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THE SUPERIOR COURT OF THE STATE OF ARIZONA

IN AND FOR THE COUNTY OF MARICOPA

STATE OF ARIZONA, *ex rel.*, MARK BRNOVICH, Attorney General,

Plaintiff,

v.

MERCEDES-BENZ USA, LLC, a Delaware limited liability company; and DAIMLER AKTIENGESELLSCHAFT, a foreign corporation; ROBERT BOSCH GMBH, a corporation organized under the laws of Germany; and ROBERT BOSCH LLC, a Delaware limited liability company,

Defendants.

Case No. CV2019-000792

FIRST AMENDED COMPLAINT

(Assigned to Hon. Roger Brodman)

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For its Complaint against Defendants Mercedes-Benz USA, LLC, a Delaware limited liability company ("Mercedes;"); Daimler Aktiengesellschaft, a foreign corporation ("Daimler AG") (collectively "Mercedes Defendants"); Robert Bosch GmbH, a corporation organized under the laws of Germany; and Robert Bosch LLC, a Delaware limited liability company (collectively "Bosch"), Plaintiff State of Arizona *ex rel.* Mark Brnovich, Attorney General (the "State"), alleges as follows:

I. INTRODUCTION

1. This action is brought under the Arizona Consumer Fraud Act (A.R.S. §§ 44-1521, *et seq.*) to obtain restitution for Arizona consumers who purchased or leased certain Mercedes-Benz diesel vehicles (the "Affected Mercedes Vehicles")[1] with cheat devices created, installed, modified, and/or designed by Defendants.

2. The State also seeks injunctive relief to prevent the unlawful acts and practices alleged herein; and other appropriate relief, including disgorgement, civil penalties, costs of investigation, and attorneys' fees.

3. This action is based on violations of the Arizona Consumer Fraud Act and not on any independent violations of federal laws regarding vehicle emissions.

4. Attempting to capitalize on growing consumer demand for products with favorable environmental impact profiles, many major automobile manufacturers rushed to develop "clean diesel" technology and promoted new diesel vehicles as environmentally friendly and clean. Certain manufacturers began marketing diesel cars and trucks as both more powerful *and* more environmentally friendly compared to gasoline vehicles. And the marketing worked, as millions of diesel vehicles were purchased between 2009 and 2016. In 2007, the first full year the BlueTec

[1] The Affected Mercedes Vehicles are described more fully in ¶ 22, *infra*.

"clean diesel" passenger vehicles were sold in the U.S., the number of BlueTEC diesels sold in the U.S. increased from zero to 12,600.[2]

5. But like most too-good-to-be-true claims, these "clean diesel" claims rested on deception—indeed, a massive fraud. Defendants systematically misrepresented the environmental benefits of their "clean diesel" technology and automobiles to consumers, and engaged in massive cheating and manipulation of emissions testing to hide the truth.

6. At the heart of the diesel scandal in the United States and Europe were Defendants Robert Bosch GmbH; and Robert Bosch LLC. Bosch was an active and knowing participant in the scheme to evade U.S. and Arizona emissions requirements and deceive consumers. Bosch developed, manufactured, marketed, tested and sold the electronic diesel control ("EDC") that allowed Mercedes to manipulate emissions controls in real world driving.

7. The Bosch EDC17[3] enabled manufacturers to employ "cheat devices" because it enabled the software to detect conditions when emissions controls can be detected—*i.e.*, conditions outside of the emissions test cycle. Almost all of the vehicles found or alleged to have been manipulating emissions in the United States (Mercedes, FCA (EcoDiesel),[4] Volkswagen,[5] Chevy Cruze,[6] Duramax,[7] BMW,[8] and others) use a Bosch EDC17 device and Bosch software.

8. Bosch developed, marketed, and sold the EDC17 to evade U.S. and Arizona

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[2] Daimler Annual Report 2007, at 84 (https://www.daimler.com/documents/investors/reports/annual-report/daimler/daimler-ir-annualreport-2007.pdf) (note this number reflect total sales in 2007 compared to 2005 because the BlueTEC passenger vehicles were introduced in the United States in late 2016, but detailed sales figures were for 2016 BlueTEC vehicles were unreported).

[3] The Bosch EDC17 is more fully described in ¶¶ 107-109, *infra*.

[4] *See, e.g., Chrysler-Dodge-Jeep EcoDiesel Marketing Sales Practices, and Products Liability Litig.* MDL No. 2777 (N.D. Cal.).

[5] *See State of Arizona v. Volkswagen AG, et al.*, Case No. CV2016-005112 (D. Ariz.).

[6] *See Counts v. G.M., LLC*, Case No. 16-cv-12541 (E.D. Mich.).

[7] *See Fenner, et al. v. G.M., LLC, et al.*, Case No. 17-cv-11661 (E.D. Mich.).

[8] *See Hu, et al. v. BMW N.A., et al.*, Case No. 18-cv-04363 (D.N.J.).

emissions requirements, including for all of the vehicles in this case. Moreover, the Bosch entities participated in a civil conspiracy with Mercedes to use the EDC17 as a cheat device to evade emissions requirements, to prevent state and federal regulators from uncovering the device's true functionality, and to deceive consumers.

9. The Bosch entities did not limit their participation to engineering the cheat device. Rather, Bosch GmbH and Bosch LLC marketed "clean diesel" in the United States and communicated itself or through trade organizations, with the public and U.S. regulators about the benefits of "clean diesel," a highly unusual activity for a mere supplier.

10. Bosch intentionally conducted "clean diesel" promotional activities in Arizona (as well as other states). This promotional activity in Arizona helped create the demand for diesel vehicles and the premium sum such vehicles commanded. These marketing efforts, taken together with evidence of each Bosch entity's actual knowledge that its software could be operated as a cheat device and participation in concealing the true functionality of the device from U.S. regulators, can be interpreted only one way under Arizona law: each Bosch entity was a knowing and active participant in a massive conspiracy with the Mercedes Defendants, and others, to defraud Arizona consumers, regulators, and diesel car purchasers or lessees.

11. Bosch had a powerful motive for doing so. With new environmental regulations effective in 2009, Bosch saw the enormous potential of a "clean diesel" movement in the United States, and needed a tool, such as a proprietary electronic diesel control device, to motivate as many manufacturers as possible to use Bosch as a supplier. Bosch was hugely successful. Bosch GmbH and Bosch LLC have enabled approximately two million polluting diesel vehicles to be on the road in the United States, including tens of thousands in Arizona, each polluting at levels that exceed emissions standards and which use software that manipulate emission controls in a manner to deceive a reasonable consumer. Bosch's complicity has contributed to respiratory illness and death in Arizona and throughout the United States.

12. Mercedes eagerly participated in the "clean diesel" fraud. A key factor in the "clean diesel" message was the ability to control emissions, and in particular the output of Nitrogen Oxides ("NOx"). NOx is an air pollutant that can cause serious illness. It also reacts in the

atmosphere to form Ozone (O_3) and acid rain, and it does so not in the upper atmosphere, but in the ambient air we breathe.

13. In marketing their popular BlueTEC Clean Diesel vehicles and technology, Mercedes promised, among other "clean" promises, that the BlueTEC vehicles (1) converted nitrous oxide emissions into "pure, earth-friendly nitrogen and water," (2) produced "fewer greenhouse gases than gasoline," (3) exceeded "statutory [emissions] requirements," (4) reduced "Nitrogen Oxides by up to 80%," and (5) used the "cleanest diesel technology in the world. For the air we breathe."

14. Defendants knew this information was false.

15. Defendants also understood the materiality of a "clean car message" to consumers. Thus, the Mercedes Defendants, with Bosch's active and knowing participation, aggressively and consistently marketed BlueTEC vehicles and technology across all media as "the world's cleanest and most advanced diesel" with "ultra-low emissions, high fuel economy and responsive performance" that emits "up to 30% lower greenhouse-gas emissions than gasoline."

16. Additionally, the Mercedes Defendants promoted their BlueTEC Clean Diesel vehicles as "Earth Friendly": "With BlueTEC, cleaner emissions are now an equally appealing benefit." In fact, the Mercedes Defendants proclaimed themselves "#1 in CO2 emissions for luxury vehicles."

17. The Mercedes Defendants' BlueTEC Clean Diesel marketing claims constituted deceptive and unfair acts and practices. In addition, they involved concealment, suppression, and omission of material facts with intent that others rely.

18. Such facts are material in that they related to the operation and true environmental characteristics of the Affected Mercedes Vehicles. Among other critical, material suppressed facts is that Defendants programmed the BlueTEC vehicles to turn off or otherwise limit the effectiveness of the emission reduction systems during normal, real-world driving. As a consequence of this critical concealed material fact, consumers were unaware that—contrary to Defendants' representations—the Affected Mercedes Vehicles are not "clean diesels" and, to the contrary, emit enormous amounts of NOx pollutants into the atmosphere.

19. The Mercedes Defendants recently admitted, in response to related litigation, that a shut-off device in the engine management of certain BlueTEC diesel cars stops NOx cleaning when ambient temperatures drop below 50 degrees Fahrenheit and under other, unspecified circumstances. Testing by an expert on the Mercedes BlueTEC vehicles at highway speeds, at low temperatures, and at variable speeds indicates a systemic failure to adequately control NOx emissions. Low temperature testing at highway speeds, for example, produced emissions that were 8.1 to 19.7 times the highway emissions standard. Testing at low temperatures at variable speeds produced emissions as high as 30.8 times the standard.

20. But the operation of Defendants' shut-off device goes well beyond when the temperature drops below 50 degrees Fahrenheit. Testing by an expert also revealed that the Mercedes BlueTEC vehicles do not meet emission standards in virtually ***all*** real-world driving conditions. In virtually every road test at a variety of speeds and temperatures, the emissions exceeded emissions standards, contrary to Defendants' representations to consumers that the Affected Mercedes Vehicles and technology were environmentally friendly.

21. Testing also revealed that the Affected Mercedes Vehicles intentionally shut down or severely limited the emissions control system when the BlueTEC vehicles were on the road. Expert testing revealed that, while the Mercedes BlueTEC vehicle's on-road emissions were very high and exceeded federal standards, the same vehicle when tested on a dynamometer in a

laboratory using Environmental Protection Agency ("EPA") testing protocols had low emissions and either passed the tests, or were within a close margin of doing so. This contrast demonstrates that Defendants programmed the Affected Mercedes Vehicles' emission systems to reduce effectiveness or turn off altogether when the vehicle is on the road. As noted, these critical and material facts have been intentionally concealed and hidden from Arizona consumers at the same time that Defendants have touted the Affected Mercedes Vehicles, defined below, as "clean" and earth friendly.

22. The State alleges that the following vehicle models powered by BlueTEC diesel-fueled engines are affected by the shut-off device described above (the "Affected Mercedes Vehicles"):

MAKE	MODEL
MERCEDES	ML 320 2009-16
	ML 350 2009-16
	GL 350 2009-16
	E320 2009-16
	S350 2009-16
	R320 2009-16
	E Class 2009-16
	GL Class 2009-16
	ML Class 2009-16
	R Class 2009-16
	S Class 2009-16
	GLK Class 2009-16
	GLE Class 2009-16
	Sprinter 2009-16

II. PARTIES

A. Plaintiff

23. Plaintiff is the State of Arizona, *ex rel.* Mark Brnovich, Attorney General (the "State").

B. Defendants

1. Daimler AG

24. Defendant Daimler Aktiengesellschaft ("Daimler AG") is a foreign corporation headquartered in Stuttgart, Baden-Württemberg, Germany.

25. Daimler AG is engaged in the business of designing, engineering, manufacturing, testing, marketing, supplying, selling and distributing motor vehicles, including the Affected Mercedes Vehicles.

26. Daimler AG engineered, designed, developed, manufactured and installed the emissions systems on the Affected Mercedes Vehicles, manipulated the emission systems in such a manner so as to reduce the systems' effectiveness during on-road driving conditions, and exported these vehicles with the purpose and intent of selling them throughout the State of Arizona. Daimler AG purposely availed itself of Arizona's laws and markets and intended to profit by selling the Affected Mercedes Vehicles to Arizona consumers.

27. Daimler AG is, and was at all relevant times, doing business in a continuous manner through a chain of distribution and dealers throughout the United States, including throughout the State of Arizona, by selling, advertising, promoting, and distributing Mercedes-Benz motor vehicles.

28. Through its wholly owned subsidiaries and/or agents, Daimler AG marketed its products in a continuous manner in the State of Arizona. Daimler AG also developed, reviewed, and approved the marketing and advertising campaigns designed to sell the Affected Mercedes Vehicles.

2. Mercedes-Benz USA, LLC

29. Defendant Mercedes-Benz USA, LLC ("Mercedes") is a Delaware limited liability company whose principal place of business is 303 Perimeter Center North, Suite 202, Atlanta, Georgia 30346.

30. Mercedes designed, manufactured, marketed, distributed and sold Mercedes-Benz automobiles throughout the State of Arizona. Mercedes and/or others with whom it was working designed, manufactured, and installed the BlueTEC Clean Diesel engine systems in the Affected

Mercedes Vehicles. Mercedes also developed, approved, and disseminated the owner's manuals and warranty booklets, advertisements, and other promotional materials relating to the Affected Mercedes Vehicles.

31. Mercedes intended that its dealerships disseminate brochures, booklets and advertisements, including information regarding its BlueTEC Clean Diesel engine systems, to potential consumers. Mercedes also communicated with its dealer network through Technical Services Bulletins and through electronic mail. These communications provided Mercedes with opportunities to disclose the truth about the Affected Mercedes Vehicles to dealers for dissemination to potential purchasers or owners; yet, Mercedes failed to utilize these opportunities to disclose materials facts regarding the BlueTEC Clean Diesel engine systems.

3. Relationship Between The Mercedes Defendants

32. Daimler AG is the ultimate parent of, controlled, and communicated with Mercedes concerning, among other things, virtually all aspects of the Affected Mercedes Vehicles distributed in the United States.

33. Mercedes acted as the sole distributor for Mercedes-Benz vehicles in the United States, and purchased those vehicles from Daimler AG in Germany for sale in this country.

34. On information and belief, the relationship between Daimler AG and Mercedes was governed by a General Distributor Agreement.

35. That General Distributor Agreement gave Daimler AG the right to control nearly every aspect of Mercedes' operations—including sales, marketing, management policies, information governance policies, pricing, and warranty terms.

36. Daimler AG directly or indirectly owned 100% of the capital share in Mercedes.[9]

37. Daimler AG paid 19 million euros (approximately 21.8 million U.S. dollars) in relocation expenses for Mercedes' headquarters.

[9] Daimler AG 2015 Annual Report, Notes to the Consolidated Financial Statement at 274 (copy available at https://www.daimler.com/documents/investors/berichte/geschaeftsberichte/daimler/daimler-ir-annual-report-2015.pdf (last accessed July 6, 2020).

4. The Bosch Defendants

38. From at least 2005 until 2015, Robert Bosch GmbH, Robert Bosch LLC, and currently unnamed Bosch employees knowingly and actively participated in the creation, development, marketing, and sale of illegal cheat devices specifically designed to evade U.S. and state emissions requirements in the Affected Mercedes Vehicles and to deceive consumers.

39. Bosch specifically collaborated with the Mercedes Defendants to sell diesel vehicles throughout the U.S., including Arizona.

40. Bosch was specifically aware that vehicles incorporating its products would be sold in Arizona and Bosch intended to profit from those sales.

41. Robert Bosch GmbH is a German multinational engineering and electronics company headquartered in Gerlingen, Germany. Robert Bosch GmbH is the parent company of Robert Bosch LLC.

42. Robert Bosch GmbH, directly and/or through its North American subsidiary, Robert Bosch LLC, at all material times, designed, manufactured, and supplied elements of the cheat device to the Mercedes Defendants.

43. Bosch GmbH is subject to the personal jurisdiction of this Court because it has availed itself of the laws of the State of Arizona through its management and control over Bosch LLC and over the design, development, manufacture, distribution, testing, and sale of thousands of the cheat devices installed in the Affected Mercedes Vehicles sold or leased in Arizona.

44. Employees of Bosch GmbH and Bosch LLC have collaborated in the "clean diesel" scheme with the Mercedes Defendants throughout Arizona.

45. Robert Bosch LLC is a Delaware limited liability company with its principal place of business located at 38000 Hills Tech Drive, Farmington Hills, Michigan. Robert Bosch LLC is a wholly owned subsidiary of Robert Bosch GmbH.

46. Robert Bosch LLC, directly and/or in conjunction with its parent Robert Bosch GmbH, at all material times, designed, manufactured, and supplied elements of the cheat device to the Mercedes Defendants for use in the Affected Mercedes Vehicles.

47. Robert Bosch LLC is subject to the personal jurisdiction of this Court because it has availed itself of the laws of the State of Arizona by participating in the design, development, manufacture, distribution, testing, and sale of thousands of the cheat devices installed in the Affected Mercedes Vehicles sold or leased in Arizona.

48. Both Bosch GmbH and Bosch LLC operated under the umbrella of the Bosch Group, which encompassed some 340 subsidiaries and companies.

49. The "Bosch Group" was divided into four business sectors: Mobility Solutions (formerly Automotive Technology), Industrial Technology, Consumer Goods, and Energy and Building Technology.

50. The Mobility Solutions sector, which supplied parts to the automotive industry, and its Diesel Systems division, which developed, manufactured and applied diesel systems, are particularly at issue here and include the relevant individuals at both Bosch GmbH and Bosch LLC. Bosch's sectors and divisions are grouped not by location, but by subject matter.

51. Some individuals worked at both Bosch LLC and Bosch GmbH during the course of the time period at issue in this action. The acts of individuals described in this Complaint have been associated with Bosch GmbH and Bosch LLC whenever possible.

52. Regardless of whether an individual worked for Bosch LLC in the United States or Bosch GmbH in Germany, the individuals often held themselves out as working for "Bosch." This collective identity was captured by Bosch's mission statement: "We are Bosch," a unifying principle that links each entity and person within the Bosch Group.[10] Bosch documents and press releases often referred to the source of the document as "Bosch" without identifying any particular Bosch entity. Thus, the identity of which Bosch defendant was the author of such documents and

[10] Bosch 2014 Annual Report at 5, available at http://www.bosch.com/en/com/bosch_group/bosch_figures/publications/archive/archive-cg12.php (copy archived Jan. 9, 2017 at http://web.archive.org/web/20170109065409/http://www.bosch.com/media/com/bosch_group/bosch_in_figures/publications/archive/GB2014_EN.pdf (last accessed July 14, 2020)).

press releases cannot be ascertained with certainty until Bosch GmbH and Bosch LLC respond to discovery requests in this matter.

53. Bosch held itself out to the world as one entity: "the Bosch Group." The Diesel Systems division, which developed the EDC17, was described as part of the Bosch Group. In the case of the Mobility Solutions sector, which oversaw the Diesel Systems division the Bosch Group competed with other large automotive suppliers.[11]

54. The Bosch publication *Bosch in North America* represented that "Bosch supplies … clean diesel fuel injection technology for cars and trucks." Throughout the document describing its North American operations, the company referred to itself as "Bosch" or "the Bosch Group."[12]

55. The *Bosch in North America* document proclaimed that automotive technology was "Bosch's largest business sector in North America." In this publication, Bosch never described the actions of any separate Bosch legal entity, like Bosch LLC, when describing its business, but always held itself out as "the Bosch Group."[13]

56. German authorities are now investigating Bosch GmbH and its role in the emissions scandal and are focusing on certain Bosch employees.[14]

57. Recently, researchers from Rohr-Universität in Bochum, Germany, and the University of California-San Diego uncovered Bosch's role in connection with the manipulation of emission controls in certain, non-Mercedes, diesel vehicles. The researchers found no evidence

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[11] Bosch 2016 Annual Report at 24-26, available at https://www.bosch.com/company/our-figures (copy archived June 8, 2017 at http://web.archive.org/web/20170608001702/https://assets.bosch.com/media/global/bosch_group/our_figures/pdf/bosch-annual-report-2016.pdf (last accessed July 14, 2020)).

[12] *Bosch in North America* at 2 (May 2007), available at http://www.bosch.us/content/language1/downloads/BINA07.pdf (copy archived Oct. 20, 2016 at http://web.archive.org/web/20161020173305/http://www.bosch.us/content/language1/downloads/BINA07.pdf (last accessed July 14, 2020)).

[13] *Id.* at 5.

[14] *Three Bosch Managers Targeted as German Diesel Probe Expands*, BLOOMBERG (June 29, 2017), https://www.bloomberg.com/news/articles/2017-06-29/three-bosch-managers-targeted-as-german-diesel-probe-expands (last accessed July 6, 2020).

that the car manufacturers wrote the code that allowed the operation of cheat devices. All the code they analyzed was found in documents copyrighted by Robert Bosch GmbH. These researchers found that in the "function sheets" copyrighted by Robert Bosch GmbH, the code to cheat the emissions test was labeled as modifying the "acoustic condition" of the engine, a label that helped the cheat fly under the radar.

58. Given that the Affected Mercedes Vehicles have a Bosch EDC17, and given testing by experts described below that reveals cheat devices in the Affected Mercedes Vehicles, it appears that Bosch was a participant in the scheme to hide the true emissions of Affected Mercedes Vehicles, and supplied a similar "function sheet" to Mercedes, to enable a similar emission deception.

III. JURISDICTION AND VENUE

59. This Complaint is filed, and these proceedings are instituted under, the provisions of the Arizona Consumer Fraud Act, A.R.S. §§ 44-1521, *et seq.*

60. This Complaint asserts claims solely under Arizona law. The State does not intend to assert any claim under federal law, and this Complaint should not be construed to advance any claim that arises under federal law under 28 U.S.C. § 1331.

61. This Court has subject-matter jurisdiction.

62. This Court may issue appropriate orders both prior to and following a determination of liability under A.R.S. § 44-1528.

63. The violations alleged herein are in connection with the sale or advertisement of merchandise, and Defendants do business in Maricopa County and elsewhere throughout the State of Arizona.

64. Venue is proper in Maricopa County under A.R.S. § 12-401.

IV. FACTUAL ALLEGATIONS

A. The Environmental Challenges Posed By Diesel Engines

65. Diesel engines pose a difficult challenge to the environment because they have an inherent trade-off between power, fuel efficiency, and emissions. Compared to gasoline engines, diesel engines generally produce greater torque, greater low-end power, better drivability, and

much higher fuel efficiency. But these benefits come at the cost of much dirtier and more harmful emissions.

66. Instead of using a spark plug to combust highly refined fuel with short hydrocarbon chains, as gasoline engines do, diesel engines compress a mist of liquid fuel and air to very high temperatures and pressures, which causes the diesel to spontaneously combust. This causes a more powerful compression of the pistons, which produces greater engine torque (that is, more power).

67. The diesel engine can do this both because it operates at a higher compression ratio than a gasoline engine and because diesel fuel contains more energy than gasoline.

68. But this greater energy and fuel efficiency comes at a cost: diesel produces dirtier and more dangerous emissions. One byproduct of diesel combustion is oxides of nitrogen (NOx), which includes a variety of nitrogen and oxygen chemical compounds that only form at high temperatures.

69. These compounds are formed in the cylinder of the engine during the high temperature combustion process. NOx pollution contributes to nitrogen dioxide, particulate matter in the air, and reacts with sunlight in the atmosphere to form ozone. Exposure to these pollutants has been linked with serious health dangers, including asthma attacks and other respiratory illnesses serious enough to send people to the hospital. Ozone and particulate matter exposure have been associated with premature death due to respiratory-related or cardiovascular-related effects. Children, the elderly, and people with pre-existing respiratory illness are at acute risk of health effects from these pollutants. As a ground level pollutant, NO_2, a common byproduct of NOx reduction systems using an oxidation catalyst, is highly toxic in comparison to nitric oxide (NO). If overall NOx levels are not sufficiently controlled, then concentrations of NO_2 levels at ground level can be quite high, where they have adverse acute health effects.

70. The United States government, through the EPA, has passed and enforced laws designed to protect United States citizens from these pollutants and certain chemicals and agents known to cause disease in humans. Automobile manufacturers must abide by these U.S. laws and must adhere to EPA rules and regulations. This case is not based on these laws but on deception aimed at consumers.

B. The Origins Of The Clean Diesel Fraud

71. Although this case is not about Volkswagen, Bosch's history with Volkswagen provides background and support for the plausibility of its participation in the unlawful acts alleged herein. On information and belief, the State alleges that the same level of coordination between Bosch and Volkswagen also occurred between Bosch and the Mercedes Defendants.

1. Volkswagen And Bosch Conspired To Develop The Illegal Cheat Device

72. Bosch introduced a new generation of diesel electronic control units ("ECUs") for Volkswagen.

73. A February 28, 2006 Bosch press release introduced the "New Bosch EDC17 engine management system" as the "brain of diesel injection" which "controls every parameter that is important for effective, low-emission combustion." The EDC17 offered "[e]ffective control of combustion" and a "[c]oncept tailored for all vehicle classes and markets." In the press release, Bosch touted the EDC17 as follows:[15]

> **EDC17: Ready for future demands**
>
> Because the computing power and functional scope of the new EDC17 can be adapted to match particular requirements, it can be used very flexibly in any vehicle segment on all the world's markets. In addition to controlling the precise timing and quantity of injection, exhaust gas recirculation, and manifold pressure regulation, it also offers a large number of options such as the control of particulate filters or systems for reducing nitrogen oxides. The Bosch EDC17 determines the injection parameters for each cylinder, making specific adaptations if necessary. This improves the precision of injection throughout the vehicle's entire service life. The system therefore makes an important contribution to observing future exhaust gas emission limits.

[15] Bosch press release, *The brain of diesel injection: New Bosch EDC17 engine management system* (Feb. 28, 2006), http://www.bosch-presse.de/presseforum/details.htm?txtID=2603&locale=en (copy archived Apr. 23, 2016 at http://web.archive.org/web/20160423201504/http://www.bosch-presse.de/presseforum/details.htm?txtID=2603&locale=en (last accessed July 14, 2020)).

74. Bosch and Volkswagen worked together closely to modify the software and to create specifications for each Volkswagen vehicle model. Indeed, customizing a road-ready ECU is an intensive three- to five-year endeavor involving a full-time Bosch presence at an automaker's facility. Such was the case with each Defendant as well.

75. All Bosch ECUs, including the EDC17, ran on complex, highly proprietary engine-management software over which Bosch exerted nearly total control. In fact, the software typically was locked to prevent customers, like the Mercedes Defendants, from making significant changes on their own.

76. Bosch's security measures further confirm that its customers could not make significant changes to Bosch software without Bosch involvement. Bosch boasted that its security modules protected vehicle systems against unauthorized access in every operating phase, meaning that no alteration could have been made without either a breach of that security—and no such claims have been advanced—or Bosch's knowing participation.[16]

77. Unsurprisingly, then, at least one car company engineer has confirmed that Bosch maintains absolute control over its software as part of its regular business practices:[17]

> I've had many arguments with Bosch, and they certainly own the dataset software and let their customers tune the curves. Before each dataset is released it goes back to Bosch for its own validation.
>
> Bosch is involved in all the development we ever do. They insist on being present at all our physical tests and they log all their own data, so someone somewhere at Bosch will have known what was going on.
>
> All software routines have to go through the software verification of Bosch, and they have hundreds of milestones of verification, that's the structure….

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[16] *Reliable Protection for ECUs*, ESCRYPT (May 12, 2016), https://www.escrypt.com/en/news-events/protection-for-ecus (last accessed July 6, 2020).

[17] Michael Taylor, *EPA Investigating Bosch over VW Diesel Cheater Software*, CAR AND DRIVER (Nov. 23, 2015), /http://blog.caranddriver.com/epa-investigating-bosch-over-vw-diesel-cheater-software/ (copy archived Feb. 9, 2018 at http://web.archive.org/web/20180209192637/https://blog.caranddriver.com/epa-investigating-bosch-over-vw-diesel-cheater-software/ (last accessed July 14, 2020)).

> The car company is never entitled by Bosch to do something on their own.

78. Thus, Bosch GmbH and Bosch LLC cannot convincingly argue that the development of a cheat device, such as that utilized by Volkswagen, was the work of a small group of rogue engineers.

79. Volkswagen's and Bosch's work on the EDC17 reflected a highly unusual degree of coordination. It was a massive project that required the work of numerous Bosch coders for a period of more than ten years, or perhaps more.[18] Although Bosch publicly introduced the EDC17 in 2006, it had started to develop the engine management system years before.[19]

80. In fact, Bosch was in on the secret and knew that Volkswagen was using Bosch's software algorithm as an "on/off" switch for emission controls when the vehicles were undergoing testing. It has been said the decision to cheat was an "open secret" at Volkswagen.[20] It was an "open secret" at Bosch as well.

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[18] Approximately 50,000 of Bosch's 375,000 employees worked in the diesel technology operations branch of Bosch, and Volkswagen was the biggest diesel manufacturer in the world. *Bosch Probes Whether Its Staff Helped VW's Emissions Rigging*, AUTOMOTIVE NEWS (Jan. 27, 2016), http://www.autonews.com/article/20160127/COPY01/301279955/bosch-probes-whether-its-staff-helped-vws-emissions-rigging (last accessed July 6, 2020).

[19] Bosch press release, *The brain of diesel injection: New Bosch EDC17 engine management system* (Feb. 28, 2006), http://www.bosch-presse.de/presseforum/details.htm?txtID=2603&locale=en (copy archived Apr. 23, 2016 at http://web.archive.org/web/20160423201504/http://www.bosch-presse.de/presseforum/details.htm?txtID=2603&locale=en (last accessed July 14, 2020)).

[20] Georgina Prodham, *Volkswagen probe finds manipulation was open secret in department*, REUTERS (Jan. 23, 2016), http://www.reuters.com/article/us-volkswagen-emissions-investigation-idUSKCN0V02E7 (copy archived Jan. 23, 2016 at http://web.archive.org/web/20160123191654/http://www.reuters.com/article/us-volkswagen-emissions-investigation-idUSKCN0V02E7 (last accessed July 14, 2020)); *See also* Jay Ramey, *VW chairman Poetsch: Company 'tolerated breaches of rules,'* AUTOWEEK (Dec. 10, 2015), http://autoweek.com/article/vw-diesel-scandal/vw-chairman-poetsch-company-tolerated-breaches-rules (last accessed July 6, 2020) (it was necessary for the "EA 189 engine to pass U.S. diesel emissions limits within the budget and time frame allotted").

