

Should the government of the State of Baden-Württemberg ban diesel cars from driving through Stuttgart, Germany?

by

Submission date: 01-Dec-2017 01:35PM (UTC-0500)

Submission ID: 888435169

File name: PaperDevLeaders.pdf (446.56K)

Word count: 3398

Character count: 20302



“Should the government of the State of Baden-Württemberg ban diesel cars from driving through Stuttgart, Germany?”

Law 1101, 1102

12/01/2017

Word count (excluding references): 2,729

Word count (including references): 3,178

Developing Leaders for Global Sustainability
MGT 3330 (17705)
Professor Rae André

Table of Contents

Abstract.....	2
1. Problem	3
2. Stakeholders	4
2.1. Residents of the Stuttgart Area	4
2.2. State Government	5
2.3. Local Businesses	6
2.4. Car Sharing Companies	6
2.5. Automobile Industry.....	6
3. Science	7
3.1. Health effects of air pollution	7
3.1.1. Health effects of gaseous pollutants	8
3.1.2. Health effects of particulate matter	8
3.2. Effects of diesel vs. gasoline powered cars on the climate.....	9
4. Recommendations	10
References	11

Abstract

This paper for the *Developing Leaders for Global Sustainability* class at Northeastern University deals with the debate on whether the city of Stuttgart, Germany, should ban old diesel cars that do not meet certain standards to improve the air quality and, thereby, the health of local residents or whether they should continue allowing diesel cars to drive through the city which would lead to less carbon dioxide emissions and, therefore, have positive effects on the climate in a long-term.

To come to a final recommendation this paper analyzes the various stakeholders' interests and the scientific arguments and evidence that points to the threats of air pollution to health and life of Stuttgart residents, but also the implications diesel cars' emissions have for the climate.

Finally, the paper recommends the government of the State of Baden-Württemberg to enact a permanent ban on diesel cars that do not meet emission standards, while improving public transport and e-car sharing services to also meet the responsibility for the global climate.

1. Problem

On July 28th, 2017, the administrative court of the city of Stuttgart, Germany, ruled that the state government has to implement measures that would increase the quality of the air, also by banning certain diesel cars that do not meet emission standards from driving through the city. The ruling comes after the “Deutsche Umwelthilfe” (English: The German Environmental Aid Association) or short “DUH” filed an action arguing that the statutory limit of nitrogen dioxide emissions had been exceeded by up to 100 percent for many years and that only a ban on certain vehicles could provide a solution. The pollution of the air with nitrogen dioxide and particulate matter (PM), they argued, causes a threat to the health and life of the city’s residents. The court ruled in their favor, stating that necessary protection of the health and life of Stuttgart residents takes precedence over protecting the legal interests of individuals and their property, namely the declining value of diesel cars owned by people in the Stuttgart area and that this objective could not be achieved by the voluntary upgrades to diesel cars made by the automobile industry, a solution proposed by the state government (Gericht ebnet Weg, 2017). The government of the State of Baden-Württemberg, which currently is formed by a coalition of the center-left Alliance 90/The Greens, often simply “Greens” (German: Bündnis 90/Die Grünen or “Grüne”) and the liberal-conservative Christian Democratic Union of Germany or short CDU (German: Christlich Demokratische Union Deutschlands) and is headed by the Minister President of the state of Baden-Württemberg Winfried Kretschmann, appealed the court ruling and took the case to the Federal Administrative Court (German: Bundesverwaltungsgericht) in October (Baden-Württemberg geht, 2017).

