Hydrogen Market Outlook

European Hydrogen Week

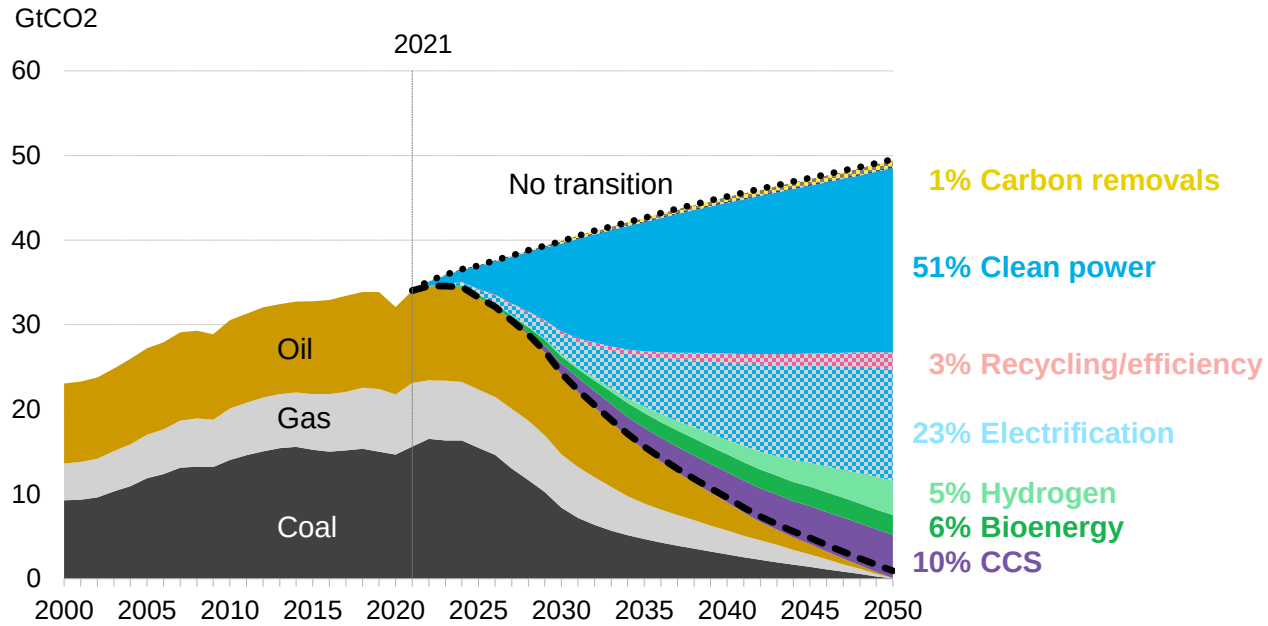
Adithya Bhashyam

November 20, 2023

BloombergNEF

Clean hydrogen use accounts for 5% of carbon abatement under a net-zero scenario

CO2 abatement by technology/type, Net Zero Scenario

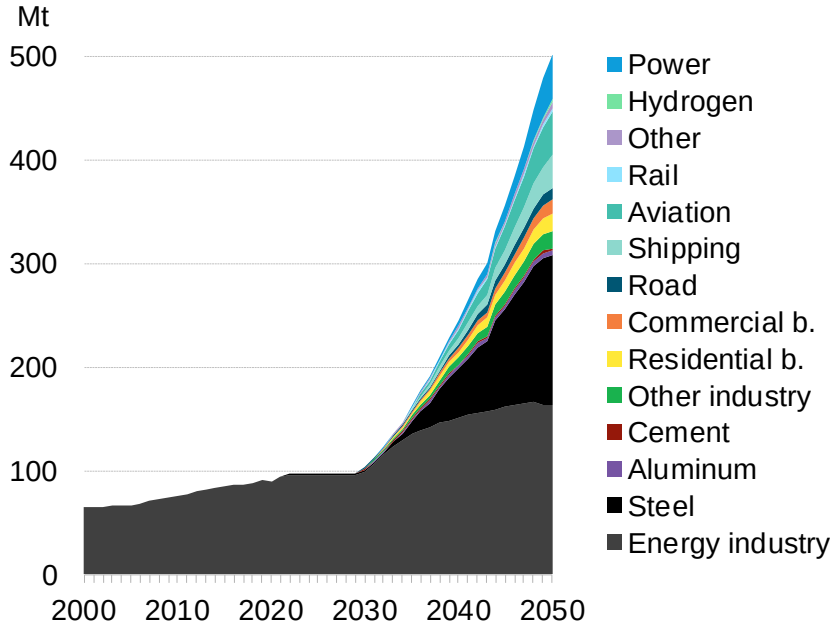


Source: BloombergNEF. Note: Abatement also includes fuel switching and other abatement technologies. Values show total abatement in 2023-50.

BloombergNEF

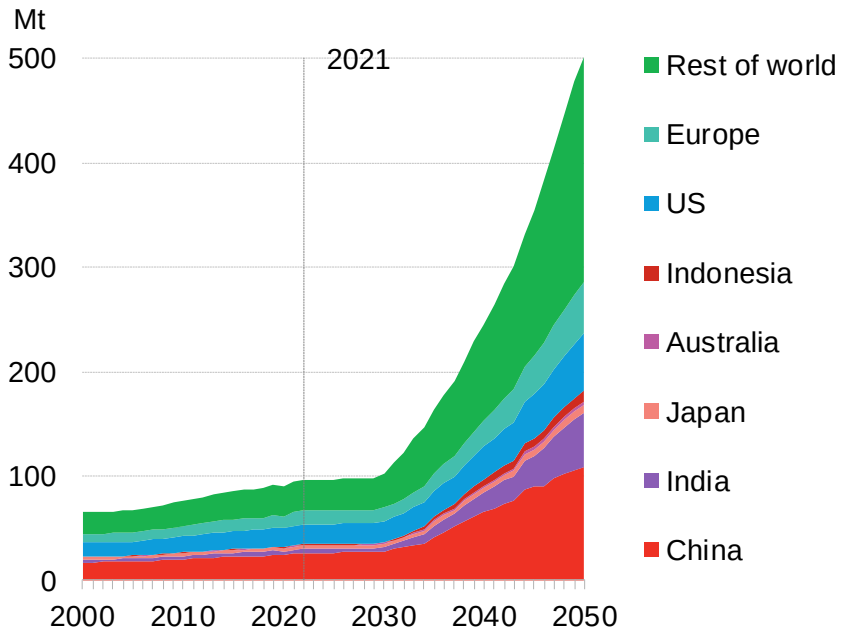
Hydrogen demand grows more than fivefold under BNEF's NEO net-zero scenario (NZS)

By sector



Source: BloombergNEF. Note: "Energy industry" includes legacy uses as well as own-use for energy-producing industries.

