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## Not So "Clean Diesel"-- How Germany's Protection of Industry Risks the Health of Its Citizens

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# NOT SO “CLEAN DIESEL”—HOW GERMANY’S PROTECTION OF INDUSTRY RISKS THE HEALTH OF ITS CITIZENS

THOMAS WHITE\*

## INTRODUCTION

“Clean Diesel.” This was the tagline of a significant advertising campaign that Volkswagen (“VW”) debuted in 2008.<sup>1</sup> These advertisements attempted to counter the notion that diesel engines are dirty and polluted the air.<sup>2</sup> It featured older women in Volkswagens discussing tales of what they knew about diesel engines (a play off the phrase “old wives tales”).<sup>3</sup> At the time of airing, few could have predicted what was to come for VW and their eventual diesel engine scandal, the fallout of which is still ongoing at the time of writing this Note.<sup>4</sup> As this Note will show, the myth of the clean diesel went beyond VW’s campaign and instead represented a mindset that contributed to an ongoing health crisis in Germany. A crisis that Germany’s current policies are not up to the task of solving.

Even before this ad campaign, the diesel engine seemed to offer a solution to one of the significant environmental problems of the century: reducing the carbon footprint of motor vehicles.<sup>5</sup> Much like the campaign described above, consumers were consistently told by automakers that diesel is both more fuel efficient and environmentally friendly while not sacrificing performance.<sup>6</sup> However, this façade began to crack when VW

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<sup>1</sup> Volkswagen’s ‘Clean Diesel,’ TRUTH IN ADVERTISING (June 28, 2016), <https://www.truthinadvertising.org/volkswagens-clean-diesel/> [<https://perma.cc/2ECD-C52C>].

<sup>2</sup> *Id.*

<sup>3</sup> *Id.*

<sup>4</sup> The latest news concerns tests utilizing live animals paid for by big German auto manufacturers. Jack Ewing, *10 Monkeys and a Beetle: Inside VW’s Campaign for ‘Clean Diesel’*, N.Y. TIMES (Jan. 25, 2018), <https://www.nytimes.com/2018/01/25/world/europe/volkswagen-diesel-emissions-monkeys.html> [<https://perma.cc/8FZC-GGXH>].

<sup>5</sup> Paul Hocckenos, *End of the Road: Are Diesel Cars on the Way Out in Europe?*, YALE ENV’T 360 (Apr. 12, 2018), <https://e360.yale.edu/features/end-of-the-road-are-diesel-cars-on-the-way-out-in-europe> [<https://perma.cc/FUA4-HM9J>].

<sup>6</sup> *See id.*

was found to have installed devices manipulating the emissions of their diesel-powered vehicles.<sup>7</sup> Consumers were now becoming aware of what climate scientists had been stating for decades: diesel emissions are high in nitrogen dioxides (“NO<sub>2</sub>”),<sup>8</sup> a gas which can lead to many respiratory issues, including cancer and asthma, if a person is exposed to it in concentrated amounts.<sup>9</sup> Many countries in western Europe, which contain a much higher number of cars powered by diesel engines than the United States,<sup>10</sup> have begun to roll out plans to fight back against these environmental effects by proposing bans of diesel-powered cars and their future sale.<sup>11</sup> Unfortunately, Germany is not one of these countries and has yet to release a legitimate plan<sup>12</sup> to stop the production and use of diesel-powered cars.<sup>13</sup>

To begin, this Note will address the impact diesel emissions have on the respiratory health of those living in areas with large amounts of diesel cars. Additionally, it will analyze the approaches countries within the European Union (“E.U.”) have taken in response to this crisis and discuss their application to Germany. As of right now, the solutions offered by the German government and their automakers are not sufficient. This

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<sup>7</sup> *Dieselgate: Who? What? How?*, TRANSP. & ENV'T, 7 (Sept. 2016), [https://www.transportenvironment.org/sites/te/files/2016\\_09\\_Dieselgate\\_report\\_who\\_what\\_how\\_FINAL\\_0.pdf](https://www.transportenvironment.org/sites/te/files/2016_09_Dieselgate_report_who_what_how_FINAL_0.pdf) [<https://perma.cc/9E9S-DXNV>].

<sup>8</sup> Studies on NO<sub>2</sub> emissions from diesel began decades ago. At the time, concerns were not raised because this was a period before gasoline engines had catalytic convertors (which operate like filters for engine exhausts) and thus, by comparison, diesel was not as worrying. See J. Harkins & J.K. Goodwine, *Oxides of Nitrogen in Diesel Exhaust*, 14 J. OF THE AIR POLLUTION CONTROL ASS'N 34, (1964), <https://doi.org/10.1080/00022470.1964.10468238> [<https://perma.cc/W682-K3D9>].

<sup>9</sup> See TRANSP. & ENV'T, *supra* note 7, at 8.

<sup>10</sup> As recently as 2015 only about three percent of cars on U.S. roads ran on diesel contrasted with the near fifty percent of cars operating in Europe. Jessica Lussenhop, *Why do American car buyers shy away from diesel?*, BBC NEWS (Sept. 23, 2015), <https://www.bbc.com/news/world-us-canada-34329596> [<https://perma.cc/ND7N-K7M6>].

<sup>11</sup> See Melissa Eddy & Jack Ewing, *As Europe Sours on Diesel, Germany Fights to Save it*, N.Y. TIMES (Aug. 2, 2017), <https://www.nytimes.com/2017/08/02/business/energy-environment/germany-diesel-car-emissions.html?mcubz=1> [<https://perma.cc/VHV8-HETS>] (stating that peer countries like Britain and France are already discussing the end of diesel).

<sup>12</sup> Germany did pass a resolution plan to ban all internal combustion engines by 2030. However, this plan has no binding legislative effect and does not require anything from localities. It was so gutless that when it was announced, auto companies did not bother to comment on it. Bertel Schmitt, *German Transport Minister: ICE Ban By 2030 “Utter Nonsense”*, FORBES (Oct. 11, 2016), <https://www.forbes.com/sites/bertelschmitt/2016/10/11/german-transport-minister-ice-ban-by-2030-utter-nonsense/#618ba10d9668> [<https://perma.cc/UVY5-BZ4W>].

<sup>13</sup> See Janosch Delcker, *Merkel balks at diesel bans*, POLITICO (Sept. 9, 2017), <https://www.politico.eu/article/merkel-balks-at-diesel-bans/> [<https://perma.cc/BWE5-9QH3>] (quoting the German chancellor as saying, “[w]e will use all our power to prevent such [diesel] bans.”).

Note will also advocate that the German government needs to end the favorable policies in place for diesel engines and instead motivate its auto-makers through legislation to alter their production and development with a focus on cleaner energy models. Since the areas with the highest levels of NO<sub>2</sub> are in inner cities,<sup>14</sup> this Note will advocate for the banning of all diesel engines in these regions of Germany within the next few years. As intrusive as this may be, the importance of the respiratory health of German citizens must take precedence. After these initial city bans, Germany can look at the improvement in local air quality and then roll it out for the country at large. This countrywide ban would dramatically reduce the amount of NO<sub>2</sub> in the air and begin the slow process of improving air quality.

In solidarity with other countries in the E.U., Germany should release a plan comparable to that of other major countries in the E.U. All of this is feasible as Germany has a large number of resources and influence within the automotive world.<sup>15</sup> Importantly, many of the automakers that produce the vehicles currently releasing copious amounts of NO<sub>2</sub> are at home in Germany.<sup>16</sup> This fact raises another issue: the legislative decisions made by the German government seem to be influenced by what is best for the automotive industry, not by what is best for the environment.<sup>17</sup> There is no reason to believe that Germany, with its resources and innovative automakers, cannot lead the way in a revolution of more environmentally friendly vehicles, which feature both hybrid and electric technologies.<sup>18</sup> At a minimum, Germany should advocate for

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<sup>14</sup> See Nicole Sagener, *Germany cities show excessive air pollution levels*, EURACTIV (Apr. 28, 2015), <https://www.euractiv.com/section/sustainable-dev/news/german-cities-show-excessive-air-pollution-levels/> [<https://perma.cc/5CES-GRDY>] (analyzing a study of the German environment ministry showing the high levels of NO<sub>x</sub> in cities).

<sup>15</sup> Most of the elite minds of the automotive world are employed in Germany. These companies continued to make large profits even during the economic downturn that caused the U.S. auto sector to face great stresses. See generally Samuel Kahara, *What the world can learn from Germany's engineering culture*, ENG'G DAILY (Mar. 1, 2017), <http://www.engineeringdaily.net/what-the-world-can-learn-from-germanys-engineering-culture/> [<https://perma.cc/PY2Q-SFYJ>].

<sup>16</sup> See TRANSP. & ENV'T (@transenv), TWITTER (Sept. 19, 2016, 7:36 AM), <https://twitter.com/transenv/status/777878977587384320> [<https://perma.cc/JZM7-RMYV>].

<sup>17</sup> Even when taking proactive steps in trying to address the issues of diesel, the German government defers to what is better for the industry. See Jill Petzinger, *Germany's diesel scandal shines a light on how cozy the government is with carmakers*, QUARTZ (Aug. 8, 2017), <https://qz.com/1045619/germanys-diesel-scandal-shines-a-light-on-how-indulgent-the-government-is-with-carmakers/> [<https://perma.cc/6DZF-GVZD>].