The problem, many argue, with banning diesel cars and setting a precedent for regulations like that is that they are a key component in Germany’s plan to reach 2020 World Climate Goals. Cars that run on diesel fuel burn less, than cars that run on regular gasoline, which makes them more environmental friendly. In an interview with the German newspaper *Kölnische Rundschau* Prof. Dr. Stefan Bratzel of the University of Applied Science Bergisch-Gladbach said he believes that: “A further decline in the percentage of newly registered diesel fueled cars would make the realization of the 2020 World Climate Goals practically impossible” (Höning & Marschall, 2017). In his opinion piece titled “Rettet den Diesel!” (English: Save the diesel!), published in

the German newspaper *BILD am Sonntag*, Minister President Armin Laschet of North Rhine-Westphalia, Germany's biggest state, argues that millions have trusted the promises of politicians to support diesel cars and they now have to follow through on them, and that the new generation of diesel engines is the most environmentally friendly fuel-burning engine there is (Laschet, 2017). Therefore, the dilemma local and federal politicians find themselves in is that they have to decide whether to pursue a policy that would be good for the global climate in the long-term or one that would be good for Stuttgart residents' health and life in the short-term.

To contextualize this problem, one must also understand the history and economy of Stuttgart. The city of Stuttgart is Germany's 7th largest city and the capital of the state of Baden-Württemberg. Its economy is built around the automobile industry, due to the headquarters of Daimler AG, Bosch, Mahle, and Porsche in the Stuttgart area. Over 110,000 people in the Stuttgart area are directly employed by the automobile industry, whereas a total of 200,000 people work for businesses that generate a significant percentage of their revenues through the automobile industry. Almost 45 percent of all the revenues generated in the area are related to this key industry (Region Stuttgart, n.d.). The first car in the world was built in Stuttgart 130 years ago and since then Stuttgart has become one of the centers of Germany's famous car industry. To understand the problem of air pollution and climate regulations, one has to understand this historical and for many involved very emotional relationship.

2. Stakeholders

2.1. Residents of the Stuttgart Area

Residents of the Stuttgart area hold arguably the biggest stake in this decision. Although it has to be distinguished between those living in the city and those living in one of the many suburbs, but work in the city. Especially, for those living in the city concerns about their health and life are essential, since they have no alternative but to breathe the air that surrounds them, although that might cause threats to their health (see Chapter 3.1. Health effects of air pollution).

What is more, residents of suburban areas, that work in the city might fear a ban of diesel cars, due to the significant inconveniences it causes to them on their way to work every day. Diesel fuel is cheaper than regular gasoline in Germany, due tax benefits, although diesel fueled cars are generally more expensive. If diesel cars are banned, individuals that relied on their diesel car to get to work, either have to sell it and buy gasoline car or use public transport if possible. Both those options are inconvenient and sometimes not affordable for less-wealthy individuals.

Last, but not least, residents of the Stuttgart area have a stark interest in the automobile industries' success, since that is what empowers the region's economy and provides a secure and good- paying job for many in the region. Setting a precedent by banning diesel cars could lead to a chain reaction in many German cities and impact car sales and, therefore, the automobile industry.

Overall, residents although tend to favor temporarily banning diesel cars. In a poll conducted by the renown Forsa polling institute, 55 percent of people living in the city and 57 percent of people living in the suburbs favor such regulations in areas where a high air pollution can be measured (Schwarz, 2017).

2.2. State Government

The state government consists of a coalition of center-left Alliance 90/The Greens and the center-right Christian Democratic Union of Germany or CDU. The green party's core theme is based around environmentalism and preventing further climate change. Many in its base have anti-automobile industry sentiments, which is why they would probably, although I could not find any surveys that could back that up, favor a ban on diesel cars. The CDU, however, is also part of the Federal Government led by Chancellor Dr. Angela Merkel (CDU), who has promised multiple times that Germany accomplish the 2020 World Climate Goals (Merkel ist überzeugt, 2011). If banning diesel cars could threaten that goal the Chancellor, who is also head of her party might put pressure on her fellow party members in the Stuttgart area to let go of those bans.

On the other hand, polls show that Stuttgart residents are in favor of banning diesel cars (Schwarz, 2017). To win their votes in the next election it might be necessary to take a stance in favor of a ban on diesel cars.

