

INTERACTIVE SESSION TECHNOLOGY

Volkswagen Pollutes Its Reputation with Software to Evade Emissions Testing

When Volkswagen Group AG tried to bypass Toyota as the world's largest automaker, one part of its strategy called for tripling U.S. sales in a decade by promoting "clean" diesel-powered cars promising low emissions and high mileage without sacrificing performance. It turned out that about 580,000 cars in the United States and almost 10.5 million more "clean" diesel models sold worldwide by VW under its VW, Audi, and Porsche brands weren't really "green" at all.

On September 18, 2015, the U.S. Environmental Protection Agency (EPA) issued a notice of violation of the Clean Air Act to the Volkswagen Group after finding that Volkswagen had intentionally programmed turbocharged direct injection diesel engines to activate certain emissions controls only during laboratory emissions testing. The programming caused the vehicle's nitrogen oxide (NOx) output to meet U.S. standards during regulatory testing but emit up to 40 times more NOx when the cars were actually driven on the road. Volkswagen put this software in about 11 million cars worldwide, and in 580,000 in the United States, during model years 2009 through 2015.

Volkswagen was able to get away with cheating on emissions tests for years because it was hidden in lines of software code. Many functions in today's automobiles are controlled by millions of lines of software program code, including monitoring carbon monoxide and nitrogen oxide levels to help a car control the amount of pollutants it emits. Diesel engines don't emit much carbon monoxide, but they generally emit a greater amount of nitrogen oxide (NOx), a component in low-atmosphere ozone and acid rain. The United States has tougher NOx standards than Europe, where diesel cars are more common.

Diesel-powered cars use sensors and engine-management software to monitor and limit emission levels. The software can control how much NOx is produced during combustion by regulating the car's mix of diesel fuel and oxygen or by deploying NOx traps to capture the pollutant and catalysts to clean emissions. However, these pollution-reducing measures also reduce fuel economy. Experts believe that by examining data on steering, tire rotation, and accelerator use, a software program would be able to determine whether a car was being actually driven

on the road or on an emissions-testing bed and adjust engine performance and emissions to pass the test.

Around 2007, VW's hard-driving chief executive Martin Winterkorn started pressuring his managers with much higher growth targets for the U.S. car market. In order to increase market share, VW needed to build the larger cars favored by Americans—and it also had to comply with the Obama administration's toughening standards on mileage. All automakers developed strategies to meet the new mileage rules, and VW's focused on diesel. Cheating on emissions tests solved multiple problems. Cars equipped with the "cheating" software were able to deliver better mileage and performance while VW avoided having to pay for expensive and cumbersome pollution-control systems.

VW started installing the software to cheat emissions tests in 2008 after learning that its new diesel engine, developed at great expense for its growth strategy, could not meet pollution standards in the U.S. and the EU. Rather than halt production, VW decided the best course of action was to game the system. It is unclear who in VW management was responsible for this decision. Lawsuits by New York, Maryland, and Massachusetts have charged that dozens of engineers and managers were involved.

The emissions scandal has shaken the entire auto industry. Volkswagen became the target of regulatory investigations in multiple countries, and Volkswagen's stock price fell in value by a third in the days immediately following the cheating revelation. Chief executive Winterkorn resigned, and the head of brand development Heinz-Jakob Neusser, Audi research and development head Ulrich Hackenberg, and Porsche research and development head Wolfgang Hatz were suspended. Volkswagen's troubles in Europe, the UK, and Asia are growing. It has spent \$25 billion so far in the U.S. by 2019 to compensate 600,000 VW diesel car owners, and paid over \$28 billion in penalties. In Europe alone there are 8 million VW diesel cars, and if VW was forced to compensate owners at the same rate, it would cost the firm \$300 billion and destroy the company. In 2018 EU regulators demanded that VW repair them all. But in Europe consumer laws are weak, and different for each country. Class-action law suits are not allowed in Europe, and the company is facing

thousands of individual lawsuits instead. For its part, VW is denying that its emission software is illegal in Europe. In December 2017, a senior VW executive was sentenced in the U.S to seven years in prison for his role in the scandal.

Sources: William Boston and Dave Michaels, "SEC Charges Volkswagen with Defrauding U.S. Bond Investors," *Wall Street Journal*, March 15, 2019; Patrick McGee, "Volkswagen Director Warns of 'Most Difficult Year Ever' in 2019," *Financial Times*, December 2, 2018; Bill Vlasic, "Volkswagen Official Gets 7-Year Term in Diesel-Emissions Cheating," *New York Times*, December 6, 2017; "EU Moves to Crack Down on Carmakers in Wake of VW Emissions Scandal," *Agence France-Presse* in Brussels, May 29, 2017; William Wilkes, "Volkswagen's Emissions Bill Could Top \$25 Billion," *Wall Street*

Journal, February 1, 2017; Hiroko Tabuchi, Jack Ewing, and Mar Apuzzo, "6 Volkswagen Executives Charged as Company Pleads Guilty in Emissions Case," *New York Times*, January 11, 2017

CASE STUDY QUESTIONS

1. Does the Volkswagen emission cheating crisis pose an ethical dilemma? Why or why not? If so, who are the stakeholders?
2. To what extent was management responsible for the cheating crisis? Explain your answer.
3. Should all software-controlling machines be available for public inspection? Why or why not?