

Transportation

Partially autonomous cars forecast to comprise 10% of new vehicle sales by 2030

August 19, 2024

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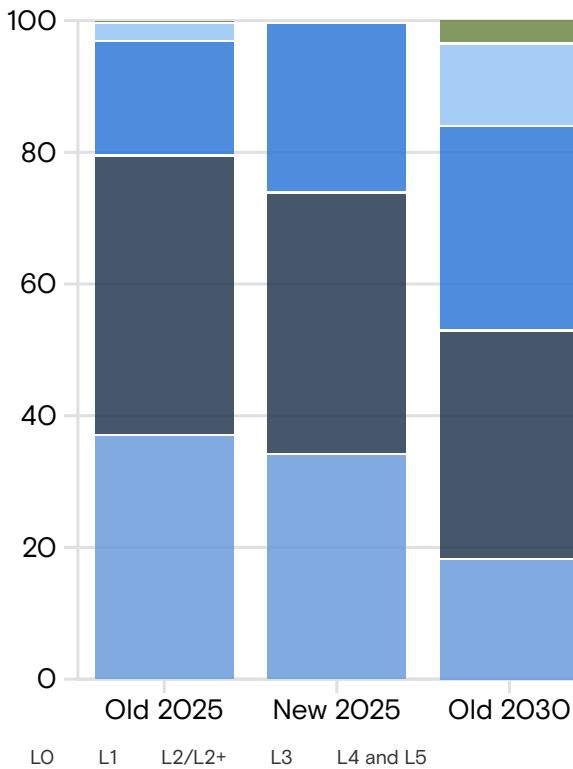
Industry expectations for autonomous vehicles range from optimism about imminent breakthroughs to pessimism that self-driving cars will ever hit the road on a wide scale.

Goldman Sachs Research sees signs that partial automation and assisted driving are becoming more widespread. The ramping-up of fully automated cars is taking longer than previously anticipated, but the segment will continue to grow and in the longer-term be a larger part of the market.

“The bottom-line is that we believe improved AI technology will help the industry reach higher levels of performance, although we also believe that wide scale AV adoption is still at least a few years away as a base case,” Mark Delaney, who covers automobiles and industrial technology for Goldman Sachs Research, writes in his team’s report.

Goldman Sachs Research has lowered its expectations for AV penetration

Old vs. new GS forecasts for autonomy penetration by level globally



Source: Company data, Goldman Sachs Research

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By 2030, up to 10% of global new car sales could be Level 3 vehicles: self-driving cars that let drivers take their eyes off the road and their hands off the wheel in select situations, such as on a highway in clear weather. (The previous forecast was around 12%.) Sales of fully autonomous cars – Levels 4 – could amount to around 2.5% of total sales in the same timeframe (compared with the previous forecast of around 3.5%).

At the same time, partially autonomous Level 2 / Level 2+ vehicles that require driver supervision are forecast to rise from about 20% of sales this year to about 30% in 2027 (the previous forecast was around 24%).

Level of autonomy in vehicles

Level of driving automation	Degree of autonomy	Examples of features
L0	No automation: manual control. The human performs all driving tasks.	No automation
L1	Driver assistance: The vehicle features a single automated system.	Automatic emergency breaking, lane centering, or adaptive cruise control
L2	Partial automation: The vehicle can perform steering and acceleration. The driver still monitors all tasks and can take control at any time.	Lane centering and adaptive cruise control (at the same time)
L2+	Partial automation: The vehicle can perform steering and acceleration, with quasi auto-pilot, but the driver is always alert/responsible and hands near wheel.	Lane centering and adaptive cruise control (at the same time); quasi auto-pilot with enhanced security features
L3	Conditional automation: The vehicle performs most driving tasks, but human override is still required. OEM liable aside from when driver warned to take over (subject to grace period).	Traffic jam chauffeur
	High automation: The vehicle performs all driving tasks under certain conditions.	

Source: SAE, NHTSA, Company data, Goldman Sachs Research

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The forecast also implies that, by 2030, a global fleet of a few million commercial AVs will be used for ridesharing. While that's a sliver of the total cars worldwide, it would mean a market of more than \$25 billion for robotaxis.

