



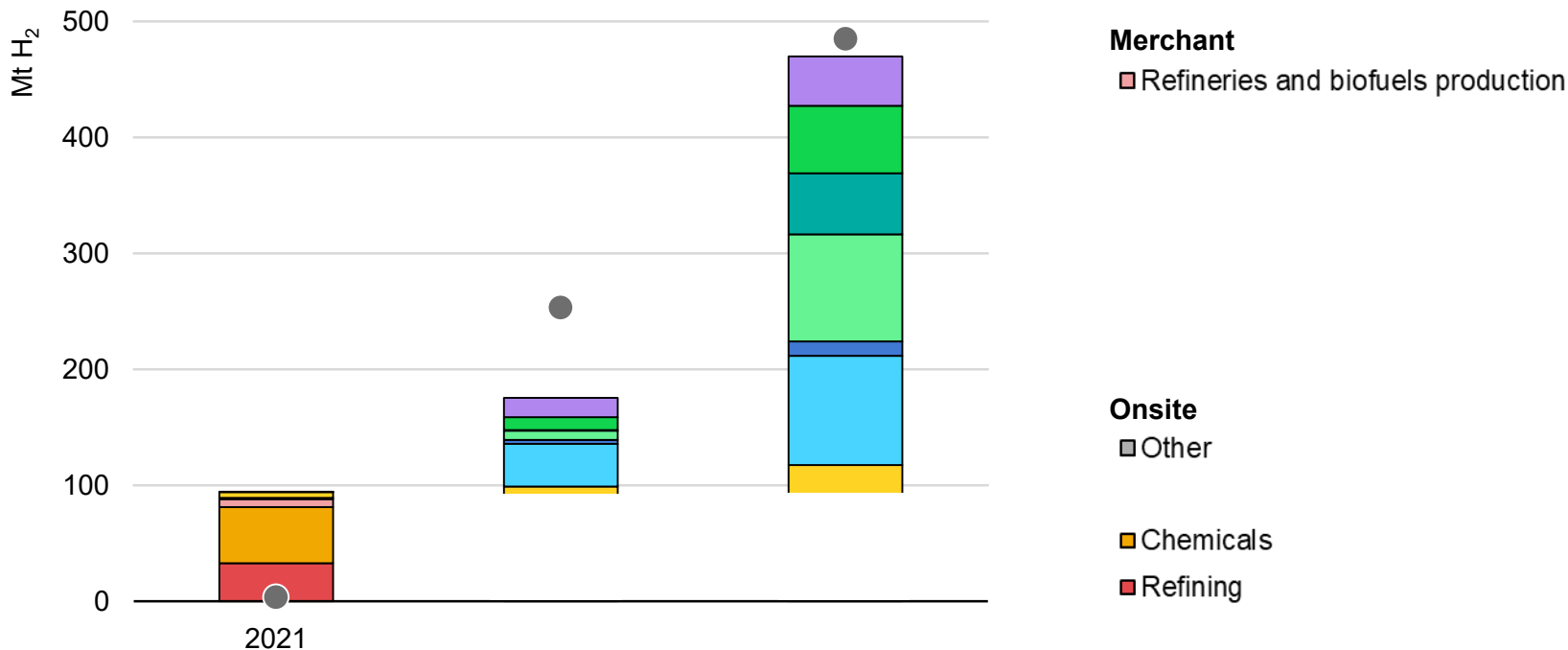
Perspectives and Challenges for Clean Hydrogen