81. Volkswagen and Bosch personnel employed code language for the cheat device, referring to it as the "acoustic function" (in German, "akustikfunktion"). The roots of the "akustikfunktion"—and likely the cheating—can be traced back to the late 1990s when Audi devised software called the "akustikfunktion" that could switch off certain functions when the vehicle was in a test mode.[21] The "akustik" term is derived from the function's ability to modify the noise and vibration produced by the engine. News articles report that, in 2006, Volkswagen further developed this "akustikfunktion" for its vehicles.[22]

82. In sum, Bosch GmbH worked hand-in-glove with Volkswagen to develop and maintain the akustikfunktion/cheat device. On information and belief, it did so with Mercedes as well.

2. Volkswagen And Bosch Conspired To Conceal The Illegal "Akustikfunktion"

83. By 2007, and likely earlier, Bosch GmbH was critical not only in developing the "akustikfunktion" but also in concealing it.

84. Bosch GmbH was concerned about getting caught participating in the cheat device fraud. As reported in a German newspaper, *Bild am Sonntag*, and a French publication, a Volkswagen internal inquiry found that in 2007, Bosch GmbH warned Volkswagen by letter that using the emissions-altering software in production vehicles would constitute an "offense."[23]

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[21] Martin Murphy, *Dieselgate's Roots Stretch Back to Audi*, HANDELSBLATT GLOBAL (Apr. 19, 2016), https://global.handelsblatt.com/edition/413/ressort/companiesmarkets/article/dieselgates-roots-stretch-back-to-audi?ref=MTI5ODU1 (copy available at https://www.handelsblatt.com/today/companies/handelsblatt-exclusive-dieselgates-roots-stretch-back-to-audi/23537354.html (last accessed July 6, 2020)).

[22] Russell Hotten, *Volkswagen: The scandal explained*, BBC (Dec. 10, 2015), http://www.bbc.com/news/business-34324772 (last accessed July 6, 2020); Matt Burt, *VW emissions scandal: how Volkswagen's 'defeat device' works*, Autocar (Sept. 23, 2015), http://www.autocar.co.uk/car-news/industry/vw-emissions-scandal-how-volkswagens-defeat-device-works (last accessed July 6, 2020). *See also* n.19, *supra*.

[23] *Bosch warned VW about illegal software use in diesel cars, report says*, AUTOMOTIVE NEWS (Sept. 27, 2015), http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says (last accessed July 6, 2020); *VW Scandal: Company Warned Over Test Cheating Years Ago*, BBC (Sept. 27, 2015), http://www.bbc.com/news/business-34373637 (last accessed July 6, 2020).

3. Volkswagen And Bosch Conspired In The United States And Germany To Elude U.S. Regulators Who Regulated Not Just Volkswagen Diesels But All Diesels

85. The purpose of the cheat device was to meet stringent U.S. emissions standards and profit off of the "clean diesel" deception perpetrated against consumers. Once Bosch GmbH, Bosch LLC, and Volkswagen perfected the cheat device, Bosch turned its attention to deceiving U.S. regulators not just for the benefit of Volkswagen, but also for the benefit of the Mercedes Defendants.

86. Bosch's North American subsidiary, Robert Bosch LLC, was also part of and essential to the fraud. Bosch LLC worked closely with Bosch GmbH and Volkswagen in the United States and in Germany to ensure that the non-compliant vehicles passed U.S. emissions tests. Bosch LLC employees frequently communicated with U.S. regulators about Volkswagen and other vehicles equipped with cheat devices and actively worked to ensure that regulators approved the Affected Mercedes Vehicles.

87. Employees of Bosch LLC and Bosch GmbH provided specific information to U.S. regulators about how Volkswagen's vehicles functioned and unambiguously stated that the vehicles met emissions standards. Bosch LLC regularly communicated to its colleagues and clients in Germany about ways to deflect and defuse questions from U.S. regulators about vehicles equipped with cheat devices—particularly the California Air Resources Board ("CARB").

4. Bosch Kept The Mercedes Defendants' Secrets Safe And Pushed "Clean Diesel" In The United States As A Concept Applicable To All Diesel Car Manufacturers

88. During the time of its efforts to promote "clean diesel," Bosch LLC and Bosch GmbH were each aware that the Affected Mercedes Vehicles could not meet emissions requirements without turning down or derating emission controls. Bosch not only kept this dirty secret safe, it went a step further and actively promoted "clean diesel" in the United States, including making vehicles with Bosch's cheat devices available for regulators to drive.

89. As early as 2004, Bosch announced a push to convince U.S. automakers that its diesel technology could meet tougher 2007 U.S. emission standards.[24] Its efforts consisted of a multi-year, multi-million-dollar effort involving key players from both Robert Bosch GmbH in Germany and Bosch LLC in the United States.

90. Bosch's promotion of diesel technology specifically targeted the United States. For example, Bosch put on "California Diesel Days"[25] and "SAE World Congress in Detroit."[26] In 2008, Bosch LLC and Volkswagen America co-sponsored the "Future Motion Made in Germany - Second Symposium on Modern Drive Technologies" at the German Embassy in Washington, D.C., with the aim of providing a venue for "stakeholders to gain insight into the latest technology trends and engage in a vital dialogue with industry leaders and policymakers."[27]

91. Bosch LLC hosted multi-day conferences open to many regulators and legislators and held private meetings with regulators in which it proclaimed extensive knowledge of the specifics of "clean diesel" technology, including calibrations necessary for the vehicles equipped with cheat devices to comply with emissions regulations.

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[24] Edmund Chew, *Bosch boosts US diesel lobbying*, AUTONEWS (Mar. 8, 2004), http://www.autonews.com/article/20040308/SUB/403080876/bosch-boosts-us-diesel-lobbying (last accessed July 6, 2020).

[25] *Bosch drives clean diesel in California,* http://www.bosch.us/content/language1/html/734_4066.htm?section=28799C0E86C147799E02226E942307F2 (copy available at The U.S. Coalition for Advanced Diesel Cars http://www.californiadieseldays.com/ (last accessed July 6, 2020)).

[26] *Bosch Brings Innovation, Green Technology to SAE 2009 World Congress*, Bosch, http://www.bosch.us/content/language1/html/734_7432.htm?section=CDAF31A468D9483198ED8577060384B3 (last accessed July 6, 2020).

[27] *Bosch: Clean Diesel is Key Part of Future Technology Mix*, Bosch, http://us.bosch-press.com/tbwebdb/bosch-usa/en-US/PressText.cfm?CFID=60452038&CFTOKEN=9c778a2564be2c9b-56CC21B6-96AB-5F79-32445B13EC121DBE&nh=00&Search=0&id=364 (copy archived June 21, 2017 at http://web.archive.org/web/20170621095300/http://us.bosch-press.com/tbwebdb/bosch-usa/en-US/PressText.cfm?CFID=60452038&CFTOKEN=9c778a2564be2c9b-56CC21B6-96AB-5F79-32445B13EC121DBE&nh=00&Search=0&id=364 (last accessed July 14, 2020)).

5. Bosch Promoted Audi "Clean Diesel" Across The U.S. And Around The World

92. On October 28, 2008, Bosch North America issued a press release that was much broader than the promotion of Audi. It was a promotion of Bosch and its role in "clean diesel" in a broad sense to further the diesel conspiracies and Bosch's objective in falsely promoting "clean diesel." The irony is glaring because Bosch knew the Audi was not clean. Bosch thus made the following pronouncements:

> Bosch, the worldwide leader in powertrain development, was selected by Audi to supply the common rail system that includes the electronic control unit (ECU), rail, pump and injectors, the dosing module and control unit for the Denoxtronic system, as well as various sensors for powertrain and exhaust gas aftertreatment in the Q7 3.0 TDI. The Denoxtronic reduction-agent metering system from Bosch permits further reductions in the emissions of diesel engines. It is a central component of the SCR system (Selective Catalytic Reduction).
>
> "The Audi Mileage Marathon provides opportunity for people to experience torque, fuel economy and other benefits of today's clean diesel technology in action," said Bernd Boisten, regional president, diesel systems North America, Robert Bosch LLC. "We call today's diesel Good, Clean, Fun. We wish all participants safe journeys and look forward to their reactions to clean diesel's fuel efficiency, low emissions and exceptional performance."
>
> Clean diesel technology combines clean diesel fuel, advanced engines and effective exhaust control technology into a complete package that is more efficient, environmentally friendly and fun to drive. Today, a clean diesel engine is one of the "greenest" powertrain options on the market.
>
> Bosch has been promoting the benefits of clean diesel in anticipation of the new 50-state compliant diesel powered vehicles, such as the Audi Q7 3.0 TDI, coming to market in the U.S.

93. In April 2009, Bosch LLC organized and hosted a two-day "California Diesel Days" event in Sacramento, California. Bosch invited a roster of lawmakers, journalists, executives,

regulators, and non-governmental organizations[28] with the aim of changing perceptions of diesel from "dirty" to "clean." The event featured vehicles equipped with cheat devices as ambassadors of "clean diesel" technology, including a 2009 Volkswagen Jetta "green car." The stated goals were to "build support for light-duty diesel as a viable solution for achieving California's petroleum and emission reduction objectives."

94. In 2009, Bosch also became a founding member of the U.S. Coalition for Advanced Diesel Cars.[29] The advocacy group's purposes included "promoting the energy efficiency and environmental benefits of advanced clean diesel technology for passenger vehicles in the U.S. marketplace."[30] This group lobbied Congress, U.S. regulators, and CARB in connection with rules affecting "clean diesel" technology.[31]

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[28] *Bosch drives clean diesel in California*, http://www.bosch.us/content/language1/html/734_4066.htm?section=28799C0E_86C147799E02226E942307F2; (the article was taken down from the website at an unknown date); *California Diesel Days*, The U.S. Coalition for Advanced Diesel Cars, http://www.californiadieseldays.com/ (last accessed July 6, 2020).

[29] Chrissie Thompson, *New Coalition Aims To Promote Diesel Cars*, AUTOMOTIVE NEWS (Feb. 2, 2009), http://www.autonews.com/article/20090202/OEM06/302029728/new-coalition-aims-to-promote-diesel-cars (last accessed July 6, 2020).

[30] *About the Coalition*, The U.S. Coalition for Advanced Diesel Cars, http://cleandieseldelivers.com/about/ (copy archived Feb. 4, 2015 at http://web.archive.org/web/20150204015342/http://cleandieseldelivers.com/about/ (last accessed July 14, 2020)).

[31] *Id.* Letter to Chairman Mary Nichols and CARB concerning a statement made about diesel technology (Jan. 8, 2016), available at http://cleandieseldelivers.com/media/Mary-Nichols-Letter-01082016.pdf (copy archived Feb. 14, 2016 at https://web.archive.org/web/20160214091915/http://cleandieseldelivers.com/media/Mary-Nichols-Letter-01082016.pdf (last accessed July 14, 2020)).

95. In 2010, Bosch sponsored the Virginia International Raceway with the support of the 2010 Volkswagen Jetta TDI Cup Series. This event included TDI vehicles featuring Bosch technology.[32]

96. In 2012, Audi, BMW, Bosch, Daimler, Porsche, and Volkswagen joined to form The Clearly Better Diesel initiative.[33] The initiative was announced in Berlin by the German Association of the Automotive Industry. Its stated goal was to promote the sale of "clean diesel" vehicles in the United States. The initiative's slogan was "Clean Diesel. Clearly Better."

97. In its efforts to promote "clean diesel," including the Affected Mercedes Vehicles, Bosch GmbH acted on behalf of its global group.

6. Bosch Has Previously Violated U.S. Law

98. On March 31, 2015, Robert Bosch GmbH pled guilty and reached an agreement with the Department of Justice to pay a $57.8 million criminal fine for its role in a conspiracy to fix prices and rig bids for spark plugs, oxygen sensors and starter motors sold to automobile and internal engine combustion manufacturers in the United States.

7. Bosch Also Played A Critical Role In Falsely Promoting "Clean Diesel" Technology Via The "Diesel Technology Forum"

99. It is not unheard of for manufacturers of dangerous products, like opioids or tobacco, to use trade associations to cover up the danger of their products. For example, tobacco companies created several trade associations to promote phony science claiming tobacco use was neither harmful nor addictive. Bosch used a similar technique to promote its "clean diesel." Bosch was a member of the Diesel Technology Forum ("DTF"), a "non-profit" dedicated "to raising awareness about the importance of diesel engines." The DTF was formed in 2000, and its members include

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[32] *Volkswagen Jetta TDI Cup Drivers Take to the Track for the First Time in 2010 at VIR*, Volkswagen of America, Inc. (April 23, 2010), available at http://www.prnewswire.com/news-releases/volkswagen-jetta-tdi-cup-drivers-take-to-the-track-for-the-first-time-in-2010-at-vir-91985604.html (last accessed July 6, 2020).

[33] *"Clean Diesel Clearly Better" Campaign for Clean Diesel Cars Welcomed*, Diesel Technology Forum (Dec. 12, 2012), available at https://www.prnewswire.com/news-releases/clean-diesel-clearly-better-campaign-for-clean-diesel-cars-welcomed-183261432.html (last accessed July 6, 2020).

Bosch, Daimler, GM, and FCA. Bosch was aware that cars made by the Mercedes Defendants used cheat devices to meet emissions requirements and were not "clean diesel" vehicles, as claimed. Despite this knowledge, Bosch, as a member of the DTF, and as part of its complicit conduct in promoting illegal diesels, authorized a steady stream of announcements about "clean diesel technology," as described below.

100. For example, the DTF on December 12, 2012, issued a press release proclaiming "Clean Diesel. Clearly Better" and highlighted new diesel models coming to the U.S. The release noted that the new "Clean Diesel" campaign was announced jointly by Audi, BMW, Bosch, Daimler, Porsche, and Volkswagen.

December 12, 2012 | Diesel Technology Forum

DIESEL TECHNOLOGY FORUM

PRESS RELEASE

"CLEAN DIESEL. CLEARLY BETTER." CAMPAIGN FOR CLEAN DIESEL CARS WELCOMED

Contact: Steve Hansen (301) 668-7230 shansen@dieselforum.org

New Effort by German Automakers to Promote Diesel Cars in U.S.

Washington, D.C. – The first ever joint promotion campaign by German automakers to promote clean diesel vehicles in the U.S. was welcomed today with the hope that it can accelerate current market successes for domestic clean diesel vehicle sales, according to Allen Schaeffer, the Executive Director of the Diesel Technology Forum (/).

The new promotional diesel campaign was announced today in Berlin by the German Association of the Automotive Industry (http://www.vda.de/en/index.html) (VDA) and member companies – Audi, BMW, Bosch, Daimler, Porsche and Volkswagen.

"We welcome this new effort to raise awareness of American car buyers to all of the benefits of the new generation of clean diesel technology," Schaeffer said. "People who know about the new clean diesel technology are extremely impressed by the improved fuel efficiency, power and lower emissions over gasoline and hybrid autos."

The slogan "Clean Diesel. Clearly Better." was unveiled along with the promotional effort's new website – www.clearlybetterdiesel.org (http://www.clearlybetterdiesel.org/) – which includes information highlighting the advantages of modern clean diesel passenger cars over gasoline engines "in terms of cleanliness, consumption and performance," according to VDA.

"The success of diesel technology is well documented in Western Europe where 55 percent of all new auto sales are clean diesels. Even though diesels represent a more modest three percent of all new vehicle sales in the U.S., we're in the midst of a resurgence of diesel in America and can easily see this percentage doubling and tripling in the next five to 10 years," said Schaeffer.

"Today's clean diesels are fast, efficient, and clean - a far cry from previous diesels in the 1970s and 1980s. Consumers are taking to new clean diesels for their long-term green value as evidenced by diesel sales increases of 24.5 percent through November 2012 compared to 2011, according to Hybrid Cars.com and Baum and Associates. Diesel sales have increased in 27 of the past 28 months in year-over-year sales, with 24 of these months showing double-digit increases. In addition, sales increased by 20 percent or better in 20 of the past 28 months.

"The growing role that clean diesel technology will play here in the U.S. meeting federal fuel economy goals is evident by the anticipated major increase in the number of diesel offerings that will be available in the U.S. in the next 12 to 18 months," Schaeffer said.

"With higher and fluctuating fuel prices, Americans are seeking more fuel efficient cars (/index.cfm?objectid=1CDF6110-DA5D-11E0-8228000C296BA163)," Schaeffer said. "The new U.S. federal fuel efficiency standards that will required a 54.5 mpg average by 2025 will significantly boost clean diesel auto sales because diesel cars (/index.cfm?objectid=7BCD5900-B1BF-11E0-8DA1000C296BA163) are 20 to 40 percent more fuel efficient than gasoline versions."

Schaeffer said the U.S. Energy Information Administration (EIA) forecasts that compared to 2012 the price of diesel fuel will decline by about 3 percent in 2013 to $3.83/gallon.

New Clean Diesels Coming To the U.S. Market

Schaeffer said a number of additional diesels will be available soon in the U.S. including:

- Audi A6, A7, A8 and Q5 TDI diesels will be available in 2013 joining the Q7 and A3 TDI to bring Audi's diesel offerings to a total of six. A TDI clean diesel A4 version is also expected in 2014 or early as 2013.

- BMW announced that the U.S. market will see a 2.0-liter four cylinder diesel and 3.0-liter inline six diesel engine in the next 12 months.

- Chrysler will introduce its new Jeep Grand Cherokee Ecodiesel in 2013.

- Ford will offer a new diesel Transit full-size commercial van in 2013.

- General Motors will offer a Cadillac ATS diesel and a diesel version of the Chevrolet Cruze in 2013.

- Mazda will become the only Asian car manufacturer to sell diesel cars in the U.S. when it introduces its SKYACTIV-D 2.2-liter clean diesel engine.

- The Mercedes S350 BlueTEC marks the return of the diesel-powered Mercedes-Benz S-Class to the United States in 2012. Mercedes also plans to bring a diesel in the GLK and C-class for a total of eight diesel models by 2014.

ABOUT THE DIESEL TECHNOLOGY FORUM

The Diesel Technology Forum is a non-profit national organization dedicated to raising awareness about the importance of diesel engines, fuel and technology. Forum members are leaders in clean diesel technology and represent the three key elements of the modern clean-diesel system: advanced engines, vehicles and equipment, cleaner diesel fuel and emissions-control systems. For more information visit www.dieselforum.org (/).

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[34] https://www.dieselforum.org/news/clean-diesel-clearly-better-campaign-for-clean-diesel-cars-welcomed, December 12, 2012 (last accessed July 13, 2020).

101. As part of the continuing and false ”clean diesel” promise, DTF posted on its website after the Volkswagen scandal that the new diesel technology enables emissions control systems that meet “near-zero” emissions standards.

ABOUT CLEAN DIESEL

WHY DIESEL ISN'T DIRTY

With a higher degree of certainty than ever before, we can say that diesel is a clean technology.

The Clean Diesel Journey

Diesel is a technology of continuous improvement and that goes for the fuel as well. Ultra-low sulfur diesel fuel has been the standard for both on-highway and off-highway diesel engines nationwide since 2007. By cutting sulfur levels in diesel fuel by 97 percent, immediate clean air benefits accrued - through lower soot emissions from all diesel vehicles and equipment using the fuel (both old and new) by 10 percent. Reducing the sulfur content of diesel fuel is similar to removing lead from gasoline during the 1970s.

Cleaner diesel fuel is the foundation that enabled the development and introduction of a new generation of advanced engines and emission control devices to meet strict "near zero" emissions standards.

102. The DTF posted on its website information about “Clean Diesel,” proclaiming “near zero emissions.”

ABOUT CLEAN DIESEL

WHAT IS CLEAN DIESEL?

DIESEL TECHNOLOGY FORUM

Cleaner diesel fuel, advanced engines and effective emissions control technology make up a new generation of diesel. It's clean diesel.

What is clean diesel?

What makes it different from regular diesel?

Clean diesel is the new generation of diesel technology.

Today's ultra-low sulfur diesel fuel, advanced engines and effective emissions control combine to achieve near zero emissions that is smoke free. Clean diesel has proven energy efficiency, and ability to use a wide range of renewable fuels that position diesel as a key technology for growing economies to achieve cleaner air, lower greenhouse gas emissions and a sustainable environment around the world.

Cleaner diesel fuel, advanced engines and effective emissions control make up a new generation of diesel. It's clean diesel.

103. The DTF website claimed the "clean diesels" resulted in "Clean Diesel and Clean Air," and that the manufacturers had "Effective Emissions Controls":

NEW CLEAN DIESEL TECHNOLOGY

Cleaner Diesel Fuel

Clean diesel fuel - containing 97 percent less sulfur - is now the standard for both on-highway and off-highway diesel engines nationwide. Using this ultra-low sulfur diesel (ULSD) immediately cuts soot emissions from diesel vehicles and equipment by 10 percent. Reducing the sulfur content of diesel fuel is similar to removing lead from gasoline during the 1970s.

Cleaner diesel fuel enables the development of a new generation of advanced engines and emission control devices that can't operate effectively with higher sulfur content in diesel fuel.

Why is diesel technology so fuel efficient?

A combination of the energy-rich properties of the fuel, and the efficiency and completeness of the combustion of fuel to create useful mechanical energy. Diesel is a petroleum-based fuel with the highest energy density among transportation fuels - that's more energy per gallon than other alternatives. The U.S. Energy Information Administration states that few transportation fuels surpass the energy density of diesel (http://www.eia.gov/todayinenergy/detail.cfm?id=9991).

Read DTF's Diesel Fuel Study - Diesel: Fueling the Future in a Green Economy (/index.cfm?objectid=346EBC1F-A348-11E0-B3DD000C296BA163).

Advanced Engines

Diesel is the world's most efficient internal combustion engine. It provides more power and more fuel efficiency than alternatives such as gasoline, compressed natural gas or liquefied natural gas. Read more about the history of the diesel engine (/files/dmfile/DieselHistory.pdf).

Fuel combustion is the primary difference between gasoline and diesel engines. Gasoline engines ignite fuel with spark plugs, whereas diesels ignite fuel with compression. Inside the engine, the combustion of air and fuel takes place under pressure and heat created by compressing the air-fuel mixture so intensely that it combusts spontaneously, releasing energy, that is transmitted to powering the wheels on a vehicle, the piston's motion and creating mechanical energy.

Advanced new technologies such as electronic controls, common rail fuel injection, variable injection timing, improved combustion chamber configuration and turbocharging have made diesel engines cleaner, quieter and more powerful than past vehicles.

Effective Emissions Control

Manufactures have been very innovative with the methods used to meet emission standards using a variety of aftertreatment technologies and advanced engine systems that do not involve the use of additional emissions control technology, particularly in the off-road sector.

Introduction of ultra-low sulfur diesel fuels for both on- and off-road applications is a central part of the clean diesel system designed to meet near zero emissions standards. With the introduction of lower sulfur diesel fuel came the ability to use a number of exhaust aftertreatment options such as diesel particulate filters (DPF), exhaust gas recirculation (EGR), diesel oxidation catalysts (DOC), and selective catalyst reduction (SCR) with the use of diesel exhaust fluid (DEF) that can be sensitive to the sulfur levels in the fuel.

The installation of various emission control technologies may also improve emissions from older diesel engines through retrofit capabilities. Read more about retrofit capabilities to reduce emissions from older vehicles and equipment (/retrofit).

104. A document entitled "Diesel: Fueling the Future in a Green Economy," by Hart Energy Consulting, prepared for the DTF, October 13, 2010,[35] was posted on the DTF website and proclaimed that:

P. 3–"**Introduction of advanced diesel technology in 2007 that**

[35] http://www.dieselforum.org/files/dmfile/Diesel-FuelingtheFutureinaGreenEconomy.pdf, October 13, 2010 (last accessed July 6, 2020) (emphasis added, *infra*).

relied on ultra low sulfur clean diesel fuel has today reduced emissions of particulate matter and nitrogen oxides—an ozone precursor—by more than 98% in heavy-duty truck applications compared to 2000 models. It has enabled introduction of high performance diesel cars, trucks and SUVs that are cleaner, quieter and safer than ever."

P. 9–"**Fuel economy advantages of 20% to 35% for diesel fuel/engines over gasoline vehicles will also provide options for meeting low carbon fuel objectives and reducing GHG emissions**. California has initiated a low carbon fuel initiative and the U.S. EPA has promulgated its first GHG control requirements in the form of vehicle CO_2 reduction regulations. Congress continues to debate on climate change and related GHG initiatives."

P. 10–"**These new levels of near-zero emissions are being met through advancements in the engine fuel and air management systems that dramatically improve combustion efficiency, and the use of ultra-low sulfur diesel fuel that enables the use of high efficiency exhaust control**. As a result, new trucks and buses are more than 98% cleaner than 2000-era models (Figure 3). In fact, results from the first phases of joint government and industry research (Advanced Collaborative Emissions Study, ACES) have demonstrated that the emissions reductions from these technologies have actually exceeded requirements, providing substantially greater performance and benefits than anticipated."

P. 11–"While new engines are now on a path to near-zero emissions, **the widespread availability of cleaner diesel fuel has created new and substantial efforts to modernize and upgrade emissions performance of existing engines and equipment**. A 2009 Report to Congress by U.S. EPA on results of the first year of a federal program to fund diesel retrofits (Diesel Emissions Reduction Program) found it to be among the most cost effective clean air programs, yielding over $13 in environmental and public health benefits for each $1 invested."

P. 27–"**The diesel industry is in the midst of implementing advanced engine and emissions control technology that will lower emissions from on-road vehicles and non-road machines and equipment by more than 98% relative to 2000 era technology. Continued investments and research to further increase fuel efficiency while lowering emissions will keep diesel engines for light duty vehicles competitive with other technologies.**"

8. Bosch's CEO Has Admitted Bosch Made Software That Allowed Emission Manipulation

105. At Bosch's April 25, 2018 annual meeting, its CEO made two statements that are admissions of Bosch's involvement in emissions cheating. First he stated Bosch "now" has the technology to meet standards and that the Bosch software would be made so that it will not recognize test cycles or allow cheating ("optimizing"):

> "With this new exhaust technology, blanket driving bans in the centers of the world's major cities will no longer be an issue. Why? Because we now have the technology to resolve the problem of nitrogen oxides in road traffic," Denner said. The system will be for new diesel cars and can't be retrofitted, a company spokesman said by phone.

106. Bosch's CEO further stated:

> "…the company is prohibiting technology that recognizes test cycles and its products aren't allowed to be optimized for test situations any more. Regulators have stepped up efforts to narrow the gap between official emission labels based on lab tests and real driving emissions."

C. The Bosch EDC17

107. All modern engines are integrated with sophisticated computer components to manage the vehicle's operation, such as an EDC. Bosch GmbH tested, manufactured, and sold the EDC system used by Volkswagen, FCA, Mercedes, and others. This system is referred to more formally to as the Electronic Diesel Control Unit 17 ("EDC17"). Upon its introduction, the EDC17 was publicly touted by Bosch as follows:[36]

> EDC17…controls every parameter that is important for effective, low-emission combustion.
>
> Because the computing power and functional scope of the new EDC17 can be adapted to match particular requirements, it can be used very flexibly in any vehicle segment on all the world's markets. In addition to controlling the precise timing and quantity of injection,

[36] Bosch press release, *The brain of diesel injection: New Bosch EDC17 engine management system* (Feb. 28, 2006), http://www.bosch-presse.de/presseforum/details.htm?txtID=2603&locale=en (copy archived Apr. 23, 2016 at http://web.archive.org/web/20160423201504/http://www.bosch-presse.de/presseforum/details.htm?txtID=2603&locale=en (last accessed July 14, 2020)).

> exhaust gas recirculation, and manifold pressure regulation, it also offers a large number of options such as the control of particulate filters or systems for reducing nitrogen oxides. The Bosch EDC17 determines the injection parameters for each cylinder, making specific adaptations if necessary. This improves the precision of injection throughout the vehicle's entire service life. The system therefore makes an important contribution to observing future exhaust gas emission limits.

108. Bosch's EDC17 controlled emissions by periodically reading sensor values, evaluating a control function, and controlling actuators based on the control signal.[37] Sensor readings included crankshaft position, air pressure, air temperature, air mass, fuel temperature, oil temperature, coolant temperature, vehicle speed, exhaust oxygen content, as well as driver inputs such as accelerator pedal position, brake pedal position, cruise control setting, and selected gear. Based on sensor input, EDC17 controlled and influenced the fuel combustion process including, in particular, fuel injection timing, which affected engine power, fuel consumption, and the composition of the exhaust gas.[38]

109. Both the design and implementation of the Bosch ECU, including the EDC17, are interactive processes, requiring Bosch's close collaboration with the automaker from beginning to end.

D. Bosch Worked With Mercedes To Defraud Arizona Consumers

110. Bosch worked with Mercedes and utilized the EDC17 to create a unique set of specifications and software code to manage Mercedes' engines operation.

111. The software calibrations were an interactive process between Bosch and Mercedes. Bosch employees used email to communicate regularly with Mercedes' employees over various changes to various code functions such as "T-Eng," sensor faults, online dosing, and other software parameters.

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[37] Moritz Contag, *et al.*, How They Did It: An Analysis of Emission Defeat Devices in Modern Automobiles, p.4 (2017).

[38] *Id.*

112. Bosch employees also regularly communicated with Mercedes employees concerning dosing rates into the Selective Catalytic Reduction ("SCR")[39] catalyst and the impact of such on NOx emissions. And Bosch employees regularly communicated with Mercedes' employees about presentations to the EPA and CARB concerning Mercedes' ability to meet emissions standards.

