



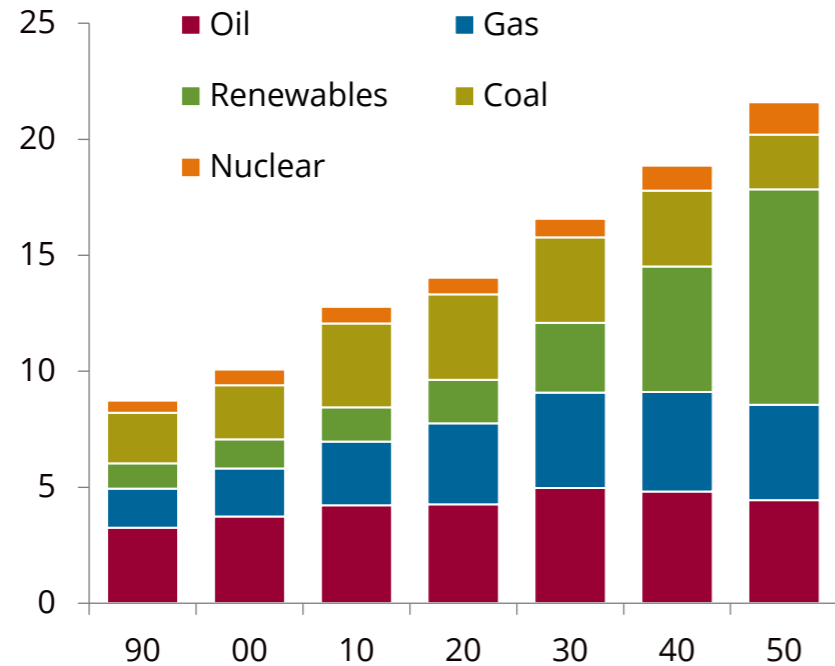
Presentation | September 2024

## The path to Net Zero: Renewable and fossil fuels, a possible combination?



# World on track for a gradual transition, but liquids demand above 100 mb/d until 2050

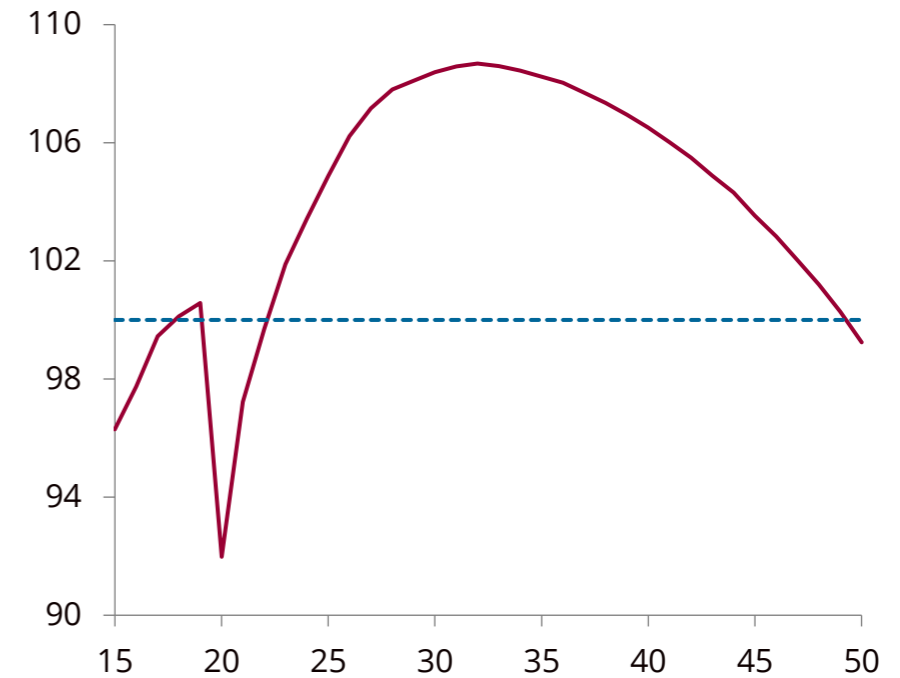
## Global primary energy demand (PED) btoe



Global PED to expand by 41% over 2023–50 (1.3% per annum), an expansion dominated by renewables (though all energies play an important role in the energy transition).