Dr. Uwe Remme, Head of Hydrogen and Alternative Fuels Unit

23 August 2023, IGES Webinar “Advancing the Net-Zero Agenda through Regional Cooperation in Green Hydrogen in Asia”

Hydrogen is a key pillar for net zero across the energy system

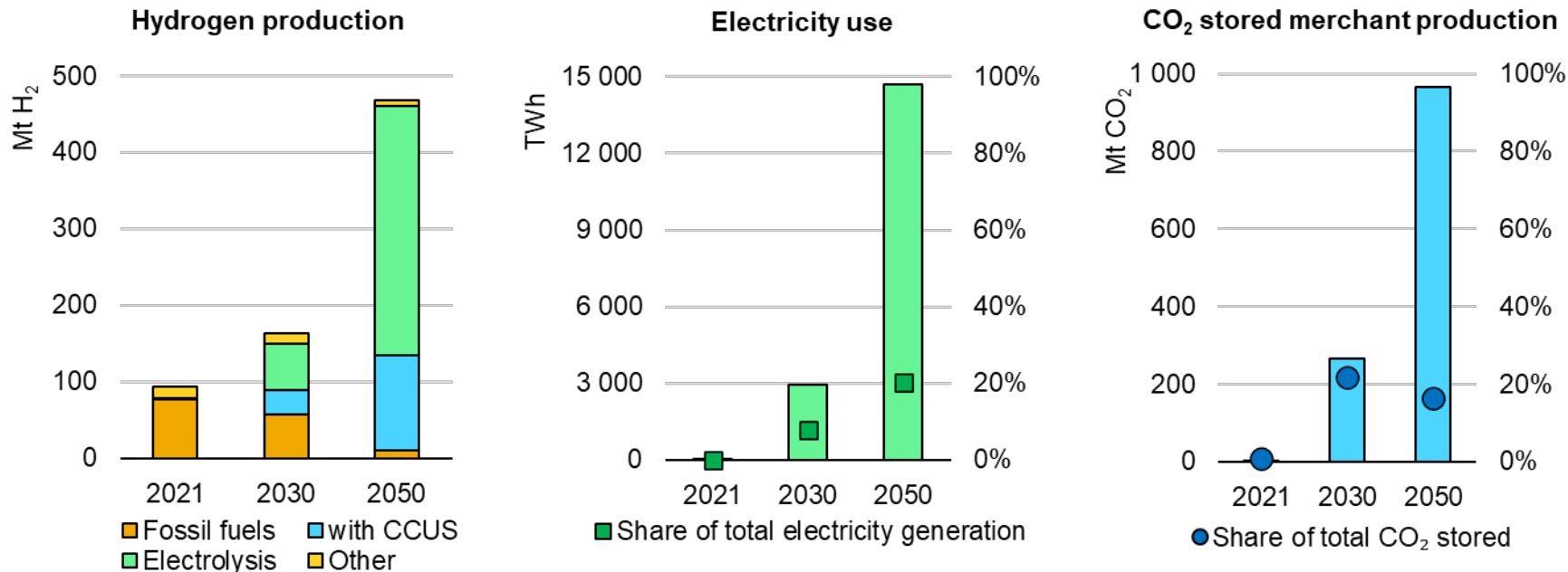
Global use of hydrogen and hydrogen-based fuels in the NZE Scenario



Hydrogen demand jumps fivefold by 2050, expanding beyond refineries and the chemical industry to new uses in long-distance transport, electricity generation and steel making

Rapid scale up of supply chains for low-carbon hydrogen needed

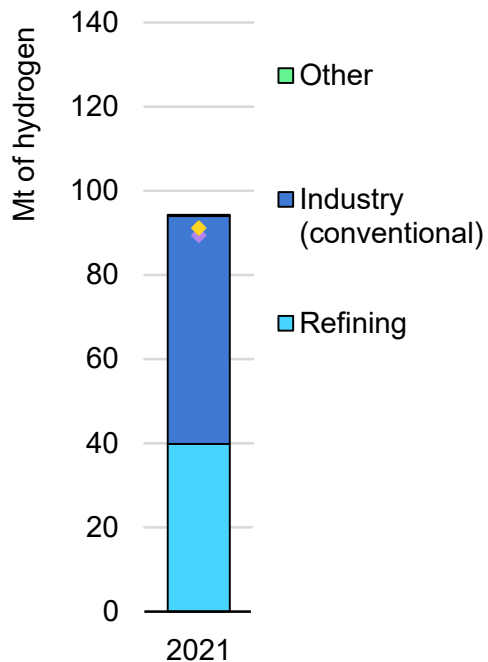
Global hydrogen production, electricity use for electrolyzers and CO₂ stored from merchant hydrogen production in the NZE