By region

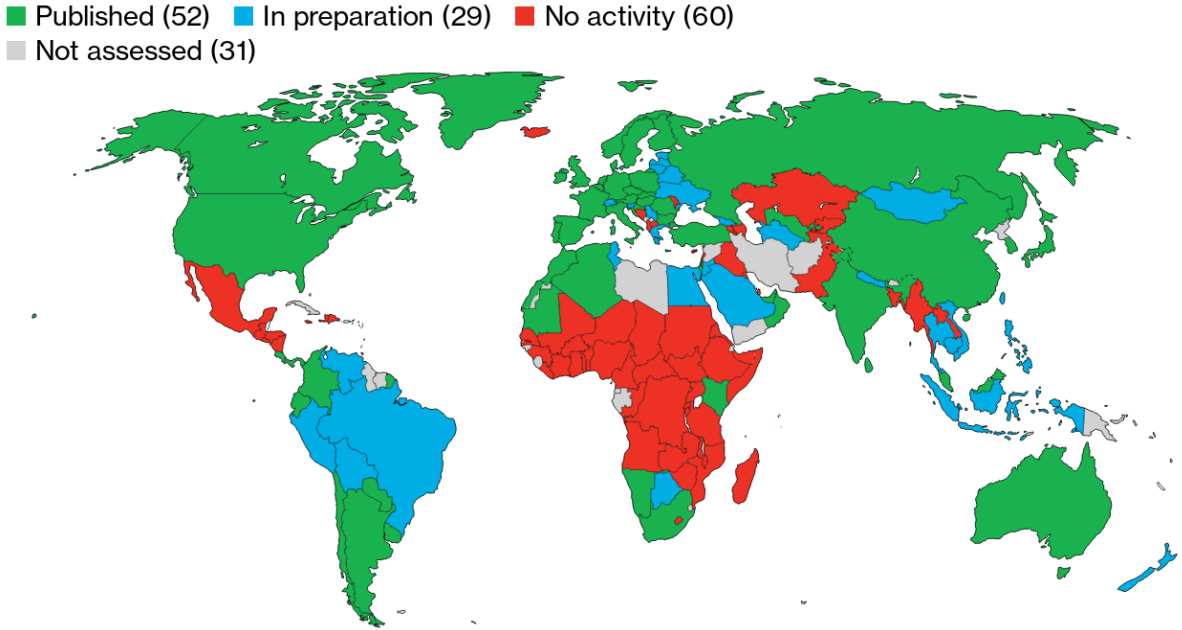


Source: BloombergNEF

BloombergNEF

Globally, 53 markets have hydrogen strategies, 20 of which are EU members

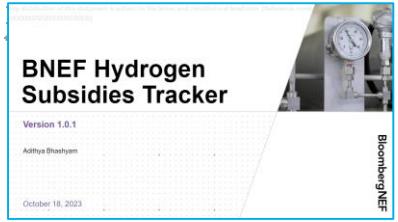
Hydrogen strategies as of October 16, 2023



Source: BloombergNEF

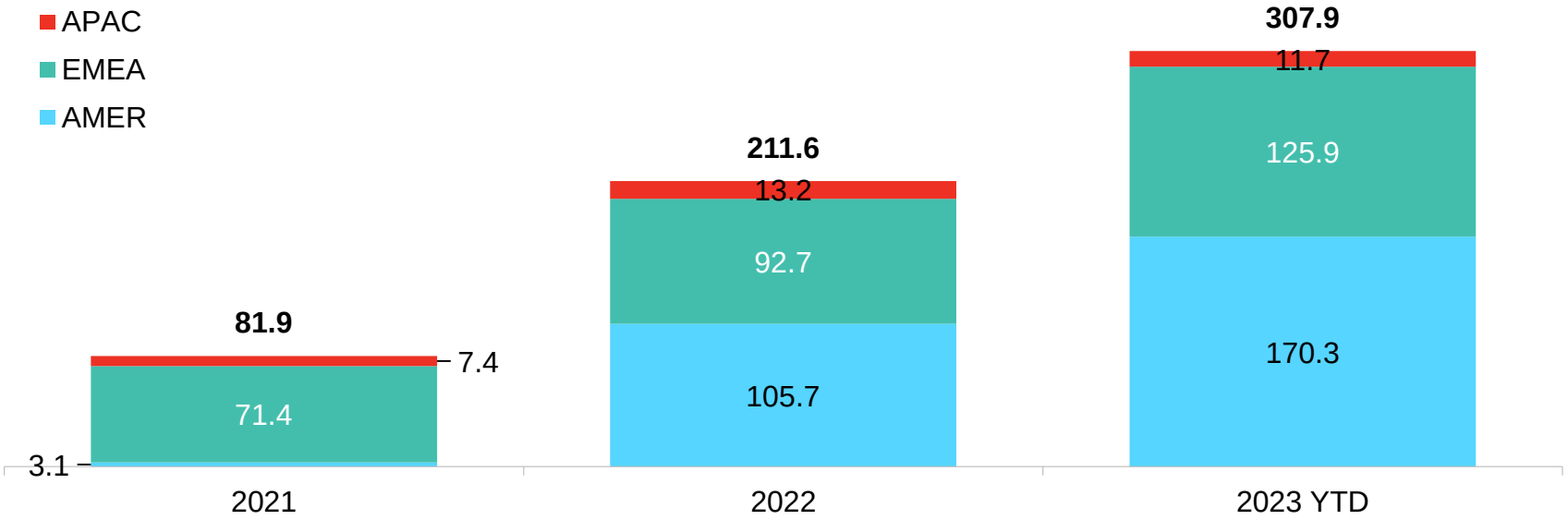
BloombergNEF

Funding for hydrogen is up by 46% since January at $308 billion



Hydrogen funding by region as of October 16, 2023

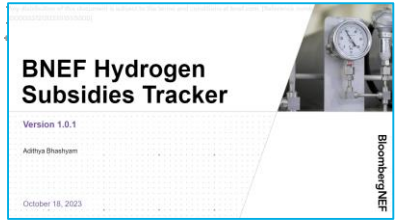
$ billion (2022 real)