Source: IEA, Energy Aspects

## Global liquids demand mb/d

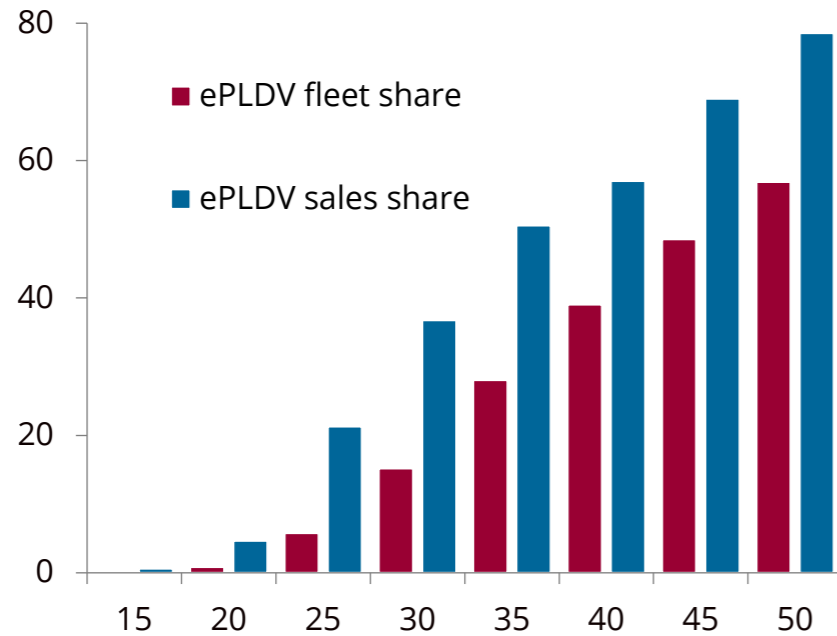


Strong emerging markets ensure global liquids demand rises until the early 2030s. Demand does not fall below 100 mb/d before 2050.

# EVs trigger the biggest oil transition story, albeit only slowly at first

## Global electric PLDVs

% share

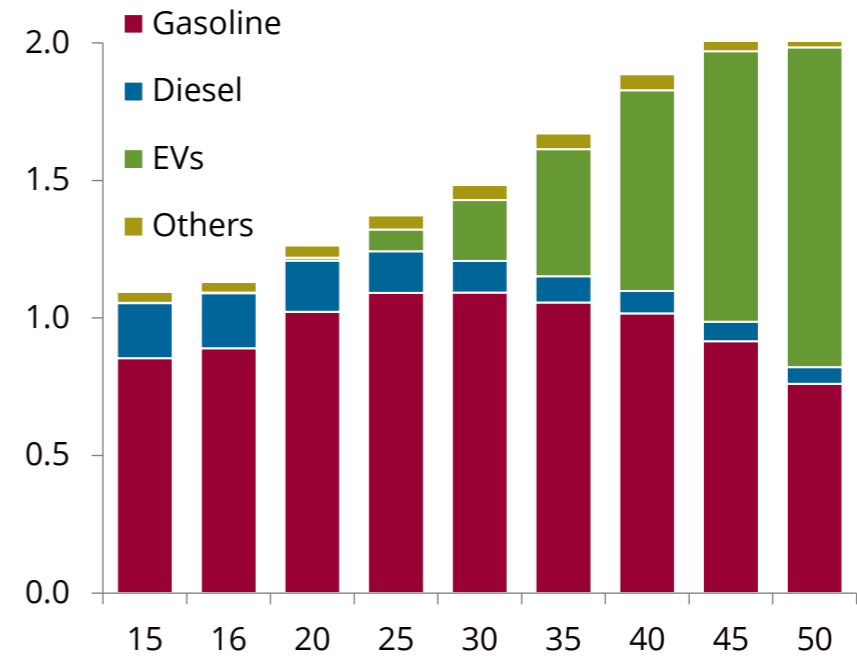


A sharp uptick in global EV sales only slowly filters into the more crucial EV fleet share; the ePLDV demand-hit will pass 12 mb/d in 2050 (approach 2.3 mb/d in 2030).

