Autelligence Automotive Powertrain Future survey

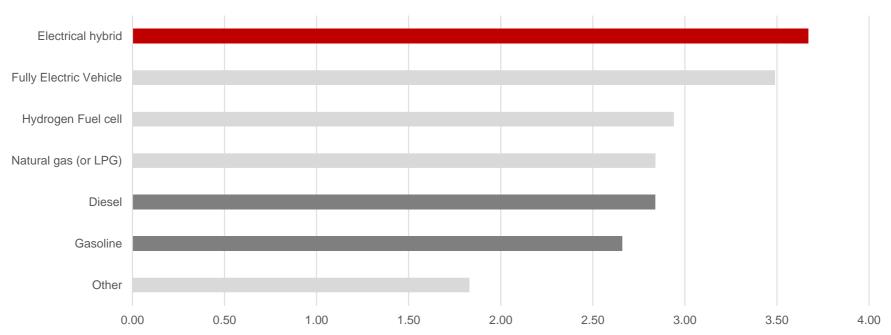
Autelligence surveyed 53 powertrain executives in the second week of January 2016. Most respondents were based in North America and Europe.



Powertrain type fuel economy prospects

Industry insiders expect the biggest fuel economy gains in the next five years to be seen in electric hybrids fully electric vehicles

Which powertrain type offers the best prospects for improving fuel economy in passenger vehicles the next five years?



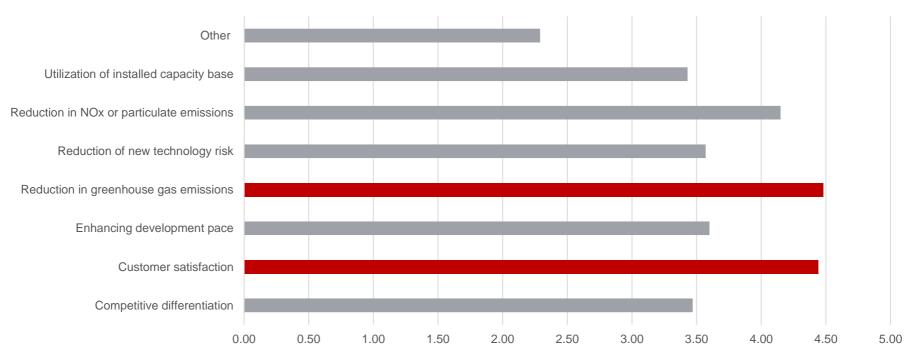
Weighted average of responses, where 1 equals "Very small economy benefits" and 5 equals "Very large economy benefits"



Development drivers

Fuel economy will matter – the reduction in greenhouse gas emissions will be the most important factor driving powertrain development in the next ten years, with 85% of respondents saying it is "critical" or "very critical" or "indispensable"

What are the critical drivers for powertrain development over the next five years?



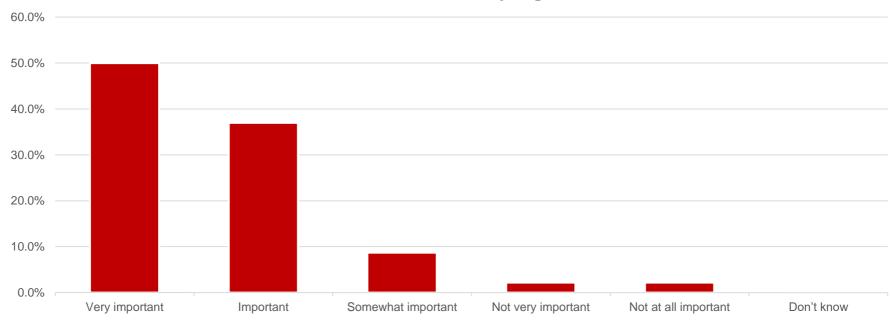
Weighted average of responses, where 1 equals "Not relevant" and 6 equals "Indispensable"



Combustion engine improvements

85% of respondents said that combustion engine powertrain improvements were "important" or "very important", compared with other vehicle technologies (for example lightweighting or electrification) in meeting future fuel economy regulations.