<sup>18</sup> Kahara, *supra* note 15. Honda may be the company to lead the future in diesel technology. They have engineered new designs to ensure that NO<sub>x</sub> emissions are limited. See

the removal of the current emission standards allowing diesel cars to output more NO<sub>x</sub> (nitrogen oxide + nitrogen dioxide) than comparable gasoline engines.<sup>19</sup> If diesel engines cannot meet the same emission standards as their gasoline counterparts, they should not be allowed on the road.

To fully grasp the situation, this Note will address how diesel became so popular within Europe. Next, this Note will look at the effect the rise of diesel had on the air quality in Europe and more specifically Germany. After a brief analysis of the VW diesel scandal<sup>20</sup> and how it motivated other countries to make substantial legislative changes, this Note will contrast the differences between E.U. and U.S. emission standards and discuss the related policies being promulgated by other nations within the E.U. Finally, this Note will argue that the current plans Germany has in place are inadequate and advocate for policies that would protect both the environment and the respiratory health of German citizens.

This Note is focused mainly on air quality and its effect on human health. It does not attempt to make an argument concerning diesel vehicles and their contribution to the climate crisis. There are negative externalities related to the use of any internal combustion engine, whether it be gasoline or diesel.<sup>21</sup> Thus, in this Note, diesel will only be considered for its negative impact on human health and air quality and not its relation to the ever-growing greenhouse effect and global warming.<sup>22</sup> Also worth noting, this Note will discuss the use of passenger vehicles, and is not intending to argue that large commercial trucks should be subject to the same level of regulation.

## I. THE RISE OF DIESEL AND ITS IMPLICATIONS ON AIR QUALITY

The fact remains, as far as average fuel economy and carbon dioxide (“CO<sub>2</sub>”) emissions go, diesel tends to be more efficient than gasoline

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Bill Visnic, *Beleaguered diesel could use a break—or a breakthrough*, THE ENGINEER (Jan. 19, 2018), <https://www.theengineer.co.uk/beleaguered-diesel-use-break-breakthrough/> [<https://perma.cc/6WCE-EANF>].

<sup>19</sup> See Martin Nesbit et al., *Comparative Study on the Differences between the EU and US Legislation on Emissions in the Automotive Sector*, EUR. PARLIAMENT 15 (Dec. 2016), [http://www.europarl.europa.eu/RegData/etudes/STUD/2016/587331/IPOL\\_STU\(2016\)587331\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2016/587331/IPOL_STU(2016)587331_EN.pdf) [<https://perma.cc/2X65-CRSU>].

<sup>20</sup> For a general overview, see TRANSP. & ENV'T, *supra* note 7, at 7.

<sup>21</sup> Research shows that diesel is contributing more to global warming rather than helping. See Eckard Helmers, *Does the European diesel car boom mitigate global warming?*, ENVT PLAN. & TECH. FAC. (Feb. 2016), <https://green-budget.eu/what-future-for-diesel-cars/> [<https://perma.cc/RHM9-PD44>].

<sup>22</sup> See *id.* at 2–3.

engines.<sup>23</sup> Additionally, diesel burns at a much leaner fuel-air mixture, which provides a more substantial torque curve<sup>24</sup> for cars and trucks.<sup>25</sup> Furthermore, this is why most commercial trucks use diesel engines, as they allow for larger towing capacities.<sup>26</sup> Thus, in the 1990s, when the E.U. coalition grew concerned with the rise of air pollution and the amount of CO<sub>2</sub> gasoline engines were emitting,<sup>27</sup> diesel offered a solution. Many auto manufacturers lobbied politicians to pass favorable diesel policies due to “diesel’s inherently low CO<sub>2</sub> output relative to the gasoline engine.”<sup>28</sup> Because of these increased efficiencies, many of the buying public were led to believe that diesel was better for the environment generally.<sup>29</sup> These beliefs, coupled with tax incentives on the buying and registering<sup>30</sup> of diesel vehicles, instigated a rise in diesel vehicles throughout Europe.<sup>31</sup> This rise peaked with over half the cars on European roads running on diesel as recently as 2011.<sup>32</sup> This amount is staggering when compared to the U.S., where less than one percent of vehicles on the road are diesel-powered.<sup>33</sup> Throughout this growth period, consumers believed they were saving the environment while saving money at the gas pump.<sup>34</sup>

Unfortunately, while diesel engines output less CO<sub>2</sub> than gasoline engines, they produce high levels of NO<sub>2</sub>, which is the main ingredient

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<sup>23</sup> Nicholas Clairmont, *The End of Diesel*, THE ATLANTIC (June 15, 2017), <https://www.theatlantic.com/business/archive/2017/06/diesel-smog-pollution-europe/528990/> [<https://perma.cc/5AU3-FND4>].

<sup>24</sup> A torque curve is a way of describing how much torque an engine is producing at lower revolutions per minute (RPMs). Diesel engines typically have all of their torque, and therein power, at lower RPMs, which makes them ideal for towing heavy loads because the vehicle can get moving from a stop easier. Chuck Schifsky, *Tech: Gas vs. Diesel*, TRUCKTREND (Mar. 27, 2002), <http://www.trucktrend.com/how-to/expert-advice/163-0210-diesel-vs-gas/> [<https://perma.cc/248E-8S6L>].

<sup>25</sup> See Jim Resnick, *Diesel: How it changed Europe and how Europe might change back*, ARSTECHNICA (Oct. 6, 2015), <https://arstechnica.com/cars/2015/10/diesel-how-it-changed-europe-and-how-europe-might-change-back/> [<https://perma.cc/DTS4-Y84Y>].

<sup>26</sup> Schifsky, *supra* note 24.

<sup>27</sup> Resnick, *supra* note 25.

<sup>28</sup> *Id.* German manufacturers also saw this as an opportunity to capitalize on a technology they already had a developmental advantage on.

<sup>29</sup> Clairmont, *supra* note 23.

<sup>30</sup> Resnick, *supra* note 25.

<sup>31</sup> *Id.*

<sup>32</sup> Clairmont, *supra* note 23.

<sup>33</sup> Bureau of Trans. Stat., U.S. DEP’T OF TRANSP., *Figure 1 Composition of Diesel and Non-Diesel Fleet: 2014*, [https://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/bts\\_fact\\_sheets/oct\\_2015/html/figure\\_01\\_text.html](https://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/bts_fact_sheets/oct_2015/html/figure_01_text.html) (last updated May 21, 2017) [<https://perma.cc/3CCD-FVBV>].

<sup>34</sup> Resnick, *supra* note 25; see discussion *supra* Introduction.

for creating smog within cities.<sup>35</sup> NO<sub>2</sub> is an extremely toxic gas that can lead to multiple pulmonary issues, including airway inflammation, increased issues related to asthma, and in the cases of long-term exposure, potentially lung cancer.<sup>36</sup> The European Environmental Agency (“EEA”) has attributed the high levels of NO<sub>2</sub> concentrations found in the air to diesel vehicle emissions.<sup>37</sup> Most troubling is that the EEA has calculated that these excessive levels of NO<sub>x</sub> are causing an average of 72,000 premature deaths across Europe annually.<sup>38</sup> The level of NO<sub>x</sub> in the air has led to the criticism of both the current E.U. emissions regulations and the original choice to promote diesel.<sup>39</sup>

Western Europe has been concerned with the reduction of air pollution over the previous decades.<sup>40</sup> Although Germany has stagnated in reducing pollution, specifically of NO<sub>2</sub>, “In Germany in 2010, still more than half of the major roads were well above the current [E.U. mandated limits of NO<sub>2</sub> in the air].”<sup>41</sup> Due to these air quality issues, the EEA estimated that in 2012 alone 10,400 premature deaths could be linked to high levels of NO<sub>2</sub> in German air.<sup>42</sup> In 2015, many major German cities were still in excess of what has been designated as the “maximum threshold level” of NO<sub>2</sub>.<sup>43</sup> The European Commission issued a final warning to five countries within the E.U. for continuous air quality breaches within their country.<sup>44</sup> One of these five was Germany, which has by far the most zones with air quality issues with twenty-eight.<sup>45</sup>

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<sup>35</sup> Ralf Kurtenbach et al., *Primary NO<sub>2</sub> emissions and their impact on air quality in traffic environments in Germany*, 24 ENVT'L. SCI. EUROPE 1, 4 (June 25, 2012), <http://www.env-europe.com/content/24/1/21> [<https://perma.cc/56UE-Y7U4>].

<sup>36</sup> TRANSP. & ENV'T, *supra* note 7, at 8.

<sup>37</sup> *Id.* at 8.

<sup>38</sup> *Id.* at 16.

<sup>39</sup> *See generally* TRANSP. & ENV'T, *supra* note 7 (criticizing E.U. regulations and the impact of diesel cars).

<sup>40</sup> Kurtenbach et al., *supra* note 35, at 1.

<sup>41</sup> *Id.* at 2.

<sup>42</sup> *Premature deaths attributable to air pollution*, EUR. ENV'T AGENCY, <https://www.eea.europa.eu/media/newsreleases/many-europeans-still-exposed-to-air-pollution-2015/premature-deaths-attributable-to-air-pollution> (last modified Apr. 21, 2016) [<https://perma.cc/PAE2-LS8M>].

<sup>43</sup> Sagner, *supra* note 14 (discussing how the air quality issues go beyond that of cars. Countries like Switzerland require filters on locomotives and construction vehicles, something Germany does not).

<sup>44</sup> *Commission warns Germany, France, Spain, Italy and the United Kingdom of continued air pollution breaches*, EUR. COMM'N (Feb. 15, 2017), [http://europa.eu/rapid/press-release\\_IP-17-238\\_en.htm](http://europa.eu/rapid/press-release_IP-17-238_en.htm) [<https://perma.cc/Y87B-KYET>].

