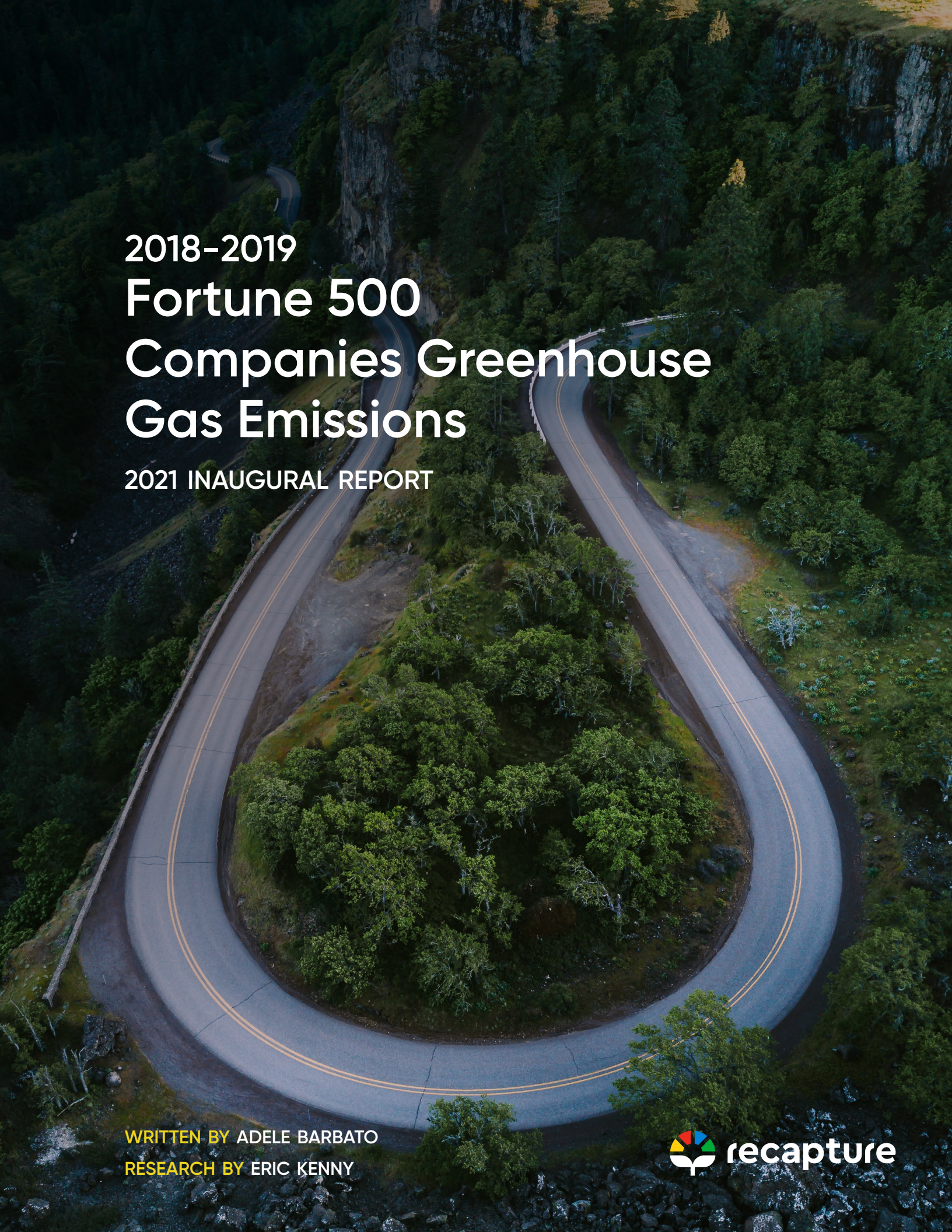


An aerial photograph of a winding asphalt road with double yellow lines, curving through a dense green forest on a mountain. The road forms a large loop in the center of the frame. The surrounding landscape is rugged with rocky outcrops and steep slopes.

2018-2019 Fortune 500 Companies Greenhouse Gas Emissions

2021 INAUGURAL REPORT

WRITTEN BY ADELE BARBATO
RESEARCH BY ERIC KENNY



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Photo Credit: David Talley (front cover)

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This summary report was made possible with the support of Trey Pringle and Philip-Michael Weiner.

For the first time, a look at the collective carbon footprint of the largest companies in the United States

This report clarifies, the first time, the impact the United States' largest companies have on earth's warming atmosphere. Despite a rise in corporate climate commitments, there is a severe lack of data to support the feasibility of those commitments. As Dr. Fatih Birol, Executive Director of the International Energy Agency, explained during the 2021 U.S. Leaders Summit on Climate Change, "Commitments alone are not enough...Right now, the data does not match the rhetoric—and the gap is getting wider." The Fortune 500 Companies Greenhouse Gas Emissions Report was written in contribution to filling that gap.

Analyzing data on the Fortune 500's scoped emissions has resulted in the following conclusions:

- ❖ emissions are being underreported by about 40%,
- ❖ prevalent inconsistency in reporting is providing unreliable GHG footprint counts,
- ❖ and current GHG reduction solutions are inadequate to meet the full potential impact of even just the F500 companies', nevermind global, emissions.

Empowering the Fight Against Climate Change with Data

Using a combination of publicly-reported data and estimated emission inventories, this report provides the first complete greenhouse gas footprint (measured throughout in tonnes of carbon dioxide-equivalent units, or "tonnes CO₂e") across all scoped emissions attributed to every company on the Fortune 500 lists for 2018 and 2019—the last years in which the global economy operated at a capacity unaffected by the COVID pandemic. Reported emission inventories are lined up next to estimated emissions—calculated by analysts at Recapture—to illustrate the difference between what is known versus what the potential is of the F500's impact.

Comprehensive and transparent emission reporting is fundamental for businesses, governments, and scientists to realistically meet science-based climate targets. *The Fortune 500 Companies Greenhouse Gas Emissions Report* is intended to empower and inform consumers and customers, climate innovators, journalists, and sustainability directors with data that helps bridge the gap between reality and rhetoric.

Data used for this report was pulled from sustainability reports, corporate social responsibility reports, "Environmental, Social, and Corporate Governance" reports, and annual reports, as well as publicly available [CDP reports](#).

For questions or comments about this report, please contact: emissions@recapturecarbon.com.

