

引领绿氢时代： 全球格局演进与中国市场新纪元

崔艺

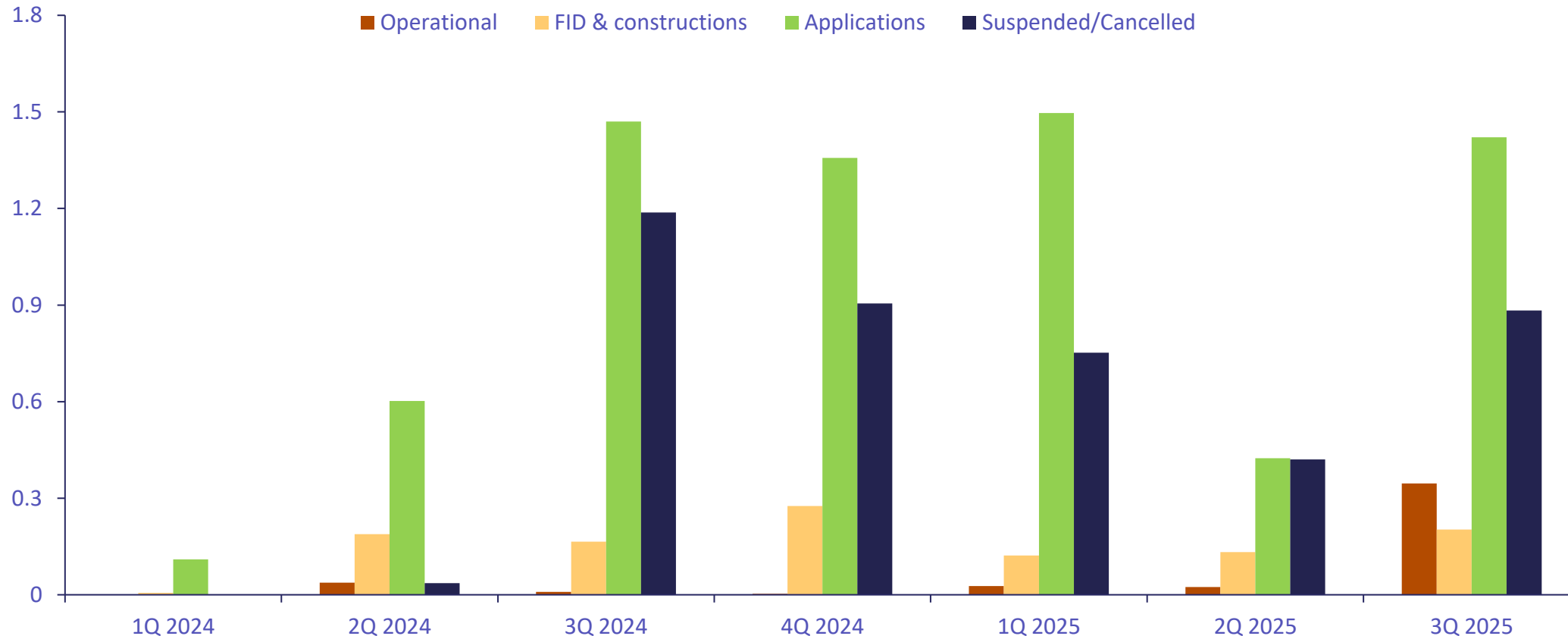
睿咨得能源 (Rystad Energy) 中国区氢能市场首席分析师

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- 01 地缘棋局与政策共振：全球清洁氢项目的演进路径
- 02 中国供应链的“颠覆性”力量：电解槽产能扩张与技术路线多元化突破
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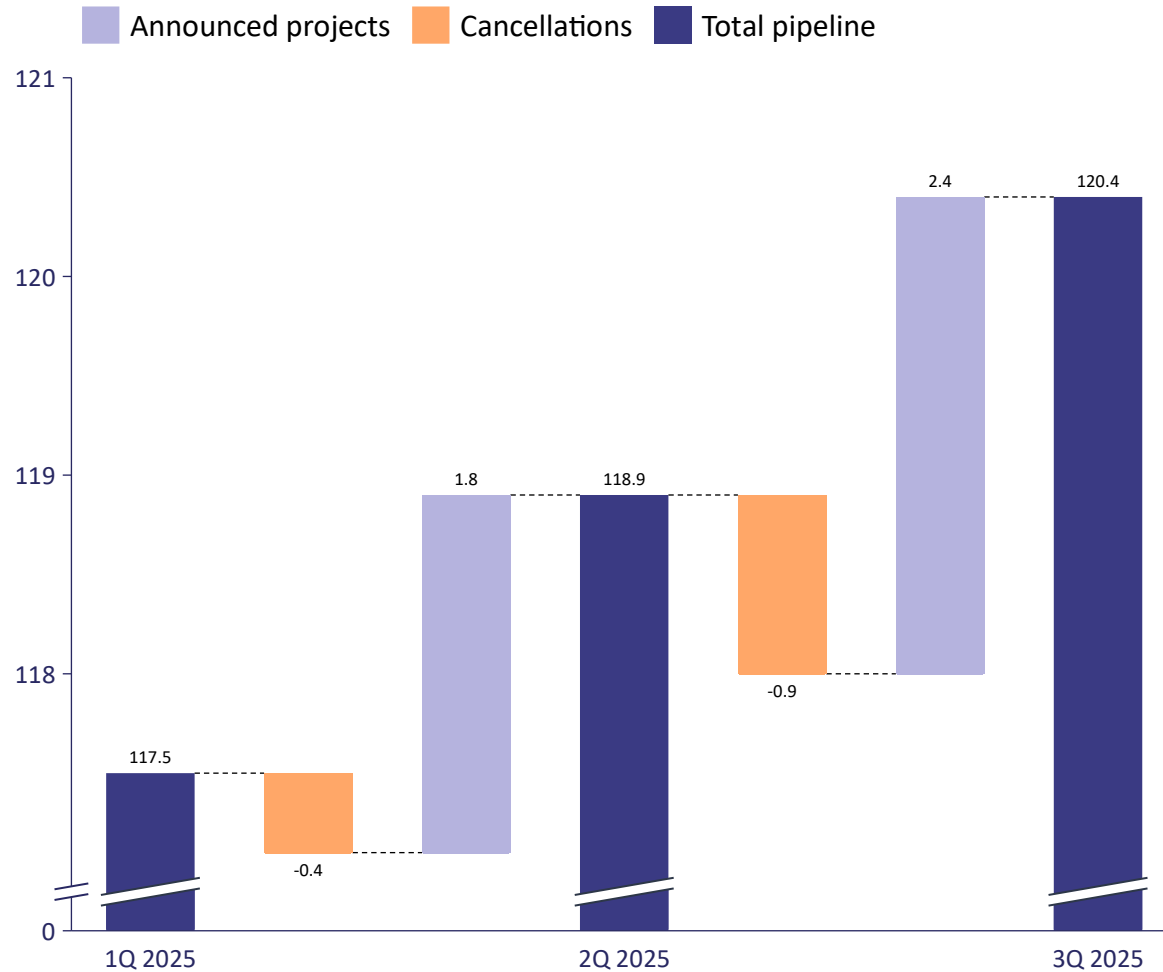
清洁氢能领域正换挡提速，迈向项目落地新阶段