<sup>45</sup> *Id.*

Unsurprisingly the areas most affected include major cities like Berlin, Munich, and Hamburg.<sup>46</sup> To put this figure in context, the country with the second-most was France with only nineteen zones exceeding limits.<sup>47</sup> Thus, Germany is aware of its abnormally significant air pollution problem and yet, as this Note will illustrate, still stagnates on developing policies to combat it.

## II. AS EVIDENCED BY VW’S MANIPULATION OF EMISSIONS TESTING, MANUFACTURERS ARE AWARE OF DIESEL’S LIMITATIONS

For many, the point of awakening about the dangers of diesel began with a scandal involving VW in early 2015 (“Dieselgate”).<sup>48</sup> Amid reports in 2014 that certain VW models were not meeting the U.S. Environmental Protection Agency (“EPA”) standards, West Virginia University’s Center for Alternative Fuels, Engines, and Emissions (“CAFEE”) began to investigate these models using real-world testing conditions.<sup>49</sup> During this testing, it became apparent that certain diesel VW models were exceeding EPA NO<sub>x</sub> limits by utilizing emissions software (so-called “defeat devices”)<sup>50</sup> that detected when the EPA was performing traditional testing and then modified how the engine ran to pass the test.<sup>51</sup> After the test, and once the vehicle was in normal road driving conditions, the car’s internal computer would then modify, amongst other components: fuel pressure, injection timing, and exhaust-gas recirculation.<sup>52</sup> These modifications permitted more NO<sub>x</sub> emissions, sometimes up to forty times the federal limit.<sup>53</sup> Ironically, these manipulations were developed

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<sup>46</sup> *Id.*

<sup>47</sup> *Id.*

<sup>48</sup> For a more in-depth analysis of the scandal and outcomes of the ongoing legal issues in the U.S., see Clifford Atiyeh, *Everything You Need to Know about the VW Diesel-Emission Scandal*, CAR & DRIVER (Oct. 24, 2017), <https://blog.caranddriver.com/everything-you-need-to-know-about-the-vw-diesel-emissions-scandal/> [<https://perma.cc/C9SY-7V67>].

<sup>49</sup> Andrew Wendler, *How Volkswagen Got Busted for Skirting EPA Diesel Emissions Standards*, CAR & DRIVER (Sept. 21, 2015), <https://blog.caranddriver.com/how-volkswagen-got-busted-for-gaming-epa-diesel-emissions-standards/> [<https://perma.cc/64B4-JKHD>].

<sup>50</sup> This has been the popular phrase to describe this equipment. Note that VW is not the only brand that has utilized such software to beat diesel emissions testing. See generally Christian Hetzner, *How common are ‘defeat devices’?*, AUTOMOTIVE NEWS (Aug. 1, 2016), <http://www.autonews.com/article/20160801/OEM11/308019968/how-common-are-defeat-devices%3F> [<https://perma.cc/87UB-7U54>].

<sup>51</sup> Wendler, *supra* note 49.

<sup>52</sup> Atiyeh, *supra* note 48.

<sup>53</sup> *Id.* See also Umair Irfan, *Why Volkswagen Declared Defeat in Diesel Cars*, SCI. AM.



by the company that once promoted a better environmental future thanks to “clean diesel.”<sup>54</sup>

Once reports of this manipulation arose, outrage was widespread both within the U.S. and abroad.<sup>55</sup> VW immediately issued a recall to patch a hole in the now open floodgates.<sup>56</sup> Ultimately, this recall could not stop the inevitable lawsuits, and on October 25, 2016, the District Court for the Northern District of California approved a \$14.7 billion settlement in a class-action suit filed against VW.<sup>57</sup> This settlement includes a buyback program in which those who bought one of the affected cars can get the fair pre-scandal trade-in value of their car.<sup>58</sup> For those who wished to keep their car, VW will compensate owners for the diminished value of their vehicles.<sup>59</sup> While this was one of the largest corporate settlements on record,<sup>60</sup> it is nearly impossible to put a monetary figure on the damage done to the environment.<sup>61</sup>

This scandal and the fallout that followed reveal a few alarming things. By installing those devices, VW likely had some idea that they needed to modify the performance of their engines to pass emissions testing.<sup>62</sup> As a company, they recognized that their current diesel engines could not possibly nor legally be considered clean. This ordeal begs the question that if these small diesel engines could not meet U.S. emission standards, why should they be deemed acceptable in the E.U. and therein Germany?

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(Oct. 9, 2015), <https://www.scientificamerican.com/article/why-volkswagen-declared-defeat-in-diesel-cars/> [<https://perma.cc/7H7Y-ZRMF>].

<sup>54</sup> Irfan, *supra* note 53; *see supra* Part I.

<sup>55</sup> *See supra* notes 47–53 and accompanying text.

<sup>56</sup> This large-scale recall was almost unprecedented. For a look at the depth of models effected and the offered solutions *see* Jeff Barlett et al., *Guide to the Volkswagen Emissions Recall*, CONSUMER REP. (last updated Oct. 23, 2017), <https://www.consumerreports.org/cro/cars/guide-to-the-volkswagen-dieselgate-emissions-recall-> [<https://perma.cc/E62X-JNTT>].

<sup>57</sup> *In re Volkswagen “Clean Diesel” Mktg., Sales Practices, & Prods. Liab. Litig.*, No. 2672 CRB (JSC), 2016 U.S. Dist. LEXIS 148374 (N.D. Cal. Oct. 25, 2016).

<sup>58</sup> *Id.* at \*730.

<sup>59</sup> *Id.*

<sup>60</sup> David Shepardson, *U.S. judge approves \$14.7 billion deal in VW diesel scandal*, REUTERS (Oct. 25, 2016), <https://www.reuters.com/article/us-volkswagen-emissions/u-s-judge-approves-14-7-billion-deal-in-vw-diesel-scandal-idUSKCN12P22F> [<https://perma.cc/D9Q2-44R6>].

<sup>61</sup> Research is still ongoing to determine how much of an impact this scandal had on the environment. *See* Shannon Hall, *VW Scandal Causes Small but Irreversible Environmental Damage*, SCI. AM. (Sept. 29, 2015), <https://www.scientificamerican.com/article/vw-scandal-causes-small-but-irreversible-environmental-damage/> [<https://perma.cc/P8H9-Q4PT>].

<sup>62</sup> Barlett et al., *supra* note 56.

A. *The E.U.’s Emissions Standards Allow Diesel to Output Too Much NO<sub>x</sub>*

It is important to note that there are some critical differences between the U.S. and E.U. standards for vehicle emissions. Regarding NO<sub>x</sub> emissions, the U.S. federal standards are more aggressive and ambitious than those in the E.U.<sup>63</sup> Notably, the U.S. enforces a single set of standards for both traditional gas and diesel engines.<sup>64</sup> By comparison, the current system the E.U. has in place allows for diesel engines to emit higher levels of NO<sub>x</sub> than comparable gasoline engines.<sup>65</sup> The U.S. even restricts NO<sub>x</sub> emissions from gasoline engines more so than the E.U.<sup>66</sup> Going further, states such as California have even stricter emission standards than the EPA requires.<sup>67</sup> These standards beg the question that, if car makers can produce vehicles to meet the U.S. standards for NO<sub>x</sub> why are they not capable of releasing comparable models for the E.U. market? The answer may be that these models were never meeting the U.S. standards and hence why Dieselgate happened.<sup>68</sup> Also, the struggle to meet these standards might explain why car makers continue to halt releases of diesel models in the U.S.

B. *The Flawed Regulatory System in the E.U. Allowed Dieselgate to Go Unnoticed*

Many countries within the E.U. have been critical of diesel regulations and have developed various alternatives to help manage the emissions of NO<sub>x</sub>. One of the sharpest criticisms concerns the process for testing the emissions systems of vehicles,<sup>69</sup> as many E.U. countries formerly relied upon laboratory testing to evaluate diesel emissions.<sup>70</sup> This form of

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<sup>63</sup> Nesbit et al., *supra* note 19, at 12–13 (an in-depth study into the differences between the E.U. and U.S. regarding emissions in the automotive sector).

<sup>64</sup> *Id.* at 9.

<sup>65</sup> *Id.*

<sup>66</sup> Interestingly, however, the E.U. has more restrictive carbon dioxide emission standards. *Id.* at 15.

<sup>67</sup> *Id.* at 16.

<sup>68</sup> See discussion *infra* Part II.

<sup>69</sup> There should be greater criticism though, as the diesel defeat devices were just as utilized in the E.U., which seems to have a broken regulatory system for testing emissions. See Kevin Tarsa, Note, *Won’t Get Fooled Again: Why VW’s Emissions Deception Is Illegal in Europe and How to Improve the EU’s Auto Regulatory System*, 40 B.C. INT’L & COMP. L. REV. 315, 339–42 (2017).