113. With respect to the Affected Mercedes Vehicles, Mercedes and Bosch used the EDC17 surreptitiously to evade emissions regulations. Mercedes and Bosch worked together to develop and implement a specific set of software algorithms for implementation in the Affected Mercedes Vehicles, including algorithms to adjust fuel levels, exhaust gas recirculation ("EGR"), air pressure levels, and urea injection rates in vehicles equipped with SCR systems.[40]

114. When carmakers test their vehicles against EPA emission standards, they place their vehicles on dynamometers (large rollers) and then perform a series of specific maneuvers prescribed by federal regulations. Bosch's EDC17 gave manufacturers the power to detect test scenarios by monitoring vehicle speed, acceleration, engine operation, air pressure, and even the position of the steering wheel. When the EDC17's detection algorithm detected that the vehicle was on a dynamometer (and undergoing an emission test), additional software code within the EDC17 downgraded the engine's power and performance and upgraded the emission control systems' performance by switching to a "dyno calibration" mode to cause a subsequent reduction in emissions to legal levels. Once the EDC17 detected that the emission test was complete, the EDC would then enable a different "road calibration" mode that caused the engine to return to full

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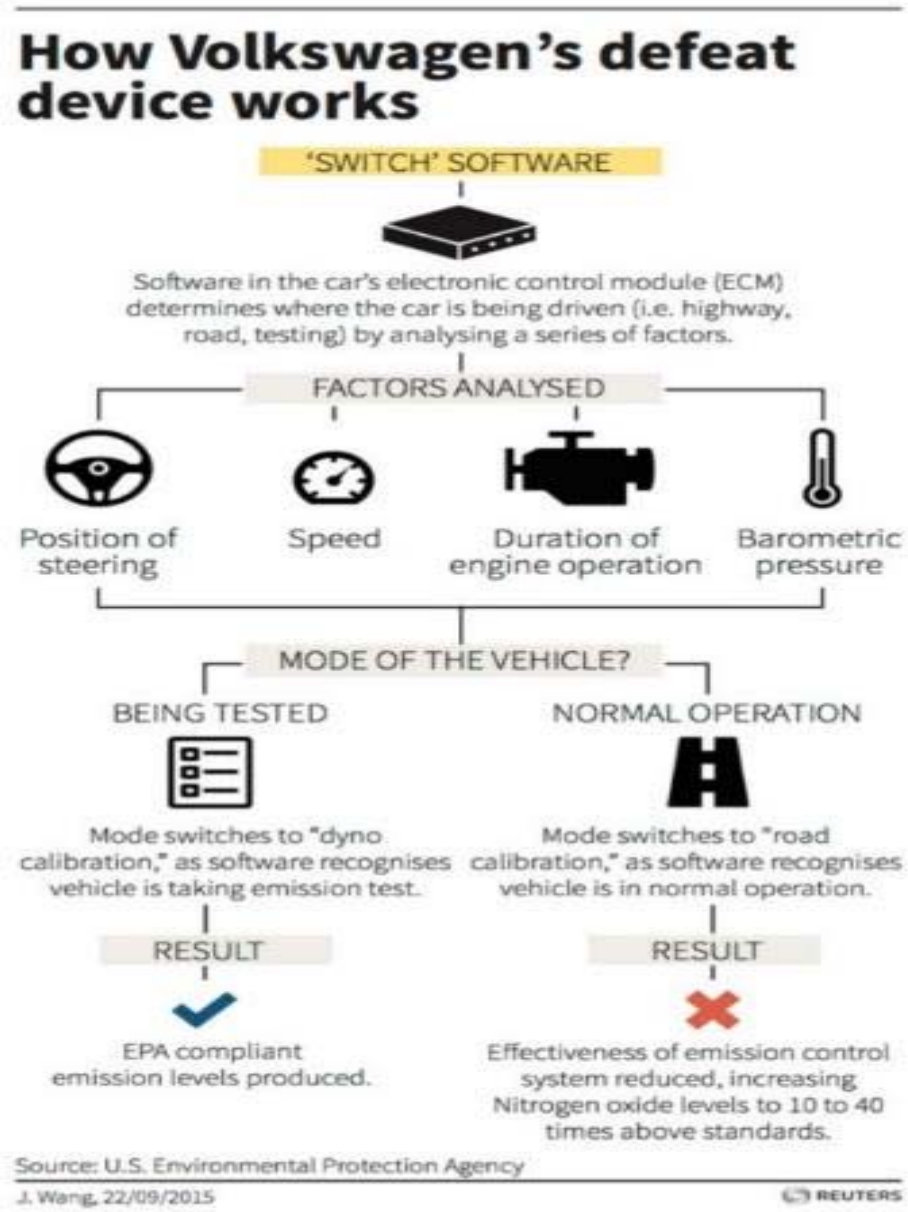
[39] A SCR system is an active emissions control technology that injects a liquid-reductant agent into the exhaust stream of a diesel engine to reduce NOx emissions.

[40] *Engine management*, Bosch Auto Parts, http://de.boschautomotive.com/en/_parts_and_accessories/motor_and_sytems/diesel/engine_management_2/engine_control_unit_1 (describing capabilities of Bosch EDC units) (March 26, 2016) (copy archived Mar. 26, 2016 at https://web.archive.org/web/20160326001420/http://de.bosch-automotive.com:80/en/parts_and_accessories/motor_and_sytems/diesel/engine_management_2/engine_control_unit_1 (last visited July 14, 2020)).

power while reducing the emission control systems' performance, and consequently caused the vehicle to spew far higher levels of illegal NOx emissions out on the road in certain conditions.[41] This process is illustrated in the following diagram, using Volkswagen merely for illustration, but applicable to the Affected Mercedes Vehicles:

[41] Russell Hotten, *Volkswagen: The scandal explained*, BBC (Dec. 10, 2015), http://www.bbc.com/news/business-34324772..http://www.bbc.com/news/business-34324772 (last visited July 6, 2020).



115. Mercedes' partnership with Bosch enabled this illegal workaround, and Bosch enjoyed a substantive portion of its annual revenue from manufacturing parts used in the Affected Mercedes Vehicles.[42] Bosch knew that Mercedes was using its emission control components as a

[42] Approximately 50,000 of Bosch's 375,000 employees worked in the diesel technology operations branch of Bosch, and Volkswagen was the biggest diesel manufacturer in the world. *Bosch probes whether its staff helped VW's emissions rigging*, AUTOMOTIVE NEWS (Jan. 27, 2016), *available at* http://www.autonews.com/article/20160127/COPY01/301279955/bosch-probes-whether-its-staff-helped-vws-emissions-rigging (last visited July 6, 2020).

cheat device and, in fact, worked with Mercedes to develop the software algorithms specifically tailored for the Affected Mercedes Vehicles.

116. Defendants understood that promoting Mercedes' BlueTEC Clean Diesel vehicles and technology as environmentally superior to gasoline cars would be material to a reasonable consumer interested in environmental issues with respect to a decision to purchase or lease a car.

117. Mercedes' customers expected "exceptional environmental sustainability."[43] In a 2008 press release, the Mercedes Defendants acknowledged that "the environmental sustainability of vehicles is gaining importance in the purchasing decision."[44]

118. To induce consumers to purchase BlueTEC Clean Diesel vehicles, the Mercedes Defendants marketed the BlueTEC-equipped vehicles as environmentally friendly and fuel efficient "without the need to forego the characteristic brand features—safety, comfort and refined driving pleasure."[45]

119. The Mercedes Defendants' advertising was widely disseminated throughout the United States and Arizona. It included, among other things, televised advertisements, online social media campaigns, press releases and public statements, print advertising, brochures and other

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[43] Press Release, Mercedes-Benz, Mercedes-Benz launches "Formula Green" in the five, four and three-litre consumption class, (March 2, 2010) *available at* http://media.daimler.com/dcmedia/0-921-658901-1-1277592-1-0-0-0-0-1-0-0-0-1-0-0-0-0-0.html (copy available at https://media.daimler.com/marsMediaSite/en/instance/ko.xhtml?oid=9907989&ls=L2VuL2luc3RhbmNlL2tvLnhodG1sP29pZD05MjY2NzExJnJlbElkPTYwODI5JmZyb21PaWQ9OTI2NjcxMSZib3JkZXJzPXRydWUmcmVzdWx0SW5mb1R5cGVJZD00MDYyNiZ2aWV3VHlwZT1saXN0JnNvcnREZWZpbml0aW9uPVBVQkxJU0hFRF9BVC0yJnRodW1iU2NhbGVJbmRleD0wJnJvd0NvdW50c0luZGV4PTUmZnJvbUluZm9UeXBlSWQ9NDA2Mjg!&rs=4 (last visited July 6, 2020)).

[44] Press Release, Mercedes-Benz, Road to the Future: From BlueTEC Diesel Vehicles to Electric Vehicles: Modular Technologies for a Clean Future of the Premium Automobile, http://media.daimler.com/dcmedia/0-921-657591-1-1091617-1-0-1-0-0-1-12639-0-0-1-0-0-0-0-0.html?TS=1459448202325. For this citation that is no longer active, a copy will be produced to Defendants.

[45] *Id.*

materials distributed to dealers and distributors, and strategic product placement (for instance, a Mercedes fleet of "low-emission" vehicles, including the E320 BlueTEC Clean Diesel, shuttled superstar musicians at each of the eight 2007 Live Earth climate protection concerts, two of which took place in the United States[46]).

1. The Mercedes Defendants Advertised And Promoted BlueTEC Clean Diesel Vehicles As Low-Emitting

120. The Mercedes Defendants' advertisements, promotional campaigns, and public statements disseminated in Arizona and across the country represented that the Affected Mercedes Vehicles had high fuel economy, low emissions, reduced NOx by 90%, had lower emissions than comparable diesel vehicles, and had lower emissions than other comparable vehicles. For example:

a) According to the Mercedes Defendants, they offered consumers "the world's cleanest diesel automobiles."[47]

b) The Mercedes Defendants promised that BlueTEC Clean Diesel vehicles have "ultra-low emissions,"[48] with "up to 30% lower greenhouse-gas emissions than gasoline."

c) On its website, the Mercedes Defendants depicted a BlueTEC Clean Diesel SUV driving next to a shoreline with ebullient waves under a clear-blue sky. In a faded-blue portion in the vehicles' path, the Mercedes Defendants ask

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[46] Press Release, Mercedes-Benz, Phil Collins, Jon Bon Jovi, Snoop Dogg and the Black Eyed Peas Join Smart to Protect the Environment, http://media.daimler.com/dcmedia/0-921-1653632-1-893475-1-0-0-0-0-1- 0-0-0-1-0-0-0-0-0.html (last accessed March 31, 2016). For this citation that is no longer active, a copy will be produced to Defendants.

[47] *Id.*

[48] *E.g.*, 2011 GL Class Brochure, p. 5 ("Advanced BlueTEC technology starts with cleaner combustion of its diesel fuel, and finishes with certified Ultra Low Emissions, even in the most stringent U.S. states."), http://www.auto-brochures.com/makes/Mercedes_Benz/GL-Class/Mercedes%20Benz_US%20GL-Class_2011.pdf (last visited July 6, 2020).

consumers to "imagine a fuel that produces fewer greenhouse gases than gasoline."[49]

d) The Mercedes Defendants claimed that BlueTEC Clean Diesel produces up to 90% fewer emissions than equivalent gas-powered vehicles,[50] and converts nitrous oxide emissions into "pure, earth-friendly nitrogen and oxygen."[51]

e) In a technical explanation of BlueTEC Clean Diesel on its website, the Mercedes Defendants told consumers that their technology "reduces Nitrogen Oxides by up to 80%"[52]

f) The Mercedes Defendants proclaimed itself "#1 in CO_2 emissions for luxury vehicles."[53]

g) The Mercedes Defendants' web site proclaimed:

> Mercedes-Benz continues to reinvent this alternative fuel that offers higher torque and efficiency with up to 30% lower greenhouse-gas emissions than gasoline.
>
> Today's BlueTEC models are simply the world's most advanced diesels, with the ultra-low emissions, high fuel economy and responsive performance that makes them not merely available in all 50 states, but desirable.
>
> ***Earth-friendly, around the world***

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[49] *BlueTEC Clean Diesel*, https://www.mbusa.com/mercedes/benz/green/diesel_bluetec (last visited March 29, 2016).

[50] *E.g.*, 2016 Sprinter Van Brochure, p. 2 http://assets.mbvans.com/Mercedes-Benz-Vans/Brochures/Mercedes-Benz-Sprinter-Vans-Brochure.pdf (last visited July 6, 2020).

[51] *E.g.*, 2011 M-Class Brochure, p. 5 http://www.auto-brochures.com/makes/Mercedes_Benz/M-Class/Mercedes%20Benz_US%20M-Class_2011.pdf (last visited July 6, 2020).

[52] How Mercedes-Benz BlueTEC Works—Clean Diesel Technology, Mercedes-Benz Official YouTube Channel, https://youtu.be/w4T5B_UmgJo (the video was taken down from the website at an unknown date).

[53] *BlueTEC Clean Diesel* https://www.mbusa.com/mercedes/benz/green/diesel_bluetec (last visited March 29, 2016) (copy archived Mar. 26, 2016 at http://web.archive.org/web/20160326211520/https://www.mbusa.com/mercedes/benz/green/diesel_bluetec (last visited July 14, 2020)).

THE LEADER IN DIESEL, SINCE THE BEGINNING.

Drivers in much of Europe and Asia frequently choose diesel over gasoline for its rich torque output and higher fuel efficiency. With BlueTEC, cleaner emissions are now an equally appealing benefit.

ADAC, Germany's largest automobile association, rates BlueTEC as #1 in CO_2 emissions for luxury vehicles.

h) One BlueTEC Clean Diesel advertisement depicted two rear mufflers side-by-side in the shape of human lungs. The caption underneath claims that BlueTEC is "For the air we breathe."

121. Mercedes held itself out as protectors of the environment: "Long before it became front-page news, Mercedes-Benz has been innovating and implementing new ways to help minimize the impact of cars and trucks on the world we share. It's a promise that's been kept for generations, and not just with cleaner, more efficient power under the hood."[54] Indeed, the company relished its message that it played an industry-leading role in advancing "green" technologies like BlueTEC Clean Diesel.

122. BlueTEC is part of a lineup of Mercedes technologies that it said were "green."[55] Mercedes widely disseminated advertisements, promotional campaigns, and public statements throughout the United States to induce the purchase of BlueTEC Clean Diesel vehicles by customers that are concerned about the environment. For example:

a) Mercedes called its BlueTEC engine, "[e]arth-friendly, around the world."[56]

b) A promotional video created for Mercedes in 2009 opened with the camera pointing up to the sky with rays of sun coming through clouds. "The Earth," says the narrator "is changing." He then told us that Mercedes-Benz BlueTEC was "cleaner … and—with a revolutionary system which significantly reduces

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[54] *Mercedes-Benz & The Environment*, https://www.mbusa.com/mercedes/benz/green#main (last visited March 31, 2016).

[55] *Id.*

[56] *BlueTEC Clean Diesel*, https://www.mbusa.com/mercedes/benz/green/diesel_bluetec (last visited March 29, 2016).

greenhouse gases and smog-forming pollutants—more respectful of the earth."[57]

c) A technical description of BlueTEC available on the Mercedes-Benz website closed with, "BlueTEC—the world's cleanest diesel engines. Environmentally-friendly technology, without sacrificing performance or driving pleasure."[58]

d) Mercedes claimed in a brochure for the 2016 Sprinter that, "Thanks to BlueTEC clean diesel technology, the Sprinter is one of the greenest vans in the land."[59]

e) Mercedes strategically placed its BlueTEC Clean Diesel vehicles among a fleet of Mercedes-Benz vehicles that shuttled superstar musicians like Bon Jovi, Snoop Dogg, The Police, Kanye West, and others at the 2007 Live Earth climate protection concerts. Live Earth attendees were asked to pledge that they would take personal action to solve the climate crises and "buy from businesses…who share my commitment to solving the climate crises."[60]

f) A 2009 website designed for Mercedes-Benz pictured a 2009 ML320 BlueTEC Clean Diesel driving in the sky through clouds, with the title, "Why you should go BLUE if you want to go green."[61] The site promised consumers "an environmentally-smart solution that doesn't demand sacrifices." On information and belief, this design was disseminated to U.S. consumers by Mercedes-Benz U.S. via its website in or around 2009.

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[57] Studio Dialog, Video for Mercedes-Benz BlueTEC, *available at* https://vimeo.com/8989688.

[58] How Mercedes-Benz BlueTEC Works—Clean Diesel Technology, Mercedes-Benz Official YouTube Channel, https://youtu.be/w4T5B_UmgJo (the video was taken down from the website at an unknown date).

[59] 2016 Sprinter Van Brochure, p. 2 http://assets.mbvans.com/Mercedes-Benz-Vans/Brochures/Mercedes-Benz-Sprinter-Vans-Brochure.pdf (last visited July 6, 2020).

[60] *Gore Urges "7 Point Pledge" Ahead of Live Earth*, Associated Press, June 29, 2007 *available at* http://www.nbcnews.com/id/19502465/ns/us_news-environment/t/gore-urges-point-pledge-ahead-live-earth/# (last visited July 6, 2020).

[61] Portfolio of Chris Lacey, Mercedes-Benz BlueTEC, http://www.chrislacey.net/354/uncategorized/mercedes-benz-bluetec (last visited July 6, 2020).

2. The Mercedes Defendants Advertised And Promoted BlueTEC Clean Diesel As Meeting And Exceeding Compliance With U.S. Emissions Standards In All 50 States

123. The Mercedes Defendants also expressly marketed the Affected Mercedes Vehicles as "clean diesel" vehicles, with registration approvals in all 50 states. For example:

a) Mercedes' website proudly presented "BlueTEC: … now available in five different Mercedes-Benz BlueTEC models in all 50 states."[62]

b) A June 2008 press release boasted that Mercedes-Benz was the first manufacturer in the world to achieve registration approval in all 50 states for Diesel SUVs.[63]

c) In an April 2009 interview about the Mercedes-Benz E Class, Professor Dr. Herbert Kohler, Chief Environmental Officer at Daimler AG, claimed that Mercedes-Benz "***goes beyond statutory requirements***," because "sustainable mobility means more than the mere fulfillment of rigid environmental guidelines" (emphasis added).[64]

E. Emission Test Cycles And Emission Standards

124. As will be shown below, Defendants' claims about the Affected Mercedes Vehicles' characteristics were false and deceptive, and also involved the concealment, suppression, and omission of material facts with the intent that others rely. To effectuate their consumer fraud, Defendants employed a cheat device to make the Affected Mercedes Vehicles appear to emit low levels of pollution when under certain testing conditions; but, in actual driving conditions, the vehicles emitted much higher levels. This fraud, which has now been exposed, violated the Arizona Consumer Fraud Act.

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[62] *Mercedes-Benz & The Environment,* https://www.mbusa.com/mercedes/benz/green#module-2 (last visited March 31, 2016). For this citation that is no longer active, a copy will be produced to Defendants.

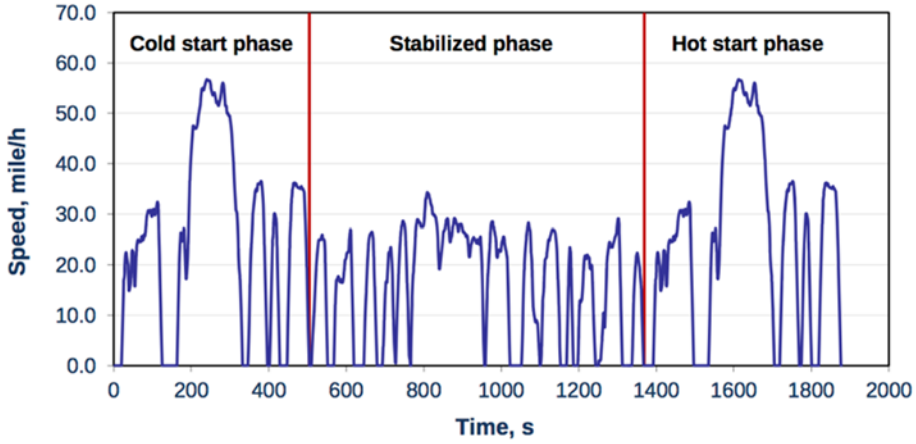
[63] Press Release, Mercedes-Benz, Road to the Future: From BlueTEC Diesel Vehicles to Electric Vehicles: Modular Technologies for a Clean Future of the Premium Automobile, *available at* http://media.daimler.com/ dcmedia/0-921-657591-1-1091617-1-0-1-0-0-1-12639-0-0-1-0-0-0-0-0.html?TS=1459448202325 (last visited March 31, 2016). For this citation that is no longer active, a copy will be produced to Defendants.

[64] Life Cycle, Environmental Certificate for the E-Class, p. 6 (April 2009). For this citation that is no longer active, a copy will be produced to Defendants.

1. Government Testing Was Performed Using FTP-75 And A Dynamometer

125. To test whether vehicles comply with emissions requirements, government agencies use emissions test cycles. An emissions test cycle defines a protocol that enables repeatable and comparable measurements of exhaust emissions to evaluate compliance. The protocol specifies all conditions under which the engine is tested, including lab temperature and vehicle conditions. Most importantly, the test cycle defines the speed and load over time that is used to simulate a typical driving scenario. An example of a driving cycle is shown in Figure A. This graph represents the FTP-75 (Federal Test Procedure) cycle that has been created by the EPA and is used for emission certification and fuel economy testing of light-duty vehicles in the U.S. The cycle simulates an urban route with frequent stops, combined with both a cold and a hot start transient phase. The cycle lasts 1,877 seconds (about 31 minutes) and covers a distance of 11.04 miles (17.77 km) at an average speed of 21.2 mph (34.12 km/h).

Figure A



126. Besides urban test cycles such as FTP-75, there are also cycles that simulate driving patterns under different conditions. To assess conformance, several of these tests are carried out on a chassis dynamometer, a fixture that holds a car in place while allowing its drive wheel to turn with varying resistance. Emissions are measured during the test and compared to an emissions standard that defines the maximum pollutant levels that can be released during such a test. In the U.S., emissions standards are managed on a national level by the EPA. In addition, California has its own emissions standards that are defined and enforced by CARB. California standards are also used by a number of other states ("Section 177" states). Together with California, these states

cover a significant fraction of the U.S. market, making them a de facto second national standard. In Europe, the emissions standards are called Euro 1 through Euro 6, where Euro 6 is the most recent standard in effect since September 2014.

127. The FTP-75 is the primary dynamometer cycle used to certify the light- and medium-duty passenger cars/trucks. This cycle is primarily a dynamic cycle, with rapid changes in speed and acceleration meant to reflect city driving along with some steadier higher speed sections meant to account for some highway driving.

128. One critically important thing to understand about the FTP-75 is that it is a "cold start" cycle. That means the vehicle starts the cycle with the engine having been off for at least eight hours and in a completely cold state. The "cold start" portion of the test is challenging for diesel engines employing SCR because catalysts meant to control emissions are not yet at temperatures where they work (*i.e.*, above their "light-off" temperature).

2. Researchers Tested Vehicles Under Different Conditions Using A Different Testing Technology—PEMS—And Discovered Discrepancies, Ultimately Leading To One Of The Biggest Scandals In The History Of The Automotive Industry

129. The green bubble with respect to diesel vehicles popped on September 18, 2015, when the EPA issued a Notice of Violation of the Clean Air Act (the "First NOV") to Volkswagen AG and/or certain of its affiliates for installing illegal "defeat devices" in 2009-2015 Volkswagen and Audi diesel cars equipped with 2.0-liter diesel engines. A defeat device, as defined by the EPA, is any apparatus that unduly reduces the effectiveness of emissions control systems under conditions a vehicle may reasonably be expected to experience. The EPA found that the Volkswagen/Audi defeat device allowed the vehicles to pass emissions testing but in the real world these vehicles polluted far in excess of emissions standards.

130. This was exposed by researchers at West Virginia University testing certain vehicles "on the road" rather than only in laboratory conditions, and discovering huge discrepancies between the actual amount of NOx emitted and what the laboratory conditions suggested would be emitted.

131. On September 22, 2015, Volkswagen announced that 11 million diesel cars worldwide were installed with the same cheat device software that had evaded emissions testing by U.S. regulators. Volkswagen pled guilty to criminal charges and settled civil class actions for over ten billion dollars.[65]

132. Volkswagen wasn't alone—soon, government agencies began to reveal that other manufacturers both in the U.S. and in Europe had produced dozens of models that were exceeding emissions standards. On January 12, 2017, the EPA issued a Notice of Violation to Fiat Chrysler America relating to emissions from its popular Dodge Ram 1500 and Jeep Grand Cherokee vehicles, and on May 23, 2017, the United States filed a civil suit in the Eastern District of Michigan alleging violations of the Clean Air Act (E.D. Mich. No. 2:17-cv-11633).

F. The Affected Mercedes Vehicles Contained A Shut-Off Device To Mask Their True Emissions Characteristics, Similar To The Volkswagen Vehicles

133. Just as with Volkswagen and other manufacturers, expert testing shows that the Affected Mercedes Vehicles emitted much higher levels of pollution in real world vs. specific testing conditions. Defendants' manipulations of the BlueTEC Clean Diesel emission controls put the lie to the Mercedes Defendants' claims that BlueTEC Clean Diesel was "the world's cleanest diesel passenger vehicle" with "ultralow emissions." Defendants misrepresented and concealed the true emissions performance of the Affected Mercedes Vehicles equipped with BlueTEC engines because of its manipulations that limited emission controls in normal driving conditions.

134. Each of the Affected Mercedes Vehicles tested in this Complaint was tested over a variety of conditions using a Portable Emission Measurement System ("PEMS"). PEMS is a collection of measurement devices that allow the measurement of gaseous vehicle emissions of oxides of nitrogen, total hydrocarbon, methane, carbon monoxide, and carbon dioxide as well as particulate matter (PM) emissions during on-road driving of light- and heavy-duty vehicles. The system is essentially a "portable laboratory" that allows measurement of emissions outside of a

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[65] *See* Nathan Bomey, *Volkswagen Emission Scandal Widens: 11 Million Cars Affected*, USA Today (Sept. 22, 2015), http://www.usatoday.com/story/money/cars/2015/09/22/volkswagen-emissions-scandal/72605874/ (last visited July 14, 2020).

conventional chassis dynamometer-based laboratory setting of the type used for certification testing. The results of all tests by experts for the respective vehicles are included herein. No test results regarding these vehicles were omitted from the Complaint.

135. These systems are highly accurate when compared to conventional chassis dynamometer tests used for vehicle emissions certification. In fact, their accuracy is such that they are currently integrated into the European vehicle emission certification process to test real driving emissions. Both EPA and CARB employ PEMS as part of the heavy duty in-use compliance program to measure emissions against the not to exceed standards, where procedures have been codified in the code of federal regulations. Furthermore, both CARB and EPA make wide use of PEMS to evaluate vehicles for the presence of cheat devices. One such study, published by the Center for Alternative Fuels Engines and Emissions (CAFEE) in collaboration with CARB, made heavy use of PEMS to discover the presence of cheat devices in Volkswagen Diesels.[66]

136. PEMS has been used since the 1990s to measure real-world vehicle emissions performance. These systems are manufactured by highly respected and well-established emissions measurement equipment suppliers like AVL, Horiba, and Sensors Incorporated. All three of these companies are leading suppliers of emissions measurement systems used for vehicle and engine certification, and they bring their experience in conventional emissions analyzers to bear in designing PEMS. Conventional gas analysis systems are very large and complex. Since the years when chassis dynamometer testing was originally introduced, advances in analyzer technologies over the past three decades have allowed for the miniaturization of conventional laboratory analyzers, yielding major size and weight reductions. These technological advances made it possible for high-accuracy emissions analyzers to be deployed on vehicles while driving on the road outside of the laboratory setting.

137. Conventional emissions testing used for certification of vehicles is performed on a chassis dynamometer. The dynamometer is a "treadmill" for the driven wheels of a vehicle. The

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[66] Thompson, Gregory J., *et. al.* "In-Use Emissions Testing of Light-Duty Diesel Vehicles in the United States," CAFEE publication, May 15, 2014, https://theicct.org/sites/default/files/publications/WVU_LDDV_in-use_ICCT_Report_Final_may2014.pdf (last visited July 6, 2020).

driven wheels are placed on rollers attached to one of more flywheels and an electric motor capable of simulating the forces on the vehicle during real-world driving on the road. The chassis dynamometer simulates inertial forces (*i.e.*, the resistance to acceleration or deceleration from the vehicle's weight), static friction, rolling resistance, and aerodynamic drag. When properly calibrated, the chassis dynamometer will simulate real-world driving with a high degree of accuracy. A "coastdown" procedure is used to verify that rolling resistance and drag are accurately simulated. However, the inertial load simulation requires very rapid and precise response from the electric motor for high accuracy. Slow responding systems can under-load the vehicle during acceleration. By contrast, real-world inertial forces on the vehicle are inherent in PEMS testing since this testing is conducted on the road in normal driving.

138. The analyzers used to measure gaseous emissions in the chassis dynamometer setting are accurate to within 1% of the full measurement scale. These analyzers are calibrated before and after each emissions test to ensure that they deliver a high level of accuracy and that the calibration does not appreciably change (or drift) during the emissions test. Furthermore, analyzers undergo monthly 10-point calibrations to ensure their response is accurate throughout the measurement range of each analyzer. These measurements are supplemented with high precision measurement of ambient temperature and relative humidity. NOx is adjusted for those values.

139. PEMS analyzers are subject to the same requirements. In fact, analyzers used by the experts have an accuracy of 0.3% of full scale, well within the 1% requirement used for chassis dynamometer analyzers. These analyzers are also subject to the same monthly 10-point calibration to ensure accuracy throughout the measurement range. The analyzers are calibrated before and after each test to ensure that they are both accurate and free of excessive drift. Drift has been shown to be far less than 1%, even after several hours of testing. PEMS also employs high-accuracy temperature and relative humidity measurements to adjust NOx.

140. Put simply, the analyzers used in chassis dynamometer testing and PEMS testing have virtually identical levels of accuracy and are subject to the same strict requirements for calibration and drift.

141. One primary difference between PEMS and chassis dynamometer emissions testing is that the latter mixes the raw exhaust with ambient air in a dilution tunnel to simulate the effects of vehicle exhaust mixing with ambient air immediately after emission from the tailpipe. In the case of PEMS, the raw exhaust emissions are measured. The dilution tunnel has the largest effect on particulate matter measurements, where sulfate and hydrocarbon aerosols may be formed during the dilution process, thereby increasing particulate matter emissions. In modern diesels using low-sulfur fuels, these effects are much less important than in the past, where hydrocarbon and sulfate formation was much higher. The effect on gaseous pollutants, and in particular NOx, is negligible. Therefore, the raw gas measurement of NOx taken during PEMS testing will closely match the diluted exhaust measurement taken in a dilution tunnel.

