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Declining diesel car share not a hurdle for meeting the European Union's CO₂ reduction targets, instead helps reduce compliance costs for manufacturers

In the aftermath of the Dieseldate scandal, the market share of diesel cars in Europe is declining. The average diesel passenger car emits less carbon dioxide (CO₂) than a comparable gasoline car within the same vehicle segment. Nevertheless, the compliance cost of meeting the European Union's (EU) CO₂ reduction target for new cars by 2025 would be up to 280 Euros per vehicle lower with fewer diesel cars sold, according to a new study by the independent research organization International Council on Clean Transportation.

Between 1990 and 2015, the share of new diesel cars in Europe increased from 14% to 52%, reaching a maximum of 56% in 2011. Apart from Europe, the only major markets worldwide with a significant share of diesel cars are India and South Korea. In China, Japan, and the United States, diesel cars account for less than 5% of the market. In the aftermath of the Dieseldate scandal, the diesel share in the European Union dropped to 49% in 2016 and is

expected to decline further, as a growing number of cities are threatening to ban diesel cars from their city centers.

The average diesel car in Europe typically emits about 17% less CO₂ than a similar conventional gasoline car within the same vehicle segment. However, across all vehicle segments, average CO₂ emissions of new diesel and gasoline cars are nearly identical (119 grams per kilometer [g/km] vs. 123 g/km, respectively). “Efficiency gains from the diesel engine often are counterbalanced by a higher engine power and higher weight for diesel cars,” explains Dr. Peter Mock, Managing Director of ICCT in Europe.

Furthermore, hybrid electric cars today often are cheaper than diesel cars within the same vehicle segment. In Germany, the average hybrid car within the lower medium segment (also known as “Golf”-segment) in 2015 sold for 26,700 Euros, whereas the average diesel car cost 1,700 Euros more. This additional cost is the result of higher temperatures and pressures for the diesel combustion process and more complex aftertreatment systems, which increase the production costs of diesel engines. Given that the average hybrid car emits about 18% less CO₂ and is cheaper than the average diesel car within a specific vehicle segment, switching to hybrid cars is a more cost-efficient way of reducing CO₂ than sticking with the diesel engine technology. In future years, the cost of hybrid cars—in particular, plug-in hybrid and battery-electric vehicles—is expected to decrease further, as a result of continued advances in battery technology.

For the analysis, the ICCT researchers assumed a CO₂ target of 70 g/km for new passenger cars by 2025. This is within the target range of 68–78 g/km, as suggested earlier by the European Parliament. “We decreased the diesel market share from 55% in the baseline scenario to 15% in the most extreme case to see whether the 2025 CO₂ target could still be met,” says Mock. “We found that manufacturers could still comply with the target by offering more advanced gasoline, hybrid, and electric vehicles.” The overall compliance cost for an average vehicle manufacturer was found to be up to 280 Euros per vehicle lower if the diesel market share declines. This is because the required investment in vehicle efficiency technologies and electrified vehicles is counterbalanced by savings when moving away from expensive diesel engine technology.

As a co-benefit, nitrogen oxide (NO_x) emissions from diesel cars are estimated to be 60,000–260,000 tons lower by 2030 if the new car diesel market share in the EU drops to 15% by 2025. This would equal a reduction of 10%–28% compared to a baseline scenario and is equivalent to the sum of all NO_x emissions in a country the size of the Netherlands.

The results come at a time when post-2020 CO₂ standards for new vehicles in the EU are under preparation; the European Commission is expected to put forward a regulatory proposal by the end of 2017. The transport sector currently is the only sector in the EU that has failed to reduce CO₂ emissions since 1990 and in fact has increased its greenhouse gas emission level by 20% between 1990 and 2014.

Publication details

Shifting gears: The effects of a future decline in diesel market share on tailpipe CO₂ and NO_x emissions in Europe

PDF for download (from July xx onward):

[link]

The International Council on Clean Transportation (ICCT) is an independent nonprofit organization founded to provide first-rate, unbiased research and technical and scientific analysis to environmental regulators. The ICCT participants' council comprises high-level civil servants, academic researchers, and independent transportation and environmental policy experts who come together at regular intervals to collaborate as individuals on setting a global agenda for clean transportation. ICCT was founded in 2005 and has offices in Berlin and Brussels, as well as in the U.S. and China. It is funded principally by private foundations, such as the ClimateWorks Foundation in the U.S. and Stiftung Mercator in Europe.

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