<sup>70</sup> *Id.*; see Charles W. Schmidt, *Beyond a One-Time Scandal: Europe’s Ongoing Diesel Pollution Problem*, 124 ENVTL. HEALTH PERSP., A19–A20 (2016).

emissions testing is not as accurate as “real-world” testing conditions,<sup>71</sup> and likely if the E.U. had been performing “real-driving” scenarios to test vehicles, they might have noticed that diesel NO<sub>x</sub> emissions have increased by twenty percent since 1992.<sup>72</sup> In response to the health crisis and Dieselgate, E.U. regulators have stated they will now move to conduct more “real-driving” scenarios in the future testing of engines.<sup>73</sup> Notably, however, more vehicles in the E.U. were equipped with defeat devices than the U.S. which allowed for the manipulation of these tests,<sup>74</sup> and yet VW has defied lawsuits within the E.U., arguing that the use of defeat devices was not technically illegal there.<sup>75</sup>

The German legal system does not allow for class-action lawsuits like the American system.<sup>76</sup> Each person must file their lawsuit individually, which has dramatically restricted VW's accountability in Germany.<sup>77</sup> Pressure has been mounting to allow for class-action suits similar to the U.S. system.<sup>78</sup> Unless something is done to allow for such suits, VW will not be adequately held accountable in Germany.

### C. *The Plans From Peer E.U. Nations Should Influence Germany*

Both the mayors of London and Paris have had strong responses to the emissions crisis.<sup>79</sup> Paris has gone as far as to develop a plan to ban diesel engines within the city altogether.<sup>80</sup> Britain has set a mark to stop

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<sup>71</sup> Schmidt, *supra* note 70, at A21.

<sup>72</sup> *Id.*

<sup>73</sup> *Id.*

<sup>74</sup> Eight of the eleven million cars that had this device installed were located within the E.U. Russell Hotten, *Volkswagen: The scandal exposed*, BBC NEWS (Dec. 10, 2015), <http://www.bbc.com/news/business-34324772> [<https://perma.cc/43NQ-PSRM>].

<sup>75</sup> *Contra* Tarsa, *supra* note 69, at 318–19.

<sup>76</sup> *Id.*

<sup>77</sup> *Id.*

<sup>78</sup> Daniel Delhaes & Dietmar Neuerer, *Germany moving toward class-action lawsuits amid Dieselgate*, HANDELSBLATT GLOBAL (Jan. 31, 2018), <https://global.handelsblatt.com/politics/germany-moving-toward-class-action-lawsuits-amid-dieselgate-881918> [<https://perma.cc/4Y3R-GG5U>].

<sup>79</sup> *See generally* Taras Grescoe, *The Dirty Truth About ‘Clean Diesel’*, N.Y. TIMES (Jan. 2, 2016), <https://www.nytimes.com/2016/01/03/opinion/sunday/the-dirty-truth-about-clean-diesel.html> [<https://perma.cc/MTB4-2WXQ>].

<sup>80</sup> *Id.* Paris originally set a goal for 2020, but now a policy has been set to ban both diesel and gas engines by 2030. Brian Love, *Paris plans to banish all petrol and diesel vehicles from city centre by 2030*, THE INDEPENDENT (Oct. 12, 2017), <http://www.independent.co.uk/environment/paris-petrol-diesel-car-ban-2030-gas-guzzlers-emissions-air-pollution-evs-france-a7996246.html> [<https://perma.cc/JTK8-DXV3>].

the production of new diesel and gasoline engines by 2040.<sup>81</sup> Scotland seems to have the most aggressive goal in mind, as it hopes to halt all production by 2032.<sup>82</sup> Meaning, in a mere fifteen years, Scotland hopes to no longer offer the sale of diesel vehicles.<sup>83</sup> If more nations adopted measures like this it would force the automotive industry to innovate. Otherwise, they would find their markets dwindling. Hybrid and electric technology is relatively new, and by setting these hard deadlines, the possibility of banning future sales can force automakers to speed up the mainstream development of non-gasoline-powered vehicles.

*D. Germany's Response to the Ongoing Diesel Crisis Is Weak and Shows Protectionism of the Auto Industry*

In August 2017, Germany hosted a “diesel summit” in which they invited the heads of major automotive companies to discuss ways of dealing with the pollution, but also intended to discuss ways of dealing with the fractured reputation of diesel.<sup>84</sup> At this meeting, the automakers proposed the release of a software update,<sup>85</sup> to help manage NO<sub>x</sub> emissions and offered to split the cost of a €500 million fund meant to improve traffic flow infrastructure within twenty-eight German cities.<sup>86</sup> Both software updates and this fund fell short of what many city officials were looking to accomplish at the summit.<sup>87</sup> After the proposal to ban diesel cars within certain cities was brought up, German Chancellor

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<sup>81</sup> Stephen Castle, *Britain to Ban New Diesel and Gas Cars by 2040*, N.Y. TIMES (July 26, 2017), <https://www.nytimes.com/2017/07/26/world/europe/uk-diesel-petrol-emissions.html> [<https://perma.cc/7MJW-C222>].

<sup>82</sup> Shehab Khan, *Scotland to 'phase out' new petrol and diesel cars by 2032*, THE INDEPENDENT (Sept. 5, 2017), <http://www.independent.co.uk/news/uk/politics/scotland-petrol-diesel-cars-phase-out-ban-2032-nicola-sturgeon-snp-environment-air-pollution-a7930781.html> [<https://perma.cc/TBV5-HRRP>].

<sup>83</sup> *Id.*

<sup>84</sup> David Tracy, *Germany Holds Emergency 'Diesel Summit' To Convince Cities Not To Ban Diesel Cars*, JALPONIK (Aug. 4, 2017), <https://jalopnik.com/germany-holds-emergency-diesel-summit-to-convince-cities-1797518416> [<https://perma.cc/DEU5-RJD5>].

<sup>85</sup> The German automakers are claiming that this will reduce diesel emissions by at least 25 percent. Christiaan Hetzner, *German automakers offer software update to cut NO<sub>x</sub> emissions by 25%*, AUTO. NEWS EUR. (Aug. 1, 2017), <http://europe.autonews.com/article/20170801/ANE/170809965/german-automakers-offer-software-update-to-cut-nox-emissions-by-25> [<https://perma.cc/AUJ5-H3VU>].

<sup>86</sup> Traffic leads to more time when cars are idle, which is part of the contribution to NO<sub>x</sub> issues in cities. Tracy, *supra* note 84.

<sup>87</sup> *See id.*

Angela Merkel stated that “[w]e will use all our power to prevent such bans.”<sup>88</sup> This statement is in sharp contrast to what other local officials within Germany are planning,<sup>89</sup> as both the cities of Stuttgart and Munich are considering diesel bans,<sup>90</sup> with Stuttgart’s proposed ban already being litigated.<sup>91</sup> Stuttgart’s ban is in solidarity with other cities within the E.U., including those mentioned above, that have announced diesel bans by 2025.<sup>92</sup>

Concerning the proposal of software updates, criticism has been widespread.<sup>93</sup> The Federal Environment Agency (“UBA”), which is Germany’s main environmental agency, stated post-summit that the software updates offered by the automakers would only reduce the emissions of “the entire passenger car fleet by between 3–6 percent.”<sup>94</sup> This reduction is limited because these software updates would still allow vehicles to output NO<sub>x</sub> beyond the legal limit.<sup>95</sup> Such limited reductions will not be drastic enough to get cities currently exceeding the allowable limits of NO<sub>x</sub> to comply with the European Commission standards.<sup>96</sup> Many have called for the more expensive alternative solution of retrofitting old diesel engines with modern components to allow for more efficient operation.<sup>97</sup> This solution would require changes to the physical hardware that makes up the car and not just the proposed software.<sup>98</sup> When asked about the possibility of upgrading hardware on old models, the Chief Executive

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<sup>88</sup> Deleker, *supra* note 13.

<sup>89</sup> Melissa Eddy, *Merkel, Vulnerable on Diesel in Germany, Moves to Address Issue*, N.Y. TIMES (Sept. 4, 2017), <https://www.nytimes.com/2017/09/04/business/germany-merkel-diesel.html> [<https://perma.cc/U8QC-R4RC>].

<sup>90</sup> *Munich considers banning diesel cars from city centre: report*, THE LOCAL (June 14, 2017), <https://www.thelocal.de/20170614/munich-considers-banning-diesel-cars-from-city-centre-report> [<https://perma.cc/2XF2-E4Y2>].

<sup>91</sup> This ban would be somewhat limited in that it would only bar from the city certain diesel cars not conforming to the latest emissions standards and only on days when pollution is heavy. Environmental groups are continuing to fight for an outright ban. Reuters Staff, *German court backs bid to ban diesel cars in Stuttgart*, REUTERS (July 28, 2017), <https://www.reuters.com/article/us-germany-emissions/german-court-backs-bid-to-ban-diesel-cars-in-stuttgart-idUSKBN1AD10Y> [<https://perma.cc/UJ9E-WEEX>].

<sup>92</sup> *Id.*

<sup>93</sup> *See Diesel cars: Software updates are not enough for clean air*, UMWELT BUNDESAMT (Aug. 23, 2017), <https://www.umweltbundesamt.de/en/press/press-information/diesel-cars-software-updates-are-not-enough-for> [<https://perma.cc/Q499-TGTG>] [hereinafter UBA].

<sup>94</sup> *Id.*

<sup>95</sup> *Id.* *See generally* Tarsa, *supra* note 69, at 318–19.

<sup>96</sup> UBA, *supra* note 93.

<sup>97</sup> Eddy & Ewing, *supra* note 11.

