

Reassessing NO_x emissions from diesel cars after the EU's top court defeat device rulings

In the 2015 Dieselgate scandal, diesel cars that had passed official lab tests were found to have higher NO_x emissions when driving on the road, prompting authorities in the United States and Europe to investigate whether manufacturers were using software to alter the vehicle's performance while being tested. This calibration strategy, also known as a "defeat device," was at the center of the legal dispute. Recent rulings from the Court of Justice of the European Union (CJEU) clarified what constitutes a prohibited defeat device under EU rules. The rulings widely limit the scope of exemptions in which calibration strategies can be used and apply to both future models and cars sold prior to decision.

The recent CJEU rulings offer grounds for further investigation of diesel cars showing high NO_x emissions. In a new study, the International Council on Clean Transportation (ICCT) assesses the extent to which diesel cars in Europe have been using what may now be classified as prohibited defeat devices, according to the EU's highest court. The report covers diesel passenger car models certified as Euro 5 and Euro 6, which represent approximately 53 million vehicles sold in Europe from 2009 to 2019.¹

Three sources of emissions data are analyzed: laboratory and real-world testing data from official government authorities, real-world testing data from independent organizations, and an extensive database of remote sensing measurements. The data are analyzed by vehicle model and engine family against emission thresholds developed to identify if a prohibited defeat device is likely or almost certainly present. These thresholds are based on expected engine behavior and testing data from other vehicle groups.

KEY FINDINGS

- » **"Suspicious" NO_x emission levels were found in at least 77% of official tests of diesel cars, indicating the likely use of a prohibited defeat device.** Results from independent tests and remote sensing campaigns show that **up to 100%** of both vehicle model and engine family averages exceed the suspicious emissions threshold.

¹ The Euro 6 diesel cars included in this analysis were certified before the introduction of the Real Driving Emissions (RDE) testing requirement, an EU regulatory procedure introduced between 2017 and 2019.

» **“Extreme” NO_x emissions were found in at least 40% of official tests, indicating that a prohibited defeat device is almost certainly present.** Approximately 42% of the 1,400 official government tests under controlled settings exceeded the extreme emissions threshold.² Real-world testing by government authorities and independent organizations shows similar or higher rates of extreme emissions. Remote sensing data indicates that approximately **75%** of engine families’ averages exceed the extreme threshold.

