Volkswagen Emissions Scandal: The Perils of Installing Illegal Software

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Abstract

This paper presents a case study related to the negative impacts of Volkswagen installing illegal software in its automobiles in order to manipulate the emissions level of its diesel vehicles. The case addresses reasons why Volkswagen decided in install the illegal software and highlights the negative consequences of its actions. These negative consequences include significant financial and reputational costs to Volkswagen.

Key Words: *Volkswagen; Emission Levels, Environmental Standards, Corporate Reputation.*

Introduction

In a stunning announcement on September 18, 2015, the Environmental Protection Agency (EPA) accused Volkswagen of illegally installing software in its diesel cars that manipulated the amount of emissions occurring during testing of the levels of emission. The EPA alleged that Volkswagen used the software to turn on the full emissions control systems for the vehicle only when the vehicle was being tested for emissions. During any other time the vehicle was operating, the full emissions control system was turned off. The software would turn on the control systems when the car was running in a stationary position since that would be the condition when the car was being tested for emissions.

The EPA estimated that when the full emissions control system had been turned off, the vehicle could release up to 40 times as much of the pollutant nitrogen oxide than is allowed under the Clean Air Act. Nitrogen oxide is a catalyst in the development of ozone and smog. It has been linked to a number of health issues including respiratory problems. One reason why Volkswagen set the emission control system to turn off is that it increases the power of the engine in areas such as torque and acceleration. The International Council of Clean Transportation (ICCT) research organization was researching on diesel vehicles and discovered that Volkswagen vehicles had different emission levels when tested in a laboratory when the car was stationary than when the car was driven on the road (Davenport and Ewing, 2015).

The Discovery of the Emissions Manipulation

The ICCT is a nonprofit environmental group which includes a number of former EPA officials. ICCT wanted to test the emissions of vehicles in the United States since the EPA has more stringent emission standards than in Europe. As a result, the original goal was to try and “shame” the European automakers by demonstrating that more stringent emissions standards do not decrease the overall performance of the vehicle. The ICCT partnered with researchers from West Virginia University to test the vehicles. In addition, the California Air Resources Board joined the testing process since it had a specialized lab that could measure emission compliance (Vlasic and Kessler, 2015).

The ICCT notified the EPA of its results from testing Volkswagen vehicles. The EPA did additional tests on the Volkswagen vehicles and discovered the software used to turn off the emissions control systems. The initial recall order by the EPA included 4 cylinder Volkswagen and Audi vehicles from 2009 through 2015 (Davenport and Ewing, 2015).

On September 20, 2015, Volkswagen announced that it had suspended all sales of the four-cylinder TDI diesel engine vehicles in the United States. CEO Martin Winterkorn stated that “I personally am deeply sorry that we have broken the trust of our customers and the public,” (Boston, 2015a). These diesel engines were marketed to the public as “clean diesel” (Ewing and Davenport, 2015). The software would measure variables such as the position of the steering wheel, the speed of the vehicle and barometric pressure to determine whether the vehicle was being tested for emissions. Based on these variables, the software would reduce the amount of nitrogen oxide emitted from the vehicle (Ewing, 2015a). The following day, September 21, 2015, the United States Department of Justice announced that it had started a criminal probe into Volkswagen’s use of software to manipulate nitrogen oxide levels (Viswanatha, 2015).

On the same day, it was revealed that Volkswagen had told environmental regulators for over a year that the differences in the emission levels between the testing conditions and the open road conditions were based on a technical error. It was only after the EPA threatened to withhold its approval on the 2016 Volkswagen and Audi models that Volkswagen admitted to the tampering of the emissions. Volkswagen could be fined as much as $37,500 per vehicle which could lead to an estimated $18 billion based on the initial estimate of the number of cars which had included the software (Vlasic and Kessler, 2015).

The Announcement of the Recalls

On September 22, 2015, Volkswagen announced that up to 11 million vehicles globally had the emissions control software and the company would allocate a $7.27 billion charge to its earnings to resolve the issue. Volkswagen’s CEO Martin Winterkorn stated that “Millions of people in the world trust our brand, our cars and our technology…I am endlessly sorry that we have betrayed that trust.”(Boston and Sloat 2015). The following day Martin Winterkorn resigned his position as Volkswagen’s CEO. Martin Winterkorn stated that he would “accept responsibility…(for the)…irregularities that have been found in diesel engines….I am shocked by the events of the past few days…(and)…Above all, I am stunned that misconduct on such a scale was possible in the Volkswagen Group.”(Boston, 2015b). Two day later, Volkswagen announced that the head of Volkswagen’s Porsche division, Matthias Muller would become the new CEO at Volkswagen. Muller promised to change the company’s management structure and vowed that “(t)he same thing must never happen again”. Revisions in the management structure would include giving the divisions more autonomy since Volkswagen had been criticized that the decision making process was too centralized in its corporate headquarters and was too slow to respond to immediate issues related to the company (Ewing and Vlasic, 2015).

