

Ethical Considerations for Automobile Emissions Management Background, Detriment, and Litigation

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DOI: <https://doi.org/10.37745/ejbir.2013/vol11n11120>

Published: 22nd January 2023

Citation: Ningxin Li (2023) Ethical Considerations for Automobile Emissions Management Background, Detriment, and Litigation, *European Journal of Business and Innovation Research*, Vol.11, No.1, pp.,11-20

ABSTRACT: *Volkswagen's diesel emissions have triggered different litigations from the EPA and other agencies. This research will analyze potential justification to the upper management and the engineers of Volkswagen. Maintaining trust between society, customers, and car manufacturers is essential. This research will provide strategies for automobile manufacturers to mitigate the potential recurrence of litigation risks. Manufacturers and engineers should ensure that the cars can successfully maintain consumers' trust. The author recommends that automobile manufacturers should focus on global markets and improve its ethical and regulatory standards. Additionally, this research emphasizes that a company has ethical obligations to disclose facts and mitigate future risks for improving reputation and devices. Moreover, this research encourages upper management and engineers to solve the emission problem by improving technological innovation to decrease emissions. The author believes that car manufacturers have social and ethical responsibilities when designing devices. They should lower emissions for climate change and public health reasons. Furthermore, this research provides insights on what manufacturers could learn from the Volkswagen scandal, which highlights that cooperation among the company, experts, and government agencies is essential. It encourages manufacturers' teams to consider different ethical approaches when designing devices to protect individuals' health and the environment.*

KEYWORDS: Automobile emissions, common good approach, ethical considerations, technological innovation, utilitarianism approach

INTRODUCTION

The Volkswagen Group, founded in 1937, is a multinational automotive manufacturer headquartered in Germany (StudyCorgi, 2021). It is one of the leading automakers in the world (StudyCorgi, 2021). The Volkswagen Group has built a reputation globally for making quality cars (StudyCorgi, 2021). Over the years, the company has manufactured different brands of cars, including Volkswagen and Audi. All the cars were supposed to undergo laboratory tests concerning the environmental regulations in different countries (StudyCorgi, 2021). The U.S. emissions standards are stricter than Europe's (Jack Ewing, 2019). Volkswagen deceptively

exceeded the United States Environmental Protection Agency (EPA) standards limiting nitrogen dioxide (LGWP Law, n.d.). Nitrogen dioxide can contribute to the formation of harmful fog and smoke (EPA, n.d.). Emissions from the cars can also cause respiratory problems, premature deaths (LGWP Law, n.d.), and cardiovascular-related health problems (EPA, n.d.). Volkswagen might have faced litigation from customers who have purchased its cars. Government agencies from different countries, such as the EPA; shareholders of Volkswagen; and wholesalers and retailers who sell Volkswagen might also litigate against the company. German prosecutors continued to pursue criminal charges against dozens of former Volkswagen executives by accusing them of applying illegal software to vehicles to disguise actual emission results in tests (Jack Ewing, 2020). In the United States, Volkswagen's diesel emissions could have triggered fraud litigation (Jack Ewing, 2019). According to evidence presented in United States courts, Audi used illegal software in testing (Jack Ewing, 2019). The company's reputation was highly compromised following the EPA's discovery of their actions (Jack Ewing, 2019). *The New York Times* showed that Volkswagen's Audi luxury-car unit, composed of the engineers and upper management of the Audi Q7 SUV, was most deeply involved in developing the emissions cheating scheme (Jack Ewing, 2019).

According to the EPA, the cars that had been used in the emission tests were different compared to the ones used in the markets (StudyCorgi, 2021). In the Audi Q7 SUV, engineers used a chemical solution to neutralize diesel emissions (Jack Ewing, 2019). Additionally, they created a so-called "cycle beating" software to cheat in the emission tests (Jack Ewing, 2019). Some Volkswagen executives pleaded guilty in the United States. The company was charged with violating the Clean Air Act (Jack Ewing, 2018). Volkswagen admitted it had illegally sold nearly 600,000 vehicles equipped with defective devices (Jack Ewing, 2018). Volkswagen stated that its diesel cheating scandal cost over 30 billion euros in fines and settlements (Reuters, 2020).

