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## The Dark Side of E-Commerce: The Negative Effects of E-Commerce on the Environment

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# THE DARK SIDE OF E-COMMERCE: THE NEGATIVE EFFECTS OF E-COMMERCE ON THE ENVIRONMENT

## ABSTRACT

*E-commerce has many advantages for both consumers and sellers, but its process has taken a toll on the environment. In this Note, I discuss two integral aspects of the e-commerce process that contribute to climate change: (1) air pollution from delivery vehicles, and (2) the use of non-sustainable packaging. I will provide insight into the U.S. environmental laws currently in place that regulate greenhouse gas emissions and other contributors to climate change, such as the Clean Air Act and the Solid Waste Disposal Act, while highlighting how these laws are minimal at best. I argue that the U.S. government should begin to address these issues by amending the existing laws to hold businesses engaging in e-commerce accountable for their carbon footprint. To illustrate, I will discuss the ways in which the Clean Air Act can be amended to regulate the delivery process, which involves a shift to the use of electric delivery vehicles and night-time deliveries. I will also highlight ways the Solid Waste Disposal Act can be amended to regulate the packaging process by focusing on a reduction in the amount of materials used in packaging, a shift to the use of sustainable materials, and a ban on the use of single-use plastics. Finally, I advocate for the passage of the proposed Break Free From Plastic Pollution Act which is currently pending in Congress.*

## INTRODUCTION

It has become apparent that the unstoppable popularity of e-commerce has come with uncovered detriments to the environment.<sup>1</sup> Accordingly, the United States government needs to hold corporations responsible for their carbon footprint by imposing high fines on companies that do not have plans to reduce the amount of waste and pollution they emit. While there are many federal environmental laws regulated by the Environmental Protection Agency (EPA),<sup>2</sup> none of these laws target the e-commerce industry. Nor do they aim to hold corporations who work and profit from the e-commerce industry accountable for their carbon emissions and non-sustainable waste. This Note pushes for the passage of amendments to federal environmental laws targeting the delivery and packaging sectors of e-commerce businesses, and for the passage of a pending amendment that requires a phase out of single-use plastics.

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1. Martina Igini, *The Truth About Online Shopping and its Environmental Impact*, EARTH.ORG (Sept. 19, 2022), <https://earth.org/online-shopping-and-its-environmental-impact/>.

2. 42 U.S.C. § 7401–7671q (1990); 42 U.S.C. § 6901–6992k (1965).

Part I will provide background on two important nuisances: the rise of e-commerce and the effects of climate change. By merging these themes together, this Part will discuss the effect of plastic and cardboard packaging on the environment, and consequentially, the effects of e-commerce on the environment.

Part II will start by introducing the EPA, which is the agency in charge of regulating activities within the United States that have negative effects on the environment. Then, it will give an overview of existing federal and state laws with the goal of bettering the environment by restricting certain human sourced emissions of pollution and waste.

Part III will offer multiple solutions to the environmental detriment that e-commerce practices impose. These solutions are broken up into the passage of laws relating to (1) carbon emissions in the delivery process and (2) the use of non-sustainable packaging for the shipment of products. For carbon emissions, this Note advocates for amendments to the Clean Air Act requiring a shift from gas and diesel-powered delivery vehicles to electric vehicles and a shift from day-time deliveries to night-time deliveries. For the packaging sector, this Note advocates for amendments to the Solid Waste Disposal Act that will require reductions in the amount of packaging used for shipping and a shift to sustainable packaging materials such as paper and cellulose-based materials. Finally, this Note argues for the passage of the Break Free From Plastic Pollution Act that is currently pending in Congress.

## **I. BACKGROUND OF THE E-COMMERCE BOOM, CLIMATE CHANGE, AND E-COMMERCE'S EFFECTS ON CLIMATE CHANGE**

### **A. THE RISE OF E-COMMERCE**

It is no secret that in-store shopping has sharply declined in recent years,<sup>3</sup> especially during the COVID-19 pandemic in 2020,<sup>4</sup> due to the fast and efficient advances of e-commerce. "E-commerce refers to the use of electronic means and technologies to conduct commerce" over the internet.<sup>5</sup> There are five steps to a typical online purchase: (1) a consumer purchases a product on a business's website; (2) the information about the sale is sent to the business' warehouse; (3) the purchased products are packaged and shipped out to the customer; (4) the delivery is either fulfilled by truck or by

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3. Rani Molla, *A Look at the finances, footprints, and futures of department store chains*, VOX (Dec. 2, 2020, 7:00 AM), <https://www.vox.com/recode/21561046/death-rebirth-department-stores-retail-charts>.

4. Melissa Repko & Lauren Thomas, *6 ways the coronavirus pandemic has forever altered the retail landscape*, CNBC (Sept. 29, 2020, 10:00 AM), <https://www.cnbc.com/2020/09/29/how-coronavirus-pandemic-forever-altered-retail.html>.

5. AMIR MANZOOR, *E-COMMERCE: AN INTRODUCTION 2* (LAP LAMBERT Academic Publishing 2010).

airfreight; and (5) a parcel delivery carrier delivers the product to the customer's address.<sup>6</sup> Sometimes, a return is initiated after the customer receives the product he orders.<sup>7</sup>

E-commerce has become increasingly popular for the convenience and variety that it provides to consumers. For example, in 2009, only 7% of American households had engaged in e-commerce, but as of January 2020, about 76% of all American households now make purchases online.<sup>8</sup> E-commerce allows customers to shop anywhere and at any time with the luxury of those goods arriving at their doorstep after just a few business days.<sup>9</sup> For businesses, incorporating e-commerce into existing business models provides the opportunity for massive growth.<sup>10</sup> Internet sales totaled more than \$790 billion amongst United States retailers alone in 2020—a 32.4% increase from the previous year.<sup>11</sup> “Online spending represented 19.6% of total retail sales last year, compared with 15.8% in 2019.”<sup>12</sup> Previously, it would have typically taken four to six years for ordinary retailers to see this level of growth.<sup>13</sup> Additionally, e-commerce allows businesses to reach a massive consumer base all over the world. “There were 256 million digital buyers in the United States” in 2020, and it is estimated that there will be nearly 278 million digital buyers by 2024.<sup>14</sup> Globally, there were about 2.14 billion digital buyers in 2021.

There has been immense growth in e-commerce within the last year alone due to the COVID-19 pandemic. Data suggests that the pandemic has accelerated the shift from physical stores to shopping online by five years.<sup>15</sup> To comply with social distancing and lockdown regulations, retail stores shut

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6. Dimitri Weideli, *Environmental Analysis of US Online Shopping*, MIT CTR. FOR TRANSP. & LOGISTICS, Nov. 2013, at 2.

7. *Id.* at 4.

8. Dave Rejeski, *E-commerce and the Environment*, ENV'T LAW INST. (Jan. 6, 2020), <https://www.eli.org/vibrant-environment-blog/e-commerce-and-environment>.

9. Hilary Stout, *In War for Same-Day Delivery, Racing Madly to Go Last Mile*, N.Y. TIMES (Nov. 23, 2013), <https://www.nytimes.com/2013/11/24/technology/in-war-for-same-day-delivery-racing-madly-to-go-last-mile.html>.

10. Sunita Tiwari & Pratibha Singh, *Environmental Impacts of E-Commerce*, 8 ICPBEE 202, 203 (2011), available at <http://www.ipcbee.com/vol8/45-S10040.pdf>.

11. Fareeha Ali, *Charts: How the coronavirus is changing ecommerce*, DIGIT.COM 360 (Feb. 19, 2021), <https://www.digitalcommerce360.com/2021/02/19/ecommerce-during-coronavirus-pandemic-in-charts/>.

12. *Id.*

13. Natalie McKeon, *As Online Shopping Surges, E-Commerce Retailers Face Major Risks From the Climate Impact and Toxicity of Their Products*, ENV'T DEF. FUND (Jul. 29, 2020), <https://www.edf.org/media/online-shopping-surges-e-commerce-retailers-face-major-risks-climate-impact-and-toxicity>.

14. Camille Collins, *Is e-commerce really sustainable? Understanding its impact on the environment*, SANA COM. (Feb. 17, 2021), <https://www.sana-commerce.com/blog/impact-of-ecommerce-on-the-environment/>.

