

# Hydrogen Strategic Planning Outlook: Extract

A view of hydrogen supply and demand to 2050

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A Verisk Business





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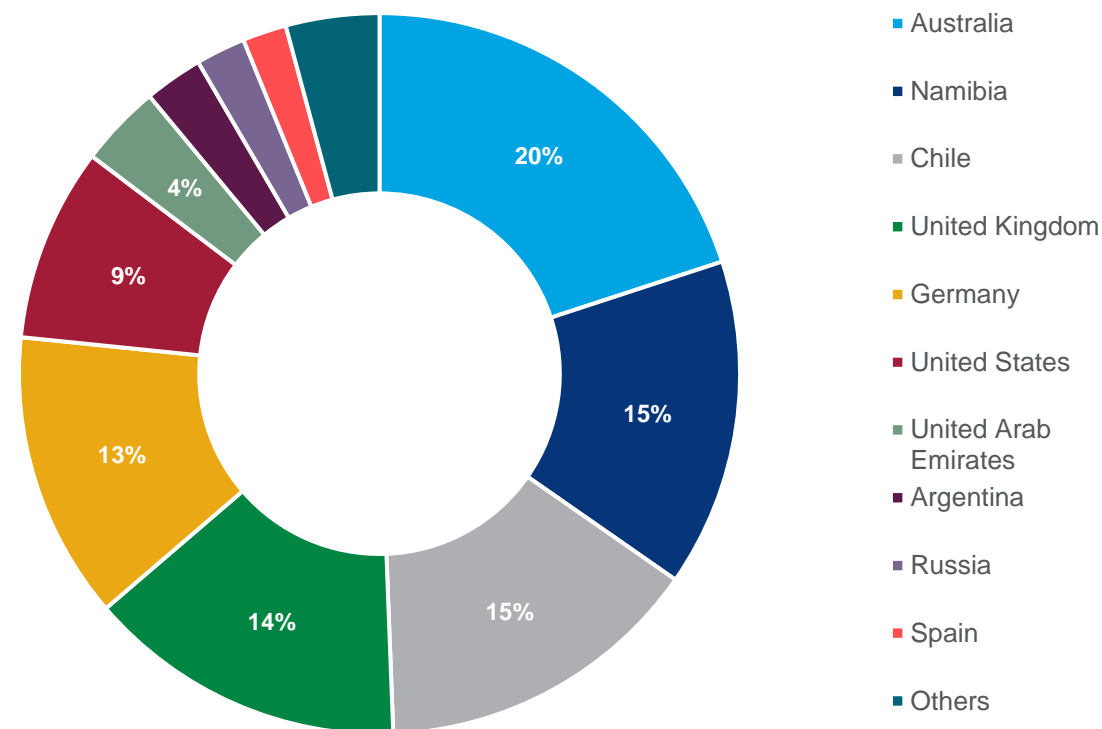
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# Low-carbon hydrogen market highlights

A mix of capacity announced globally in Q4 2021, low-carbon hydrogen production pipeline is now 50Mtpa

Announced in Q4 2021	
<b>Projects</b>	<ul style="list-style-type: none"> <li>3 low-carbon projects, or <b>9.6Mtpa</b> of hydrogen production,</li> <li>Of which, <b>53GW (6Mtpa)</b> were electrolysis projects</li> <li>Largest projects from <b>Chile (8GW)</b> and <b>Namibia (8GW)</b></li> <li>Total low-carbon hydrogen pipeline now <b>50Mtpa</b></li> </ul>
<b>End-use Sectors</b>	<ul style="list-style-type: none"> <li><b>6</b> end-use sector projects, power and steel still lead the charge</li> <li><b>6.3 Mtpa(H<sub>2</sub>)</b> of export and/or Ammonia projects</li> <li>General <b>H2 economy, aviation and refuelling</b> sectors accounted for bulk of end-use sector partnerships announced</li> </ul>
<b>H2 Policy</b>	<ul style="list-style-type: none"> <li><b>Australia</b> and <b>Belgium</b> revamped their hydrogen strategies</li> <li><b>Morocco, UAE and Alberta (Canada)</b> released hydrogen roadmaps</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li><b>US\$22 billion</b> in funding, mainly due to the announcement from the <b>US DOE Office of Clean Energy Demonstrations</b> for <b>US\$20 billion</b></li> <li>US is gaining momentum, seeing some of the largest fund announcements this year from both private and government</li> <li>Total funding for 2021 stands at <b>US\$46 billion</b>, Q4 accounting for nearly half</li> </ul>