Upper Management for Car Manufacturers

Car manufacturers should react as quickly as possible when a public concern arises (StudyCorgi, 2021). The management board has responded to the scandal by suspending some senior members of the management teams (StudyCorgi, 2021). Moreover, a company should investigate all employees who were responsible for defect designs (StudyCorgi, 2021). A company could offer most sincere apologies to the people affected by any harmful actions due to defect design and manufacturing (StudyCorgi, 2021).

Reports indicated that vehicles like the Audi Q7 SUV were equipped with catalytic converters that used injections of a chemical solution to neutralize emissions of nitrogen oxide (Jack Ewing, 2019). Upper management might have been unaware of the problem before the scandal (StudyCorgi, 2021). After the company noticed this problem, the company took immediate measures to recall all affected cars to make necessary changes (StudyCorgi, 2021). It is important to tell the public that a company cares about the concerns and welfare of customers. A company should be aware of the issues reported in the news and it should solve the in a timely manner (StudyCorgi, 2021). The emissions scandal provided an awakening call for the company and

engineers across the world to upgrade our devices (StudyCorgi, 2021). Car manufacturers should regularly investigate the tests and processes used by the U.S. authorities to make sure the problems will not occur (StudyCorgi, 2021). They can redesign the parts to decrease air pollution in diesel vehicles (StudyCorgi, 2021).

In the Volkswagen scandal, some upper-level managers and engineers have contributed to the wrongdoing (Jack Ewing, 2018). They should have been supervised more closely and carefully throughout the process of designing and producing the cars (Jack Ewing, 2018). This case gave insights that a car manufacturer should be more open and honest with informing regulators, managers, engineers, marketing personnel, and customers about the potential problems of devices producing emissions that can harm the public's health (LGWP Law, n.d.). Also, a company should be open to communicate with any individuals and organizations having concerns and suggestions, as well as address the public's concerns properly.

Strategies of Mitigating a Recurrence of the Risk

It is important to maintain trust between customers and the company. A company could create a culture of accountability and transparency (Ajay Dugar, 2018). Engineers should ensure that the company could regain and maintain consumers' trust (Ajay Dugar, 2018). When a country such as the United States has strict rules for emission control, the company should respond to all its concerns and upgrade our technology to meet customers' needs and agencies' requirements (StudyCorgi, 2021).

The car manufacturer could focus on its current global markets to gain a better understanding of their sociocultural, demographic, and regulatory factors (Ajay Dugar, 2018). Upper-level management, engineers, and all other employees in the company should consider learning the framework for ethical decision-making. For example, a utilitarianism approach indicates that the most ethical action ensures the greatest amount of good for the largest number of individuals and creates the least amount of harm (Florida Tech, n.d.). The company should consider such an approach to improve ethical standards. The company should not allow any misleading information or negligence and consider the safety needs and health of the public.

There must be a standard of fairness that applies to employees (Florida Tech, n.d.). A car manufacturer could utilize the fairness approach to allow its employees to be treated equally to create a transparent, friendly, organized, and responsible working environment. The company could also bring in more talented employees to help us create customer-friendly and environmental-friendly products. The car manufacturer can implement a cost-benefit analysis to measure the benefits of a decision. Cost-benefit analysis involves evaluating project costs or decisions by laying out various possibilities and alternatives (Tim Stobierski, 2019). Engineers could identify goals to address the concerns of the public. Upgrading the emission system and other functions might cost more money. The company could invest funds to enhance safety and increase reliability rather than release defective devices that might lead to further litigation and damages.

Engineers in car manufacturers would consider different types of costs when they implement plans to solve technical problems (Tim Stobierski, 2019). Direct costs could include inventory, raw materials, and manufacturing expenses (Tim Stobierski, 2019). Indirect costs might include such items as electricity and overhead costs from management and utilities (Tim Stobierski, 2019). Intangible costs of a decision should also be evaluated, such as the impact on customers, employees, and time for engineers to upgrade a system (Tim Stobierski, 2019). Additionally, instead of upgrading the old emission system, the car manufacturer could consider alternative investments, such as buying new equipment (Tim Stobierski, 2019). Furthermore, the company could consider the costs of handling potential risks, such as regulatory risks, litigation, and environmental impacts when they produce a new product (Tim Stobierski, 2019). The company could also evaluate intangible benefits and costs from a decision, such as employees' morale and customer satisfaction (Tim Stobierski, 2019). Engineers can review vehicle design and incorporate necessary strategies to reduce emissions according to federal emissions standards and test procedures (Legal Information Institute, n.d.). There will be information requirements: The company should provide an explanation containing detailed information regarding engineering evaluations, test programs, and design specifications for operation during and outside of federal emission test procedures (Legal Information Institute, n.d.). Engineers should investigate possible defective emission devices under the Prohibition of Defeat Devices paragraph: "The engineers will provide an explanation that the emissions will be reasonably controlled to the linear guidelines, across the intermediate temperature range" (Legal Information Institute, n.d.). They should carefully follow the codes in the Prohibition of Defeat Devices. § 86.1809-01 indicates:

