argusmedia.com

The market for green ammonia: future potential and hurdles

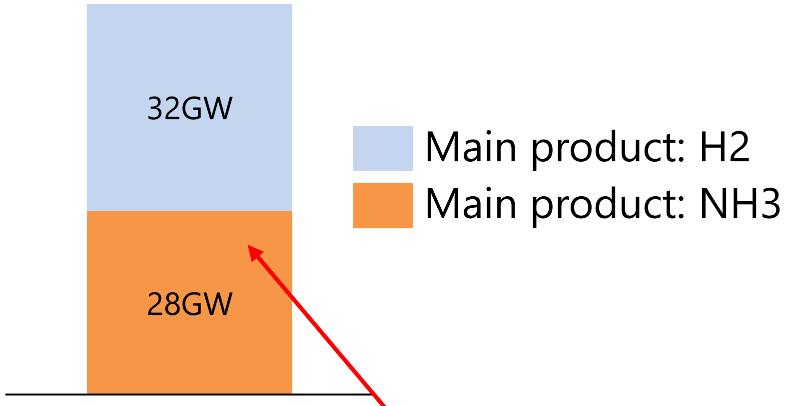
Andrea Valentini
May 6, 2021

Market Reporting
Consulting
Events

illuminating the markets

How does ammonia fit in the hydrogen story?

GW-class H2 projects



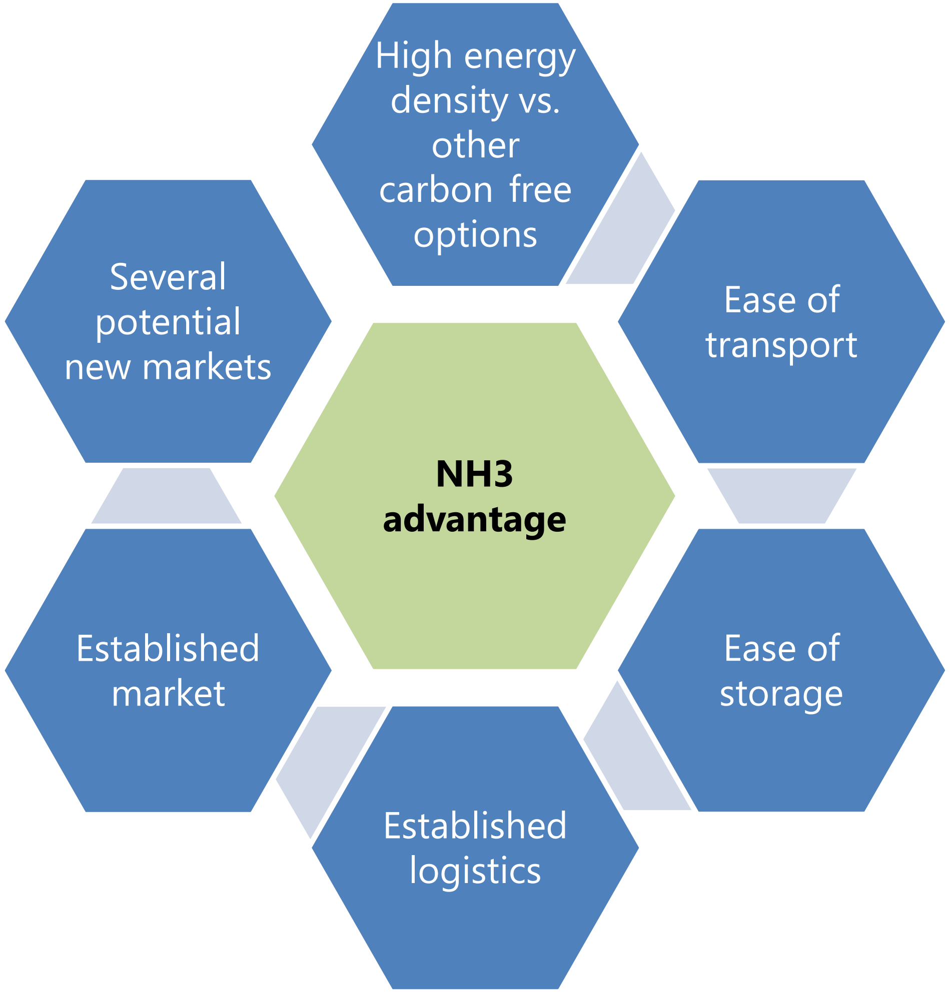
A huge portion of H2 projects under development are aiming to produce ammonia as a H2 carrier