How AI can boost the self-driving car industry

Though there are some AVs on the road now (in markets such as San Francisco, Phoenix, Wuhan, and Beijing), the technology has yet to be broadly deployed. While 60% of current vehicles have some level of driver assistance, only 1-2% of total global vehicles sales in 2026 are expected to have Level 3 features.

Higher levels of driving automation have been implemented more slowly than Goldman Sachs Research forecast in 2022, due to technology constraints as well as regulatory and business model considerations.

That said, there are also signs that AI advances could accelerate the adoption of vehicles that are substantially more autonomous. "Research on AI scaling does suggest that added computers, larger training datasets, and improved

model architectures should contribute to better AI model performance," our analysts write.

Lower costs of hardware are another potential reason AV adoption may increase. Driver assistance and fully autonomous vehicles use dozens of cameras, sensors and, in some cases, lidar devices. For example, a certain Level 2+ car on the road today uses 8 cameras, while a particular Level 4 vehicle uses 29. As the costs of these components drop, AVs will get cheaper and more efficient.

This acceleration in AV adoption could power a variety of stocks in an array of sectors, including chipmakers, rideshare companies, self-driving technology developers, as well as some automakers.

Looking out even further, Goldman Sachs Research sees a bull case scenario in which AV sales (Level 3 automation or higher) account for about 60% of all light vehicle sales in 2040. Even in a less optimistic scenario, AVs will likely make up close to 40% of new sales.

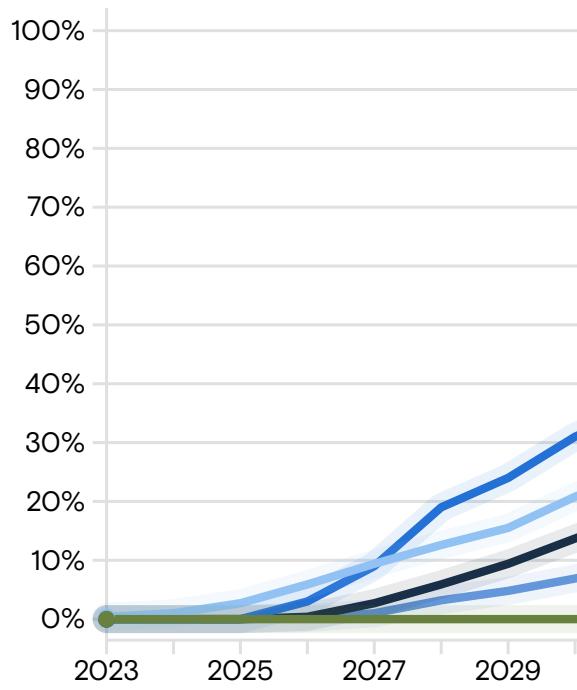
How self-driving cars will change the rideshare business

AV adoption rates are anticipated to be the highest in China, where Level 3 or higher AV sales could account for 90% of all sales by 2040. According to our analysts, nearly 80% of all car sales in Europe and roughly 65% of all car sales in the US could be advanced AV vehicles by 2040.

Autonomous vehicle penetration is forecast to grow in major economies

Key regions level 3/4/5 penetration rate

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Source: Company data, Goldman Sachs Research

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A large number of these vehicles are expected to be deployed by ridesharing companies. Increasingly, the cost model makes it compelling for rideshare firms to switch to self-driving cars. Goldman Sachs Research finds that vehicle driving costs are currently an estimated \$3.13 per mile for robotaxis but may decrease to less than \$1 a mile by 2030 and 58 cents a mile by 2040. Robotaxi costs that factor in corporate overhead and research and development are significantly higher — but that's poised to fall from an estimated \$184 per mile for a vehicle in 2024 to about \$12 a mile in 2030 (and close to \$1 in 2040).