"(a) No new light-duty vehicle, light-duty truck, or complete heavy-duty vehicle shall be equipped with a defective device; (b) The engineers may test or require testing on any vehicle at a designated location, using driving cycles and conditions, which may reasonably be expected to be encountered in normal operation" (Legal Information Institute, n.d.).

For the purposes of investigating a potential defective device, this includes vehicles that exceed the CO emissions guideline upon intermediate temperature cold testing: "(1) If the CO emission level is greater than the 20 degree F (-7 deg. C) emission standard, the vehicle will be considered to be equipped with a defective device without further investigation; (2) If the CO emission level does not exceed the 20 degree F emission standard, the administrator will investigate the vehicle design for the presence of a defective device under paragraph (d) of this section" (Legal Information Institute, n.d.).

Violation of business ethics based on environmental regulations is frequently observed in the automobile industry (Kashfia Ameen, 2020). The company has faced two allegations: air pollution and falsifying emissions tests (Kashfia Ameen, 2020). Upper-level managers should establish business ethics for its engineers and other employees (Kashfia Ameen, 2020). Automobile manufacturers should follow strict scrutiny when it approves any new components or technology that will be implemented. Also, manufacturers could separate the personnel who test the vehicles for emissions from the ones who design the vehicles. The car manufacturer could establish a

committee to ensure their projects are compliant with the Clean Air Act. The company could create a portable emission measurement system on their vehicles. Also, the car manufacturer could invite an independent professional to double-check more details in the procedure of making cars and to ensure that its product design would comply with not only local laws and regulations, but also abide by ethical codes.

Ethical Obligation to Disclose the Fact and to Mitigate Unethical or Unlawful Behavior

As engineers, they have both moral and legal obligations to disclose unethical or unlawful behavior. “Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact” (NSPE, n.d.). It is important to be open and honest with the public, even considering the possibilities of discomfort when receiving unpleasant news or updates. For maintaining the long-term reputation of the company, the company should establish and uphold ethical standards for behavior to help employees decide how to make ethical, lawful, and responsible decisions (Brown University, n.d.). The engineers should review its bylaws and policies in designing or enforcing any standard in different divisions (Brown University, n.d.). The car manufacturer might consider the utilitarian approach. Philosopher Epicurus of Samos explained that achieving the best life involves producing the least pain and distress for everyone (Brown University, n.d.). Also, philosopher Jeremy Bentham believed individuals should pay attention to the amount and degree of pleasure compared with the pain produced (Brown University, n.d.). The manufacturer might consider taking the environmental and health factors into grave consideration when they upgrade engineering systems and cars (Brown University, n.d.). Also, the company should be aware of their actions to make people comfortable and ensure the best interest of the majority to produce the greatest balance of good over harm (Brown University, n.d.).

The common good approach can be applied in this case. Philosophers Plato and Aristotle argued that individuals’ actions should contribute to ethical, communal life (Brown University, n.d.). Also, philosopher Jean-Jacques Rousseau stated that the best society should be guided by the “general will,” producing what is the best for the general public (Brown University, n.d.). A car manufacturer could review and update their policies, as well as promote constant innovation that would produce the most good for the general public, because a car is an important and useful tool for many people when they go to work, school, and travel (Brown University, n.d.). Since many people use cars, the company and engineers might need to take different factors into consideration, such as public health and ensuring its emission and other standards will comply with local rules. A car manufacturer should lower emissions for climate change and public health reasons. The emissions scandal posed a serious ethical dilemma for the company (StudyCorgi, 2021). The company should not only consider the health and interests of their customers when designing cars, the company should also evaluate the risks to others who do not drive cars but might be exposed to the emissions (StudyCorgi, 2021).

The best way to solve the emission problem is to encourage technological innovation to decrease emissions. A car manufacturer can hire more designers, engineers, consultants, and marketing

analysts to assist engineers in making better choices and selecting better alternatives when designing cars. Additionally, the company could create a separate division to ensure their vehicles will meet EPA standards in various states and countries. This approach to ethics highlights cooperation among employees and compassion for individuals who are vulnerable with compromised health conditions.