15. Sarah Perez, *COVID-19 pandemic accelerated shift to e-commerce by 5 years, new report says*, TECHCRUNCH+ (Aug. 24, 2020, 11:42 AM), <https://techcrunch.com/2020/08/24/covid-19-pandemic-accelerated-shift-to-e-commerce-by-5-years-new-report-says/>.



down for months.<sup>16</sup> Businesses quickly adapted an e-commerce business model in order to stay afloat.<sup>17</sup> In fact, many online retailers now *only* have online shops, which allows them the freedom to set up warehouses in cheap and convenient places without having to keep up with physical retail stores.<sup>18</sup> On the consumer side, there has been a huge shift in consumer habits, including a significant shift to e-commerce due to the COVID-19 pandemic.<sup>19</sup> The mass public was afraid to leave their homes to shop, leading many consumers to turn to online shopping.<sup>20</sup> Another reason consumers turned to online shopping was for a mood booster during the stressful and uncertain time of being in the midst of a global pandemic.<sup>21</sup> In fact, many consumers purchased items online for the first time during the pandemic.<sup>22</sup>

Like other lasting effects of the pandemic, it is predicted that these models are here to stay.<sup>23</sup> In fact, “e-commerce sales are expected to double in the next decade.”<sup>24</sup> Regardless of the economically advantageous aspects of e-commerce, these benefits must be weighed against a much larger issue—e-commerce’s effects on the environment.

## B. EFFECTS OF CLIMATE CHANGE

In simple terms, global warming refers to “the effect of human activities on the climate.”<sup>25</sup> Particularly, the burning of fossil fuels, including coal, oil, and gas, and deforestation, cause greenhouse gases to be released into the atmosphere.<sup>26</sup> The release of greenhouse gases thins the atmosphere, causing the temperature on planet Earth to rise continuously to dangerous, unprecedented heights.<sup>27</sup> The term “carbon footprint” is used to describe the

16. Maria Monteros, *NYC saw most chain store closures in over a decade in 2020: report*, RETAIL DIVE (Jan. 6, 2021), <https://www.retaildive.com/news/nyc-saw-most-chain-store-closures-in-over-a-decade-in-2020-report/592884/>.

17. *How COVID-19 triggered the digital and e-commerce turning point*, U.N. CONF. ON TRADE AND DEV., (Mar. 15, 2021), <https://unctad.org/news/how-covid-19-triggered-digital-and-e-commerce-turning-point>.

18. Weideli, *supra* note 6, at 2.

19. Ali, *supra* note 11.

20. *Id.*

21. Ruth Macgilp, *What Does Online Shopping During Lockdown Mean for the Environment?*, ECO-AGE (Dec. 5, 2020), <https://eco-age.com/resources/online-shopping-impact-on-environment/>.

22. Silvia Escursell, Pere Llorach-Massana & M. Blanca Roncero, *Sustainability in e-commerce packaging: A Review*, 280 J CLEAN PROD. 2 (2021), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7511172/>.

23. *Id.*

24. Blake Morgan, *Does E-Commerce Care About Sustainability?*, FORBES (Nov. 5, 2019, 11:09 AM), <https://www.forbes.com/sites/blakemorgan/2019/11/05/does-e-commerce-care-about-sustainability/?sh=4d5071bf12c8>.

25. Tiwari, *supra* note 10, at 204.

26. *Id.*

27. Amanda MacMillan & Jeff Turrentine, *Global Warming 101*, NRCD (Apr. 7, 2021), <https://www.nrdc.org/stories/global-warming-101>; *Carbon Footprint Factsheet*, UNIV. OF MICH. CTR. FOR SUSTAINABLE SYS. (Sept. 2021), <https://css.umich.edu/factsheets/carbon-footprint-factsheet>.

total amount of greenhouse gas emissions caused by a particular individual, organization, activity, or product.<sup>28</sup> Every person and corporation has a carbon footprint.<sup>29</sup>

Although the term “greenhouse gases” refers to the combination of carbon dioxide, methane, and nitrous oxide,<sup>30</sup> carbon dioxide represented about 79% of the total greenhouse gas emissions in 2020.<sup>31</sup> Transportation of all types, including by car, truck, train, boat, or aircraft, involves the “burning [of] fossil fuels like gasoline and diesel [which] releases carbon dioxide . . . into the atmosphere.”<sup>32</sup> Since transportation is such an integral part of a person’s everyday life, it is not surprising that emissions from transportation are the largest contributor to greenhouse gas emissions within the United States.<sup>33</sup>

As shown in step four of the e-commerce process mentioned above,<sup>34</sup> transportation plays a crucial role in delivering goods ordered online.<sup>35</sup> As a result, transportation within the e-commerce process has an enormous carbon footprint and a negative effect on climate change.<sup>36</sup> For example, freight vehicles, which include medium- and heavy-duty trucks, are responsible for almost one-quarter of the carbon footprint in the transportation category.<sup>37</sup> While it may be impossible to reverse the effects of global warming, it is possible to slow its rate by reducing human emissions of greenhouse gases.<sup>38</sup> Part V of this Note will discuss possible ways to limit and lessen e-commerce’s carbon footprint by targeting transportation.

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28. *Carbon Footprint Factsheet*, *supra* note 27.

29. “People, products and entire industries have carbon footprints. Your person footprint includes emissions from a variety of sources – your daily commute, the food you eat, the clothes you buy, everything you throw away . . . and more. The larger your footprint, the heavier the strain on the environment.” *What is a carbon footprint?*, CONSERVATION INT’L, <https://www.conservation.org/stories/what-is-a-carbon-footprint#:~:text=People%2C%20products%20and%20entire%20industries,the%20strain%20on%20the%20environment> (last visited Sept. 22, 2022).

30. *Carbon Pollution from Transportation*, U.S. ENV’T PROT. AGENCY, <https://www.epa.gov/transportation-air-pollution-and-climate-change/carbon-pollution-transportation> (last updated May 19, 2022).

31. *Overview of Greenhouse Gases*, U.S. ENV’T PROT. AGENCY, <https://www.epa.gov/ghgemissions/overview-greenhouse-gases> (last visited Sept. 22, 2022).

32. *Carbon Pollution from Transportation*, *supra* note 30.

33. *Id.* (“Greenhouse gas emissions from transportation account for about 27 percent of total U.S. greenhouse gas emissions”).

34. Weideli, *supra* note 6, at 2.

35. Weideli, *supra* note 6, at 5.

36. Terry Nguyen, *Amazon’s 1-day shipping is convenient – and terrible for the environment*, VOX (Oct. 16, 2019, 1:40 PM), <https://www.vox.com/the-goods/2019/10/16/20917467/amazon-one-day-shipping-bad-for-environment>.

37. *Id.*

38. David Herring & Rebecca Lindsey, *Can we slow or even reverse global warming?*, U.S. DEPT. OF COM. NAT’L OCEANIC AND ATMOSPHERIC ADMIN. (Oct. 29, 2020), <https://www.climate.gov/news-features/climate-qa/can-we-slow-or-even-reverse-global-warming>.

### C. THE EFFECT OF PLASTIC AND CARDBOARD PACKAGING ON THE ENVIRONMENT

Another prevalent contributor to global warming is plastic.<sup>39</sup> Since plastic can be used in an infinite number of ways and is inexpensive to make, plastics are widely mass produced.<sup>40</sup> More than 350 million tons of plastic are produced each year worldwide, with the United States leading in plastic waste generation.<sup>41</sup>

One of the most helpful ways to reduce the plastic footprint is by simply reducing plastic use.<sup>42</sup> Studies have shown that if the human population could “reduce plastic use as much as possible,” the total amount of plastic waste could be reduced by 30%.<sup>43</sup> This can be done by replacing single-use plastic products like plastic bags, bottles, and straws with more sustainable items like reusable bags, reusable bottles, and paper straws.<sup>44</sup> Single-use plastic, like those used in packaging, is a particularly difficult problem because they remain in the environment after disposal.<sup>45</sup> Despite efforts to enforce the recycling of plastic items, “91% of all plastic [is not] recycled at all . . . and ends up in landfills or in the environment.”<sup>46</sup> Plastic that ends up in landfills does not break down—the sun and heat slowly turn plastic into smaller pieces until it becomes microplastics that end up in the environment.<sup>47</sup> Exposure to microplastics is harmful to the health of both humans and wildlife.<sup>48</sup> Implementing efficient recycling programs could reduce plastic waste by another 20%.<sup>49</sup>

Another contributor to environmental harm is cardboard.<sup>50</sup> Although cardboard is more biodegradable than plastic, it is still important to limit

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39. Courtney Lindwall, *Single-Use Plastics 101*, NRDC (Jan. 9, 2020), [https://www.nrdc.org/stories/single-use-plastics-101?gclid=Cj0KCQjw-4SLBhCVARIsACrhWLV4DC51iSTVBXZJvp0tpXSix-SWMAzPE36hCm6dZbdmvUChf9d2PkSaAjIXEALw\\_wcB](https://www.nrdc.org/stories/single-use-plastics-101?gclid=Cj0KCQjw-4SLBhCVARIsACrhWLV4DC51iSTVBXZJvp0tpXSix-SWMAzPE36hCm6dZbdmvUChf9d2PkSaAjIXEALw_wcB).