Source: Energy Aspects

## Global PLDV fleet, by fuel type

billion vehicles

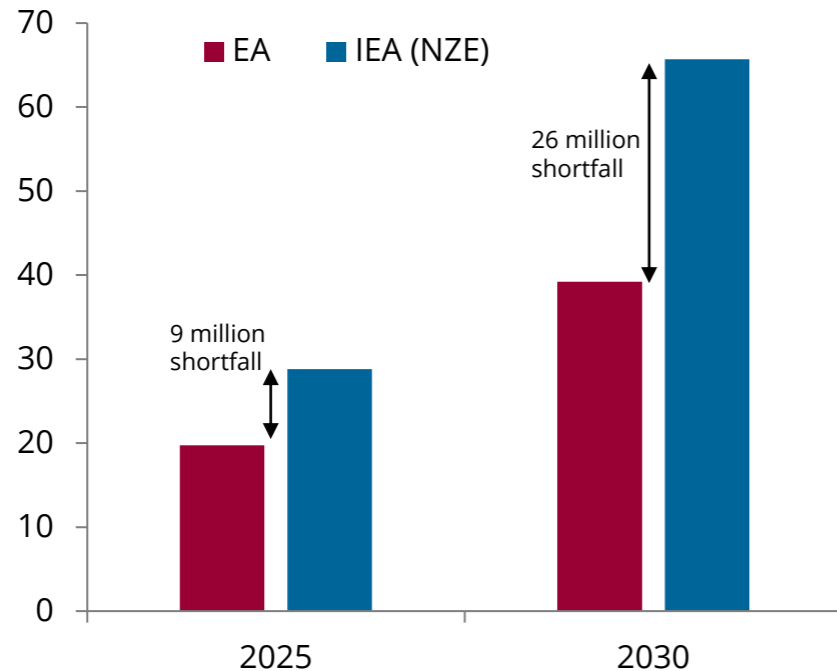


The global internal combustion engine (ICE) passenger light duty vehicle (PLDV) fleet will expand through 2025 before gradually losing market share to EVs.

# EV sales to fall short of IEA's net zero 2050 pathway

## Electric PLDV sales

Millions per year



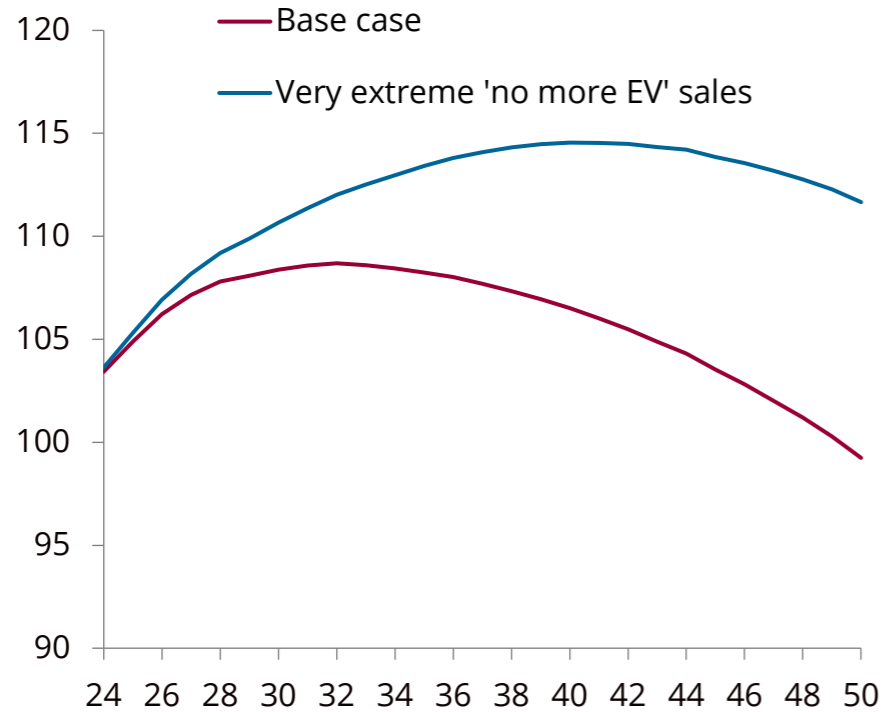
Source: IEA, Energy Aspects

- Our models show the global internal combustion engine (ICE) passenger light duty vehicle (PLDV) fleet will expand through 2025, before very gradually losing market share to EVs.
- We consider our global EV sales forecasts to be aggressive, yet they still fall far short of the levels the IEA believes are required to keep pace with net zero 2050 targets.
- The sales shortfall increases throughout the 2020s, rising from 9 million vehicles in 2025 to 26 million vehicles in 2030.
- The uptick in global EV sales share (to 30% by 2028) takes time to filter into the overall fleet share (only 11% by 2028).
- Risks to our EV forecasts are skewed to the downside if sticker prices for EVs remain high as a result of cost inflation, as well as elevated interest rates making it more expensive for consumers.