Understanding Ethical Guidelines

The Volkswagen group stated that they spent more than \$2.7 billion into a fund for environmental remediation of the harm caused by pollution, as well as funded around \$2 billion to promote zero-emissions vehicles (LGWP Law, 2021). Car manufacturers could learn from the Volkswagen scandal and could provide information in an objective and truthful manner in a responsible and ethical way (NSPE, n.d.).

National Society of Professional Engineers Code of Ethics

The National Society of Professional Engineers (NSPE) Code of Ethics for Engineers indicates: “Engineering is an important profession, and engineers are expected to uphold the highest standards of honesty and integrity; Engineers should be objective and truthful in professional reports, statements, and testimony; They shall acknowledge their errors and shall not distort or alter the facts; They should fulfill their professional duties to approve only those documents that are in conformity with applicable standards (NSPE, n.d.). Also, engineers should not aid or abet unlawful practices of engineering by a person or organization” (NSPE, n.d.).

Engineers should not promote their own interest at the expense of the dignity and integrity of the profession (NSPE, n.d.). Instead, engineers should always serve the public interests (NSPE, n.d.). Additionally, engineers cannot accept any compensation and financial assistance from more than one party for services on the same project unless they fully disclose the information and have consent from all interested parties (NSPE, n.d.). “Engineers must be dedicated to the protection of the public health, safety, and welfare; Engineers’ device designs will have a direct and vital impact on the quality of life of the public” (NSPE, n.d.). Engineers should obtain knowledge of the NSPE Code of Ethics and cooperate with proper authorities in assisting project designs (NSPE, n.d.). “Engineers in car manufacturers will perform services only in the areas of their competence. The services provided by them will ensure honesty, impartiality, fairness, and equity” (NSPE, n.d.). More importantly, they are encouraged to comply with the principles of sustainable development to protect the environment for future generations. Additionally, the company should encourage them to work for the advancement of the safety, health, and well-being of their communities (NSPE, n.d.).

Institute of Electrical and Electronics Engineers Code of Ethics

The 2014 Institute of Electrical and Electronics Engineers (IEEE) Code of Conduct indicates that engineers in companies must commit themselves to the highest ethical and professional conduct (IEEE, n.d.). Engineers should not have any unlawful conduct in professional activities; they should reject bribes in all forms (IEEE, n.d.). Engineers should recognize the importance of

technologies in affecting the quality of life and personal obligations to the engineering profession (IEEE, 2014).

Engineers should disclose any information that might endanger the public and the environment when their acts or the company's products violate EPA rules (IEEE, 2014). They should comply with all applicable environmental laws and regulations, as well as the IEEE codes (IEEE, 2014). Engineers should uphold the highest standards of integrity, responsible behavior, and ethical conduct in compliance with ethical design and sustainable development standards (IEEE, n.d.). Moreover, they should understand that deceptive conduct is not ethical and might cause legal consequences. Engineers could do more research to fix the problems and create new devices to produce less emissions. Additionally, when designing cars, engineers could consult relevant agencies and experts to avoid producing extra emissions that might lead to safety, environmental, and health problems.

Interested Parties and Litigations

Automobile manufacturers should balance product profits, individuals' rights, and social welfare. The company needs to analyze potential litigation raised against it. The upper management should make responsible decisions and uphold justice rules. The CEOs and board of directors could consider the benefits and effects of their decisions and actions on different parties.

The company should consider how to evaluate responsibilities of employees, including CEOs, managers, and engineers in different divisions throughout the company (Lief Cabraser Heimann & Bernstein, n.d.). Employees of a company may want to consider improving its ethical codes for the company, especially for engineers, marketing managers, and CEOs. CEOs may want to eliminate similar risks and mistakes in their management when they approve cars and send them into the global markets. Upper management personnel should understand more market policies and environmental rules to avoid further litigation that could influence the company's reputation. Additionally, shareholders of a manufacturer might be interested in improving the company's management rules and bylaws because they may want to investigate whether their past or future profits and interests might have been or will be impacted by the scandal. Additionally, shareholders might want to consider adjusting their stock market strategies. Individuals and corporations who hold stock in a company can also be potential interested parties in this case. Reports showed that the Volkswagen emissions scandal caused numerous negative effects on its stockholders (StudyCorgi, 2021). Qatar was one of the major shareholders in Volkswagen. following the scandal, the Arab country lost around \$5 billion due to the decreased stock value (StudyCorgi, 2021). At the Frankfurt Stock Exchange, Volkswagen's stock value decreased 20% on the first day of trading after the scandal (StudyCorgi, 2021). This issue provides insight that shareholders might want to be informed when a company's board of directors makes a decision to respond to the public (Jack Ewing, 2018). The board of directors must make a reasonable effort to keep shareholders informed about important decision-making and updated policies of the company (Lynn Stout, 2015).