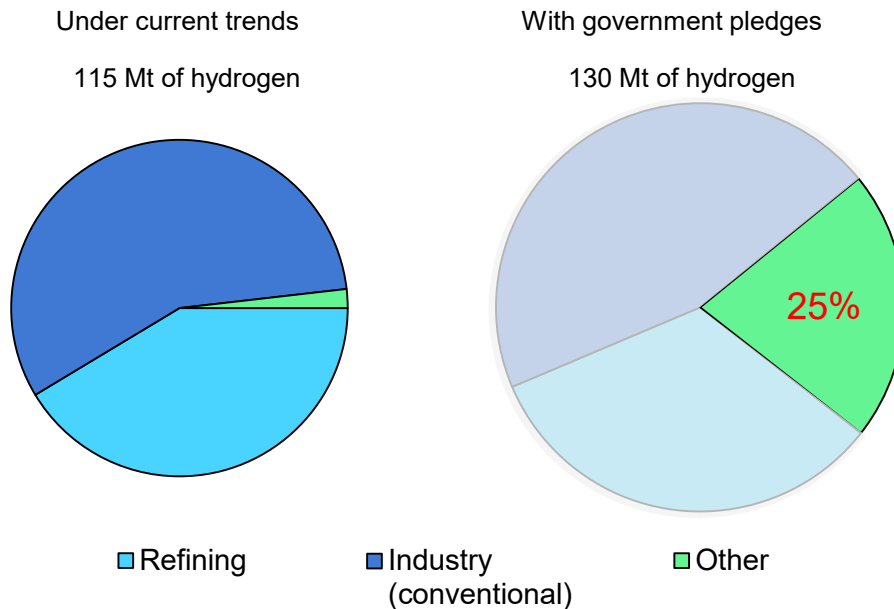
By 2050, hydrogen production in the NZE is almost entirely based on low - emission technologies, with electrolyzers accounting for around 70% of global production, and natural gas in combination with CCUS for almost 30%