142. A wide variety of studies have been performed over the years to validate the accuracy of PEMS. One such study, conducted by experts at Ricardo UK, one of the world's leading vehicle research and development companies, concluded that "NOx emissions agreed within ~10% across a wide range of values."[67] When considering that cheat devices result in emissions that are often several times, or even orders of magnitude, higher than the relevant emissions standards, this level of agreement with chassis dynamometer emissions measurement is more than sufficient to identify the presence of cheat devices and to quantify the effects. PEMS tested also recently triggered a recall by CARB of 500,000 trucks with Cummins engines.[68]

143. That being said, test conditions are highly controlled in a chassis dynamometer laboratory setting. Ambient temperature, wind, and road quality are consistent from test to test. Although PEMS measures emissions with a high degree of accuracy, great care must be taken to ensure that the driving conditions are representative, consistent, and can be compared to the emission standards in a meaningful way. However, a well-designed PEMS test program can

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[67] Anderson, Jon, *et. al.*, "On-Road and Chassis Dynamometer Evaluations of Emissions from Two Euro 6 Diesel Vehicles," SAE 2014-01-2826, October 2014.

[68] *See CARB Investigation Leads to nationwide recall of 500,000+ Cummins Heavy-Duty Trucks*, https://ww2.arb.ca.gov/news/carb-investigation-leads-nationwide-recall-500000-cummins-heavy-duty-trucks (last visited July 6, 2020).

account for ambient temperature, traffic variability, relative positive acceleration (RPA—*i.e.*, the "hardness" or "softness" of the driver's driving style), road quality, and wind speed. The effect of wind speed, in particular, can be averaged out by conducting a large number of tests with variable wind conditions. Tests are typically repeated dozens of times, with careful attention paid to, among other things, the average cycle speed, ambient temperature, RPA, and road grade.

144. In order to perform chassis dynamometer testing to certify a vehicle, on-road data must be collected for each vehicle that is tested to obtain a proper model of the vehicle's rolling resistance and aerodynamic drag (called the vehicle's "road load model"). This procedure is conducted over the road and must be repeated multiple times to account for the effects of variable wind speeds and directions. This kind of repetition is no different than that required to average out the effects of wind speed during PEMS testing.

145. For the chassis dynamometer to simulate real-world driving accurately, the testing conducted over the road to create the road load model must be generated with great care, accounting for effects like tire pressure, drive train resistance, state of maintenance, vehicle inertial load, et cetera—the same issues that must be addressed when conducting PEMS tests.

146. Furthermore, it is possible to re-create virtually any chassis dynamometer certification cycle over the road using a PEMS by simply following the same vehicle speed cycle in a carefully controlled setting. Special test software has been developed by experts to allow these test cycles to be performed on the road. In the case of medium-duty passenger vehicles, like the Dodge Ram 2500/3500, it is virtually impossible to test the full combined weight rating of 24,000 pounds on a chassis dynamometer, as most of these dynamometers either lack the ability to simulate those inertial loads or maintain traction of the driven wheels on the dynamometer roller (or rollers) during testing. For the same reason, sharp accelerations and aggressive driving can be problematic for these heavier vehicles.

147. High ambient temperatures can generally not be tested in a chassis dynamometer laboratory; the same is true of very low temperatures. During certification testing on the FTP-75 and the highway fuel economy standard test (HWFET), ambient temperature is controlled to a narrow window between 68°F and 86°F. PEMS testing can be conducted at a wide variety of

temperatures, which is important because many cheat devices are triggered based on changes in ambient temperature.

148. Importantly, it is often not possible to test conditions on a chassis dynamometer that might be experienced in the real world. As was discovered during the Volkswagen diesel scandal, the vehicle's engine control module can often detect that the vehicle is being tested on a chassis dynamometer. In addition to being able to detect that a certification test cycle is being run, as with Volkswagen, vehicles can use various sensors to determine the vehicle is on a chassis dynamometer. Types of algorithms used to detect a chassis dynamometer include, but are not limited to, the following:

a) driven wheels are moving but the front wheels are not turning, a condition only experienced on a chassis dynamometer;

b) on a 2-wheel drive vehicle, the driven wheels are moving but the non-driven wheels are not, a condition only experience on a chassis dynamometer; and

c) on a vehicle equipped with GPS, the vehicle's wheels are moving while the GPS position is not changing.

149. For this reason, while testing on a chassis dynamometer for cheat devices, it can never be ruled out that the vehicle can detect that it is being tested on a chassis dynamometer. Therefore, results from chassis dynamometer testing may be dramatically different than those measured in real-world driving. In contrast to chassis dynamometer testing, the vehicle cannot detect the presence of a PEMS. PEMS is not only accurate for detection and quantification of cheat devices, it is essential.

150. PEMS testing was also used by CAFEE at West Virginia University to test light duty vehicles under a contract from the International Council on Clean Transportation ("ICCT"). CAFEE relied primarily on PEMs testing and, in the process, uncovered the fact that Volkswagen vehicles were not meeting emissions standards. The ICCT contract with CAFEE mandates that CAFEE use PEMs.

G. Defendants' Emissions Deception

1. Expert Testing Of BlueTEC Clean Diesels In The United States

151. The following three Mercedes "clean diesel" vehicles were tested over the course of testing.

(1) 2013 Mercedes GLK250 BlueTEC

a. Approximately 39,000 miles (120,000-mile useful life).

b. OM651 2.1 Liter engine.

c. Clean vehicle record with no accidents and regular scheduled maintenance.

(2) 2012 Mercedes R350 BlueTEC

a. Approximately 45,000 miles (120,000-mile useful life).

b. OM642 3.0 Liter engine.

c. Clean vehicle record with no accidents and regular scheduled maintenance.

(3) 2014 Mercedes/Freightliner Sprinter 2500 BlueTEC (the 2.1-liter OM-651 engine variant)

a. Approximately 32,000 miles (150,000-mile useful life).

b. OM651 2.1 Liter engine.

c. Clean vehicle record with no accidents and regular scheduled maintenance.

152. All vehicle records were checked for proper maintenance history and to ensure the vehicles were accident free. The vehicles were loaded to the equivalent test weight listed in the EPA certification application for each vehicle. None of the vehicles displayed any fault codes or malfunction indicator lights (MILs) indicating there might have been a problem with the vehicle(s) and their emission systems.

2. All Vehicles Were Well Under The Useful Life Listed On Their Emissions Certificate

153. Emissions on all three vehicles were found to be well in excess of the relevant standards for emissions of nitrogen oxides (NOx). The excesses stem from a variety of cheat devices described for each vehicle below.

154. In general, the cheat devices triggered a reduction in performance of the two main NOx reduction systems in a "clean diesel" vehicle: 1) the exhaust gas recirculation (EGR) system and 2) the selective catalytic reduction ("SCR") system.

155. Exhaust gas recirculation feeds some of the exhaust gas back into the engine intake using a controllable valve that routes the exhaust from the exhaust manifold, through an EGR cooler, and into the engine intake. The mixture of exhaust gas with fresh incoming air reduces NOx generated in the cylinder during normal engine operation. The system can be shut off by completely closing the valve that allows exhaust gases to enter the intake. The amount of EGR can be controlled by opening the valve to a larger or smaller extent. A lower "percentage" of EGR indicates a valve that is more closed, which restricts the amount of EGR. Conversely, a high percentage indicates a high level of EGR. High EGR results in a more significant reduction in NOx emissions. Simply speaking, high EGR rates lead to lower NOx. The EGR rate is controlled by the engines' electronic control module (ECM), and can thus be programmed to behave in any way.

156. The SCR system is a catalyst through which all of the exhaust stream flows. When urea (sometimes called diesel exhaust fluid (DEF) or AdBlue) is injected into the tailpipe upstream of the SCR system, a reaction takes place on the surface of the catalyst to reduce NOx to nitrogen and water. With no urea present, the reaction will not take place, and no NOx reduction will occur over the SCR catalyst. Therefore, by changing the amount of urea injected, the effectiveness of the SCR system can be altered by the engine's ECM. If high levels of urea are injected, high NOx reduction occurs provided there is sufficient exhaust temperature. If no urea is injected, no NOx reduction takes place.

157. Exhaust gas temperatures were studied extensively for all three vehicles over a wide variety of operating conditions. Except in the most extreme conditions on hills in excess of 6% downhill and very briefly during startup, exhaust gas temperatures entering the SCR systems were well in excess of the light-off temperature (*i.e.*, the minimum temperature for the reaction to occur) required for successful SCR operation.

158. NOx emissions are first reduced in the engine cylinder by various means related to injection timing and engine design. The EGR system is the next system in line to reduce NOx coming out of the engine. The SCR system comes last in line.

159. In the case of all three vehicles, Mercedes manipulated the programming of the software to reduce EGR and SCR effectiveness at various times using cheat devices, AECDs (auxiliary emission control devices), which are not approved by the EPA or California Air Resources. The programming of these vehicles is meant to cheat the emissions certification standards.

160. The vehicles were tested with a PEMS as well as a chassis dynamometer running the federal certification FTP-75 and HWFET tests. The vehicles were outfitted with an on-board diagnostics (OBD) monitoring system to monitor data on the vehicle's ECM (e.g., EGR rate, exhaust gas temperatures, SCR inlet and outlet NOx, etc.).

161. The relative positive acceleration, a measurement of how aggressively the vehicle is being driven, was tracked for every test performed. The RPAs were kept well below the values experienced during the certification cycles, which means that the vehicles were driven less aggressively than the conditions experienced during certification. The results are therefore *conservative* and representative of "light footed" driving styles. It is anticipated that more aggressive driving styles would lead to even higher emission values than those presented below.

162. Furthermore, the vehicles tested were relatively "young" compared to their full useful life. It is anticipated that vehicles closer to full useful life will have experienced, among other things, degradation in the SCR catalyst as well as possible fouling of the EGR valve and cooler. This degradation would likely lead to higher NOx levels than those presented below as the vehicles approach their full useful lives.

163. Lastly, all vehicles were monitored for active regenerations, events where high exhaust temperatures are used to remove soot collected in the DPF. In general, NOx emissions increase dramatically during these infrequent events (though a high frequency of these events would be of great concern). These infrequent events are monitored and noted where relevant. They are not included in the analyses of cheat devices as they would confuse the data on the cheat

device strategy. For these three vehicles, active regenerations are so infrequent that they can be excluded from the analysis.

3. 2014 GLK250 BlueTEC

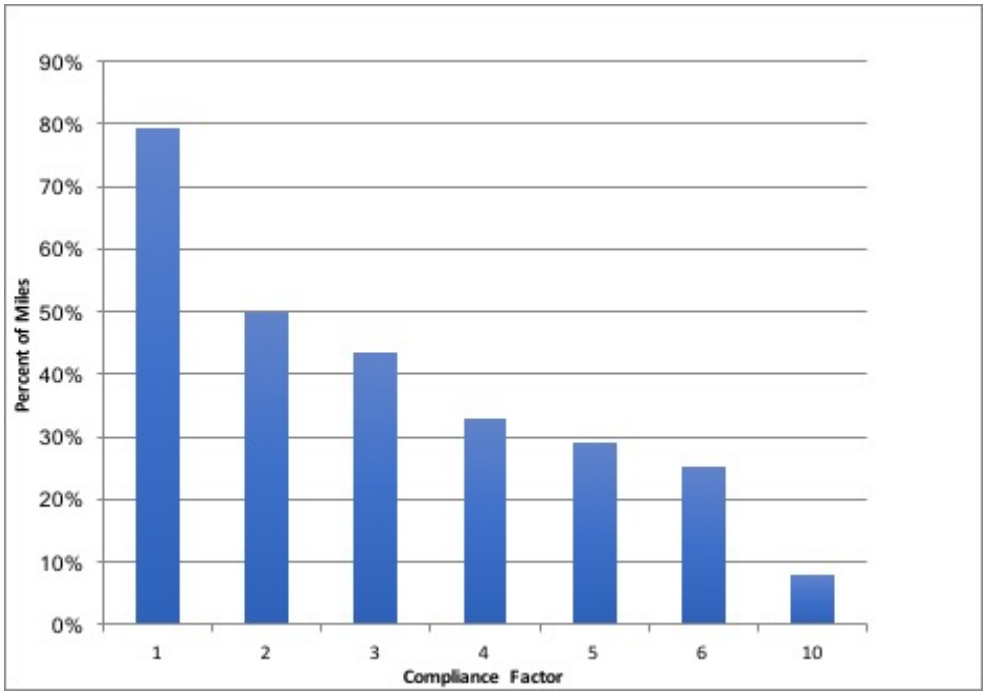
164. This vehicle was tested with a PEMS over the course of 1,330 miles, 953 of which were on the highway and 207 of which were in stop-and-go or variable speed conditions. A generator was installed on the rear of the vehicle to power the PEMS equipment in a position that was considered to have a minimal impact on the vehicle's aerodynamic drag.

165. The stop-and-go emissions were found to be 208 mg/mile on average over all tests conducted, or 4.2 times the standard of 50 mg/mile. Maximum emissions in stop-and-go conditions were found to be 1,725 mg/mile, a condition where the EGR and SCR systems had been completely shut off. That is 34.5 times the standard.

166. The "compliance factor" can be considered a multiple of the emission standard. It is the actual emission rate found during testing divided by the certification standard. A vehicle that meets the standard will have a compliance factor less than 1. A vehicle with a compliance

factor of one meets the standard exactly. A compliance factor of two means the vehicle exceeds the standard by a factor of 2.

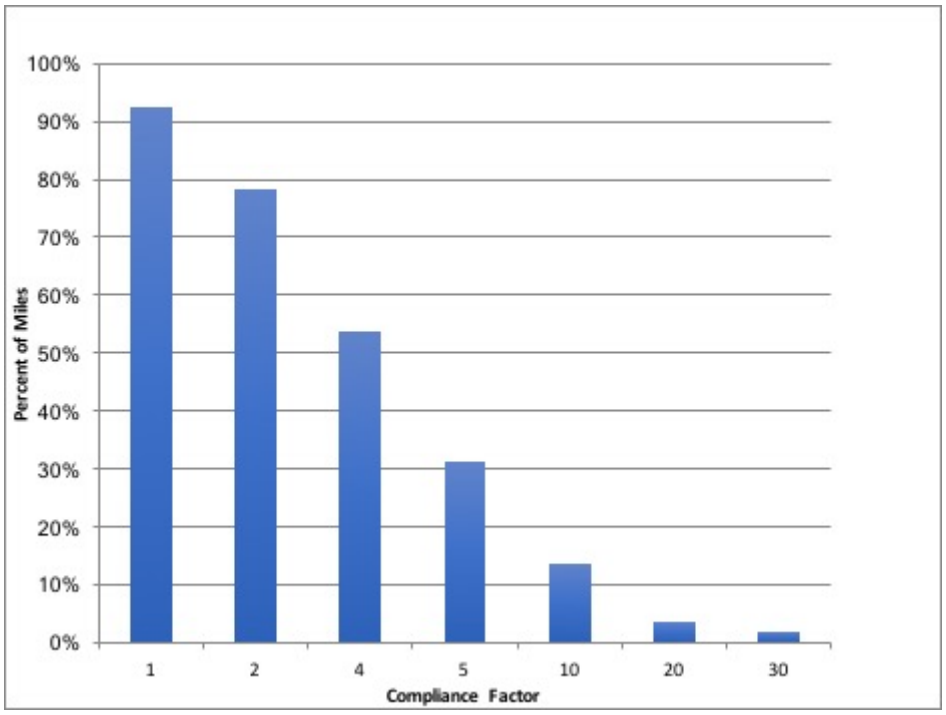
167. The compliance factor for stop-and-go conditions is plotted below.



168. The bar chart for a compliance factor of "1" represents the fraction of the total miles that are at or above the standard. The bar for a compliance factor of "2" represents the total miles that are twice the standard or more, and so on. What is notable is that the vehicles spend 79% of its time above the standard. That means only 21% of the miles traveled in stop-and-go conditions actually met the standard. What is also notable is that the vehicle spends 50% of its time at twice the standard *or more*. Finally, we see that the vehicle spends 8% of its time at ten times the standard or more.

169. The highway emissions were found to be 319 mg/mile on average over all tests conducted, or 6.4 times the standard of 50 mg/mile. Maximum emissions in highway conditions were found to be 4,166 mg/mile, or 83 times the standard.

170. Similarly, the compliance factor for highway driving is plotted below.



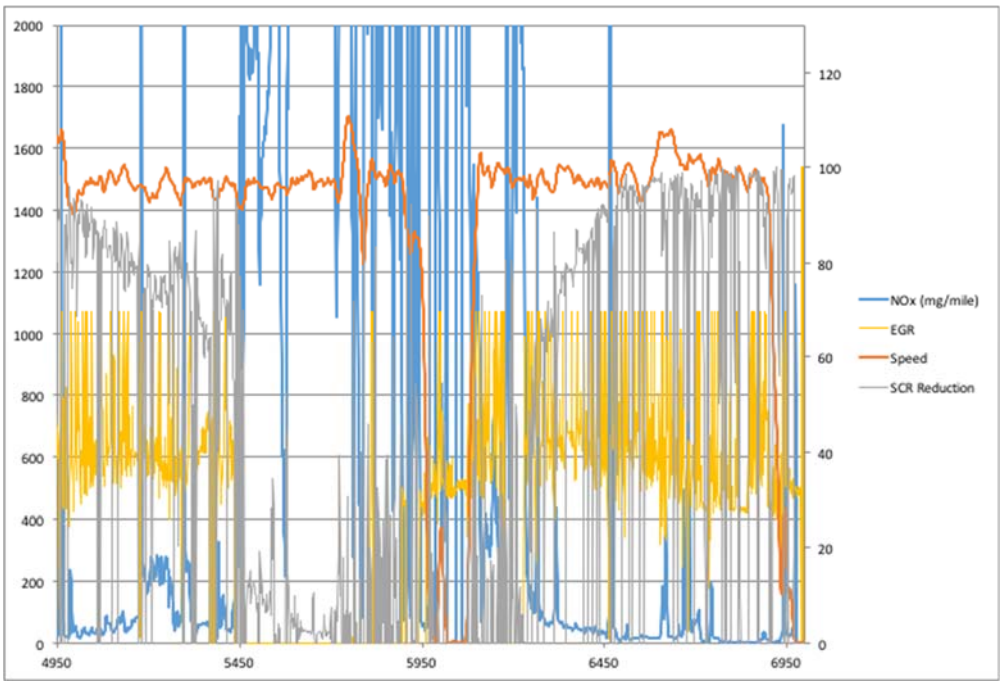
171. The vehicle spends 92% of the miles traveled above the standard (a compliance factor greater than 1), leaving only 8% of the vehicle miles traveled (VMT) having met the standard. The vehicle spends 54% of its VMT at four times the standard or above, and 4% at 20 times the standard or above.

172. The excessive emissions are a result of a number of cheat devices. On the GLK250, the EGR and SCR rates are both turned down significantly at various moments in time where one would not expect a change, most notably when the speed and road grade are not changing.

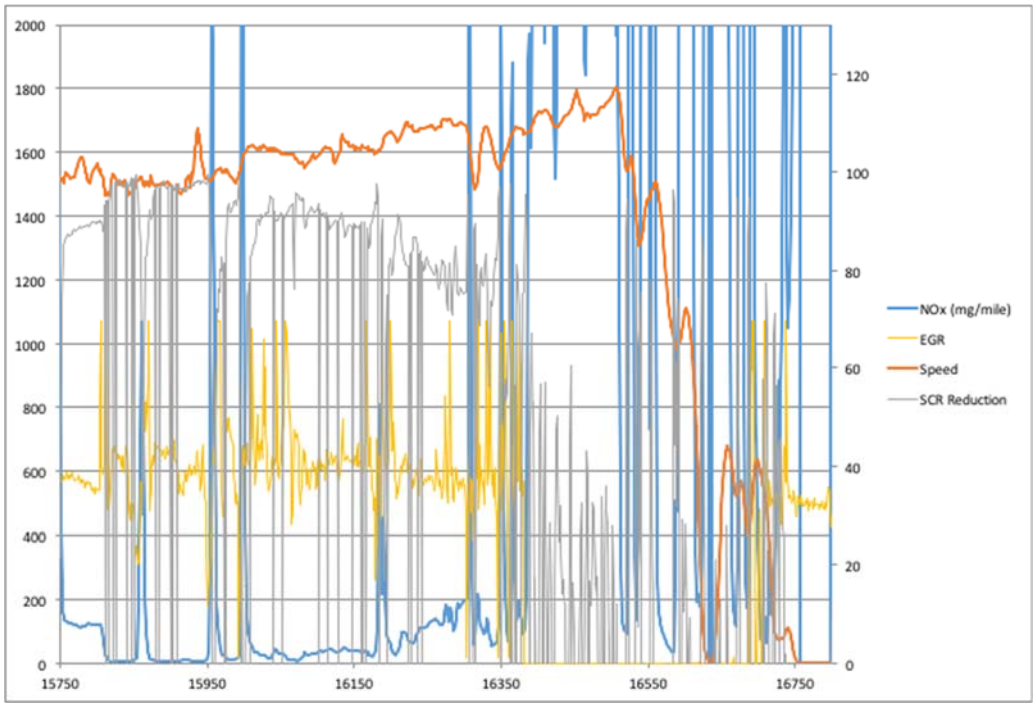
173. The plot below is one of several that shows the typical behavior. The orange line represents the vehicle speed. Note that it is relatively constant at 100 km/hour (62 mph). The small fluctuations observed in the speed over the several plots presented below are normal, as vehicle speed is usually maintained by small accelerations and decelerations that the driver doesn't usually notice.

174. The gray line indicates the percent reduction of the SCR system. A higher percentage reduction represents a very low NOx emission rate from the tailpipe. In the limit that NOx reduction is 100% on the SCR catalyst, the emissions will be 0 mg/mile from the tailpipe. The yellow line represents the percent EGR. The absolute value of this number is not so important

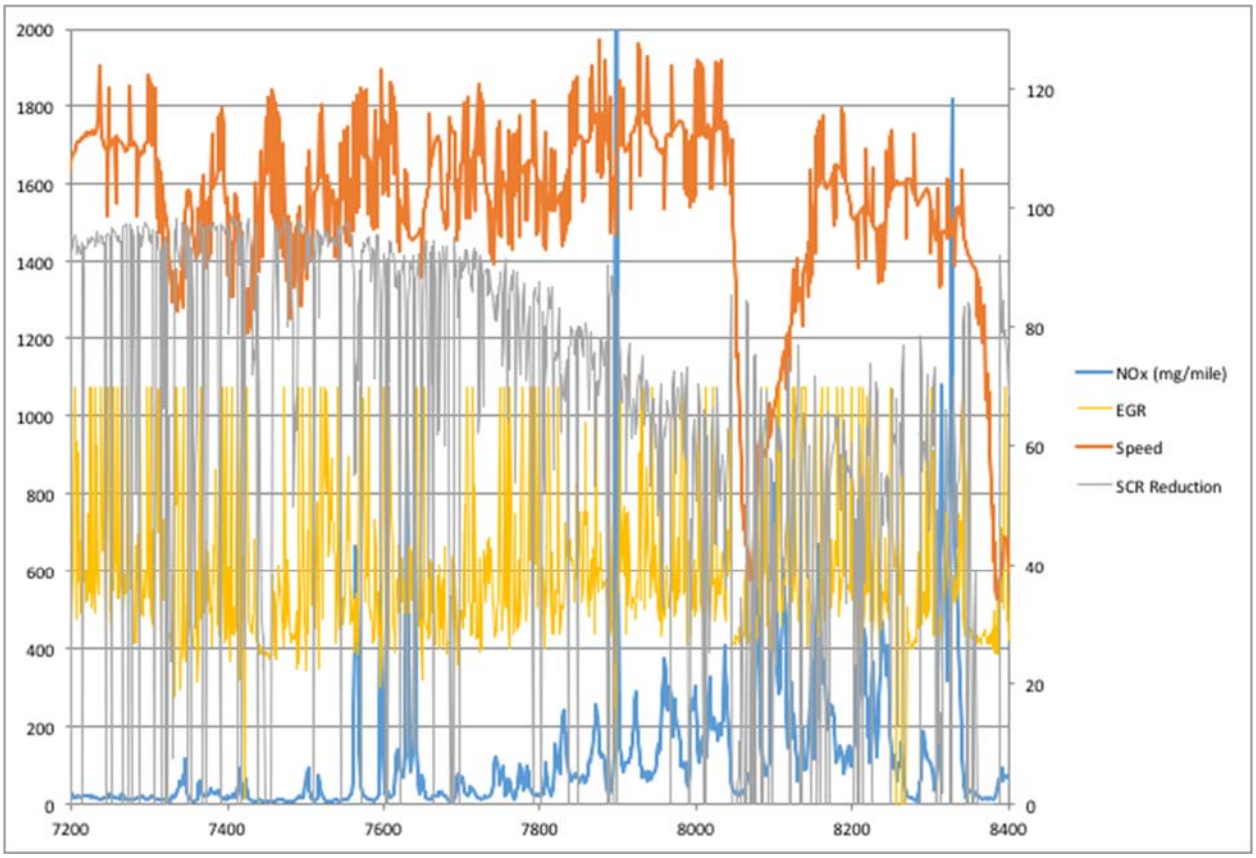
compared to the relative value in various situations. Note that around 5,450 seconds in the plot EGR is shutoff (the yellow line goes to 0) and the SCR reduction (gray line) also goes to near 0. As a result, the NOx emission rate (represented by the blue line) exceeds the upper limit of the chart. After a short period of time, the EGR system is reactivated, but the SCR system doesn't come back up to high NOx reduction until about 6,450 seconds. This is typical.



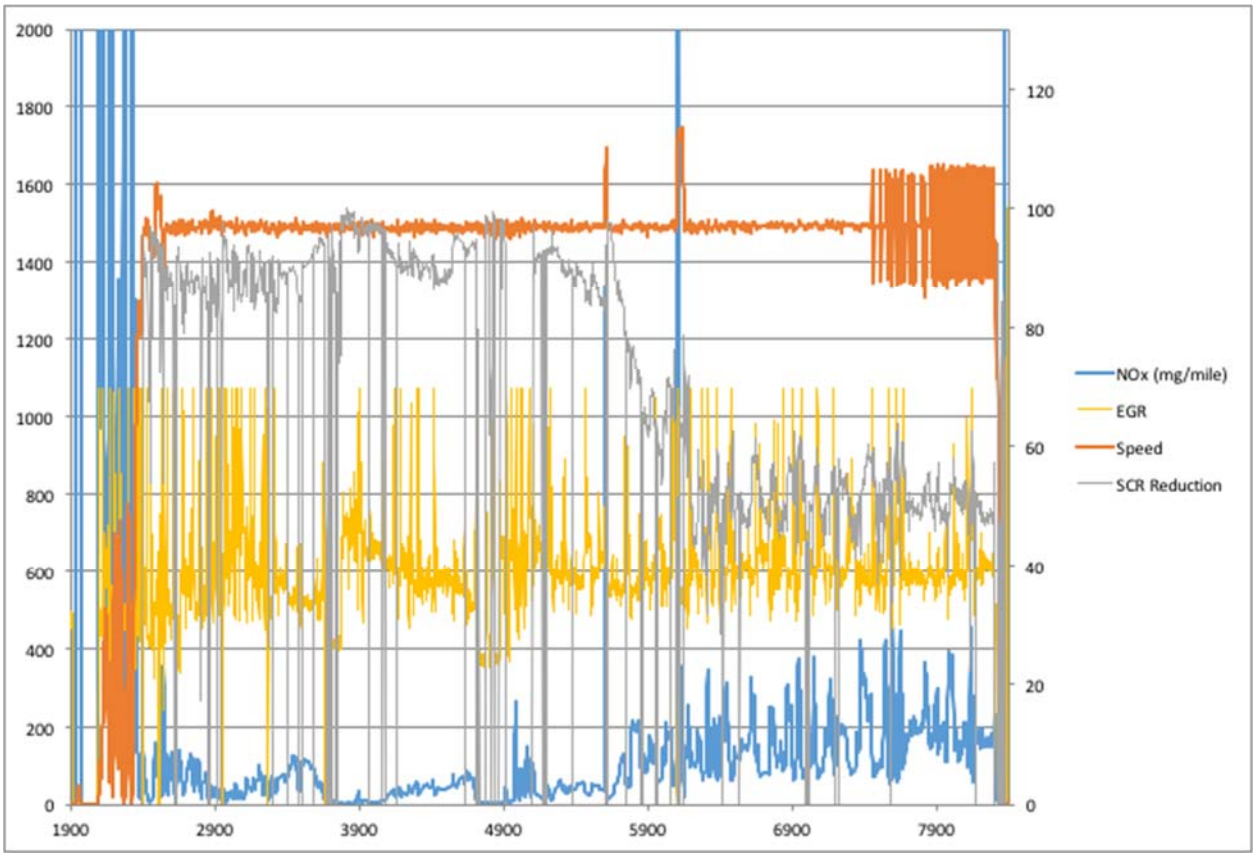
175. The following plot shows similar behavior. At around 16,150 seconds, the SCR system reduction begins to decrease and NOx begins to increase. At 16,350 seconds, the EGR system is shut off completely and the SCR reduction goes to near 0. Again, the NOx emissions (blue line) increase to values that exceed the maximum 2,000 mg/mile limit on the chart. These changes are not associated with any load change due to speed or road grade.



176. The GLK250 also seems to employ a timer that will meet the emission standard for a certain period of time and then begin to increase emissions after a certain period of operation. In the plot below, the vehicle speed remains constant at 110 km/hr while the SCR reduction (gray line) decreases over time. In this case, the emissions are 46 mg/mile for about 400 seconds, and then the SCR effectiveness (*i.e.*, amount of urea injected) decreases starting at 7,800 seconds. Although the speed and road grade haven't changed at all, the emissions increase to 203 mg/mile after the SCR system is slowly turned off.



177. The same behavior is observed in the plot below. Emissions are 63 mg/mile for about 400 seconds before the SCR system is de-rated (*i.e.*, urea injection is reduced). After the SCR system is de-rated, emissions increase to 167 mg/mile.



178. Similar events are summarized in the following table.

Condition	Temp	Event #	Pre-timeout NOx (mg/mile)	After timeout NOx (mg/mile)	Factor increase	Del NOx mg/mile
Flat	71.6	1	46	203	4.4	157
Flat	60.6	2	63	167	2.7	104
Flat	63.1	3	119	252	2.1	133
Uphill 2.8%	57.8	4	355	4166	11.7	3811
				Average	5.2	1051

179. On average, these events result in an increase in NOx emissions by a factor of 5.2, but in some cases as high as 11.7. On average, the EGR rate is decreased from 36.6% to 32.0% after the system is de-rated and the SCR effectiveness is reduced from 80% to 43% after the urea injection is turned down.

