



Technical & Commercial
Conference

Does the current war mean the end for blue hydrogen in Europe?

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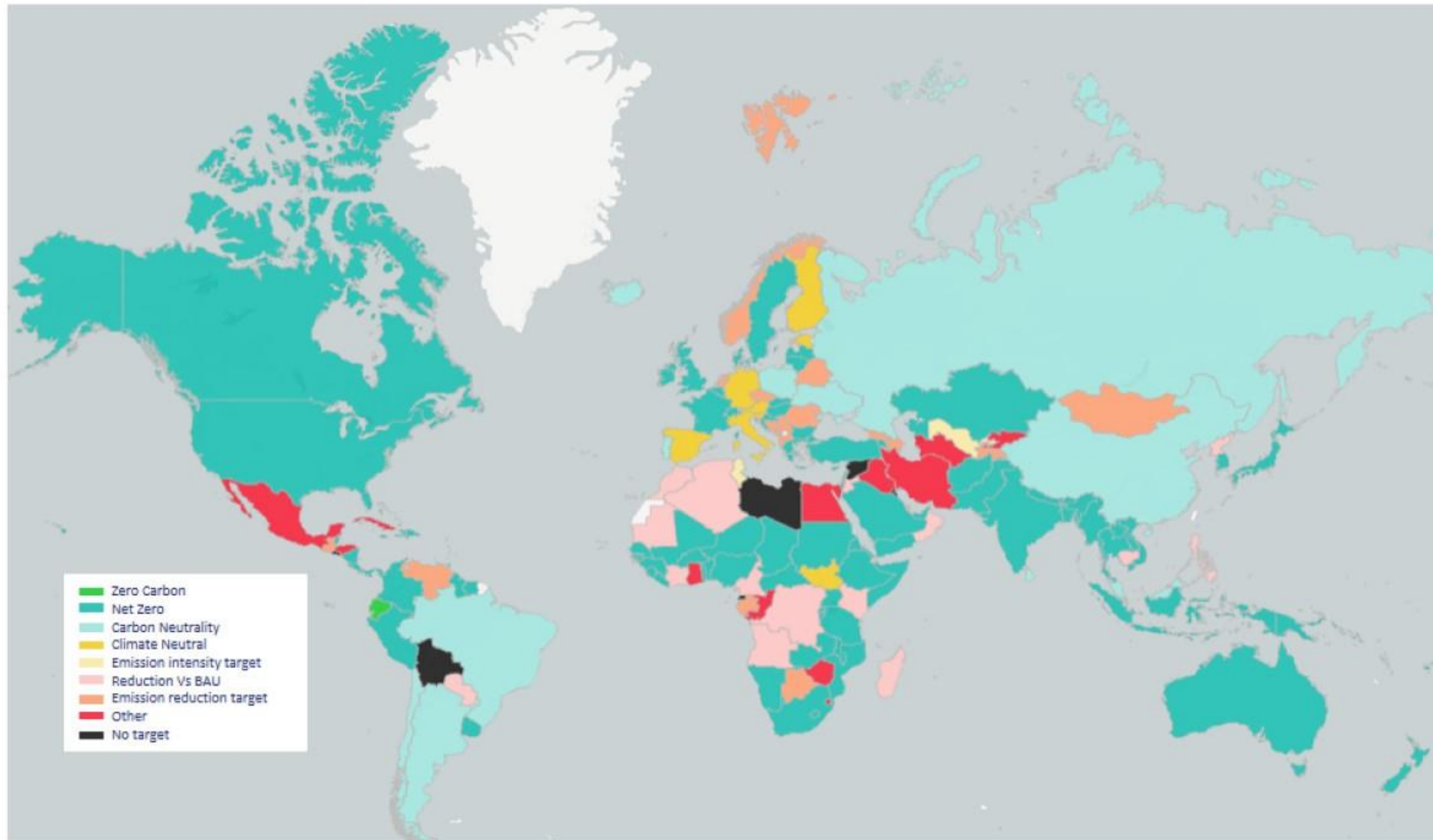
Rystad Energy

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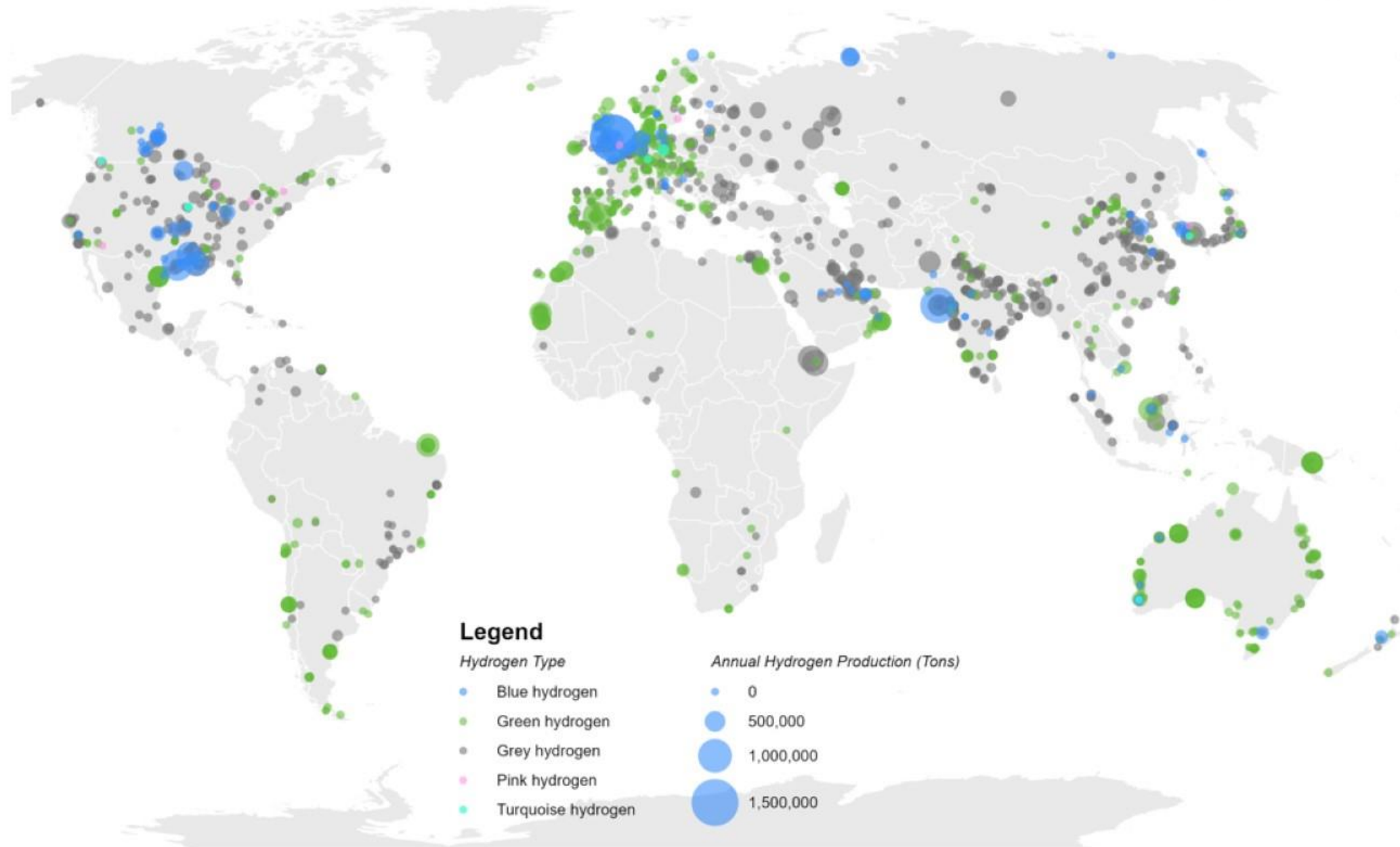
Most countries have determined their carbon reduction targets, but varies in aggressiveness