# Risks to the upside for fossil fuel demand in many alternative scenarios

## Global liquids demand

mb/d

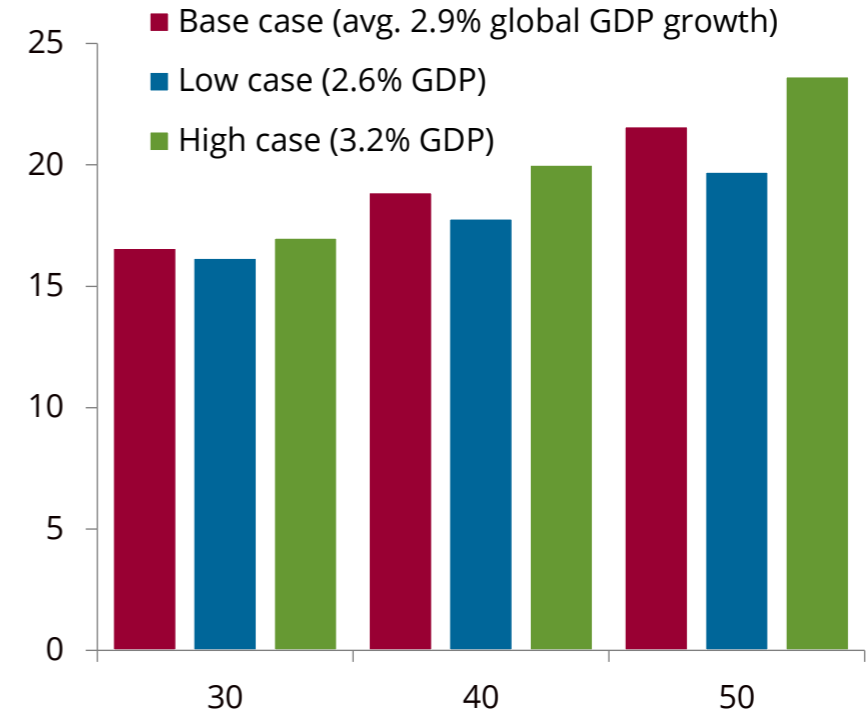


Slower EV uptake would support higher liquids demand (over 12 mb/d in 2050, at extreme, if no more EVs sold, all else equal), curbing power demand (and all the fuels required).

