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## Phase1: Problem statement and sub-theme

### Introduction

In September 2015 Volkswagen was told to recall a couple million cars within the world because they were caught deploying sophisticated software within their diesel cars. This was a total shock for lots of people all around the world, because the brand Volkswagen was a trustworthy car brand.

### General Challenge

- To what degree should the German government get involved within the Dieselgate scandal?  
Actor - German government

### Sub-themes

- To what degree did Volkswagen follow the legislation?
- How could they circumvent these rules?
- What government agencies are involved?
- What political sanctions should be imposed on Volkswagen?
- Can Volkswagen's image be restored when they adapt their business to the legal system?
- To what extent are the users disadvantaged through the Dieselgate scandal.

In order to know to what degree the German government should take into account the damage that has been done to the world, several aspects are important to know beforehand. One of these is to what extent Volkswagen (enterprise) followed the rules. This is important because we have to know if the consequences are intended by Volkswagen. Another question popping

up after the scandal was discovered is how Volkswagen could have avoided these rules after so many years.

Government agencies with their position in the transport industry are dealing with the Volkswagen scandal. Discovering what agencies are involved can help tackling the general challenge. To do so, we need to establish what instances are affected and the role they play within the procedure of car design, development and testing. The agency which is responsible (EPA (Environmental Protection Agency)) for the testing of pollution levels will have a major impact as well, as they decide whether or not a car can drive on the public road considering the test results.

It is clear that Volkswagen should be punished for what they did. Therefore, we want to investigate what kind of sanctions should be imposed on Volkswagen in order to make their punishment fluent. Another point of discussion will be if their image can be restored after these sanctions have been followed by the Volkswagen company. This is important to know for economical reasons, as well as environmental and political reasons, because the people involved play a major role in solving the Dieselgate scandal.

For the general solution the government has to know in what way the users are affected through this scandal. This is because they play a big role in the kind of punishment Volkswagen has to deal with. The German government has to take the users as well as Volkswagen into account when imposing sanctions.

As for the main challenge, all of the abovementioned sub-themes will be discussed in order to come to a solution. The most important sub-theme for imposing a solution to the challenge will be: What political sanctions should be imposed on Volkswagen?

To propose a good solution for to what extent government agencies should adapt, we need to thoroughly discuss what sanctions we think should be imposed on Volkswagen.

Source:

<http://www.autoexpress.co.uk/car-news/consumer-news-vw-emissions/95277/german-car-brands-to-recall-630k-diesel-models-over>

Source:

<http://energydesk.greenpeace.org/2015/10/12/dieselgate-scandal-government-regulator-receives-over-80-million-from-auto-industry-in-past-10-years/>

(In order to know how Volkswagen recovers from the sanctions imposed, we first need to find out what these sanctions were and how impactful these were on Volkswagen. A lot of people were shocked by the scandal, making them less trustful towards Volkswagen. The enterprise therefore harmed their image.

We think that the challenges of our sub-themes are: finding out what specific rules Volkswagen has to follow in order to pay for the political and environmental damage that has been done. Moreover, we need to investigate what people thought of Volkswagen after the scandal came out, in order to find out in what degree their image was damaged.)

# Phase 2: Problem analysis

## 2.1. User, society, enterprise

The first actor relevant to our sub-theme is of course Volkswagen itself, Volkswagens image has been damaged and in order to keep their business alive they need to recover. Also Volkswagen has to deal with possible sanctions imposed by the German government, European parliament and US government as well as deal with the lawsuits from different individuals and companies hurt by the scandal.

The Volkswagen's shareholders is another group of actors, they more or less have the same interest as the Volkswagen company.

Another actor is the European parliament, it is partially the responsibility of the European Parliament to enforce emission regulations. So it is in their interest to investigate and sanction Volkswagen accordingly. Also it is in interest of the European Parliament to look at the current regulations and tests to prevent similar incidents from taking place.

Thus far the European Investment Bank has announced its own investigation and could possibly recall VW loans. The European Parliament has voted to establish a europe wide authority to oversee car-emissions and emission tests. Furthermore the European Parliament has voted to establish a special committee to investigate whether regulators and executive officials, including the European Commission, have failed in their efforts to oversee the car industry and its pollution testing regimes.

The German government is the actor we will primarily be focussing on, it also has the responsibility to sanction and monitor Volkswagen. Furthermore the image of the whole of Germany has been hurt by the scandal, so it is in the interest of the whole of Germany to deal with the scandal. However, the car industry being a large part of german economy, it is also important for germany to keep the car industry healthy.

Thus far the VW headquarter has been raided and 20 investigators are working on investigation VW employees. Also the former ceo Martin Winterkorn is under investigation. To see if the scandal is more widespread than is currently known; the KBA (federal motor transport authority) has started to test 50 cars of other manufactures on the road.

The German government is a major player in the scandal since the reason the german car industry is thriving is that customers have a lot of faith in the german industry. By not punishing Volkswagen the image of the german industry will be hurt and will be seen less trustworthy, however punishing Volkswagen too much will hurt the company and therefore the german economy. It is up to the German government to find a balance between sanctioning Volkswagen and not destroying Volkswagen in order to keep the car industry as well as the economy as a whole thriving. It might also play a role in helping Volkswagen recover, for example by making it possible to file a lawsuit on behalf of all car owners to prevent Volkswagen from getting a lot of individual lawsuits.