40. Jessica A. Knoblauch, *Environmental toll of plastics*, ENV'T HEALTH NEWS (Feb. 1, 2020), <https://www.ehn.org/plastic-environmental-impact-2501923191/particle-7>.

41. *#breakfreefromplastic Pollution Act*, BREAK FREE FROM PLASTIC, <https://www.breakfreefromplastic.org/pollution-act/> (last visited Sept. 12, 2022).

42. Lindwall, *supra* note 39.

43. Matt Simon, *A Billion More Tons of Plastic Could Blanket Earth by 2040*, WIRED (Jul. 23, 2020), <https://www.wired.com/story/billion-more-tons-of-plastic-could-blanket-earth/>.

44. Lindwall, *supra* note 39.

45. Jasmin Malik Chua, *Online shopping has boomed in the pandemic. But what about all the packaging?*, VOX (Jan. 8, 2021, 9:10 AM), <https://www.vox.com/the-goods/22214017/online-shopping-pandemic-packaging-ecommerce-waste-plastic>.

46. Lindwall, *supra* note 39.

47. *Id.*

48. Simon, *supra* note 43.

49. *Id.*

50. *Paper and Paperboard: Material-Specific Data*, U.S. ENV'T PROT. AGENCY, <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/paper-and-paperboard-material-specific-data> (last updated Jan. 27, 2022).

cardboard production and ensure that it gets recycled.<sup>51</sup> The production of cardboard is linked to deforestation and chemical emissions that are harmful to the environment.<sup>52</sup> Recycling cardboard has a multitude of advantages, including reducing greenhouse gas emissions and saving landfill space.<sup>53</sup> Virgin fiber,<sup>54</sup> making up the basis of cardboard boxes, can be recycled five to seven times which saves trees and lowers production.<sup>55</sup> Cardboard boxes are used heavily to deliver products in e-commerce.<sup>56</sup> For example, the amount of corrugated board used in e-commerce packaging is estimated to be worth more than \$20 billion.<sup>57</sup>

#### D. THE EFFECTS OF E-COMMERCE ON THE ENVIRONMENT

While there are many aspects of e-commerce that contribute to global warming, this Note discusses two of these contributions in depth: (1) air pollution from the over-utilization of delivery trucks and planes, and (2) the overproduction and use of non-sustainable packaging, including single-use plastics and non-recyclable cardboard.

Initially, e-commerce was thought to be better for the environment than in-person shopping because it reduced the carbon emissions from consumers driving to physical stores in their individual vehicles.<sup>58</sup> However, this no longer proves true due to a change in consumer online shopping habits, demand for quicker last-mile deliveries, and an increase in the number of trucks and other gas vehicles used for these deliveries. For example, the convenience of shopping online results in consumers buying items right away each time they think of the item instead of buying multiple items from the same store together as they would have done if shopping in-person.<sup>59</sup> There is no longer a need to prevent making multiple trips to a store.

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51. Hannah Denham, *How Big Cardboard is handling the 2020 box boom*, THE WASH. POST (Dec. 30, 2020, 6:00 AM), <https://www.washingtonpost.com/business/2020/12/30/cardboard-pandemic-online-shipment/>.

52. *Id.*

53. *Wastes – Resource Conservation – Common Wastes & Materials – Paper Recycling*, U.S. ENV'T PROT. AGENCY (Feb. 21, 2016), <https://archive.epa.gov/wastes/conservation/materials/paper/web/html/index-2.html>.

54. Virgin fiber is “a material used to make paper that has not been recycled from previous paper or other materials.” See *Virgin fiber*, GLOSBE DICTIONARY, <https://glosbe.com/en/en/virgin%20fiber> (last visited Sept. 22, 2022).

55. Denham, *supra* note 51.

56. *E-commerce a \$20 billion market for corrugated packaging, and growing fast*, SMITHERS, [https://www.smithers.com/resources/2018/may/e-commerce-a-\\$20-billion-market-for-corrugated](https://www.smithers.com/resources/2018/may/e-commerce-a-$20-billion-market-for-corrugated).

57. *Id.*

58. Catherine Boudreau, *Shopping online surged during Covid. Now the environmental costs are becoming clearer*, POLITICO (Nov. 18, 2021), <https://www.politico.com/news/2021/11/18/covid-retail-e-commerce-environment-522786>.

59. Parija Kavilanz, *Online shopping can be worse for the environment than driving to a store*, CNN BUS. (Jul. 7, 2020), <https://www.cnn.com/2020/02/26/tech/greenhouse-gas-emissions-retail/index.html>.

“Last-mile delivery” is a term used to describe the journey of a product purchased online from a warehouse to the back of a truck to its final destination at the customer’s doorstep.<sup>60</sup> With the massive jump in the number of products bought and sold online, the “demand for urban last-mile delivery is expected to grow to 78% by 2030, leading to 36% more delivery vehicles in 100 cities around the world,” adding more emissions, pollution, and congestion.<sup>61</sup> This, in turn, will “cause related emissions to rise by nearly one-third and add [eleven] minutes to each [person]’s commute.”<sup>62</sup> There has also been a push for immediate deliveries. To illustrate this, companies like Amazon have started promising their customers expedited shipping in as little as one day.<sup>63</sup> This causes many businesses to “send out freights that are only partially full . . . [requiring] additional trips and more transportation emissions.”<sup>64</sup>

The other major environmental problem resulting from the e-commerce process is the mass production and use of packaging. Besides the actual cardboard shipping box that products are delivered in, items are often wrapped in excessive padding using Styrofoam, plastic, or additional paper in an effort to prevent damage to the purchased items.<sup>65</sup> For example, a consumer who ordered a three-inch cable reported that the cable “arrived wrapped in two boxes, padded by three layers of brown wrapping paper and plastic.”<sup>66</sup>

The high number of online returns also adds to the harmful impact of e-commerce on the environment through both transportation emissions and packaging issues. Returns result in double the amount of transportation used to get the purchased item to the customer.<sup>67</sup> For example, due to the lack of opportunity to try clothes on at a physical store when shopping online, 30% of online purchases are returned compared to the 6-8% of clothing items that are returned when purchased in-person at a store.<sup>68</sup> Customers also may not reuse the packaging that the item arrived in, resulting in the use of additional packaging to fulfill the return. In addition to the extra carbon emissions and packaging involved in online returns, another issue is that 20% of online

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60. Shelagh Dolan, *The challenges of last mile delivery logistics and the tech solutions cutting costs in the final mile*, INSIDER INTEL. (Apr. 21, 2022), <https://www.businessinsider.com/last-mile-delivery-shipping-explained>.

61. Kate Whiting, *Online shopping is polluting the planet – but it’s not too late*, WORLD ECO. FORUM (Jan. 10, 2020), <https://www.weforum.org/agenda/2020/01/carbon-emissions-online-shopping-solutions/>.

62. *Id.*

63. Nguyen, *supra* note 36.

64. Collins, *supra* note 14.

65. *Id.*

66. Derek Beres, *Study details the negative environmental impact of online shopping*, BIG THINK (Jul. 10, 2020), <https://bigthink.com/the-present/online-shopping-carbon/>.

67. Collins, *supra* note 14.

68. Macgilp, *supra* note 21.

returns are unable to be resold by the retailer and end up in landfills.<sup>69</sup> A common alternative when a consumer receives an item purchased online that doesn't fit is to *exchange* an item for another, which triples the amount of transportation, and potential packaging used to get the correct item to the consumer.<sup>70</sup>

## II. OVERVIEW OF EXISTING LAW

The United States is not new to the fight against climate change. Accordingly, the United States government currently has many environmental laws that regulate greenhouse gas emissions and other contributors to climate change, such as air pollution and waste disposal. There is also a pending environmental law aiming to ban the use of single-use plastics. However, as this Note argues, these regulations may not be enough to combat the increasing amount of pollution and waste that arises from the e-commerce process.