Clean hydrogen projects' status change in 2024-2025
Million tonnes

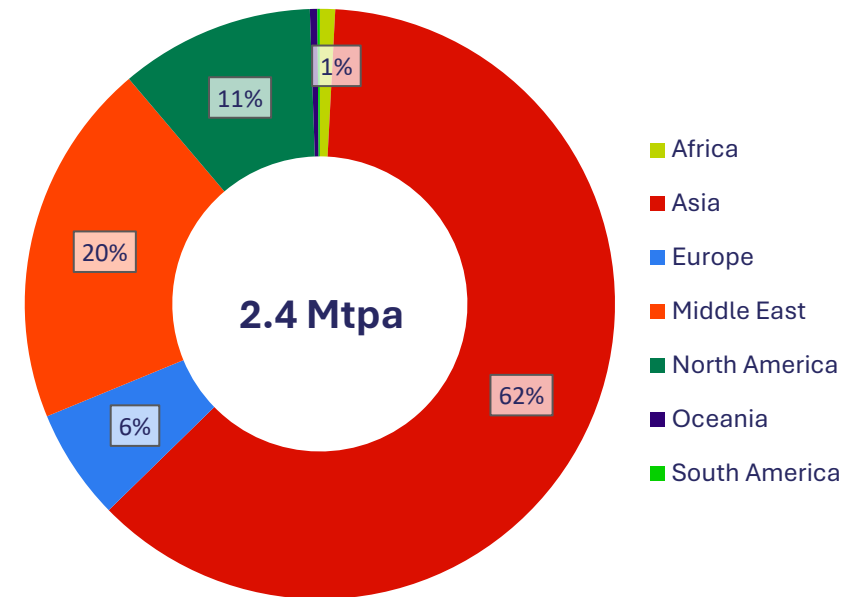


2025年前三季度全球清洁氢项目产能变化趋势

Million tpa of hydrogen



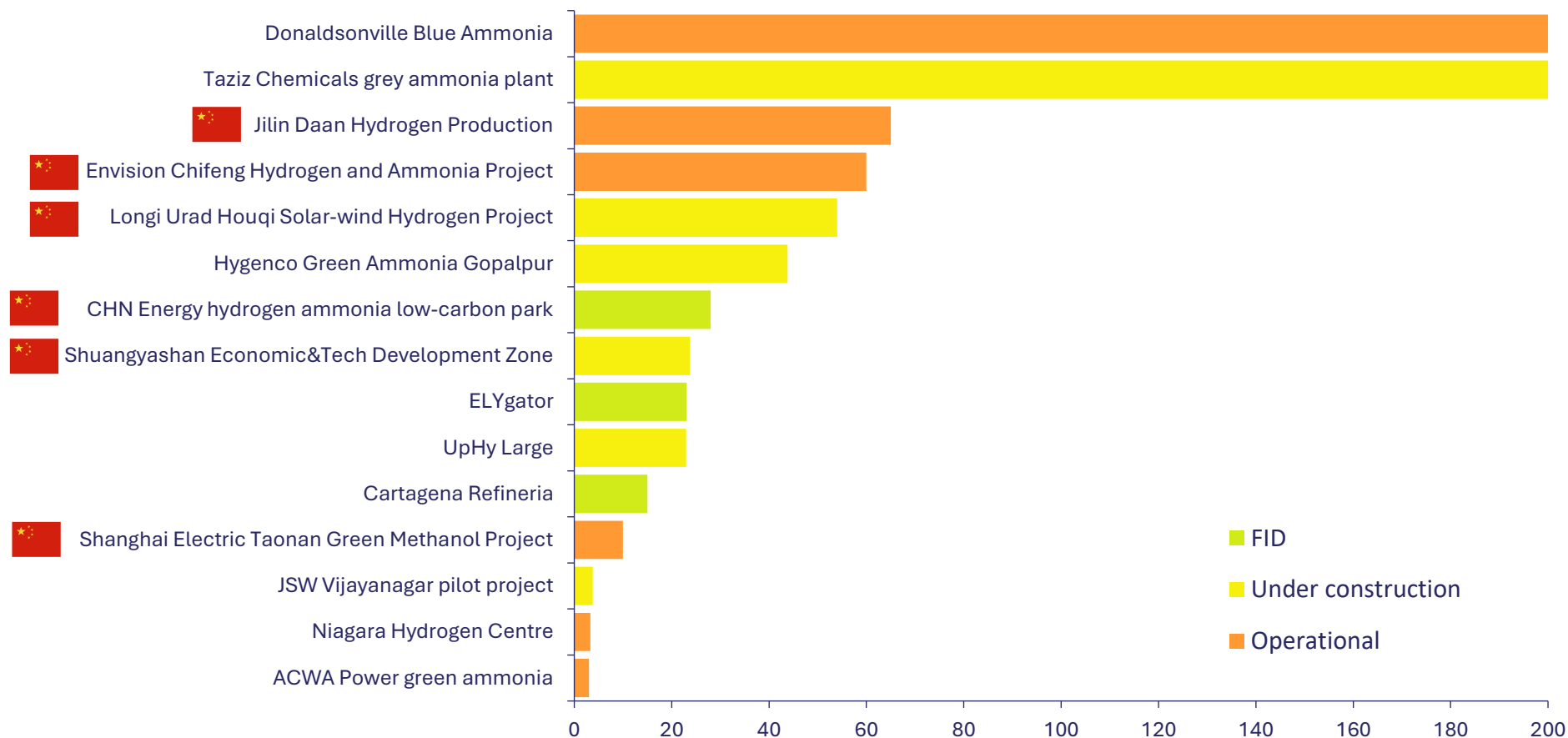
Share of hydrogen capacity announcement – 2Q 2025



中国市场加速：2025年第三季度全球氢能项目进展焦点

Major project advancements in 3Q25

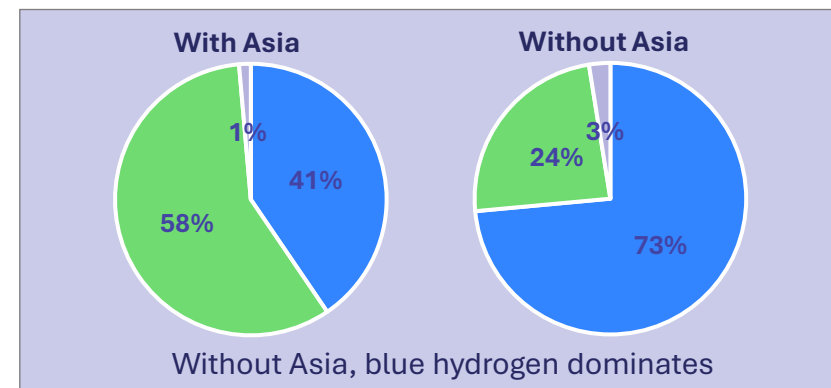
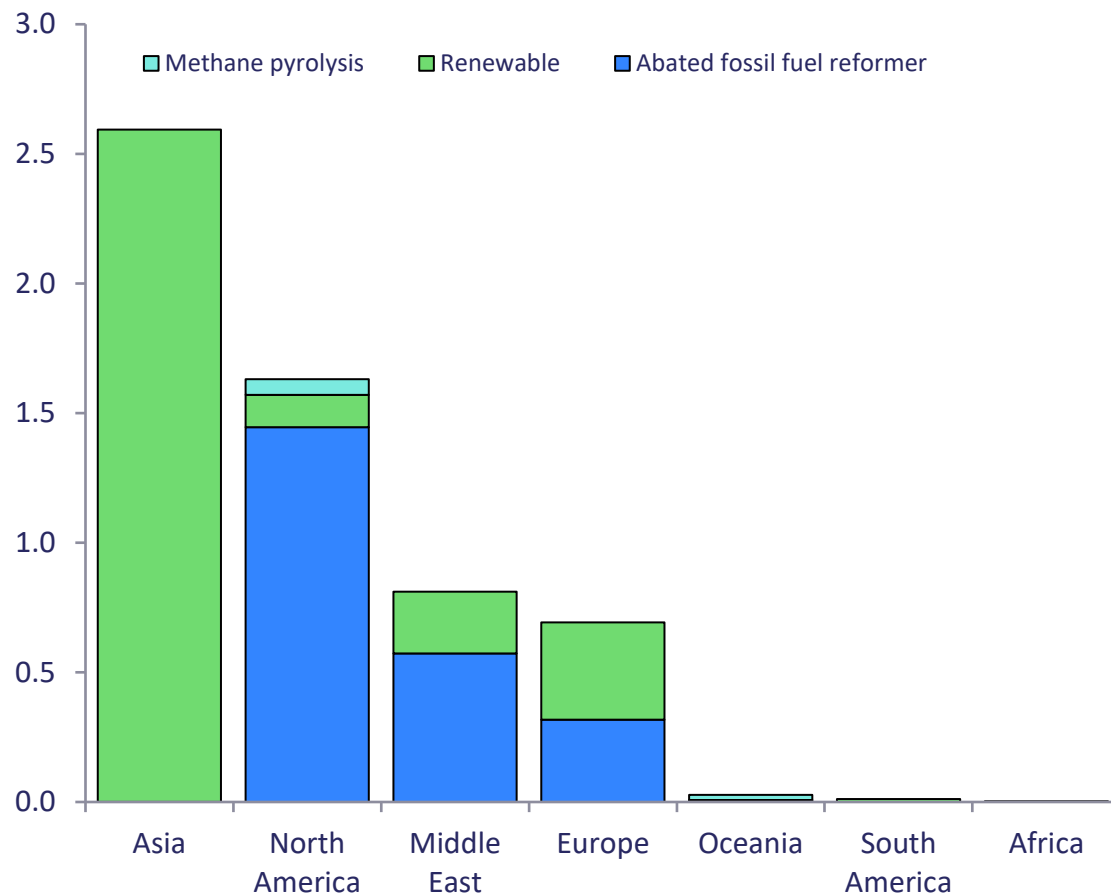
Thousand tonnes of hydrogen