Source: Rystad Energy CCUS market dashboard

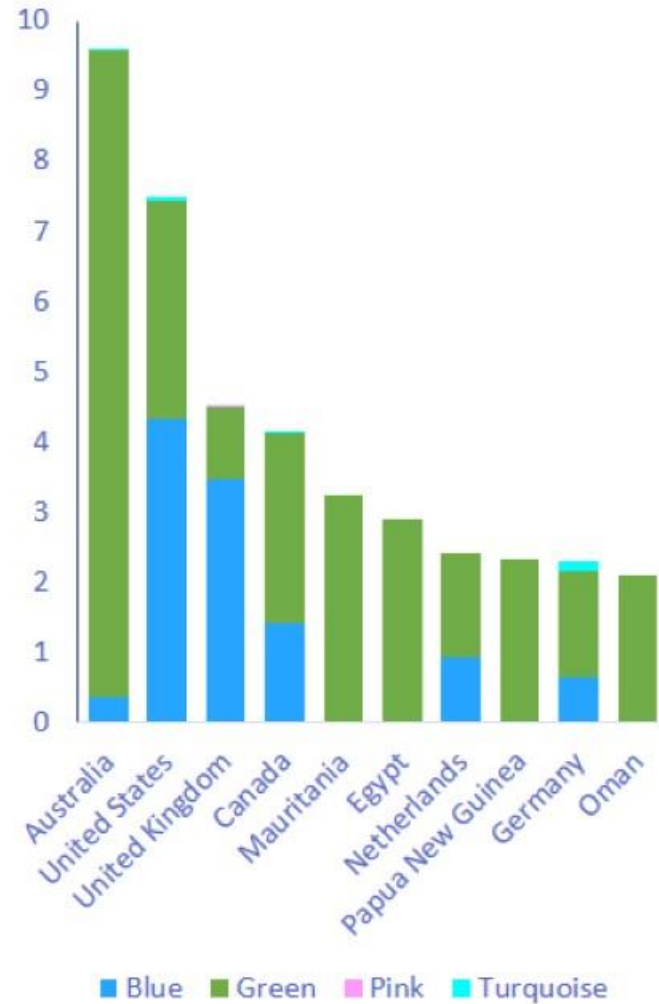


Data extracted from Rystad Energy HydrogenCube with over 1500 production assets

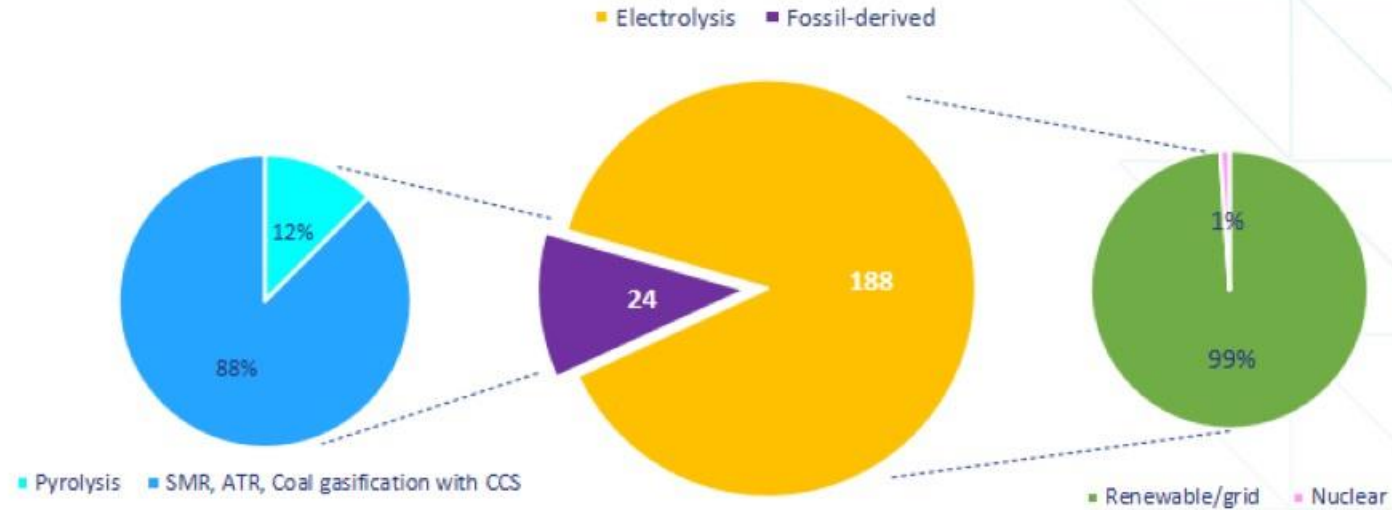


Cleaner hydrogen pipeline grew significantly

Top 10 countries by clean hydrogen production pipeline
Mtonnes