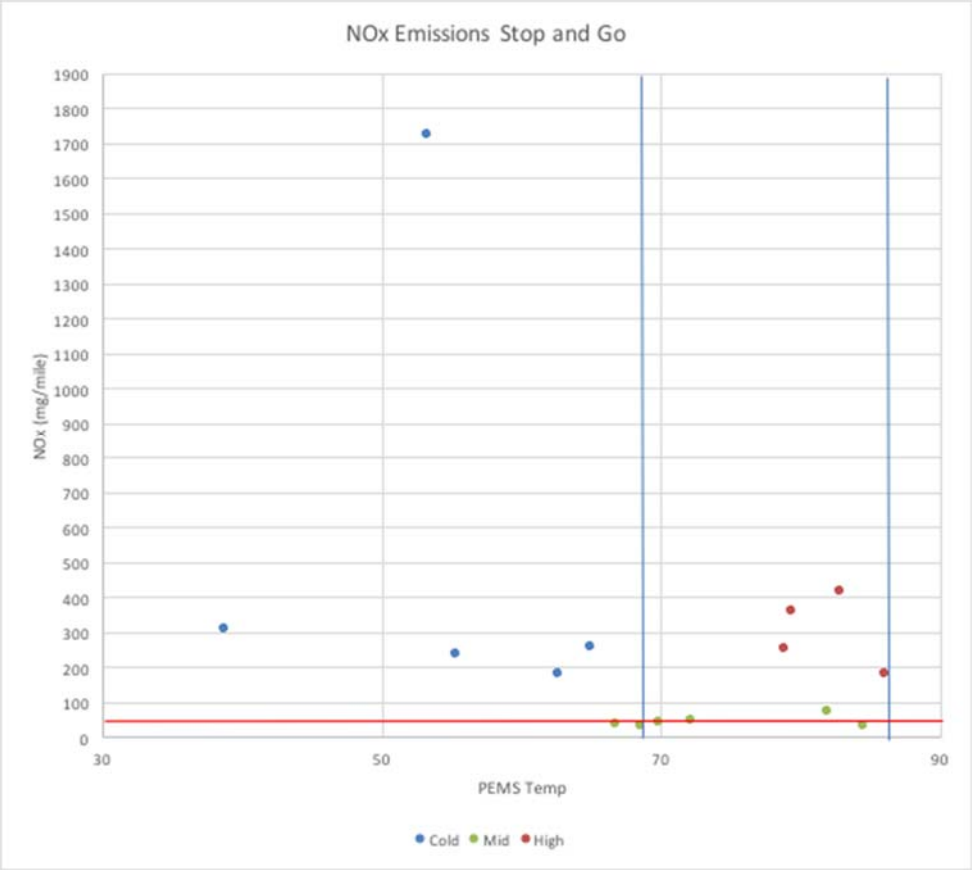
180. The data were analyzed for both stop-and-go conditions and highway conditions on flat roads and several road grades. The results from flat roads in stop-and-go conditions are plotted below. Each represents an individual test point. The horizontal red bar represents the NOx

emission standard of 50 mg/mile. The vertical blue lines are the upper and lower bounds for the ambient temperature while performing certification testing (68 and 86°F). It is believed that the vehicle triggers an increase in NOx when the ambient temperature is outside the certification test window.

181. In the plot below, the blue dots represent emission tests for which low ambient temperature cheat device is triggered (i.e. temperature generally below 68°F). The red dots represent emission tests for which the high ambient temperature cheat device is believed to be active (*i.e.*, temperature generally above 86°F). The green dots represent the tests for which the certification test software is active (*i.e.*, low NOx, in between 68 and 86°F).

182. The vehicle's ambient temperature sensor is usually mounted in front of the radiator close to the road. These sensors are not necessarily shielded from the sun and are highly susceptible to false readings at high ambient temperatures from heat generated by hot black top or direct sunlight.

183. When it comes to a cheat device based on ambient temperature, the vehicle may use one or more temperature sensors in the intake that are affected by ambient temperature. There are several temperature sensors in the intake manifold for the engine, any combination of which could be used to trigger a cheat device (in addition to the possible use of the ambient temperature sensor). The temperature sensors may not directly measure ambient temperature, but are certainly related to ambient temperature. Therefore, the cutoff temperatures, as measured by the ambient temperature sensor, are not necessarily exactly 68°F or 86°F. Hence, the high and low temperature cheat devices can occasionally fall within the certification test window. In general, however, these instances occur when the vehicle is very close to the certification test window temperature or when the ambient temperature is changing and the intake temperature sensors may not yet have changed in response. This applies to the R350 data presented in the next section as well.



184. It appears that NOx emissions are high in both the low ambient temperature modes and high ambient temperature modes, while the emissions appear to meet the standard inside the test window. In this case, the red dots occur during a transition from high temperature to low temperature. In this case, it is believed that the high temperature cheat device is active even though the ambient temperature sensor is below 86°F (probably triggered by another sensor in the intake manifold that still shows a high reading as a result of the high ambient temperature). As explained above, this is likely due to lingering high temperatures at some sensor or combination of sensors in the intake under the hood.

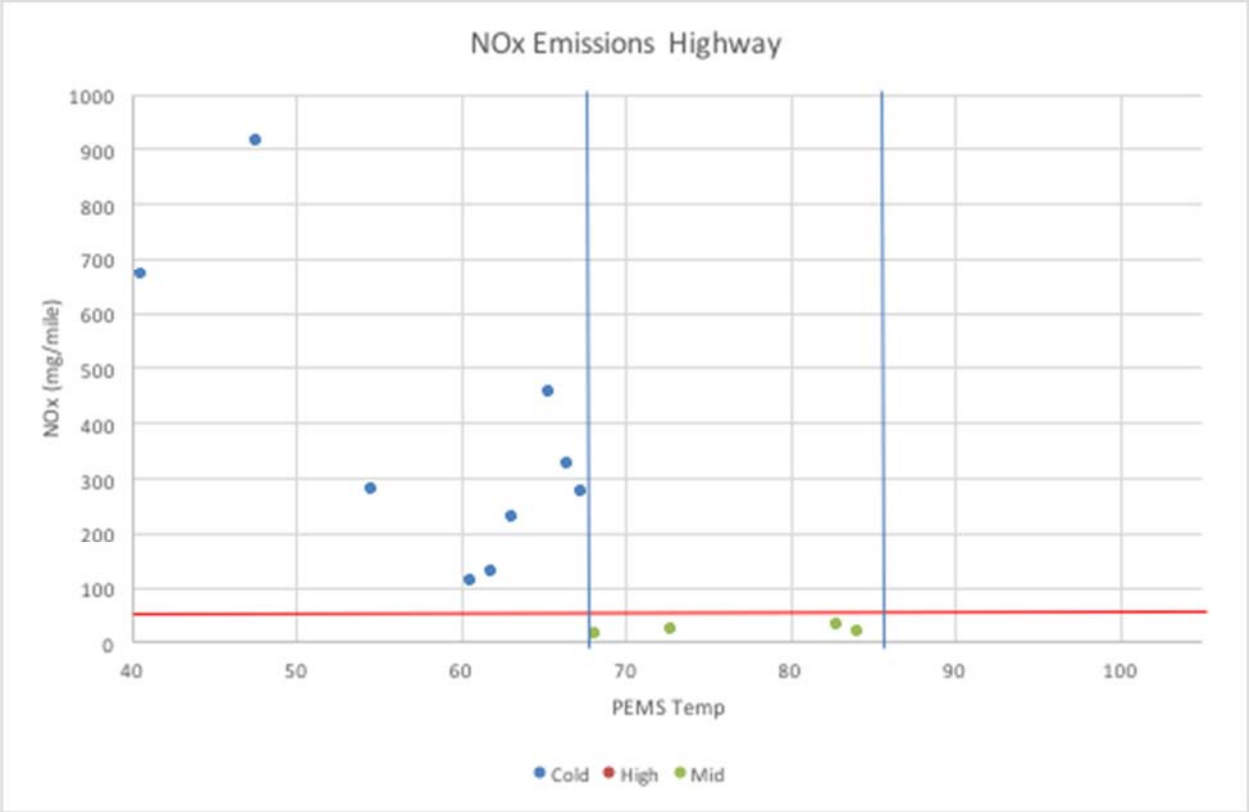
185. The emissions for the cold ambient cheat device are 453 mg/mile on average. The emissions for the high ambient temperature cheat device are 278 mg/mile, while the emissions inside the certification test window are 41 mg/mile on average (*i.e.*, meet the standard).

186. Similar behavior is observed for highway driving on flat roads. In this case, high temperature data was not taken as these temperatures were not available in the necessary road conditions during testing. Emissions in the certification test window are well below the standard,

while emissions below 68°F are well in excess of the standard. Cold cheat device NOx emissions are 230 mg/mile while emissions in the certification window are 19 mg/mile.

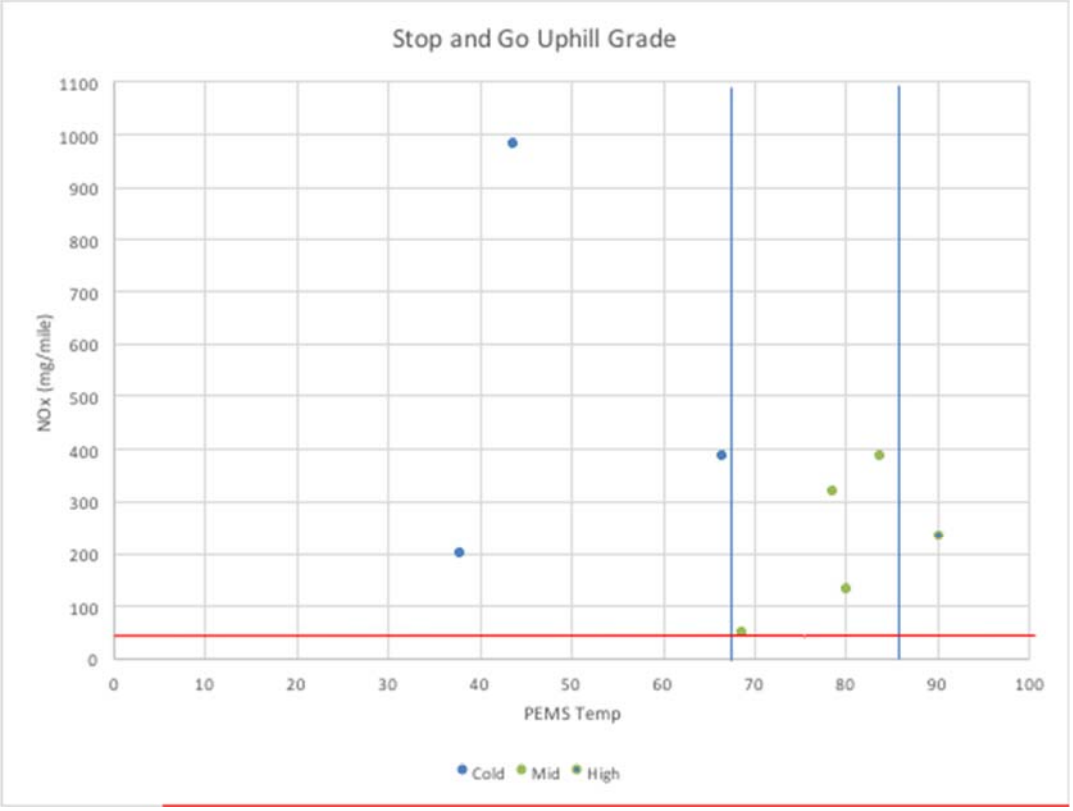
187. In general, the SCR reduction efficiency in stop-and-go flat road conditions is 96% for conditions where the vehicle meets the standard and 33% on average for all other conditions. That is a major reduction in SCR reduction efficiency, accomplished by a major reduction in injected urea by the program in the engine's ECM. The EGR rate is reduced from 34% to 32% for the compliant and non-compliant conditions, respectively.

188. Similarly, for steady highway driving on flat roads, the SCR efficiency decreases from 97% to 65%, while the EGR rate decreases from 39% to 36%.



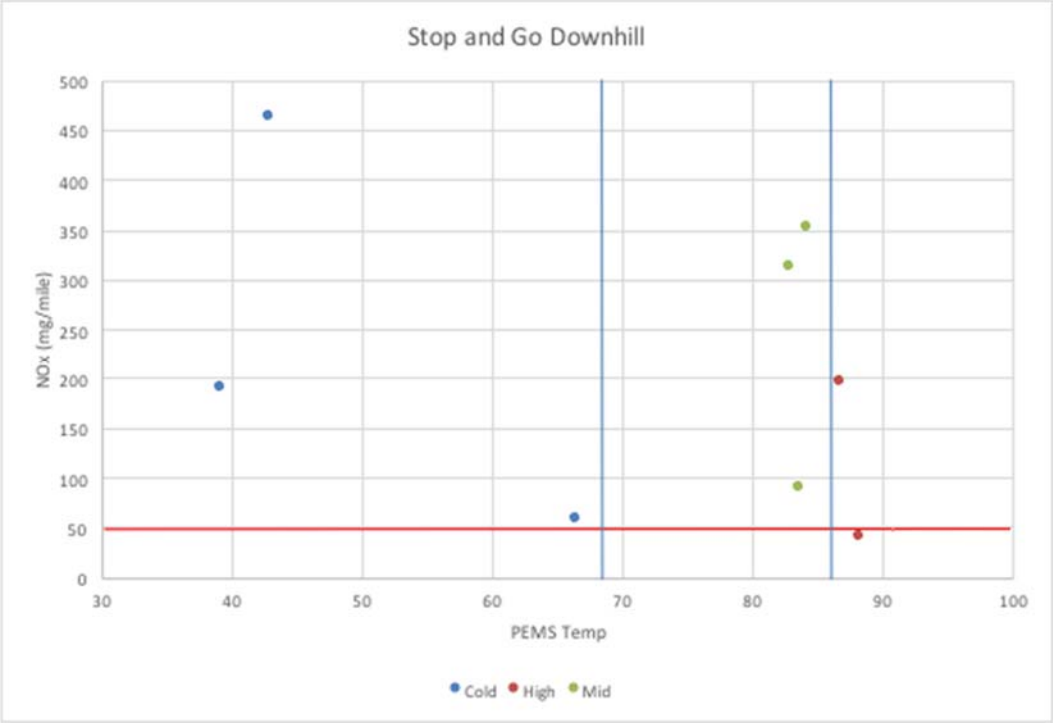
189. The vehicle also employs a cheat device that detects the grade in the road. During certification, the vehicle does not experience either physical or simulated road grade. Therefore, a cheat device that triggers higher emissions on an uphill or downhill road grade would not be detectable on a certification dynamometer. That device could only be detected using a PEMS system.

190. Road grades tested in stop-and-go conditions ranged from 0.4 to 3.7%. It should be noted that, in the colloquial sense, a road grade less than 1.0% would be considered "flat" by the average person. Even at modest grades like 2.7% in stop-and-go conditions, the NOx emissions increase to 983 mg/mile (nearly 20 times the standard). That level of road grade would generally be considered a very slight hill. As shown in the plot below, this cheat device appears to be active at all temperature ranges, not just above and below the certification test window.

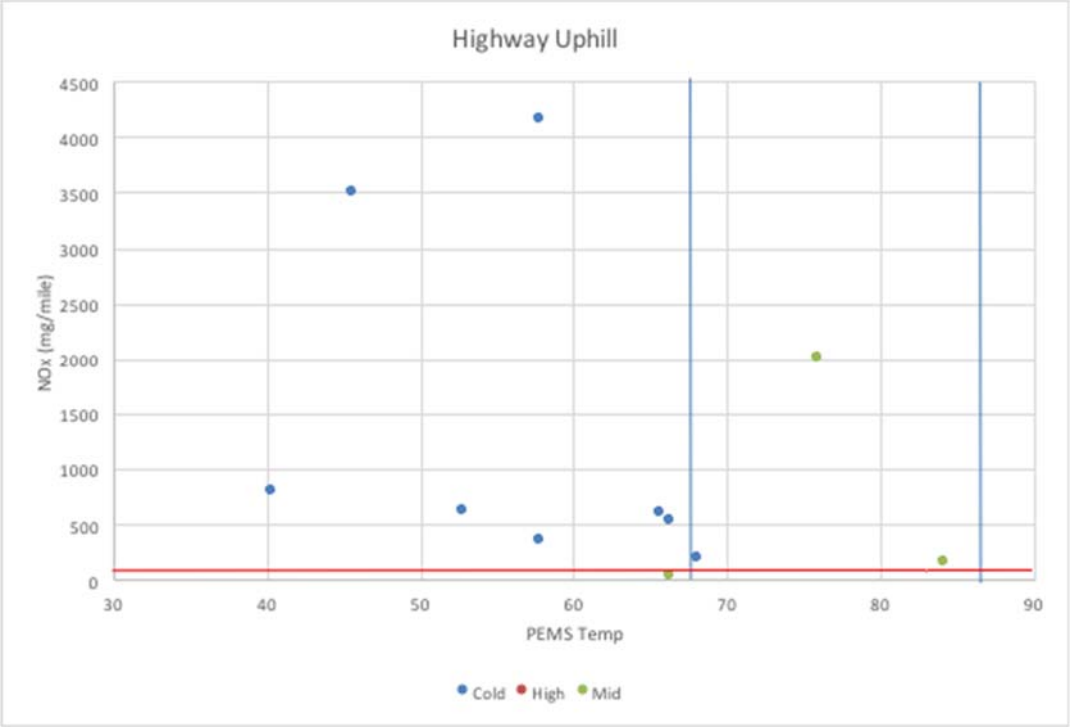


191. Average stop-and-go emissions on hills are 308 mg/mile, which is 7.5 times the value of 41 mg/mile measured during stop-and-go conditions in the certification test window. The SCR efficiency is reduced from 96% when the vehicle meets certification in flat stop-and-go driving to 73% in this case.

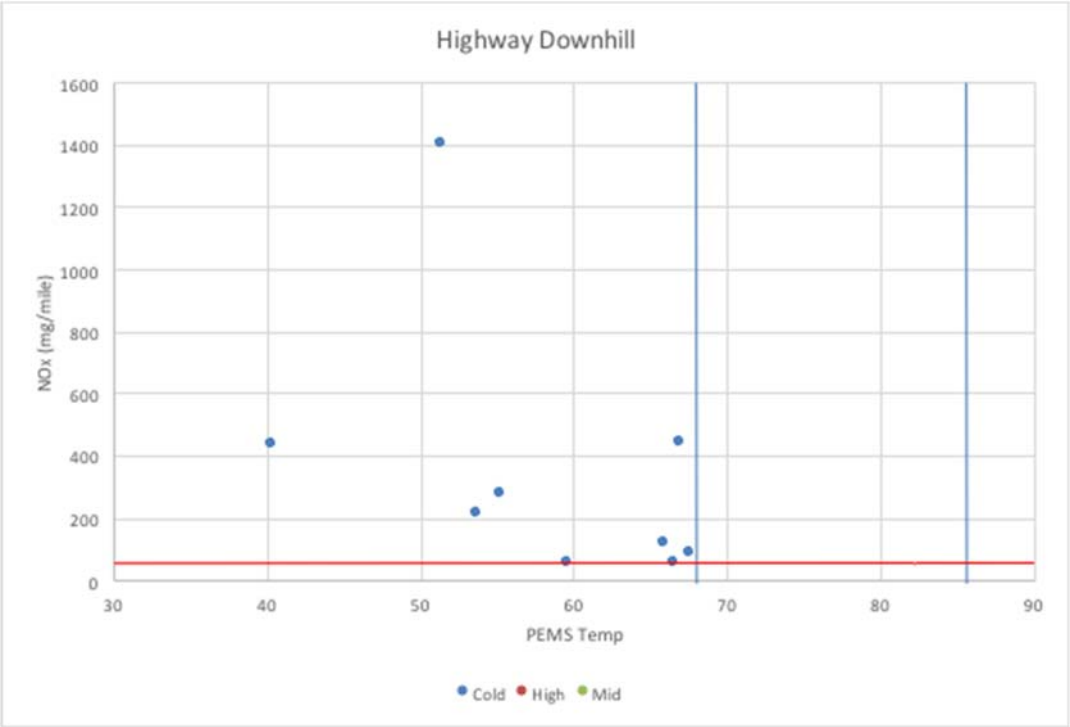
192. Emissions during downhill stop-and-go test runs ranging in grade from 0.5 to 3.3% downhill were as high as 464 mg/mile and were 190 mg/mile on average. That's 4.6 times the emissions measured during stop-and-go conditions in the certification test window. The SCR system effectiveness is reduced to 55%, compared to 96% when the vehicle meets the standard on flat roads.



193. Uphill grades between 0.6% and 5.3% were tested. On average, highway emissions on uphill grades are 1,035 mg/mile, more than 20 times the standard. Emissions are as high as 4,166 mg/mile on a 4.2% road grade. That's 83 times the standard. Even on a grade as small as 1.7%, emissions were 355 mg/mile, some seven times the standard. The overall SCR reduction effectiveness is reduced to 61%, compared to 97% where the vehicle meets the standard on flat roads. EGR rates are reduced from 39% in cases where the vehicle meets the standard on flat roads to 30% on uphill grades.



194. Downhill grades between 0.4% and 5.5% were tested, with an average NOx emission rate of 210 mg/mile. Even on a road grade as small as 1.4%, emissions were as high as 1,408 mg/mile. The SCR effectiveness is reduced, on average from 97% where the vehicle meets the standard on flat roads to 61%.



195. Finally, this vehicle was tested on a chassis dynamometer following the protocol for the FTP-75 and HWFET tests, with the following results.

	Test Cycle (values in mg/mile)	
	FTP	**HWFET**
EPA Cert Standard	50	70
Reported Cert Values	40	20
Dyno Test Values	66	8

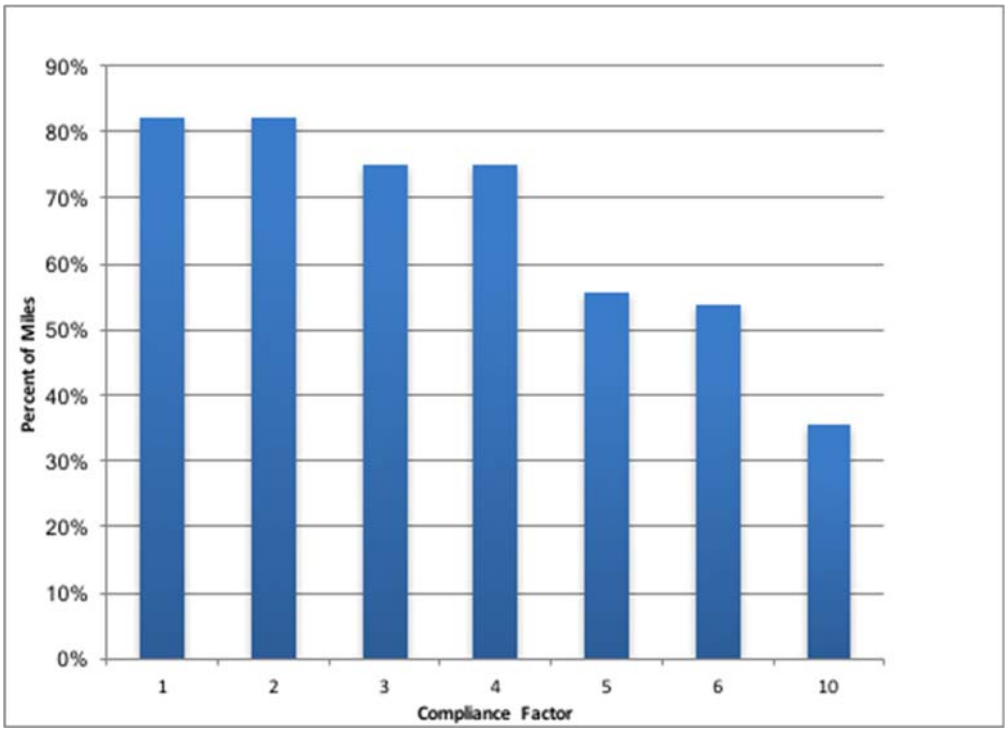
196. The certification values are either close to (in the case of the FTP-75) or under the standards, so the vehicle is believed to operate according to the manufacturer's original specifications. It is clear that the over-the-road driving emissions increase dramatically above the standard, which would suggest the vehicle is able to detect the certification test, as was done in the case of the Volkswagen diesel emissions scandal.

4. 2012 R350 BlueTEC

197. This vehicle was tested with a PEMS over the course of 1,742 miles, 1,395 of which were on the highway and 347 of which were in stop-and-go or variable speed conditions. A generator was installed on the rear of the vehicle to power the PEMS equipment in a position that was considered to have a minimal impact on the vehicle's aerodynamic drag.

198. The stop-and-go emissions were found to be 361 mg/mile on average over all tests conducted, or 7.2 times the standard of 50 mg/mile. Maximum emissions in stop-and-go conditions were found to be 1,500 mg/mile, or 30 times the standard.

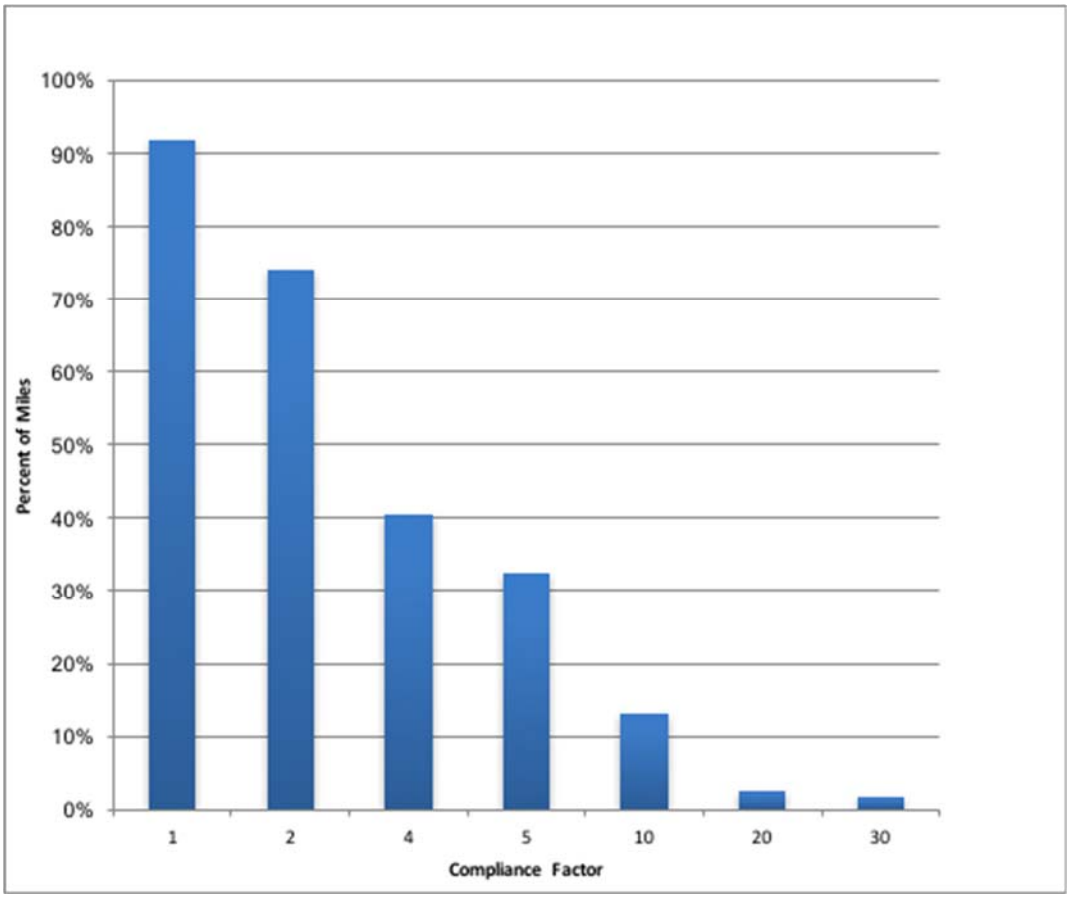
199. The compliance factor for stop-and-go conditions is plotted below.



200. The vehicle spends 82% of its time above the standard. That means only 18% of the miles traveled in stop-and-go conditions actually met the standard. The vehicle spends fully 36% of the time more than ten times the emission standard.

201. The highway emissions were found to be 286 mg/mile on average over all tests conducted, or 5.7 times the standard of 50 mg/mile. Maximum emissions in highway conditions were found to be 4,558 mg/mile, or 91 times the standard.

202. Similarly, the compliance factor for highway driving is plotted below.

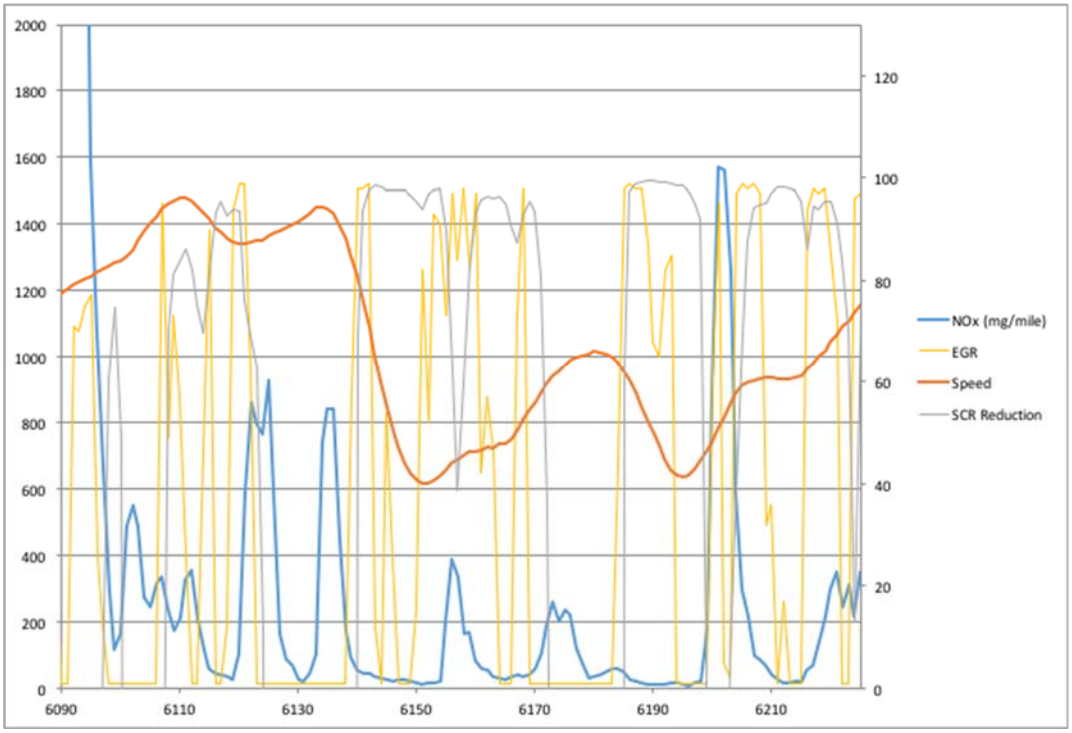


203. The vehicle spends 92% of the miles traveled above the standard, leaving only 8% of the vehicle miles traveled (VMT) having met the standard. The vehicle spends 41% of its VMT at four times the standard or above, and 13% at ten times the standard or above.