Environmentalists and NGOs might have an interest in this case since their main concern would be the potential damages to the environment from car emissions. Also, environmental protection agencies might want to gather information and evidence about how a company will respond to their concerns in potential litigation. Certain agencies have obligations to issue policies to ensure the benefits of their citizens. For example, the EPA might need to evaluate the benefit and cost of allowing Volkswagen's cars to continue to be sold in the U.S. market. EPA might also need to reevaluate the emissions of the cars that failed the initial inspection. Wholesalers and retailers who sell cars could also be the potential litigation parties because they might need to evaluate the cars' market values and decide whether they should continue to import certain types of cars. Also, competitors of different car manufacturers may want to hear and react to any news (Comparably, n.d.).

They may want to improve their market strategies to compete with a car manufacturer, learn lessons to avoid any risks in car designs, and avoid mistakes on the upper management level. A car manufacturer should evaluate that the interests of the customers who have purchased or will purchase cars might be impacted because of the quality of a car. Customers who have purchased cars from the company might raise concerns over their cars' emissions and public health. For example, many customers who bought Volkswagen and Audi diesel cars learned that their cars were in violation of EPA's rules (Lieff Cabraser Heimann & Bernstein, n.d.). The scandal might lead to a class action lawsuit from buyers against the company (HG.org, n.d.). A report showed that plaintiffs have asked the Volkswagen company to disclose information for the benefit of the class members (Lieff Cabraser Heimann & Bernstein, n.d.). Moreover, people who have not bought the cars from the company but plan to buy, may be curious about the potential market values of the cars. When customers plan to buy cars from or resell their cars to a third party, they would want to know the market value of the cars. Car manufacturers should evaluate the concerns over a company that is constantly being sued by different parties.

Is It Ethical to Develop or Design a Defective Device?

Whether it is ethical to develop or design a defective device depends on different situations. Some problems of a device may not be foreseeable when engineers first design it. A design defect occurs when there was an inherent flaw or error in a product (FindLaw, 2018). Because of the complexity of the software and technology used in a device, it may take time for engineers and the company to work with regulators to identify problems and upgrade defective devices (Jack Ewing, 2019). A company should plan to take certain steps to prevent problems in their defective devices. Engineers might have limited knowledge about rules and policies of different areas and countries. The company could require more information from international agencies and experts to improve the cars' performance while complying with local regulations. More problems and questions would occur while people are using the cars. That is why it is important for a company to gain feedback and advice from the public. By the time the company gathers comprehensive information, engineers would be able to identify the factors to improve the defective devices (Lynn Stout, 2015). Additionally, a company can issue recalls on specific defective parts and cars and allow customers to bring their cars in for service free of charge to replace the affected parts.

Car manufacturers have social and ethical responsibilities. The company could take necessary steps for sustainable development of the products. The company must be conscious of the environment and the effects of global warming. The company might have a long-term goal to benefit the public and eliminate harm and risk to the environment (Lynn Stout, 2015). Also, the manufacturer could develop an updated agenda of environmental sustainability by improving technology to reduce emissions. Additionally, engineers could improve oversight of engine-software development to control the level of emissions and ensure the products' emissions will comply with the EPA rules (EPA, 2015). Furthermore, a car manufacturer can encourage engineers to work with different teams with varied expertise to solve design defect problems while complying with national ethical guidelines and codes.

The car manufacturer's teams should always care for the health of our children, adults, and older people, especially those with weaker health systems (EPA, n.d.). For example, Volkswagen has invested over \$2 billion for the Zero Emission Vehicle (ZEV) plan and could do more to meet the public's needs (EPA, n.d.). The company has submitted and could continue to update its ZEV investment plans to the EPA for review and approval (EPA, n.d.). More importantly, a car manufacturer needs to inform the public about new information regarding the progress of improving its devices, ethical standards, and management rules.

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