Share of clean hydrogen projects announced 2021

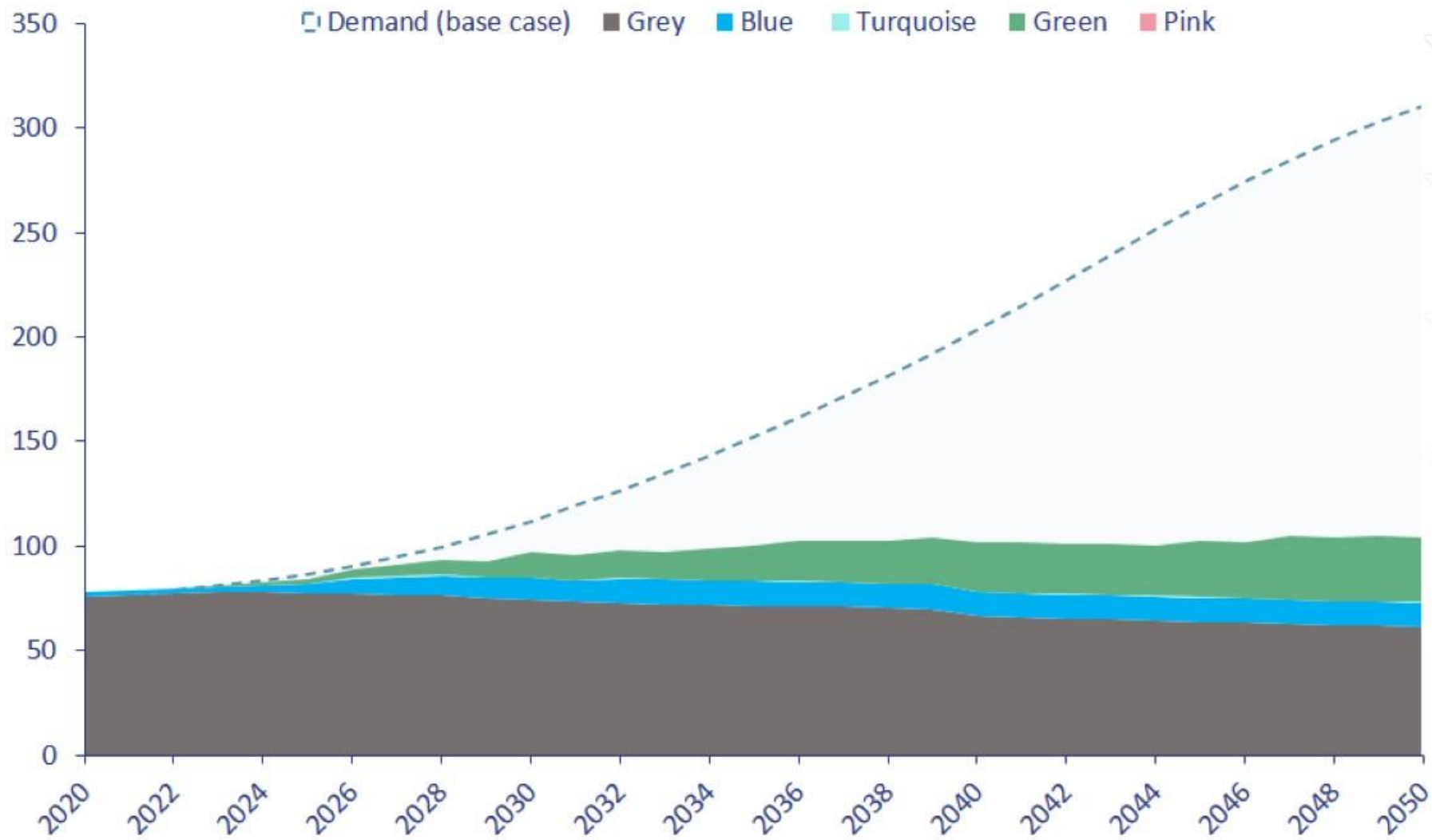


- 2021 hydrogen production pipeline grew by 192%
- 2022 so far on the same track: 130 projects have been announced, adding 13.7 Mtonnes



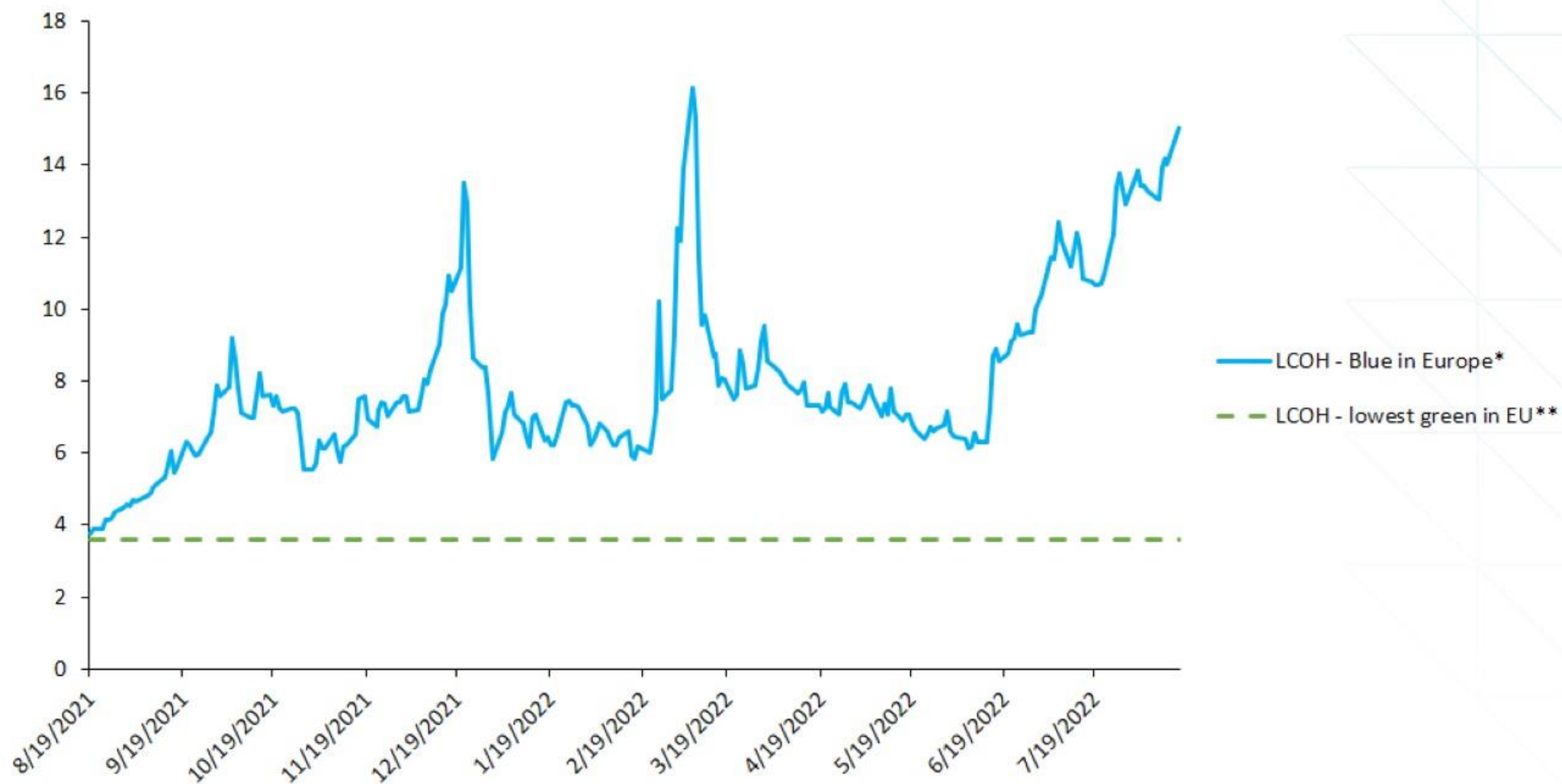
Supply and demand of hydrogen – nearly Mtonnes gap