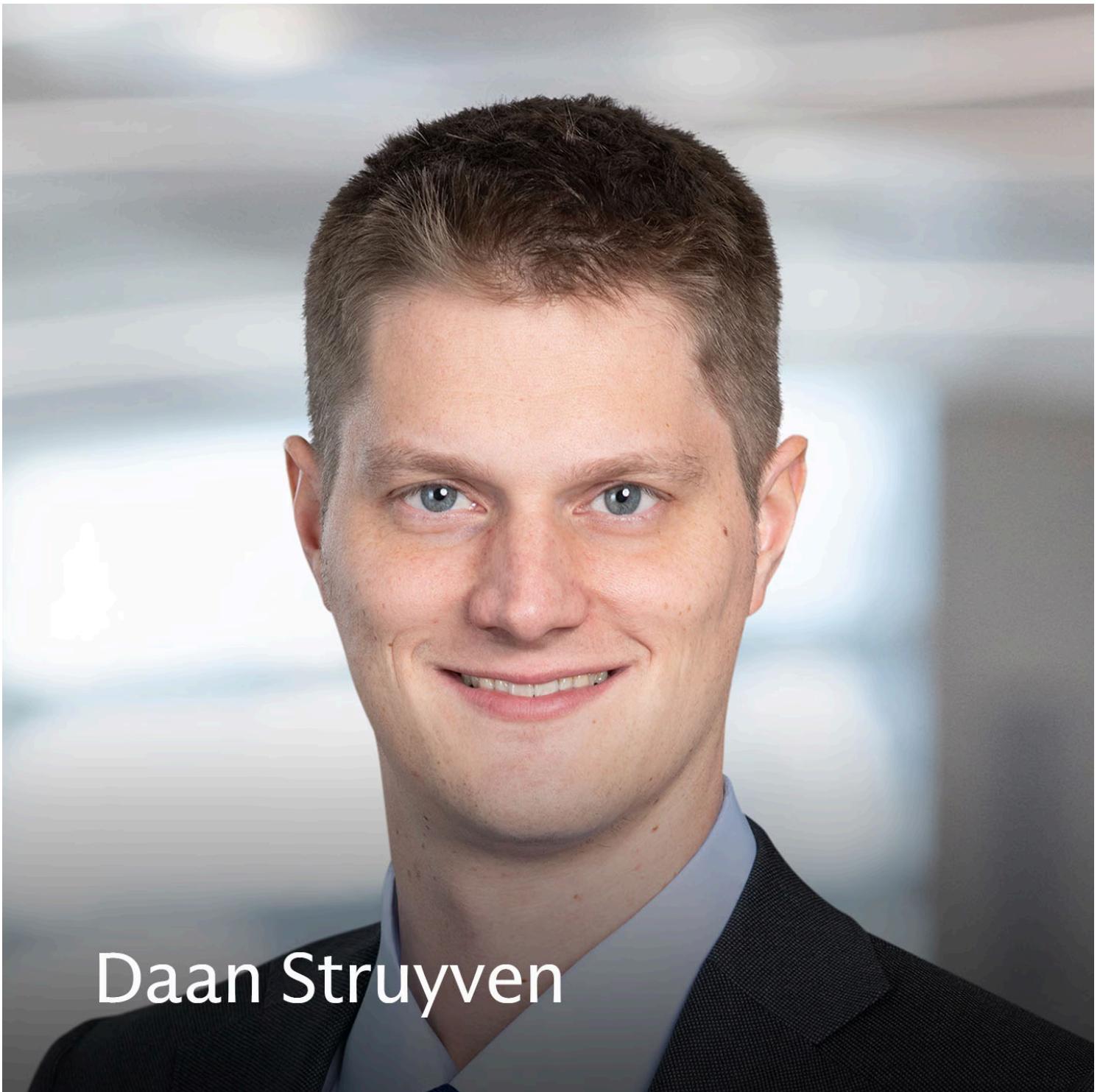
As rideshare operators scale up their AV fleets, our analysts expect a gradual shift in the supply-side industry structure from highly fragmented (i.e. millions of individual drivers) to more consolidated (i.e. a handful of AV fleet operators). But even if AVs were to gradually be deployed in certain geographies over the next 3-5 years, it is likely they will operate as supplemental supply for specific routes as opposed to being the only option.

Goldman Sachs Research notes that the most profitable routes are often the most complex to solve from an AV technology perspective (such as airport pick-up / drop-offs, late night pick-up / drop-offs to nightlife in crowded city streets). Over the near-to-medium term, a hybrid model combining AVs and human drivers is likely to ensure widespread availability of vehicles and a better user experience for riders.

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