### A. THE U.S. ENVIRONMENTAL PROTECTION AGENCY

The EPA was created in 1970 in response to growing public concerns about air pollution, waste, and water contamination.<sup>71</sup> Its mission is to “protect human health and the environment.”<sup>72</sup> One of its concerns is the uncontrollable amount of motor vehicle emissions.<sup>73</sup> The EPA performs a multitude of tasks to further its mission, such as publishing information to educate the public on how to reduce the negative environmental impacts of its activities, conducting research into solutions to the environmental issues that exist, and giving grants to institutions involved in community cleanups.<sup>74</sup> Most importantly, the EPA writes regulations to implement the environmental laws that Congress passes.<sup>75</sup> The EPA is also responsible for enforcing those regulations and for setting national standards that most states enforce through state regulations.<sup>76</sup>

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69. *Id.*

70. Collins, *supra* note 14.

71. *The Origins of EPA*, U.S. ENV'T PROT. AGENCY, <https://www.epa.gov/history/origins-epa#:~:text=Administrator%20Ruckelshaus%20was%20confirmed%20by,of%20EPA%20in%20July%201970> (last updated June 24, 2022).

72. *Our Mission and What We Do*, U.S. ENV'T PROT. AGENCY, <https://www.epa.gov/aboutepa/our-mission-and-what-we-do> (last updated June 13, 2022).

73. *The Origins of EPA*, *supra* note 71.

74. *Our Mission and What We Do*, *supra* note 72.

75. *Id.*

76. *Id.*

### B. THE CLEAN AIR ACT AND THE NATIONAL AMBIENT AIR QUALITY STANDARDS

An important federal law that the EPA has implemented is the Clean Air Act.<sup>77</sup> The Clean Air Act allows the EPA to “regulate air pollutants in order to protect public health and welfare.”<sup>78</sup> One way in which the EPA has promoted the regulation of air pollutants under this Act is through the establishment of the National Ambient Air Quality Standards (NAAQS), which directs the states to develop state implementation plans, commonly called SIPs, in order to achieve these standards.<sup>79</sup> The NAAQS are the national pollution caps on the total amount of pollutants that sources of pollution, including corporations and businesses, emit into the air.<sup>80</sup> The six principal air pollutants that are limited by these standards include “ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide, and lead.”<sup>81</sup> These standards are reviewed by an independent committee of experts every five years to ensure the accuracy of the emission rates.<sup>82</sup> The effects of the NAAQS appear to be highly successful. From 1980 to 2019, vehicle miles traveled increased by 85%, but total emissions of the six principal air pollutants dropped by 73%.<sup>83</sup>

However, there are still challenges to reaching the full potential of the NAAQS and, consequently, of the Clean Air Act. For example, in 2021, “approximately 102 million people nationwide [still] lived in counties with pollution levels above the primary NAAQS.”<sup>84</sup> In addition, the Trump administration decided to retain the then-current ozone standards at 70 parts per billion during the 2020 review of the NAAQS despite substantial evidence from scientists and environmental experts that the standard should be lowered to 60 parts per billion because of the “heavier pollution burden

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77. *Summary of the Clean Air Act*, U.S. ENV'T PROT. AGENCY, <https://www.epa.gov/laws-regulations/summary-clean-air-act> (last updated Sept. 28, 2021).

78. Andy Parker, *The Clean Air Act and the Climate*, CTR. FOR BIOLOGICAL DIVERSITY, [https://www.biologicaldiversity.org/programs/climate\\_law\\_institute/global\\_warming\\_litigation/clean\\_air\\_act/index.html](https://www.biologicaldiversity.org/programs/climate_law_institute/global_warming_litigation/clean_air_act/index.html) (last visited Sept. 22, 2022).

79. *Summary of the Clean Air Act*, *supra* note 77.

80. *Frequently Asked Questions: Setting a National Pollution Cap on Greenhouse Gases Under the Clean Air Act*, CTR. FOR BIOLOGICAL DIVERSITY, [https://www.biologicaldiversity.org/programs/climate\\_law\\_institute/global\\_warming\\_litigation/clean\\_air\\_act/pdfs/Clean-Air-Act-FAQ.pdf](https://www.biologicaldiversity.org/programs/climate_law_institute/global_warming_litigation/clean_air_act/pdfs/Clean-Air-Act-FAQ.pdf) (last visited Sept. 22, 2022).

81. *Id.*

82. EELP Staff, *Ongoing Changes to the Air Quality Standards Review Process*, ENV'T & ENERGY LAW PROGRAM (Dec. 9, 2019), <https://eelp.law.harvard.edu/2019/12/ongoing-changes-to-the-air-quality-standards-review-process/>.

83. *History of Reducing Air Pollution from Transportation in the United States*, U.S. ENV'T PROT. AGENCY (May 16, 2022), <https://www.epa.gov/transportation-air-pollution-and-climate-change/history-reducing-air-pollution-transportation>.

84. *Air Quality – National Summary*, U.S. ENV'T PROT. AGENCY (Jun. 1, 2022), <https://www.epa.gov/air-trends/air-quality-national-summary>.

carried by low-income and communities of color and ozone's impact on at-risk groups.”<sup>85</sup>

The decision was due to the priorities of the Trump administration that placed the economic considerations of corporations and big businesses over environmental health. The administrator of the EPA under the Trump administration, Andrew Wheeler, reasoned that the decision “to retain the current standards, without revision”<sup>86</sup> was because pollution levels have sharply declined since the creation of the agency in 1970 and the last several years, in particular, have seen immense improvements in air quality which has benefitted the health of millions of Americans.<sup>87</sup> However, this reasoning does not explain how the decision not to update the emission standards would result in *further* progress in the next five years since it can be assumed that the progress so far has been at least partly due to the willingness of the agency to review and necessarily change standards every five years in response to the potential increase in the amount of air pollution emissions from emerging sectors, such as e-commerce, that affect air quality.

### C. SOLID WASTE DISPOSAL ACT

Another activity the EPA regulates is the disposal of solid waste. In 1965, Congress passed the Solid Waste Disposal Act, which “provides waste management standards for municipal and industrial waste, promotes waste management technology, and charges municipalities with responsibility for the disposal of solid waste.”<sup>88</sup> The Solid Waste Disposal Act was the first regulation to introduce environmentally responsible methods of waste disposal for household, municipal, commercial, and industrial sources<sup>89</sup> like recycling.

### D. AMENDMENTS TO THE SOLID WASTE DISPOSAL ACT: THE RESOURCE CONSERVATION AND RECOVERY ACT AND THE POLLUTION PREVENTION ACT

While there have been multiple amendments to the Solid Waste Disposal Act,<sup>90</sup> the most prevalent amendments to the law are made through the Resource Conservation and Recovery Act. While the Solid Waste Disposal Act only applied to the disposal and transport of solid, nonhazardous waste,

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85. Juliet Eilperin & Dino Grandoni, *Trump administration keeps existing smog limits, rejecting calls to toughen them*, THE WASH. POST (Dec. 23, 2020, 5:37 PM), <https://www.washingtonpost.com/climate-environment/2020/12/23/trump-smog-rule/>.

86. Review of the Ozone National Ambient Air Quality Standards, 85 Fed. Reg. 87,256 (Dec. 31, 2020) (to be codified at 40 C.F.R. pt. 50).

87. Eilperin & Grandoni, *supra* note 85.

88. Jason Gordon, *Solid Waste Disposal Act – Explained*, THE BUS. PROFESSOR (Sept. 26, 2021), [https://thebusinessprofessor.com/en\\_US/environmental-law/solid-waste-disposal-act](https://thebusinessprofessor.com/en_US/environmental-law/solid-waste-disposal-act).

89. *Solid Waste Disposal Act [SWDA] Law and Legal Definition*, US LEGAL, <https://definitions.uslegal.com/s/solid-waste-disposal-act-swda/> (last visited Sept. 12, 2022).

90. *Id.*



the Resource Conservation and Recovery Act extends regulation to the handling of solid, hazardous waste and holds sources of those hazardous wastes responsible from “cradle-to-grave.”<sup>91</sup> Cradle-to-grave is “a methodology used to evaluate natural effects linked to all the phases in the life of the product from obtaining raw materials, processing of these materials, manufacturing, dissemination, usage, maintenance, repair, and selling or reusing.”<sup>92</sup> It also grants the EPA the authority to oversee waste management and recycling, to provide recycling guidelines that many states adopt, and to enforce disposal and recycling requirements by requiring state governments to ensure that the federal guidelines are being adhered to.<sup>93</sup> Remarkably, the Resource Conservation and Recovery Act has been a success in reducing emissions, minimizing waste, controlling the disposal of solid waste, and raising recycling rates.<sup>94</sup>

A particularly important amendment to the Solid Waste Disposal Act is the Pollution Prevention Act.<sup>95</sup> The Pollution Prevention Act emphasizes source reduction in replacement of waste management and pollution control.<sup>96</sup> It establishes a hierarchy for pollution prevention: (1) source reduction, (2) recycling and reuse, (3) treatment, and as a last resort, (4) land disposal.<sup>97</sup> Source reduction involves preventing or reducing pollution *at the source*<sup>98</sup> by encouraging businesses to adopt practices that prevent the use of hazardous and toxic materials, or that implement strict recycling practices when such use cannot be prevented.<sup>99</sup> Although the Pollution Prevention Act does not *require* industries and businesses to reduce their pollution, it does require them to at least “*explain* what steps are being taken to reduce pollution.”<sup>100</sup> This has the effect of focusing industry attention on the Act’s

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91. MARK L. BRUSSEAU, IAN L. PEPPER & CHARLES P. GERBA, ENVIRONMENTAL AND POLLUTION SCIENCE 570 (Mark L. Brusseau et al. eds., 3rd ed. 2019); Gordon, *supra* note 88.