Mtonnes H₂



Levelized cost of hydrogen in Europe in 2021/22

USD/kg hydrogen



*based on TTF price

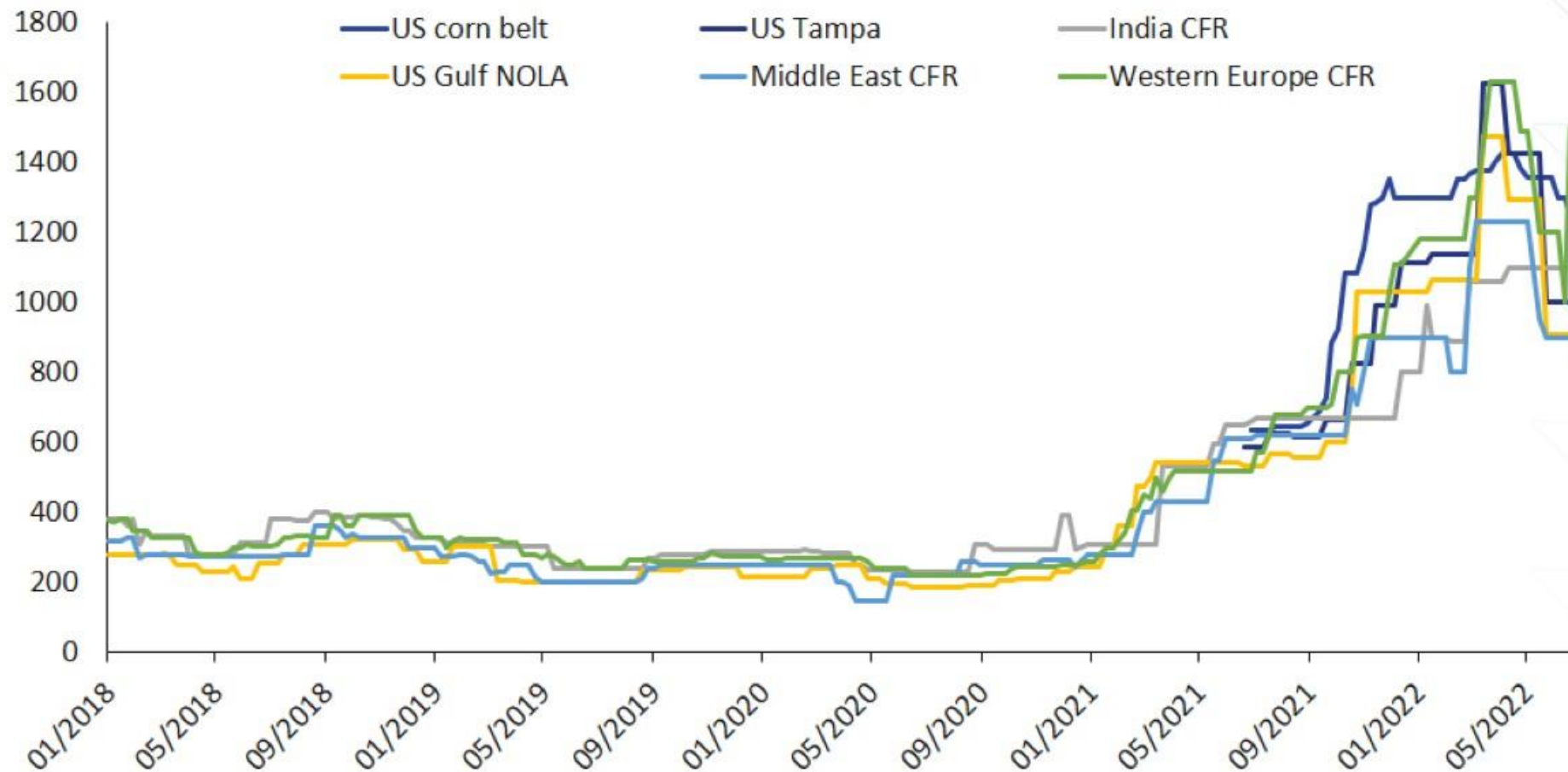
** based on PPA with auction-winning price from Iberian peninsular

Source: Rystad Energy HydrogenCube



Ammonia price sky-rocketed due to natural gas challenges – green ammonia a solution?