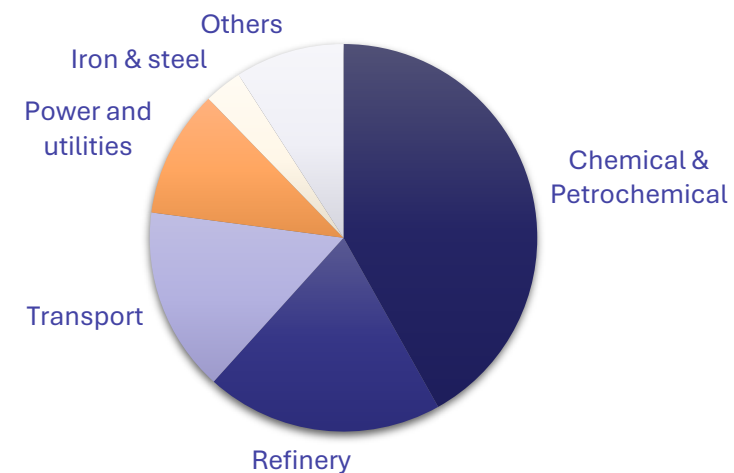
超550万吨清洁氢项目落地，亚洲成为全球产业新引擎

Clean hydrogen capacity under construction or has reached FID

Million tonnes



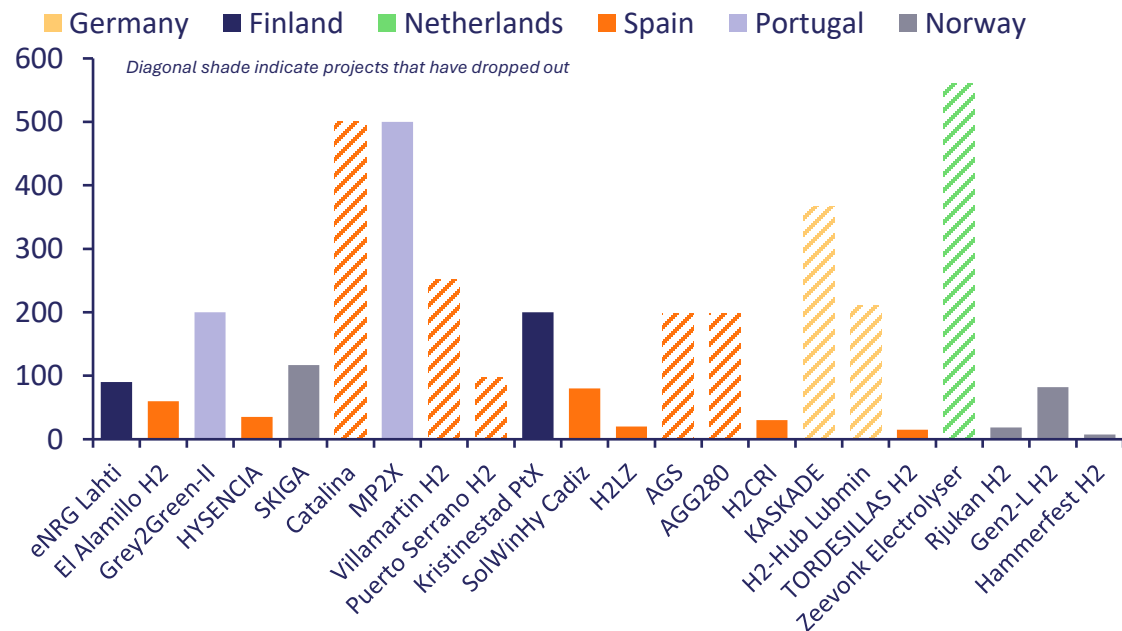
Share of binding offtake of clean hydrogen & derivatives projects post FID



欧洲氢能银行未达预期，欧盟氢能前路在何方？

Electrolyzer capacity of winning projects of EHB

Megawatts



Factor to consider for EU Hydrogen market continued development:

- REDIII transposition & penalties
- Adoption of Low carbon hydrogen delegated acts
- Infrastructure development timeline to match