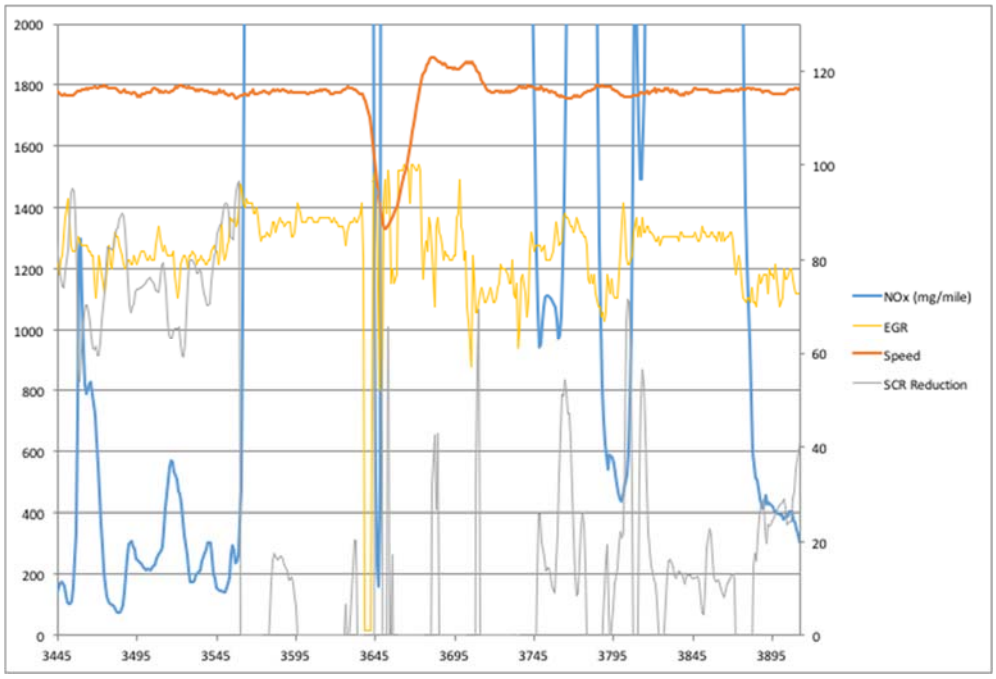
204. As with the GLK250, the R350 employs a number of cheat device strategies that reduce the effectiveness of the EGR and SCR systems. Like the GLK250, the EGR and SCR systems are periodically turned off or de-rated in a manner which is not justified by operating conditions (e.g., steady operation with no change in speed or road grade). This behavior is also observed in stop-and-go conditions, where the EGR system is periodically turned off, leading to a spike in NOx.

205. The plot below shows one such event. As with the plots above, the orange line is the vehicle speed; the blue line is the NOx emissions in mg/mile; yellow line is the EGR rate; and the gray line is the SCR percent reduction. At multiple points in this plot, the yellow line (EGR rate) drops to zero, leading to a significant spike in NOx emissions. These periodic spikes lead to

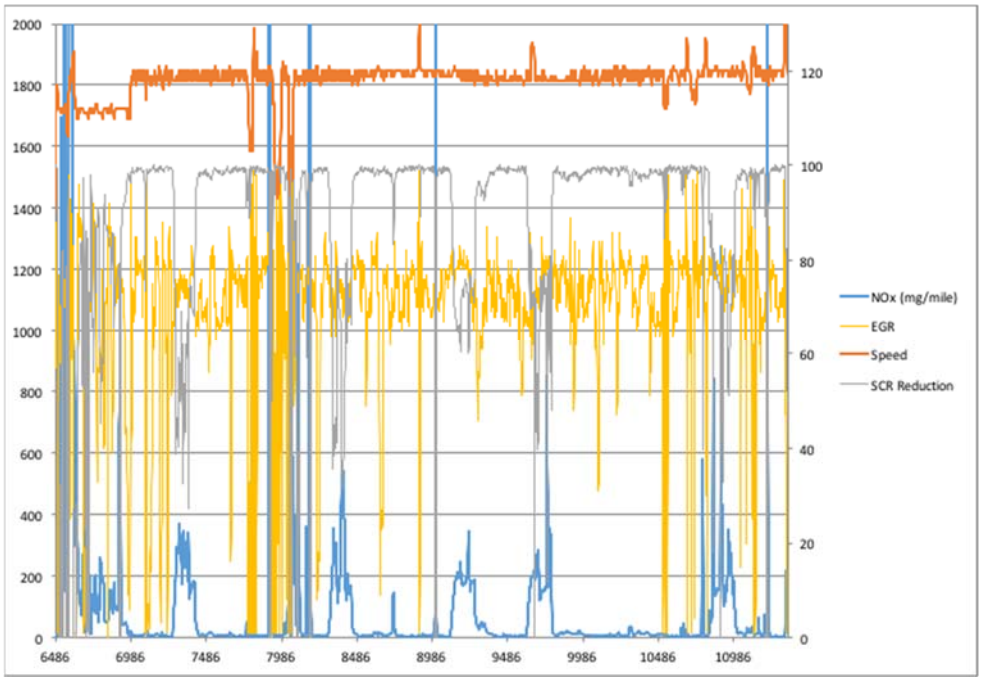
greatly increased overall NOx emissions. The first event in the plot occurs near 6,000 seconds, the second at 6,120 seconds, and the third at 6,170 seconds. Notice that in each case, the NOx spikes are well above the standard. In the first case, we see a spike to nearly 600 mg/mile. The second spike leads to over 800 mg/mile. The third leads to over 200 mg/mile. These spikes are well in excess of the 50 mg/mile standard and lead to a composite emission rate for this test of 279 mg/mile, or 5.6 times the standard.



206. In many circumstances, the SCR system is significantly de-rated. In the plot below, the speed is relatively constant at 120 km/hr (71.2 mph). Near 3,550 seconds, the SCR system (gray line) drops from approximately 80% reduction to 0-40% reduction. The resulting NOx goes off the plot, with levels exceeding the 2,000 mg/mile upper bound of the plot. The resulting NOx rate for this test is 4,558 mg/mile, or 91 times the standard.

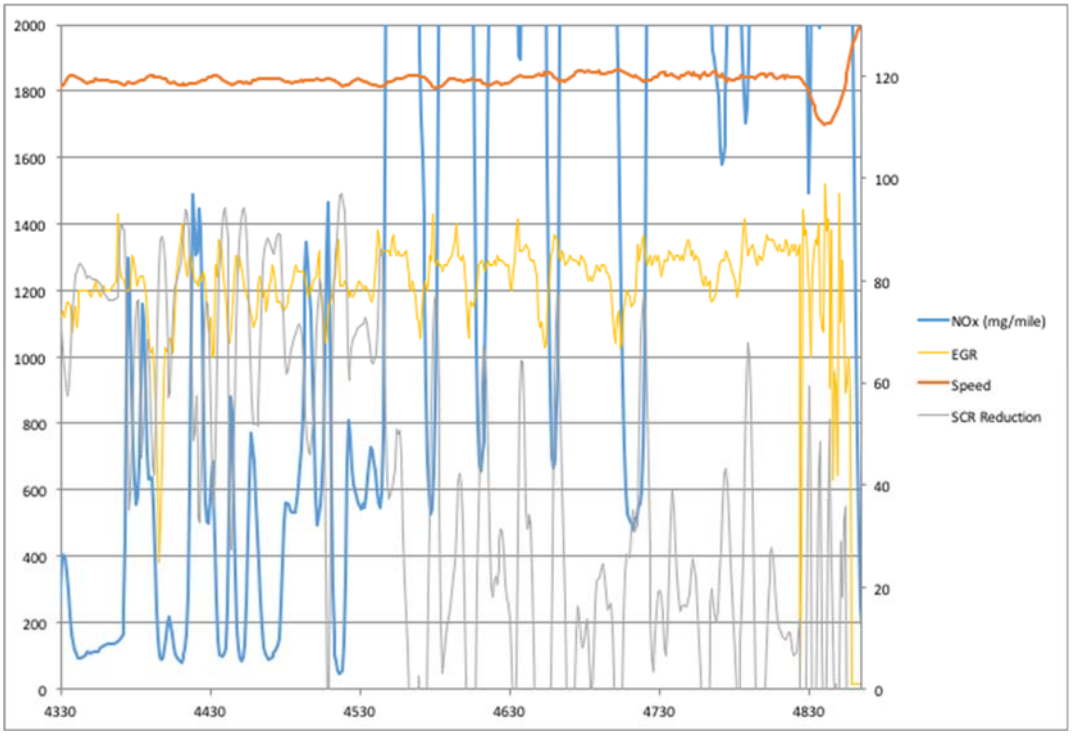


207. Here we see a plot where the SCR system is de-rated on a periodic basis (gray line) over the course of 1.2 hours, driving the NOx up to levels above 200 mg/mile. As a result, the overall NOx emission rate for this segment is 131 mg/mile.



208. The plot below shows the same behavior, with SCR effectiveness dropping from the 80% region to 0-40% region around 4,550 seconds. Again, the NOx levels exceed the upper bound

of the plot, with NOx in excess of 2,000 mg/mile, with the composite NOx emission rate for the test at 1,880 mg/mile.

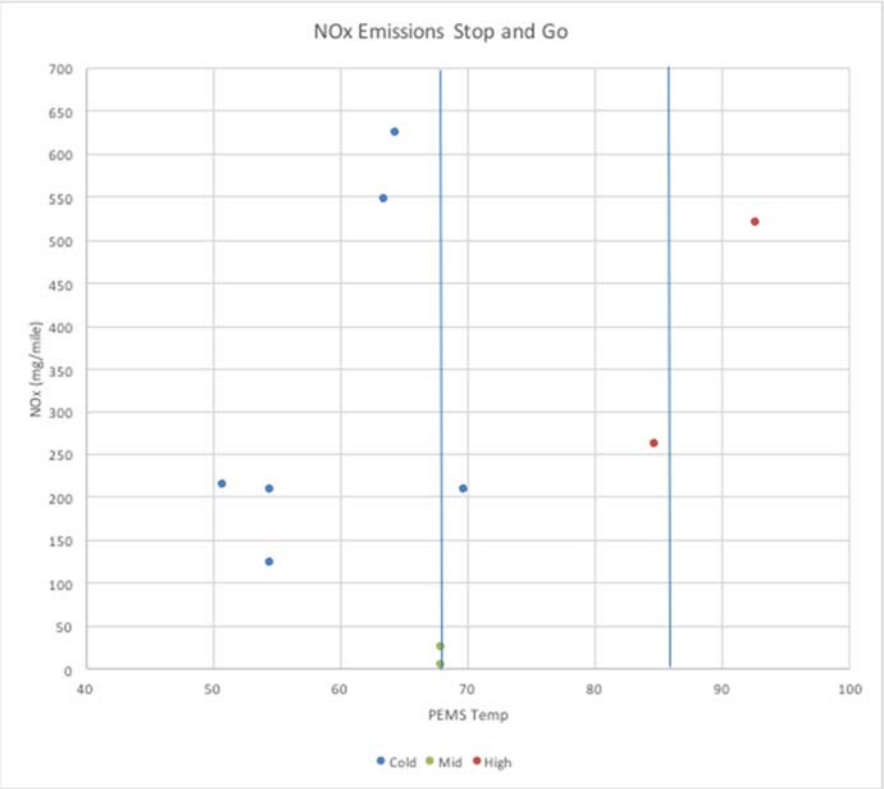


209. These plots are presented for illustrative purposes, as there are dozens of similar plots that were collected over the course of testing the R350.

210. As with the GLK250, the data was analyzed in stop-and-go and highway conditions on flat roads and grades. This data is plotted against ambient temperature, as a similar ambient temperature cheat device strategy is employed with the R350.

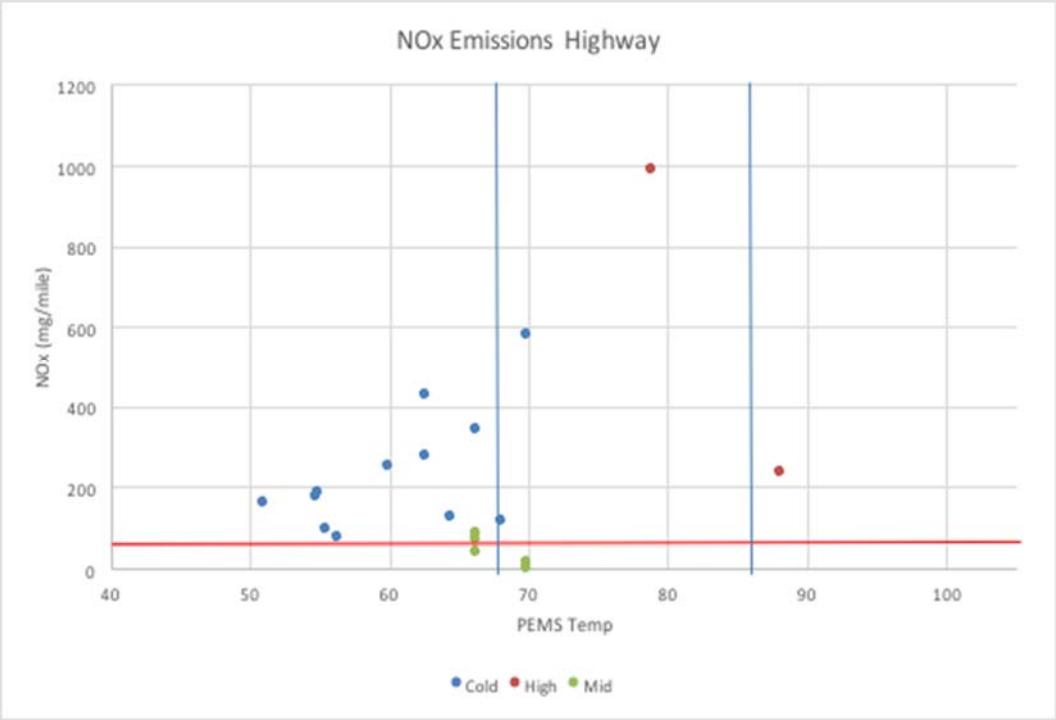
211. For stop-and-go driving on flat roads, the emissions appear to meet the standard in the temperature window between 68 and 86°F, as with the GLK250. However, outside of that temperature window, the NOx emissions increase significantly. The details of the coloring for the points (and classification as "cold," "mid," or "high") and justification are presented above in the discussion of the GLK250. Within the certification test window, stop-and-go results are 23 mg/mile on average, well below the 50 mg/mile standard. At temperatures below 68°F, emissions spike as high as 624 mg/mile, with an average of 264 mg/mile. At temperatures above 86°F, emissions spike as high as 521 mg/mile, with an average of 428 mg/mile. Temperature-related cheat devices are particularly dangerous in the State of Arizona, with daily temperatures far above

the U.S. average. Phoenix, for example, averages 168 days above 90 degrees. The EPA has warned that "[t]he adverse health impacts from excessive NOx emissions–excessive ozone formation–are most acute on hot days." A cheat device shuts down emissions at high temperatures poses real health risks for the residents of Arizona because of Arizona's hot weather.



212. For stop-and-go flat driving, the SCR reduction rate is 97% for conditions where the vehicle meets the standard. This number drops to 74%, on average, for conditions where the vehicle exceeds the standard. Similarly, the EGR rate drops from 44% to 29%, on average.

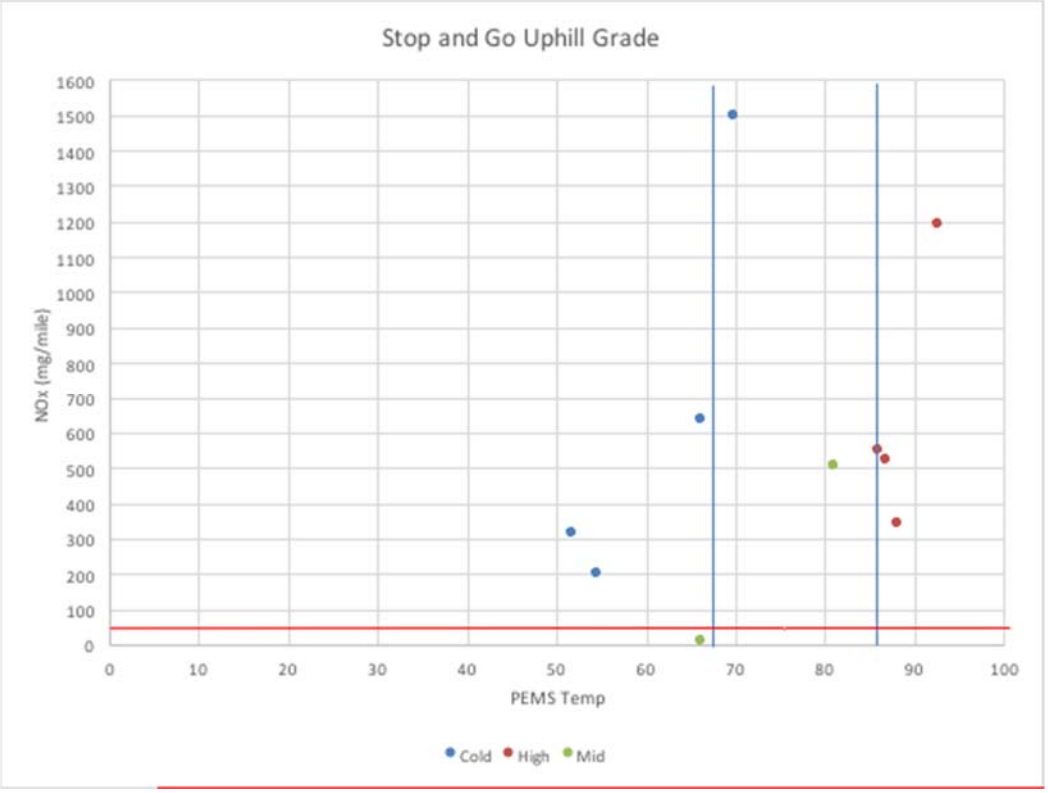
213. The same behavior is observed for highway driving. Note that the coloring of the points presented on the plots and discussion of the exact ambient temperature where the cheat devices are active is discussed in the GLK250 section above. Within the certification test window, highway results are 62 mg/mile on average, very close to the 50 mg/mile standard. At temperatures below 68°F, emissions spike as high as 583 mg/mile, with an average of 216 mg/mile. At temperatures above 86°F, emissions spike as high as 991 mg/mile, with an average of 401 mg/mile.



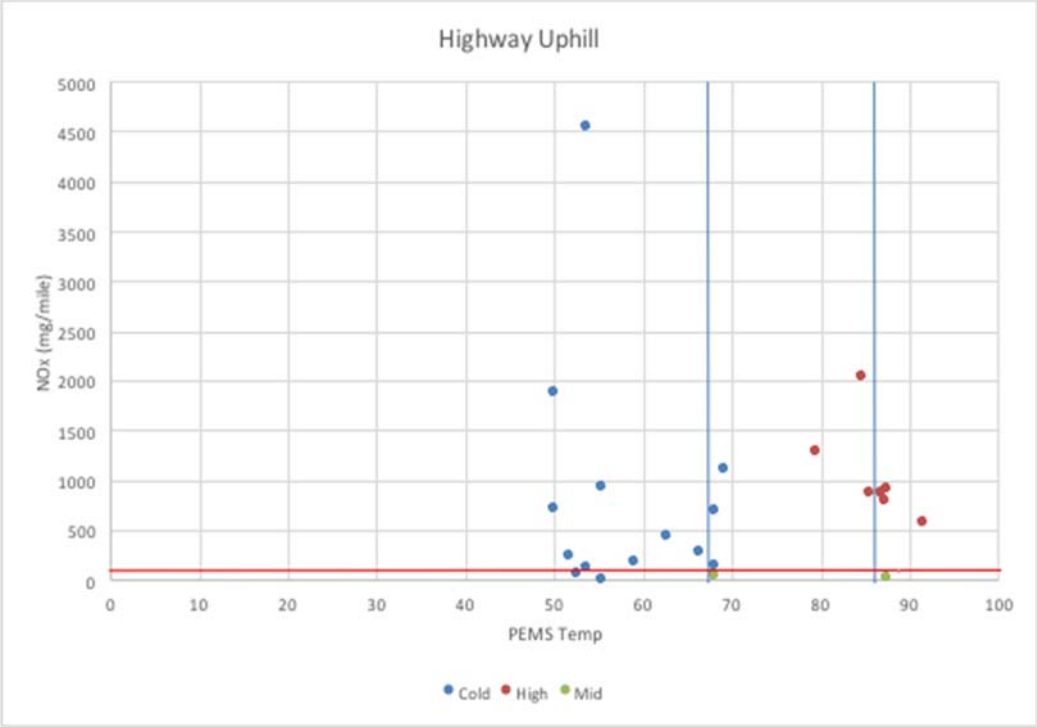
214. For highway flat driving, the SCR reduction rate is 88% for conditions where the vehicle meets the standard. This number drops to 80%, on average, for conditions where the vehicle exceeds the standard. Similarly, the EGR rate drops from 47% to 38%, on average.

215. Similar to the GLK250, the R350 has a cheat device that dramatically increases NOx on uphill and downhill road grades. The vehicle was driven on uphill road grades ranging from 0.4% to 2.6%. These are modest grades, and yet NOx increases to levels as high as 1,500 mg/mile, some 30 times the standard. Average NOx emissions for all stop-and-go testing on an uphill grade are 523 mg/mile. SCR effectiveness drops from 97% in cases where the vehicle meets the standard on flat roads to 70% on uphill grades. Similarly, EGR drops from 44% to 27% for the flat road and uphill road tests, respectively.

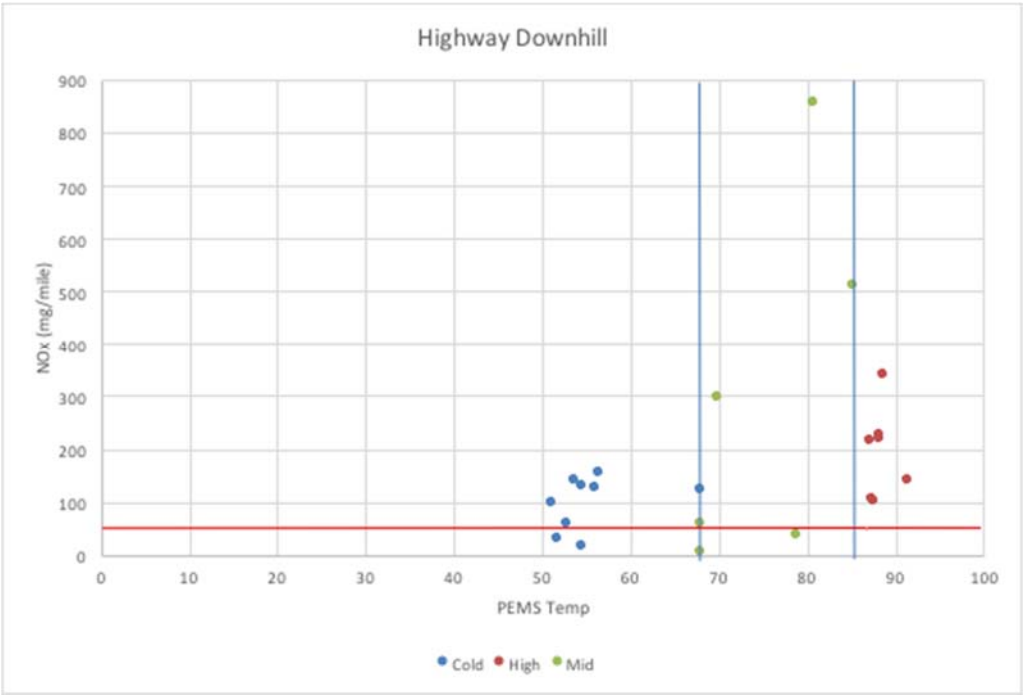
216. There are not enough data points in stop-and-go downhill conditions to present, but downhill emissions for steady highway driving are presented later.



217. For steady highway driving, grades between 0.5% and 3.5% were tested. Emission levels were measured as high as 4,558 mg/mile, with an average of 942 mg/mile. These are extraordinarily high numbers given the relatively low road grade. The SCR effectiveness drops from 88% in cases where the vehicle meets the standard on flat roads during highway driving to 54%. Similarly, the EGR rates drops from 47% to 32% for the flat road and uphill grade conditions, respectively.



218. Downhill emissions under steady highway conditions were measured from 0.5% downhill grade to 3.2% downhill grade. On average, emissions were 190 mg/mile, with values as high as 857 mg/mile. The SCR effectiveness drops from 88% in cases where the vehicle meets the standard on flat roads during highway driving to 74%. Similarly, the EGR rates drops from 47% to 37% for the flat road and downhill grade conditions, respectively.



219. Finally, the R350 was tested using the certification protocols for the FTP-75 and HWFET tests. As can be seen, the vehicle meets the certification standard for both tests, so the emissions system is operating within the manufacturer's design specifications. It is clear that the over-the-road driving emissions increase dramatically above the standard, which would suggest the vehicle is able to detect the certification test, as with the Volkswagen scandal.

	Test Cycle (values in mg/mile)	
	FTP	**HWFET**
EPA Cert Standard	50	70
Reported Cert Values	50	10
Dyno Test Values	23	47

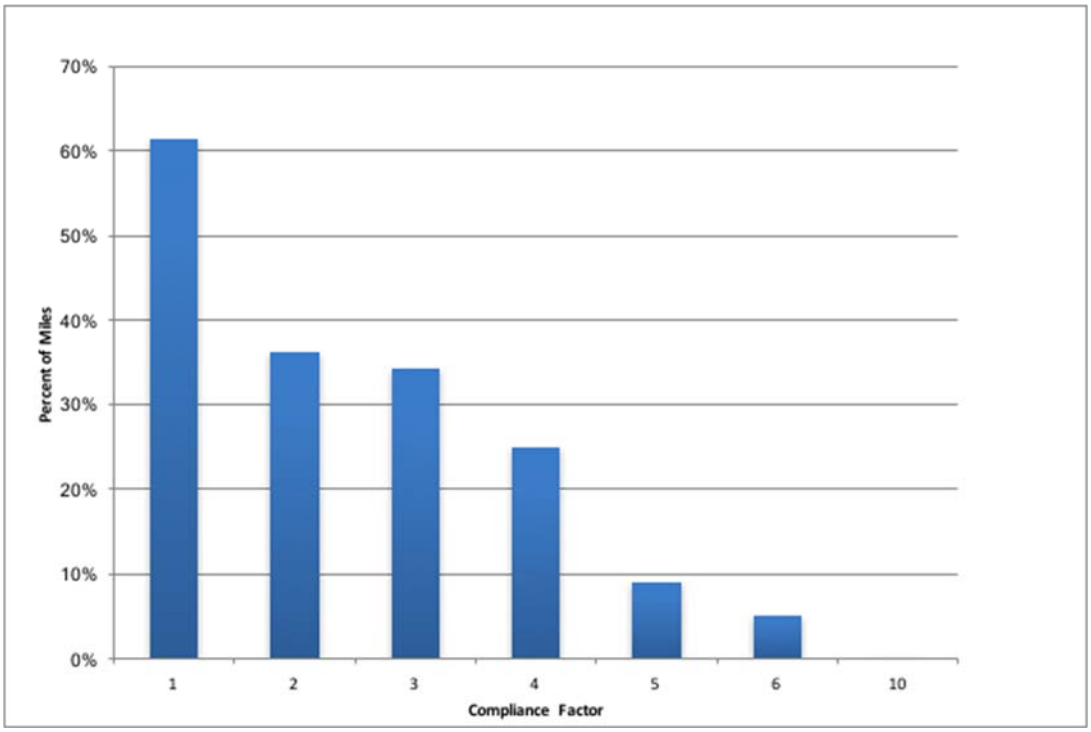
5. 2014 Mercedes/Freightliner Sprinter 2500 BlueTEC

220. This vehicle was tested with a PEMS over the course of 1,712 miles, 1,224 of which were on the highway and 488 of which were in stop-and-go conditions (or city conditions as represented by the FTP-75 certification test). A generator was installed on the rear of the vehicle to power the PEMS equipment in a position that was considered to have a minimal impact on the vehicle's aerodynamic drag.

221. The vehicle was found to have at least two cheat devices: 1) a timer on the SCR system that reduces the effectiveness after a short period of time, and 2) a cheat device that detects road grade and reduces overall emission system performance.

222. The stop-and-go emissions were found to be 465 mg/mile on average over all tests conducted, or 2.3 times the standard of 200 mg/mile. Maximum emissions in stop-and-go conditions were found to be 1,844 mg/mile, or 9.2 times the standard.