Source:

[https://www.researchgate.net/profile/Pedro\\_Da\\_Cruz\\_Caria/publication/292722292\\_'The\\_Volkswagen'\\_case\\_morally\\_permissible/links/56b0d8ef08ae9f0ff7b77951.pdf](https://www.researchgate.net/profile/Pedro_Da_Cruz_Caria/publication/292722292_'The_Volkswagen'_case_morally_permissible/links/56b0d8ef08ae9f0ff7b77951.pdf)

## 2.2. Why history matters

We are going to discuss the ambitious market strategy of Volkswagen from 2007.

In December 2007 Volkswagen had big plans for the future. Under the direction of former CEO Martin Winterkorn they came up with a really ambitious market strategy. The strategy focused on four strategic goals with the intention to compete in the top of the global automobile industry.

The four goals were the following:

- Deploying intelligent innovations and technologies to become a world leader of customer satisfaction and quality.
- Increasing unit sales to more than 10 million vehicles a year.
- Returning on sales before tax of at least 8% so as to ensure the Group's solid financial position and ability to act are guaranteed even in difficult market periods.
- Volkswagen wants to become the top employer across all brands, in all companies and regions.

Volkswagen wants to become the top employer across all brands, in all companies and regions. Volkswagen wanted to achieve these goals in 2018 which was very optimistic. In 2014 the car company did reach the goal of 10 million unit sales. But the joy was only for a short while because Toyota released its sales number for the first three quarters in October 2015 and they were better than Volkswagens. Also in 2010 Volkswagen launched a new campaign called 'Think Blue', the campaign was about promoting eco-friendly driving and green initiatives. But this was a bit contradictory because in September 2015 they were caught deploying implemented software to cheat in emissions tests. They used a so called 'defeat device'. The device is programmed in such a way that it influences the cars emission stats when it detects that the car is undergoing a test.

So the NOx emissions for the vehicles where the device is implemented are a factor 10 to 40 above the EPA (Environmental Protection Agency) standard. But the cars' performance stays the same. And because of the defeat device Volkswagen could sell more cars because they have much better performance than most other cars, and it seemed like the car was also really eco-friendly.

Source: <http://iopscience.iop.org/article/10.1088/1748-9326/10/11/114005/pdf>

Source: <http://scholarship.richmond.edu/cgi/viewcontent.cgi?article=1016&context=robins-case-network>

## 2.3. Conflicting values in the societal debate

Here we will discuss some values of Volkswagen has to deal with.

Values in the case of the Volkswagen scandal are mostly about honesty, justice, money and human well-being.

### Honesty

The company has damaged their trustworthiness towards their customers and the government. Moreover, smaller businesses where cars are fixed will have a lot of work to their hands just because of the Dieselgate. Victims of the scandal want to have some kind of compensation for the time that their cars will be taken to get rid of the so called defeat device. This can be experienced as unpleasant and may result in less car purchases from these customers. The people afflicted will probably talk about it in their societal surroundings as well, causing even more damage to the Volkswagen company.

### Justice

As explained above, the people afflicted would probably like to have some kind of compensation for the time their cars will be taken away. A financial compensation might not be satisfying enough for some of the customers, as they might have been in some uncomfortable situations due to their loss of transportation. Customers who bought a Volkswagen with the defeat device installed might be shocked because the higher emission levels of the car is going against their principles of environmental consciousness. Human principles could have been harmed and there is no way for Volkswagen to make up for that.

### Money

Money is a value for Volkswagen specifically. They have installed this specific software to their engines in order to fake good results on emission tests, which leads to more people buying their cars. It is on the long term cheaper for a consumer to buy a fuel efficient car because they have to go to the gas station less often. The consumers though, are being tricked by Volkswagen due to this software, which is profitable for Volkswagen only. This is morally incorrect because the consumers must have the upper hand in their decision which car they want to buy. They should not be steered into a certain direction just because Volkswagen offers low-emission cars.

## Human well-being

By producing cars with higher emission levels than is allowed, pollution levels will rise. This pollution will be problematic for the well-being of the population in the countries in which the specific cars affected are sold. For our actor, the German Government, this is one of the most important values. The pollution could cause premature deaths, which is something they want least. The government should make sure a scandal like this will not happen ever again, in order to maintain the well-being of their population.

## Dilemma for Volkswagen

Volkswagen had to deal with a big dilemma once the cheating software was available. If they implemented this into the largest share of their diesel vehicles, they as a company would profit a lot of it. However, emission levels would go through the roof and if they got caught using this software, they would be in massive trouble.

One could say there was a short-term and a long-term option for Volkswagen:

- If Volkswagen looked to gain a lot of profit, they had to choose the immoral option to install the software into their engines. This is a relatively short-term option.
- On the other hand, Volkswagen could choose not to install the software, thus keeping their image they previously had. With this option, more research should be done on how to reduce emission levels. Actors alike the German government would definitely prefer this option, because the well-being of the population is preserved. This applies especially to the generations to come, making it a long-term option

From a utilitarian point of view, the second option would have been the best as well, because there are more customers than employees. This results in more people being happy. For outsiders, it might feel like Volkswagen acts like the well-being of the world population is no big deal at all, and they only care about their financial business. Because of the decision Volkswagen made, the German government is saddled with a handful of work, which could have been prevented in two ways, one of them being Volkswagen to not have chosen the selfish short-term option. The other way for the German government and its instances was to make sure the emission tests could not be frauded. The trust of the German government in Volkswagen is therefore also damaged, because they assumed Volkswagen was not cheating.

## Phase 3: Possible solutions

In this section, we will introduce three solutions. Afterwards, the differences and similarities are indicated.