REDIII Transportation transposition

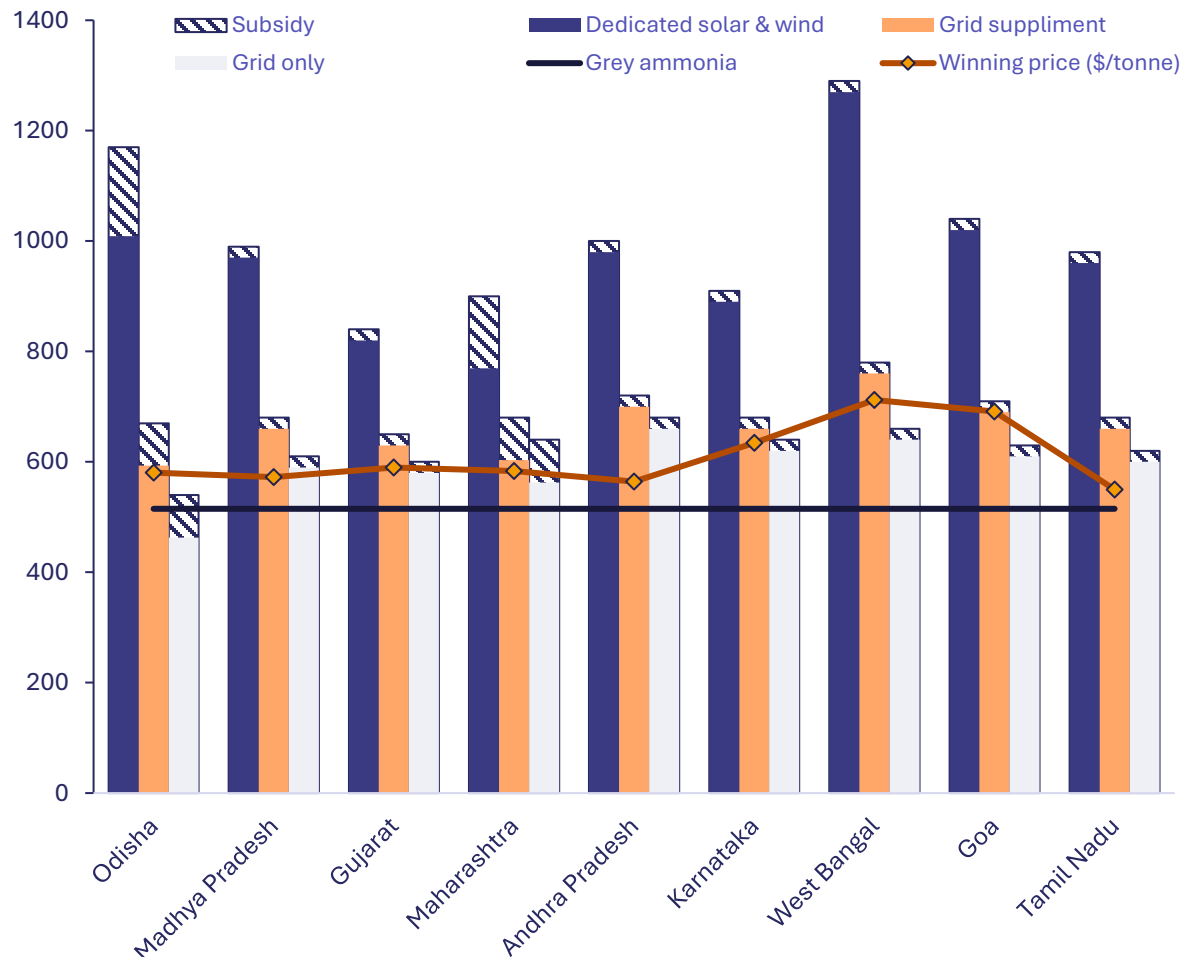


Country	2030 RFNBO transportation target	Multiplier announced	Penalty announced	Status
Finland	4% for road transport		✓	Adopted
Czechia	1%	General: 2x	✓	Adopted
Denmark	0.9%	Maritime & aviation: 1.5x	✗	Adopted
Spain	2.5%	General: 2x Maritime & aviation: 1.5x	✗	Draft
Germany	1.5%	General: 3x Maritime & aviation: 1.5x	✓	Draft
France	1.5%		✓	Draft
Romania	1%	General: 2x Maritime & aviation: 1.5x	✗	Draft
Netherlands	1.07% for road transport		✗	Draft
Portugal	1 %		✗	Draft
Belgium	5%		✗	Draft

近日的印度绿氨招标释放出全新价格信号



Ammonia tender winner prices vs. LCOA from various project's setup
USD/tonnes



E-ammonia winning price of \$630/t ~ **\$2.75/kg H2**

E-ammonia tender by SECI produces record low e-ammonia prices level, benefitting from:

- Local subsidies
- Lower CAPEX
- Less stringent rule for e-fuels, allow for grid banking
- Marketing strategy

Assessing EU import from India



Low cost



Low cost might not be sustainable



Compliance to RFNBO



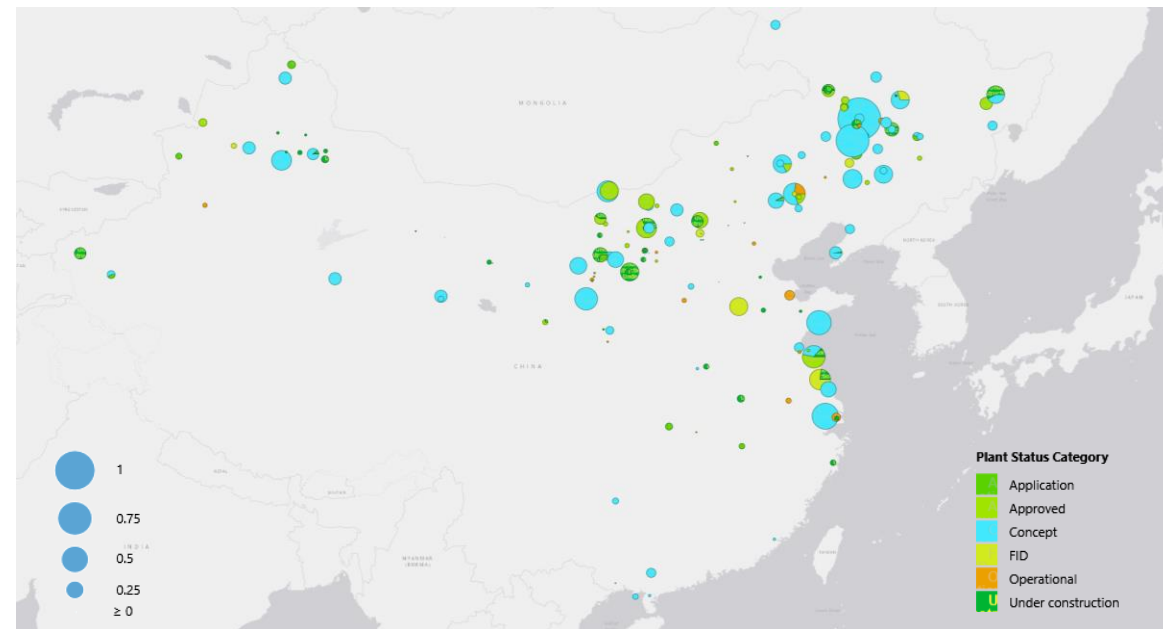
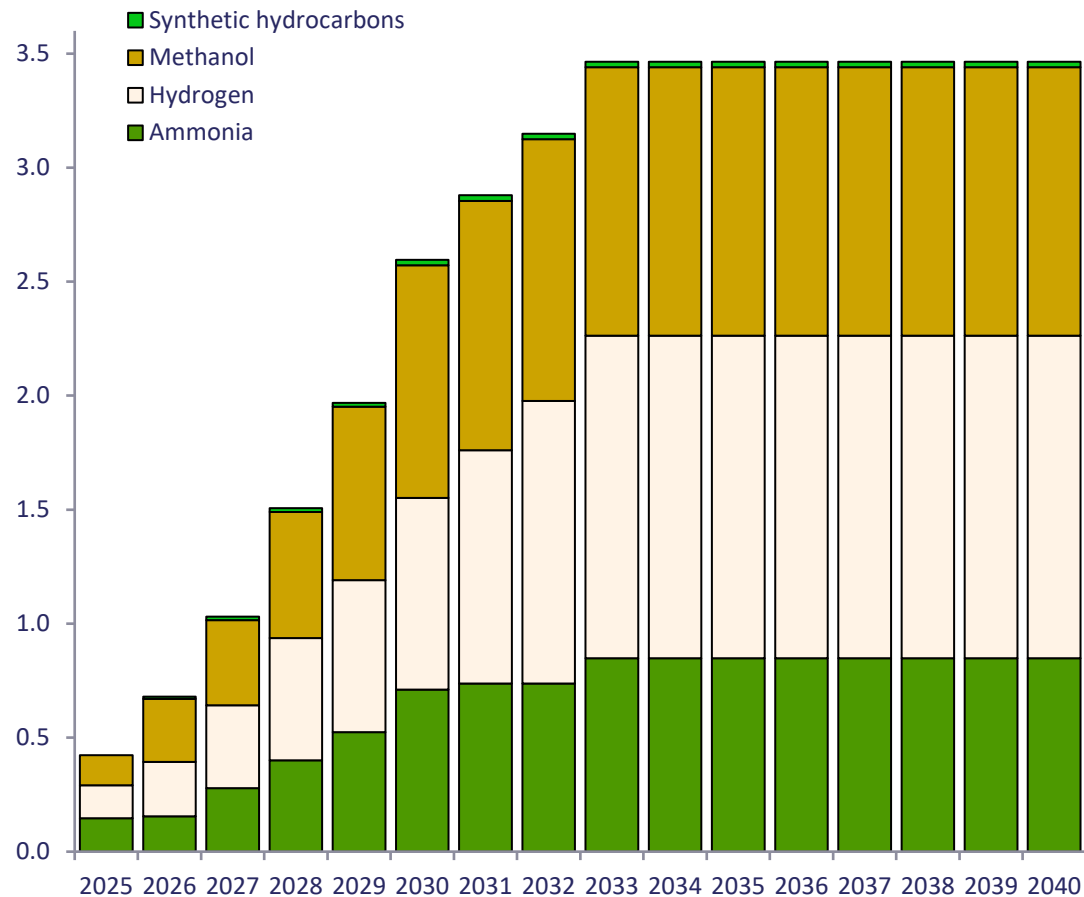
Can fit CBAM & Low-carbon hydrogen DA