223. The compliance factor for stop-and-go conditions is plotted below.

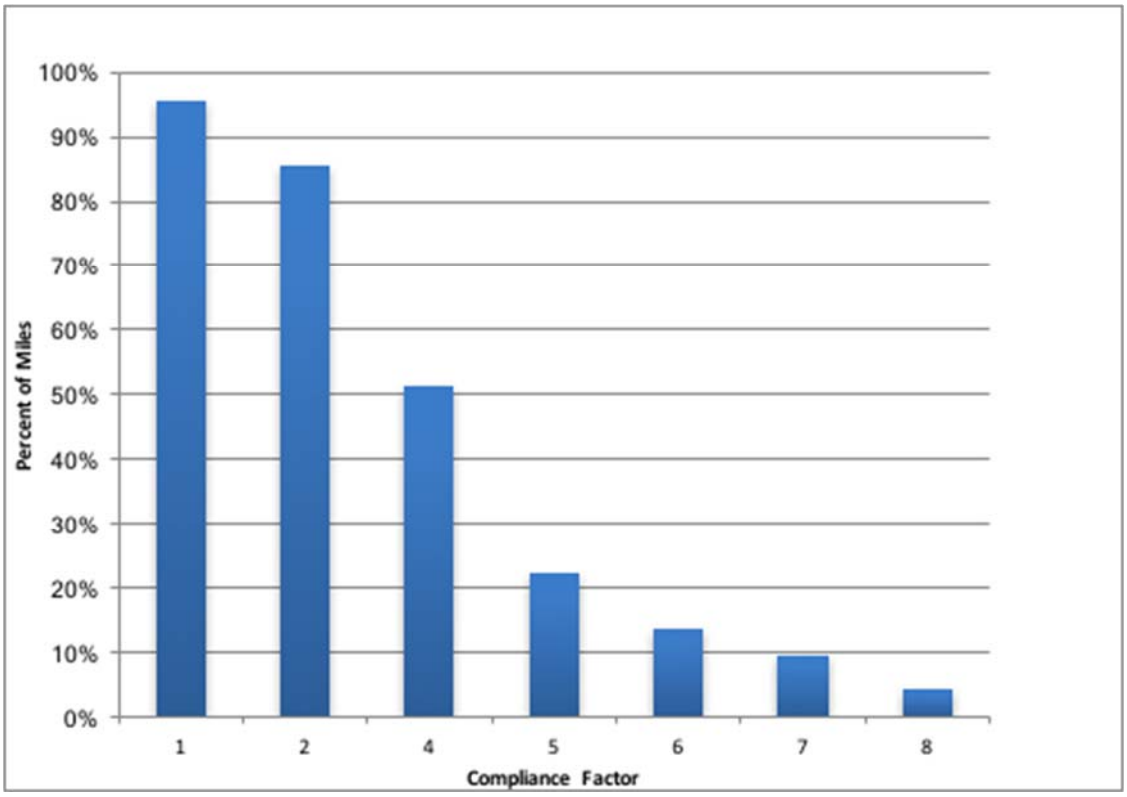


224. The vehicle spends 61% of its time above the standard. That means only 39% of the miles traveled in stop-and-go conditions actually met the standard. The vehicle spends fully 25% of the time more than four times the emission standard.

225. It should be noted that, although the magnitude of the compliance factors is lower than with the passenger cars (GLK250 and R350), the actual excess NOx emitted is just as significant as that seen on the passenger cars. For example, if the passenger cars are at 1,000 mg/mile NOx, that's 20 times the standard of 50 mg/mile, with an increase of 950 mg/mile above the standard. If the Sprinter is at 1,000 mg/mile NOx, that's 5 times the standard with an increase in 800 mg/mile above the standard. In terms of excess NOx emitted, the Sprinter is similar to the passenger cars even though the compliance factors are relatively lower.

226. The highway emissions were found to be 798 mg/mile on average over all tests conducted, or 4.0 times the standard of 200 mg/mile. Maximum emissions in highway conditions were found to be 1,790 mg/mile, or 9.0 times the standard.

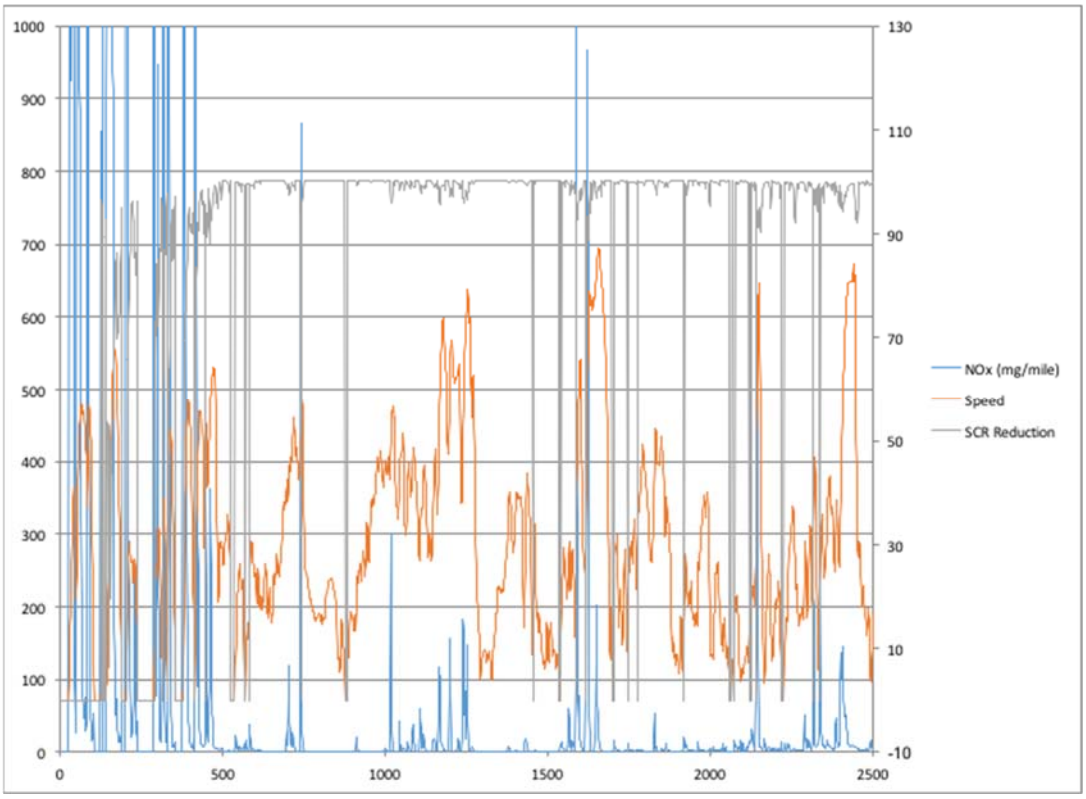
227. Similarly, the compliance factor for highway driving is plotted below.



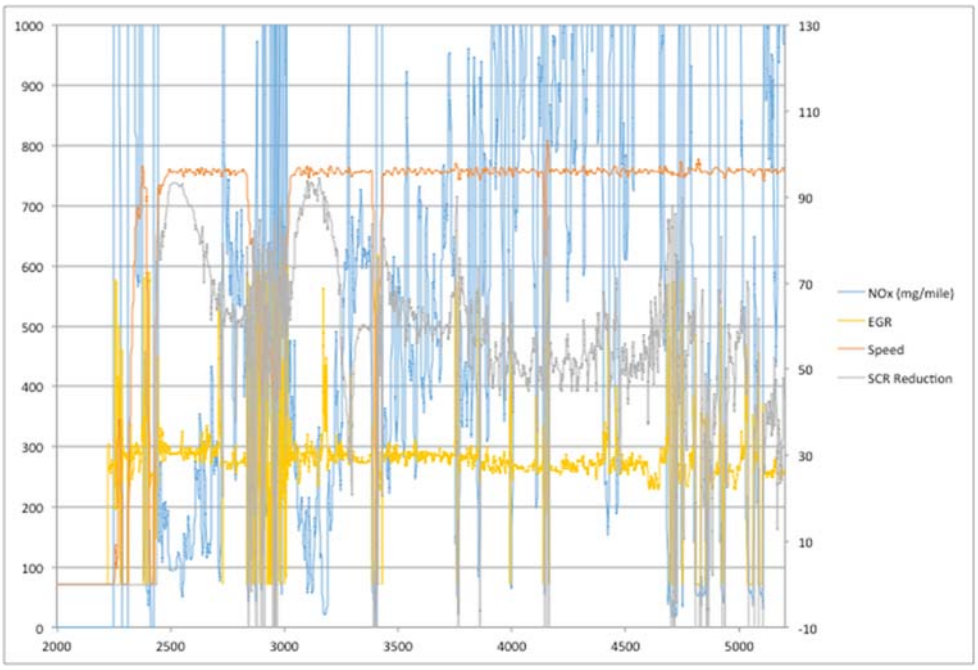
228. The vehicle spends 96% of the miles traveled above the standard, leaving only 4% of the vehicle miles traveled (VMT) having met the standard. The vehicle spends 51% of its VMT at four times the standard of above, and 4% at eight times the standard or above.

229. As with the GLK250 and R350, the Sprinter employs a number of cheat device strategies that reduce the effectiveness of the EGR and SCR systems. As with the passenger cars, the EGR and SCR systems are periodically turned off or de-rated in a manner which is not justified by operating conditions (e.g., steady operation with no change in speed or road grade).

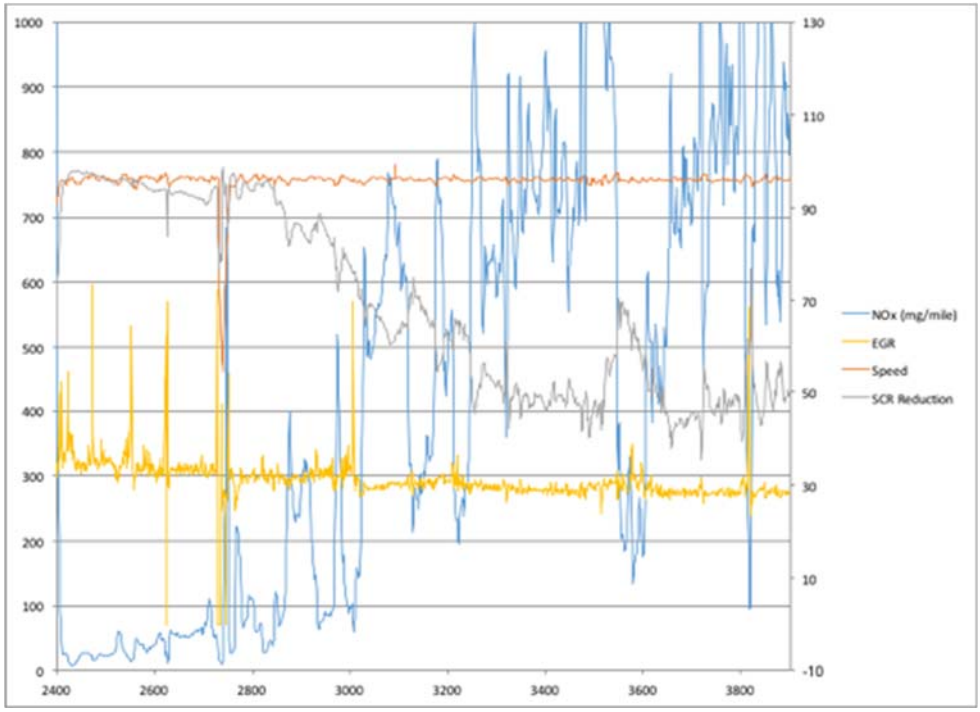
230. In several instances, the SCR effectiveness is de-rated significantly after a short period of time, if not shut off altogether. Here we observe a very well-behaved system. The EGR rate is removed from the plot for the sake of clarity, though it's relatively constant throughout. Although the vehicle is operating at a variety of speeds, the SCR reduction rate (gray line) is 94% overall, and the resulting NOx emissions are 116 mg/mile, well within the 200 mg/mile standard.



231. Here, however, the SCR effectiveness is reduced from over 90% to some 50% over the course of a short period of time during steady driving at approximately 60 mph (triggered by a reduction in urea injected into the SCR system by the engine ECM). The reduction starts at about 3,250 seconds. The resulting NOx levels spike above the 1,000 mg/mile limit of the plot, with the composite emission rate for this segment of 710 mg/mile. Prior to the reduction in urea injection, the emission rate is 216 mg/mile, which is very close to the standard. After the reduction in urea injection, the emission rate increases to 766 mg/mile.



232. Another instance in the following plot, where the reduction in SCR effectiveness begins to reduce at 2,900 seconds. The SCR effectiveness reduces from well over 90% to approximately 50%, just as before, with a composite NOx emission rate of 428 mg/mile. Prior to the reduction in urea injection, the emission rate is 58 mg/mile, well below the standard. After the reduction in urea injection, the emission rate increases to 586 mg/mile.

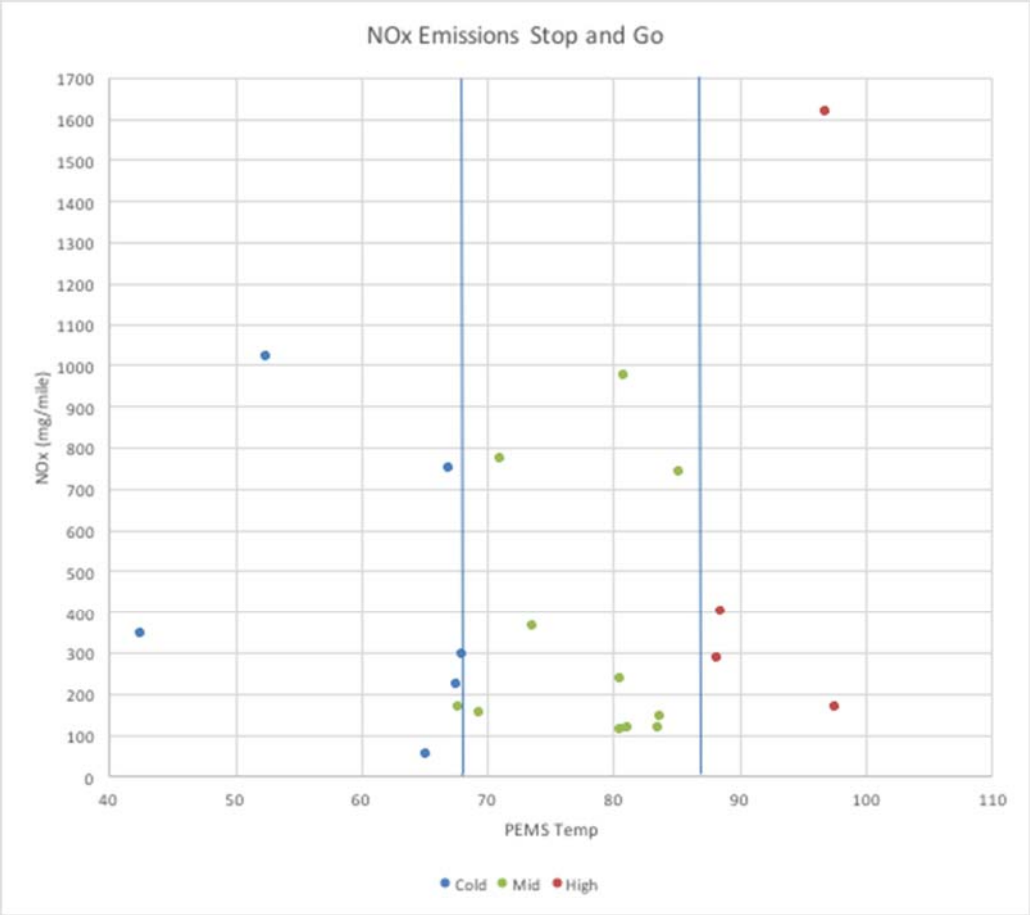


233. A wide variety of these SCR urea injection cheat devices were observed over the course of testing. These instances are summarized in the table below. In general, this cheat device results in a factor of 6.4 increase in NOx once the cheat device is triggered. The cheat device generates an additional 467 mg/mile of NOx above the standard. The SCR effectiveness is decreased on average from 90% to 59% once the cheat device is enabled. The EGR rate drops from 29.8% to 28.6%, so it would appear the primary cheat device is related to a reduction in urea injection into the SCR system.

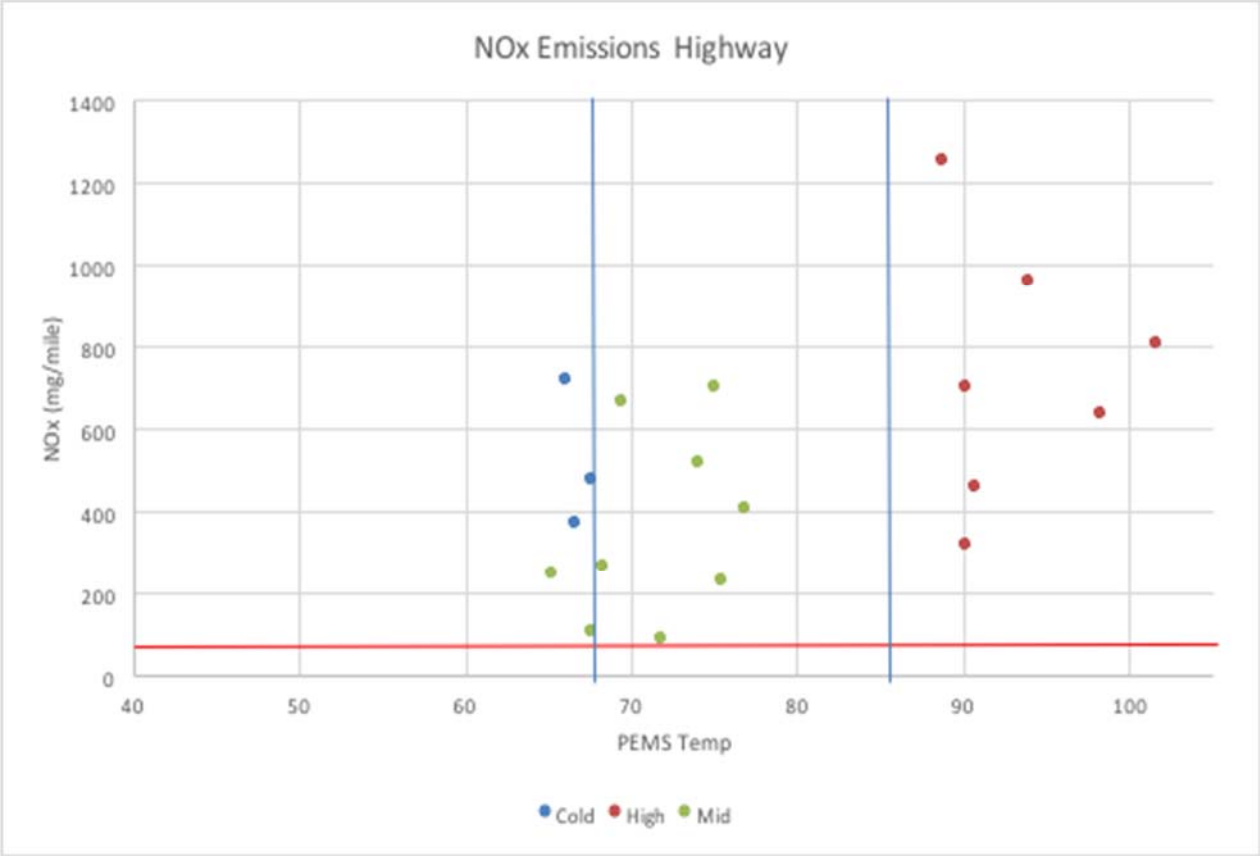
Condition	Temp	Event #	Pre timeout NOx (mg/mile)	After timeout NOx (mg/mile)	Factor Increase	Del NOx mg/mile
Uphill 0.7%	70	**1**	77	507	6.6	430
Uphill 2.0%	91	**2**	788	1176	1.5	388
Flat	94	**3**	103	965	9.4	862
Flat	90.2	**4**	210	667	3.2	457
Flat	75.5	**5**	109	324	3.0	215
Flat	88.5	**6**	127	811	6.4	684
Downill -0.6%	78.3	**7**	101	272	2.7	171
Uphill 0.5%	91.4	**8**	216	766	3.5	550
Flat	86	**9**	58	586	10.1	528
Flat	67.6	**10**	98	445	4.5	347
Hilly	80.8	**11**	108	851	7.9	743
Flat	90.7	**12**	74	603	8.1	529
Flat	76.9	**13**	52	529	10.2	477
Flat	65.2	**14**	16	206	12.9	190
Uphill 0.7%	70	**15**	77	507	6.6	430
				Average	**6.4**	**467**

234. The vehicle was tested on flat roads in stop-and-go conditions across a wide variety of ambient temperatures. Unlike the GLK250 and R350, there does not appear to be any ambient temperature dependence for the SCR cheat device. The cheat devices are active across all ambient temperatures.

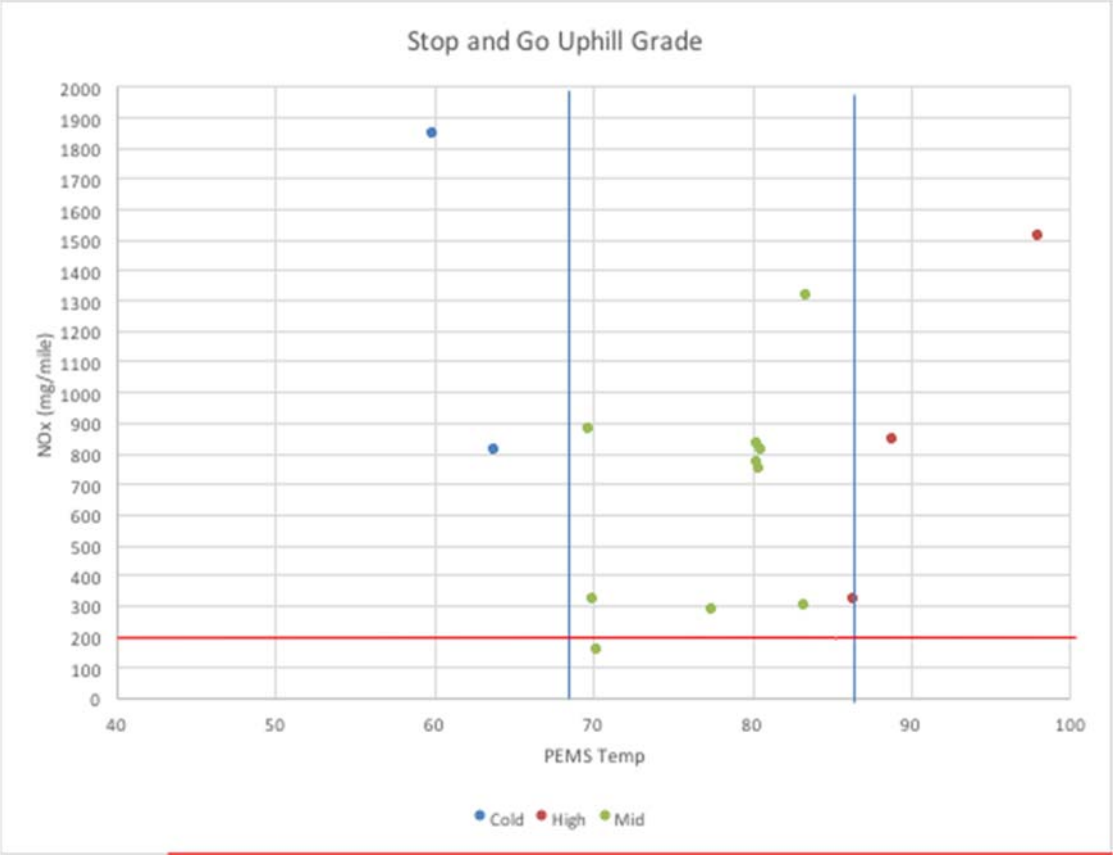
235. On average, the NOx emissions are 293 mg/mile, with spikes as high as 1,618 mg/mile. On average, the SCR effectiveness is reduced from 87% in cases where the vehicle meets the standard to 63% in cases where the vehicle exceeds the standard.



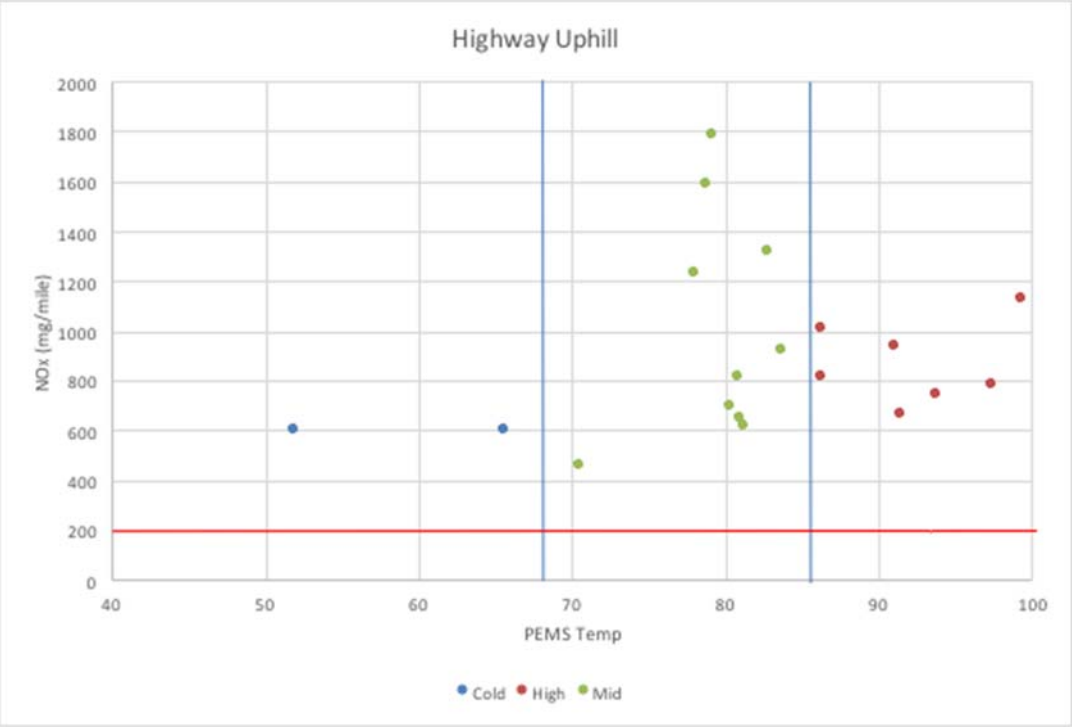
236. Similarly, for steady highway conditions on flat roads, the average NOx emission rate is 615 mg/mile, or three times the standard of 200 mg/mile. We observe emission rates as high as 1,254 mg/mile, or 6.3 times the standard. On average, the SCR effectiveness is reduced from 86% in cases where the vehicle meets the standard to 54% in cases where the vehicle exceeds the standard.



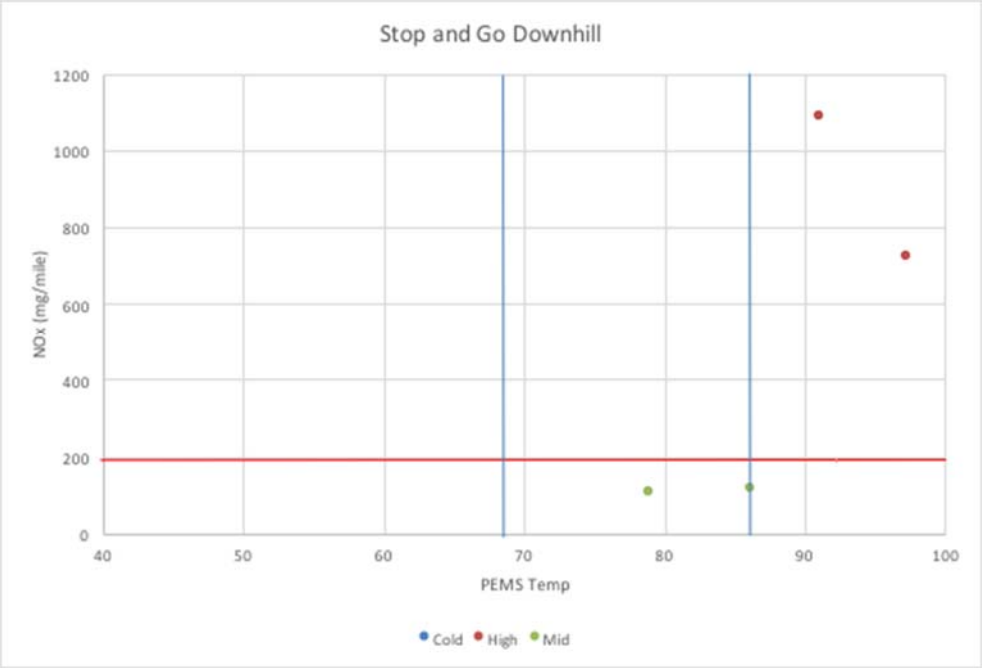
237. As with the passenger cars, the effects of modest road grades were studied in both stop-and-go and highway driving conditions. In stop-and-go conditions, road grades between 0.7% and 3.7% were tested, with a resulting average NOx of 738 mg/mile and maximum of 1,844 mg/mile. Even on a grade as insignificant as 1.0%, the emissions are as high as 845 mg/mile. In only one case on uphill grades did the vehicle meet the standard. The SCR effectiveness is reduced from 87% in cases where the vehicle meets the standard on flat roads to 53% on uphill grades. The EGR rate is reduced from 30% in cases where the vehicle meets the standard on flat roads to 23% on uphill grades.