### Software change

The German government has to demand Volkswagen to update their vehicles with a new software package. They can loan the money needed from the government if they don't have the money at the moment but the software has to be updated of all the cars within several months. So the cars will drive under the test circumstances (acceptable emission levels). However this can harm the performance of the car and maybe that is something that the customers don't like. This is a short term consequence so the image of Volkswagen can be harmed in this way. This is for Volkswagen a relatively cheap solution because they only have to adapt the software of the car. There are no hardware changes needed in this way so not much man hours have to be made to tweak the software. However, this solution doesn't solve the damage that already has been done to the environment so it is only a solution to prevent that more damage can be done.

### Hardware change

Another solution could be that the German government makes Volkswagen to recall all the cars with the defeat device and change the hardware. This would be really expensive for Volkswagen and for this solution also holds that they can loan money from the government. For this solution Volkswagen has to take out all the parts that cause the high level emission stats and still keep the performance the same. This is better for the car and its performance but it costs much more money. Also for this solution holds that it doesn't do anything about the damage that already has been done to the environment. But the car will pollute less. Maybe a long term solution for Volkswagen is that they should focus more on alternating environmental fuel sources such as biofuel or electricity. With this they can restore a bit from their image and they can compensate a bit for the damage that they have done.

## Fine

Volkswagen has to pay a fine toward the German government because they violated certain laws. It is unacceptable what Volkswagen has done with those cars so they cannot get away without consequences. But this solution is only a form of justice and the problem will stay in the world with the current cars. The company could also become bankrupted so that will not contribute that much to the German economy so this will probably not be the best solution. But it is assumed that all the car companies won't do the same if this sanction is implied on Volkswagen because when you cheat on emission levels and people find out you probably get bankrupted.

## Differences and similarities

The solutions introduced have differences and similarities. The most important ones are discussed here:

The most important difference between the software and hardware change compared to the fine is that there are no cars to be recalled in the solution of paying a fine.

## Phase 4: Evaluations of the solutions

### 4.1: Ethical evaluation of the options

#### Intuition

Our solutions in short:

- 1. Recall the cars and fix the software
- 2. Recall the cars and fix the hardware
- 3. Volkswagen pays a fine to the German government

We think that the best solution to the problem is to recall the cars and fix the hardware currently implemented in the cars, because this will have the most impact on the long term. The customer gets an updated car, which performs at least the same as the car they had before. It might take a long while for all the cars being fixed though, because this process will take longer than only changing the software. First, the car has to be brought to a car dealer where the fix can be made. The car dealer should have the right components required for the fix delivered in advance, so they can actually make changes to the engine. Once the car has been adapted, the car can return to the customer. One has to keep in mind that only a limited amount of cars can be fixed at one specific car dealer at a time, so Volkswagen needs to set up a plan for their dealers to make the fix go fluently. This whole process should not cost any money for the customers and the car dealers, as they have to do the fix, which costs money. Volkswagen has to pay for what they did anyway, so they have to face these financial issues too.

In our opinion, the second best solution is changing the software, which also requires a recall for all the vehicles that have the cheating software installed. For this solution, no specific components have to be delivered so that will be a good thing from Volkswagen's point of view. However, the performance of the car will be worse than before, which is not customer-friendly. We think that the users should not be the victim of something Volkswagen did to their cars, making this solution not as good as the previous one.

The least best solution is Volkswagen paying a fine to the German government. Volkswagen violated the law and therefore they have to pay for what they have done. However, this does not really solve the problem of pollution. The cars will still be driven and the emission levels will still be way too high. The German government will probably not do this, because of Volkswagen's role in the German economy. Volkswagen is a really big manufacturer and they have produced a lot of good cars as well. This scandal is a really big disappointment for the German economy in general, but making Volkswagen pay a big fine will not result in the best solution.

## Utilitarianism

A type of consequentialism based on the utility principle. In utilitarianism, actions are judged by the amount of pleasure and pain they bring about. The action that brings the greatest happiness for the greatest number should be chosen. (Ibo van de Poel and Lambert Royackers - Ethics Technology and Engineering - 2011). We are using Bentham's theory in this part.

## Software

If Volkswagen is going to adapt the software the consequences would be positive for the majority. The emission levels are decreasing and within the EPA standard, so the people who care for the environment are going to be more happy about this part, but the damage that already has been done is done and Volkswagen cannot make this right. For Volkswagen itself this solution is relatively cheap so they cannot complain if this solution is implemented. Their image will not become much better with this solution but the overall costs will be really low. The customers that bought the car for its performance will be disappointed because the performance will get worse. Also Volkswagen can recover a bit from this because they won't have to pay a fine so they will probably not become bankrupted so they can still earn money which they can pay taxes over to the government.

So emissions are decreasing, it is relatively cheap for Volkswagen to change the software and German industry will not deteriorate further but performance will decrease and the harm that has been done will not be fixed.

Who is affected	effect
Environment	Positive: less premature deaths (60 deaths due to the past 6 years 2009-2015)
Volkswagen	Positive in terms of money but negative in

	terms of image recovery for 610,000 employees
Pro environmental customers	Positive for 3-4 million people
Customers who value performance	Negative for 7-8 million people
German government	Positive for 630 people

For the customers we decided to make an estimation on our own findings because it is hard to find on the internet.