<sup>98</sup> *Id.*

of VW responded, “We consider it out of the question to carry out hardware retrofitting.”<sup>99</sup>

An additional criticism concerns the German government and their regulation (or lack thereof) of the major German automakers.<sup>100</sup> Throughout the entire diesel summit, pundits were complaining that the government is far too comfortable with the auto executives.<sup>101</sup> This lack of regulation and cozy relationship is nothing new. In 2013, Germany was the one country fighting for more relaxed emissions standards within the E.U.<sup>102</sup> The German government’s extension of this shield over the industry is likely related to the importance of the field to their national identity as well as their contribution to the economy.<sup>103</sup> Some have gone as far as to call it “misguided protectionism” of the automakers.<sup>104</sup> But with 20 percent of Germany’s total industrial revenue coming from the automakers,<sup>105</sup> it is not hard to determine why they are so protective of the industry and why they have vowed to fight off more extreme measures like citywide bans of diesel.<sup>106</sup> This protection also extends to the industry’s employment of nearly 800,000 German workers.<sup>107</sup> This massive industry has allowed for the creation of a powerful automotive lobby which harbors incredible sway over environmental policies within Germany.<sup>108</sup>

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<sup>99</sup> *Id.* As this would require removal and installation of actual components of a vehicle and not just the plugging in of a software device, the sheer cost is likely the reasoning behind this decision.

<sup>100</sup> Petzinger, *supra* note 17.

<sup>101</sup> Tracy, *supra* note 84.

<sup>102</sup> Germany fought to block efforts by the E.U. to reduce greenhouse emissions being produced by automobiles. *See Germany Blocks CO2 Reduction Deal*, SPIEGEL ONLINE (June 27, 2013), <http://www.spiegel.de/international/europe/germany-delays-eu-decision-on-lower-co2-emissions-for-cars-a-908176.html> [<https://perma.cc/9FEY-Y4MY>].

<sup>103</sup> This is Germany’s largest industry by revenue and one of its largest employers. *The Automotive Industry in Germany*, GER. TRADE & INV. 3 (Sept. 2016), [https://www.gtai.de/GTAI/Content/EN/Invest/\\_SharedDocs/Downloads/GTAI/Industry-overviews/industry-overview-automotive-industry-en.pdf](https://www.gtai.de/GTAI/Content/EN/Invest/_SharedDocs/Downloads/GTAI/Industry-overviews/industry-overview-automotive-industry-en.pdf) [<https://perma.cc/L2C2-FCVM>].

<sup>104</sup> Frank Zeller, *Battling to thwart diesel bans, Merkel throws in the cash*, PHYS (Sept. 4, 2017), <https://phys.org/news/2017-09-thwart-diesel-merkel-cash.html> [<https://perma.cc/BLF2-AQ5Q>].

<sup>105</sup> GER. TRADE & INV., *supra* note 103, at 3.

<sup>106</sup> *See* Zeller, *supra* note 104.

<sup>107</sup> GER. TRADE & INV., *supra* note 103, at 3.

<sup>108</sup> Since 2015, “German government officials have held 325 meetings with car industry lobbyists on Dieselgate and air pollution, compared to 90 meetings with trade unions (many of which are union representatives on car company boards) and just 49 with environmental and consumer groups”. *See Two years after Dieselgate: car industry still*

*E. Germany's Current Low Emissions Zones Are Too Limited*

Since 2008, Germany has had in effect low emission zones (“LEZ”)<sup>109</sup> to meet E.U. standards and combat air pollution.<sup>110</sup> The system operates by having vehicles designated with colored stickers that correspond to that vehicle’s emissions.<sup>111</sup> It is up to the locality to determine what diesel vehicles or “stickers” they are willing to let in.<sup>112</sup> While they have been effective in helping German cities meet E.U. limits, some have questioned their usefulness going forward.<sup>113</sup> One of the apparent drawbacks is these zones force drivers without the required stickers to drive longer routes around the outside of the LEZ.<sup>114</sup> Meaning, not only is more fuel being used to avoid the LEZ, but the areas outside of these cities now have inflated levels of particulate matter.<sup>115</sup> A study conducted for the World Conference on Transport Research summed up the LEZ within Germany by stating, “it is clear that there is not much potential in further reducing air pollution concentration by introducing new LEZ under the current characteristics. Instead, the instrument of LEZ should be further developed, towards stricter limit values and regulations.”<sup>116</sup> The next part of this Note will discuss stricter regulation than the current LEZ restrictions

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*drives Berlin and Brussels*, CORP. EUR. OBSERVATORY (Sept. 18, 2017), <https://corporate.europe.org/power-lobbies/2017/09/two-years-after-dieselgate-car-industry-still-drives-berlin-and-brussels> [<https://perma.cc/DVC8-AHK6>].

<sup>109</sup> *Low-emission zones in Germany*, UMWELT BUNDESAMT (Jan. 2, 2016), <https://www.umweltbundesamt.de/en/topics/air/particulate-matter-pm10/low-emission-zones-in-germany> [<https://perma.cc/KB4Y-6SZ7>] (giving a brief description on how the low emission zones work).

<sup>110</sup> Veronica Fensterer, *Evaluation of the Impact of Low Emission Zone and Heavy Traffic Ban in Munich (Germany) on the Reduction of PM<sub>10</sub> in Ambient Air*, 11 INT’L J. ENVTL. RES. PUB. HEALTH 5094, 5094–95 (2014).

<sup>111</sup> Chuck Emerson, *Environmental Zones (Umweltzonen) in Germany*, HOWTO GERMANY, <https://www.howtogermaany.com/pages/environmentalzones.html> [<https://perma.cc/3TEB-PAFY>] (describing the different stickers and how they work).

<sup>112</sup> UMWELT-PLAKETTE, *Environmental zones and traffic restrictions in Germany*, <https://www.umwelt-plakette.de/en/information-about-german-environmental-badge/environmental-zones-in-germany/german-environmental-zones.html> [<https://perma.cc/9WS6-B2KX>].

<sup>113</sup> Wei Jiang et al., *Impacts of low emission zones in Germany on air pollution levels*, 25 TRANSP. RES. PROCEDIA 3370, 3380–81 (2017), <https://www.sciencedirect.com/science/article/pii/S2352146517305185> [<https://perma.cc/7XUG-HFQZ>].

<sup>114</sup> Hendrik Wolff & Lisa Perry, *Trends in Clean Air Legislation in Europe: Particulate Matter and Low Emissions Zones*, REV. ENVTL. ECON. & POL’Y, 16 (May 1, 2010), <http://hendrikwolff.com/web/REEP.pdf> [<https://perma.cc/DD3G-T3V5>].

<sup>115</sup> *See id.*

<sup>116</sup> Jiang et al., *supra* note 113, at 3381.

and attempts to formulate policies that, if implemented, would more effectively reduce air pollution within Germany.

### III. THE EXTENSION OF GERMAN POLICIES AND HOW TO COMBAT THE AIR CRISIS

#### A. *Germany Should Instill Full Citywide Bans of Non-commercial Cars*

As discussed above, citywide bans are currently being litigated in the German court system.<sup>117</sup> While arguably the most aggressive and invasive form of regulation, they would likely be the most effective way of improving air quality within city centers and also improve the air quality in all of Germany.<sup>118</sup> As stated above, a majority of the areas within Germany that are over the maximum threshold of NO<sub>x</sub> limits are large cities.<sup>119</sup> As cities have larger population densities, which lead to more vehicles on the road and thus increased traffic, it is not surprising to find these areas over the threshold as traffic leads to cars spending more time sitting and idling, which in turn leads to exhaust spewing more NO<sub>x</sub> particulates.<sup>120</sup> While the government’s current plan of investing in the public transportation infrastructure within cities can help improve traffic and therein vehicle emissions, it is not aggressive enough to stop this public health crisis.<sup>121</sup> Due to the sheer size and nature of the respiratory health issues,<sup>122</sup> the government should draft and support the bans being proposed in local cities.

A local level city ban can also be a useful indicator of the effectiveness of an eventual country-wide prohibition of diesel engines. This method of utilizing local areas as a “laboratory” has proven effective in the U.S.<sup>123</sup> These “laboratories of democracy” allow citizens of an area to “serve as a laboratory, and try novel social and economic experiments without risk

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<sup>117</sup> See REUTERS, *supra* note 91.

<sup>118</sup> Low Emission Zones have already proven effective, so a more aggressive ban on all diesel cars would likely see even greater results. See *supra* notes 113–14 and accompanying text.

<sup>119</sup> See discussion *supra* Part I.

<sup>120</sup> See Kai Zhang & Stuart Batterman, *Air pollution and health risks due to vehicle traffic*, SCI. OF THE TOTAL ENV’T 307, 307–08 (Apr. 15, 2013), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4243514/> [<https://perma.cc/Z8DK-MB53>].

<sup>121</sup> Tracy, *supra* note 84; see discussion *infra* Section III.D.

<sup>122</sup> EUROSTAT, *Respiratory disease statistics*, [https://ec.europa.eu/eurostat/statistics-explained/index.php/Respiratory\\_diseases\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php/Respiratory_diseases_statistics) [<https://perma.cc/DJH5-2VYB>].

<sup>123</sup> See *New State Ice Co. v. Liebmann*, 285 U.S. 262, 311 (1932).



to the rest of the country.”<sup>124</sup> German cities are analogous to the U.S. states, and there is no reason to think environmental experiments cannot be tested using this method. These experiments would help point out any potential flaws with diesel bans and can prove their effectiveness.