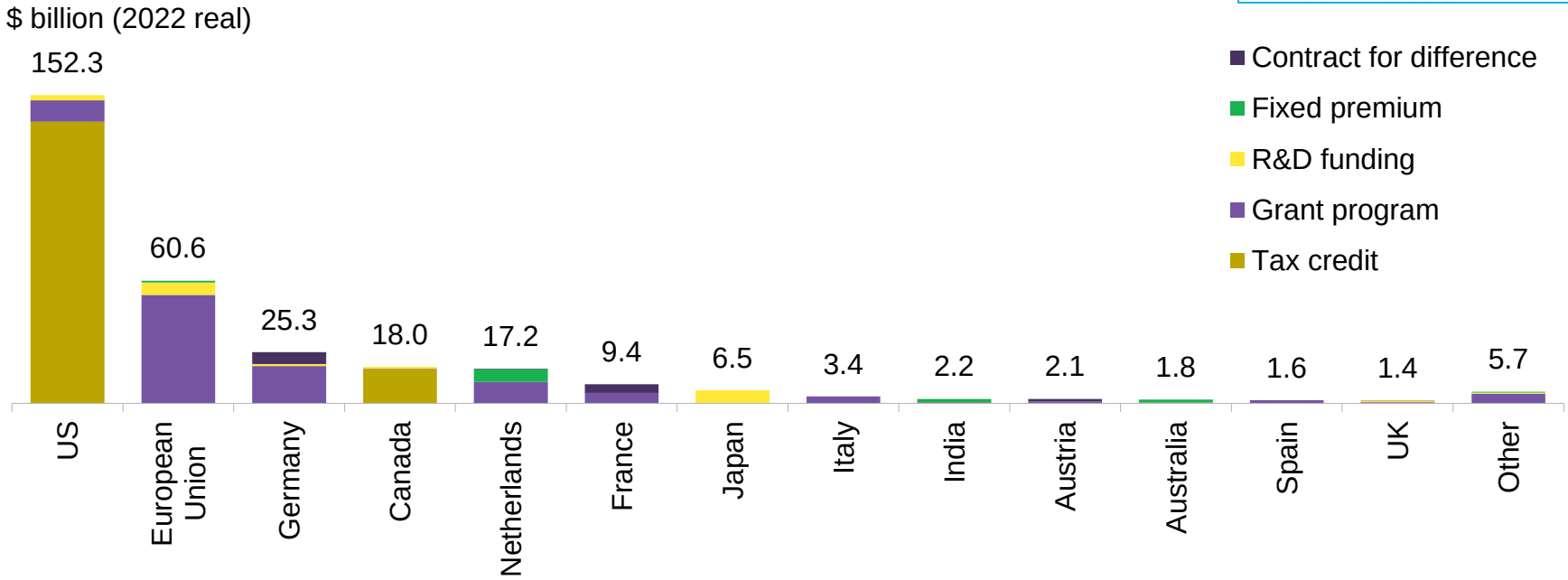
Source: BloombergNEF Hydrogen Subsidies Tracker. Note: 2023 YTD data is as of October 16, 2023.

BloombergNEF

US, EU and Germany offer the most support. US uses tax credits, Europe grant programs



Hydrogen funding by region as of October 16, 2023

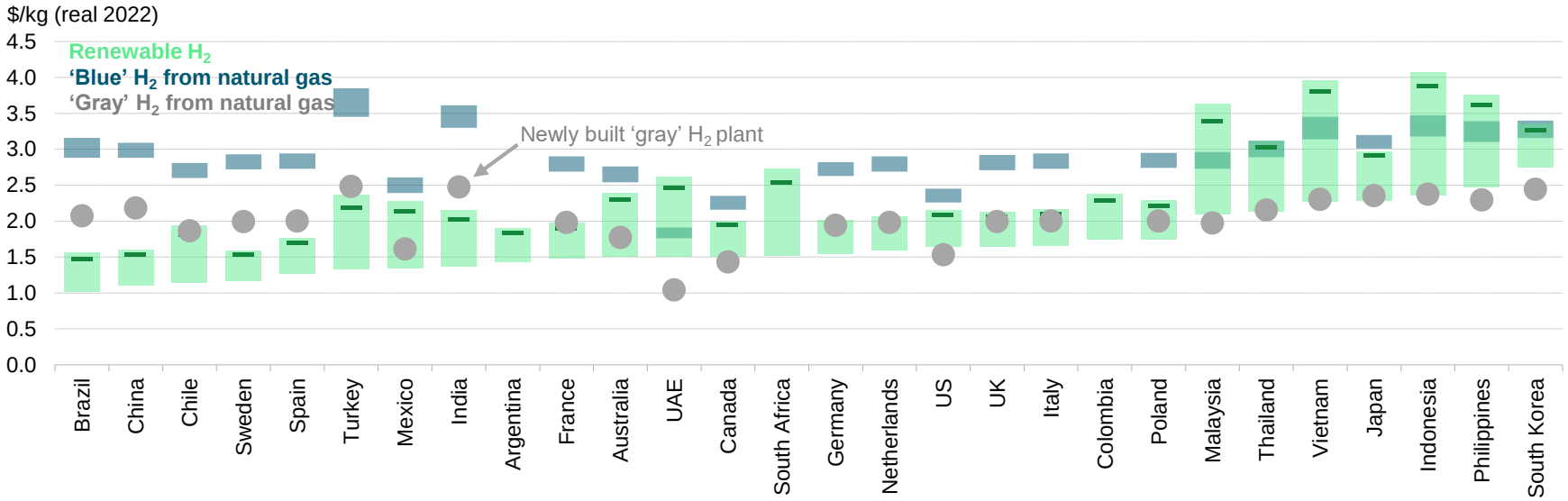


Source: BloombergNEF Hydrogen Subsidies Tracker

BloombergNEF

Green hydrogen should outcompete blue – and even gray in some markets – by 2030

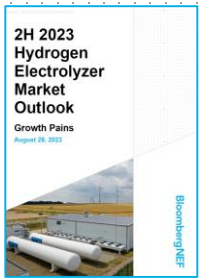
Levelized cost of hydrogen in 28 markets, 2030