Key Report Insights

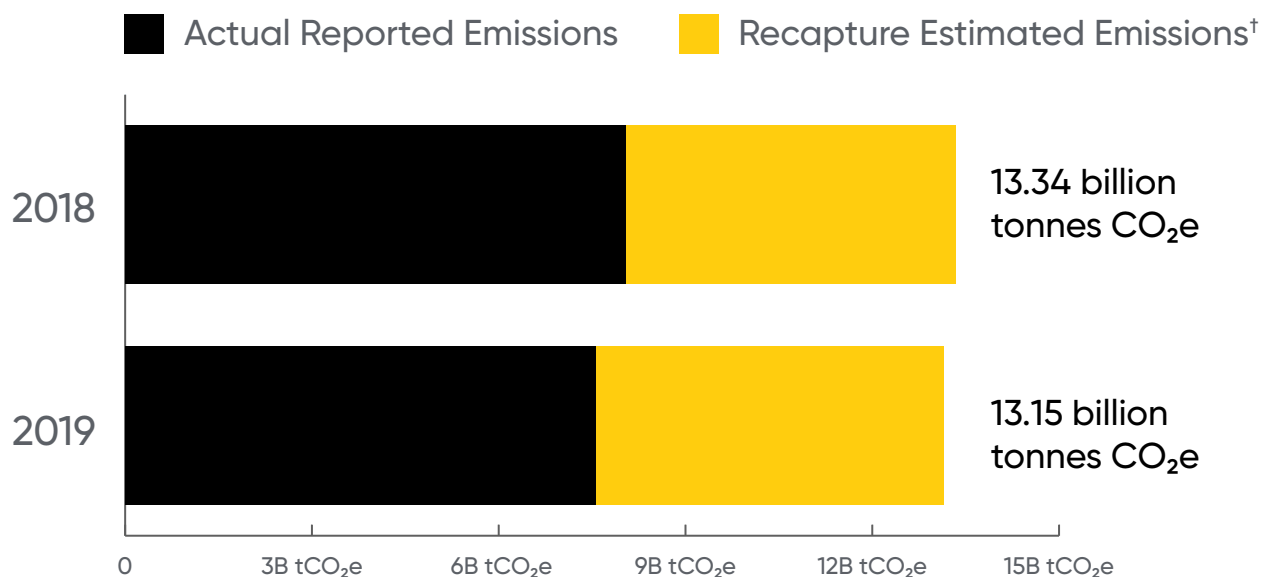
Analyzing the greenhouse gas (GHG) emission volume and reporting practices of the 2018–2019 Fortune 500 companies reveals the following insights and conclusions:

- ✖ Actual reported emissions from Fortune 500 companies equaled 8.04 billion tonnes CO₂e in 2018 and 7.56 billion tonnes CO₂e in 2019.
- ✖ The combined GHG footprint for Fortune 500 companies is estimated to have been 13.34 billion tonnes CO₂e in 2018 and 13.15 billion tonnes CO₂e in 2019.
- ✖ The Fortune 500 companies are estimated to be responsible for around 27% of global emissions.
- ✖ Roughly half of the Fortune 500 are voluntarily reporting their greenhouse gas emissions, either in full or in part.
- ✖ Among reporting companies, a high rate of variability and inconsistency exists in how emission inventories are calculated (particularly of scope 3 emissions) resulting in unreliable claims of emissions reduction and GHG footprint counts.
- ✖ Scope 3 (value-chain) emissions account for over three-quarters of all reported emissions.
- ✖ Corporate emission footprints publicly disclosed to stakeholders often cite lower volumes of emissions than what is disclosed to CDP.
- ✖ The volume of carbon credits currently available in the voluntary carbon market comes nowhere near meeting current or future demand. In fact, the less than 10 million tonnes CO₂e of new carbon removal credits issued in 2020 wouldn't be enough to remove the emissions from even one company on the Fortune 500.

- ✖ A combination of carbon removal and renewable energy deployment are the only solutions currently available that have the potential to match the GHG reduction needed based on estimated emission rates, however their efficacy is dependent on the ability to scale adoption in these two industries at an urgent pace.
- ✖ Governmental regulation and centralized oversight is likely required to ensure emission reporting, carbon removal, an appropriately incentivized carbon market, and the development of other climate solutions accelerate on schedule with science-based targets.

F500 Total CO₂e Emissions from 2018–2019

[†]See Appendix B for the estimation methodology for Fortune 500 estimated emissions.





Philip-Michael Weiner
A Founding Partner @ Recapture

**“How can we solve the whole
problem when we don’t actually
know how big the hole is?”**

Introduction

There has been a meteoric rise in corporate net zero commitments over the past two years, spurred by an increasing urgency for climate awareness, and the recent combined global crises involving wildfires, floods, extreme heat, hurricanes, and a global pandemic.¹

Relatedly, commitments to greenhouse gas reduction and neutrality likewise rose during this time period, increasing 12% between 2017 and 2021 among the Fortune 500 alone.² However, not all these commitments have the same scope. While 60% of Fortune 500 companies have declared some type of climate target, only 13% of those commitments have been formally approved by the [Science Based Targets Initiative \(SBTi\)](#).³

The SBTi was founded in 2015 as a joint partnership between [CDP](#), the [United Nations Global Compact](#), the [World Resources Institute](#), and the [World Wildlife Fund](#) to help structure and accelerate best practices in achieving greenhouse gas emission reduction based on the most up-to-date available science. Today, its resources are based on the 1.5°C target set by the Paris Agreement and augmented by the Intergovernmental Panel on Climate Change (IPCC). Science-based target criteria require companies to calculate their emissions based on the [Greenhouse Gas \(GHG\) Protocol](#) framework, and publicly disclose the resultant carbon inventory through avenues such as “annual reports, sustainability reports, the company’s website, and/or...CDP’s annual questionnaire.”⁴

1 UN Climate, “Press Release: Commitments to Net Zero Double in Less than a Year,” United Nations Climate Change, September 21, 2020, Accessed 14 March 2021, <https://unfccc.int/news/commitments-to-net-zero-double-in-less-than-a-year>.

2 Luz Cervantes et al., “Power Forward 4.0: A Progress Report of the Fortune 500’S Transition to a Net-Zero Economy” (World Wildlife Foundation, June 2021), https://c402277.ssl.cf1.rackcdn.com/publications/1499/files/original/Power_Forward_4.0.pdf?1622608268.

3 Ibid.

4 “FAQS.” Science Based Targets. Accessed 1 August 2021, <https://sciencebasedtargets.org/faqs#where-should-we-disclose-our-annual-emissions-and-progress-against-our-targets>.

The GHG Protocol provides an accounting standard that categorizes emissions based on the nature of the activities responsible for producing those emissions, and the correlation of those activities to the direct or indirect emission output of the associated business. These categories are grouped as hierarchical scopes:

- ✦ Scope 1, or S1, (direct) emissions are those produced from sources owned or controlled by the company.
- ✦ Scope 2, or S2, (indirect) emissions are generated by purchased or acquired energy consumed by the company, such as that needed for electricity, and heat and cooling.
- ✦ Scope 3 (value-chain) emissions are those that occur as a consequence of the activities of the company, but not from sources owned or controlled by the company.

Scope 3 (S3) emission activities are further divided into 15 subcategories along a company's value chain, such as business travel, waste disposal, purchased goods and services, and investments. Scope 3 reporting is optional under the auspices of the GHG Protocol, provided as an avenue "to be innovative in GHG management".⁵

The Fortune 500 lists are composed of companies in twenty-one different sectors across 75 industries. This represents a near complete cross-section of business categories, ranging from Energy, Materials, and Aerospace & Defense, to Retail, Household Products, and Hotels, Restaurants & Leisure. As the largest and most influential businesses in the United States, analysis of the F500's scope 1-3 emissions offers a helpful predictive snapshot of larger global emission trends, especially in sectors where reporting lags.⁶ For companies that have not yet begun inventorying their GHG footprint, a comprehensive emissions estimation provides a practical baseline from which emerging net zero commitments can be conceptualized.

⁵ *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* (World Resources Institute and World Business Council, 2004), Page 29, <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf>.

⁶ See the World Wildlife Fund's Power Forward 4.0 report for a break-down of climate commitments by sector: https://c402277.ssl.cf1.rackcdn.com/publications/1499/files/original/Power_Forward_4.0.pdf?1622608268.

Unless emission targets are aligned with clear science and data-based pathways for reaching net zero, it is impossible to know whether we are on track to meet the ambitious goal of global net zero by 2050. Providing incentive and resources to ease the burden of carbon accounting will be particularly important as the balance gets smaller and smaller on the remaining global carbon budget. As of August 2021, it is expected that around 269.62 billion tCO₂e are able to be emitted before earth reaches the 1.5°C temperature rise threshold, which is a theoretical point-of-no-return for climate-related shifts that are projected to force social, demographic, and geographic change on the human landscape that is beyond our ability to control.⁷ Like monitoring one's fitness with caloric metrics, this report is a contribution to—and endorsement of—the sustained, science-based monitoring of earth's health.