Stuttgart, which ironically happens to be the home of major manufacturers like Porsche and Mercedes-Benz,<sup>125</sup> has a ban that can serve as a starting point. But this ban would mainly be of older diesel cars that do not meet the current (already too high) E.U. emission standards.<sup>126</sup> Also, it would only be in effect on days where air pollution is high.<sup>127</sup> The success of this ban, however, could serve to support other German cities being comfortable enough to legislate for restrictions of their own.<sup>128</sup> The shortcoming of this limited ban is that while it may improve air quality temporarily, it does not seem that it would solve the issue permanently. In practice, a temporary ban likely operates in this way:<sup>129</sup> on days that NO<sub>x</sub> is above a certain threshold, the city would announce that some diesel-powered vehicles are temporarily banned from the area. This restriction would then lead to improved air quality as less diesel exhaust would inevitably cause NO<sub>x</sub> levels to drop. With the NO<sub>x</sub> levels back below the determined threshold, the ban would be lifted, and diesel engines would again be spewing NO<sub>x</sub> into the air, thus, leading to rising levels of NO<sub>x</sub> in the atmosphere until the ban is yet again mandated. A ban of this kind seems cyclical and does not seem to solve the issue of air pollution. Instead, a more aggressive ban should be legislated and passed, something comparable to the prohibition of diesel outright by 2025 in city centers like Paris and Madrid.<sup>130</sup>

It must be conceded that there would be an issue with citywide bans of all diesel passenger vehicles. The most significant effect would be on the average citizen attempting to travel in their current car. Many people who drive these diesel vehicles daily are using them to commute into major cities for work.<sup>131</sup> If citywide diesel bans were to be immediate

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<sup>124</sup> *Id.*

<sup>125</sup> *Stuttgart, Home of the Porsche and Mercedes-Benz*, AUTO EUROPE, <https://www.autoeuropa.com/travel-blog/stuttgart-home-of-the-porsche-and-mercedes-benz/> [<https://perma.cc/88QN-USFE>].

<sup>126</sup> REUTERS, *supra* note 91.

<sup>127</sup> *Id.*

<sup>128</sup> *See id.*

<sup>129</sup> *See, e.g., Diesel vehicles ban*, CITY OF OSLO, <https://www.oslo.kommune.no/english/street-transport-and-parking/diesel-vehicles-ban/#gref> [<https://perma.cc/TNX7-7J6Y>] (the city of Oslo announces twenty-four hours ahead of time whether or not a ban is in effect).

<sup>130</sup> REUTERS, *supra* note 91.

<sup>131</sup> As of July 2017, a record number of German citizens are now commuting to work, with

with no grandfather period, this would have an impact on most people who could not afford to buy a new car that meets current emission standards right away. This shortcoming illustrates why these bans would need to happen slowly over years of time. A graduated prohibition on these vehicles is a better proposal and less invasive into the liberty of car owners to choose what they would like to drive. However, the ruling court in the Stuttgart ban case did not find the burden these vehicle owners would face persuasive, stating the following, “Driving restrictions are legally enforceable and in the court’s view a proportionate measure because protection of health outweighs the right to property and freedom to act for vehicle owners.”<sup>132</sup>

*B. Germany Should Mandate Equivalent Gas and Diesel Emissions*

Much like the U.S., the E.U. (and therein Germany) should adopt a system that requires equal emission standards for both gasoline and diesel engines. Diesel engines in the E.U. are still allowed to output higher levels of NO<sub>x</sub> than their gasoline counterparts.<sup>133</sup> Additionally, the gasoline NO<sub>x</sub> emission standards within the U.S. are stricter than the current Euro 6 standard.<sup>134</sup> Why are diesel engines within the E.U. not required to meet the standards of gasoline engines? The answer seems to be that the E.U. does not want a policy that would create more of a burden on member nations with high automotive production. This rationale appears rather weak, considering one of the purposes of the most recent Euro 6 emission standards was to reduce the level of NO<sub>x</sub> diesel engines were emitting.<sup>135</sup> Germany could send a strong message by going beyond E.U. standards and mandate that NO<sub>x</sub> emissions of diesel must be within gasoline engine limits. If manufacturers are unable to produce

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nearly 60 percent of citizens identifying as commuters. Sertan Sanderson, *Record number of Germans commute to work every day*, DW (July 31, 2017), <https://www.dw.com/en/record-number-of-germans-commute-to-work-every-day/a-39902304> [<https://perma.cc/8QU3-83AD>].

<sup>132</sup> Elisabeth Behrmann, *Diesel Ban Looms Over German Home of Porsche and Mercedes-Benz*, BLOOMBERG (July 28, 2017), <https://www.bloomberg.com/news/articles/2017-07-28/german-court-rules-in-favor-of-diesel-ban-in-mercedes-hometown> [<https://perma.cc/2V8N-3EJ7>].

<sup>133</sup> See discussion *supra* Section II.A.

<sup>134</sup> Nesbit et al., *supra* note 19, at 15.

<sup>135</sup> Regulation No 715/2007 of the European Parliament and of the Council of 20 June 2007 with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) 2007 O.J. (L 171/1), <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007R0715&from=EN> [<https://perma.cc/F5QQ-5VV9>].

vehicles that meet these heightened standards, then this could be another method of having a de facto ban on diesel cars. Compared to an outright ban, this would be less invasive, as those cars already on the road could continue in operation for the time being. However, it would be far more useful to utilize this in conjunction with bans.

Currently, for manufacturers there would be no cost-effective way to design diesels to meet heightened emission standards. The technology to achieve stricter emission limits does exist, as diesel cars within the U.S. utilize equipment like after treatment systems, particulate filters, and specially designed diesel exhaust fluid to meet more stringent standards.<sup>136</sup> However, the issue lies in the added cost of this equipment. Diesel cars that feature this technology are inevitably more expensive.<sup>137</sup> Additionally, this additional mechanical equipment increases the weight of vehicles.<sup>138</sup> More weight forces the engine to work harder to move the car, which causes the engine to operate with worse fuel efficiency.<sup>139</sup> The added cost of purchase and now lower fuel efficiency could potentially spell the end for the diesel engine in consumer cars, as many German car buyers cite price, comfort, and fuel consumption in their top five considerations when buying a new car.<sup>140</sup> Consumers do take into account other factors,<sup>141</sup> but diesel would now lose its main benefits over similar gas models, due to both the added cost of the equipment and lost fuel efficiency.

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<sup>136</sup> CUMMINS ENGINES, *Meeting Emissions—The Cummins Solution*, CUMMINS, <https://cumminsengines.com/cummins-aftertreatment-system> [<https://perma.cc/V8UF-K46D>] (last visited Oct. 29, 2018) (explaining how Cummins engine builders utilize multiple systems in order to meet U.S. emission standards). See generally Jurgen Schnitzler, *Particulate Matter and NOx Exhaust Aftertreatment Systems*, FEV, [https://www.fev.com/fileadmin/user\\_upload/Media/TechnicalPublications/Diesel\\_Systems/ParticulateMatterAndNOxExhaustAftertreatmentSystems.pdf](https://www.fev.com/fileadmin/user_upload/Media/TechnicalPublications/Diesel_Systems/ParticulateMatterAndNOxExhaustAftertreatmentSystems.pdf) [<https://perma.cc/VQV3-Z5WP>] (providing an in-depth look at after treatment systems).

<sup>137</sup> Larry Webster, *The Future of Diesel in the US: Analysis*, POPULARMECHANICS (Sept. 9, 2009), <https://www.popularmechanics.com/cars/a4567/4330313/> [<https://perma.cc/BCK9-86S8>].

<sup>138</sup> Christopher R. Knittel, *Automobiles on Steroids: Product Attribute Trade-Offs and Technological Progress in the Automobile Sector*, 101 AM. ECON. REV. 3368, 3377 (Dec. 2011), <https://pubs.aeaweb.org/doi/pdfplus/10.1257/aer.101.7.3368> [<https://perma.cc/Z9ZF-W26H>].

<sup>139</sup> As cars have increased in weight since the 1980s, fuel mileage gains have been smaller than they could have been if not for the added weight required by modern safety standards. See, e.g., *id.* at 3380–81.

<sup>140</sup> Environmental impact ranks surprisingly low for buyers. Eric Heymann & Jakob Lahrrow, *Environmental aspects do not play a key role in car purchase decisions*, DEUTSCHE BANK RES. (Sept. 13, 2017), [https://www.dbresearch.com/PROD/RPS\\_EN-PROD/PROD00000000451556.pdf](https://www.dbresearch.com/PROD/RPS_EN-PROD/PROD00000000451556.pdf) [<https://perma.cc/AG36-B69A>].

<sup>141</sup> See *id.*

One of two things will likely occur if regulation forces manufacturers to make diesel engines that meet the U.S. standards. Either they will choose to push money into innovation and attempt to make diesel engines that operate cleaner but yet remain cheap, or they will eliminate their production. Due to the necessary research cost, it might not be worth it for manufacturers to work towards diesel innovations at this point. In fact, part of the reason that so few diesel models are offered for sale in the U.S. is the added cost of equipment to make them environmentally acceptable.<sup>142</sup> This added cost pushes the prices too high, and most consumers do not see the benefit in paying extra for a diesel-powered car compared to the gasoline options.<sup>143</sup> If diesel vehicles sold within Germany and the E.U. now needed additional equipment similar to those utilized in the U.S., the increase in the cost of specific models may lower sales to a point where manufacturers would eliminate them. It would not make sense for manufacturers to continue to market diesel cars if they were now too expensive for their comparable market cost point. Essentially, enforcing a system in which diesel must meet the standards of gasoline engines might be another method of instilling a de facto ban on the manufacturing of new diesels and motivate car makers to develop different technologies.