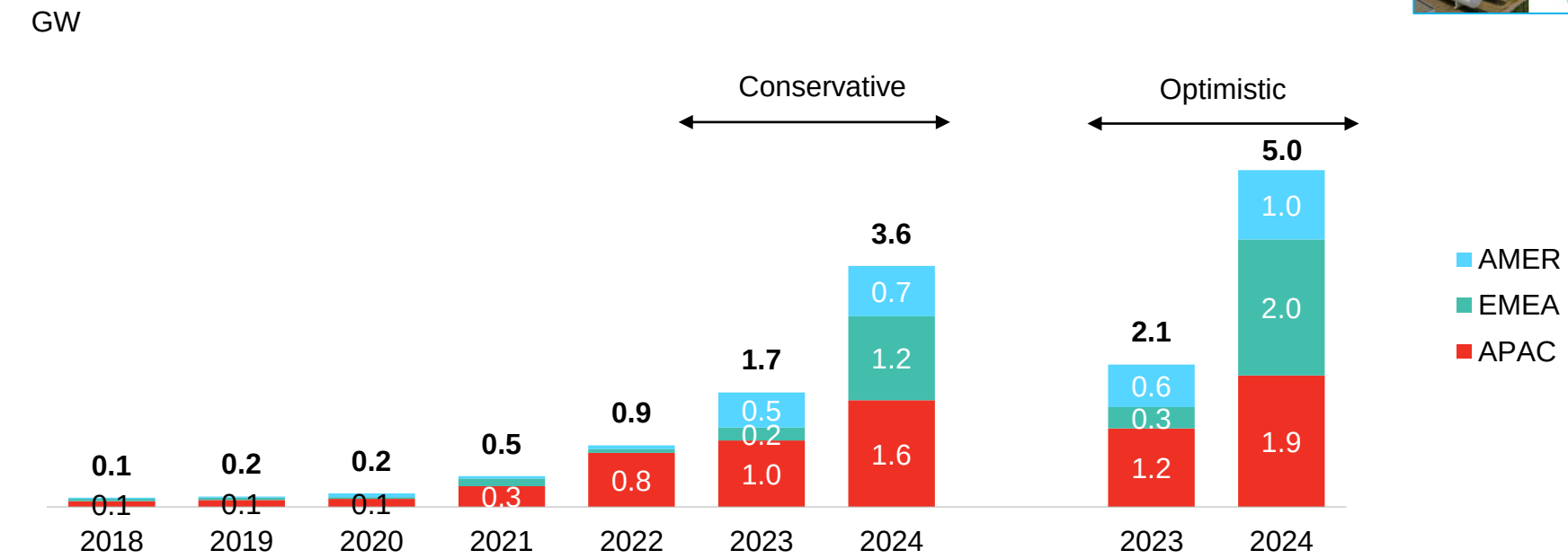
Source: BloombergNEF, National Energy Technology Laboratory (NETL). Note: Based on project financing year. Assumes BNEF's optimistic electrolyzer cost scenario. Renewable $LCOH_2$ range reflects a diversity of electrolyzer type, Chinese alkaline (low) to proton exchange membrane, or PEM (high). The electrolyzer's electricity is sourced from the cheaper renewable resource. Capital and operational costs for blue hydrogen are sourced from the NETL. Gas prices derived from BNEF's 1H 2023 LCOE Update (web | terminal). Grid electricity prices assumed to be $75/MWh (in real 2022 terms) for all modeled markets.

BloombergNEF

The electrolyzer market is set to double for a third time, and a fourth



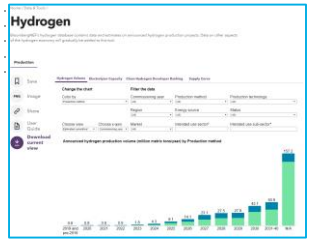
Forecast annual electrolyzer shipments



Source: BloombergNEF

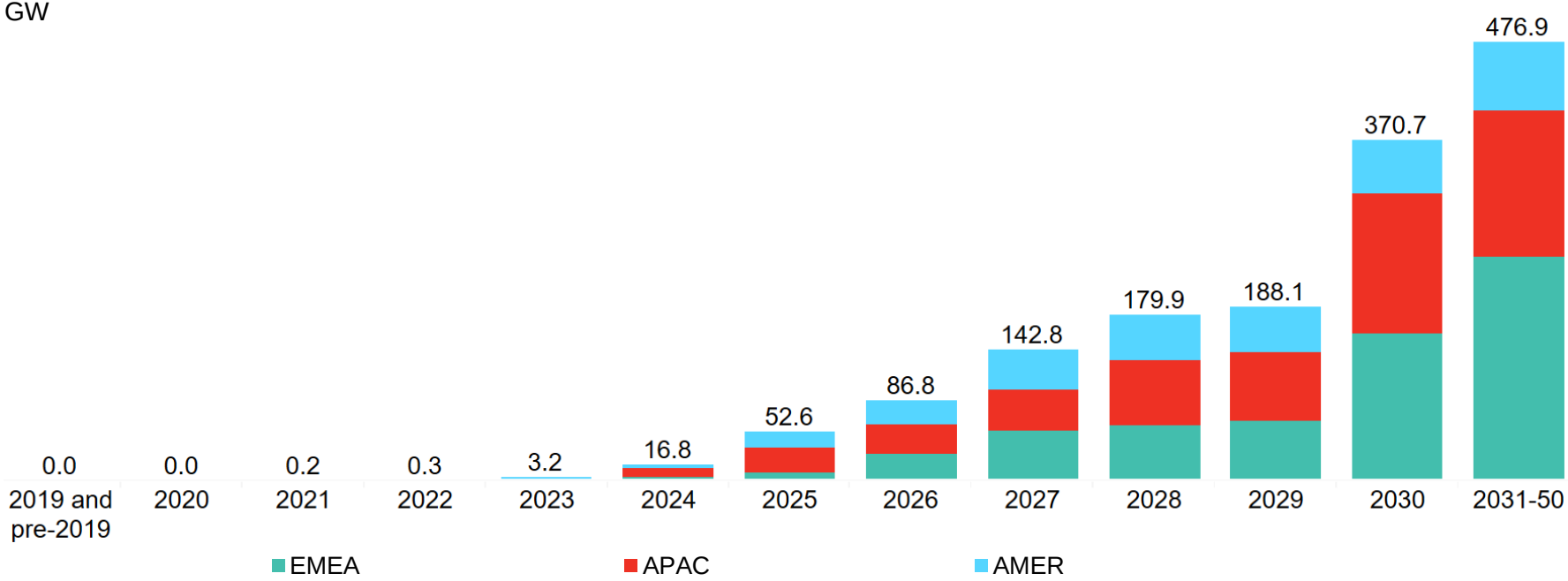
BloombergNEF

Market could grow more than 100 times by 2030 if all announced projects come online