⁷ Carbon budget figure accessed on 1 Aug 2021 from the MCC Carbon Clock published on: "Remaining Carbon Budget." Mercator Research Institute on Global Commons and Climate Change. <https://www.mcc-berlin.net/en/research/co2-budget.html>. Thresholds for Science-Based Target goals are available at: "FAQS." Science Based Targets. Accessed 1 August 2021, <https://sciencebasedtargets.org/faqs#why-are-you-increasing-the-minimum-level-of-ambition-from-well-be-low-2-c-to-1-5-c>.

Analysis of Fortune 500 Greenhouse Gas Emissions

There has never been one definitive figure that represents the GHG footprint of the Fortune 500. As is often the case when trying to extract meaningful targets from climate-related figures, the inherent entanglement of atmospheric physics and human activity means there are several angles through which to approach the data.

Key factors that affect the understanding of the Fortune 500's GHG footprint contribution include:

- ✖ Whether a company has calculated and reported its emissions.
- ✖ The scope to which a company has reported its emissions.
- ✖ The changing line-up of companies on the Fortune 500 year-to-year.

2018-2019 Reported Emissions

Just over 50% of all Fortune 500 companies calculate and disclose some amount of data across all scopes (1, 2, and 3) of their GHG emissions, either through in-house publication channels and/or the CDP questionnaire. The differential in reporting from 2018 to 2019 shows a marginal increase of 1.6%, with 55.6% of the F500 reporting data across all three scopes in 2019 as compared to 54% in 2018. Despite this increase in the number of companies reporting year-to-year, the total volume of emissions reported decreased from 8.04 billion tonnes CO₂e in 2018 to 7.56 billion tonnes CO₂e in 2019. (Figure 1) However, this decrease in emissions volume does not strictly equate to a decrease in emissions produced. Deeper analysis of the

top 25 companies reporting a decrease year-over-year in GHG emissions reveals that 602.47 million tonnes CO₂e reported in 2018 do not reoccur in 2019 due to shifting reporting choices and methodologies.

Simply stated, companies are choosing to report their emissions differently year-to-year. This becomes particularly problematic when trying to analyze scope 3 reported emissions. Value-chain emissions are both the largest contributor to a company's GHG footprint, and at the same time, the most under-reported subset of emissions activity, comprising 79% of the total reported emissions of the Fortune 500 in 2019 even though only 23% of companies fully reported their emissions. With partial and inconsistent S3 data overwhelmingly surpassing both S1 and S2 numbers, it is easy to see how woefully under-informed companies are when it comes to understanding the realistic climate impact of doing business within a global supply chain reliant on fossil fuels. (Figure 2)

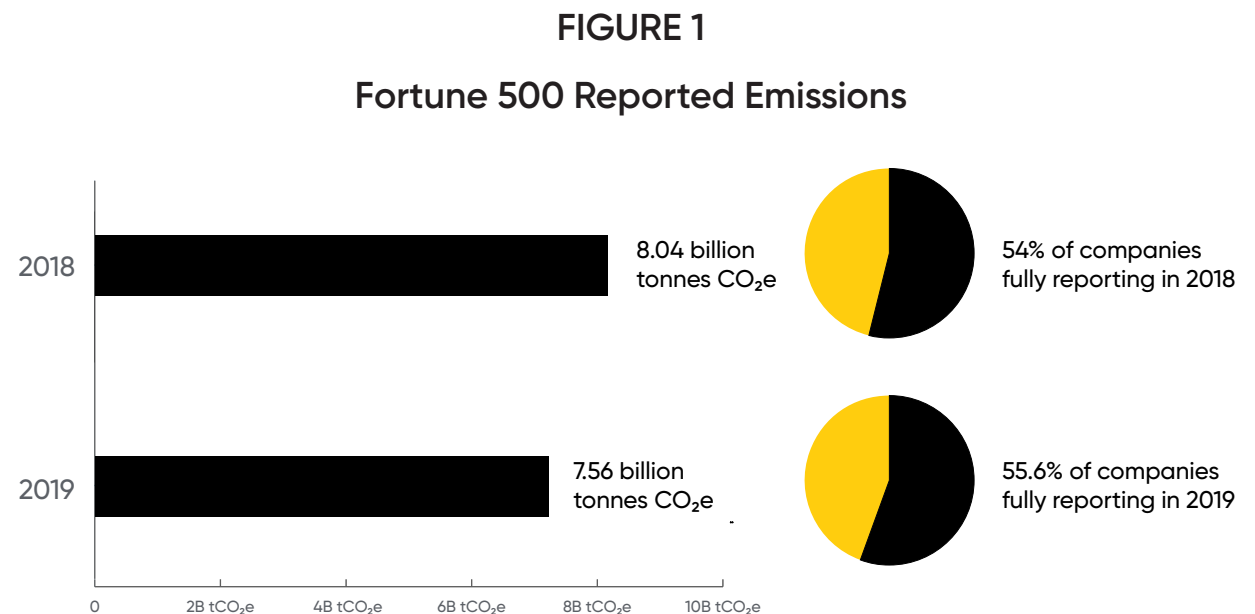
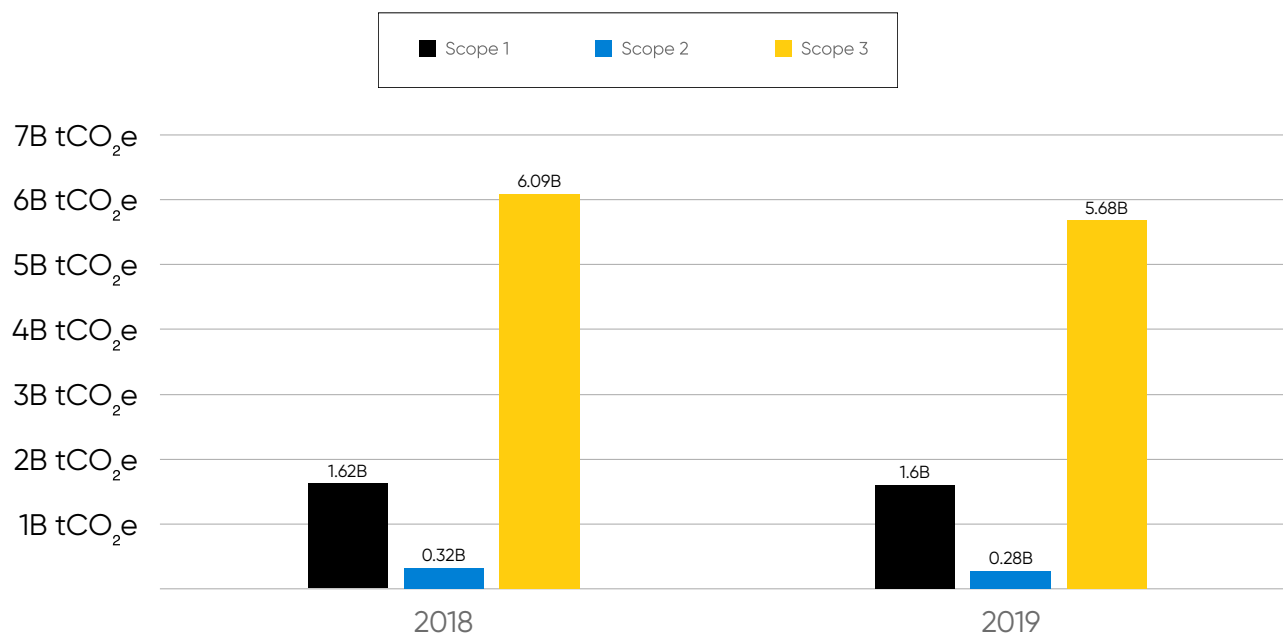