USD/tonnes NH₃

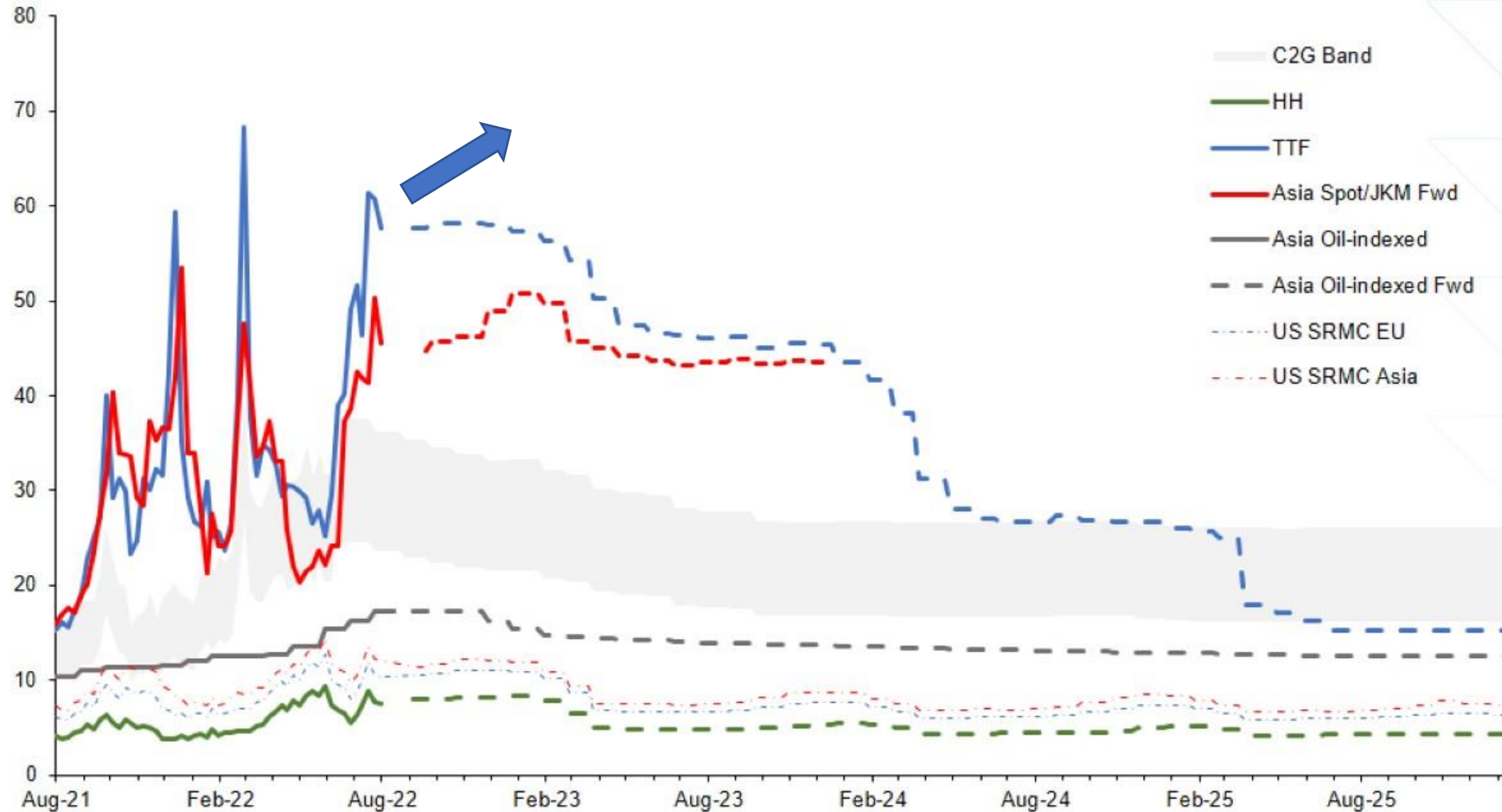


Source: Rystad Energy Research & Analysis, Green Markets



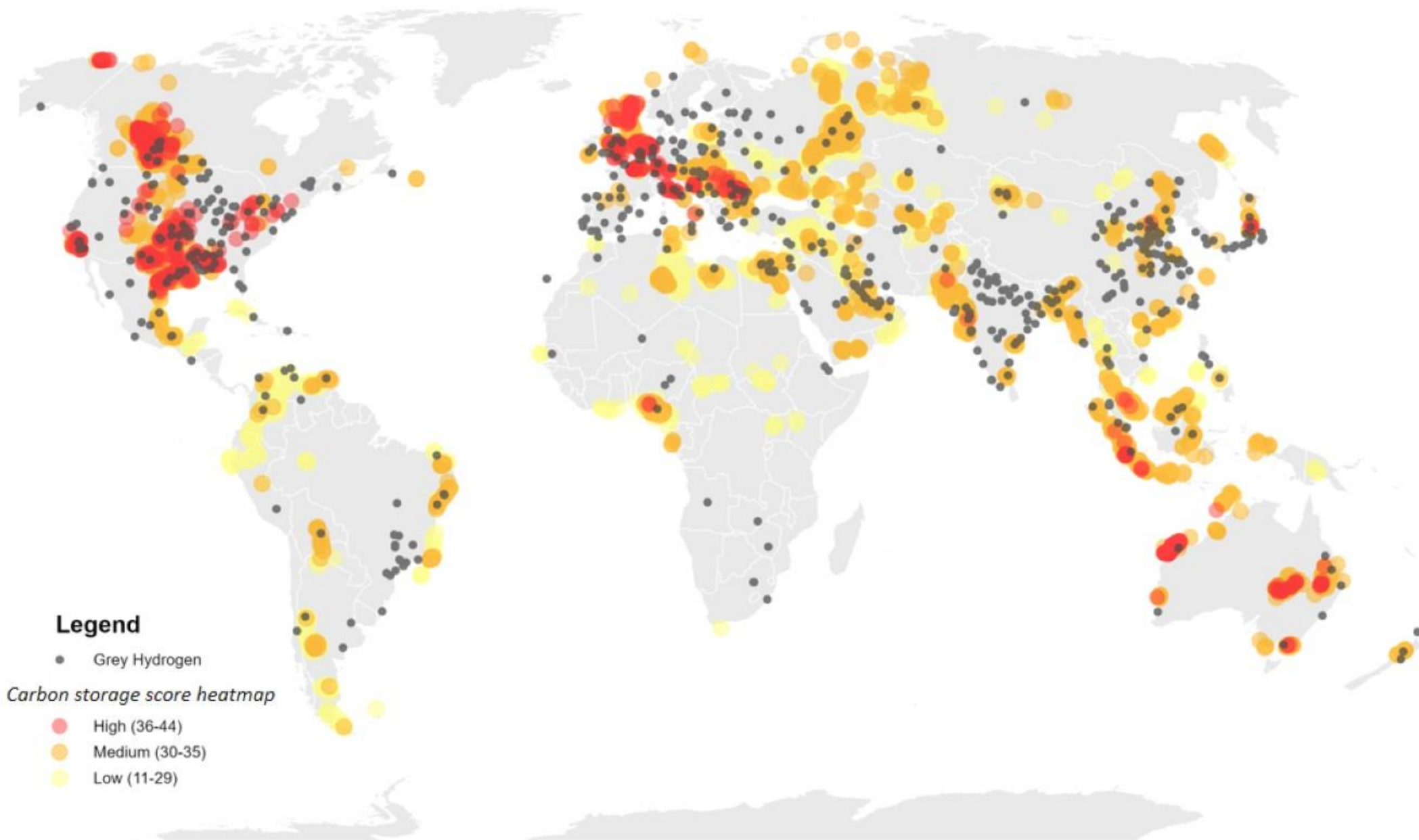
International prices jump after a further drop in Russian pipeline exports to Europe

International natural gas prices* (historical and forward curves)
USD per million British thermal units (MMBtu)



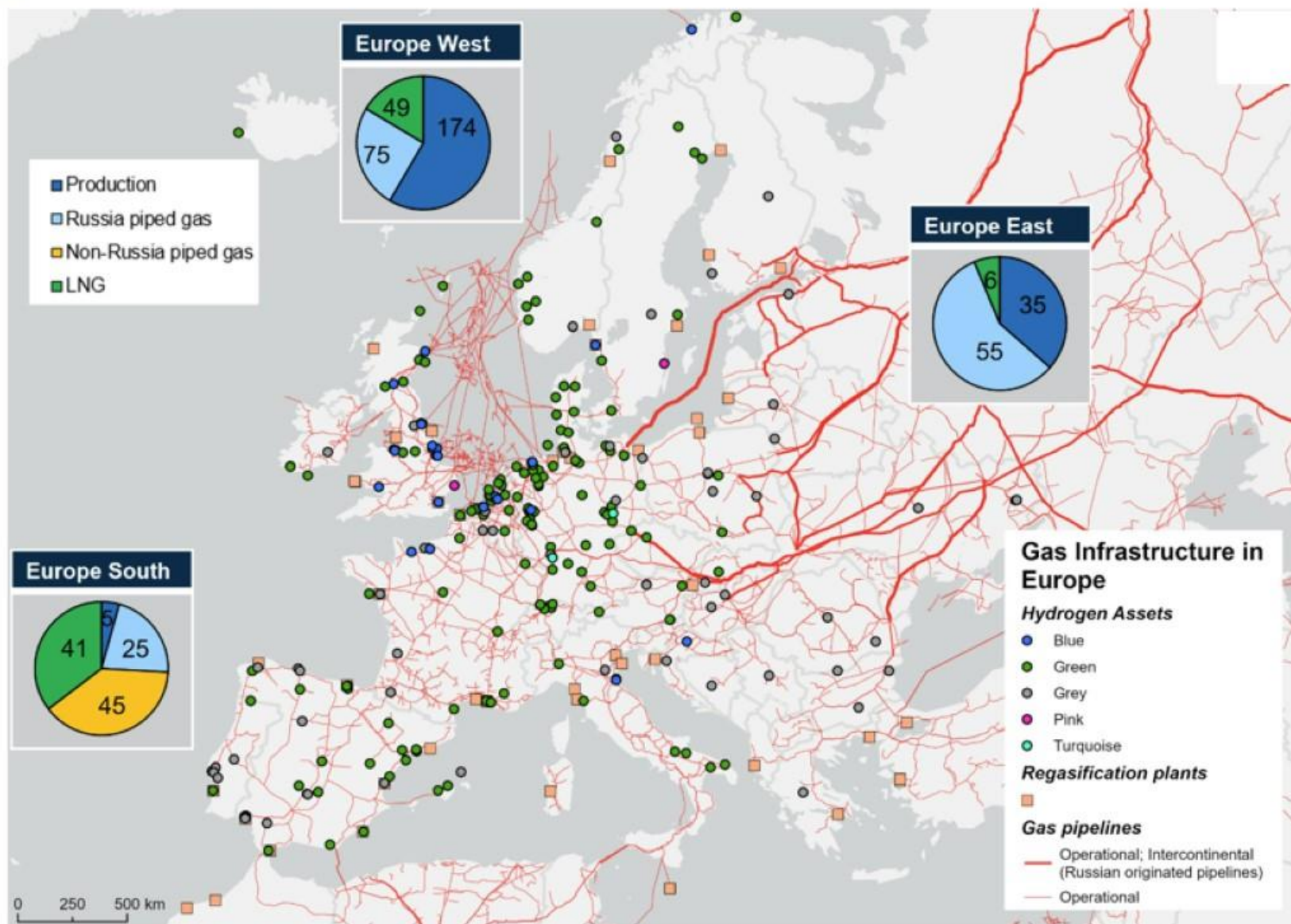
- *Historical TTF and HH prices correspond to the front month contract. Forward prices are from 09 Aug 2022. Prices are monthly average. C2G: coal to gas. **SRMC: Short run marginal cost of US LNG delivered to Europe/Asia. Sources: Rystad Energy research and analysis, Rystad Energy LNG Trade Solution