Announced cumulative pipeline of electrolyzer projects

GW

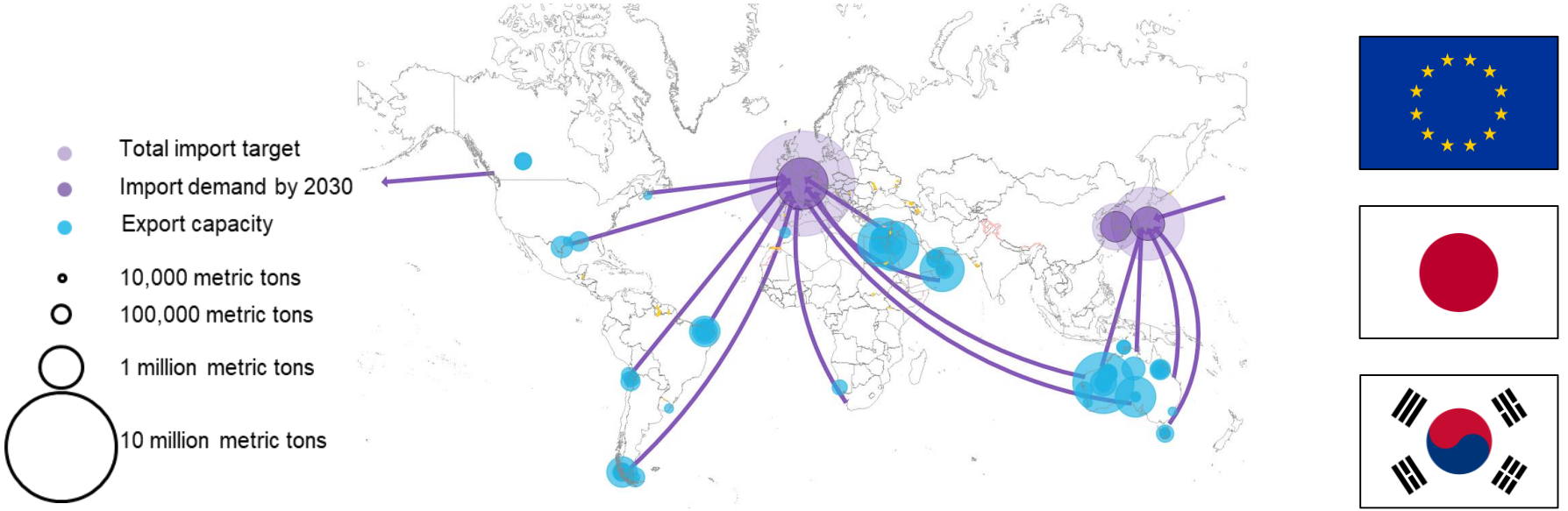


Source: BloombergNEF

BloombergNEF

Europe, Japan and Korea are looking to import clean hydrogen in the near-term

Planned hydrogen export projects versus import demand

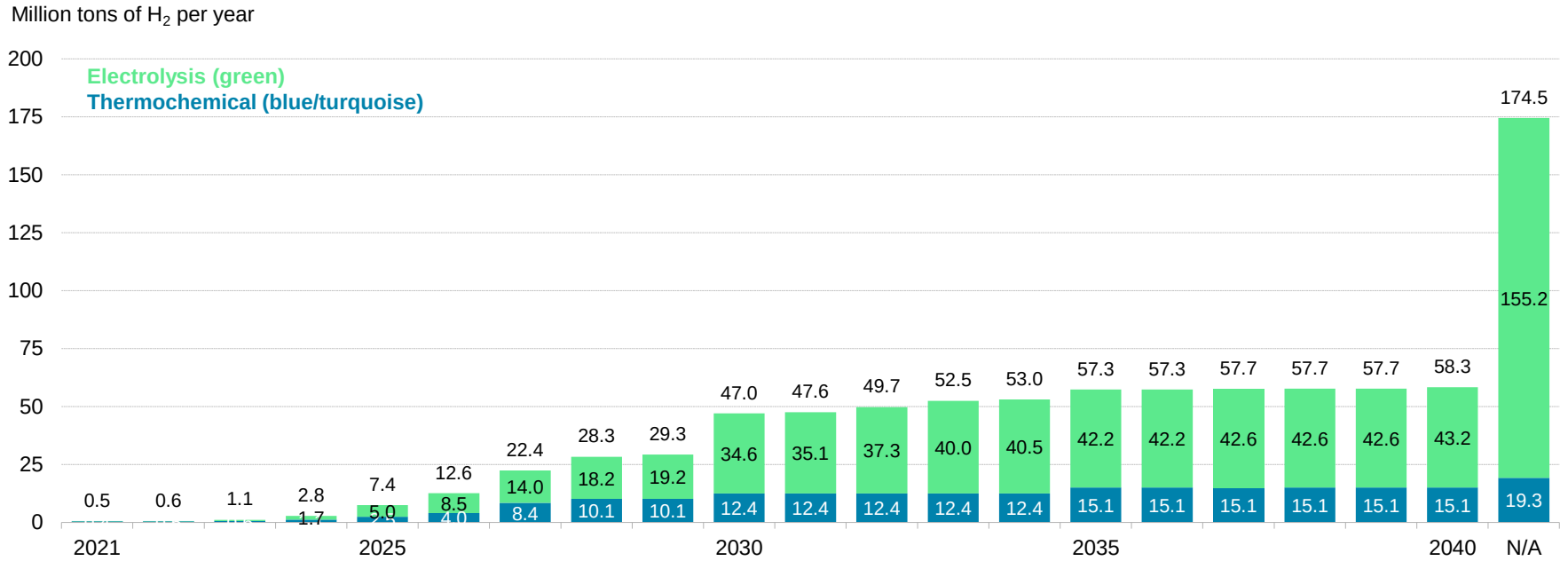


Source: BloombergNEF. Note: Only includes export projects of 9,000 metric tons of capacity estimated using BNEF Hydrogen Supply-Demand Model: Supply. EIA is environmental impact studies. FEAS is feasibility studies. Does not include a 2GW solar – hydrogen project in UAE that didn't disclose hydrogen capacity.

BloombergNEF

Announced supply could displace more than current demand with green dominating

Cumulative clean hydrogen supply pipeline proposed by developers

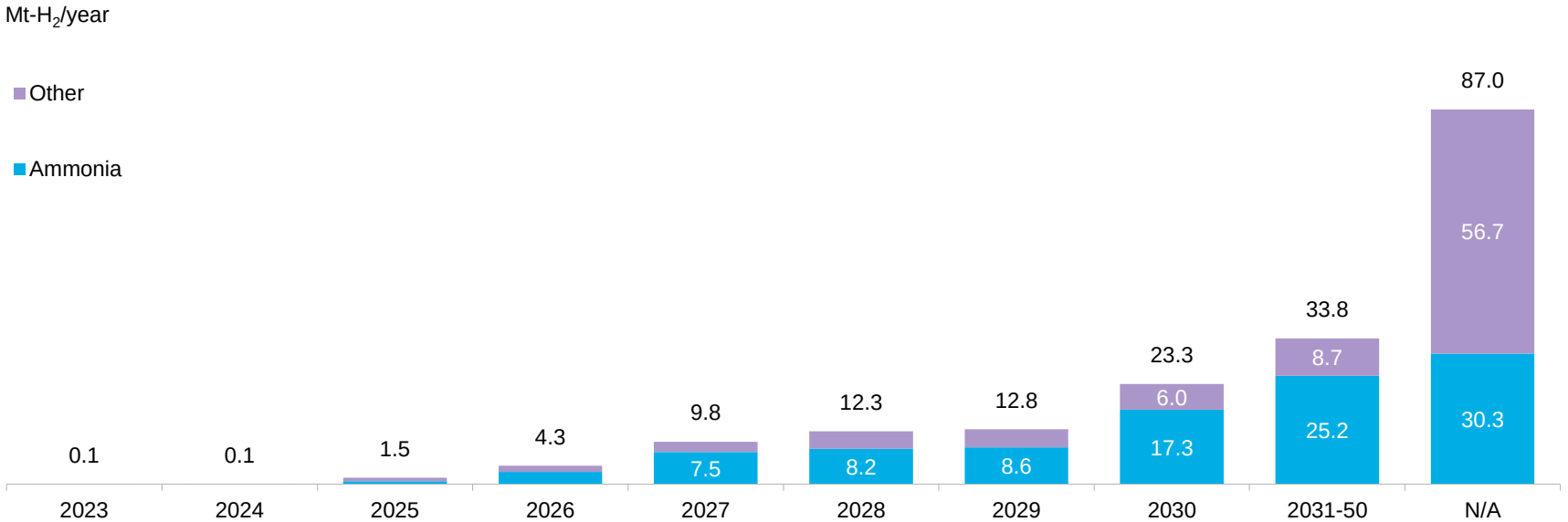


Source: BloombergNEF Hydrogen Project Database (web). Note: this is not a forecast but a pipeline of proposed projects

