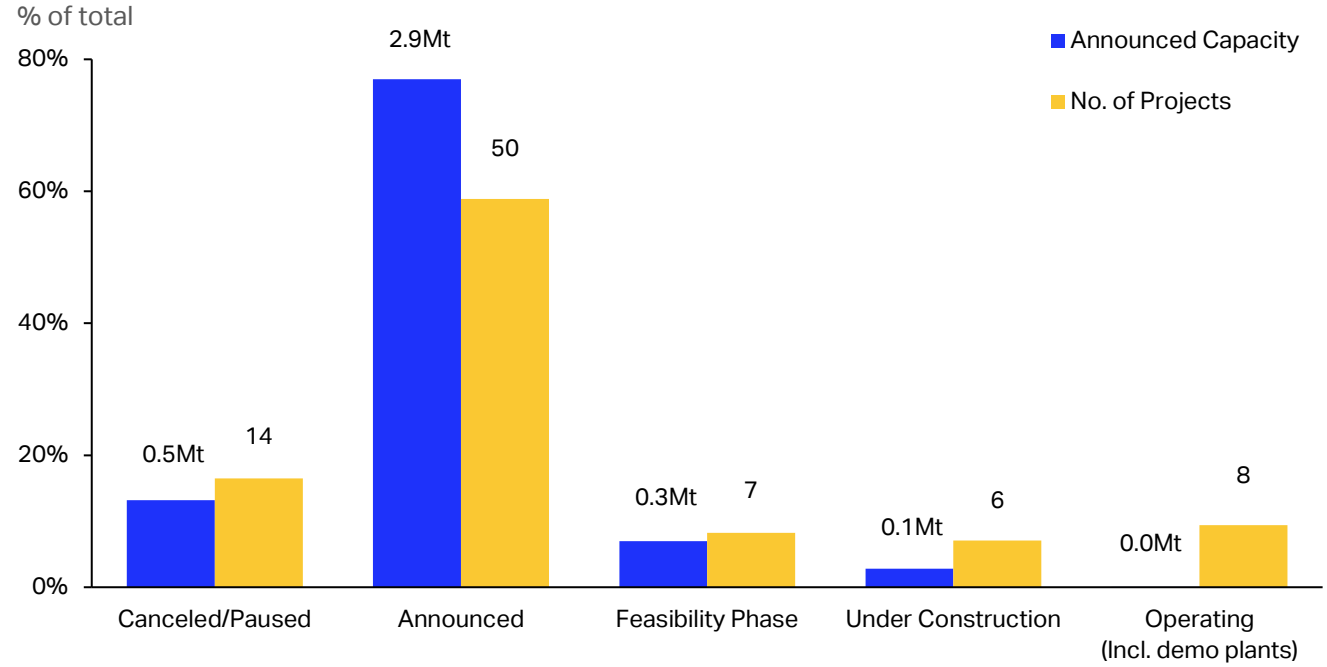
Chart of the Week

28 March 2025

The role of Power-to-Liquid in expanding SAF availability

Global PtL projects by announced capacity and project stage



Source: IATA Sustainability and Economics

- The aviation industry is committed to net zero carbon emissions by 2050, with SAF as one of the key drivers. HEFA currently leads the scene as the only commercially established pathway, with standalone HEFA facilities covering over 90% of total SAF output. Further efforts are needed to diversify production technologies and enhance feedstock availability to scale up SAF while ensuring its economic and environmental sustainability.
- Power-to-liquid (PtL) is uniquely positioned as the only SAF production technology that can leverage a theoretically unlimited feedstock supply, carbon dioxide (CO_2), while offering the potential for enhanced emission reductions. PtL can be produced from CO_2 sourced from biomasses, industrial waste gases, or direct air capture, combined with green hydrogen generated primarily by renewable energy-powered electrolyzers. Although very energy intensive presently, these characteristics position PtL as a key technology to overcome feedstock bottlenecks and help ensure that sufficient SAF will be available to reach net zero by 2050.
- PtL SAF is still in the pioneer phase. Over half of the 85 projects tracked are only announced or in initial engineering. These 50 early-stage projects account for 77% of the global planned PtL capacity. One in six projects, expected to produce around 0.5 million tonnes (Mt), have been paused or canceled. Meanwhile, 8 plants operate as demonstration or pilot projects, translating into a modest output of around 4Kt in 2024.
- The growing interest in PtL is reflected in the many projects announced and airlines' commitment through offtake agreements. Around 13% of offtakes signed since 2022 are for PtL. Impending mandates drive these announcements, but PtL projects struggle to reach commercial production without significant policy incentives and access to the required large volumes of cost-competitive renewable power. Long-term public financial support is central to mitigating high investment costs, reducing renewable energy premiums, and catalyzing private investments, thus enabling the ramp-up of PtL SAF, critical to the decarbonization of aviation.

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