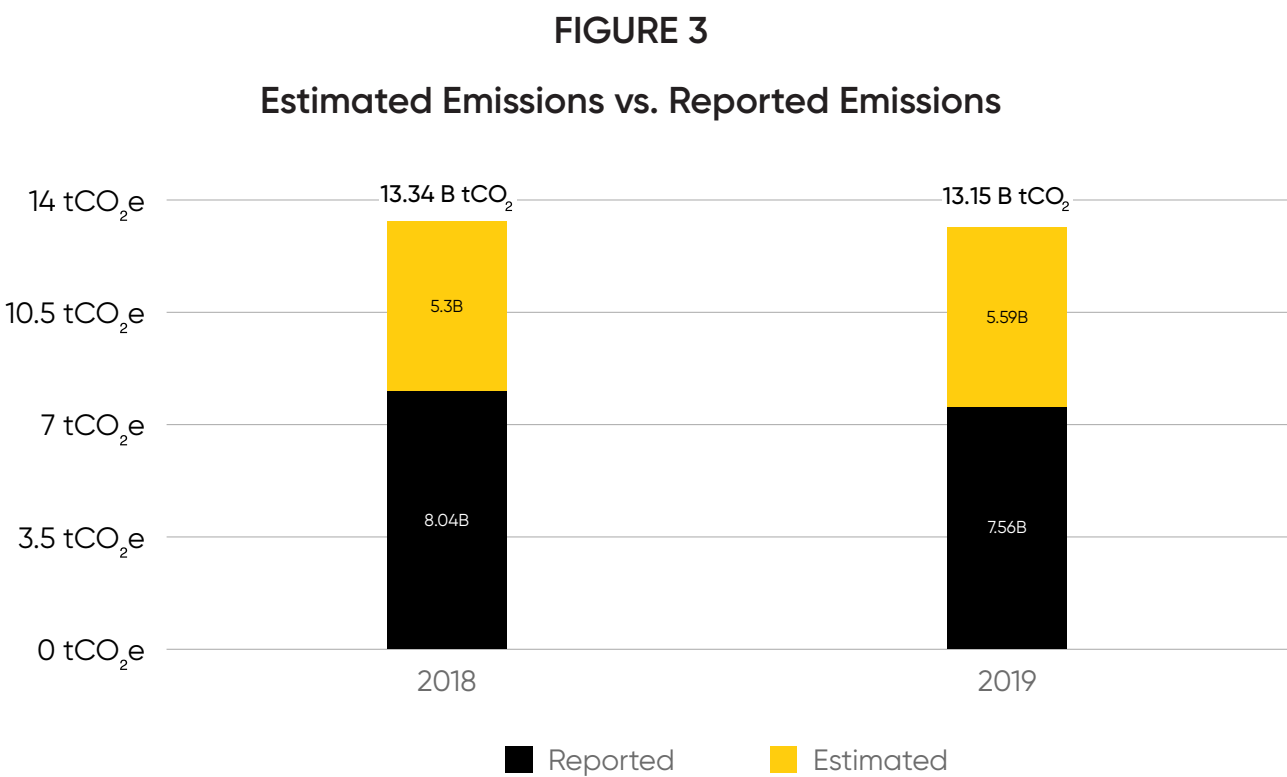
FIGURE 2
Reported Emissions by Scope



	Scope 1	Scope 2	Scope 3
2018	1,624,079,392	321,415,157	6,090,209,354
2019	1,604,196,418	280,664,762	5,675,610,642

2018-2019 Estimated Emissions

Recapture's research team developed and applied two emission estimation models (see *Appendix B: Methodology*) to calculate the likely amount of emissions not being reported by Fortune 500 companies. The result of these estimations show a total presumed F500 greenhouse gas output of 13.34 billion tonnes CO₂e in 2018, and 13.15 billion tonnes CO₂e in 2019. (Figure 3)

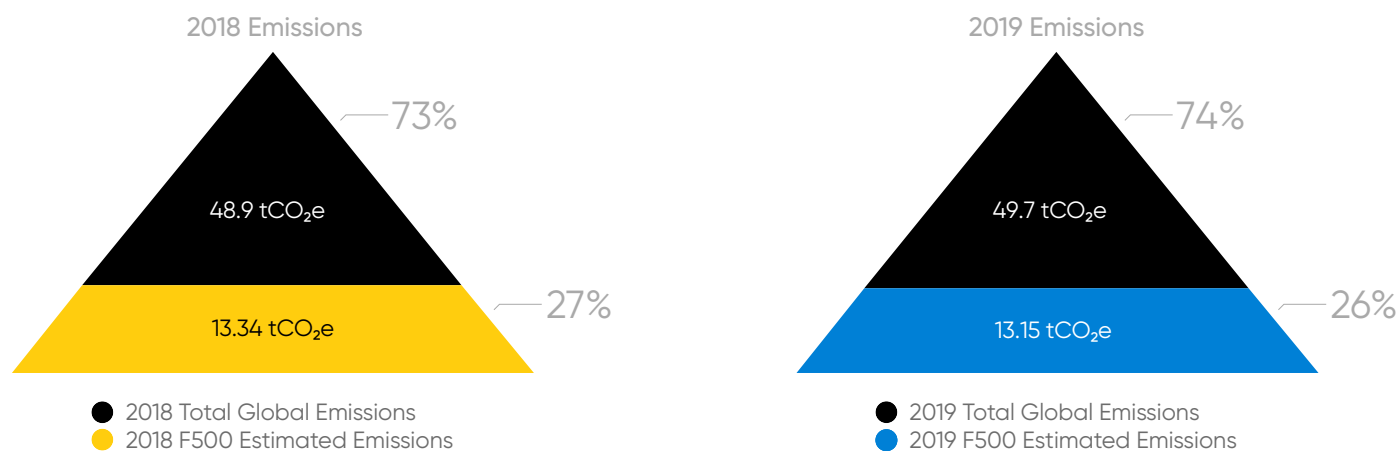


The companies that comprised the Fortune 500 in 2018 and 2019 are estimated to be responsible for around 27% of global emissions.

According to these estimations, just the 500 largest U.S. companies alone are directly and indirectly (through incidental, value-chain involvement) contributing to approximately 27% of the total amount of global greenhouse gas emissions each year.⁸ (Figure 4)⁹

FIGURE 4

Estimated Emissions vs. Global Emissions



It is important to note that since estimated footprints include reported numbers when available, the same previously-mentioned caveat regarding the inconsistency of scope 3 data remains, as does the variability in reporting choices and methods year-to-year. Additionally, since a full estimation takes into account the entire Fortune 500 list, and the list changes each year based on annual revenue rankings, these estimated GHG footprints cannot offer a 1:1 comparison year-over-year.

⁸ The figure for world-wide GHG emissions due to fossil fuels, industrial processes, and land management taken from the Climate Watch "Data Explorer," which indicates total global GHG emissions was 48.94 billion tonnes CO₂e in 2018. Website accessed 8/25/2021, https://www.climatewatchdata.org/data-explorer/historical-emissions?historical-emissions-data-sources=cait&historical-emissions-gases=all-ghg&historical-emissions-regions=All%20Selected&historical-emissions-sectors=total-including-lucf&page=1&sort_col=2018&sort_dir=DESC.