92. Jason Gordon, *Cradle to Grave – Explained*, THE BUS. PROFESSOR (Jun. 6, 2021), [https://thebusinessprofessor.com/en\\_US/mgmt-operations/cradle-to-grave-definition](https://thebusinessprofessor.com/en_US/mgmt-operations/cradle-to-grave-definition).

93. Shelby Bell, *Recycling Statutes and Regulations Every Business Should Know*, ROADRUNNER RECYCLING (Jul. 2, 2019), <https://www.roadrunnerwm.com/blog/recycling-statutes-and-regulations>.

94. Cole Rosengren, *As RCRA turns 40, EPA looks to the future of national solid waste policy*, WASTEDIVE (Oct. 20, 2016), <https://www.wastedive.com/news/as-rcra-turns-40-epa-looks-to-the-future-of-national-solid-waste-policy/428725/>.

95. *Pollution Prevention Act of 1990*, U.S. ENV’T PROT. AGENCY, <https://www.epa.gov/p2/pollution-prevention-act-1990> (last visited Sept. 12, 2022).

96. *Summary of the Pollution Prevention Act*, U.S. ENV’T PROT. AGENCY, <https://www.epa.gov/laws-regulations/summary-pollution-prevention-act> (last visited Sept. 12, 2022).

97. THOMAS E. HIGGINS, POLLUTION PREVENTION HANDBOOK 1–2 (Thomas E. Higgins eds., 1995).

98. Sam Blink, *Get to know the Pollution Prevention Act’s impact on business*, BLINK L. BLOG (May 28, 2020), <https://www.blinklaw.org/post/get-to-know-the-pollution-prevention-act-s-impact-on-business>.

99. *Pollution Prevention: An Environmental Program Fact Sheet*, CONN. DEPT. OF ENERGY AND ENV’T PROT. (Feb. 2013), <https://portal.ct.gov/DEEP/Permits-and-Licenses/Permitting-Factsheets/Pollution-Prevention-Fact-Sheet>.

100. Higgins, *supra* note 97, at 19.

goal of reducing the amount of pollution in the environment through “cost-effective changes in production, operation, and raw materials use.”<sup>101</sup> Additionally, the EPA issued a Pollution Prevention Strategy in 1991, which provides guidelines and directions for efforts to incorporate pollution prevention into the EPA’s existing programs.<sup>102</sup>

#### E. THE BREAK FREE FROM PLASTIC POLLUTION ACT

A new pending amendment to the Solid Waste Disposal Act called “The Break Free From Plastic Pollution Act” was introduced in the Senate on March 25, 2021, under bill number S.984.<sup>103</sup> The law aims to reduce the amount of plastic pollution in the United States.<sup>104</sup> The Break Free From Plastic Pollution Act has the potential of being “the most comprehensive set of policy solutions to the plastic pollution crisis” ever passed.<sup>105</sup> The Act aims to reduce the production and use of certain single-use plastic products and packaging, to hold producers responsible for the design, collection, reuse, recycling, and disposal of their consumer products and packaging, and to prevent consumer products and packaging from entering into the waterways.<sup>106</sup> The proposed law establishes (1) minimum percentages of products that must be reused, recycled, or composted, and (2) an increased percentage of recycled content that must be contained in beverage containers.<sup>107</sup>

The Break Free From Plastic Pollution Act places the responsibility of managing and recycling plastic packaging and single-use plastics on the producers of those products.<sup>108</sup> For example, it will require producers of plastic packaging and containers to “design, manage, and finance waste and recycling programs.”<sup>109</sup> Plastic producers will have to ensure that their products contain 25% post-consumer content by 2025, and 80% post-consumer content by 2040.<sup>110</sup> Post-consumer content is “material that is made from items that consumers recycle every day, like aluminum, cardboard

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101. JAMES G. SPEIGHT, *NATURAL WATER REMEDIATION* 306 (Matthew Deans eds., 2019).

102. Higgins, *supra* note 97, at 21.

103. Break Free From Plastic Pollution Act of 2021, S. 984, 117th Cong. §1 (2021).

104. *Id.*

105. #breakfreefromplastic, *supra* note 41.

106. Break Free From Plastic Pollution Act of 2021, S. 984, 117th Cong. §1 (2021).

107. *Id.*

108. Kate Melges, *Congress: Support the Break Free From Plastic Pollution Act of 2021*, GREENPEACE (Mar. 25, 2021), <https://www.greenpeace.org/usa/congress-support-the-break-free-from-plastic-pollution-act-of-2021/>; Break Free From Plastic Pollution Act of 2021, S.984, 117th Cong. §1 (2021).

109. Jennie Romer, *Federal Break Free From Plastic Pollution Act Introduced!*, SURFRIDER FOUND. (Feb. 12, 2020), <https://www.surfrider.org/coastal-blog/entry/federal-break-free-from-plastic-pollution-act-introduced>.

110. Nadine M. Snyder, *The Solution to Plastic Pollution: A Dissection of the Break Free From Plastic Pollution Act*, THE CUPOLA AT GETTYSBURG COLL. (May 12, 2021), [https://cupola.gettysburg.edu/cgi/viewcontent.cgi?article=2006&context=student\\_scholarship](https://cupola.gettysburg.edu/cgi/viewcontent.cgi?article=2006&context=student_scholarship).

boxes, paper, and plastic bottles.”<sup>111</sup> After being recycled, these materials are collected and shipped to recycling facilities to be melted and turned into some other usable product like packaging.<sup>112</sup> The proposed Act also imposes fines of up to \$70,000 for companies that do not have recycling plans for the plastic products they produce and for selling non-compostable or non-recyclable plastic products.<sup>113</sup> This creates an incentive for companies to create products that are easily recyclable and to take the responsibility of implementing a recycling plan to avoid paying a fine.<sup>114</sup>

If passed, the Act will phase out certain single-use products and will incentivize the reduction of other single-use products through various methods, including a tax on carryout shopping bags.<sup>115</sup> Additionally, the Act will affect businesses in three ways: (1) it will put temporary stops on new or expanded permits for certain facilities that manufacture plastics until the EPA updates its standards regarding pollution from plastic plants, including requirements on the use of the best available technologies, (2) it will require businesses to use proper labels for recyclable products, and (3) it will limit the export of plastic waste to other countries.<sup>116</sup>

The biggest supporters of the Break Free From Plastic Pollution Act have been environmental organizations.<sup>117</sup> Greenpeace, in particular, has shown immense support for the proposed law and gives three plausible reasons for its support: (1) it will hold the plastic industry responsible for its actions, (2) it will reduce fossil fuel emissions, and (3) it will help marginalized communities that live near petrochemical plants.<sup>118</sup> As discussed in the next section, all of these arguments will likely prove true if the Break Free From Plastic Pollution Act is passed. Many citizens and communities are also big supporters of this Act. Low-income communities, particularly those situated near large plastic manufacturing facilities, are naturally pushing for the Act’s implementation because they have the potential to benefit from the “restrictions on the pollutants that can be emitted into their communities.”<sup>119</sup>

Not surprisingly, the biggest opposition to the passage of the Break Free From Plastic Pollution Act comes from the plastic industry, especially

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111. *What You Need to Know About Post-Consumer Recycled (PCR) Packaging*, EPAC, <https://epacflexibles.com/what-you-need-to-know-about-post-consumer-recycled-pcr-packaging/> (lasted visited Sept. 22, 2022).

112. *Id.*

113. Snyder, *supra* note 110.

114. *Id.*

115. Break Free From Plastic Pollution Act of 2021, S.984, 117th Cong. §1 (2021), <https://www.congress.gov/117/bills/s984/BILLS-117s984is.pdf>.