C. *Germany Should Eliminate Favorable Taxes on Diesel*

Germany still has favorable taxes on diesel versus traditional gasoline.<sup>144</sup> The reason for these tax advantages can be traced back to the signing of the Kyoto Protocol of 1997.<sup>145</sup> The current tax laws were put in place to promote the usage of diesel because of the lower amount of CO<sub>2</sub> they output when compared to gasoline.<sup>146</sup> Based on the effect diesel emissions have on the environment, it is now counterintuitive to have these taxes in place.<sup>147</sup> A more model system would be one that taxed

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<sup>142</sup> Webster, *supra* note 137.

<sup>143</sup> *Id.*

<sup>144</sup> *Id.*

<sup>145</sup> Mark Z. Jacobson, *Control of fossil-fuel particulate black carbon and organic matter, possibly the most effective method of slowing global warming*, 107 J. GEOPHYSICAL RES. 1, 17–18 (Oct. 15, 2002), <https://web.stanford.edu/group/efmh/jacobson/Articles/VIII/fossil/fossil.pdf> [<https://perma.cc/59SS-4N6K>].

<sup>146</sup> *Id.*

<sup>147</sup> “[T]ax laws in all E.U. countries except the U.K. favor diesel, inadvertently promoting global warming. Some countries, (e.g., Finland, the Netherlands, Norway, and Sweden) also levy carbon taxes based on the carbon content of fuels. These taxes also favor diesel, since diesel releases less carbon per mile than does gasoline, but we calculate that the small release of BC + OM by diesel warms climate over 100 years [more] than does the extra CO<sub>2</sub> released by gasoline.” *Id.* at 18.

vehicles based on not only their CO<sub>2</sub> but their NO<sub>x</sub> footprint. Meaning, if people choose to drive diesel vehicles, especially those produced over twenty years ago that are outputting copious amounts of NO<sub>x</sub>, they should have to pay a tax on it. A NO<sub>x</sub> footprint tax can be based on existing programs that already tax vehicles based on their outputs of CO<sub>2</sub>; such programs have been effective in lowering CO<sub>2</sub>.<sup>148</sup> This tax would prove to be less invasive, albeit less effective, than an outright ban on diesel cars. It would offer motivation through taxation, rather than regulation, in which people could still use and buy new diesel vehicles, but would now be motivated to purchase more environmentally friendly cars.

*D. Germany Must Prepare Their Infrastructure and Expand Their Current Electric Car Incentives*

Electric-powered vehicles are slowly becoming more mainstream by the day.<sup>149</sup> With the rise of vehicles like the Tesla Model S and the Chevrolet Volt, manufacturers see a future in the technology.<sup>150</sup> As great as the technology may seem, electric cars are not entirely environmentally friendly.<sup>151</sup> Electric vehicles still contribute to carbon emissions as the factories producing the batteries and generating the power grid for these vehicles emit significant CO<sub>2</sub>.<sup>152</sup> With that said, electric vehicles do not directly output NO<sub>2</sub>, and due to the harm that NO<sub>2</sub> has on the respiratory health of humans,<sup>153</sup> Germany should still embrace electric technology

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<sup>148</sup> See Julius Andersson, *Cars, carbon taxes and CO2 emissions*, CENTRE FOR CLIMATE CHANGE ECON. & POL'Y 1, 3 (Oct. 2015), <http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2015/10/Working-Paper-212-Andersson.pdf> [<https://perma.cc/ZZR6-K3T4>].

<sup>149</sup> Oliver Sachgau, *One in Six New Cars in the World Will Be Electric By 2025*, BLOOMBERG (Nov. 28, 2017), <https://www.bloomberg.com/news/articles/2017-11-28/rise-of-electric-cars-quickens-pace-to-tesla-s-benefit> [<https://perma.cc/B2FZ-58AV>] (“The shift to electric cars will come faster and in a more pronounced way, fueled by the diesel demise in Europe, battery technology advancements and regulation in China and Europe”).

<sup>150</sup> See Brad Berman, *Toyota Prius Prime is Catching Up to Chevy Volt as Most Popular Plug-in Hybrid*, PLUGINCARS (Apr. 18, 2017), <https://www.plugincars.com/toyota-prius-prime-catching-chevy-volt-most-popular-plug-hybrid-132812.html> [<https://perma.cc/25PQ-Q56P>]; Yoni Heisler, *Tesla's Model S is far more popular than most other luxury vehicles*, BGR (July 9, 2017), <https://bgr.com/2017/07/09/model-s-sales-2017-model-x/> [<https://perma.cc/J8LR-AL8R>].

<sup>151</sup> Hilke Fischer & Dave Keating, *How eco-friendly are electric cars?*, DW (Apr. 8, 2017), <https://www.dw.com/en/how-eco-friendly-are-electric-cars/a-19441437> [<https://perma.cc/EQY8-273U>] (discussing how Germany's electricity is mainly generated by coal and gas. Meaning, there's CO<sub>2</sub> being emitted during the process).

<sup>152</sup> *Id.*

<sup>153</sup> See *supra* Part I.

and create an infrastructure that can better support electric vehicles while recognizing that it is not the ultimate solution to the already existing carbon problem.<sup>154</sup> In 2010, Angela Merkel announced a lofty goal of having one million electric vehicles on German roads by 2020, and as that goal year approaches, it has become increasingly evident that they are far from hitting that mark.<sup>155</sup>

German manufacturers and citizens are not buying into the electric car at the rate that comparable countries are.<sup>156</sup> This is partly because Germany currently has a flawed electric car incentive program in place, which may explain the lack of sales.<sup>157</sup> One of the largest flaws is that cars costing over €60,000 do not get the current discount.<sup>158</sup> An argument could be made that this lack of a tax break would not deter those who can afford vehicles in that price range, but this seems short-sighted as this price limit excludes cars like the Tesla Model 3 and the BMW i3 from consideration,<sup>159</sup> therein pushing buyers with means to look at the already cheaper gas and diesel models. This program should allow all potential buyers of electric vehicles, regardless if they are buying them for environmental or otiose reasons, to receive the break irrespective of wealth.

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<sup>154</sup> A solution to their carbon problem while supporting electric cars would be to change their power grid's reliance on oil and gas for energy production. See Fischer & Keating, *supra* note 151.

<sup>155</sup> Elisabeth Behrmann & Arne Delfs, *Merkel Admits Germany Won't Meet 1 Million Electric-Car Target*, BLOOMBERG LAW (May 16, 2017), <https://www.bloomberg.com/news/articles/2017-05-16/merkel-admits-germany-won-t-meet-1-million-electric-car-deadline> [<https://perma.cc/NW6M-6D4E>] (explaining how as of 2016, only 200,000 vehicles registered on German roads were hybrid or electric).

<sup>156</sup> Jill Petzinger, *Performance anxiety is putting car-crazy Germans off buying electric vehicles*, QUARTZ (Apr. 9, 2017), <https://qz.com/953748/why-germans-don-t-want-electric-cars/> [<https://perma.cc/Y6S6-NN5R>] (making a somewhat weak argument that Germans' desire to drive long distances is partly keeping them from buying electric cars. This does not correlate with the fact that the United States is larger and typically requires longer distance travel and yet consumers have not been deterred from buying electric cars).

<sup>157</sup> See Fred Lambert, *Germany's electric vehicle incentive program is off to a slow start: 9,000 out of 300,000 by 2019*, ELECTREK (Jan. 2, 2017), <https://electrek.co/2017/01/02/germanys-electric-vehicle-incentive-program/> [<https://perma.cc/2SVU-AJX3>].

<sup>158</sup> *Id.*

<sup>159</sup> *Id.* (explaining how Tesla was offering models with fewer options to help get below the 60,000 level, but this is stripping down what is meant to be a luxury car and likely not the version most would be interested in buying); Markus Wacket, *Tesla has been removed from the list of electric cars eligible for subsidies in Germany*, BUS. INSIDER (Dec. 1, 2017), <https://www.businessinsider.com/tesla-removed-from-list-of-electric-cars-eligible-for-subsidies-in-germany-2017-12> [<https://perma.cc/EN8S-PTJS>] (arguing that Tesla was the reason this figure was determined in order to keep down their sales).

Many German buyers cite electric cars' lack of range as their reasoning for not buying one.<sup>160</sup> This belief is becoming outdated as cars from the 2017 model year now offer ranges of over 200 miles on a single charge.<sup>161</sup> A range like this may not be ideal for the occasional long weekend trip, but for the normal consumer, a range of 200 miles should be more than sufficient as the average German commute is 10.5 miles a day.<sup>162</sup> The other issue that Germans note is the duration of time that recharging takes.<sup>163</sup> While the length of time it takes for electric vehicles to recharge is still not as fast as filling a tank with gasoline or diesel, fast charging ports are being introduced that allow for recharging in thirty minutes,<sup>164</sup> and technologies are on the horizon that will allow for charging in as little as five minutes.<sup>165</sup> Regardless, the ability of even so-called slow chargers to charge a car overnight should eliminate the worry that people will experience delays in the usage of their vehicles. However, a valid concern is the lack of a charging infrastructure as Germany is lagging behind comparable countries when it comes to available charging ports for public use. For example, Paris (which is smaller in both population and area)<sup>166</sup> has substantially more charging stations than Berlin.<sup>167</sup> To keep up and support their electric goals, Germany must develop an

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<sup>160</sup> Petzinger, *supra* note 156.

<sup>161</sup> John Voelcker, *Electric-car battery progress: incremental improvements, not revolutionary leaps*, GREEN CAR REP. (July 27, 2017), [https://www.greencarreports.com/news/1111768\\_electric-car-battery-progress-incremental-improvements-not-revolutionary-leaps](https://www.greencarreports.com/news/1111768_electric-car-battery-progress-incremental-improvements-not-revolutionary-leaps) [<https://perma.cc/E6HX-6K98>] (reporting that battery ranges are increasing at about 7 percent per year).