⁹ Ibid.

What they can offer is a more realistic working average from which corporate commitments and net zero targets can be framed. The estimated amount of GHG emissions for which companies are responsible far exceeds—by likely billions of tonnes of CO₂e—any amount of carbon credits or offsets humanity will be able to produce without dramatic, rapid scaling of carbon removal technologies. Unfortunately, as this report will show, the majority of corporate sustainability plans outline net zero targets well below the realistic amount of emissions for which these companies may actually be responsible.

Voluntary emission reporting practices vary widely among Fortune 500 peers

There were 301 companies that voluntarily reported their emissions in both 2018 and 2019. A high rate of variability exists in how these companies reported their emission figures. This variability primarily manifests within scope 3 data (value-chain emissions), which is an optional reporting category within the GHG Protocol standards. Notably, though, another clear pattern of inconsistency exists in how self-published versus CDP-published emission figures are reported by companies.

The variability in reporting appears to largely originate from an overall need for adjustment and refinement as companies work toward understanding the complexities of emission reporting. It will be important to watch for an increase in participation over the next few years, as well as an increase in the consistency of how emission numbers are calculated.

Reporting Practices

Year-to-Year

Scopes 1 and 2—Operational Emissions

The participation rate for voluntary reporting of direct emissions (scope 1) and purchased energy (scope 2) was largely consistent from 2018 to 2019. Looking collectively at the F500 lists, the overall percentage change in the number of companies reporting their S1 and S2 emissions was nominal, hovering at just over a one percent differential.¹⁰ Looking deeper, we see that when a given company reported these two emission scopes in one year, they tended to be reported again the following year, whether or not a company made the Fortune 500 list in both years.

Some of the reporting differentiation can be attributed to merger and acquisition activity among companies. DowDupont, for example, which was on the 2018 F500 list, split into two companies in 2019, Dupont de Nemours and Dow Chemical. Only Dupont de Nemours remained on the F500 for 2019, resulting in a significant portion of 2018 emission activity exiting the data set in 2019. On the other hand, mergers, which occurred among several firms, often resulted in differing emission reporting methodologies being used in what was now a single company, which made it difficult to verify true emissions levels in a given year with the information that was publicly available.

Additional muddiness in S2 figures arose through the lack of disclosure around whether a company calculated their emissions using a location-based or market-based methodology. While the GHG Protocol specifies that companies should report and distinguish both location-based and market-based figures, the distinction was neither provided nor fully communicated in some reports.¹¹

¹⁰ The exact figures are 64.4% of companies on the 2018 list and 65.8% of companies on the 2019 list.

¹¹ See *Appendix B: Methodology* for more information on “location-based” and “market-based” scope 2 calculations.

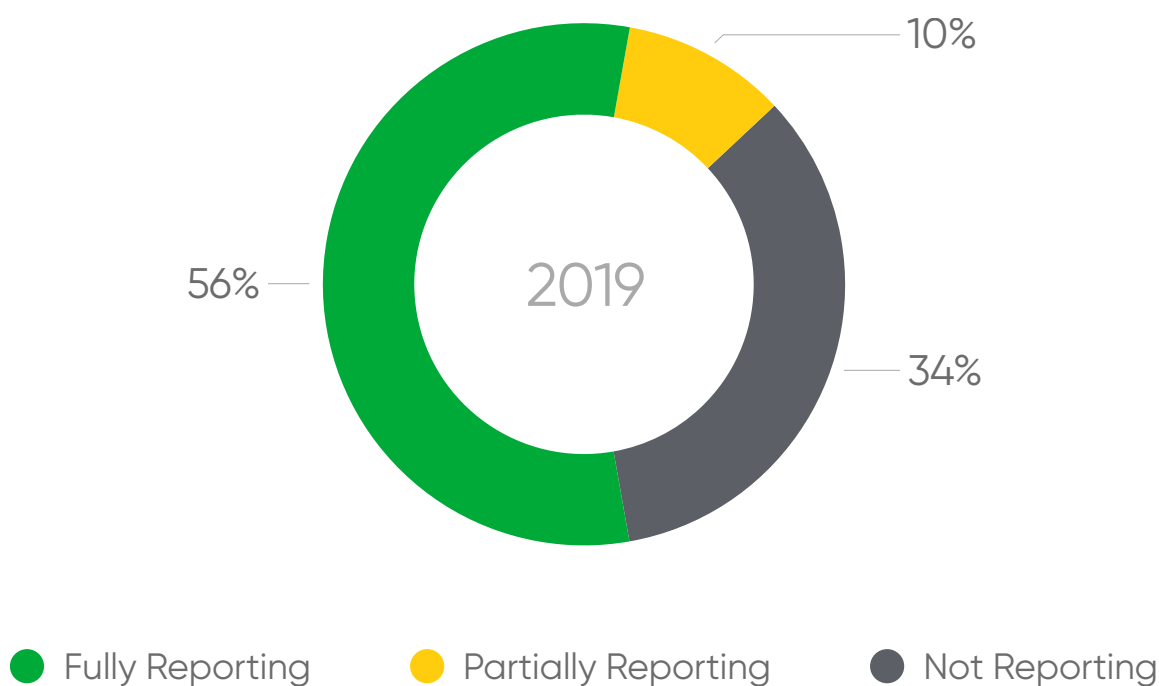
What is encouraging to see, however, is that of the nearly 280 companies that reported their emissions each year, only 10% calculated for S1 and S2 exclusively. This means that despite the discretionary nature of reporting scope 3 emissions, more than 80% of reporting companies are still choosing to do so—though to dramatically varying degrees. (Figure 5)