116. *Id.*

117. *Greenpeace as part of Break Free From Plastic Pollution presents a new way of exposing plastic pollution offenders*, GREENPEACE (Oct. 5, 2017), <https://www.greenpeace.org/international/press-release/7434/greenpeace-as-part-of-break-free-from-plastic-presents-a-new-way-of-exposing-plastic-pollution-offenders/>.

118. EPAC, *supra* note 111.

119. Snyder, *supra* note 110.

manufacturers. The American Chemistry Council is a “trade association . . . that represents ‘the leading companies in the business of chemistry.’”<sup>120</sup> The American Chemistry Council outlines four main reasons for its opposition: (1) pausing plastic production will negatively affect the economy’s recovery from the COVID-19 pandemic, (2) strict restrictions on plastic production will cause a shortage in medical supplies, (3) pausing plastic production will financially hinder manufacturers and as a result, will not be able to fund the development of new recycling technology, and (4) regulating plastic will hinder the development of infrastructure necessary to combat climate change, such as solar panels and wind turbines because plastic is needed in this development.<sup>121</sup> Another industry that would be negatively harmed, and is thus in opposition to the proposed law, is the fossil fuel industry. Like those in the plastic industry, big players in the fossil fuel industry also argue that pausing the production of plastic will be detrimental to the economy and will result in a substantial loss of American jobs.<sup>122</sup>

#### F. STATE ENVIRONMENTAL LAWS

Many states have passed mandatory environmental laws of their own, including landfill bans, recycling laws, e-waste laws, and pollution laws.<sup>123</sup> As of 2019, 49 states already have landfill bans in place, and 25 states have mandatory recycling requirements.<sup>124</sup> State laws can be more effective than federal laws in some contexts.<sup>125</sup> For example, New York State passed the Solid Waste Management Act of 1988, which has similar regulations on waste reduction and recycling as the federal Solid Waste Disposal Act<sup>126</sup> discussed earlier.<sup>127</sup> Costs associated with complying with state environmental regulations can impact where to locate new plants and production facilities.<sup>128</sup> Thus, state regulations may be a feasible way to hold businesses accountable for their pollution emissions.

An increasingly common type of environmental legislation that many states have been passing recently involves restricting the use of single-use

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120. *American Chemistry Council*, BALLOTPEdia, [https://ballotpedia.org/American\\_Chemistry\\_Council](https://ballotpedia.org/American_Chemistry_Council) (last visited Sept. 12, 2022).

121. Snyder, *supra* note 110.

122. *Id.*

123. Bell, *supra* note 93.

124. *Id.*

125. “State officials need not enforce federal laws that the state has determined to be unconstitutional; nor may Congress mandate that states enact specific laws.” Robert A. Levy, *Yes, States Can Nullify Some Federal Laws, Not All*, CATO INST. (Mar. 18, 2013), <https://www.cato.org/commentary/yes-states-can-nullify-some-federal-laws-not-all>.

126. *Solid Waste Disposal Act [SWDA] Law and Legal Definition*, *supra* note 89.

127. *Recycling and Composting: Reduce, Reuse, Recycle and Composting*, N.Y. STATE DEP’T OF ENV’T CONSERVATION, <https://www.dec.ny.gov/chemical/294.html> (last visited Sept. 22, 2022).

128. Wayne B. Gray, *Environmental regulations and business decisions*, IZA WORLD OF LAB. (Sept. 2015), <https://wol.iza.org/articles/environmental-regulations-and-business-decisions/long>.

plastic bags such as grocery bags.<sup>129</sup> As of February 2021, eight states have banned single-use plastic bags.<sup>130</sup> The New York State Bag Waste Reduction Act<sup>131</sup> (1) bans “any person required to collect tax” from distributing single-use plastic carryout bags to its customers unless such bags are “exempt” and (2) authorizes “any person required to collect tax” who distributes paper carryout bags to charge customers a five cents fee.<sup>132</sup> If these restrictions on single use plastic bags prove effective in reducing plastic waste, they could serve as model regulations for the e-commerce industry.

### III. POLICY SUGGESTIONS HOLDING CORPORATIONS ACCOUNTABLE FOR THEIR CARBON FOOTPRINT

The most beneficial way to reduce e-commerce’s carbon footprint is to hold companies who engage in such practices accountable for their shipping practices. This Note focuses on large businesses since small businesses may be fatally harmed by stringent e-commerce laws and leave a much smaller carbon footprint. The EPA can implement the environmental laws that Congress has passed by promulgating regulations that specifically target e-commerce practices, like those discussed in the last section of this Note. This section will therefore propose the passage of two types of regulations—one targeting the delivery process and one targeting the packaging process.

#### A. AMEND THE CLEAN AIR ACT: REGULATE THE DELIVERY PROCESS

The Clean Air Act permits the EPA to regulate air pollutants for the benefit of public health.<sup>133</sup> Thus, instead of passing a new law, the EPA should pass an amendment under the Clean Air Act to regulate the amount of carbon emissions from trucks and other delivery vehicles that are particularly used in the e-commerce process. Although the Clean Air Act already limits the number of pollutants that businesses and corporations may emit each year through the NAAQS, the pollutant cap has not changed in over five years.<sup>134</sup> This Note pushes for a revision of the pollutant cap to commensurate the increase in e-commerce practices within the past few years, especially since the COVID-19 pandemic.

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129. Jennifer Schultz & Kim Tyrrell, *State Plastic Bag Legislation*, NAT’L CONF. OF STATE LEGIS. (Feb. 28, 2021), <https://www.ncsl.org/research/environment-and-natural-resources/plastic-bag-legislation.aspx>.

130. *Id.*

131. *See generally* S.B. 1508C, 116<sup>th</sup> Cong. (N.Y. 2019).

132. Andrew G. Geyer & Michael J. Altieri, *New York to Commence Enforcement of Plastic Carryout Bag Ban*, THE NAT’L L. REV. (Oct. 16, 2020), <https://www.natlawreview.com/article/new-york-to-commence-enforcement-plastic-carryout-bag-ban>.

133. 42 U.S.C. § 7401–7671q (1990).

134. *Frequently Asked Questions: Setting a National Pollution Cap on Greenhouse Gases Under the Clean Air Act*, *supra* note 80.

Additionally, this Note advocates for the EPA to pass amendments targeting changes in certain practices used in e-commerce that would substantially lower the amount of air pollution emissions. These changes include: (1) a shift from diesel and gas-powered delivery vehicles to electric vehicles; (2) a shift from day-time deliveries to night-time deliveries; (3) limiting free shipping, returns, and exchanges practices; (4) offering pick up locations; (5) moving warehouses closer to major delivery areas; and (6) consolidating items into single shipments. This Note will focus on items (1) and (2) above: implementation of electric vehicles and night-time deliveries.

### 1. Electric Vehicles

Most e-commerce packages are currently delivered by diesel-fueled trucks or vans.<sup>135</sup> Diesel-fueled trucks are used because they are relatively cheap to buy, maintain and run, but they have an extremely detrimental effect on the environment due to their “inefficiency . . . for short trips and slow start-stop traffic.”<sup>136</sup> For example, the U.S. Energy Information Administration estimated that diesel fuel consumption in the U.S. transportation sector resulted in the emission of 468 million metric tons of carbon dioxide in 2019.<sup>137</sup> Advances in technology have allowed for a promising alternative: zero-emission electric vehicles.<sup>138</sup> While these vehicles are more expensive, technological advances are ongoing, and in the near future, there will be a range of different types of electric truck models available for companies to choose from for their individualized e-commerce delivery plans and budgets.<sup>139</sup> In fact, many big corporations have already voluntarily started to move into the electric vehicle direction. Amazon, the leading company engaging in e-commerce, has promised to create a fleet of 100,000 electric delivery vans in order to become completely carbon neutral by 2040.<sup>140</sup>

A potential way to introduce requirements on players in the e-commerce game is through a point system similar to the one that has been implemented by California’s South Coast Air Quality Management District, which set a precedent for regulating the e-commerce industry earlier last year.<sup>141</sup> In May 2021, the South Coast Air Quality Management District adopted an “indirect

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135. Sam Heshmati, et al., *Alternative e-commerce delivery policies: A case study concerning the effects on carbon emissions*, 8 EURO J. ON TRANSP. AND LOGISTICS 217, 224 (Sept. 2019), <https://www.sciencedirect.com/science/article/pii/S2192437620300509>.

136. *Id.* at 224–225.

137. *How much carbon dioxide is produced from U.S. gasoline and diesel fuel consumption?*, U.S. ENERGY INFO. ADMIN. (May 10, 2022).