Source premature deaths: <http://www.insidercarnews.com/research-indicates-dieseldgate-is-deadly/>

Source for people working at volkswagen:

<http://www.statista.com/statistics/272052/worldwide-number-of-volkswagen-group-employees/>

Source for people working at the German government: [http://www.bundestag.de/htdocs\\_e/](http://www.bundestag.de/htdocs_e/)

## Hardware

When the hardware will be fixed, the consumers will be very happy. They won't have to pay for the changes, their car will pollute within acceptable EPA standard emissions, and the performance of the car will stay approximately the same. It is also better for the environment if the hardware will be changed because the car will pollute less. The image of Volkswagen will be restored more quickly so they can recover more quickly but it will cost a lot of time and money. Also the world will look up to the German government because they also want to solve the problem.

So in short: consumers will be more happy, emissions will decrease, performance stays the same, image of Volkswagen will be changed more quickly so quicker recovery and the only disadvantage is that it costs a lot of money.

Who is affected	effect
Environment	Positive less premature deaths (60 deaths due to the past 6 years 2009-2015)
Volkswagen	Negative in terms of money but positive in terms of image recovery for 610,000 employees
Pro environmental customers	Positive for 3-4 million people
Customers who value performance	Positive for 7-8 million people
German government	Positive for 630 people

## Fine

When the German government imposes a fine on Volkswagen they will get a lot of money. Volkswagen can become bankrupted with such an action because their image will stay the same as it is nowadays. So they will not sell much more cars and their profit will decrease drastically. Also this solution will not solve the big problems here like the car will still pollute very much and the environment won't get fixed. So actually this solution doesn't give that much happiness for the people.

Who is affected	effect
Environment	Negative: more premature deaths (60 deaths due to the past 6 years 2009-2015)
Volkswagen	Negative for 610,000 employees
Pro environmental customers	Negative for 3-4 million people
Customers who value performance	Positive for 7-8 million people
German government	Positive for 630 people

## Recommendation

As you can see in the tables the best choice would be the hardware change because its consequences affect the most people in a positive way. The second best choice would be the software change and the least option would be the fine.

## Kantian theory

The class of approaches in ethics in which an action is considered morally right if it is in agreement with a certain moral rule (law, norm, or principle). (Ibo van de Poel and Lambèrt Royakkers - Ethics Technology and Engineering - 2011)

The Kantian theory suggests that there is a principle of morality, referred to as the categorical imperative. Following to Kant, we can only speak of good will when actions are led by the moral norm. For our solutions, none of this is really true for Volkswagen, because they are being told what to do. In solutions one and two, the German government forces Volkswagen to act in a certain way, making the notion of good will from Volkswagen meaningless. Although, for the German government, this notion is important. The government wants to legitimately solve this problem, because it might have severe consequences for the German industry if it is not solved. When they do nothing to help Volkswagen, Volkswagen's shares will decrease more than they already did and car industry will be led by other - maybe less good - car companies. Our third solution has already been executed in one way or another. It is said that Volkswagen had set aside 6.7 billion euros to deal with all the penalties it has to face. Later, sources inform

that this amount is raised to a whopping 16.2 billion euros. They did not raise their 'recovery money' out of good will, because these sanctions were imposed by several instances such as the US Clean Air Act and Norway's sovereign wealth fund. They also want Volkswagen to literally pay for what they did to the environment. The point here is that Kantian theory does not really apply in this point of view, because neither parties are acting through the moral norm. The only moral thing in this situation is that they want to solve the issue, therefore imposing sanctions.

## Recommendation

As far as Kantian theory is concerned, the best option would be to combine the solutions and solve the problem. In this way, all parties involved are acting out of good will as Kant imposes, because the problem will lift a lot of problems off of Volkswagen's shoulders as well as the German government.

Source: <http://www.telegraph.co.uk/finance/newsbysector/industry/11884738/VW-emissions-scandal-whats-it-all-about.html>

Source: <http://gas2.org/2016/03/25/volkswagen-went-to-court-this-week-heres-what-happened/>

Source: <http://www.bbc.com/news/business-36298591>

## Virtue ethics

An ethical theory that focuses on the nature of the acting person. This theory indicates which good or desirable characteristics people should have or develop to be moral. (Ibo van de Poel and Lambèrt Royakkers - Ethics Technology and Engineering - 2011) virtue ethics focuses on the nature of the acting person. This theory indicates which good or desirable characteristics people should have or develop and how people can achieve this. Virtue ethics is not exclusively aimed at reason, but it is more a mixture of ethics and psychology with an emphasis on developing character traits.

## Story of Hans Dieter Potsch

After the scandal was revealed to the world, Hans Dieter Potsch was appointed as the new chairman for Volkswagen. He was the former finance director of the company and has a lot of experience within the car industry, as well as in Volkswagen itself. Potsch's task is to make clear what exactly happened and when the crucial decision was made to install the defeat devices. Also, he strives to get to the bottom of the scandal during the time being Volkswagen's chairman, in order to "guide Volkswagen towards a successful future". With this being said, we can conclude that Potsch has the following virtues whilst at Volkswagen:

- He has expertise in the car industry and knowledge in the Volkswagen company which he can utilise to bring Volkswagen back on its feet.

- He wants to get the scandal to be sorted out, which involves clear and informative communication towards the co-workers as well as the customers.
- Potsch wants to guide Volkswagen towards a successful future, which involves a lot of cooperation from other people involved in the recovery of Volkswagen, because he is probably not able to achieve this all by himself.
- Referring to a successful future, he also seeks to strive for quality, which is another virtue of Mr. Potsch.

Hans Dieter Potsch can be a very impactful person for the purpose of the German government as well. If he can partly or completely solve the issues within the company of Volkswagen, the German government will gain profit off of his work. This in means of economy and justice. Potsch wants to improve the overall company, which will most likely bring Volkswagen's economical situation back on track. This is favorable for the government as well because Volkswagen will do better at the stock market.