Source: Energy Aspects

## Global PED

btoe

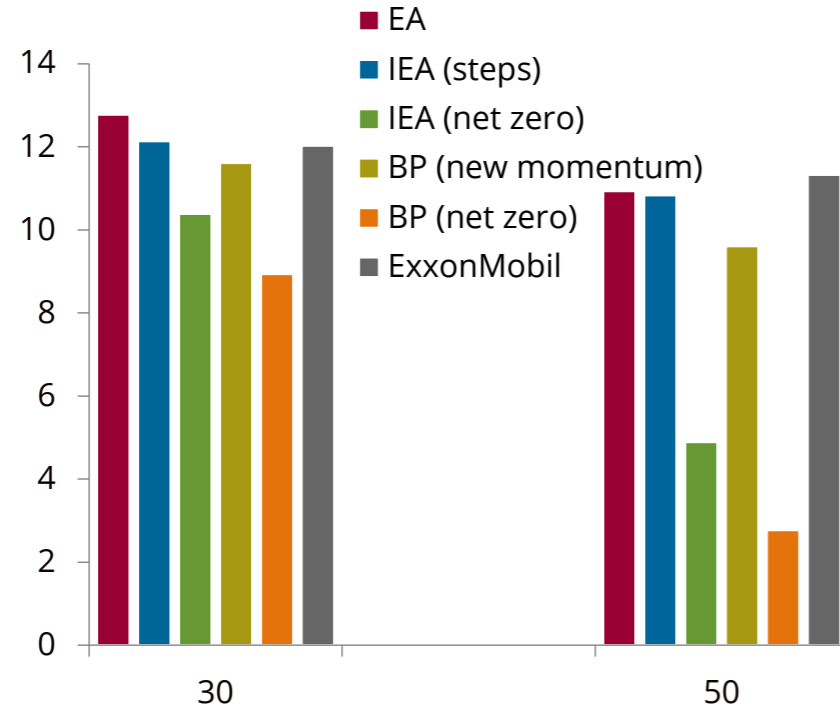


Economic uncertainty is a huge risk (upside and downside), while legislative ambiguity impacts fuel mix (tighter net-zero requirements raise renewable/nuclear share and vice versa).

# Despite lower outlook, our fossil fuel demand forecast still above most others

## Global fossil fuel demand

btoe

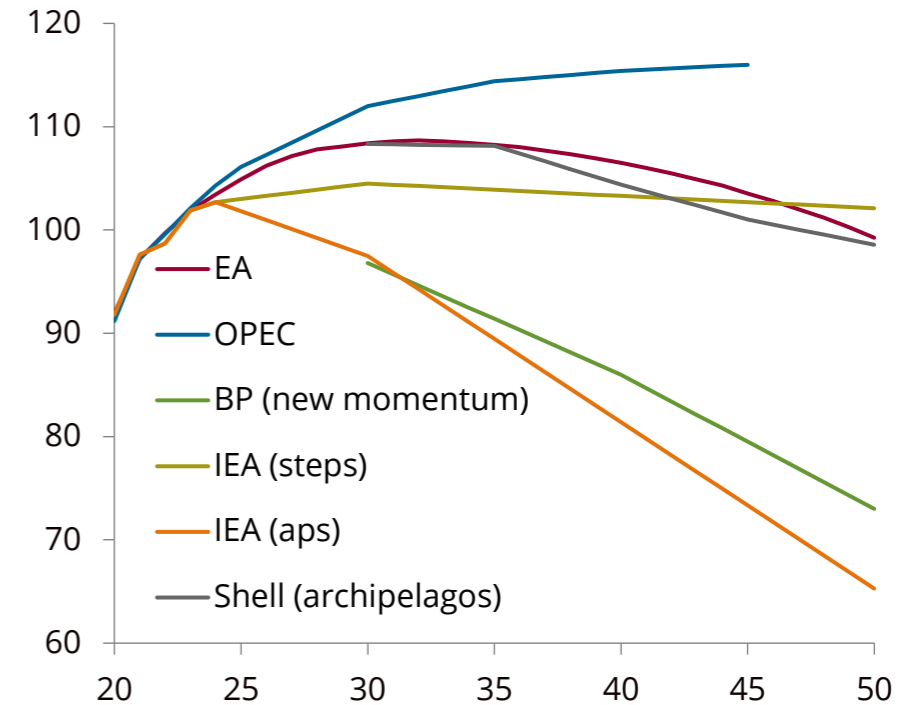


There is a huge divergence between the 2050 forecasts—BP's net zero is the lowest and ExxonMobil's the highest.