2.3. Local Businesses

Local Businesses that rely on diesel cars in their fleet (i.e. taxi operators, postal services, moving agents, plumbers etc.) could be forced to buy gasoline powered cars or electrical vehicles, which would constitute expenditures that they cannot afford. Therefore, those businesses would have a big stake in this decision, because they might have to adjust their entire business model due to it.

2.4. Car Sharing Companies

Car sharing companies like Car2Go or DriveNow, are becoming more and more popular (Hüetlin, 2013). Many companies' fleets are largely based on electric cars, which would not be affected by a diesel ban. Therefore, they could win over new customers and expand their business to more rural areas in the suburbs. After the city banned driving cars that do not meet the "EURO 6" standards on certain days ("Feinstaubalarm") when the pollution of the air in the city through nitrogen dioxide and particulate matter (PM) exceed certain limits, car sharing provider Car2Go's customers on those days increased by 20 percent (Löhle, 2017).

2.5. Automobile Industry

The automobile industry, especially the German manufacturers, rely heavily on diesel cars in their business model. 66.3 percent of all newly registered Audi cars, 65.5 percent of all newly registered BMW's and 56.1 percent of all newly registered Mercedes-Benz cars in Germany have a diesel engine (Grafik des Tages, 2017). Therefore, they want to keep their customer's trust in this technology up. A ban of diesel cars in certain cities could lead to decreased sales in diesel cars and, therefore, less profits.

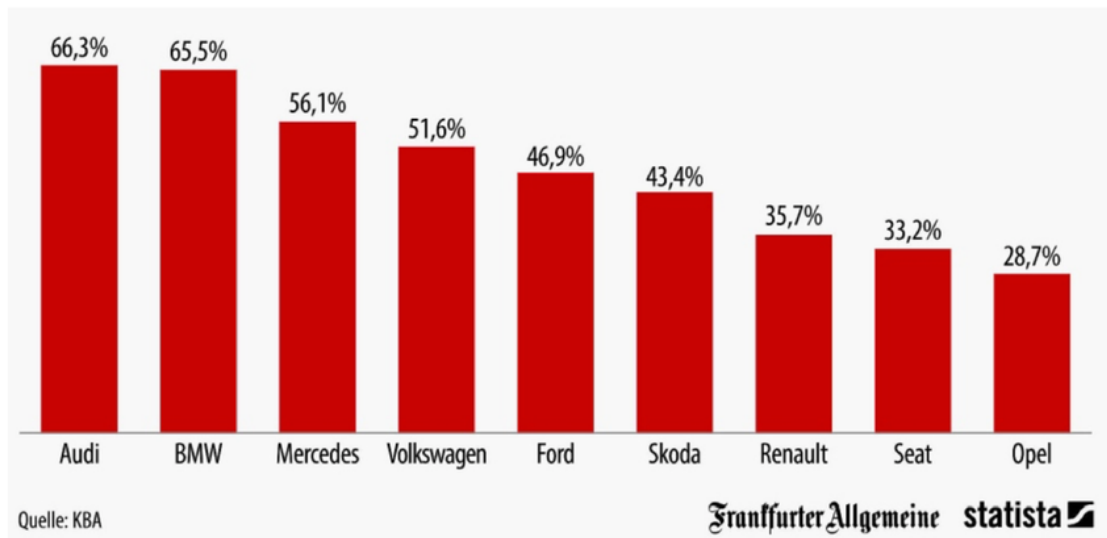


Figure 1: Share of diesel cars of all newly registered cars in Germany in 2016 (Grafik des Tages, 2017).

3. Science

To provide the state government with a recommendation on whether or not they should implement a ban on diesel cars, one has to weight the health effects of the air pollution caused by diesel engines against the effects it will have on the overall climate. In this chapter I will analyze those effects based on scientific findings published in peer reviewed journals.