Demand is growing, with positive signals in key applications

Hydrogen demand, 2019-2021

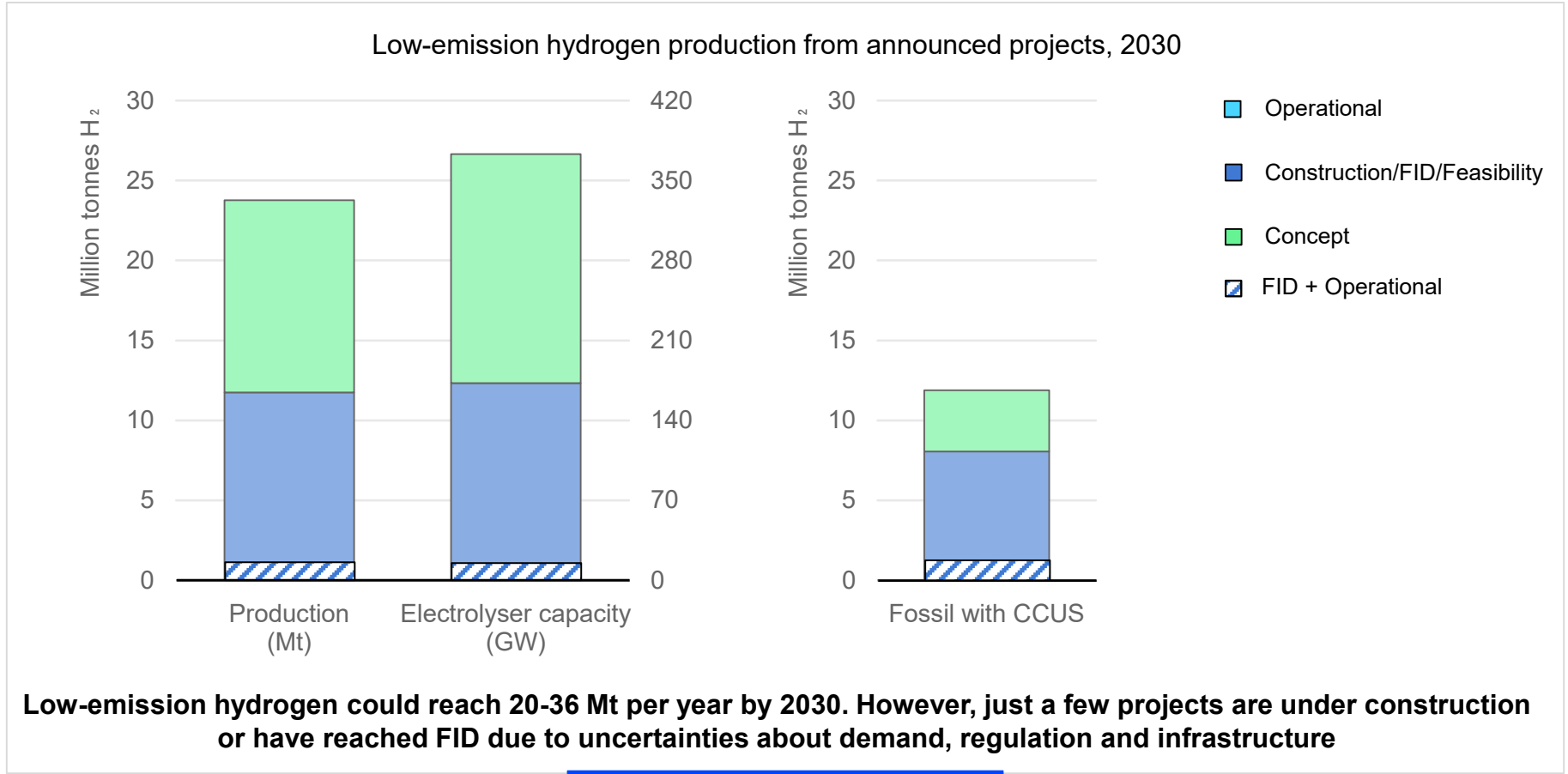


Hydrogen demand, 2030



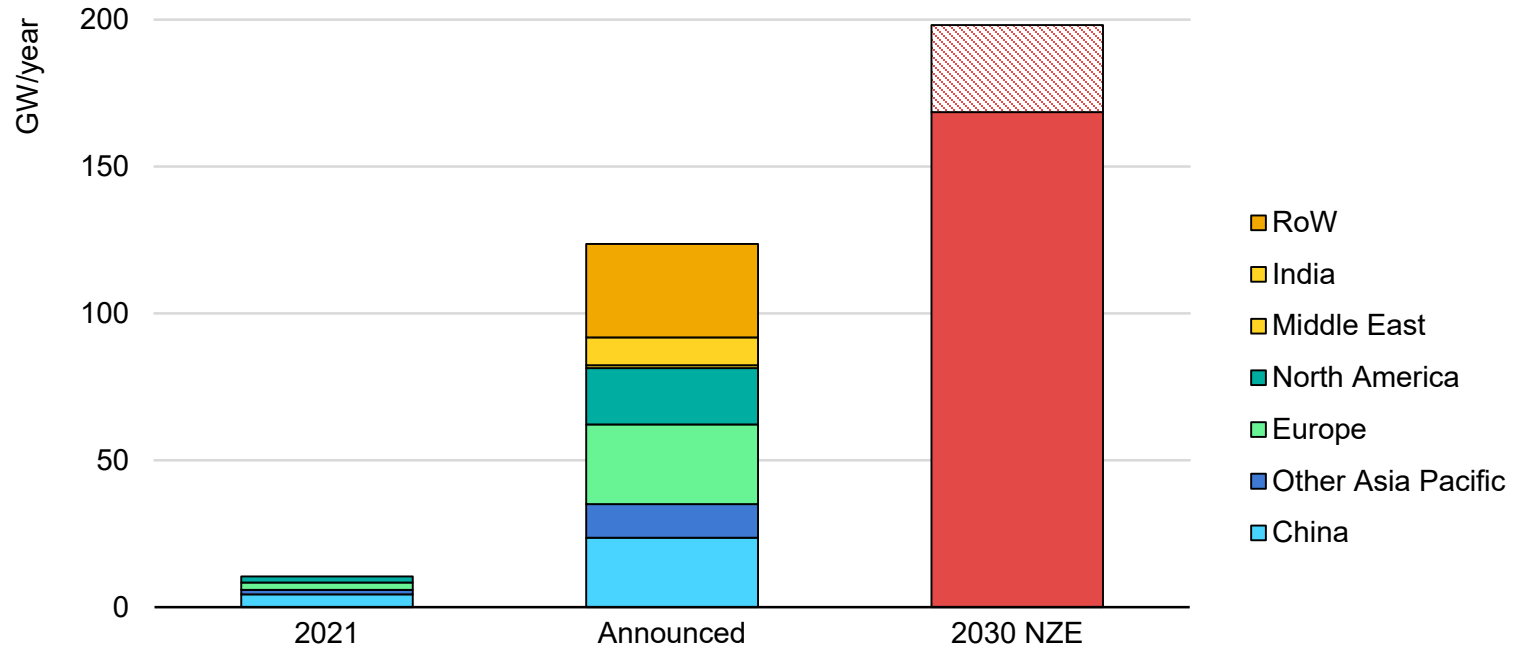
There are plans to increase hydrogen use in heavy industry, transport and power generation, but ambitious policies are needed for hydrogen to play its role in meet government climate pledges