Storage locations – a challenge?



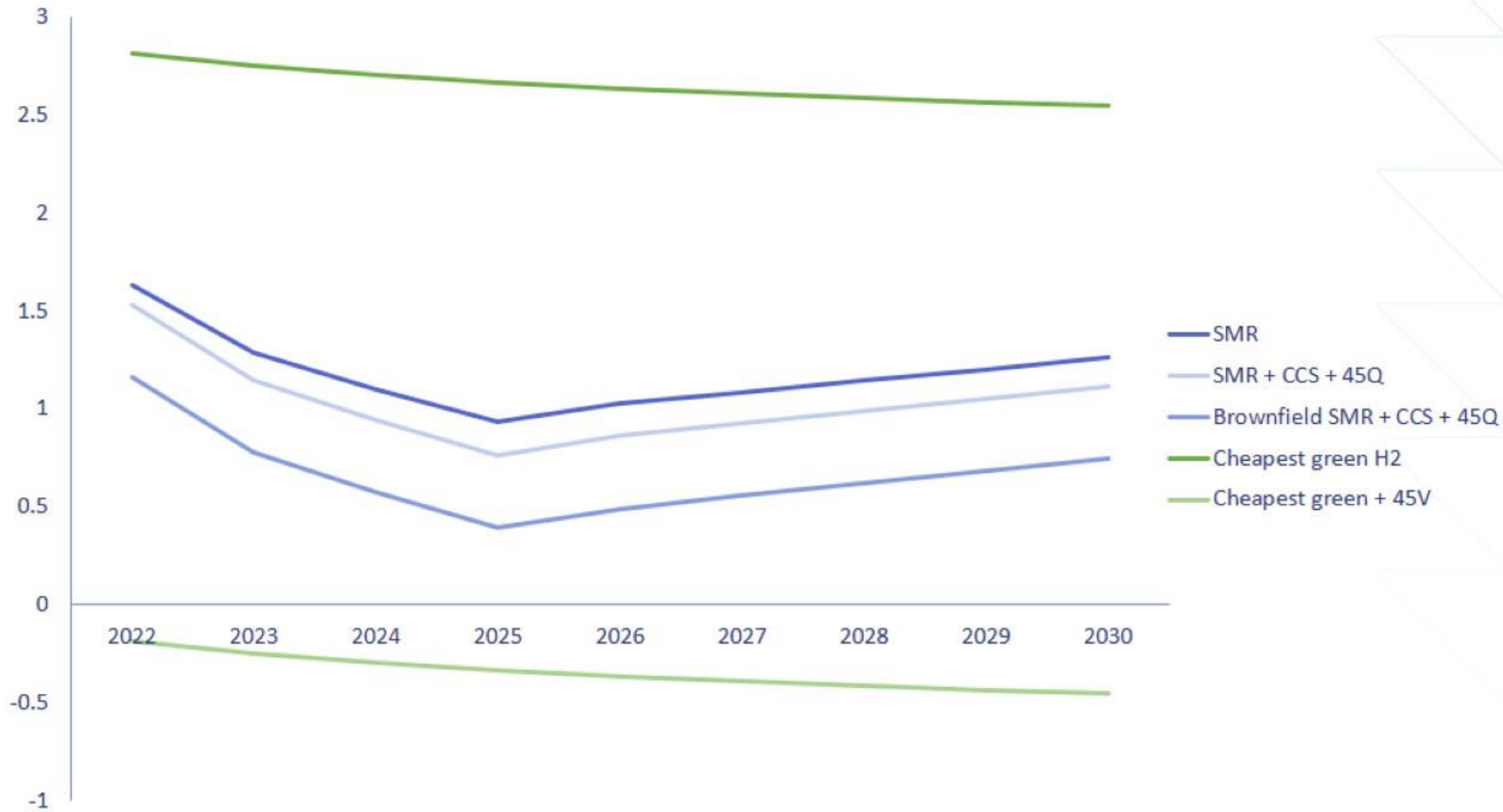
Regional natural gas supply by source (2021) and European hydrogen projects

Bcm



Incentives effect: cost comparison between Hydrogen from different production pathways with their respective credits from Inflation Reduction Act