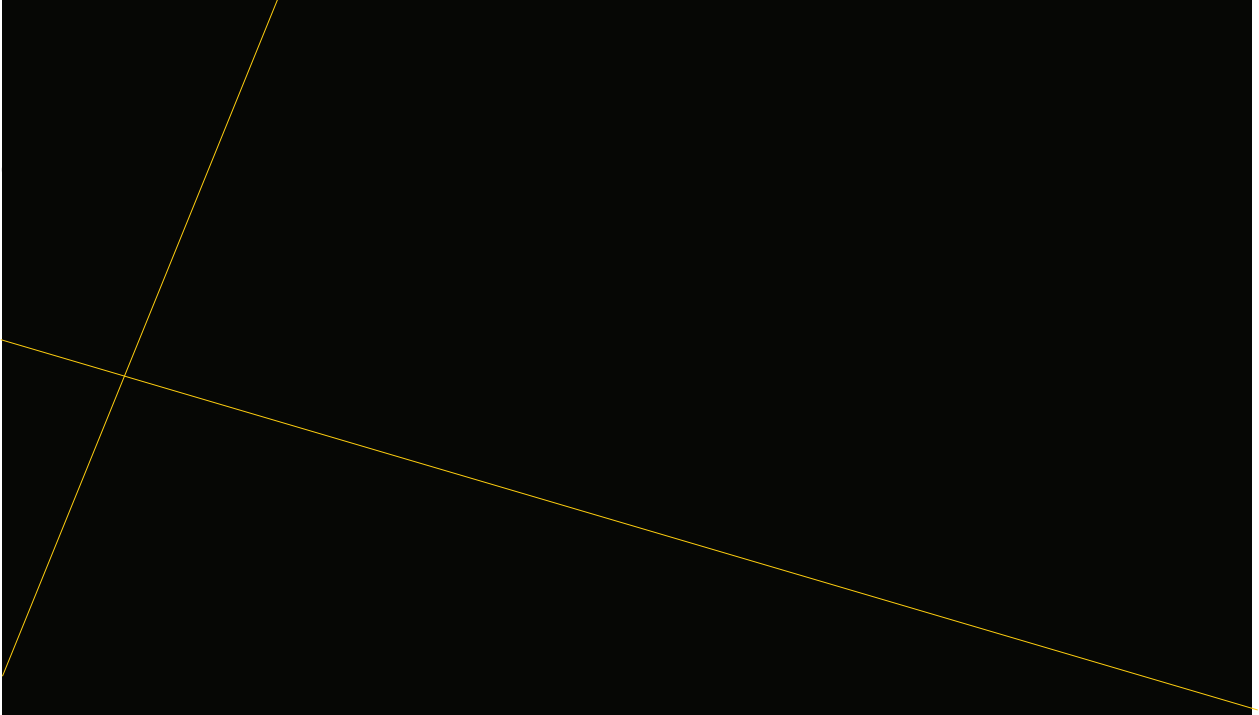
Scope 3—Value-Chain Emissions

Scope 3—an optional scope comprising 15 distinct subcategories tracking indirect, value-chain emissions—is where the majority of inconsistency emerges in emissions reporting.

FIGURE 5

Percentage of F500 Companies Fully Reporting, Partially Reporting, and Not Reporting Scope 3 Emissions in 2019

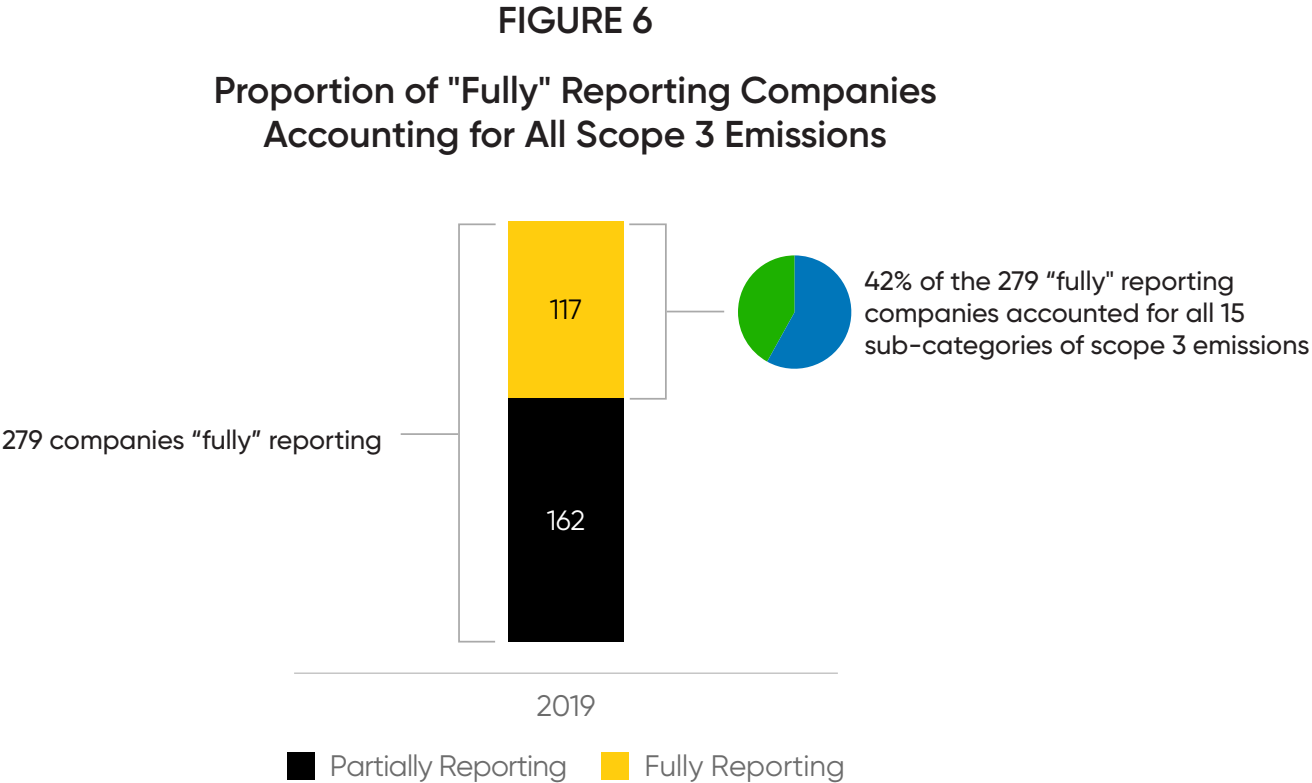




Only 23% of the entire Fortune 500 list in 2019 accounted for all 15 subcategories of their scope 3 emissions.

There's room for improvement.

In fact, in 2019, only 117 of the 279 "fully" reporting F500 companies accounted for all 15 subcategories of their scope 3 emissions.¹² (Figure 6) Further analysis of S3 reporting practices among the 25 companies that showed the greatest overall decrease in emissions from 2018–2019 reveals an even deeper level of inconsistency, one that undermines the very credibility of emissions reduction claims. This inconsistency manifests in two ways: a company changing its approach and methodology for calculating its S3 subcategories, or companies changing the subcategories being reported. For example, of these 25 companies that decreased their overall emissions from 2018–2019, eight did not report the same S3 subcategories in 2019 that they did in 2018, and seven companies changed their S3 accounting approach in some way.



¹² All companies were labelled under one of three categories based on their reporting practices: "Fully Reporting", "Partially Reporting" or "Non-Reporting". See page 51 of this report (in *Appendix B: Methodology*) for a breakdown of how these labels were designated.

Many of these instances we would assume to be good-faith efforts to update or streamline reporting methodologies as companies understand and engage with emission reporting over the years.

FIGURE 7

Top 25 Companies With A Decrease In Overall Emissions

Rank 2019	Company	GHG Emissions Tons CO ₂ e Scope 1+2+3		Change In Reporting	Description
		2019	% Change		
413	KeyCorp	122,912	-97.55%	None	S3 Capital Goods: Decreased from 4,905,108 MMTCO ₂ e to 2,078 MTCO ₂ e
46	United Technologies	12,787,774	-96.74%	Omitted	S3 Use of Sold Products: changed from 370,000,000 MMTCO ₂ e to "relevant, not yet calculated"
30	Citigroup	1,130,948	-90.03%	Omitted	S3 Investments: changed from 9,990,000 MTCO ₂ e to not reported
343	Voya Financial	98,434	-72.35%	Omitted	S3 Investments: changed from 279,300 MTCO ₂ e to not reported
239	ADP	338,633	-70.96%	None	S3 Employee Commuting: changed from 995,748 MTCO ₂ e to 147,316 MTCO ₂ e
384	Fifth Third Bancorp	27,592	-68.76%	None	S2 Market Based: changed from 61,380 MTCO ₂ e to 2,180 MTCO ₂ e
42	Lowe's	125,753,796	-63.55%	Approach	S3 Use of Sold Products: changed from 342,000,000 MMTCO ₂ e to 123,000,000 MMTCO ₂ e with change in which products were included in calculations (Only Energy Star Products- 2019)
324	PVH	2,818,053	-63.24%	None	S3 Purchased Goods and Services: changed from 4,779,395 MMTCO ₂ e to 1,477,630 MMTCO ₂ e; S3 Use of Sold Products: 2,095,222 MMTCO ₂ e to 596,298 MTCO ₂ e