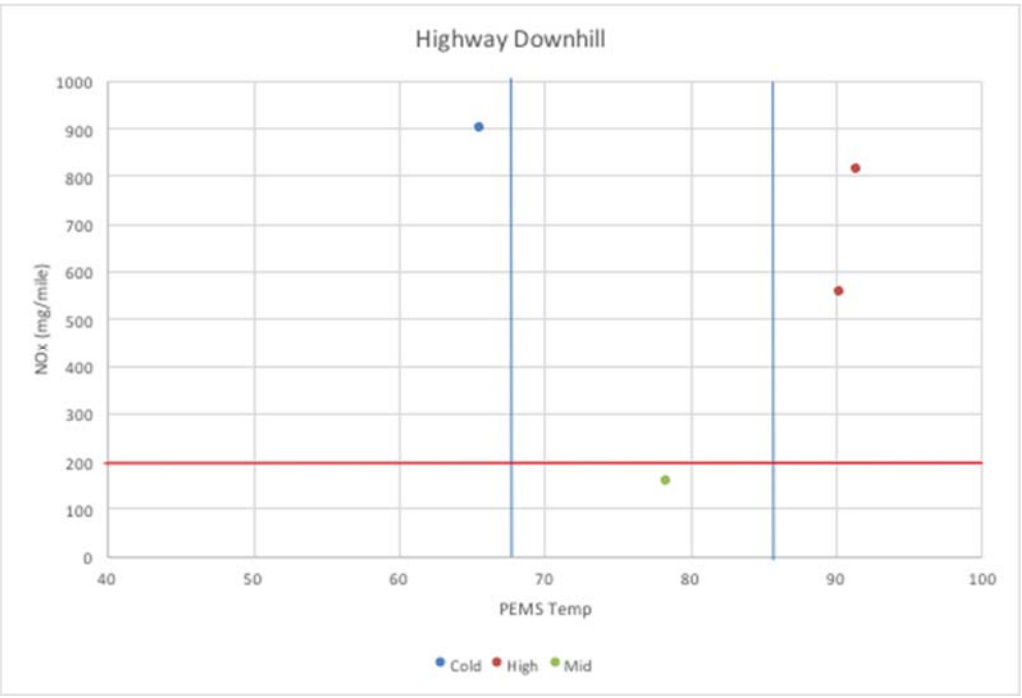
238. For highway conditions, road grades between 0.6% and 4.4% were tested, with a resulting average NOx of 1,003 mg/mile and a maximum of 1,790 mg/mile. Even with an almost imperceptible grade of 0.4%, the emissions are 698 mg/mile, or 3.5 times the standard. In no cases does the vehicle meet the standard on uphill grades. On average, the SCR reduction rate is 43%, compared to the high 80% range when the vehicle meets the standard. EGR rates are on average 22%, compared to 27% when the vehicle meets the standard in highway conditions (only on flat roads in this case).



239. Stop-and-go data for downhill conditions is relatively limited, but grades were tested between 0.7% downhill to 2.4% downhill, producing NOx emissions of 343 mg/mile on average. Interestingly, the highest NOx emission rate for downhill stop-and-go occurs at a very modest 0.7% downhill grade, yielding a NOx emission rate of 1,087 mg/mile. The SCR reduction rate is, on average, 70%, which compares to the 87% reduction rate when the vehicle meets the standard on flat roads.



240. Downhill grades between 0.6% and 2.9% were tested under steady highway conditions. The average NOx for these conditions is 714 mg/mile, with a maximum of 899 mg/mile at 1.0% downhill. The SCR effectiveness is 42% on average, compared to 86% where the vehicle meets the standard on flat roads.



241. It is thus clear that the vehicle is able to detect both uphill and downhill grades and reduce the level of urea injection. This cheat device results in a reduced effectiveness of the SCR

and EGR systems and dramatic and consistent increases in NOx above the standard. Combined with the timeout cheat device that reduces the SCR effectiveness after a short period of time, the vehicle rarely meets the NOx emission standard.

6. Summary Of The Mercedes/Bosch Deception

242. It is clear from the testing that Mercedes used a systematic set of cheat devices across their entire OM642 and OM651 engine platforms. The tested vehicles are representative of the entire group of vehicles in the Complaint as they test both the 3.0- and 2.1-Liter platforms. In the latter case, the OM651 platform was demonstrated to use cheat devices in both passenger car and medium-duty vehicle applications. The vehicles used consistent cheat devices to reduce both EGR rates and SCR rates under a wide variety of test conditions that were not discoverable using the certification test.

243. These cheat devices were only discoverable when conducting over-the-road testing that was not part of the certification protocol. A variety of cheat devices were used, including ambient temperature sensing, road grade sensing, SCR "timeout" (reduction after a period of time), and periodic and sporadic de-rate of the EGR and SCR systems. The result is that all three vehicles grossly exceeded the relevant emission standards when operated in normal driving conditions representative of a wide variety of driving styles.

244. The State did not test each model to derive plausible allegations that each Affected Mercedes Vehicle violated U.S. and CARB emissions standards and produced emissions beyond those a reasonable consumer would have expected when he or she purchased their Mercedes, because there was no need to do so. As set forth in more detail below, all of the models share either identical or very similar engines and emissions systems, allowing experts to plausibly conclude that all Affected Mercedes Vehicles violated U.S. and CARB standards and the expectations of a reasonable consumer.

245. Mercedes itself grouped various engines and vehicles into certain emission control groups. There is a standard EPA and CARB allowed practice, whereby vehicle manufacturers combine vehicles and engines into groups to reduce the cost of testing. This same approach laid

the groundwork for allegations of similarity and sameness across multiple models, model years, and configurations.

246. When a manufacturer submits an application for emissions certification to the EPA or CARB, they will group similar vehicles into the same test group that (i) have the same engine and emission control system, (ii) have similar weights, and (iii) are certified to the same emission standard. In some cases, only one vehicle will go in a test group. In other cases, there may be two or more vehicles in a test group. The manufacturer will group them based on the equivalency of the engine/emission control system and weight. For example, the 2009 ML320 BlueTEC and R320 BlueTEC are grouped together in the same test group because their engines/emission control systems are identical (3.0 Liter OM642 with SCR after-treatment) and they are a similar weight class. The GL320, which has the same engine and emission control system as the ML320/R320, goes into a different test group because it is in a different weight class (even though the engine and emission control system is the same). When a manufacturer groups multiple models onto the same certification application, only one vehicle is used for the manufacturer's testing in order to reduce cost; the manufacturer need not test every vehicle or even a sampling.

247. If the EPA considers the vehicles similar enough to allow grouping on the same application for a test group, then the EPA considers the vehicles identical from an emissions standpoint.

248. Comparisons to the "emissions data vehicle" (EDV) and the "durability data vehicle" (DDV) across multiple test groups also reinforces this conclusion. An EDV is used to demonstrate compliance with the relevant emission standard; this is the vehicle that is actually tested on the dynamometer to determine emissions performance and compliance with the standard. The DDV is used to show the durability of the emission control system and to determine the rate of deterioration for the emission control system over the vehicle's useful life.

249. When a manufacturer submits an application for certification, it will use a unique identifier (like a serial number) to identify the EDV and DDV that are being used to support the application. In many cases, the EDV will be the same vehicle as used in previous years, which means the application is a carryover from the previous year and no model changes were made. If

the EDV is the same from one application to the next, the vehicles in those test groups should be considered equivalent from an emissions performance standpoint.

250. The DDV applies more broadly across multiple test groups, as it is primarily a measure of catalyst deterioration. Many different models and model years may use the same DDV to demonstrate the durability of the emissions system. If two test groups use the same DDV, it provides some additional evidence that there is equivalence between the two engines and emission control systems.

251. All variants of the two base Mercedes BlueTEC engines sold in the U.S.—the 2.1L OM651 and the 3.0L OM 642—are well represented by both the State's list of vehicles and expert testing of the vehicles. Though there were different configurations and possibly subtle changes from vehicle to vehicle and model year to model year, these engines were substantially similar.

252. As noted, manufacturers tend to try to leverage the same engine/emissions technology across multiple vehicle platforms and model years in order to reduce the burden of testing. In fact, a single engine and/or vehicle has been used across multiple vehicle models and model years to achieve certification. This strongly (and plausibly) suggests that any cheat strategies would reasonably operate across the broad class of similar engines. Indeed, it would be prohibitively expensive and impractical for Mercedes to develop completely separate emissions control systems for vehicles that have the same or similar engines.

253. Experts also conducted additional research into the public technical literature providing an understanding of the various configurations of BlueTEC engines sold between 2009 and 2016. The literature provides some insight into the architecture of the variants of the OM642 and OM651 engines. In all cases, the engines are shown to have much more commonality than not, leading experts to conclude there is a strong basis for sufficient similarity or "sameness" to warrant inclusion on the list of Affected Mercedes Vehicles. *The vehicles are either equivalent from an emissions standpoint to the test vehicles or use the same core technologies and engine platforms as the tested vehicles.*

254. The vehicles can be broken down into four categories, all of which are well represented by the test vehicles identified for the reasons discussed above and as further explained below:

3.0 Liter OM642 with SCR

All of the Affected Mercedes Vehicles featuring a 3.0 Liter engine share the same basic engine architecture, code named OM642-30 by Mercedes. Although there are variations from revisions of the OM642-30, the same basic emission control architecture is employed through the line.

This architecture of the OM642 engine comprises the following emission control technologies: exhaust gas recirculation (EGR), a turbo-charger, a diesel oxidation catalyst (DOC), a diesel particulate filter (DPF), a selective catalytic reduction (SCR) system, a urea dosing tank and dosing system, and a Bosch EDC17 engine control module (ECM).

This architecture is well represented by the 2012 R350 BlueTEC test vehicle, which uses the OM642-30 engine along with all the aforementioned emission control devices. This test vehicle should be considered a reasonable representation of all 3.0 Liter Affected Mercedes Vehicles that employ SCR.

3.0 Liter OM642 with NOx Storage Catalyst

The very earliest (MY2007) implementation of the BlueTEC diesel engine employed an OM642-30 engine with a NOx storage catalyst after-treatment. Although this older after-treatment technology differs from the SCR systems, the *same* OM642-30 engine is used. In particular, the EGR system is well represented by the 2012 R350 BlueTEC tested. This is important because the tested R350 employs a cheat device (EGR valve de-rate or shutoff at ambient temperatures below approximately 50°F) to significantly reduce EGR flow rate to prevent condensation in the engine intake. NOx emissions increase as EGR flow rates are reduced. This cheat device is well-documented in Europe and has been demonstrated on the Plaintiff's R350 BlueTEC test vehicle. This cheat device results in a significant increase in NOx emissions. The 2007-2009 E320 BlueTEC vehicles configured with the NOx storage catalyst make use of the same EGR system as the tested 2012 R350 BlueTEC (as well as many other parts of the same OM642-30 engine system) and, for this reason, the 2012 R350 BlueTEC is be considered appropriately representative.

2.1 Liter OM651 with SCR

All of the Affected Mercedes Vehicles featuring a 2.1 Liter engine share the same basic engine architecture, internally code named OM651-22 by Mercedes. Based on literature and certification documents, the OM651-22 does not appear to have been significantly altered since its introduction in 2013.

This architecture comprises the OM651-22 engine with exhaust gas recirculation (EGR), a turbo-charger, a diesel oxidation catalyst (DOC), a diesel particulate filter (DPF), a selective catalytic reduction (SCR) system, a urea dosing tank and dosing system, and a Bosch EDC17 engine control module (ECM).

This architecture is well represented by the 2013 GLK250 BlueTEC 4matic test vehicle, which uses the OM651-22 engine along with all the aforementioned emission control devices. This test vehicle should be considered a reasonable representation of all 2.1 Liter Affected Mercedes Vehicles.

Sprinter

In the Sprinter, the emission control architecture remains largely unchanged from the aforementioned passenger cars. In fact, the Sprinter makes use of the same OM642-30 and OM651-22 engines and SCR emission control systems.

In both cases, this architecture comprises the base engine (either OM651-22 or OM642-30) with exhaust gas recirculation (EGR), a turbo-charger, a diesel oxidation catalyst (DOC), a diesel particulate filter (DPF), a selective catalytic reduction (SCR) system, a urea dosing tank and dosing system, and a Bosch EDC17 engine control module (ECM).

The tested 2014 Freightliner Sprinter 2500 with 2.1 Liter engine is representative of all 2.1 Liter equipped OM651-22 Sprinter vans. Although the 2.1 Liter Sprinter is certified to multiple weight classes in some cases, the emissions generally increase with higher weight ratings. The same engine and emissions control system is used across the various weight ratings, probably with very minor tweaks to account for the difference in weight.

The 3.0 Liter versions of the Sprinter contain OM642-30 engines that were taken from the passenger car market. The 2012 R350 BlueTEC, which employs the same basic OM642-22 architecture and emission control setup, is representative. Furthermore, the more modern 2014

> Freightliner Sprinter 2500 that was tested provides additional evidence that a cheat device is likely to be employed in the 3.0 Liter Sprinter platform as well.

255. The foregoing summary, backed by a deeper analysis that is not necessary to further detail at this time, is sufficient to demonstrate the representativeness of the test vehicles to the Affected Mercedes Vehicles. Any differences between the test vehicles and the Affected Mercedes Vehicles are not material and not significant enough to suggest that the same cheat device would not be present in the Affected Mercedes Vehicles.

256. Indeed, in the Volkswagen case, the EPA issued violation notices based on engine size (2.0 and 3.0 liters) and did not differentiate based on models or years. In other words, all 2.0 models were in violation.

257. The test results reported above are consistent with findings by testing agencies in Europe. Emissions Analytics is a British testing company that holds itself out as "the leading independent global testing and data specialist for real world emissions." The company publishes the EQUA Air Quality Index that identifies vehicles emissions on a scale from "A+" (best), to "H" (worst).

258. The Mercedes Diesel vehicles at issue were rated D, E, F, and H. The Mercedes gas cars were rated A+. A reasonable consumer would not expect his or her "clean" BlueTEC to rate far worse than a Mercedes gas powered car.

259. Recently Daimler recalled 700,000 vehicles in Europe as a result of an administrative order by the German Federal Motor Transport Authority. The recall addressed emissions systems and includes the same engine codes at issue here. These vehicles, the European version of the U.S. models at issue here, violated the Euro 6(b) emissions standard of .60 (the U.S. is .50).

H. The Damage From Excessive NOx

1. Environmental Harm

260. The State does not seek recovery for the harm to the environment, either through damages or otherwise. However, it is important to understand why (1) NOx is regulated and (2) why a reasonable consumer would not want his or her vehicle to dump NOx into the air.

261. NOx contributes to ground-level ozone and fine particulate matter. According to the EPA, "[e]xposure to these pollutants has been linked with a range of serious health effects, including increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital. Exposure to ozone and particulate matter has also been associated with premature death due to respiratory-related or cardiovascular-related effects. Children, the elderly, and people with pre-existing respiratory disease are particularly at risk for health effects of these pollutants."

262. The EPA describes the danger of NOx as follows:

Acid Rain - NO_x and sulfur dioxide react with other substances in the air to form acids which fall to earth as rain, fog, snow, or dry particles. Some may be carried by the wind for hundreds of miles. Acid rain damages forests; causes deterioration of cars, buildings, and historical monuments; and causes lakes and streams to become acidic and unsuitable for many fish.

Water Quality Deterioration - Increased nitrogen loading in water bodies, particularly coastal estuaries, upsets the chemical balance of nutrients used by aquatic plants and animals. Additional nitrogen accelerates "eutrophication," which leads to oxygen depletion and reduces fish and shellfish populations. NO_x emissions in the air are one of the largest sources of nitrogen pollution to the Chesapeake Bay.

Toxic Chemicals - In the air, NO_x reacts readily with common organic chemicals, and even ozone, to form a wide variety of toxic products, some of which may cause biological mutations. Examples of these chemicals include the nitrate radical, nitroarenes, and nitrosamines.

Ground-level Ozone (Smog) - is formed when NO_x and volatile organic compounds (VOCs) react in the presence of heat and sunlight. Children, the elderly, people with lung diseases such as asthma, and people who work or exercise outside are susceptible to adverse effects such as damage to lung tissue and reduction in lung function. Ozone can be transported by wind currents and cause health impacts far from the original sources. Millions of Americans live in areas that do not meet the health standards for ozone. Other impacts from ozone include damaged vegetation and reduced crop yields.

Particles - NO_x react with ammonia, moisture, and other compounds to form nitric acid vapor and related particles. Human health concerns include effects on breathing and the respiratory system, damage to lung tissue, and premature death. Small particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis, and aggravate existing heart disease.

Global Warming - One member of the NO_x family, nitrous oxide, is a greenhouse gas. It accumulates in the atmosphere with other greenhouse gases causing a gradual rise in the earth's temperature. This will lead to increased risks to human health, a rise in the sea level, and other adverse changes to plant and animal habitat.

263. A recent study published in NATURE estimates that there are 38,000 deaths worldwide due to excess NOx emissions. And recently a study commissioned by the Federal Office for the Environment (Germany) concluded that 6,000 people died prematurely in 2014 from illnesses known to be caused or aggravated by NOx exposure.

264. As noted, NOx contributes to ozone. Ozone is a particular issue for Phoenix, which was recently rated the 8th most air polluted city in the United States.

2. Economic Harm Specifically Alleged Here

265. As a result of Defendants' unfair, deceptive, and/or fraudulent business practices, and their failure to disclose that under normal operating conditions the Affected Mercedes Vehicles are not "clean" diesels, emit more pollutants than do gasoline-powered vehicles, and emit more pollutants than permitted under federal and state laws, owners and/or lessees of the Affected Mercedes Vehicles have suffered losses in money and/or property. Had Arizona consumers known of the higher emissions at the time they purchased or leased their Affected

Mercedes Vehicles, or had they known of the effects on fuel economy if the emissions were not manipulated, they either (a) would not have purchased or leased those vehicles, or (b) would have paid substantially less for the vehicles than they did. Arizona consumers paid a premium for diesel vehicles as the Mercedes Defendants charged more for a diesel engine than a comparable gas engine based on features that were falsely advertised including the cleanliness of the emissions, fuel performance, and durability. Further, without improvements in fuel economy and emissions over gasoline vehicles, there is no reason for a consumer to purchase a diesel car over a gas-powered car.

I. The Schemes At Issue Are Just The Latest In A Worldwide Diesel Emissions Cheating Scandal That Adds Plausibility To The Allegations Here

266. As noted, the world was shocked to learn that Volkswagen had manufactured over 11 million vehicles that were on the road in violation of European emissions standards, and over 480,000 vehicles were operating in the United States in violation of EPA and state standards. But Volkswagen was not the only manufacturer of vehicles that exceeded emissions standards.

267. In the wake of the major scandal involving Volkswagen and Audi diesel vehicles evading emissions standards with the help of certain software that manipulates emission controls,[69] scientific literature and reports and testing indicate that most of the diesel vehicle manufactures of so-called "clean diesel" vehicles emit far more pollution on the road than in lab tests. The EPA has widened its probe of auto emissions to include, for example, the Mercedes BlueTEC diesels and FCA's Jeep Cherokees and Dodge Rams. The results of the studies enhance

[69] EPA's Sept. 18, 2015 Notice of Violation to Volkswagen Group of America, Inc., available at https://www.epa.gov/sites/production/files/2015-10/documents/vw-nov-caa-09-18-15.pdf (last accessed July 6, 2020). As detailed in the Notice of Violation, software in Volkswagen and Audi diesel vehicles detects when the vehicle is undergoing official emissions testing and turns full emissions controls on only during the test. But otherwise, while the vehicle is running, the emissions controls are suppressed. This results in cars that meet emissions standards in the laboratory or at the state testing station, but during normal operation they emit NOx at up to 40 times the standard allowed under U.S. laws and regulations. Volkswagen has admitted to installing a defeat device in its diesel vehicles.

the plausibility of the allegations here as it is unlikely only Mercedes would have been capable of emissions technology that did not cheat.

268. In May 2015, a study conducted on behalf of the Dutch Ministry of Infrastructure and the Environment found that all sixteen vehicles made by a variety of manufacturers, when tested, emitted significantly more NOx on real-world trips while they passed laboratory tests. The report concluded that "[i]n most circumstances arising in normal situations on the road, the system scarcely succeeded in any effective reduction of NOx emissions."[70]

269. The report further remarked:[71]

> It is remarkable that the NOx emission under real-world conditions exceeds the type approval value by [so much]. It demonstrates that the settings of the engine, the EGR and the SCR during a real-world test trip are such that they do not result in low NOx emissions in practice. In other words: ***In most circumstances arising in normal situations on the road, the systems scarcely succeed in any effective reduction of NOx emissions***.

The lack of any "effective reduction of NOx emissions" is a complete contradiction of Defendants' claims that the Affected Mercedes Vehicles are clean.

270. Other organizations reached similar conclusions. The Transportation and Environment ("T&E") organization, a European group aimed at promoting sustainable transportation, compiled data from "respected testing authorities around Europe." T&E stated in September 2015 that real-world emissions testing showed drastic differences from laboratory tests such that models tested emitted more pollutants on the road than in their laboratory tests. "For

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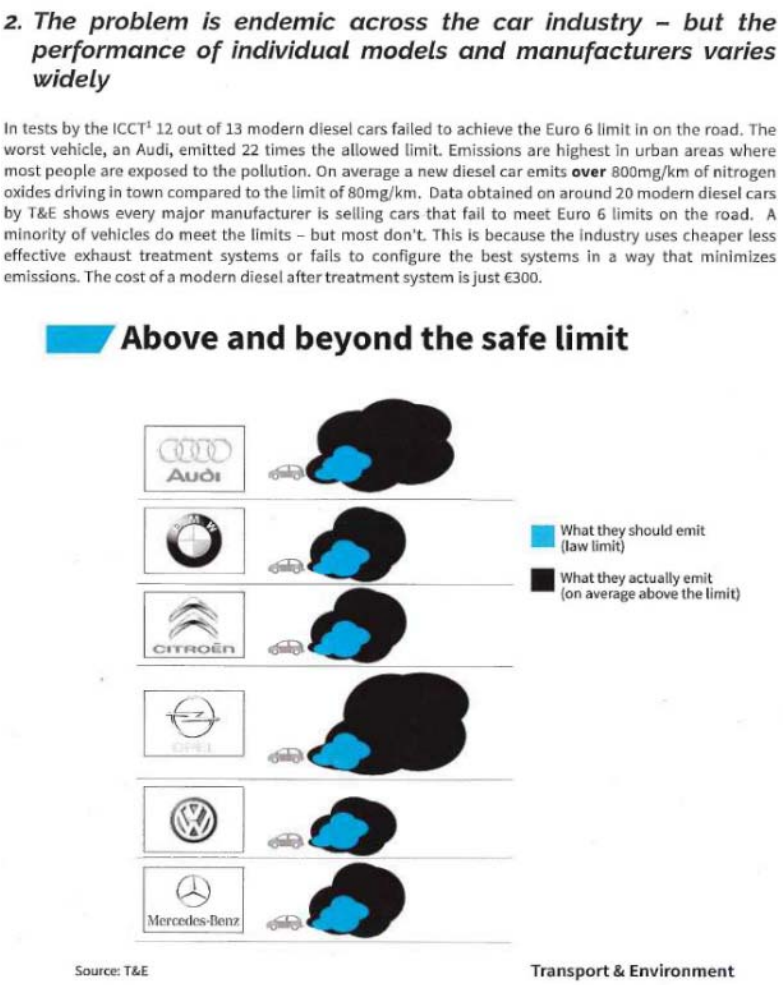
[70] *Detailed investigations and real-world emission performance of Euro 6 diesel passenger cars*, TNO (May 18, 2015), http://publications.tno.nl/publication/34616868/a1Ug1a/TNO-2015-R10702.pdf (last accessed July 6, 2020).

[71] *Id.* at 6 (emphasis added).

virtually every new model that comes onto the market the gap between test and real-world performance leaps," the report asserts.[72]

271. In a summary report, T&E graphically depicted the widespread failure of most manufacturers including Mercedes:[73]



[72] *VW's cheating is just the tip of the iceberg*, Transport & Environment (Sept. 21, 2015), https://www.transportenvironment.org/publications/vw%E2%80%99s-cheating-just-tip-iceberg (last accessed July 6, 2020).

[73] *Five facts about diesel the car industry would rather not tell you*, Transport & Environment (Sept. 2015), https://www.transportenvironment.org/sites/te/files/publications/2015_09_Five_facts_about_diesel_FINAL.pdf (last accessed July 6, 2020.

272. The T&E report concluded that the current system for testing vehicles in a laboratory produces "meaningless results."[74]

273. Emissions Analytics is a U.K. company that says that it was formed to "overcome the challenge of finding accurate fuel consumption and emissions figures for road vehicles." With regard to its recent on-road emissions testing, the company explains:[75]

> [I]n the European market, we have found that real-world emissions of the regulated nitrogen oxides are four times above the official level, determined in the laboratory. Real-world emissions of carbon dioxide are almost one-third above that suggested by official figures. For car buyers, this means that fuel economy on average is one quarter worse than advertised. This matters, even if no illegal activity is found.

274. In February 2018 news articles reported that investigators probing U.S. models of Mercedes found "defeat devices" similar to those in Volkswagen's. According to confidential documents cited in the article,[76] the Mercedes vehicles are equipped with software that switches off emissions controls after 16 miles. The article refers to emails from engineers at Daimler questioning the legality of this software.

V. CLAIM FOR RELIEF

COUNT I
(AGAINST ALL DEFENDANTS)
ARIZONA CONSUMER FRAUD ACT (A.R.S. § 44-1521, ET SEQ.)

275. The State re-alleges and incorporates by reference all preceding paragraphs.

276. Each Defendant is a "person" within the meaning of A.R.S. § 44-1521(6).

277. The Affected Mercedes Vehicles are "merchandise" within the meaning of A.R.S. § 44-1521(5).

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[74] *Id.*

[75] Emissions Analytics Press Release (Sept. 28, 2015), available at http://www.abvwc.com/home/emissions-analytics (copy available at https://www.emissionsanalytics.com/news?year=2015 (last accessed July 6, 2020)).

[76] https://www.greencarreports.com/news/1115433_mercedes-benz-gets-its-own-diesel-emission-cheating-questions-now (Feb. 23, 2018) (last accessed July 6, 2020).

278. The Arizona Consumer Fraud Act provides that "[t]he act, use or employment by any person of any deception, deceptive or unfair act or practice, fraud, false pretense, false promise, misrepresentation, or concealment, suppression or omission of any material fact with intent that others rely upon such concealment, suppression or omission, in connection with the sale or advertisement of any merchandise whether or not any person has in fact been misled, deceived or damaged thereby, is declared to be an unlawful practice." A.R.S. § 44-1522(A).

279. In the course of their business, Defendants systematically concealed the true operation of the Affected Mercedes Vehicles' emission system and fuel economy, as described herein and otherwise engaged in activities with a tendency or capacity to deceive.

280. Defendants also engaged in unlawful practices by employing deception, deceptive or unfair acts or practices, fraud, false pretenses, false promises, misrepresentations, or concealment, suppression or omission of material facts with intent that others rely upon such concealment, suppression or omission, in connection with the sale and lease of the Affected Mercedes Vehicles.

281. Among other things, by failing to disclose and by actively concealing the true emissions and fuel economy of the Affected Mercedes Vehicles, Defendants engaged in deceptive and unfair acts and practices in violation of the Arizona Consumer Fraud Act.

282. Defendants conspired to conceal the true operating characteristics of the Affected Mercedes Vehicles, including their true emissions output and the fact that fuel economy and performance is achieved only by derating emissions controls.

283. For example, Bosch maintains nearly total control over the EDC17. As such, the Mercedes Defendants and Bosch had to work together to create a unique set of specifications and software code to manage the Affected Mercedes Vehicles' engine operations. Software calibrations and creation of sophisticated algorithms to evade emissions was an interactive process between Defendants—implemented though regular email exchanges and other communications—with a goal of evading emissions standards and misleading consumers.

284. Defendants' employees regularly communicated to each other regarding the creation and implementation of the EDC17 in the Affected Mercedes Vehicles. Further,

Defendants made presentations to regulators, where they knew they would present false and misleading information, and make material omissions. The companies also jointly promoted the Affected Mercedes Vehicles and "clean diesel" technology in Arizona and across the country as environmentally superior to gasoline vehicles even though they knew their statements were false.

285. In short, to effectuate a fraud on Arizona consumers, Defendants created and employed a cheat device to make the Affected Mercedes Vehicles appear to emit low levels of pollution under certain driving conditions when in actual driving conditions the vehicles emitted much higher levels. Defendants then promoted the Affected Mercedes Vehicles containing the cheat device, and further promoted "clean diesel" technology to Arizona consumers even though they knew their promotions were false and omitted material information.

286. These unfair and deceptive practices, false statements, and material omissions violate the Arizona Consumer Fraud Act, and were made in connection with the sale and advertisement of the Affected Mercedes Vehicles.

287. Defendants misrepresented facts regarding the Affected Mercedes Vehicles.

288. Defendants' unfair and deceptive acts, practices, and material omissions had the tendency and capacity to deceive consumers, including Arizona consumers.

289. Defendants concealed, suppressed, and omitted material facts regarding the Affected Mercedes Vehicles with an intent that Arizona consumers rely on the concealment, suppression, or omission.

290. Defendants' violations present a continuing risk to owners of the Affected Mercedes Vehicles, as well as to the general public. Defendants' unlawful acts and practices complained of herein affect the public interest.

291. While engaging in the unlawful acts and practices alleged in this Complaint, Defendants were at all times acting willfully as defined by A.R.S. § 44-1531.

PRAYER FOR RELIEF

WHEREFORE, the State respectfully requests the Court to enter Judgment against Defendants as follows:

A. Order that each Defendant restore to any person in interest any monies or property, real or personal, which may have been acquired by means of any practice declared to be unlawful under the A.R.S., pursuant to A.R.S. § 44-1528(A)(2);

B. Enter an injunction against each Defendant permanently prohibiting it, and all others acting directly or indirectly on its behalf, from continuing and engaging in the unlawful acts and practices as alleged in this Complaint and from doing any acts in furtherance of such unlawful acts and practices, pursuant to A.R.S. § 44-1528(A)(1);

C. Order each Defendant to disgorge any profits, gains, gross receipts, or other benefit obtained after September 13, 2013, by means of any unlawful act or practice in connection with the sale or advertisement of each Affected Mercedes Vehicle as alleged in this Complaint, pursuant to A.R.S. § 44-1528(A)(3);

D. Order each Defendant to pay to the State a civil penalty of not more than $10,000 for each willful violation of the Consumer Fraud Act in connection with the sale or advertisement of the Affected Mercedes Vehicles;

E. Order each Defendant to pay its share of the State costs of investigation and prosecution of this matter, including its reasonable attorneys' fees, pursuant to A.R.S. § 44-1534;

F. Confirm the designation of this case as a Tier 3 case under Rule 26.2(b)(3)(C) of the Arizona Rules of Civil Procedure, subject to the State seeking discovery beyond those limits, as contemplated by Rule 26.2(g); and

G. Award the State such further relief the Court deems just and proper under the circumstances.

Dated: September 13, 2020

Respectfully submitted,

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