USD/kg H₂

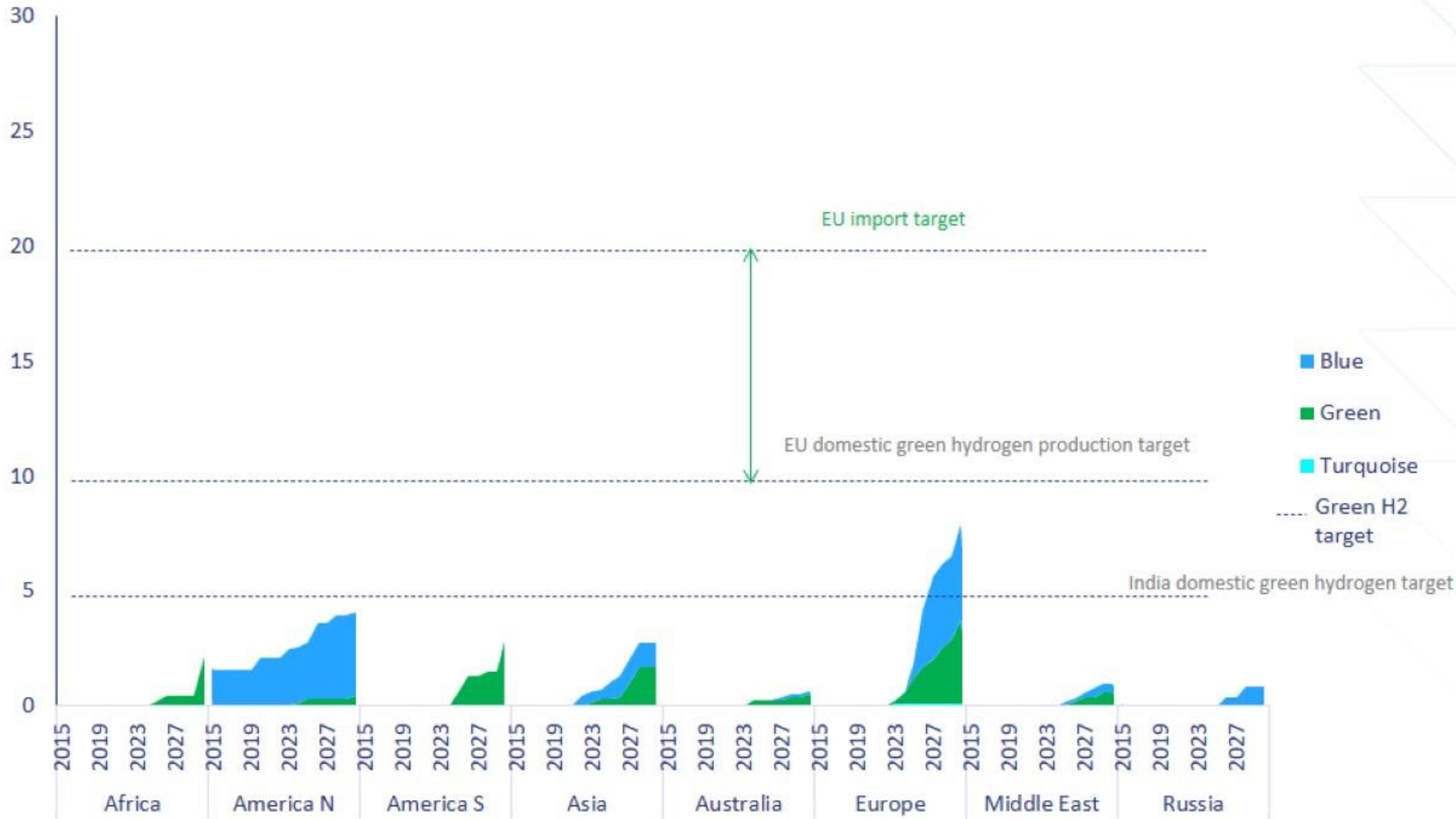


Source: Rystad Energy HydrogenCube



Global pipeline of hydrogen by continent to 2030, ex. syngas

Mtonnes

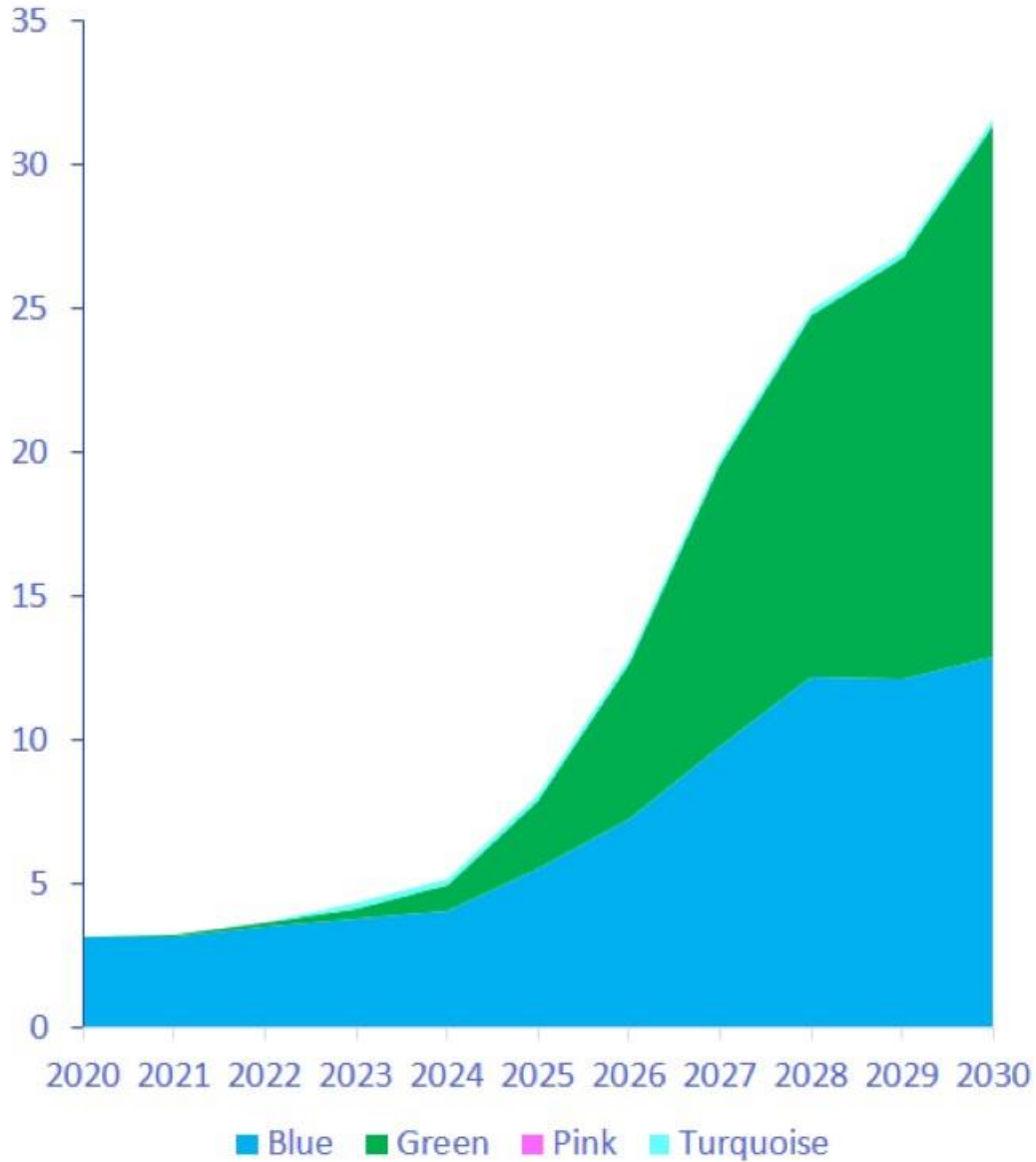


Source: Rystad Energy HydrogenCube

