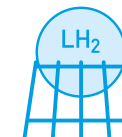


Energy density of LNG compared to alternative liquid energy vectors

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	LNG, Liquefied Natural Gas	Liquid Ammonia	Liquid Methanol	LOHC - Liquid Organic Hydrogen Carrier (MCH used as an example)	Liquid Hydrogen
Temperature for transportation and storage	-162 °C	-33.3 °C	Liquid at ambient temperature	Hydrogenation: 150 - 200 °C; Transported at ambient temperature; Dehydrogenation: 250 - 320 °C	-253 °C
Pressure for transportation and storage	Close to atmospheric pressure	Close to atmospheric pressure	Close to atmospheric pressure	Hydrogenation: above 20 bar; Transported at atmospheric pressure; Dehydrogenation: below 5 bar	Close to atmospheric pressure
Density	0.46 kg/L	0.68 kg/L	0.79 kg/L	0.77 kg/L	0.071 kg/L
Toxicity	TWA 1,000 ppm	TWA 25 ppm	TWA 200 ppm	TWA 400 ppm	non toxic
Flammability (% in air)	4 - 15 %	14.8 - 33.5 %	6.0 - 36.5 %	1.2 - 6.7%	4 - 74 %
Volumetric Lower Heating Value (LHV)(MJ/L)	22.2	12.7	15.7	5.76	8.52
Gravimetric LHV (MJ/kg)	48.6	18.6	19.9	7.48	120
Infrastructure readiness for large scale deployment in mid-term H/M/L	H	H	H	M	L
Commercialisation status and pilot projects	Many commercial LNG production, distribution, storage and regasification assets worldwide	Many commercial liquid ammonia production, distribution and storage assets worldwide with 120 port locations able to handle ammonia	Methanol is a widely traded commodity with tankers up to 50,000 tonnes.	The HySTOC (Hydrogen Supply and Transportation using Liquid Organic Hydrogen Carriers) project in Finland	HySTRA-Hydrogen Energy Supply-chain Technology Research Association - Australia to Japan LH2 shipping