Rank 2019	Company	GHG Emissions Tons CO ₂ e Scope 1+2+3		Change In Reporting	Description
		2019	% Change		
295	Ebay	263,288	-60.19%	Approach	S3 Purchased Goods and Services & Capital Goods: Change in input-output life cycle assessment tool from Aligned Incentives to Carnegie Mellon
130	Paccar	83,168,851	-52.69%	Approach	S3 Use of Sold Products: changed from 151,989,572 MMTCO ₂ e to 78,066,148 MMTCO ₂ e & Downstream Leased Assets changed from 16,136,985 MMTCO ₂ e to 1,589 MTCO ₂ e with changes to methodology in both cases
203	Goodyear Tire	92,860,006	-44.78%	None	S3 Capital Goods: changed from 34,406,956 MMTCO ₂ e to 317,442 MTCO ₂ e & Use of Sold Products: changed from 120,625,380 MMTCO ₂ e to 79,778,317 MMTCO ₂ e with no changes to methodology in both cases
354	J.B. Hunt	3,445,203	-44.40%	Omitted	S3 Purchased Goods and Services: changed from 4,473,990 MMTCO ₂ e to "not relevant"
419	Newont Mining	5,911,470	-42.01%	None	S3 Purchased Goods and Services: changed from 4,812,817 MMTCO ₂ e to 860,510 MTCO ₂ e with no changes to methodology
247	State Street Corp	130,795	-39.63%	Omitted	S3 Investments: changed from 78,115 MTCO ₂ e to not reported
484	Tapestry	147,335	-39.56%	Omitted	S3 Purchased Goods and Services: changed from 92,740 MTCO ₂ e to "relevant, not yet calculated"
21	General Electric	3,253,123	-39.15%	None	S3 Investments: changed from 2,344,737 MMTCO ₂ e to 682,075 MTCO ₂ e with no changes to methodology
182	Applied Materials	175,331	-38.88%	Omitted	S3 Purchased Goods and Services: changed from 35,850 MTCO ₂ e to "not relevant" & Waste Generated in Operations: changed from 2,757 MTCO ₂ e to "not relevant"
273	Unum Group	60,655	-37.21%	Omitted	S3 Purchased Goods and Services: changed from 22,436 MTCO ₂ e to "relevant, not yet calculated" & Upstream Transportation and Distribution: changed from 22,436 MTCO ₂ e to "not relevant"

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	% Change	Change In Reporting	Description
27	Home Depot	206,494,563	-35.46%	Approach	S3 Purchased Goods and Services: changed from 317,875,090 MMTCO ₂ e to 204,637,598 MMTCO ₂ e S3 Use of Sold Products: changed from 260,000,000 MMTCO ₂ e to 156,500,611 MMTCO ₂ e with changes to methodology in both cases
227	Arconic	12,776,766	-34.27%	None	S3 Purchased Goods and Services: changed from 15,191,537 MMTCO ₂ e to 9,852,809 MMTCO ₂ e with no changes to methodology
121	Starbucks	15,626,886	-34.01%	Approach	S3 Purchased Goods and Services: changed from 15,020,133 MMTCO ₂ e to 8,844,532 MMTCO ₂ e with changes to methodology
123	Eli Lilly	1,104,000	-33.47%	None	S3 Upstream Transportation and Distribution: changed from 49,227 MMTCO ₂ e to 32,680 MMTCO ₂ e S3 Waste Generated in Operations: changed from 58,321 MMTCO ₂ e to 42,021 MMTCO ₂ e with no changes to methodology; Significant decrease in S1 emissions as well.
39	Target	54,347,450	-33.12%	None	S3 Purchased Goods and Services: changed from 43,284,000 MMTCO ₂ e to 27,389,000 MMTCO ₂ e S3 Downstream Transportation and Distribution: changed from 6,950,000 MMTCO ₂ e to 5,672,000 MMTCO ₂ e S3 Use of Sold Products: changed from 23,340,000 MMTCO ₂ e to 12,897,000 MMTCO ₂ e with no changes to methodology
64	Cisco Systems	26,799,606	-32.61%	Approach	S3 Use of Sold Products: changed from 37,865,598 MMTCO ₂ e to 24,929,174 MMTCO ₂ e with changes to methodology; Company cites updated approach and that "we do not attribute this to an actual reduction" but a more accurate estimation
282	W.W. Grainger	17,743,050	-31.62%	Approach	S3 Use of Sold Products: changed from 22,810,068 MMTCO ₂ e to 15,152,874 MMTCO ₂ e with changes to methodology; how both electricity emissions and emissions from products using fuel changed year to year.

None – emissions decreased with no apparent or reported change in calculation methodology.

Approach – the manner in which S3 emissions categories were calculated changed from year to year.

Omitted – company removed calculated emissions for an activity from year to year.

Recognizing inconsistency at this granular level underscores why enforceable standardization around emissions accounting is so important. Without centralized oversight on a clear, unified standard that governs how emissions are being reported, the resultant numbers, as this study shows, are vulnerable to manipulation. Additionally, if not all companies are following the same accounting standards, the potential issue of double-counting scope 3 emissions cannot even begin to be addressed—without transparent reporting, there is no way to tell what is being counted.¹³

In contrast, ten companies in this analysis group did not change their S3 reporting methodology or count in any way from 2018 to 2019. The consistency and clarity in their reporting can be seen as the most reliable claims of actual emission reduction over the year.

¹³ Double-counting occurs when two or more companies may account for the same emissions within the scope 3 inventories they count, or even within a single company if multiple products use the same supply chain. The [GHG Protocol](#) attempts to assuage this issue by designing the S3 subcategories "to be mutually exclusive" of each other, but the issue is a common one nevertheless. The complexity of double-counting S3 emissions is a topic greater than what is addressed here in this report.

FIGURE 8

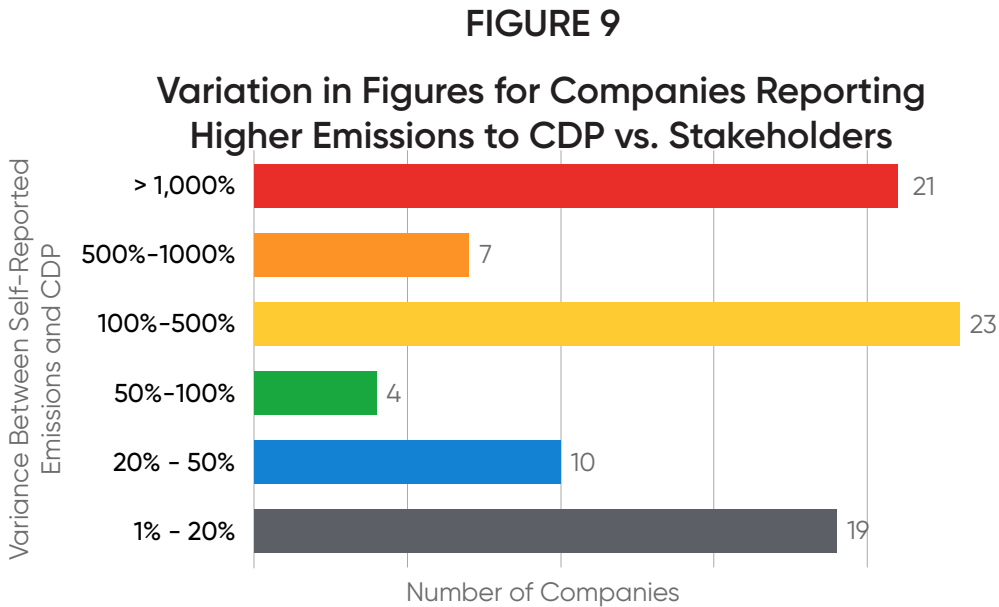
10 Companies With Greatest Decrease In Emissions With Consistent Carbon Accounting Reporting