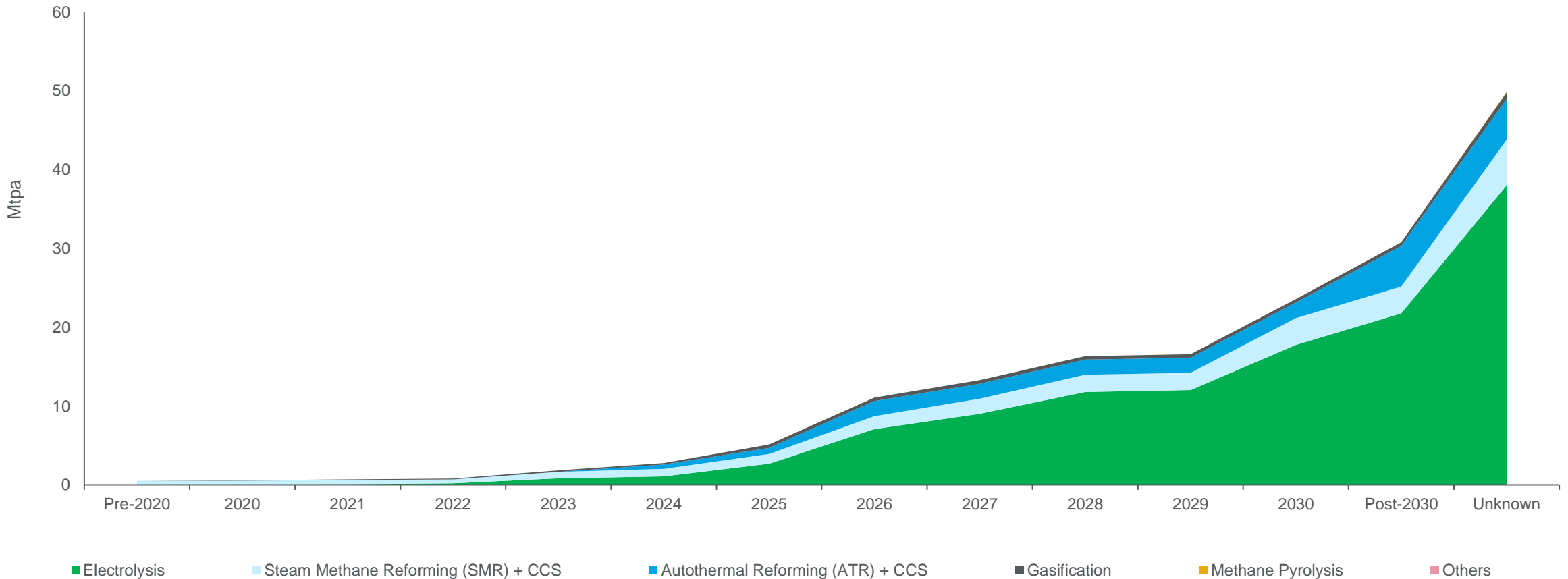
Q4 2021 announced low-carbon hydrogen production by country



# Electrolysis projects represent 76% of the low-carbon hydrogen pipeline

53GW in electrolysis projects were announced last quarter bringing the total pipeline to 243GW – driven by favorable policy in North America blue hydrogen projects announcements also increased last quarter