138. Nguyen, *supra* note 36.

139. Hiroko Tabuchi, *E-Commerce Mega-Warehouses, a Smog Source, Face New Pollution Rule*, N.Y. TIMES (May 8, 2021), <https://www.nytimes.com/2021/05/08/climate/e-commerce-warehouse-smog-regulation.html>.

140. Beres, *supra* note 66; Nguyen, *supra* note 36.

141. Tabuchi, *supra* note 139.

source rule” which requires operators of warehouses larger than 100,000 square feet to earn points by acquiring or using zero-emission trucks or other vehicles to make up for the emissions that come and go from their warehouses.<sup>142</sup> This new rule is estimated to reduce nitrogen oxide emissions by up to 15%.<sup>143</sup> Another potential and more direct way to promote the transition from gas and diesel-powered delivery vehicles to zero-emission electric delivery vehicles is to ban gas and diesel-fueled vehicles altogether. However, this would face much more backlash from big retailers and put a potentially fatal burden on many companies due to the current high prices of electric vehicles.<sup>144</sup> Requiring a slow, multi-phase-out for diesel powered vehicles may be more practical.

Another benefit of passing regulations that will force corporations in the e-commerce industry to implement electric delivery vehicles is that it will spur investment and development efforts in “a more rapid electrification of freight trucks.”<sup>145</sup> This would have the potential of reducing the cost of attaining electric automobiles and potentially getting rid of gas vehicles altogether. This would be a huge step towards reducing emissions from the transportation sector as a whole.

## 2. Night-time Deliveries

It is not surprising from the number of trucks and delivery vans seen double-parked on the roads during peak traffic hours that most deliveries of e-commerce parcels are delivered during the day-time. This causes traffic congestion which elongates each driver’s travel time and consequentially causes more emissions from vehicles. This is especially true in highly populated cities. For example, as of October 2019, cars in the busiest parts of Manhattan moved at an average of seven miles per hour.<sup>146</sup> Shifting deliveries to night-time, especially in urban areas, would decrease delivery times, resulting in fewer emissions per delivery route.<sup>147</sup> In addition, night-time deliveries would reduce the number of trucks and large vans on the road

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142. *Id.*

143. *Id.*

144. “Over a five-year period, the total cost of owning a [battery electric van] range from \$69,000 to \$92,000, compared to \$71,000 for a gasoline van and \$82,000 for a diesel van.” Eamon Mulholland, *Cost of Electric Commercial Vans and Pickup Trucks in the United States Through 2040*, THE INT’L COUNCIL ON CLEAN TRANSP. (Jan. 11, 2022), <https://theicct.org/wp-content/uploads/2022/01/cost-ev-vans-pickups-us-2040-jan22.pdf>.

145. Tabuchi, *supra* note 139.

146. Matthew Haag & Winnie Hu, *1.5 Million Packages a Day: The Internet Brings Chaos to N.Y. Streets*, N.Y. TIMES (Oct. 27, 2019), <https://www.nytimes.com/2019/10/27/nyregion/nyc-amazon-delivery.html>.

147. Edouard Barreiro, *Night-time deliveries are the solution to urban delivery challenges*, PARCEL AND POSTAL TECH. INT’L (Dec. 24, 2020), <https://www.parcelandpostaltechnologyinternational.com/features/night-time-deliveries-are-the-solution-to-urban-delivery-challenges.html>.

during peak traffic hours which would reduce each driver's travel time and each person's emissions per trip.

New York City has already begun the shift towards night-time deliveries of packages in response to the surging number of items being bought and shipped over the internet. New York City's Department of Transportation trialed an Off-Hour Truck Delivery Program from 2009 through 2010.<sup>148</sup> The pilot program showed that when delivering parcels during "off-hours" from 7:00 P.M. to 6:00 A.M., "truck speeds go up, shipment times go down, local traffic gets better, and the air gets cleaner."<sup>149</sup> The pilot program results show that shifting deliveries from day-time to night-time would be highly beneficial for the environment. The EPA should implement requirements for e-commerce players to shift some, if not all, of their deliveries to night-time deliveries, especially in urban cities, with the goal of reducing air pollution under the Clean Air Act.

## **B. AMEND THE SOLID WASTE DISPOSAL ACT: REGULATE PACKAGING**

The Solid Waste Disposal Act permits the EPA to regulate waste disposal. While the Solid Waste Disposal Act requires individuals and businesses to use environmentally responsible methods like recycling in their waste disposal practices, it does not do enough to respond to the enormous jump in the amount of waste that is involved in packaging shipments of items bought and sold online. The EPA should pass an amendment to the Solid Waste Disposal Act that specifically targets businesses engaging in e-commerce to make changes that will (1) reduce the amount of packaging used in a single shipment and (2) implement sustainable packaging practices and materials. Additionally, the passage of the pending Break Free From Plastic Pollution Act,<sup>150</sup> which aims to reduce plastic pollution in the United States, would be beneficial. The Break Free From Plastic Pollution Act should add provisions applying the restrictions on single-use plastics to packaging used in e-commerce.

### **1. Material Reduction**

E-commerce generates an enormous amount of waste in the way that products are packaged for shipment.<sup>151</sup> Most of the time, an item bought and

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148. *About Off-Hour Deliveries*, OFF-HOUR DELIVERIES NEW YORK CITY DOT <https://ohdnyc.com/home> (last visited Sept. 12, 2022).

149. Eric Jaffe, *New York's Hugely Successful Late-Night Delivery Truck Program Is Heading to D.C.*, BLOOMBERG (Sept. 6, 2022), <https://www.bloomberg.com/news/articles/2015-03-11/new-york-s-hugely-successful-late-night-freight-and-delivery-truck-program-is-heading-to-d-c>.

150. *See generally* Break Free From Plastic Pollution Act of 2021, S.B. 984, 117<sup>th</sup> Cong. (2021).

151. Noah Rue, *Not Just Product Packaging: The Ecommerce-Environment Conflict*, MULTICHANNEL MERCH. (Jun. 29, 2020), <https://multichannelmerchant.com/blog/not-just-product-packaging-the-ecommerce-environment-conflict/>.



sold online is not simply thrown into a cardboard box and shipped out. Instead, the product is packaged in such a way that there are multiple unnecessary layers of plastic and cardboard. If the product is small compared to the outer cardboard box, many retailers even put extra plastic or foam to prevent breakage. This is an enormous amount of packaging just to ship one item in e-commerce. Thus, it is important for the EPA to pass regulations under the Solid Waste Disposal Act to minimize the amount of packaging that companies engaging in e-commerce use when shipping a single order. Such regulation might also spur investment and a race for the development of materials that can protect products in travel while generating a minimal amount of packaging waste.

Some large retailers have started to solve this problem. For example, Amazon has been working on a “material reduction” program with the goal of minimizing the secondary packaging used.<sup>152</sup> Secondary packaging is the smaller protective packaging around the actual product that is put inside of the outer cardboard box in which the product is eventually shipped out in. According to the program, “the secondary packaging . . . must protect the product, minimize the amount of material used in each pack and maximize its recyclability in order to reduce waste production.”<sup>153</sup> In implementing this program, Amazon now “offers ‘frustration free’ packaging on some items, which sends items in their original packaging without excess boxes.”<sup>154</sup> This is proof that material reduction in packaging is possible. Thus, the EPA should impose the implementation of such practices on all big corporations and require that packages be made from as little material as possible.

## 2. Sustainable Packaging

In addition to the excess materials used in packaging items for shipment in e-commerce, the materials used for packaging are often unsustainable and non-recyclable. For example, foams, plastics, and other non-biodegradable materials, are widely used for packaging in the e-commerce industry.<sup>155</sup> While these materials are “cheap and readily available . . . they are not good for the environment because they do not decay.”<sup>156</sup> This is a huge problem for waste disposal and needs to be regulated under the Solid Waste Disposal Act.<sup>157</sup>

A solution is for the EPA to pass an amendment to the Solid Waste Disposal Act requiring companies who engage in e-commerce to use more sustainable packaging materials that are easily recyclable. While the

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152. Escursell et al., *supra* note 22 at 9.

153. *Id.*

154. Morgan, *supra* note 24.

155. Stephanie Neusser, *A sustainable business model for e-commerce site owners*, SANA-COM. (Mar. 26, 2020), <https://www.sana-commerce.com/blog/ecommerce-sustainable-business-model/>.

156. *Id.*; Escursell et al., *supra* note 22.