Moreover, if Potsch manages to uncover the scandal, justice will be served to every party involved in the scandal, including customers and of course the German government. The government can decide to punish the individuals responsible for the installing the defeat device or they can keep that decision up to Volkswagen. Either of these options will ultimately result in justification.

Source:

<http://www.telegraph.co.uk/finance/newsbysector/industry/engineering/12043637/Misconduct-at-heart-of-VWs-dieselpgate-scandal-says-chairman.html>

Source:

<http://www.telegraph.co.uk/finance/newsbysector/industry/engineering/11917195/VW-names-Hans-Dieter-Poetsch-as-chairman-in-board-resuffle.html>

Source: <http://www.wsj.com/articles/volkswagen-poised-to-name-potsch-chairman-1444214103>

## Important virtues

The most important values of the German government are: justice, welfare and environmental sustainability

- Justice: Justice is a virtue were the whole republic of Germany is built upon. This virtue is one of the founding parts of any democracy. Without justice we would not be able to walk around as we do nowadays so it is important that those who caused this scandal are justified.
- Welfare: Volkswagen's company value dropped down by a huge amount after the scandal was discovered. For the shares, this meant that they became less worthy, resulting in a huge disappointment for the German Government as well. If Volkswagen can crawl back up again to reach their old stock value, that would probably mean a lot for both parties, as welfare is an important virtue for both.

- Environmental sustainability: the fines Volkswagen has to pay now, could have been spent elsewhere, such as the investment in electrical cars. In the past six years, the government has spent already 1.6 billion euros into research for the electrical cars. Since Volkswagen already set aside around 16.2 billion euros to pay upcoming complications (as mentioned in the Kantian theory part), they should have thought about investing it in electrical cars, instead of ruining the environment with the defeat device.
- Human well-being: The health of the inhabitants of a country is of great importance for the government of that particular country. It is their duty to keep its citizens safe and healthy. Because of the increase NOx values that Volkswagen's cars did emit, the health of people all around the world is in danger. This is because higher concentration of NOx in the air can lead to more asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

Source: [http://www.consumerreports.org/cro/cars/guide-to-the-volkswagen-dieselgate-emissions-recall-](http://www.consumerreports.org/cro/cars/guide-to-the-volkswagen-dieselgate-emissions-recall/)

Source: <http://www.euractiv.com/section/transport/news/vw-s-dieselgate-puts-spotlight-on-electric-cars-in-germany/>

## Our solutions in the context of virtue ethics

Virtue ethics does not play a big role in our solutions. However, we will concisely give a description for every of our solutions. Afterwards, a recommendation is given.

### Software

Because the engineers working at Volkswagen do not act out of own will, virtue ethics does not really apply in this context. They have to change the software in order to limit the pollution of the environment as a sanction to what they did beforehand.

### Hardware

For our solution concerning to recalling the cars installed with the defeat device and implementing a hardware upgrade, virtue ethics can, same to the software solution, not be applied, as the engineers do not act out of free will.

### Fine

If Volkswagen has to pay a fine towards the government, there are not that much virtues involved. One of few virtues we can place is justice because it cannot be allowed to this kind of things in society nowadays.

## Recommendation

In virtue ethics, the solution of paying a fine would fit the most, because there is at least one virtue which is justice. With the other solutions, no real virtues are involved. Paying a fine would give the car industry and the German government justice in the way that Volkswagen pays for their actions.

## Role of ethics in a real activity

In the debate we had a discussion on what solution should help recover Volkswagen the best. Every group came with one of their solutions and here we will list the most important insights we gained off of that debate.

One of the most important aspects of the debate was that Volkswagen has to be more sustainable in the future to reassure their image in the future. They could do this by making a fuel switch. This means that they have to switch from diesel powered engines to biodiesel engines or electrical vehicles. The main reason to do this is that biodiesel does not emit nitrousoxide. These cars will only require a small tweak and they will be good to go. With this solution, the infrastructure keeps intact, and the same cars can be used. Although, the fuel provided is much more expensive than traditional fuels. Also, people might not care about the future generations so they might not want to change their engines to be less powerful whilst making fuel costs higher, even though it is way better for environmental purposes.

This is a real entrepreneurial view of how the problem can be solved. The user though, will be disadvantaged twice. First, they appear to have a car which is not as clean as it should have been, and afterwards, they have to pay even more fuel costs while the performance of the car is not improved. From a society point of view, people don't have to suffer from the mistakes that Volkswagen made. For this to be solved, justice has to be served and Volkswagen has to pay for what they have done.

Within the debate we did not focus much on the ethical perspectives our focus was more about the general challenge as we thought it was more important to getting more insights into the whole Dieselgate problem.

For better negotiation skills we should have prepared better and it was maybe practical if the negotiation was not that early in the assignment stage. We thought it was a bit early because we didn't think of the ethical and historical parts of our solution so we could not take good perspective. We also did not choose the best solution in our point of view so maybe the general outcome could have been better if we had thought about it some more. I think the negotiation skills of everyone was good because everyone let each other speak, so no-one interrupted each other. But something that we found a bit odd was that the debate was a bit divided between user and society against enterprise. Even though it was in our favour, we thought together about a joint conclusion.

## 4.2: Historical evaluation of the options

### Software

Updating the software in the cars is a solution which requires the participation of Volkswagen and the owners of the affected cars. Volkswagen will have to provide the user with a possibility to update its cars and the users will actually have to get their cars updated. Because this update will decrease the performance of a car in some aspects it might be possible that the users don't want to update their car. The government has to find a method of enforcing the update in cooperation with Volkswagen to make sure all cars get updated.