BloombergNEF

Half of all proposed supply will export, and ammonia is the most popular carrier

Announced supply of H2 export projects by carrier

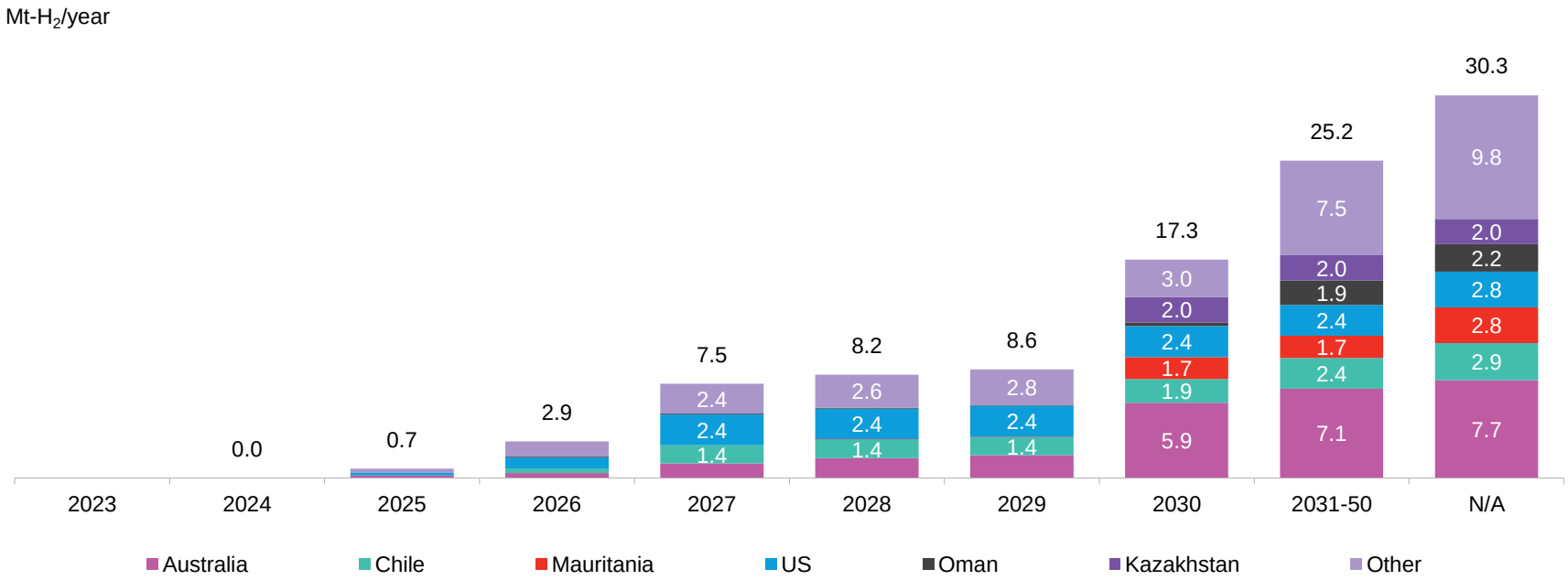


*Source: BloombergNEF. Note: as of September 22, 2023. *Many projects without disclosed commissioning date (N/A) also did not disclose transport media. Some of them could use ammonia as the carrier*

BloombergNEF

Australia, Chile and the US dominate supply but Oman could soon follow

Announced supply of H2 for export as ammonia by origin

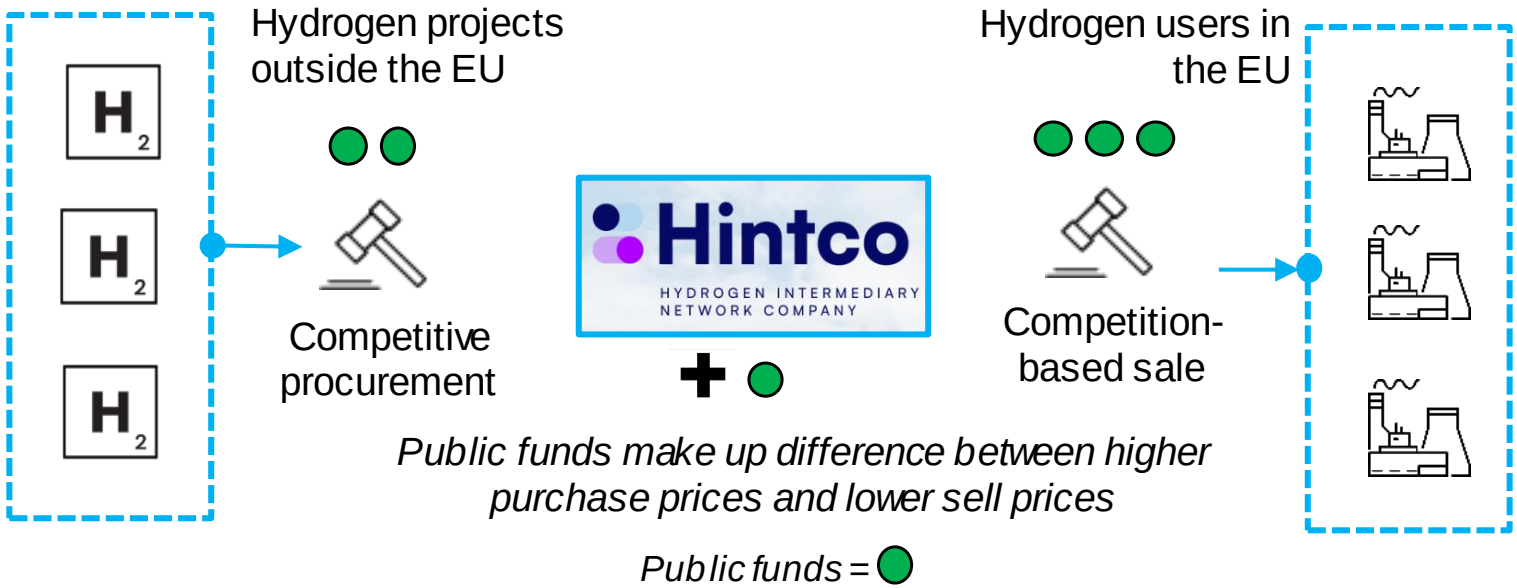


Source: BloombergNEF. Note: as of September 22, 2023

BloombergNEF

Imports will need support, schemes like H2Global play an important role

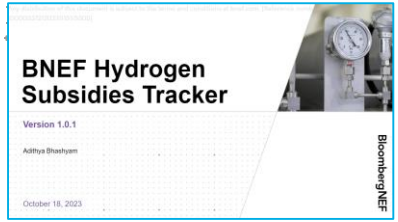
Germany's H2Global green hydrogen import scheme



Source: BloombergNEF, H2Global.

