Industry, Buildings, other Transport

Potential impact of reductions: ~ 2.3 Gt CO_2

Overall progress rating: Mixed

State of play 2022 & Progress since COP 26

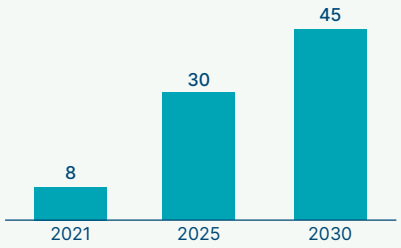
- Since COP26, there has been growing momentum for progress in the harder-to-abate sectors, backed by clear industry-supported roadmaps for 2030 and 2050 (e.g., *Making Mission Possible Sector Transition Strategies*).
- Projects in harder-to-abate sectors such as steel and green ammonia are ramping up due to falling prices of green hydrogen and slowly forthcoming policy support packages. By 2030, there are projected to be as many as 45 green steel plants operating (vs. 8 plants in 2021),[1] as well as 45 Mt of green ammonia capacity (vs. less than 5 Mt pre-2020).[2]

Progress & Bottlenecks

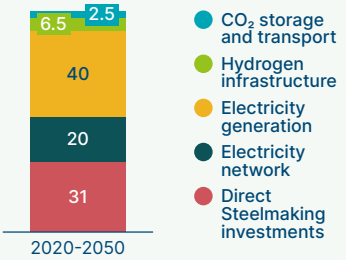
Steel

Newly operated green steel plants per annum[1]

Cumulative number, out of 960 steel plants currently in existence



Investment breakdown ($200 billion required annually)[3]

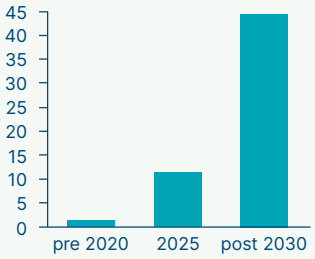


- Recent years have shown a rise of green steel project announcements mainly in Europe, driven by local policy support.
- Additional policy support, primarily to cover upfront investment and initial operational expenses, is needed to continue to fast-track green steel plants.
- A 1.5°C compatible steel industry is possible but will require significant annual investments of $200 billion with only a one-third share falling directly into the steel industry. Therefore, policy coordination across the value chain is required to unlock green steel.

Ammonia

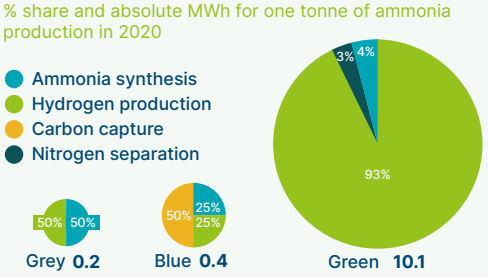
Green Ammonia Capacity over time[4]

Mt



Green ammonia requires much more electricity than grey or blue[5]

% share and absolute MWh for one tonne of ammonia production in 2020

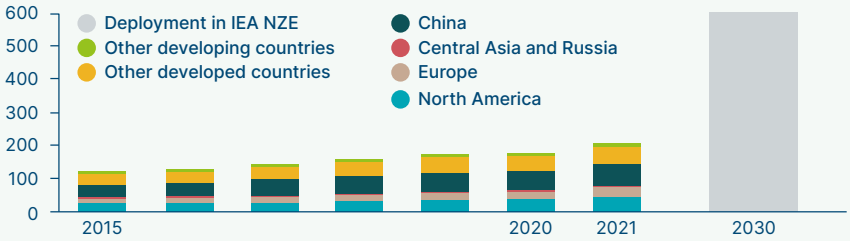


- Ammonia producers representing over a fifth of global production capacity have set climate neutrality commitments by 2050 and some major producers have set 2030 targets; over 60 low-emissions ammonia projects have been announced in the past 3 years.
- Concrete demand signals from both existing and new applications (e.g., shipping) for low carbon ammonia remain limited. Given the capital intensive nature of ammonia production, industry players will require clear market signals (e.g., through offtaker agreements).

Heat Pumps

Heat pump installations globally[6]

Million heat pump units installed/annum



- Heat pump deployment has been growing steadily, with ~190 million units in operation in buildings worldwide in 2021.
- 2021 has seen record-high growth in heat pump sales (particularly in Europe, China and the United States), and 2022 is also showing positive signs despite some supply-chain challenges.
- Policy support and technical innovation are essential to drive further uptake and address barriers such as high upfront Capex costs, renovation challenges, improved energy performance, and ability to provide power system flexibility.

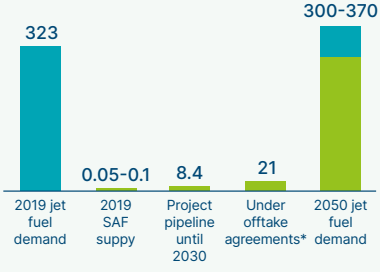
Aviation

Sustainable aviation fuels against other decarbonisation vehicles for aviation[7]

	Battery-electric	Hydrogen	SAFs
Efficiency of fuel production and propulsion system	~60%	~25%	~15%
Maximum range in 2050	Few 100s km up to 1,000 km	2,500 km up to no limitation	No limitation
Expected large-scale market entry	Around 2035-40		<2030
Share of cumulative GHG emissions reduction from renewable fuels (2022-50)	2%-3%	8%-22%	75%-91%

SAF supply starting to take off[8]

Mt jet fuel



* For varying offtake durations of 0.5–20 years.

- Sustainable Aviation Fuels (SAF) will play a major role in aviation decarbonisation.
- Currently SAF faces high production costs, with better policy coordination across the SAF value chain required to unlock higher volumes to reach economies of scale in production.
- SAF volume equal to 3% of current jet fuel demand is in the project pipeline until 2030, in addition to 7% under offtake agreements over the next 20 years.[9]
- Airlines are starting to sign large offtake agreements while policy makers develop binding blending mandates, e.g. 5% by 2030 in the EU.

SOURCES: (1) LeadIt (2022) Green Steel Tracker; (2) Mission Possible Partnership (2022) Making Net Zero Steel Possible, Mission Possible Partnership (2022) Making Net Zero Ammonia Possible; (3) Mission Possible Partnership (2022) Making Net Zero Steel Possible; (4,5) Mission Possible Partnership (2022) Making Net Zero Ammonia Possible; (6) IEA (2022), Installed heat pump stock by region and global Net Zero Scenario deployment, 2010-2030, IEA (2022), Heat Pumps Tracking Report (7, 8, 9) Mission Possible Partnership (2022) Making Net Zero Aviation Possible