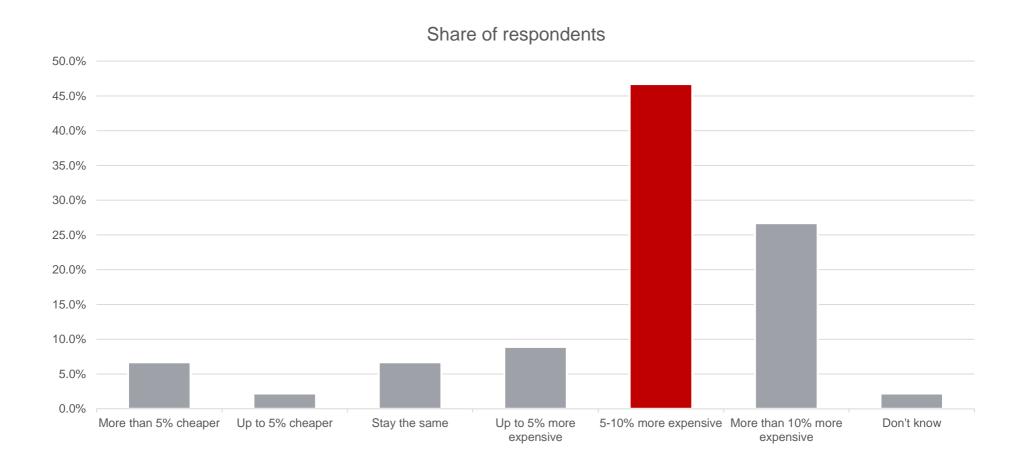
How important are combustion engine powertrain improvements versus other vehicle technologies (for example lightweighting, electrification) in meeting these future fuel economy regulations?





How will the cost of powertrains increase?

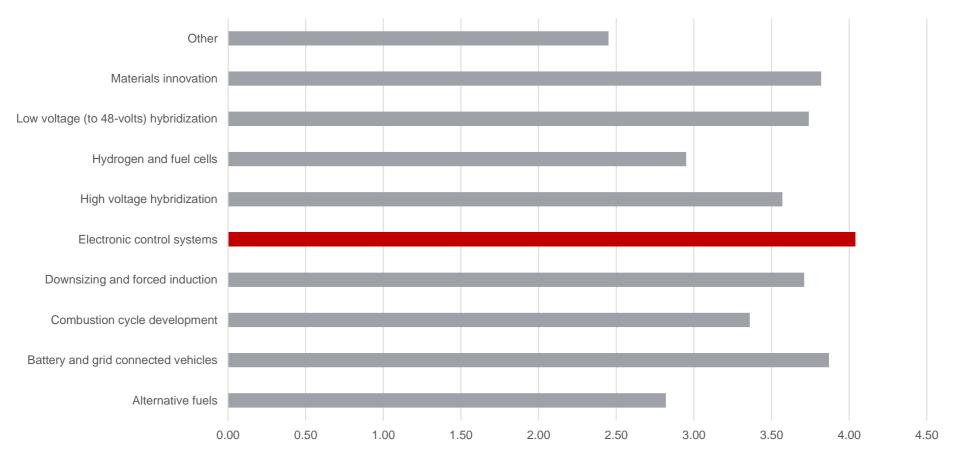
Fuel economy gains will cost money – 5-10 percent more expensive powertrains, say 47 percent of respondents – or more, say another 25 percent.





Which are the most important technologies for achieving powertrain objectives in the next 10 years?

Electronic control systems are seen as the most important powertrain technology in the next 10 years, closely followed by materials innovation and battery/grid connected vehicles



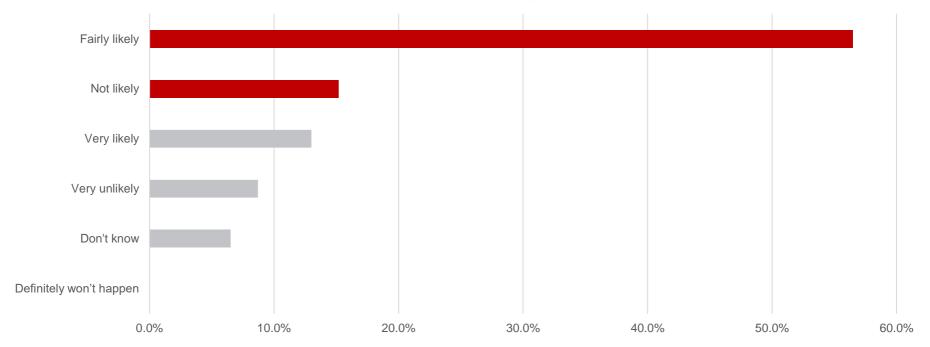
Weighted average of responses, where 1 equals "Of little importance" and 5 equals "Critically important"



European 2021 greenhouse gas (GHG) standards

Sixty-nine percent of respondents think that the industry is likely or very likely to meet these the European 2021 GHG standards, which target a fleet average of 95 g of CO2 / km, or 57.4 mpg (US).

The European 2021 GHG is a fleet average of 95 g of CO2 / km (again adjusted by a limit value curve.) This roughly corresponds to 57.4 mpg (US). What is the likelihood of the industry meeting these standards?