<sup>162</sup> Sanderson, *supra* note 131.

<sup>163</sup> Petzinger, *supra* note 156.

<sup>164</sup> Joe Romm, *With fast-charging, electric cars will soon match or beat gasoline cars in every respect*, THINK PROGRESS (Oct. 17, 2017), <https://thinkprogress.org/amazon-wants-its-drones-to-charge-your-electric-car-heres-why-you-wont-need-them-facf1e08cd6f/> [<https://perma.cc/SRM9-5KYS>] (discussing the rapid technology increase related to charging).

<sup>165</sup> *Battery Breakthrough: How Startups, Tech Giants, And Automakers Could Finally Make EVs Go The Distance*, CB INSIGHTS (Oct. 12, 2017), <https://www.cbinsights.com/research/electric-vehicle-battery-innovation/> [<https://perma.cc/92SX-294T>].

<sup>166</sup> COMPARE CITIES, *Paris and Berlin Comparison by area & population*, <http://comparecities.org/en/compare/Paris-Berlin> [<https://perma.cc/73A2-Z2PA>] (last visited Oct. 29, 2018). COMPARE WORLD POPULATION REV., *Paris Population*, <http://worldpopulationreview.com/world-cities/paris-population/> [<https://perma.cc/6TAC-39PH>] (last visited Oct. 29, 2018) WITH WORLD POPULATION REV., *Berlin Population*, <http://worldpopulationreview.com/world-cities/berlin-population/> [<https://perma.cc/TD6Q-32RA>] (last visited Oct. 29, 2018).

<sup>167</sup> CHARGE MAP, *Charging stations in Paris*, <https://chargemap.com/cities/paris-FR> [<https://perma.cc/589Y-ED9H>] (754 reported charging stations in Paris on Feb. 8, 2018); CHARGE MAP, *Charging stations in Berlin*, <https://chargemap.com/cities/berlin-DE> [<https://perma.cc/C6LL-65UY>] (328 reported charging station in Berlin on Feb. 8, 2018).

infrastructure that promotes fast charging possibilities.<sup>168</sup> A country that purports a goal of having an electric future<sup>169</sup> must be ready for it. If they do not, their policies are doomed, and consumers will ignore the benefits of an electric future.

Perhaps the most significant issue with Germany having an electric car future is the impact it will have on its power grid.<sup>170</sup> If electric car usage grows at the rate it hopes, their power grid may be subject to frequent brownouts.<sup>171</sup> Without a proper infrastructure in place, electric cars will be doomed to fail, and the arguments for the continued use of diesel and petrol engines will stay strong. The cost of upgrading the power grid to handle electric vehicles will be massive.<sup>172</sup> But this is what it would take to ensure that electric vehicles would not overdraw the power grids. The benefits that a proper electrical network would have on human respiratory health are massive compared to the monetary costs of implementing this updated system.

#### *E. Consumers Can be the Ultimate Drivers of Change*

The harsh reality of the situation in Germany is that the legislature may not be in the best position to force a change in the auto industry. With the overlap of government officials who were formally involved in the auto industry and vice versa, it is apparent that interest in protecting the industry may keep the government from acting as quickly or thoroughly as necessary in fighting the diesel crisis.<sup>173</sup> If the legislature will be

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<sup>168</sup> Frank Lambert, *First ‘ultra-fast’ electric car charging station comes online in Europe*, ELECTREK (Dec. 21, 2017), <https://electrek.co/2017/12/21/first-ultra-fast-electric-car-charging-station-europe/> [<https://perma.cc/2N6L-54XQ>] (illustrating that the technology exists, and Germany is the first country to have “ultra-fast” charging stations available for public use).

<sup>169</sup> Geir Moulson, *German government: 1 million electric cars by 2020*, ABC NEWS, <https://abcnews.go.com/Business/german-government-million-electric-cars-2020/story?id=8364933> [<https://perma.cc/8TUG-QYMC>] (last visited Oct. 29, 2018).

<sup>170</sup> See generally Jurgen Flauger & Franz Hubik, *Electric cars pose blackout threat to German cities*, HANDELSBLATT GLOBAL (Jan. 24, 2018), <https://global.handelsblatt.com/mobility/electric-cars-blackouts-german-cities-878678> [<https://perma.cc/62F4-J2M6>].

<sup>171</sup> *Id.*

<sup>172</sup> *Id.* (predicting that a total of \$13.45 billion over the next fifteen years would need to be invested into the power grid). This may seem like an exorbitant amount of money but consider that Germany has already spent \$200 billion over the past two decades on the electric grid. Stanley Reed, *Power Prices Go Negative in Germany, a Positive for Energy Users*, N.Y. TIMES (Dec. 25, 2017), <https://www.nytimes.com/2017/12/25/business/energy-environment/germany-electricity-negative-prices.html> [<https://perma.cc/X6NQ-ZKUE>].

<sup>173</sup> Kay-Alexander Scholz, *Dieselgate: the cozy ties between Germany’s car industry and Berlin exposed*, DW (Aug. 2, 2017), <https://www.dw.com/en/dieselgate-the-cozy-ties-between>



unwilling to enact some of the changes proposed in this Note, who then can motivate the rapid changes needed and ensure that air quality improves at the required rate? The answer lies in the power of consumers.

Consumers can motivate change through the boycotting of products. Historically, boycotts have not been overwhelmingly successful in enacting reform.<sup>174</sup> For a boycott to be successful, it usually depends on a few factors including whether there are competing products on the market, how well organized it is, whether the media gets on board, and how much brand loyalty there is for the products.<sup>175</sup> When considering these factors, a boycott of diesel sounds as if it could be useful in enacting change. The first factor is met as there are plenty of competing vehicles for sale on the market that do not utilize diesel. Second, plenty of environmental groups are already protesting diesel usage which enables them to become leaders of a country-wide boycott of diesel products. Promotion of these boycotts would rely a lot on the third factor concerning the media. Since the outbreak of Dieselgate, media outlets have begun covering diesel and its effects more and more steadily.<sup>176</sup> The last element, brand loyalty, is potentially the hardest barrier to overcome.<sup>177</sup> However, this factor may have less importance for this boycott. The point of this boycott would not be to stop the purchase of all of a specific manufacturers' cars; the boycott would only be of particular models. As all of these brands sell both gasoline<sup>178</sup> and in some cases electric models, a

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-germanys-car-industry-and-berlin-exposed/a-39927429 [https://perma.cc/557J-HA9P] (illustrating that many officials who once worked for the auto industry are now working in governmental roles; additionally a lot of campaign finances come from auto manufacturers).

<sup>174</sup> *To Boycott or Not: The Consequences of a Protest*, KNOWLEDGE @ WHARTON (June 9, 2010), <http://knowledge.wharton.upenn.edu/article/to-boycott-or-not-the-consequences-of-a-protest/> [https://perma.cc/2UUC-N48V].

<sup>175</sup> *Id.* When analyzing the BP oil situation, it is important to note the difference between the BP oil crisis and diesel. During the BP situation, the damage was already done and the boycott of buying their gas was not going to fix the spill while the diesel situation can be improved just by the slowing of new sales. *Id.*

<sup>176</sup> When looking at the previous ten years, there has been an increase in traffic of people seeking information of diesel emissions. See Google Trends, Search term: diesel emissions, <https://trends.google.com/trends/explore?date=2008-01-01%202018-02-10&q=diesel%20emissions> [https://perma.cc/T6FW-YEH4].

<sup>177</sup> In spite of all the negative media attention surrounding them, VW topped a study in 2017 looking at customer loyalty to brands. AUTOTRADER, *Is Automotive brand loyalty a myth?* (Feb. 20, 2017), <https://about-us.autotrader.co.uk/is-automotive-brand-loyalty-a-myth/> [https://perma.cc/4CJU-DGR5].

<sup>178</sup> See *Global Luxury Car Market Reports 2017—Research & Markets*, CISION (June 19, 2017), <https://www.prnewswire.com/news-releases/global-luxury-car-market-report-2017---research-and-markets-300475704.html> [https://perma.cc/UH93-UE24]. This boycott

proper boycott could still allow those with brand loyalty to keep purchasing a manufacturers’ products while not supporting their diesel models.

#### CONCLUSION

Germany has an understandable interest in protecting the jobs of those who work within the auto industry, but that protection should only go so far. Improving air quality and negating the effect diesel emissions are having on respiratory health should take precedence over protecting jobs. Significant monetary investments will be necessary, but safeguarding human health makes this an essential expense. Germany already has a solid foundation in place to combat this crisis with administrative courts approving the right to ban diesel,<sup>179</sup> existing low emission zones, and an aggressive goal of motivating electric vehicle purchases. But to be successful, this foundation needs a robust framework built upon it; this Note attempts to offer such a framework. Often, we worry about what vehicle emissions have done to warm the planet, but we should not forget that the same air warming Earth is also entering our lungs.

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would not require a full blockade of purchasing brands in order to meet the goal of lowering emissions.

<sup>179</sup> These bans are not mandated yet, but this decision gives localities the power to do so. It is anticipated that the German government, which still may try to avoid these bans, will now be forced to consider developing a policy to allow for some unity within the country concerning diesel bans. *Diesel ban approved for German cities to cut pollution*, BBC NEWS (Feb. 27, 2018), <https://www.bbc.com/news/business-43211946> [<https://perma.cc/D8AZ-FQUM>].