3.1. Health effects of air pollution

An *air pollutant* is defined as “any substance which may harm humans, animals, vegetation or material” (Kampa & Castanas, 2008). There is a wide range of air pollutants that effect human health and they are mostly caused by burning fuel in order to generate energy for transport or manufacturing. However, they can be grouped into four categories:

1. Gaseous pollutants (e.g. SO₂, NO_x, CO, ozone, Volatile Organic Compounds).
2. Persistent organic pollutants (e.g. dioxins).

3. Heavy metals (e.g. lead, mercury).

4. Particulate Matter (PM).

In my analysis of the effects on human health I am going to focus on the effects of gaseous pollutants, especially nitrogen dioxide, and particulate matter or PM, since they are the main pollutants mentioned in the initial administrative court decision that fueled the debate (Gericht ebnet Weg, 2017).

3.1.1. Health effects of gaseous pollutants

Gaseous pollutants in the atmosphere are mainly due to combustion of fossil fuels (Katsouyanni, 2003). Findings show that all air pollutants, also gaseous pollutants, contribute to increased mortality and hospital admissions (Brunekreef & Holgate, 2002). Studies of the Harvard Medical School in Boston, MA, show that nitrogen dioxide and P2.5, a type of particulate matter, are associated with life-threatening arrhythmia leading to therapeutic interventions by an implanted cardioverter defibrillator (Peters, Liu & Verrier, et al., 2000). Nitrogen dioxide and particulate matter were also associated with causing bronchitis, but no asthma (Brunekreef & Holgate, 2002).

3.1.2. Health effects of particulate matter

Particulate matter is defined as “a type of air pollutants, consisting of complex and varying mixtures of particles suspended in the breathing air, which vary in size and composition, and are produced by a wide variety of natural and anthropogenic activities” (Kampa & Castanas, 2008; Pöschl, 2005). The effect of particulate matter on shortening life expectancy is estimated at 1–2 years for realistic exposure contrasts, a very substantial risk compared to other risk factors (Brunekreef, 1997). Data shows that all-cause daily mortality increases by 0.6 percent for each 10 µg/m³ increase in PM₁₀, one type of particulate matter (Brunekreef & Holgate, 2002). The city of Stuttgart currently calls out a “Feinstaubalarm” (English: Particulate matter alarm) when the pollution exceeds the threshold of 50 µg/m (Aktuelle Schadstoff- und Lärmsituation, 2017). For the Netherlands, a country with a population of 16 million and an average PM₁₀ concentration of >30 µg/m, an estimated 2,100 deaths per year are attributed to air pollution.

That is almost twice as much as the number of deaths in traffic accidents admissions (Brunekreef & Holgate, 2002). Those numbers speak to the immense threats to human health and life that are caused by air pollution.

Particulates caused by burning diesel have also been linked to long-term effects on allergic individuals, due to the increase of the synthesis of IgE, an allergic antibody that increases sensitization to common allergens (Diaz-Sanchez, Fujieda & Saxon, 1998). Those effects could be lessened by a diesel car ban in the city.

3.2. Effects of diesel vs. gasoline powered cars on the climate

As I cited in Chapter 1, opponents of the diesel ban argue that without the clean diesel technology, people will buy more gasoline cars and that will make it impossible for Germany to achieve the 2020 World Climate Goals and further increase the threat climate change causes to the world (Laschet, 2017; Höning & Marschall, 2017). But is that true?