Source: IEA, BP, ExxonMobil, OPEC, Shell, Energy Aspects

## Global liquids demand

mb/d

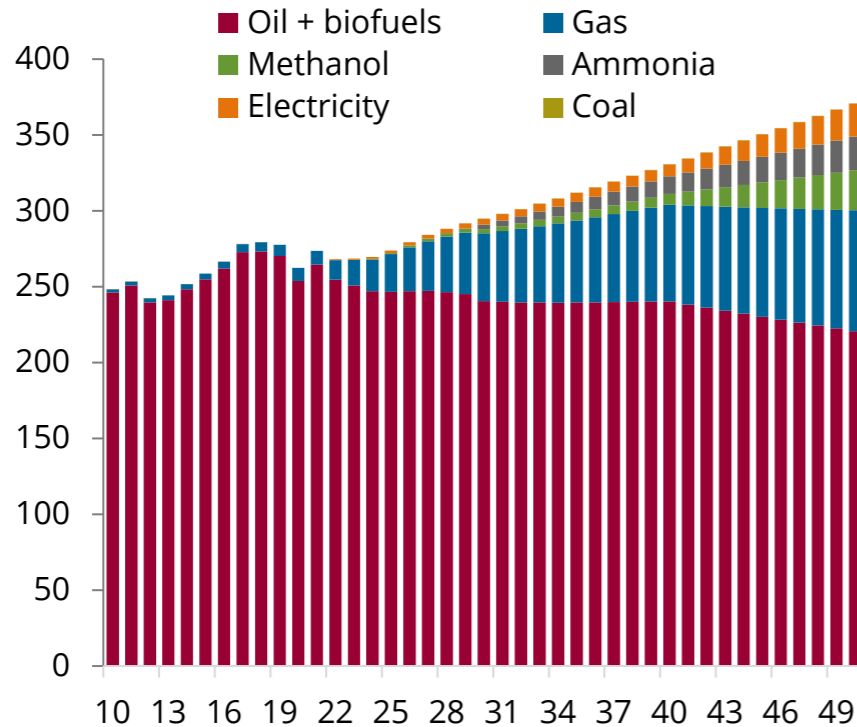


A disparity that carries heightened magnitude in oil, with OPEC showing the highest liquids forecast.

# Huge policy ambition falls short of supporting investments needed

## World bunker fuel demand forecast

Mtoe

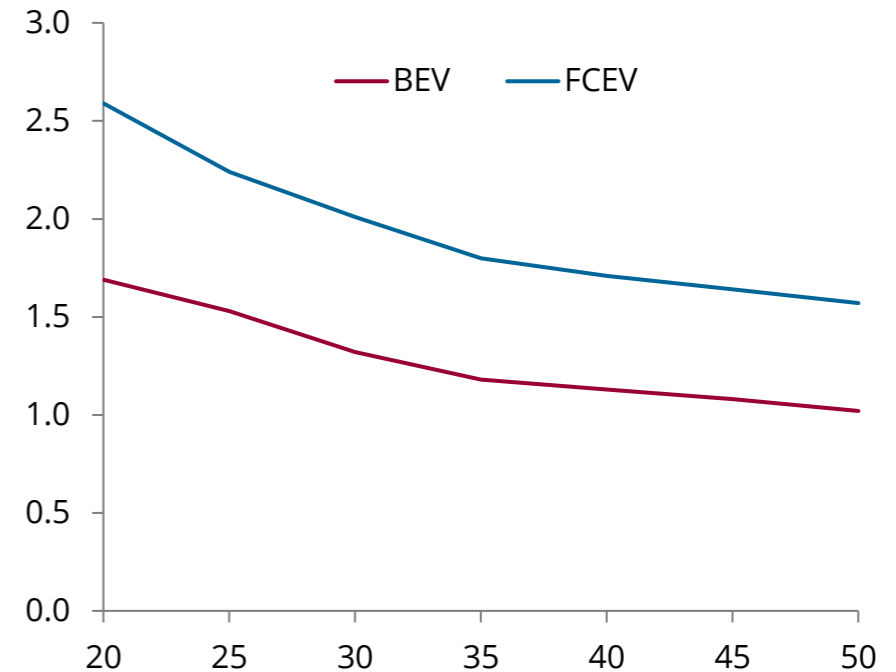


Replacing one-quarter of current ship fuel demand with ammonia requires doubling the current global ammonia industry.