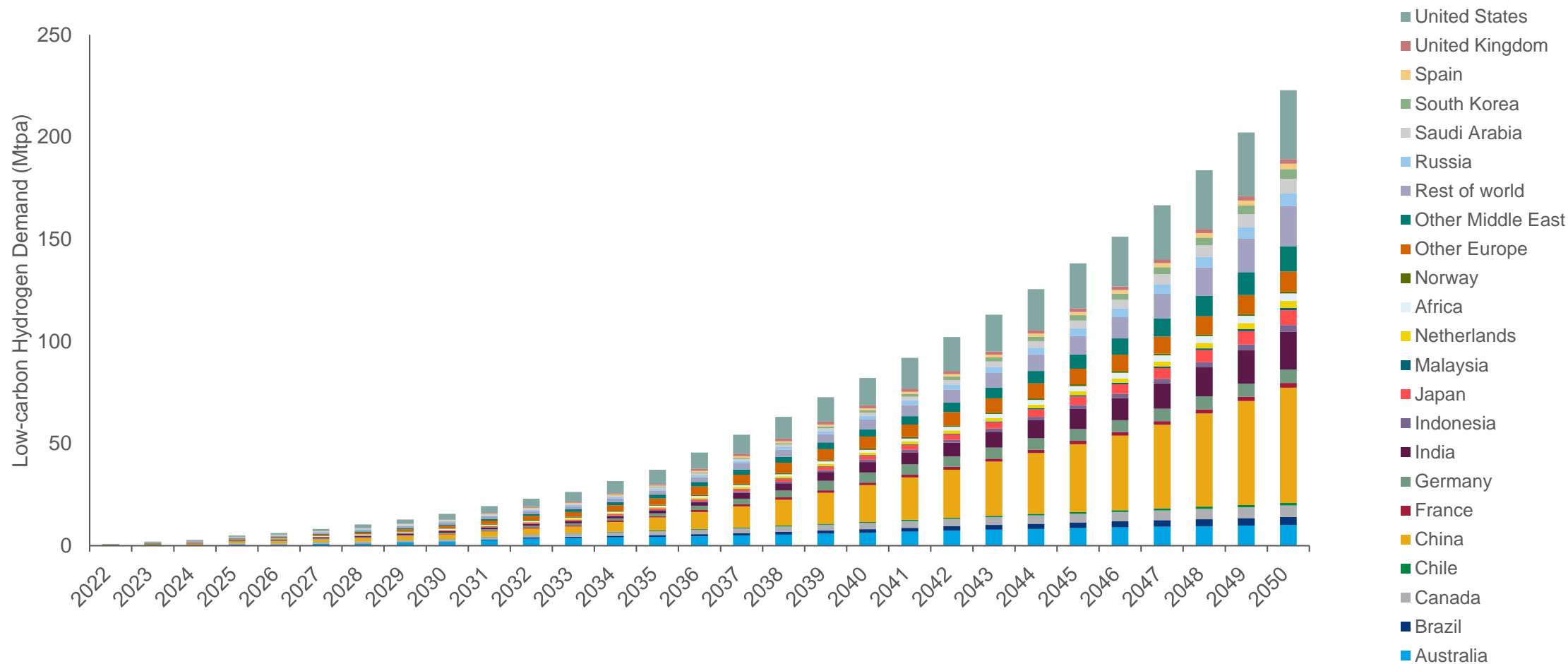
Global cumulative hydrogen production by production method based upon low-carbon hydrogen project pipeline (Mtpa)



# China, United States and Europe will dominate the market for hydrogen

Strong policy support through specific demand sector mechanisms and technology progress will help demand materialize