中国聚焦甲醇消纳，多项目迈入高阶发展阶段

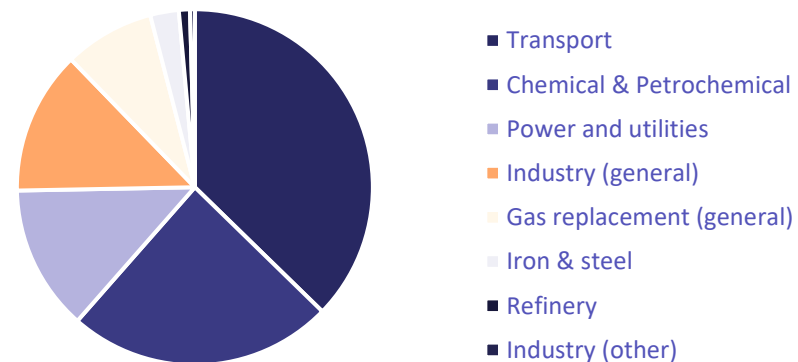


Clean hydrogen capacity (risked) build in China by end product type

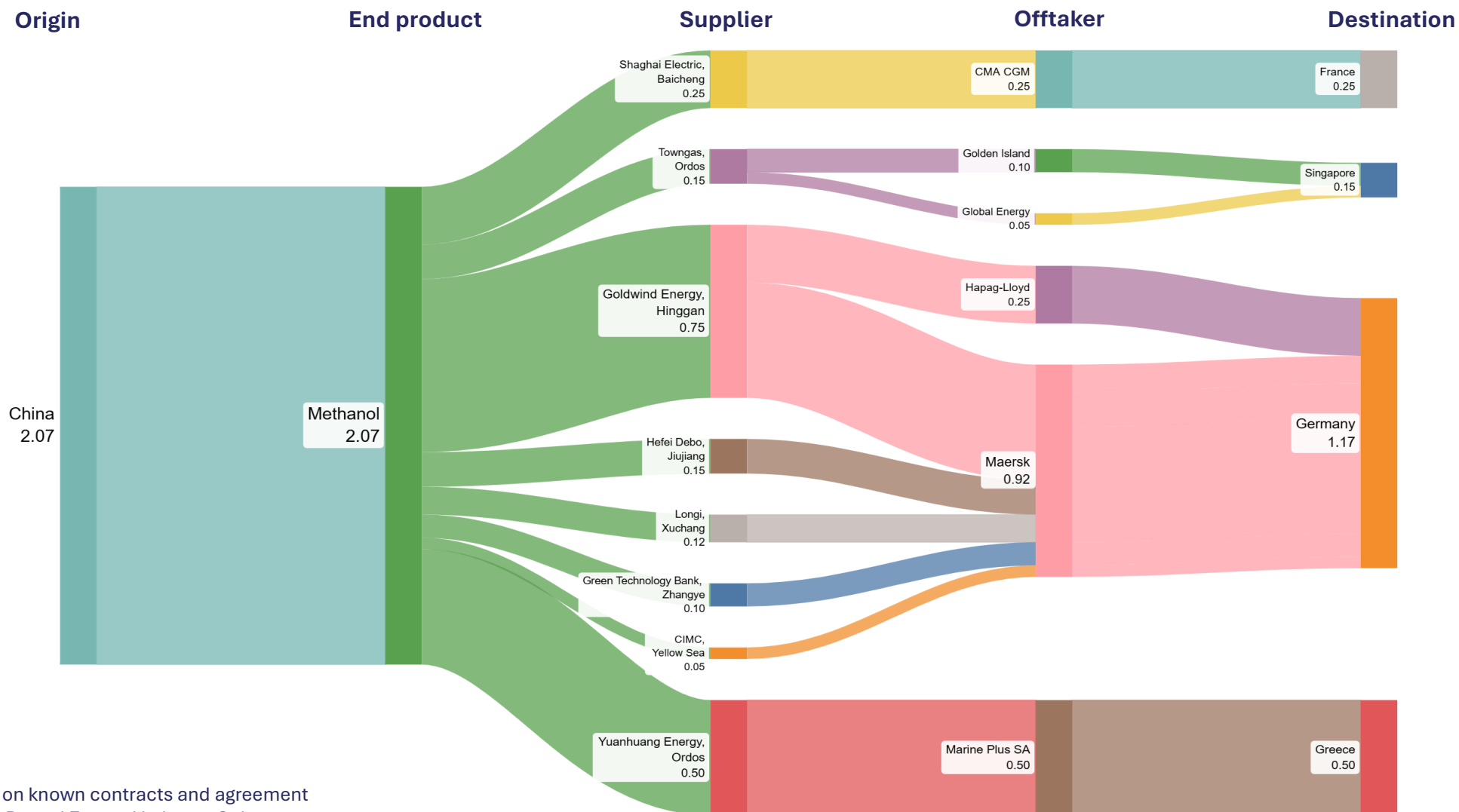
Mtpa hydrogen



Known applications of hydrogen projects in China



中国会成为未来的全球甲醇出口主力吗？



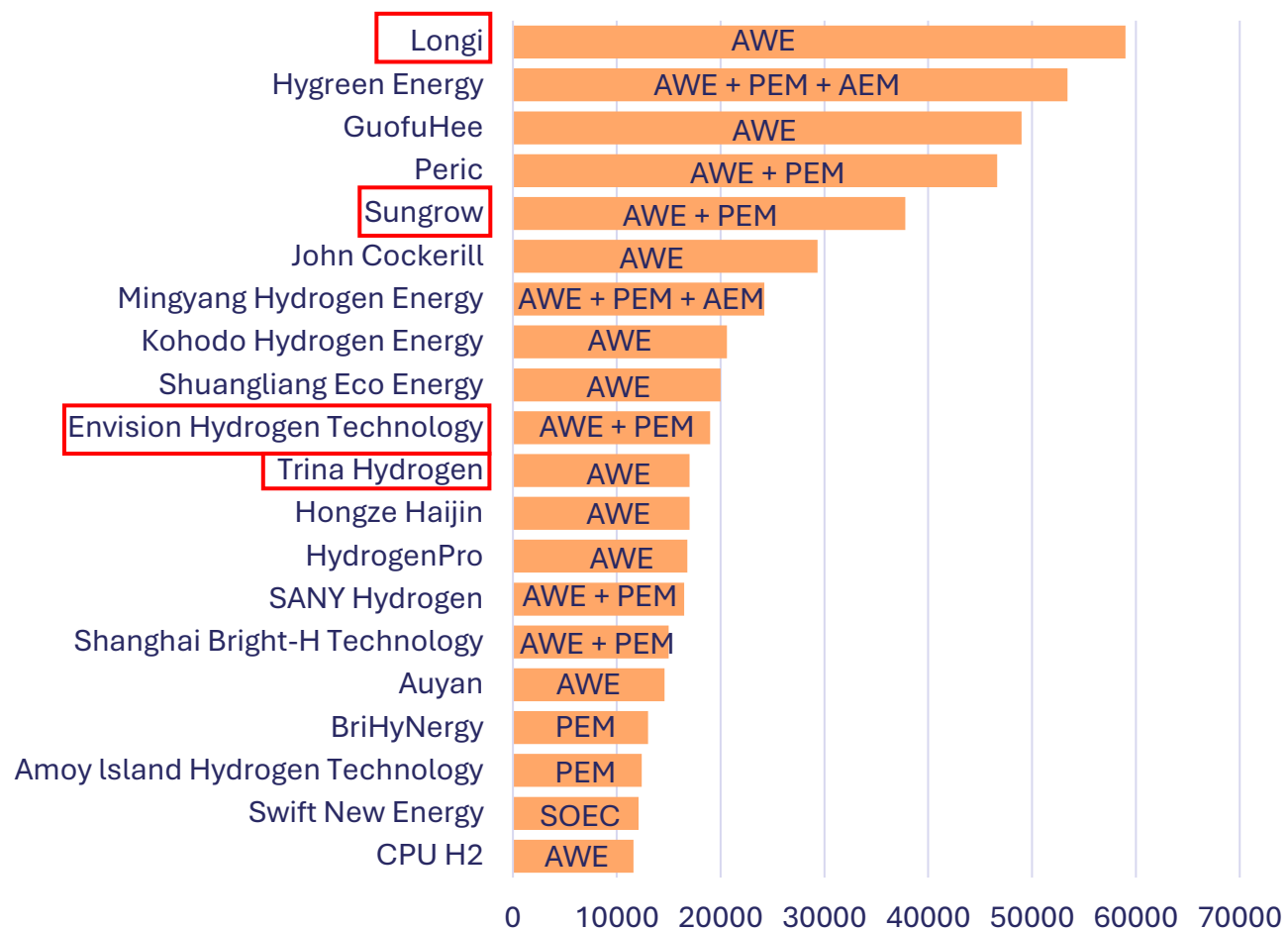
*Based on known contracts and agreement
Source: Rystad Energy HydrogenCube

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中国产能规模前20名电解槽制造商

Manufacturing Capacity in China by Electrolyzer OEMs

Megawatt



Renewable energy OEMs

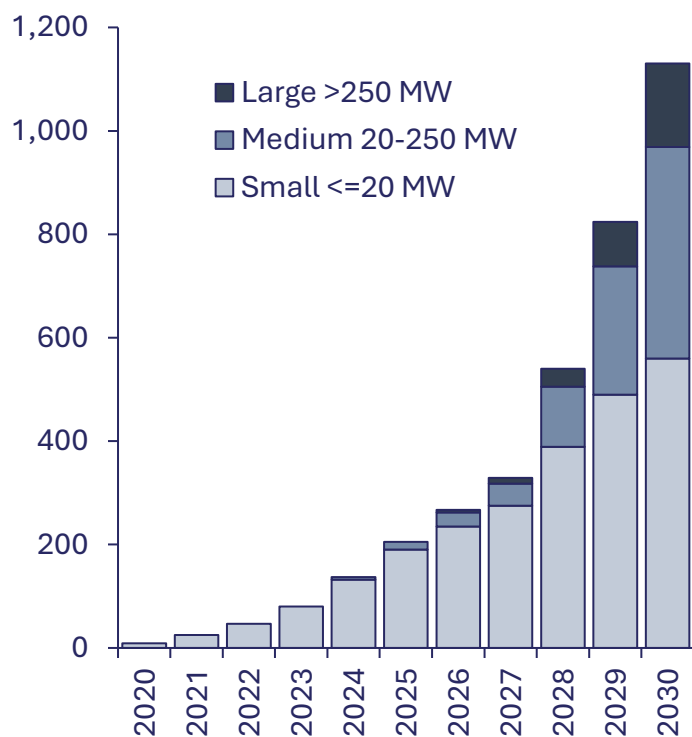
Key electrolyzer supply contracts in 3Q 2025

Supplier	Customer	Capacity (technology)	Project
GuofuHee	Self	300 MW (AWE)	Green Hydrogen Complex, Inner Mongolia, China
	Hami Tonghuide Green Casting	100 MW (AWE)	Hami Tonghuide Green Casting Project, Xinjiang, China
Mingyang Hydrogen	Green World Energy Hydrogen	80 MW (AWE)	Green Hydrogen Project, Mato Grosso do Sul, Brazil
	Qair Brazil	20 MW (AWE)	H2BRASIL Project, Brazil
Longi Hydrogen	Sinopec	80 MW (AWE)	Zhongtian Hechuang Ordos Coal Chemical Project, China
SANY Hydrogen		80 MW (AWE)	
Huadian Heavy Industries		80 MW (AWE)	