Planned green hydrogen-to-ammonia plants

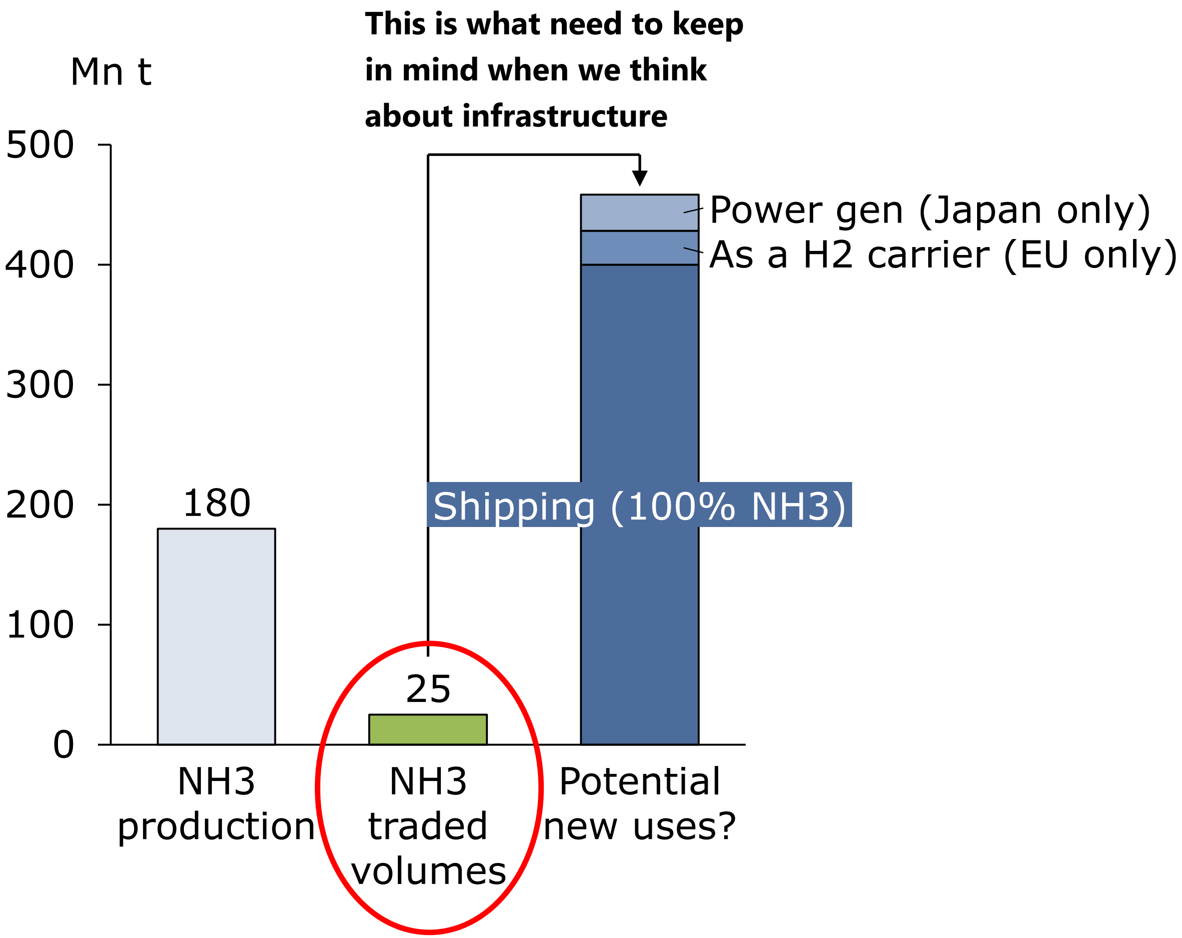
Ammonia as a hydrogen carrier – key advantages