Global Low-carbon Hydrogen Demand by Country: 2022 to 2050

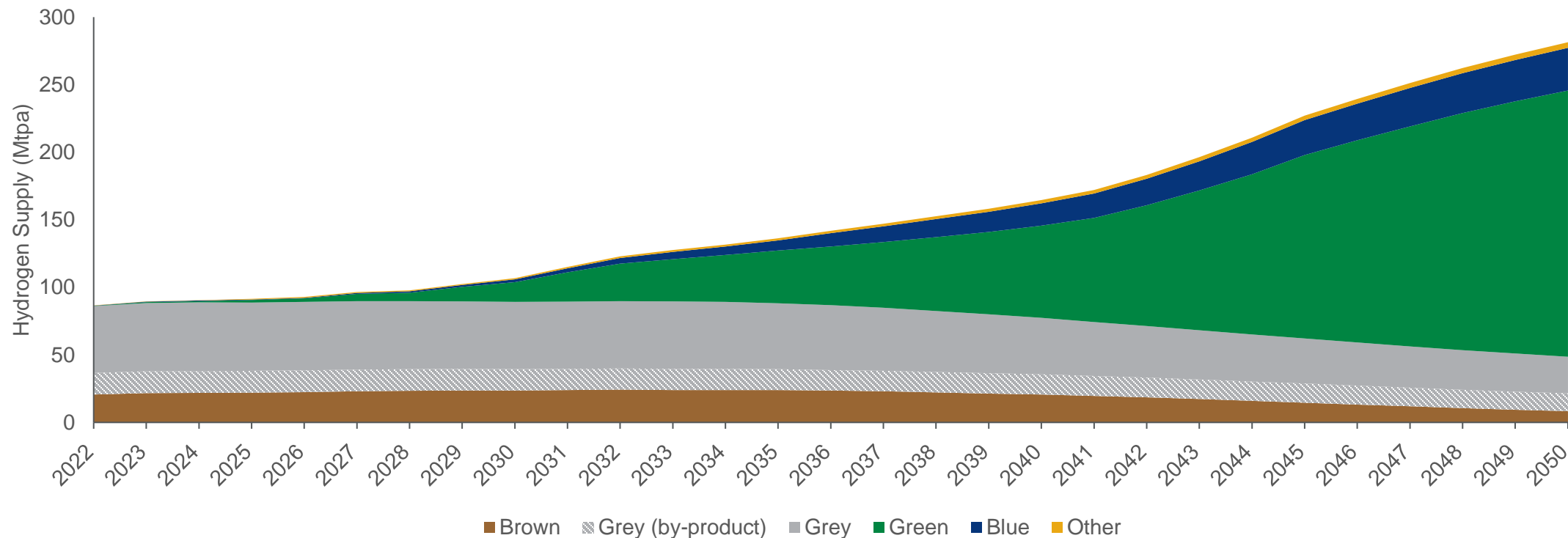


Source: Wood Mackenzie

# The rapid rise of green hydrogen will dwarf fossil hydrogen to below ~20%

By 2050 blue hydrogen will require 280 Mt of CCUS deployments

Global Hydrogen Production by Colour: 2022 to 2050 (Mtpa)



- Grey hydrogen refers to hydrogen produced from Steam Methane Reformers (SMRs) in the ammonia, refining and methanol sectors. Grey hydrogen (by-product) represents hydrogen produced as a by-product (e.g. catalytic reforming) in the refining and petrochemical sectors. Since by-product hydrogen does not have to be produced from scratch it cannot be entirely substituted with low carbon hydrogen. By-product hydrogen in refining is ~16 Mt today and decreases to ~13 Mt by 2050 due to shrinking oil demand.

## About the analysts

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### Bridget van Dorsten

#### Research Analyst – Hydrogen & Emerging Technologies – Energy Transition Practice

Bridget is a hydrogen-focused research analyst within Wood Mackenzie's Energy Transition Practice. They work on modelling hydrogen markets and hydrogen assets in addition to tracking project deployments, policy, investments and new technologies.

Prior to this role, they were a consultant with Power Advocate specializing in hydrogen asset modelling, strategic sourcing and category management for energy utilities in North America. Bridget holds a bachelor's degree in Environmental Engineering from Brown University where their focus was on renewable energy and hydrogen. Prior to graduation, Bridget worked in France and the U.S. for entities focused on optimization of hydrogen production and distribution for light-duty vehicle applications, namely Air Liquide and First Element Fuel.



### Flor Lucia De la Cruz

#### Senior Research Analyst – Hydrogen & Emerging Technologies – Energy Transition Practice

Flor is a subject matter expert in hydrogen and emerging technologies for Wood Mackenzie's Energy Transition Practice. She works on modelling hydrogen markets, tracking deployments, policy, investments, technology trends, and analyzing the adoption of hydrogen in industrial processes including ammonia, methanol, heating, blending, midstream logistics and the power and storage sector.

Before joining Wood Mackenzie, Flor led the innovation team at IDOM working on developing low carbon and circular economy projects for green/blue hydrogen, advanced biofuels, hydrotreated vegetable oils, plastic recycling, and carbon capture. At IDOM she also worked as a process engineer on LNG projects in Brazil, Colombia and Poland and a natural gas processing facility in Morocco. Before IDOM, Flor worked as a Health Safety & Environment engineer at Tecnicas Reunidas (TR). At TR she worked on the Al-Zour Refinery for Kuwait and a Nitric Acid plant for Yara in Norway.

Flor holds a bachelor's degree in Chemical Engineering from the Massachusetts Institute of Technology (MIT). While at MIT she worked as a researcher at the Metabolic Engineering Laboratory on a project for Novogy Inc (now Total) to investigate yeast's ability to convert low-cost feed stocks into lipids to produce inexpensive biodiesel.





# How to get the report

The full version of our *Hydrogen strategic planning outlook* is available to subscribers to our [Energy Transition Service](#). To find out more about the service, email us at [power@woodmac.com](mailto:power@woodmac.com).

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## Related Research

Our data is at the core of everything we do. We build our research from the bottom up and top down so that you can understand market dynamics and make decisions that will help your company grow. Below are links to some of our recent events, insights and research that may be of interest to you:

- [Can the Middle East become a global hydrogen player?](#)
- [Asia's NOCs can now move through the decarbonisation gears](#)
- [World must double-down on plans to achieve net zero by 2050](#)
- [Corporate New Energy Series](#)
- [Event: Power & Renewables Conference: Europe](#)
- [Event: Hydrogen Conference](#)



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