An increasing project pipeline for low-emission hydrogen production



A new energy economy: the case of electrolyser manufacturing

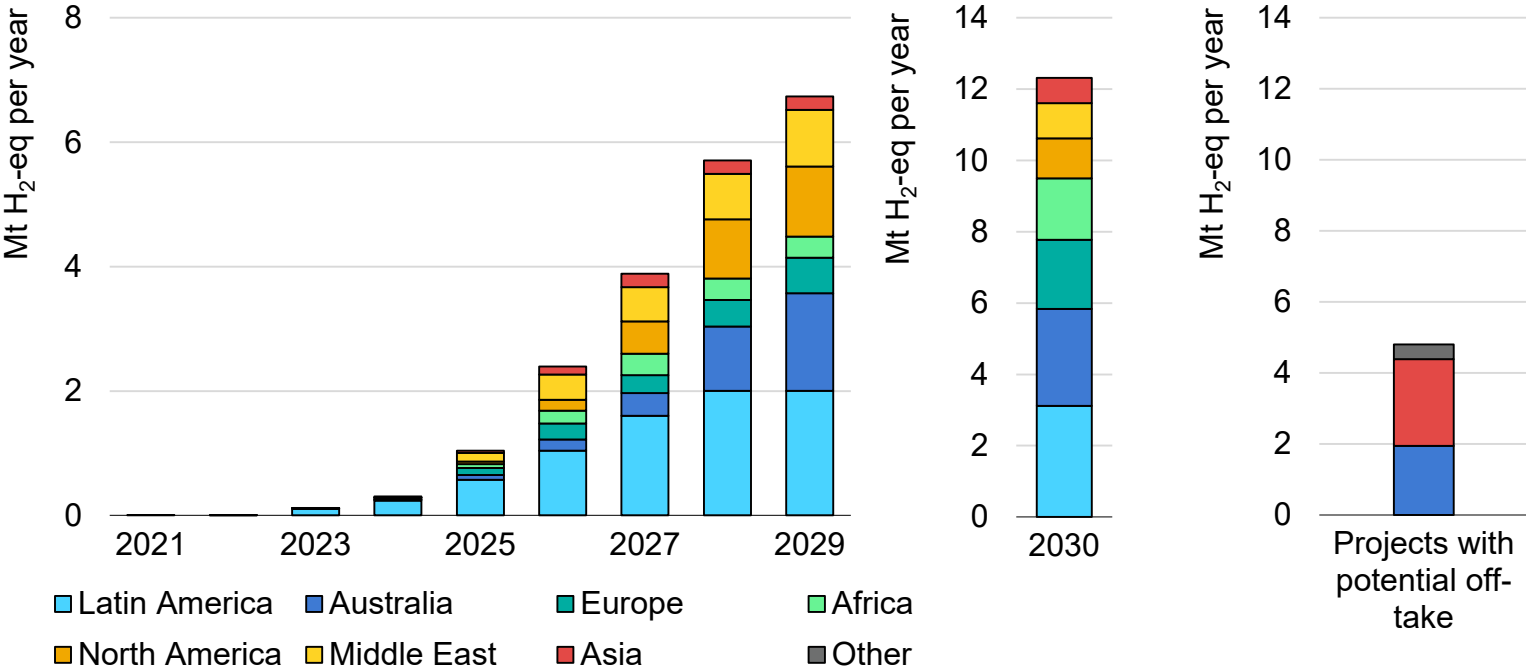
Electrolyser manufacturing capacity by region, 2021-2030



**Electrolyser manufacturing capacity could reach 125 GW per year by 2030.
This would be more than enough to support planned electrolyser projects and government targets**

Hydrogen trade can kick start soon, but barriers remain

Planned hydrogen exports by year and exporting region, 2020-2030



Annual exports could reach 12 Mt of hydrogen by 2030, but off-take agreements are lagging behind. Key challenges remain in regulation, infrastructure, demand creation, value for exporters and trade rules

- **Move from announcements to policy implementation** by reducing risks and improving economic feasibility of projects
- **Raise ambitions for demand creation in key applications** through instruments as auctions, mandates or public procurement and for emerging technologies through innovation and demonstration efforts
- **Intensify international cooperation for hydrogen trade**, with harmonised standards and certification systems being a key enabler
- **Accelerate the development of hydrogen infrastructure**, a critical element for long-distance transport and international trade of hydrogen

iea