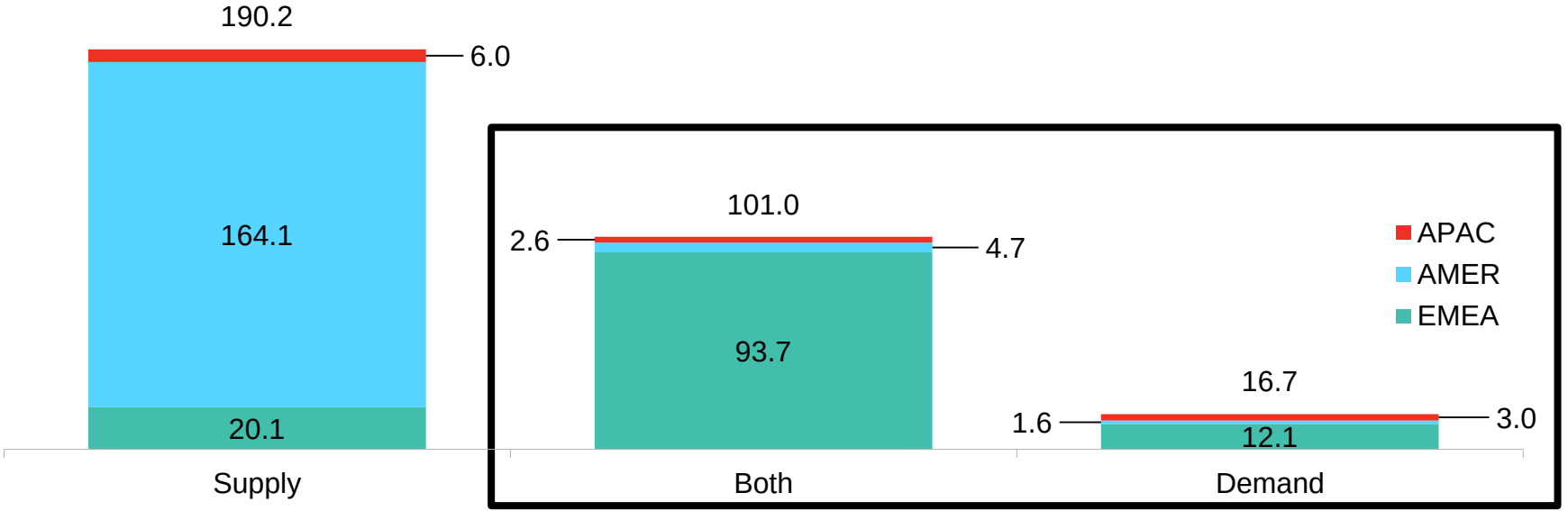
BloombergNEF

Globally, more support for hydrogen uptake will be needed but Europe is clearly leading



Hydrogen funding by category (supply vs demand) as of October 16, 2023

$ billion (2022 real)

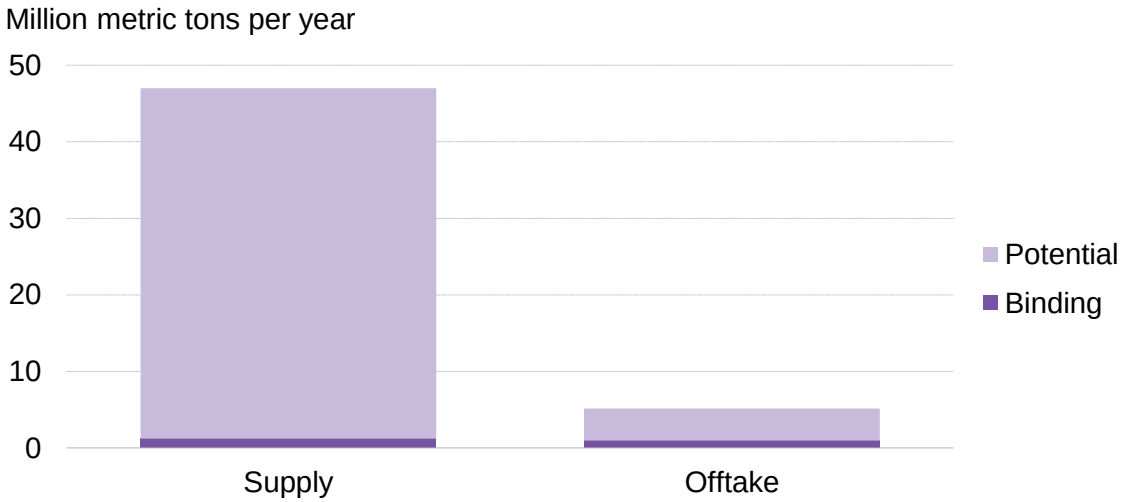


Source: BloombergNEF Hydrogen Subsidies Tracker

BloombergNEF

Only 1% of clean hydrogen capacity by 2030 is supported by binding offtake agreements