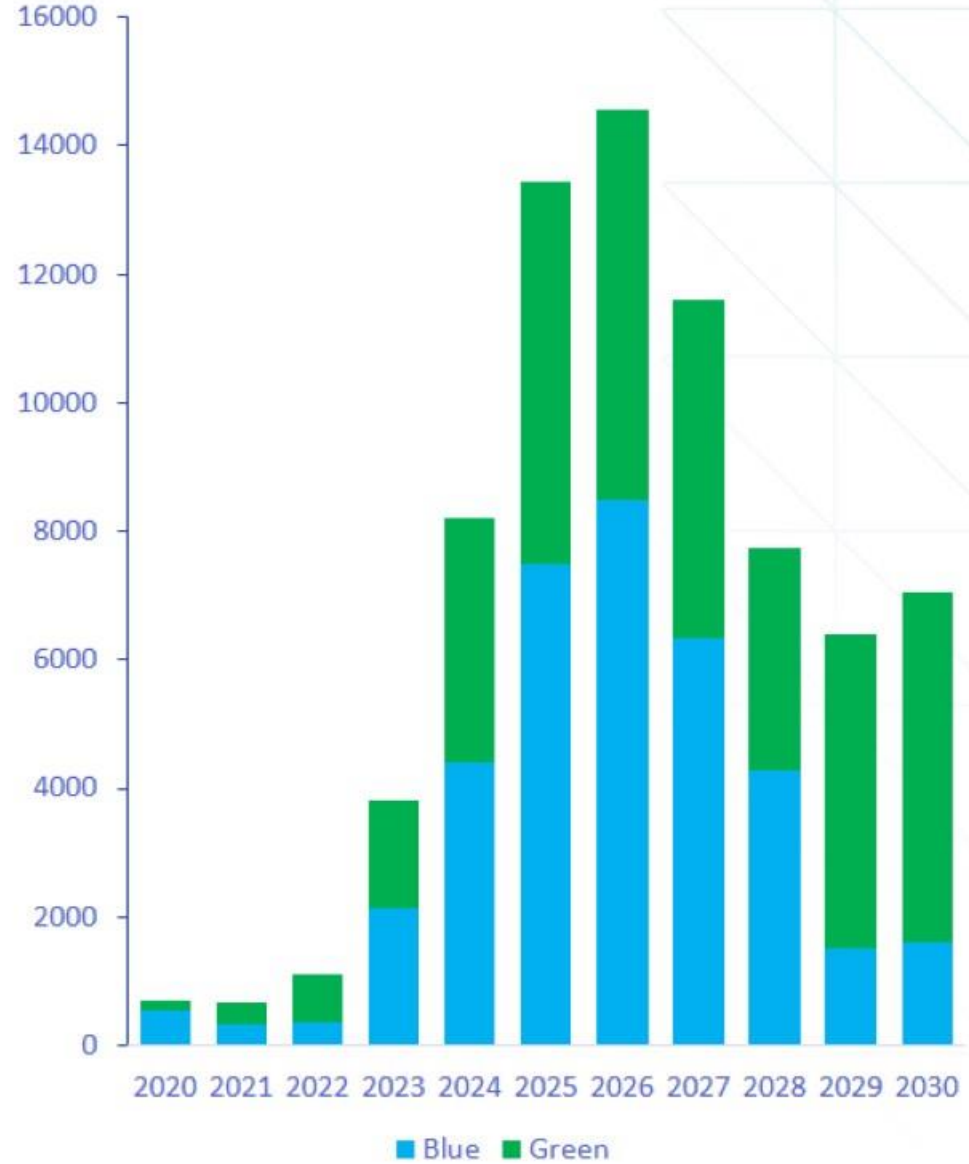


Low carbon hydrogen dominates until late 2020s

Mtonnes H₂

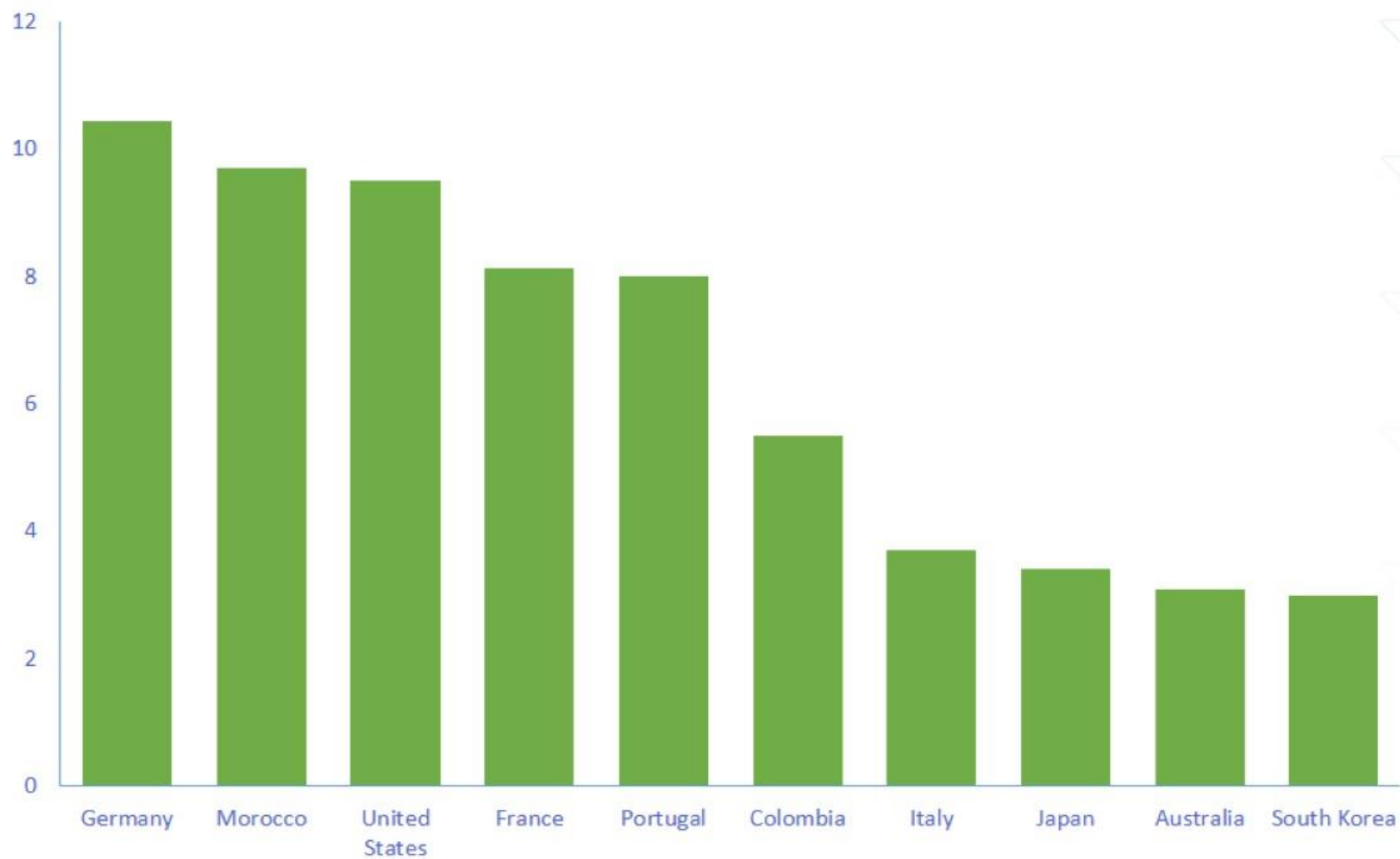


MUSD



Committed government spendings to enable hydrogen

MUSD



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