It is clear that the government is telling Volkswagen what to do, namely update their software. However it is not so evident whose responsibility it is to make sure all cars get updated. Does Volkswagen only provide the software update and is it the responsibility of the government to enforce the update? Or must Volkswagen take an active part in making sure the update is distributed?

We think that the best way to realize this solution to have the German government enforcing and monitoring the process while at the same time keeping the users and Volkswagen very much involved in how this process will take shape. It is clear what must be done, this is enforced by the government, however how this exactly is done is a question in which both users and Volkswagen can have their say.

To put it in a more concrete way, we suggest that the government organizes a series of meetings with representatives of Volkswagen as well as representatives of "Stiftung Warentest" (a German consumer organisation which can represent the users. The government will communicate that all cars must be updated and during these meetings the process of doing so can take shape with the input of all 3 parties.

So in our view the best way to realize the solution is by organizing the process in a participatory way. Since it requires users to take action it is important to get them involved and on board with the plan. Also an important part of the problem is that users have lost trust in Volkswagen, to regain this it is very important to make the users feel involved and to make sure their voice is heard.

### Path dependency

In 1973 Volkswagen was involved in scandal similar to the dieselgate scandal, it also installed a "defeat device" to disable pollution control systems. Volkswagen settled with the Environmental Protection Agency resulting in a 120,000 dollar fine to the Agency.

Source: <http://www.cnbc.com/2015/09/23/vw-had-previous-run-in-over-defeat-devices.html>

Since Volkswagen has not learned from the 1973 scandal the punishment this time should be more severe. It is hard to make an estimation upfront of how much the recall will cost Volkswagen and how this compares to the height of the fine in 1973. Combining the solution with a fine will increase leeway for this solution since it is then evident that the sanction is higher than it was previously. However considering an important aspect of the solution is to keep Volkswagen healthy, this is not the best option for this solution.

### Unintended consequences

One consequence that this solution might have is what the financial strain on Volkswagen will do to the further development of more eco friendly cars. Volkswagen, undoubtedly, has to spent a lot of money implementing this solution. This money has to come from somewhere and it might put a damper on the research & development activities within the company. In 2015 Volkswagen topped the list in R&D spendings within the car companies, so it is safe to say that Volkswagen has a part in developing cleaner cars. Less R&D will probably mean less development in new technologies to make cars cleaner for the environment. So putting a lot of financial stress on Volkswagen might hurt the environment in the long run.

Source: <http://europe.autonews.com/article/20160221/COPY/302219994>

Another consequence could be that the decrease in car performance might make some car owners to turn their back on Volkswagen and go for a different, perhaps non German, car in the future. Some people might care less about the environment and more about the performance of their car, these people will not be happy with the software change and might steer away from Volkswagen. Since it is in everyone's interest that Volkswagen recovers well this an undesirable effect.

What we want to prevent is the first consequence. The environment is of big concern and it is important that the development of cleaner cars continue. The solution to this problem lies in the german government. The government could financially support Volkswagen for a number of years, provided that the money injected by the government is spent on R&D. The government would have to require Volkswagen to be transparent in their spendings and justify their spendings to make clear that the money is spent on the appropriate R&D activities. This would at the same time further the image of Volkswagen, they will show the users and the society that they are still developing cleaner cars.

### Hardware

Recalling all cars is a massive undertaking which requires, again, the cooperation all the users. It poses some of the same problems as updating the software, namely: how to make sure all the cars are "fixed" and how to can this process be shaped in such a way that it minimizes resistance of the users.

We think that the way to best shape this process is to get all parties involved. So (like previously mentioned in the software solution) the German government would have to take the initiative to get representatives of Volkswagen, representatives of "Stiftung Warentest" and the German government around the table and figure out a way to get this process rolling. This participatory way of tackling the problem will ensure that the users are involved and feel represented while also making sure that Volkswagen can handle the financial aspect of the process. Recalling the cars will be very expensive and to prevent Volkswagen from going bankrupt they must have their say in the process. Since this will cost such a large amount a loan from the government will be offered to Volkswagen. This again requires the involvement of all parties, the government can't just loan money to Volkswagen. The 3 parties must agree on how the money is spent and require Volkswagen to be transparent. A risk of loaning money to Volkswagen is that users might view this as strange or unfair. To prevent this image from forming it is, again, important to have the users involved.

In conclusion, this solution must absolutely be organized in a participatory way to make sure the image of Volkswagen is not further damaged as well as minimizing resistance from the users.

### Path dependency

In the previous section the scandal of 1973 was mentioned. The same argument can be made that the sanction this time must be higher than in 1973. However with recalling so many cars it is evident that this will cost Volkswagen a lot more money and effort than the 120,000 dollar did in 1973. So this solution covers the problem as far as future prevention goes.

Another historic event worth looking into took place in 2013. In 2013 Takata, a large airbag producer, began selling airbags which had a major flaw. This causes numeral deaths and injuries and after investigation by several safety agencies the companies which sold cars containing this airbag started recalling affected cars to replace the airbag. At first the car producers themselves started recalling the cars and in 2014 the USA ordered Takata a nationwide recall of affected cars. Takata was also fined 200 million dollar by the U.S. federal regulators. The recall process was guided by the National Highway Traffic Safety Administration (an American agency responsible for car safety).