Low-carbon hydrogen supply and offtake by 2030



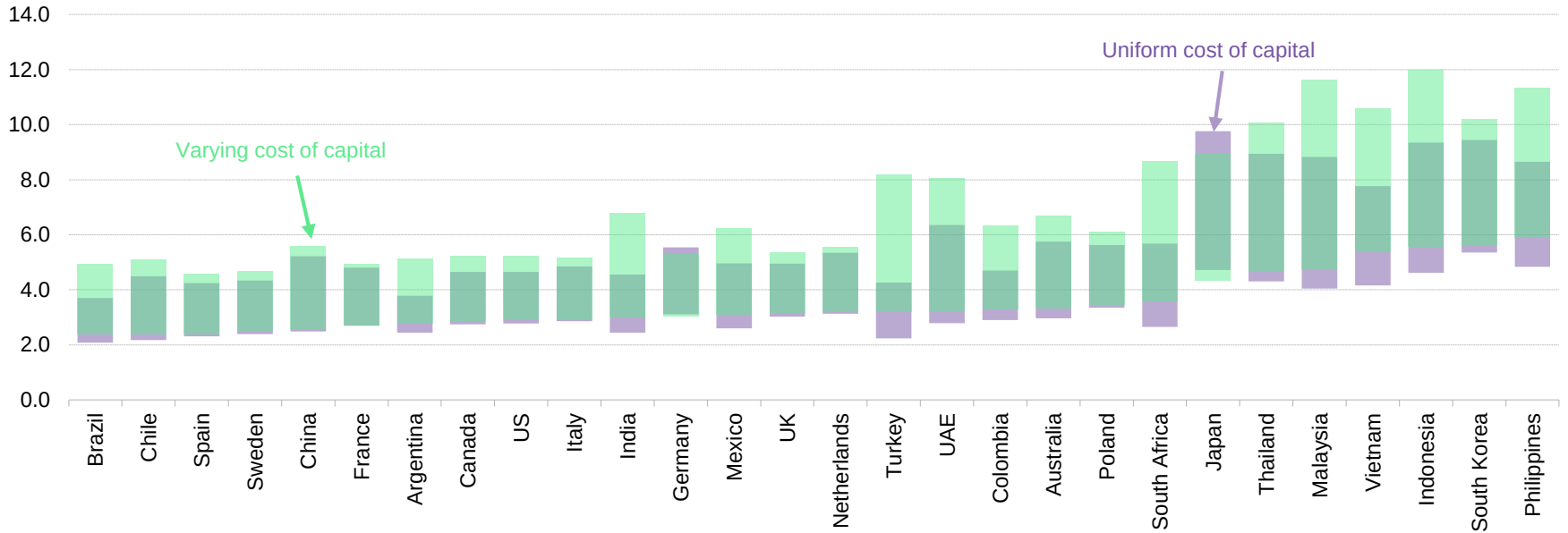
Source: BloombergNEF. Note: Data as of September 29, 2023. The database only includes projects of over 20 megawatts or 2,800 metric tons/year of capacity. Potential offtake includes letters of intent, heads of terms agreements, memoranda of understanding, and unspecified offtake agreements disclosed in news.

BloombergNEF

High financing costs can raise LCOH by up to $2-4/kg today, MDBs can help address this

2023 $LCOH_2$ analysis with varying and uniform cost of capital by market, 2023

$/kg (real 2022)

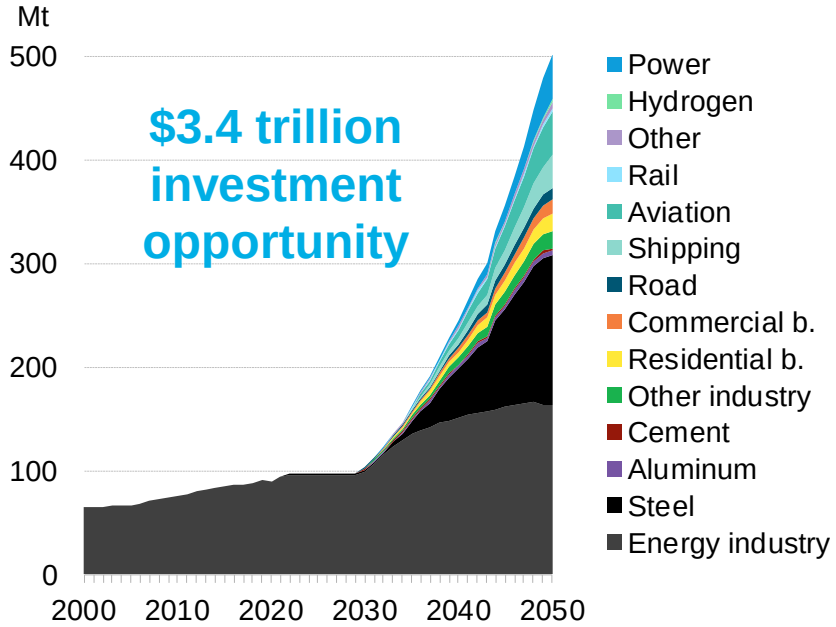


Source: BloombergNEF. Note: CoC refers to cost of capital. Uniform cost of capital scenario assumes a 10% equity IRR and a 5% cost of debt in all markets. Projects financed in 2023 have a 48% debt share. Assumes the renewable electricity source that provides the lowest $LCOH_2$ for each market.

BloombergNEF

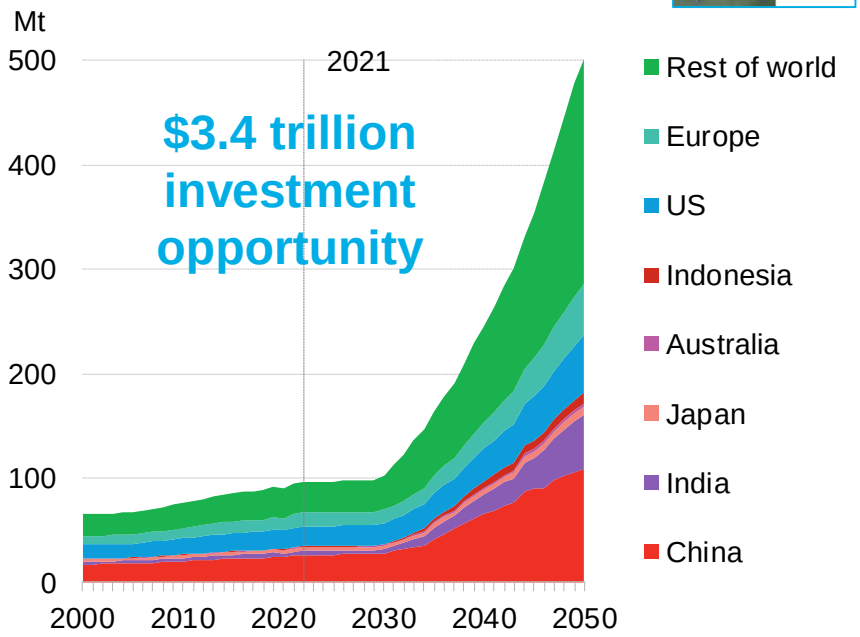
Clean hydrogen needs $3.4 trillion in investments until 2050, much of this will come from the private sector

By sector



Source: BloombergNEF. Note: "Energy industry" includes legacy uses as well as own-use for energy-producing industries. Mt is million metric tons.

By region



Source: BloombergNEF. Note: Mt is million metric tons.

BloombergNEF

Copyright and disclaimer

BloombergNEF (BNEF) is a strategic research provider covering global commodity markets and the disruptive technologies driving the transition to a low-carbon economy.

Our expert coverage assesses pathways for the power, transport, industry, buildings and agriculture sectors to adapt to the energy transition.

We help commodity trading, corporate strategy, finance and policy professionals navigate change and generate opportunities.

BloombergNEF

Adithya Bhashyam,
abhashyam1@Bloomberg.net

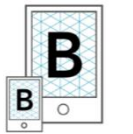
Client enquiries:

Bloomberg Terminal: press <Help> key twice
Email: support.bnef@bloomberg.net

Learn more:

about.bnef.com | @BloombergNEF

Get the app



On IOS + Android
about.bnef.com/mobile