Source: Energy Aspects

## Levelised cost of driving (heavy truck)

\$/mile



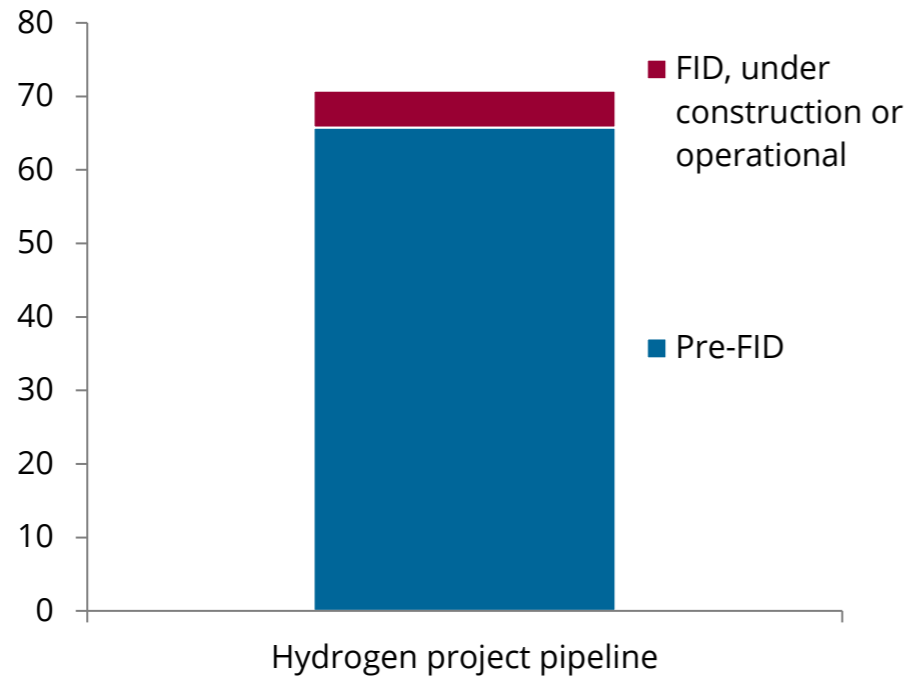
FCEVs have an efficiency of 23%, well below EVs, where for every 100 kWh of power generated, around 69 kWh reaches the wheels.

Note: Incorporates 45V clean hydrogen tax credit (up to \$3/kgH2)

# Lack of demand and high costs shackle low-carbon hydrogen

## Global hydrogen project pipeline (2023–30)

Mtpa

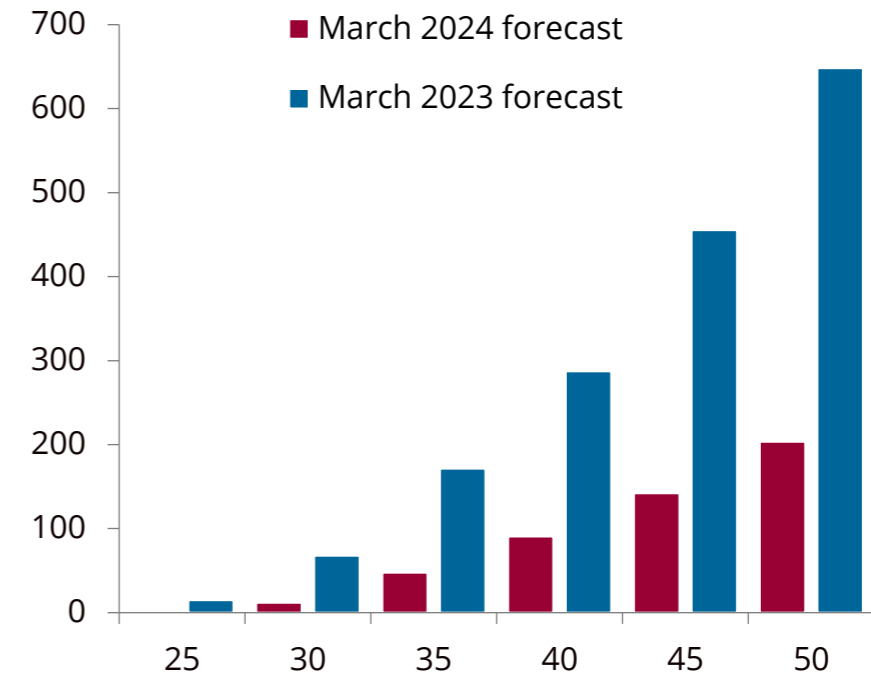


Poor demand a key contributor to delays and cancellations. Only 7% of the capacity slated to start between 2023–2030 has reached FID, begun construction or is operational.

Source: Energy Aspects, Company reports

## Industrial hydrogen demand

Mtoe



We have revised down our hydrogen demand assumptions, in part because lower-temperature industrial applications will adopt lower-cost electrical solutions such as heat pumps.





# Global data & intelligence for energy commodity and macro markets

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- LPG and NGLs
- Europe gas
- Long term
- North America gas
- North America power
- North America emissions
- European emissions
- Global LNG
- Data dashboards and API

## Actionable macro policy intelligence

- Developed markets
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