It is true, that diesel cars obtain 25 to 35 percent better mileage and emit less carbon dioxide than similar gasoline cars (Jacobson, 2002). Increasing carbon dioxide levels are the major cause climate change and sea level rise (Solomon, Plattner, Knutti & Friedlingstein, 2009). However, Mark Z. Jacobson, associate professor of civil and environmental engineering at Stanford University, argues in his 2002 paper "Control of fossil-fuel particulate black carbon and organic matter, possibly the most effective method of slowing global warming" that appeared in the *Journal of Geophysical Research-Atmospheres*, that although diesel cars emit less carbon dioxide, they can emit 25 to 400 times more mass of particulate black carbon and associated organic matter ("soot") per kilometer (Jacobson, 2002). Jacobson argued in an article for the *Stanford News Service* that "[n]ot only does soot warm the air to a much greater extent than does carbon dioxide per unit mass, but the lifetime of soot in the air (weeks to months) is much less than is that of carbon dioxide (50 to 200 years). As such, removing soot emissions may have a faster effect on slowing global warming than removing carbon dioxide emissions." (Jacobson (2), 2002). I searched through the Google Scholar data base using key words "diesel", "carbon

dioxide”, “climate”, and “emission” and examined 11 articles but found no disconfirming evidence.

4. Recommendations

I would recommend the state government to follow the ruling of the administrative court and implement permanent bans on diesel cars that do not meet certain standards. Not only would that be popular with their constituents (Schwarz, 2017), but also improve their health and the air quality. I would, however, recommend to provide the people of Stuttgart with a guarantee that, once implemented, the standards on diesel cars do not change for a long time (i.e. 15 years) to assure them that they can invest their money in clean modern diesel cars that meet the standards without fear of a new ban. This assurance would also benefit the automobile industry, since they can meet the new standards and by doing that assure their customers that buying their diesel cars is a good investment. However, I think the government should provide a fund where small businesses can borrow money, if they do not have the capital to invest in a new fleet of clean cars.

I think the immediate health and life of the people of Stuttgart is at threat. This threat outweighs, in my opinion, the threat caused by globally insignificant increase in carbon dioxide in the atmosphere. Furthermore, I think the state can use other tools to decrease carbon dioxide by, for instance, improving public transport systems and making them more affordable and subsidizing e-car sharing services.

References

Aktuelle Schadstoff- und Lärmsituation. (2017, November 30). Retrieved November 30, 2017, from http://www.ethoma.de/AGVL_Home/index.php/luftreinhaltung/alle-artikel-zu-diewser-kategorie/86-aktuelle-schadstoffsituation

Baden-Württemberg geht gegen Dieselfahrverbot vor. (2017, October 02). *ZEIT ONLINE*. Retrieved November 29, 2017, from <http://www.zeit.de/politik/deutschland/2017-10/fahrverbotsurteil-baden-wuerttemberg-stuttgart-diesel>

Brunekreef, B. (1997). Air pollution and life expectancy: is there a relation? *Occupational and Environmental Medicine*, 54(11), 781–784.

Brunekreef, B., & Holgate, S. T. (2002). Air pollution and health. *The Lancet*, 360(9341), 1233-1242. Retrieved November 30, 2017.

Diaz-Sanchez, D., Fujieda, S., & Saxon, A. (1998). Combined nasal challenge with diesel exhaust particles and allergen induces In vivo IgE isotype switching. *American Journal of Respiratory Cell and Molecular Biology*, 19, 507-512. Retrieved November 30, 2017.

Gericht ebnet Weg für Fahrverbote in Stuttgart. (2017, July 28). *ZEIT ONLINE*. Retrieved November 29, 2017, from <http://www.zeit.de/mobilitaet/2017-07/dieselautos-umwelthilfe-gewinnt-prozess-um-fahrverbot-in-stuttgart>

Grafik des Tages: So groß ist der Diesel-Anteil der Autohersteller. (2017, August 01). *Frankfurter Allgemeine Zeitung*. Retrieved November 30, 2017, from <http://www.faz.net/aktuell/wirtschaft/wirtschaft-in-zahlen/grafik-des-tages-so-gross-ist-der-diesel-anteil-der-autohersteller-15131866.html>

Hüetlin, T. (2013, August 28). Car-Sharing Gears Up in German Cities. *Spiegel Online*. Retrieved November 29, 2017, from <http://www.spiegel.de/international/zeitgeist/car-sharing-increasingly-popular-in-german-cities-a-913891.html>