In order to be in compliance with the EPA standards of emissions, Volkswagen would have had to spend 400 Euros or approximately $440 extra per car. Therefore, for the 10.8 million vehicles that had been recalled the total cost would have been $4.3 billion Euros or approximately $4.8 billion dollars. After the announcement of the emissions tampering by Volkswagen, the company’s stock lost approximately 29 Billion Euros in market capitalization which resulted in the loss of 140 Euros in market value for each Euro of “savings” by not incorporating the emissions reduction technology in their vehicles (Storbeck, 2015).

In 2008, Volkswagen’s CEO Martin Winterkorn told executives of Volkswagen’s American operations that he wanted the sales in the United States to triple to at least 800,000 cars by 2018. It was expected that diesel engine vehicles would make up a large percentage of this increase since diesel engine vehicles only made 5 percent of the United States car market in 2007 (Boston, 2015c).

The Timeline Changes for Volkswagen

On October 4, 2015, it was revealed that the emissions tampering was reportedly started in 2008. The underlying motivation of the tampering was that Volkswagen had just developed a new diesel engine but it did not meet the EPA standards of pollution emissions. The EA 189 engine took several years to develop and was planned to be used in not only Volkswagen brand vehicles, but also in other vehicles in the Volkswagen group including Audi, Skoda and Seat. This engine was being positioned as part of the "clean diesel" marketing campaign used globally to give comfort to Volkswagen's customers that they were purchasing vehicles that were environmentally friendly yet also had high mileage per gallon and strong physical performance. Therefore, instead of starting the development of a new engine again, the managers at Volkswagen decided to tamper with the reported emissions level. Before the introduction of the EA 189, Volkswagen had developed an alternative emission reduction technology with Daimler who makes Mercedes-Benz vehicles. This alternative technology was more expensive and in 2007, Volkswagen announced it was going to develop its own technology to reduce emissions. Based on the emissions scandal, three top level managers had been suspended for their involvement in the emissions scandal: Ulrich Hackenberg, who was the head of development for all Volkswagen Group brands; Heinz-Jacob Neusser, who was the head of development of the Volkswagen brand, and Wolfgang Hartz who was the head of engines and transmissions development for all of the Volkswagen brands (Ewing, 2015b).

It was revealed on October 7, 2015 that the Chief Executive of Volkswagen's American division, Michael Horn, was aware of the emissions problems in the spring of 2014. During that time period, Horn was informed of "a possible emissions noncompliance" with the diesel engine vehicles. Horn was also told that Volkswagen engineers would work with the EPA in order to resolve the issue (Ivory and Ewing, 2015). The following day, it was revealed that Volkswagen had installed a second computer program in some of its diesel vehicles models to lower emission levels. The second software is an auxiliary emissions device which modifies the performance of emissions equipment. Volkswagen's response was that the additional software was disclosed and was approved by the EPA. Automobile makers are allowed to insert auxiliary emissions control devices in their vehicles if they have informed and negotiated with the regulators to reduce emissions due to extreme conditions such as when the vehicle goes up a steep hill or runs in very cold weather (Ivory and Bradsher, 2015). On October 9, 2015, German prosecutors raided the corporate offices of Volkswagen as part of their criminal investigation into the manipulation of emissions level of Volkswagen's diesel vehicles. The government officials secured documents and data storage devices from several people within the corporate headquarters. Volkswagen turned over a "comprehensive collection of data" to the investigators (Boston, Spector and Lange, 2015).

The Technical Changes Start

On October 13, 2015, Volkswagen announced that it would adopt an alternative technology in order to control the diesel exhaust. In the future, Volkswagen would start using a selective catalytic reduction (SCR) system which Volkswagen had developed with Daimler and rejected in 2007 because of the cost. This technology requires that a tank of urea-based fluid, called AdBlue, be added to the vehicles to neutralize nitrogen oxide emissions from the vehicle through the new emission filtration system However, using the SCR technology not only increased the cost, but also added more weight and took up more space in the vehicle than other emission controls technology. The amount of space becomes a difficult challenge to solve in compact cars such as the Volkswagen Golf and Jetta which are among the bestselling Volkswagen brands in the United States. In addition, that tank which holds the AdBlue must be refilled, on occasion, which reduces the convenience of owning the vehicle. Furthermore, in the United States, vehicle owners are not allowed to refill the AdBlue tank and must take the vehicle to the dealership or to a service station (Eddy, 2015, Ewing 2015c). On November 3, 2015, Volkswagen disclosed that it had understated the level of carbon dioxide emissions in 800,000 gasoline powered vehicles and overstated the vehicles' fuel economy. The result of the disclosure will cost Volkswagen an estimated $2.2 billion in penalties since Volkswagen had received tax breaks in Europe based on selling cars with low levels of carbon dioxide emissions (Ewing and Bowley, 2015). Volkswagen later reduced the number of estimated vehicles from 800,000 to 36,000 after retesting the vehicles. It had announced the figure of 800,000 as a conservative estimate of the number of vehicles that were involved in the understating of carbon dioxide emission levels (Ewing, 2015d).