Source: [https://en.wikipedia.org/wiki/Takata\\_Corporation](https://en.wikipedia.org/wiki/Takata_Corporation)

So implementing this solution will not be the first time a large scale recall must take place, this creates a little more leeway for this solution since it will not be seen as outrageous to recall all cars because it has been done before.

### Unintended consequences

The first possible unintended consequence is the same as with the software solution; the financial stress might decrease R&D activities towards developing cleaner cars. This is more so a risk with this solution than it is with the software solution since the costs of recalling and modifying all cars will be much higher than the cost of updating the software.

Also modifying all cars will require a lot of mechanics. This might create a peak in the number of mechanics which are trained and employed. After all cars are fixed however the demand is not as high anymore and we could see a lot of mechanics losing their jobs in a short time which of course puts stress on the economy.

Since the first problem is already tackled in the software solution we will now propose a solution for the mechanics problem. The solution again lies within the government. It is inevitable that more mechanics will be required and employed, however the demand will lower and it will lower predictably. When implementing this solution Volkswagen has to be transparent about where they stand in the process and how far along they are. Therefore it is predictable when the decrease in mechanic demand will take place. It is up to the government to provide retraining facilities for mechanics and actively stimulate them in participating with these trainings. This will not prevent the dip in demand but it will make sure that a lot of mechanics can get back to work sooner.

## Fine

The last solution is to fine Volkswagen. This fine will fulfill a number of purposes including preventing similar incidents in the future and giving the users a sense of justice. The challenge of this solution is how much this fine should be and within what timeframe the fine should be payed. It must be high enough to fulfill the above purposes but it is very important that the fine will not bankrupt Volkswagen or cripple in such a way that work opportunities will drop drastically.

We think that the best way to figure out the exact parameters of the fine is a technocratic approach. To determine the exact fine the financial well being of Volkswagen has to be looked at in detail as well as the projected numbers for next couple of years. This to ensure that the fine fulfills the purposes mentioned above. This requires a very good understanding of economics as well as business. We don't think that the involvement of users will bring much good to the table in this discussion since the question is of a very rational and exact nature and the users will most likely argue from an emotional place. Also making sure that Volkswagen doesn't go bankrupt outways the importance of the sense of justice from the users in our opinion and experts can better determine what will cripple Volkswagen and what won't.

More concretely we think that the government should install a committee of qualified economics, business majors and such experts to determine what the exact fine should look like.

## Path dependency

As mentioned before in the 1973 scandal Volkswagen was fined. This can either increase leeway or decrease leeway for this solution. It could be argued that a fine is not enough since it didn't stop Volkswagen from repeating their actions, however when the panel which will

determine the exact fine takes this scandal into consideration they can actually come up with a fine which will be much more severe compared to the 1973 fine. This way the previous scandal will actually increase leeway for this solution since it is easy to show that the fine this time is much higher.

### Unintended consequences

Again one of the unintended consequences is that the financial stress put on Volkswagen can hurt the development of more eco-friendly cars which will not benefit the environment in the long run.

Another unintended consequence is that we could see Volkswagen start selling assets to deal with the fine. Selling parts of the company is not what is intended however it also the consequences for the environment, the economy and the users are mild. So even though this is unintended we don't see it as a big problem.

We think that the first consequence is the most severe. This solution does not fix the cars currently on the road and therefore the solution does not do much for the environment anyway. By putting stress on the R&D activities it does even less for the environment. A way to solve this problem is by investing the money from the fine in projects that help protect the environment. The money will be payed to the German government which should, in our opinion, invest this money back into the environment to make sure that this solution actually helps the environment.

# Phase 5: Reflection, recommendation and our redesigned USE proof solution

## 5.1. Reflection and recommendation based on ethical analysis

In this section, the best solution will be given based on our ethical analysis. First, the solutions per theories will be described shortly.

Utilitarianism: Here the best solution would be the hardware change.

Kantian theory: There is no particular good solution, although combining the solutions will apply to the Kantian theory.

Virtue ethics: The solution which fits the most is paying a fine.

All in all, our recommendation based upon our analysis is changing the hardware and paying a fine. The changing of the hardware causes the most happiness for most of the people, which is good from a utilitarian point of view. Recalling the cars and changing the software would solve some problems, but has more disadvantages than the other solutions as mentioned in the previous sections. Ultimately, paying a fine would solve some of the issues from a virtue ethical point of view, because justice plays a major role here.

Combining the hardware upgrade and the fine, Volkswagen pays for the most of what they have done, and this helps them recover as a company. Simultaneously, the German government will profit as Volkswagen's stocks will get back to their original value from before they installed the defeat devices.

The most relevant theory for the problem would be utilitarianism. Some parties are disadvantaged while others benefit from the solutions we introduced. Though, in the end we want to achieve most happiness to the most people. This can be done by combining all of the solutions we brought about as well, but combining only the hardware and the fine will solve most of the problem. The decision to not change the software will only affect Volkswagen in a negative way in terms of money. Their image will be restored to a certain extent and they will pay for what they have done as well when deciding to apply the other solutions.

From a user, societal and entrepreneurial point of view, the combination of a hardware change and a fine is reasonably justified as well. The users will get an upgraded car after they have been recalled, the society (German government) will get justice, welfare and a better environment for their people to live in. Finally, the enterprise Volkswagen will recover their image and crawl back up again from all what they have suffered. The only issue is that the

amount of time they have to recover everything is limited, because they cannot take too long to pay for what they have done, as the users as well as the society will probably get impatient if Volkswagen does not act quickly enough.