中国领跑大型电解槽部署：2020-2025年三季度20MW级以上装机占比超半数，较全球7%水平展现显著规模优势

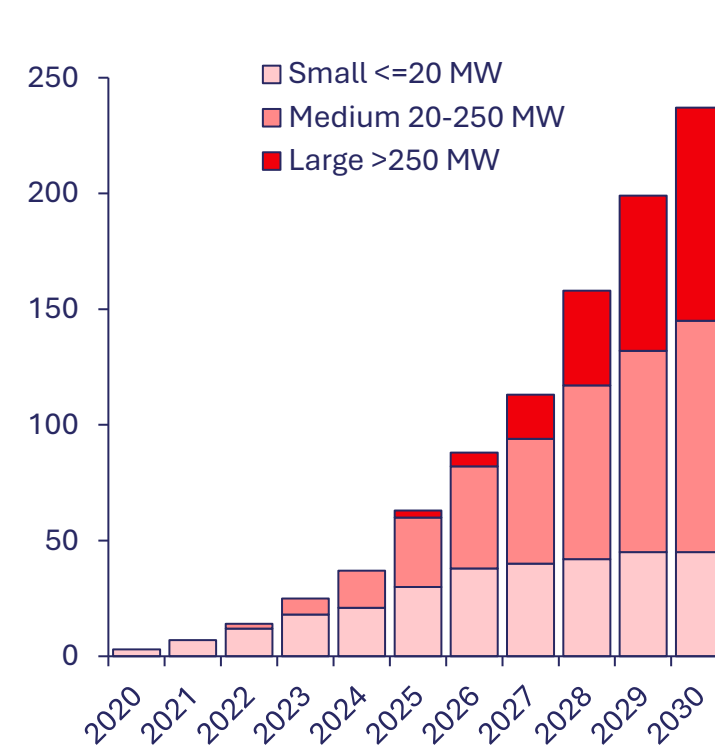
Electrolyzers installed outside China

Cumulative count



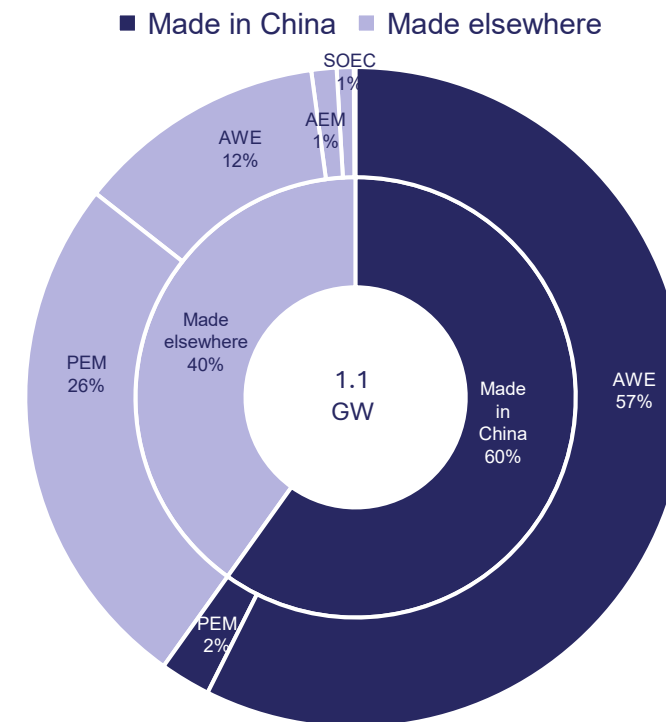
Electrolyzers installed in China

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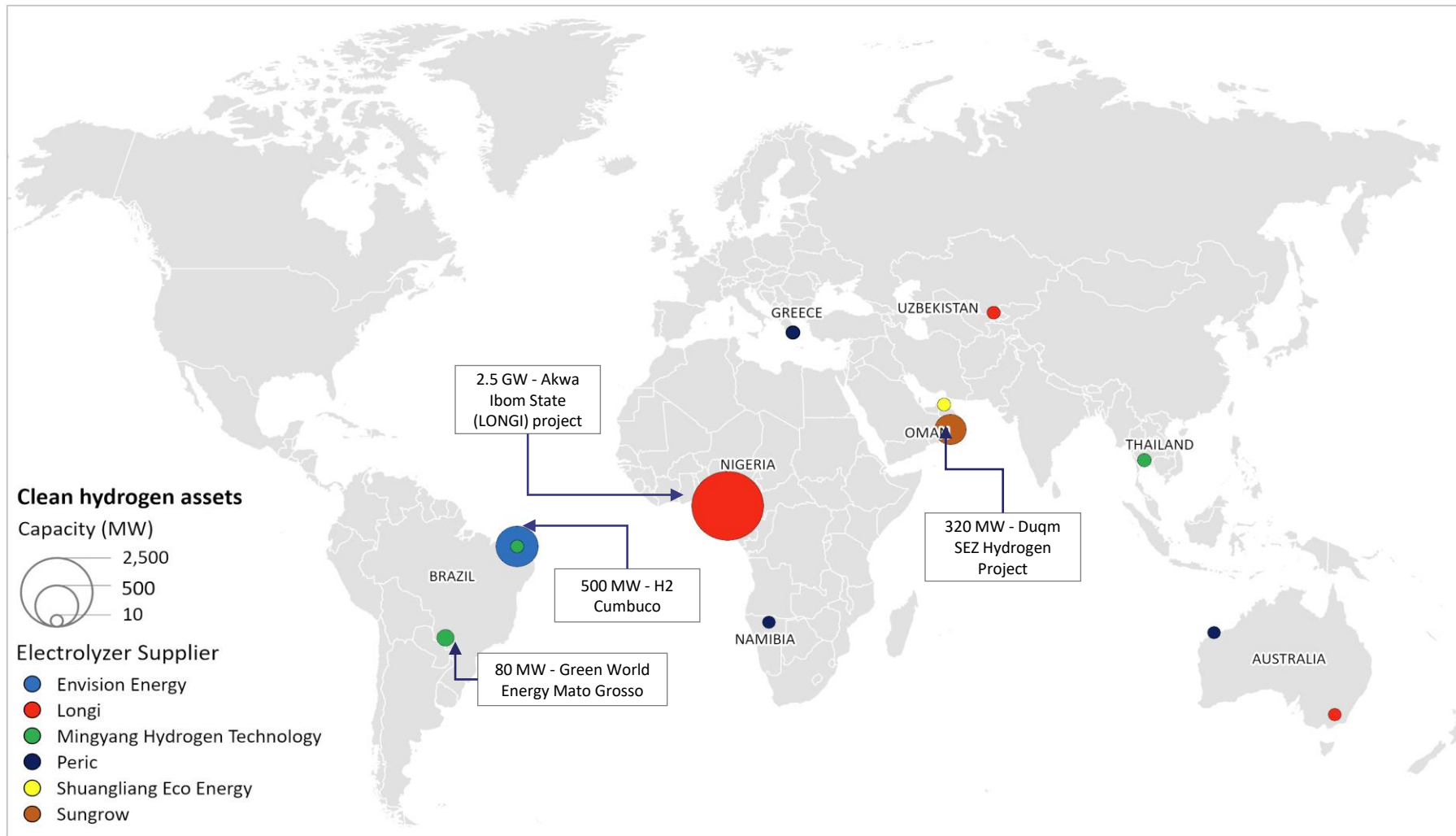
Operational electrolyzer capacity

Percentage based on aggregated electrolyzer capacity commissioned in GW, based on contract announcements



中国电解槽制造商出海破局，占领产业链高地

Project capacity in MW



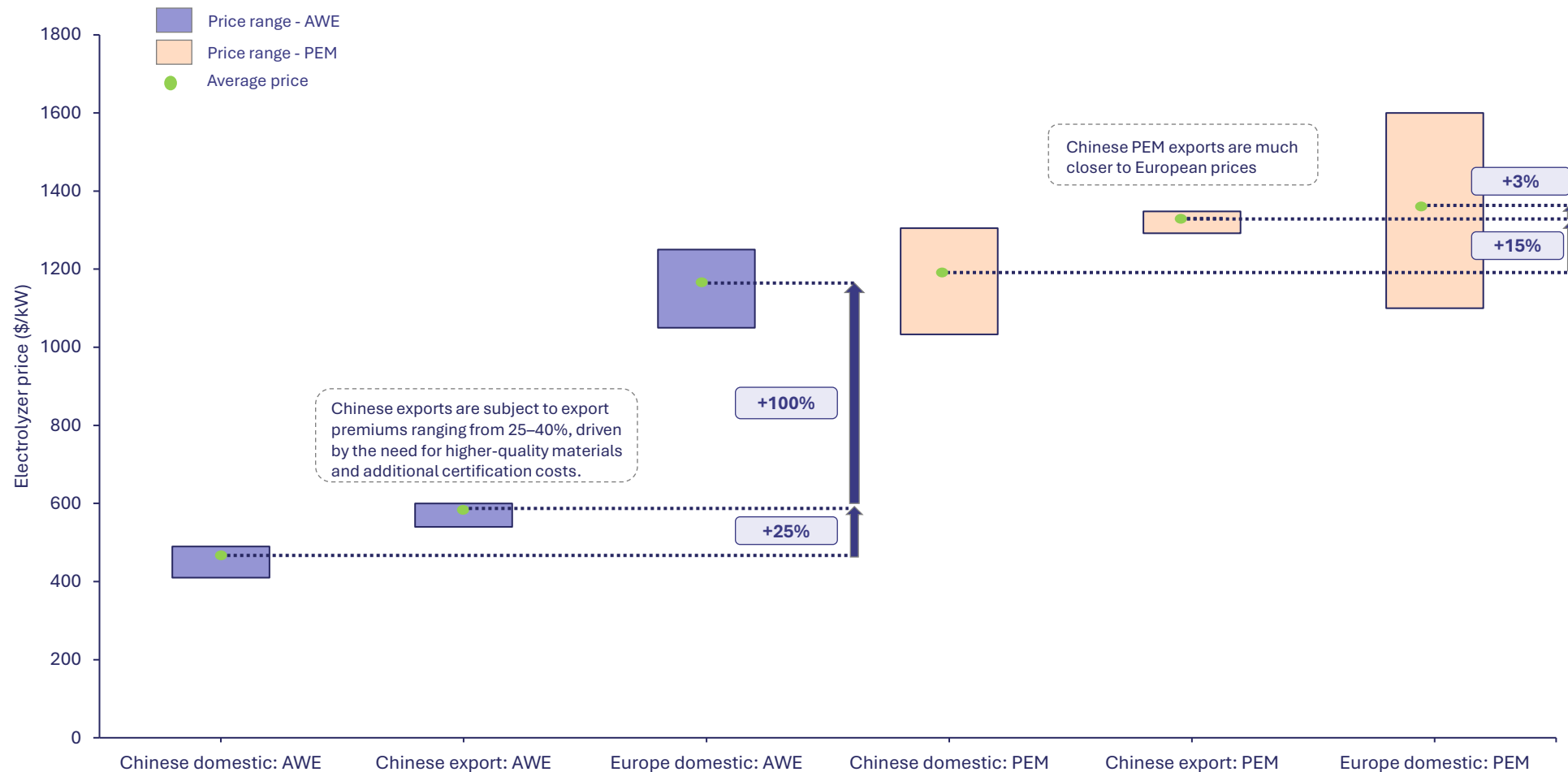
Chinese OEMs and EPCs are gathering market share overseas due to domestic experience and leverage first mover advantage:

Combination of state-owned enterprises and OEMs

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2025年中国电解槽价格 VS 欧洲电解槽价格

Average market (nominal) prices in USD per kilowatt (\$/kW)

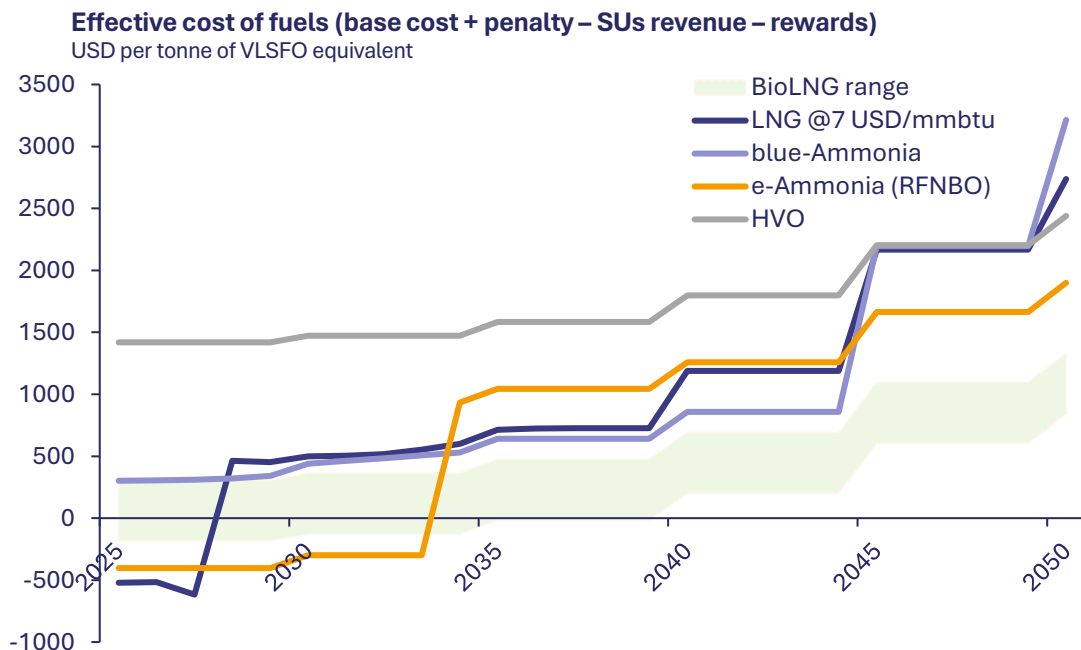


*Price comparison scope is for 1 MW AWE/PEM electrolyzer systems covering stack + Balance of System (BOS) + Balance of Plant (BOP). The current density for AWE system in this analysis ranges from 0.3-0.6 A/cm² and for PEM it is 1 A/cm². Chinese electrolyzer export ranges does not account for transportation. Electrolyzer prices are estimated through conversations with Chinese and European OEMs.

Source: Rystad Energy Hydrogen Solution; Rystad Energy research and analysis

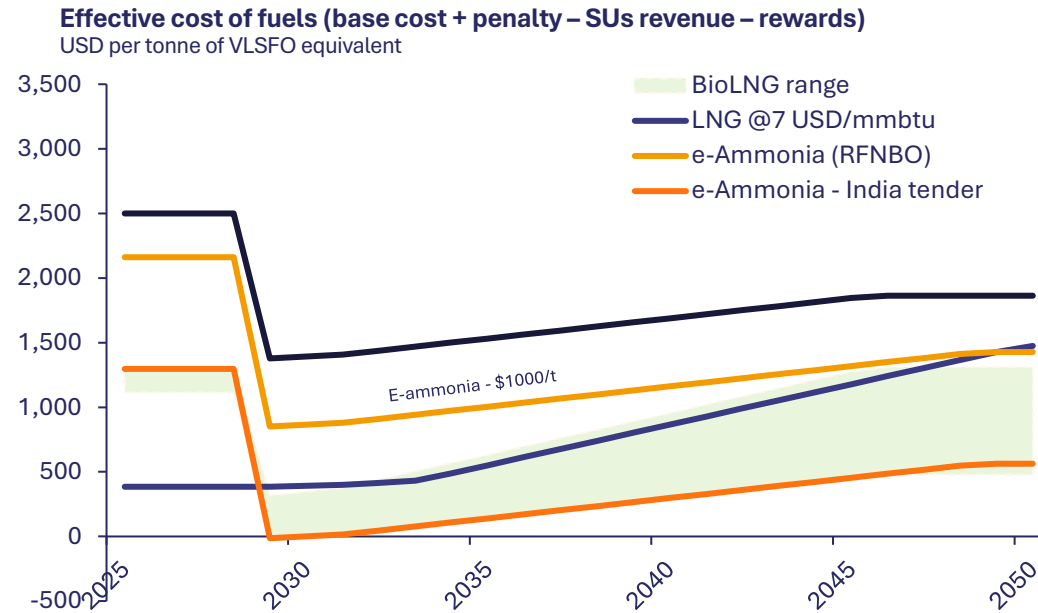
在IMO推迟行动后，FuelEU Maritime法规成为当前航运脱碳进程的唯一驱动力

FuelEU Maritime



- FuelEU Maritime ammonia use tied to 1% RFNBO sub-target
- Green ammonia (RFNBO) competitive with LNG until ~2035 due to compliance pooling/trading
- After 2035, LNG may regain advantage unless e-ammonia drops below ~\$800/t.
- LNG remains viable until mid-2040s due to bioLNG blending intra-EU
- Transition from blue to green ammonia out in time possible if low carbon intensity achieved
- **Key takeaway: Green ammonia competitive with LNG until 2035, but LNG remains viable longer due to blending flexibility and regulatory scope, Bio-LNG is key to watch**

IMO



- Uncertainty on adoption timeline
- Ammonia is still competitive, but depends on GHG definition, adoption timeline is between 2030-2040
- Delay can help ammonia prove successful operations
- **Key takeaway: Lower LNG prices will test ammonia competitiveness, bio-LNG cost development & adoption key to watch**

*All e-fuels and biofuels are assumed to have a **GFI of 14gCO₂eq/MJ**. All e-fuels are produced in the North America region with learning rate assumption, SU trading price at \$190/t, IMO reward at \$200/t for all years.; BioLNG cost is not subsidized; LNG GFI is according to IMO LCA default parameters using IPCC AR6 GWP-100 factors; LNG is combusted in LNG Diesel slow speed engine. Actual competitiveness driven by each shipowner's exposure to FuelEU/IMO, demand development for different fuels, geographical factors, ship & engine type, bunkering location. E-ammonia (RFNBO) is set at \$1000/t ammonia, e-ammonia – India tender at \$600/t
Source: Rystad Energy research and analysis; IMO;Argus

Thank you.

Please contact our team for questions or how to get started.

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