Volkswagen's Tainted Corporate Culture

On November 12, 2015, Volkswagen offered an amnesty program to encourage workers to come forward and disclose information relative to the emissions scandal. The amnesty guaranteed the workers that they would not be fired or face damage claims but it did not shield the employees from criminal charges. The amnesty offer was applicable only to the workers who were part of the collective bargaining agreements. The amnesty offer was not offered to top management employees (Ewing and Creswell, 2015). Giving evidence to the financial impact of the emissions sandal, Volkswagen announced that its October 2015 global sales decreased by 5 percent (Ewing, 2015e).

The following month on December 10, 2015, Volkswagen Chairman Hans Dieter Potsch described the emission scandal based on the fact that "(T)here was not one single mistake, but rather a chain of errors that was never broken." In addition, he stated that the foundation of the scandal was based on the "misconduct and shortcomings of individual employees… (and was supported by)…a mind-set in some areas of the company that tolerated breaches of rules." (Boston, Varnholt and Sloat, 2015). On January 4, 2016, the United States Department of Justice filed a civil complaint against Volkswagen for installing illegal devices in approximately 600,000 diesel engine vehicles sold in the United States (Davenport and Hakim, 2016).

It was revealed on February 15, 2016 that a quality control executive send an internal memo to Volkswagen's CEO Martina Winterkorn warning him that American regulators were about to start an investigation into whether Volkswagen was using "test recognition" software in order to manipulate emission levels. Bernd Gottweis was part of a group of quality experts who were sent around the world to resolve major quality issues related to Volkswagen vehicles. It was also revealed that Volkswagen was aware in April 2014 that West Virginia University was conducting an emissions study in which two Volkswagen models, the Passat and Jetta had emission levels than were more than 30 times the allowable levels of nitrogen oxide. Mr. Gottweis discussed the results with Volkswagen engineers in the United States who could not explain the results of the study. As a result, Gottweis wrote in the memo to the CEO that "(n)o plausible explanation for the dramatically increased NOx emissions can be given to the authorities…It is assumed that the authorities will subsequently examine VW systems to determine if Volkswagen has installed test recognition into the engine control software."(Boston, 2015d).

On March 9, 2016, Michael Horn stepped down from his position as the head of Volkswagen North American operations. Horn had worked at Volkswagen for over 25 years and was the head of global sales at Volkswagen before he became the head of the North American operations. Horn admitted while giving testimony in October 2015 that he was aware of the emissions problem in the spring of 2014 (Mouawad, 2016).

The former vice chairman of General Motors, Bob Lutz, could not understand why General Motors' engineering was unable to match Volkswagen's emissions level. He now knows the reason why. Lutz commented that "(t)here's no way to fix these noncompliant cars." The reason was that Volkswagen could not solve the fundamental conflict occurring when reducing emissions within a restricted budget. Emissions technology which reduces the output of nitrogen oxide automatically increases the production of soot particles. As a result, traditional emissions technology cannot reduce all the different harmful emissions. While high nitrogen oxide level increases lung problems, higher level of soot can potentially increase the probability of cancer. If Volkswagen reduced the nitrogen oxide levels and increased the soot levels, the diesel engine would need to undergo periodically flushing in order to clean out the buildup of soot (Ewing, 2016).

The Legal Problems Start

On March 29, 2016, the Federal Trade Commission (FTC) filed a complaint against Volkswagen for falsely advertising its diesel vehicles as environmentally friendly. The FTC claimed that Volkswagen falsely claimed that its vehicles are “clean diesel” and had low levels of emissions which was in compliance with state and federal environmental standards. The FTC stated that the message of the advertising was false with statements such as “Diesel. It’s no longer a dirty world…Green has never felt so right…clean as a whistle.” In addition, the FTC claimed that while Volkswagen claimed that its diesel vehicles had reduced nitrogen oxide emissions by 90 percent, in actuality, the vehicles were releasing emissions that were up to 4,000 percent higher than the legal limit of nitrogen oxide (Randazzo and Spector, 2016).