## 5.2. Reflection and recommendation based on historical analysis

The main objectives of the solutions are preventing a recurrence of such a scandal, reducing/repairing the damage to the environment and repairing the image of Volkswagen. The comparison of the different solutions will be done based on the following 3 objectives.

### Preventing a recurrence

The 1973 scandal holds the most significance when looking at prevention, the fact that Volkswagen has done it before indicates that the punishment last time was not severe enough. So it is clear that this time Volkswagen has to be punished much more severe to prevent such a scandal from recurring. Moreover, the German government can prevent that such a scandal will occur again, because they can strengthen their regulations for emission tests.

The Software and Hardware solution both punish Volkswagen in such a way that it will cost them a lot of money, however it is very difficult to determine how much money exactly and how this punishment compares to the fine that was issued in 1973. Fining Volkswagen again makes the comparison to the 1973 fine much easier. Therefore, from a historical perspective, the best solution to prevent recurrence is to issue a fine.

### Reducing/repairing damage to the environment

From a historical perspective it is hard to compare the solutions based on how they will reduce/repair the damage to the environment. However it is possible to predict how the different solutions will affect the environment (taking into account the unintended consequences with their proposed solutions). The software and hardware solution will impact the environment in the same way because they will both reduce the actual pollution to the pollution during test runs. The fine is a bit harder to estimate because the current cars are not fixed but the money is invested back into the environment. This will of course also depend on how high the fine will be and how much of this money is invested back into the environment. So from a historical perspective all 3 solutions are similar when it comes to reducing/repairing the environment.

### Repairing the image of Volkswagen

Again the 1973 case is important since users will not accept Volkswagen if they are not punished more severe than last time. So for the same arguments as mentioned above the fine solution holds up the best.

The Takata scandal is also important for the image of Volkswagen because this case shows that companies do recall their products when they are faulty even though this has to happen on a massive scale. So not recalling the cars, while others companies do recall their faulty products, will not be the best option in terms of repairing the image of Volkswagen.

So the fine solution has some leeway since it is the best way to punish Volkswagen more severely than last time. However the hardware solution also has some leeway because it shows that Volkswagen is also willing to recall faulty products. Therefore the fine solution and the hardware solution both come out as best when it comes to repairing the image of Volkswagen.

## Proposed solution

The solution which comes out as best (from a historical perspective) is the fine solution, given that the money from the fine is invested in the environment. The best way to implement this solution is to have the German government install a committee of experts to determine the fine, thereby implementing the solution in a technocratic way (as argued in section 4.2). Furthermore an investment plan must be created to determine how the money is invested back into the environment. This investment plan should also be created in a technocratic way, because it is important that the money is invested in such a way that it repairs the damage that is done by the diesel pollution. This requires the knowledge of experts to figure out how the money should be spent.

In conclusion, the German government should install 2 committees: one to determine the fine issued to Volkswagen and one to create and investment plan to invest the money into the environment.

## 5.3. Reflection and recommendation based on combined ethical & historical analysis

Our sub-theme is: What political sanctions should be imposed on Volkswagen? With the our main actor being the German government.

From a combined ethical and historical point of view, the solution to our sub-theme problem is that Volkswagen has to pay a fine, while recalling the cars affected with the defeat device and update their hardware. The money Volkswagen pays can be used by the government to set up a plan for investment in the environment. In the long term, this should solve most of the problems around the Dieselgate scandal, while on the short term, promises of how Volkswagen is going to tackle the problem should be made to both the users as well as the German government.

To implement the solution a couple of committees should be installed by the German government.

## Recall committee

A committee that is organized in a participatory way with the purpose of figuring out how the process of recalling the cars should take place. This committee should include representatives of Volkswagen, representatives of "Stiftung Warentest" and the representatives of the German government. Their combined efforts are required to guide the recalling process.

## Fine committee

A committee to determine what the exact fine should be and over what period it should be paid. This committee is organized in a technocratic way, including experts in the fields of business and economics.

## Investment committee

A committee organized in a technocratic way with the purpose of investing the money from the fine into the environment.

## 5.4. Final overall recommendation

Our general challenge is: To what degree should the German government get involved within the Dieselgate scandal?

It has become clear through ethical and historical analysis that it is important that the government needs to get involved to implement the solution proposed in section 5.3.

When acted out carefully, most issues will be solved and Volkswagen will recover their image by a fair amount. Implementing the solution is of great essence to all actors, as the effect caused by the solution is relevant for the future.

Throughout the making of this report, we have come to a lot of insights around the Dieselgate scandal. Through ethical and historical analysis, we learned what the scandal was about and what factors are important within such a scandal. It is also interesting how Volkswagen and the governments are dealing with the scandal in real life. The chairman of Volkswagen, Hans Dieter Pötsch, is really digging into this. He wants to get to the bottom of the scandal and find out who suggested the implementation of the defeat device. If he manages to do so, justice will be served for the most part to all the parties involved. We think it is interesting to follow what

During the assignment we have worked according to the engineering cycle. We found out that when a problem is of such a large scale as the Dieselgate scandal, with a lot of different aspects, actors and considerations, it is important to have a process that helps you work on the problem in a structured way. At the beginning of the project we found ourselves discussing and

evaluating different solutions immediately, these discussions didn't result in much because we were unclear about the goals, the actors and we lacked an understanding of the problem. So quickly we decided to just follow the engineering cycle with the steps laid out for us. This resulted in much more meaningful discussions later on, during the periods in the cycle where these discussions should take place. So in conclusions, the engineering cycle was crucial for this topic since we knew little about the subject. In a broader sense, the engineering cycle is important to get everyone on the same page and make sure everyone has the same knowledge.

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