- **Marine fuels**
- **Power generation**
- **Simply as a H2 carrier**

- **Fertilizers**
- **Chemicals**
- **Other industrial uses**



Potential new uses of ammonia: how big can the market become? Hype vs. reality

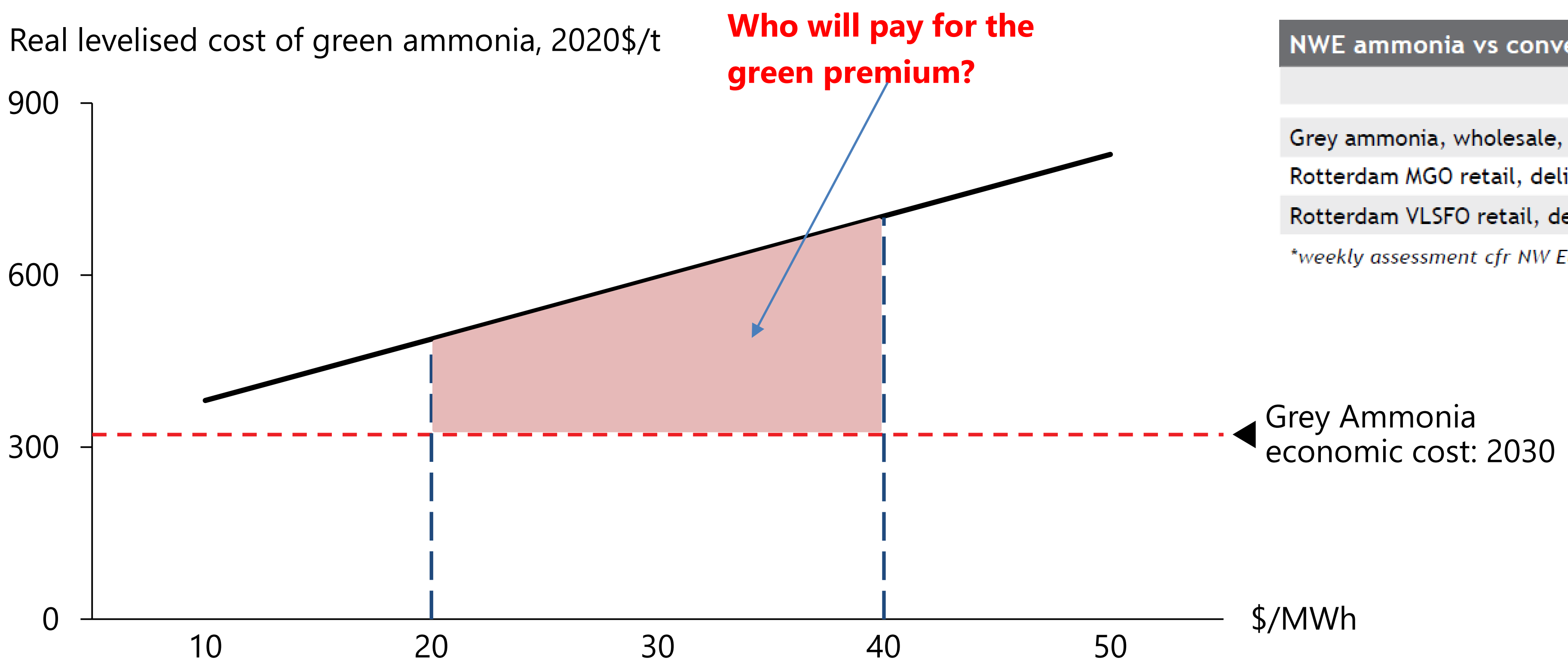


Limiting factors:

1. **Costs**
2. **Infrastructure (traded ammonia is actually only around 25mn t)**
3. **Safety**
4. **Competition from other fuels/energy sources**
5. **Limited potential as fertilizer (urea is the main nitrogen product derived from ammonia, and it is not carbon free)**

Potential issues: costs

Real levelised cost of green ammonia, 2020$/t



NWE ammonia vs conventional marine fuel, weekly average			
	$/mn Btu	*$/t MGOe*	*$/t VLSFOe*
Grey ammonia, wholesale, cfr*	29.403	1,186.67	1,155.03
Rotterdam MGO retail, delivered	12.090	487.95	-
Rotterdam VLSFO retail, delivered	11.492	-	477.70

**weekly assessment cfr NW Europe*

Even grey ammonia is not competitive today

Source: Argus Media

Potential issues: lack of clear regulations and certifications might lead to market distortions

- Lack of regulations and certifications on lifecycle emissions might lead to short-term use of grey ammonia as a fuel, or questionable claims about blue ammonia emissions reduction

Example of blue ammonia's dubious green credentials: *if we produce blue ammonia by using carbon dioxide for methanol production, this might lead to carbon emissions elsewhere in the supply chain, since methanol has significant fuel-related applications.*

- Where project developers see a price premium, consumers see an additional cost. What measures will be taken by governments to mitigate this? Subsidies? Border adjustments? What about carbon offsets (very fragmented at the moment?)

Farmers caution on EU fertilizers carbon tax

Published date: 08 March 2021

Share:

A carbon-border adjustment mechanism covering fertilizers but not EU agriculture would be "intolerable", European farmers' association Copa said ahead of a vote in the European Parliament tomorrow.

argus

Potential adoption drivers – despite the challenges there seems to be a convergence of market drivers that might make it work

Regulatory support

Similarly to early-stage renewables, subsidies and incentives will drive change.

Examples: EU Hydrogen Roadmap , IMO Marine CO2 emission limits, Japan H2 Strategy.

Certifications to avoid carbon leakage.

Private sector market drivers

Convergence of sustainability initiatives sponsored by key companies.

Awareness of the inevitability of the adoption of low/zero-carbon fuels

Voluntary carbon offsets might help mitigate investment costs.

Economies of scale

With time, similarly to renewables, we can expect costs to decrease. This will be further encourage investment and create a virtuous circle that will make this market sustainable and attractive for investors.

Thank you

andrea.valentini@argusmedia.com