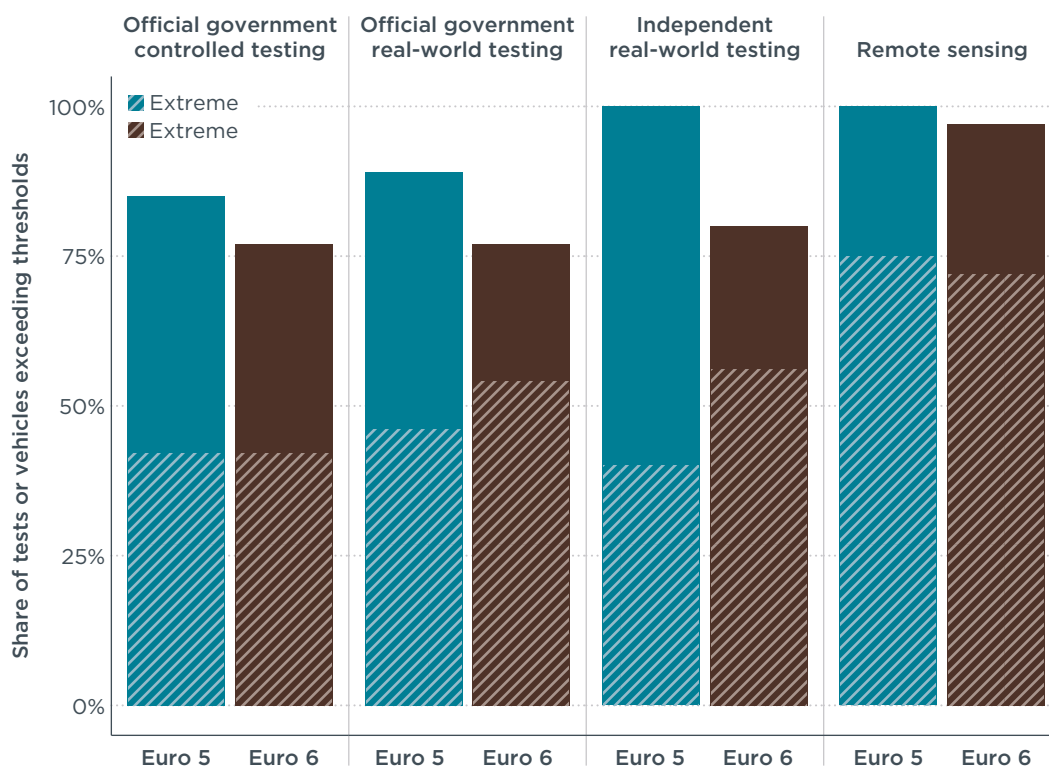
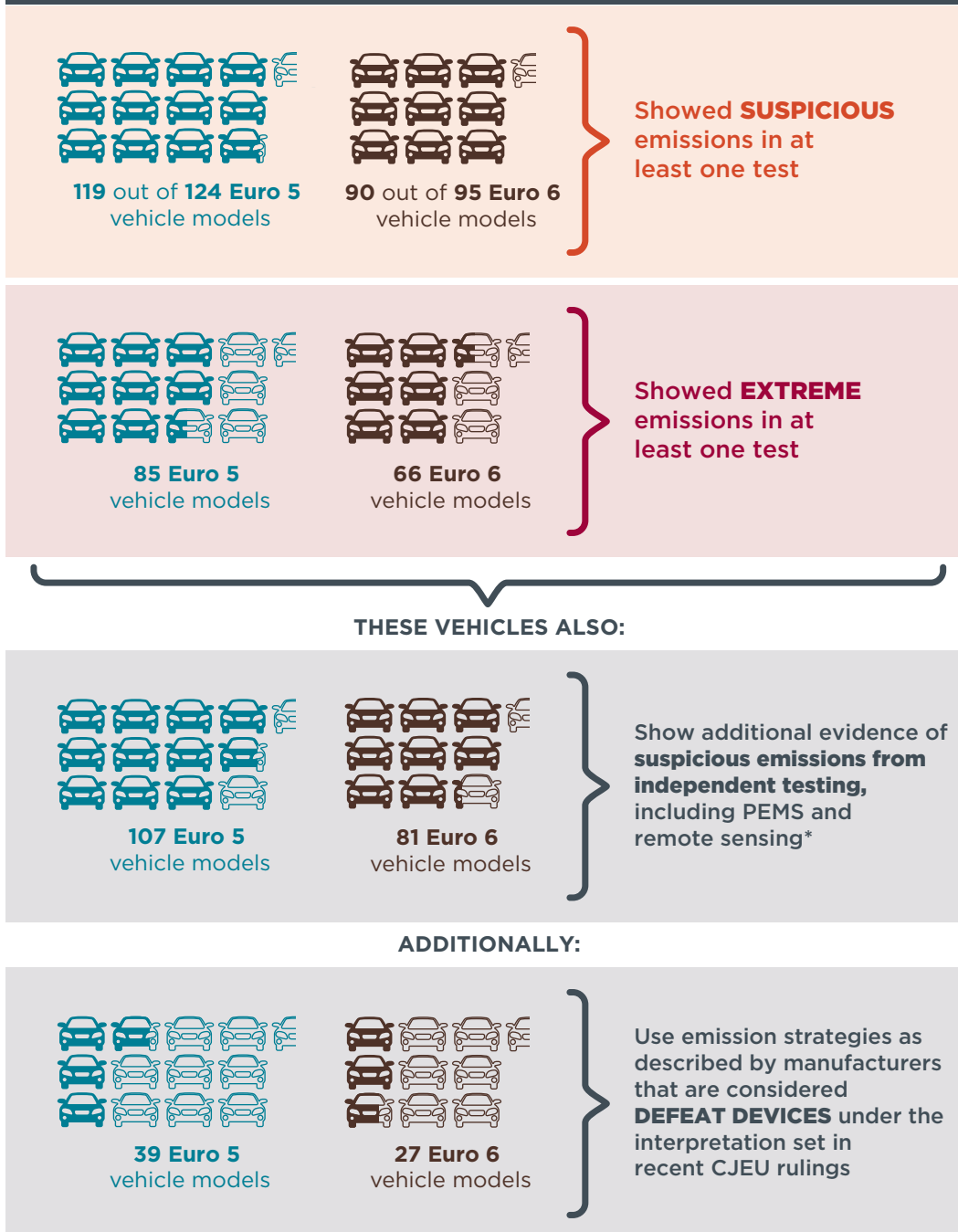


Figure 1. Share of vehicle tests and vehicle model/engine family averages exceeding the suspicious threshold

- » **More than 200 tested vehicle models show high NO_x emissions above the “suspicious” threshold. 150 vehicle models show emissions above the “extreme” threshold.** Nearly 70% of vehicle models showed extreme emissions in at least one official test. A large majority showed suspicious emissions in independent testing and remote sensing data as well.
- » **A total of 66 vehicle models used calibration strategies as described by manufacturers that should now be considered prohibited defeat devices, according to the latest CJEU rulings.** Nearly 50 vehicle models alter or deactivate the emissions control system in low ambient temperatures, a strategy specifically ruled on and found to be a prohibited defeat device by the CJEU.

² The extreme threshold is three or four times the official emissions limit. The thresholds are defined based on technical criteria developed from the expected engine behavior and testing data in line with 2017 EU guidelines.

OFFICIAL GOVERNMENT TESTING OF DIESEL VEHICLES



* Remote sensing results are grouped by engine family. This number includes all vehicle models for which their engine family average show suspicious emissions.

Figure 2. Summary of Euro 5 and Euro 6 diesel vehicle models showing suspicious and extreme emissions

This study highlights the widespread prevalence of calibration strategies in Euro 5 and Euro 6 diesel cars leading to excess NO_x emissions and the comparatively limited corrective action to date. With a clarified definition of defeat devices and the rules prohibiting their use from recent CJEU rulings, EU Member State and UK market surveillance authorities now have a clear basis on which to address excess NO_x from prohibited defeat devices and implement systemic changes in testing and enforcement practices.

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Note to the editors:

The “extreme” threshold indicates a level of emissions so far in excess of regulatory limits that explanations for it other than the presence of a defeat device are highly unlikely. Circumstances that could lead to extreme emissions without a defeat device could exist, such as undetected individual vehicle malfunctions, undetected aftertreatment system regeneration during the test, measurement instrument malfunctions, or a widespread malfunction across a vehicle family. Such conditions are exceedingly rare, but always theoretically possible. To acknowledge the remaining small degree of uncertainty, we, therefore, conclude that tests and vehicle models crossing the extreme threshold indicate that the use of a defeat device is almost, but not perfectly, certain.

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