157. *Solid Waste Disposal Act [SWDA] Law and Legal Definition*, *supra* note 89.

amendment should not give specifics on what materials to use, it can offer suggestions that have shown to be sustainable while still protecting products in transit. For example, paper and cardboard are biodegradable and reusable, allowing customers to reuse the same packaging to return or exchange items.<sup>158</sup> Die-cut inserts are “made from sustainable materials such as paper or cardboard [and] can separate multiple products inside one cardboard box or further secure fragile items without the use of packaging peanuts or plastics.”<sup>159</sup> Another renewable option is cellulose-based materials.<sup>160</sup> Cellulose-based materials have a low environmental impact because they are renewable and naturally abundant.<sup>161</sup> Cellulose can be found in grass, algae, bacteria, and waste from timber and agricultural industries.<sup>162</sup> It is a great alternative for use as disposable packaging.<sup>163</sup>

Passing an amendment to the Solid Waste and Disposal Act<sup>164</sup> while giving suggestions of workable and sustainable materials that can be swapped might also spur incentives for inventors to come up with new technologies to produce products that are sustainable, recyclable, and sufficiently protective. This alone would be a great plus for environmentally friendly e-commerce practices.

### C. BAN ON SINGLE-USE PLASTICS

Finally, and most importantly, the passage of the Break Free From Plastic Pollution Act,<sup>165</sup> a pending amendment to the Solid Waste Disposal Act, would be beneficial.<sup>166</sup> If passed, the Act would hold e-commerce players responsible for the design, collection, reuse, recycling, and disposal of the packaging of the items that they sell by establishing minimum percentages of products, and packaging, that must be reused, recycled, or composted.<sup>167</sup> The Act also includes a phase out of the production and use of certain single-use plastics and packaging.<sup>168</sup> Most plastics used in packaging are single-use because consumers will typically dispose of plastic wrappings after opening their product. Thus, the passage of this amendment would be highly beneficial for reducing e-commerce’s carbon footprint.

Many states have already experimented with phasing out single-use plastics through a tax on single-use plastics like plastic bags, bottles, and

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158. Neusser, *supra* note 155.

159. *Id.*

160. Escursell et al., *supra* note 22, at 7.

161. *Id.* at 14.

162. *Id.*

163. *Id.*

164. *Solid Waste Disposal Act [SWDA] Law and Legal Definition*, *supra* note 89.

165. Break Free From Plastic Pollution Act of 2021, S.984, 117th Cong. §1 (2021), <https://www.congress.gov/117/bills/s984/BILLS-117s984is.pdf>.

166. *Id.*

167. *Id.*

168. *Id.*

utensils, which has proved to be successful.<sup>169</sup> In fact, more than 400 laws and ordinances across the country ban or tax plastic bags.<sup>170</sup> The idea behind such taxes on plastic material is that it would “increase the price of such items and therefore drive demand away from such items and result in substitution.”<sup>171</sup> Instead of a sudden and outright ban on single-use plastics, I would advocate for the Break Free From Plastic Pollution Act to include a tax or fine on companies engaging in e-commerce that continue to use single-use plastics for packaging products for shipment. This is because “straightforward bans can lead to skyrocketing use of paper bags or thicker plastic that’s allowed because it’s considered reusable.”<sup>172</sup>

There is evidence that even small fees of a few cents can lead to a big reduction in disposable plastic bag use, which suggests that most people are willing to use recyclable or reusable ones if given the option.<sup>173</sup> A study by Tatiana Homonoff<sup>174</sup> showed that before Chicago’s tax on disposable bags, 80% of Chicago’s consumers used disposable bags, and after the tax, that percentage was nearly cut in half.<sup>175</sup> Another benefit of these policies on single-use plastics is that they seem to be “changing the culture around single-use plastic, which many people know is environmentally damaging but still need a slight nudge to change their behavior.”<sup>176</sup>

However, these state initiatives have involved taxes on consumers and not businesses who are supplying the consumers with the single-use plastics.<sup>177</sup> A tax on plastic manufacturers and businesses that use single-use plastics for packaging would work the same way. The government, under the Break Free From Plastic Pollution Act,<sup>178</sup> would “charge companies that use virgin plastics a fee, incentivizing them to switch to fully recycled materials or alternative paper-based materials.”<sup>179</sup> Ideally, the revenues from these taxes and fines will be reinvested into waste management infrastructure to further promote recycling.<sup>180</sup>

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169. Matthew Zeitlin, *Do plastic bag taxes or bans curb waste? 400 cities and states tried it out*, VOX (Aug. 27, 2019, 1:00 PM), <https://www.vox.com/the-highlight/2019/8/20/20806651/plastic-bag-ban-straw-ban-tax>.

170. *Id.*

171. *Taxes on single-use plastic*, OECD <https://www.oecd.org/stories/ocean/taxes-on-single-use-plastics-186a058b> (last visited Sept. 12, 2022).

172. Zeitlin, *supra* note 169.

173. *Id.*

174. Tatiana Homonoff, Lee-Sien Kao & Christina Seybolt, *Skipping the Bag: Assessing the impact of Chicago’s tax on disposable bags*, IDEAS42 [https://www.ideas42.org/wp-content/uploads/2018/09/Bag\\_Tax\\_Paper\\_final.pdf](https://www.ideas42.org/wp-content/uploads/2018/09/Bag_Tax_Paper_final.pdf) (last visited Sept. 12, 2022).

175. Zeitlin, *supra* note 169.

176. *Id.*

177. Matt Simon, *Should Governments Slap a Tax on Plastic?*, WIRED (Aug. 4, 2020, 8:00 AM) <https://www.wired.com/story/should-governments-slap-a-tax-on-plastic/>.

178. Break Free From Plastic Pollution Act of 2021, S.984, 117th Cong. §1 (2021), <https://www.congress.gov/117/bills/s984/BILLS-117s984is.pdf>.

179. Simon, *supra* note 43.

180. *Id.*

Still, a tax or fine on corporations who use single-use plastics in their course of business must be dealt with delicately. As we have seen from carbon taxes, a plastic tax may end up imposing a bigger economic burden on smaller businesses. Thus, the tax or fine must be proportionate to a business's income. It must be large enough to affect the business in a way that will truly incentivize them to find alternatives to plastic without forcing entire businesses to shut down. This is due to evidence that "financial incentives aimed at encouraging desirable behaviors or discouraging harmful behaviors will be effective only if the magnitude of the incentive exceeds the costs an individual associates with changing his behavior."<sup>181</sup>

Additionally, Amazon has proved that avoiding the use of single-use plastics is possible for large e-commerce companies that use such plastics for packaging products for shipment.<sup>182</sup> After India announced that it would be phasing out single-use plastics, "Amazon India managed to eliminate non-recyclable plastic packaging from fulfillment centers in the country" and announced that it had completely stopped using single-use plastics.<sup>183</sup> This was done by shipping products in their original boxes without an additional outer box and through the use of lightweight paper mailers.<sup>184</sup> Passage of the Break Free From Plastic Pollution Act<sup>185</sup> with additional fines and taxes on plastics can force companies to find other solutions to overpackaging and the use of plastic packaging in the United States.

## CONCLUSION

The world is in a stage of rapid technological growth, which has both benefits and detriments for the already-declining environment. While the shift to e-commerce has made shopping for consumer goods extremely convenient for consumers, buying online as the principal means of shopping for clothing, accessories, and even household items has resulted in an enormous boom in shipping. This increase in shipping has caused more delivery vehicles on the road, increasing the amount of carbon emissions in the transportation sector, and has caused a steep increase in the use of shipping materials, including plastics, cardboard, foam, etc., that end up in waste disposals in uncontrollable numbers.

The federal government needs to step up and respond to this change in consumer behavior before it is too late to control the detriment of our environment. It can do this through the passage of laws regulated by the EPA. While federal environmental regulations exist, they do not do enough to

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181. Tatiana A. Homonoff, *Can Small Incentives Have Large Effects? The Impact of Taxes versus Bonuses on Disposable Bag Use*, 10 AM. ECON. JOURNAL: ECON. POL'Y 4 (Nov. 2018).

182. Chua, *supra* note 45.

183. *Id.*

184. *Id.*

185. Break Free From Plastic Pollution Act of 2021, S.984, 117th Cong. §1 (2021), <https://www.congress.gov/117/bills/s984/BILLS-117s984is.pdf>.

target the particular practices that have been arising in the new e-commerce sector. Through amendments to existing federal laws, holding corporations engaging in e-commerce accountable for their shipping and packaging practices, and the passage of new pending legislation, the government has a chance to influence businesses to not only stop non-sustainable behaviors, but also to spur investments in technologies that could better address sustainability. The Earth is our biggest investment. We must take care of it!

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