Höning, A., & Marschall, B. (2017, August 01). Faktencheck: Was der Diesel wirklich bringt. *Kölnische Rundschau*. Retrieved November 29, 2017, from <https://www.rundschau-online.de/wirtschaft/faktencheck-was-der-diesel-wirklich-bringt-28098230>

Jacobson, M. Z. (2002). Control of fossil-fuel particulate black carbon and organic matter, possibly the most effective method of slowing global warming. *JOURNAL OF GEOPHYSICAL RESEARCH*, 107(4410), d19. doi:10.1029/2001JD001376

Jacobson, M. Z. (2) (2002, October 21). Despite lower carbon dioxide emissions, diesel cars may promote more global warming than gasoline cars. *Stanford News Service*. Retrieved November 30, 2017, from <https://news.stanford.edu/pr/02/jacobsonJGR1023.html>

Kampa, M., & Castanas, E. (2008). Human health effects of air pollution. *Environmental Pollution*, 151(2), 362-367. Retrieved November 30, 2017.

Katsouyanni, K. (2003). Ambient air pollution and health. *British Medical Bulletin*, 68(1), 143. Retrieved November 30, 2017.

Laschet, A. (2017, July 03). Rettet den Diesel! *BILD am Sonntag*. Retrieved November 30, 2017, from <http://www.bild.de/politik/inland/armin-laschet/kommentar-rettet-den-diesel-52702022.bild.html>

Löhle, J. (2017, March 06). Car2go in Stuttgart - 20 Prozent mehr Fahrten bei Feinstaubalarm. *Stuttgarter Nachrichten*. Retrieved November 29, 2017, from <http://www.stuttgarter-nachrichten.de/inhalt.car2go-in-stuttgart-20-prozent-mehr-fahrten-bei-feinstaubalarm.b540856e-3d1e-441d-979c-6eeb48029e48.html>

Merkel ist überzeugt: Deutschland hält Klimaziele ein. (2011, July 02). *Handelsblatt*. Retrieved November 30, 2017, from <http://www.handelsblatt.com/politik/deutschland/merkel-ist-ueberzeugt-deutschland-haelt-klimaziele-ein/4350106.html>

Peters, A., Liu, E., Verrier, R.L., et al. (2000) Air pollution and incidence of cardiac arrhythmia *Epidemiology*, 11, pp. 11-17.

Pöschl, U., 2005, Atmospheric aerosols: composition, transformation, climate and health effects, *Angewandte Chemie International Edition Engl.* 44, 7520. Retrieved November 30, 2017.

Region Stuttgart - Schwerpunktbranche: Fahrzeugbau. (n.d.). Retrieved November 29, 2017, from <https://www.region-stuttgart.de/die-region-stuttgart/wirtschaft-arbeit/fahrzeugbau.html>

Schwarz, K. (2017, July 28). Luftreinhaltung in Stuttgart - Umfrage: Mehrheit für Fahrverbote. *Stuttgarter Zeitung*. Retrieved November 29, 2017, from <http://www.stuttgarter-zeitung.de/inhalt.luftreinhaltung-in-stuttgart-umfrage-mehrheit-fuer-fahrverbote.d98e0cde-4195-4625-be9f-1143482b91ed.html>

Solomon, S., Plattner, G., Knutti, R., & Friedlingstein, P. (2009). Irreversible climate change due to carbon dioxide emissions. *Proceedings of the National Academy of Sciences of the United States of America*, 106(6), 1704-1709. doi:10.1073/pnas.0812721106

Should the government of the State of Baden-Württemberg ban diesel cars from driving through Stuttgart, Germany?

GRADEMARK REPORT

FINAL GRADE

/0

GENERAL COMMENTS

Instructor

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11

PAGE 12

PAGE 13

PAGE 14