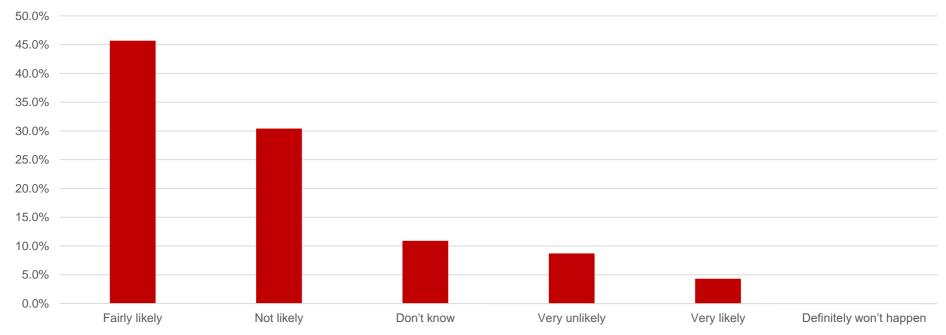
Weighted percentage average of responses



2025 Corporate Average Fleeet Economy (CAFE) standards

50% of respondents believe that the industry is "very likely" or "fairly likely" to meet the 2025 US CAFE Standards. Almost nine percent of respondents said it was "very unlikely".

The 2025 CAFE Standards in the USA requires a nationwide fleet average, as adjusted by individual footprints of vehicles, of roughly 54.5 MPG by 2025. What is the likelihood of the industry meeting these standards in North America?

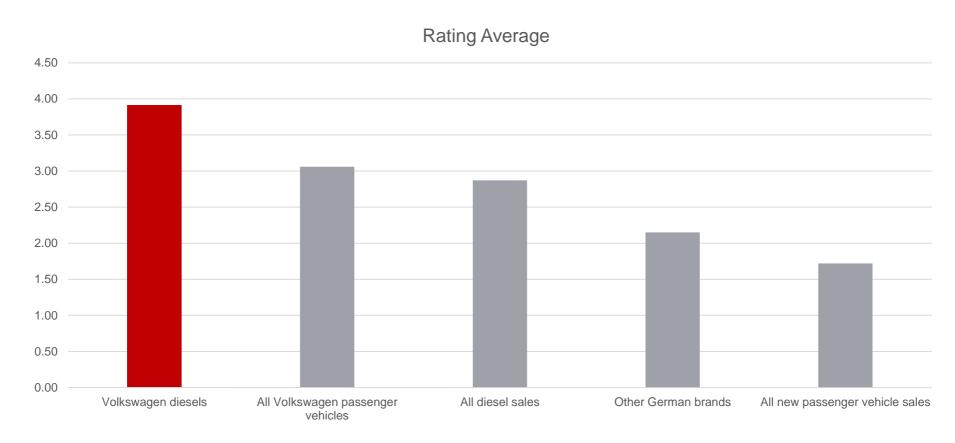


Weighted percentage average of responses



Effect of VW emissions scandal

74 percent of industry executives surveyed expect the VW scandal to have only a small or very small effect on Volkswagen sales, and almost no-one expects the scandal to have a large effect on other German brands.



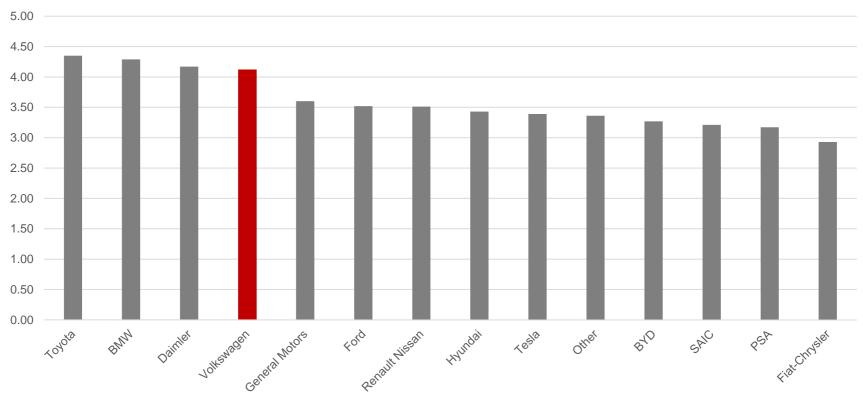
Weighted average of responses, where 1 equals "No effect" and 5 equals "Very large effect"



Powertrain development capability

Despite recent events, VW is the fourth most respected OEM in the industry in terms of its powertrain development capability





Weighted average of responses, where 1 equals "Limited Capability" and 5 equals "Very High Capability"