On April 21, 2016, Volkswagen announced that it would either fix or buy back all of the approximately 500,000 diesel cars in the United States which had the emission manipulative software installed in the vehicle. The estimated Kelley Blue Book value of these vehicles was estimated to be $7 billion. At this point in time, Volkswagen had only allocated $7.6 billion to cover the global costs of the emission scandal (Ewing, 2016a). The following day Volkswagen announced that it was going to set aside more than $18 billion instead of the initial estimate of $7.6 billion to cover the costs of the emissions scandal. In addition, Volkswagen announced that it had reported a loss of more than $6.2 billion in 2015 in large part due to the emissions scandal (Ewing, 2016b).

On April 26, 2016, it was revealed that a top technology executive at Volkswagen made a Power Point presentation describing how Volkswagen could manipulate the emissions results in the United States. It was also disclosed that Volkswagen executives rejected any recommendations to improve the existing emissions equipment in order to satisfy the stringent United States regulations even though they knew that the Volkswagen vehicles were releasing more emissions than EPA regulations allowed. The existing emissions equipment could have been calibrated to meet the regulatory standards of the United States but is would result in the equipment quickly wearing out. Volkswagen also continued to install the manipulating software even after government regulators started investigating Volkswagen’s claim of low level of emissions in their diesel vehicles. The software would detect whether the vehicles were being tested, for example if the steering wheel not moving when the vehicle was running. In addition, Volkswagen had significantly underestimated the potential cost of violating emissions requirements. Volkswagen had hired the law firm of Kirkland & Ellis to examine fines related to regulatory violation and the law firm told Volkswagen in August 2015 that the highest penalty for regulatory violations by an automobile manufacturer was $100 million. The $100 million was levied against Hyundai-Kia for greenhouse gas emissions violations involving 1.1 million vehicles (Ewing, 2016c).

German prosecutors announced on June 20, 2016 that former Volkswagen CEO, Martin Winterkorn, was under investigation for his role in the emissions scandal. Winterkorn was suspected of stock manipulation by delaying announcing to the public that Volkswagen was going to be investigated for emissions testing (Ewing, 2016d). On June 27, 2016, Volkswagen announced that it had agreed to pay up to $14.7 billion to settle civil claims related to the emissions scandal in the United States. The amount included $10 billion to buy back approximately 475,000 vehicles with the illegal software at their pre-scandal value. In addition, approximately $4.7 billion will be given as additional cash compensation to the vehicle owners. The range of the cash compensation to the owners will vary from $5,100 to $10,000. Additionally, Volkswagen agreed to pay the EPA fund $2.7 billion to compensate for the environmental impact of the vehicles which had released excess amounts of emissions. Volkswagen also agreed to invest $2 billion in future cleaner vehicle projects to aid in the development of its future vehicles (Tabuchi and Ewing, 2016). On July 7, 2016, Volkswagen announced that it had agreed to pay the state of California $486 million in civil penalties for the emissions scandal (Minaya, 2016).

The Financial Impact of the Emissions Scandal

On September 21, 2016, investors had filed approximately 1,400 claims for damages from Volkswagen for the declining stock price due to the emissions scandal. The investors claimed that Volkswagen failed to notify the public that it was being investigated by the EPA and the California Air Resources Board and, therefore, did not warn investors of the potential financial risks of these investigations.

From September 17, 2015 to October 1, 2015, the stock price of Volkswagen decreased from 167.80 Euros per share to 118.35 Euros. A spokesman for Volkswagen, Andreas Hoffbauer stated that "Volkswagen maintains that we completely fulfilled our legal duties to financial markets and that these claims are unfounded."(Boston, 2016). On October 1, 2016, Volkswagen agreed to pay 652 American dealers $1.2 billion as compensation for providing them with vehicles with the illegal emissions software. The dealers will receive, on average, $1.85 million as part of the settlement (Randazzo, 2016). On October 17, 2016. Volkswagen agreed to pay $175 million to lawyers representing the plaintiffs filing lawsuits against Volkswagen (Randazzo, 2016a). As a result, on November 18, 2016 Volkswagen announced that it was going to cut 30,000 jobs by 2021 as part of its restructuring program. Volkswagen was going to shift toward electric and self-driving vehicles in the future (Reuters, 2016). Volkswagen extended a 20 billion Euro loan on November 28, 2016 ($21.2 billion) in order to secure its financial strength as it still waits for the final financial cost of the emissions scandal (Reuters. 2016a).

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