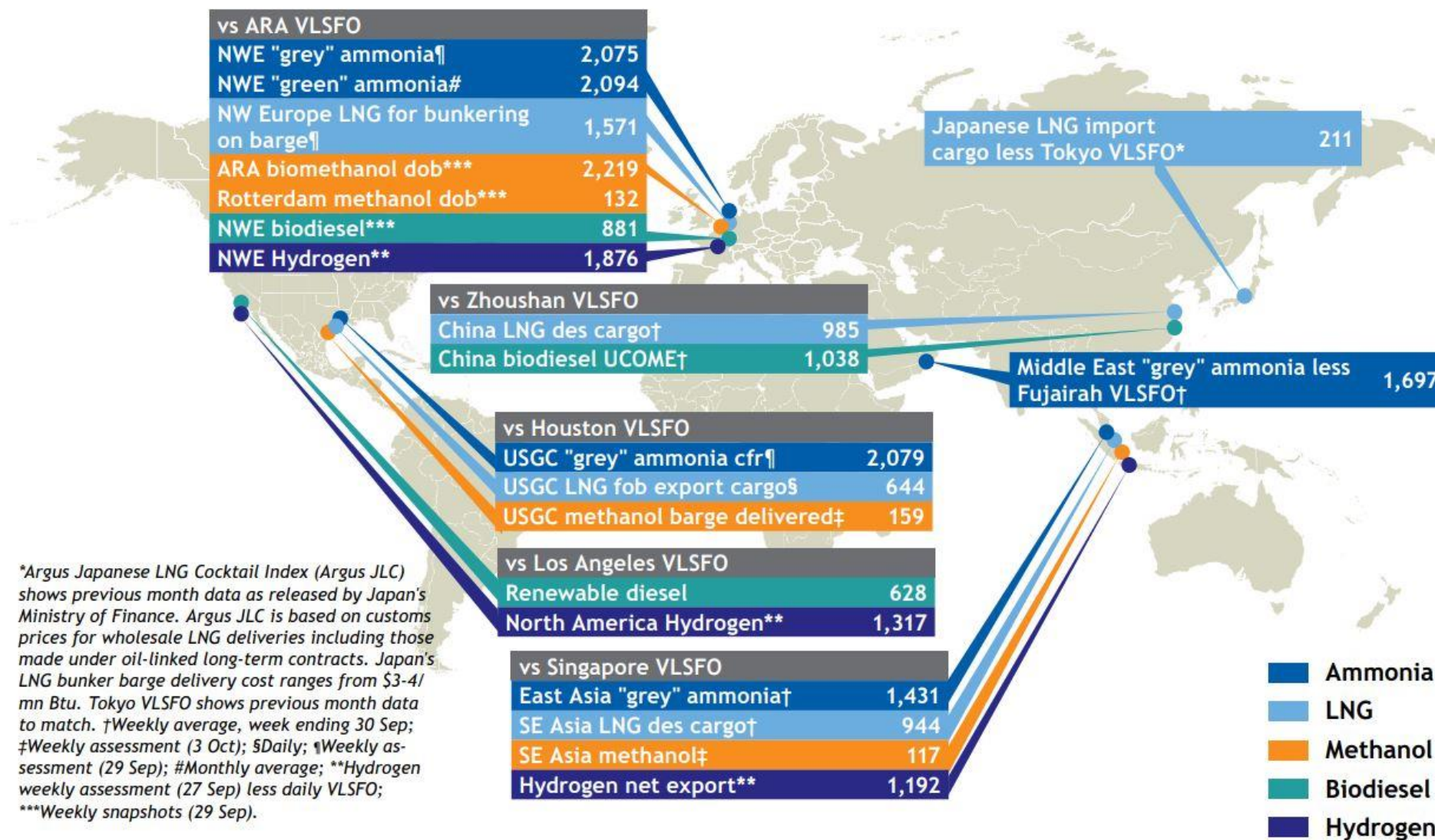
B30 marine biodiesel dob ARA index, showing premium to VLSFO



Argus B30 dob index shows a mostly downward trend in Sep 22. The Sep monthly average premium to VLSFO dob ARA is 29pc

ALTERNATIVE MARINE FUEL VS VLSFO

\$/t VLSFO-equivalent





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