Rank 2019	Company	Revenue (millions USD)	Revenue (millions USD)	% Change	GHG Emissions Tons CO ₂ e Scope 1+2+3	GHG Emissions Tons CO ₂ e Scope 1+2+3	% Change
		2019	2018		2019	2018	
413	Key Corp	\$7,393	\$6,868	7.60%	122,912	5,014,538	-97.55%
239	ADP	\$13,326	\$12,380	7.60%	338,633	1,166,191	-70.96%
384	Fifth Third Bancorp	\$7,973	\$7,713	3.40%	27,592	88,330	-68.76%
324	PVH	\$9,657	\$8,915	8.30%	2,818,053	7,667,018	-63.24%
203	Goodyear Tire	\$15,475	\$15,377	0.60%	92,860,006	168,172,947	-44.78%
419	Newmont Mining	\$7,253	\$7,348	-1.30%	5,911,470	10,194,337	-42.01%
21	General Electric	\$120,268	\$122,274	-1.60%	3,253,123	5,345,919	-39.15%
227	Arconic	\$14,014	\$12,960	8.10%	12,776,766	19,439,526	-34.27%
123	Eli Lilly	\$24,556	\$22,871	7.40%	1,104,000	1,659,409	-33.47%
39	Target	\$75,356	\$71,879	4.80%	54,347,450	81,264,377	-33.12%

Interestingly, even further analysis of these ten companies shows that 80% also reported an increase in revenue over the same time period. While it was not analyzed under the auspices of this report, a potential correlation between revenue and emissions reduction may be interesting to pursue in further research. However, such a correlation—including any impacts to shareholder returns and core financial performance—cannot be addressed until all companies are reporting based on the same S3 carbon accounting standard. Ten companies is not enough of a sample.

There is a discrepancy between what Fortune 500 companies are self-reporting to their stakeholders versus what they are reporting to third-parties like CDP.

In 2019, 142 of the companies on the Fortune 500 that self-reported their emission numbers also filed a report with CDP. In these instances, 59% of these companies reported larger emissions to CDP than what was reported to stakeholders.¹⁴ This discrepancy is largely due either to companies not reporting any scope 3 emissions to stakeholders, or reporting S3 totals that include only a partial accounting of their overall S3 value-chain emissions. The most common circumstance in which this manifests are instances in which companies only report the "business travel" subcategory in their stakeholder documents, but then have more expansive S3 accounting within their CDP filings. (Figure 9)



¹⁴ Similar metrics exist for 2018, where out of 156 self-reported emissions, 66% had larger emission figures in CDP reports than stakeholder reports.



Adele Barbato
Climate Adaptation Fellow @ Recapture

The reasons why a company would choose to inconsistently report its emissions numbers are irrelevant to the fact that increased, consistent participation is needed across the board if humanity is to have a fighting chance at combating climate change.

One of the greatest needs in the fight against climate change is data that is timely, accurate, reliable, and usable.

Comprehensive and standardized global reporting will arm scientists, governments, and businesses with the information needed to enable realistic solutions and effective policy for reducing the amount of greenhouse gas in the atmosphere.

Unfortunately, as this report shows, we have a long way to go before emission reporting can provide reliable, transparent, or thorough data points. This is particularly striking given the volume of emissions this report estimates is actually being produced—a number far larger than solutions or corporate net zero commitments currently accommodate.

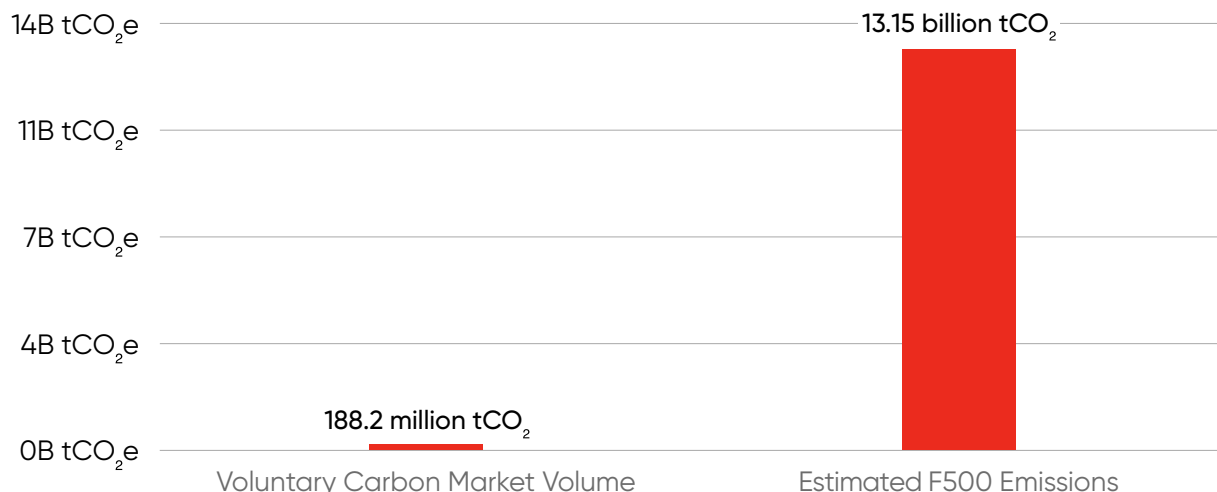
The Conclusion of This Report is the First of Many to Come

While solutions need to take into account emissions produced from all three emission scopes, S3 emissions are particularly problematic because their reduction relies on the voluntary carbon market. In order for companies to reach net zero, scope 3 emissions that cannot be reduced through a vendor or supplier's transition to a zero-carbon input or clean energy source need to be removed from the atmosphere.

However, the volume of carbon credits currently available via voluntary carbon markets comes nowhere near the demand projected by this report.

FIGURE 10

Comparison of 2019 Voluntary Carbon Market Volume
vs F500 Estimated Emissions in 2019



Think of This When You Hear the Words Net Zero

2020 Voluntary Carbon
Market Volume



2019 Reported Scope 3
Emissions of Fortune 500



Known transacted carbon credits reached 104 million tonnes CO₂e in 2019, 188 million tonnes CO₂e in 2020, and 239 million tonnes CO₂e in 2021 (as of August).

The reported scope 3 GHG emissions alone among the 2019 Fortune 500 companies equaled 5.67 *billion* tonnes CO₂e.

Voluntary carbon markets today can only negate around 2.5% of reported Fortune 500 scope 3 emissions, let alone the entire footprint.

Known transacted carbon credits reached 104 million tonnes CO₂e in 2019,¹⁵ 188 million tonnes CO₂e in 2020, and 239 million tonnes CO₂e so far in 2021 (as of August),¹⁶ with the majority of these units crediting avoided additional emissions as opposed to removing greenhouse gases already in the atmosphere. In fact, of the 188 million tonnes CO₂e credited in 2020, less than 10 million of those credits were issued for newly additive carbon removal.¹⁷ That's not enough to account for the emissions of even one company on the Fortune 500.

Somehow, the global carbon market will need to account for billions in unmet demand of CO₂e removal over the next nine years to accommodate the surge in corporate commitments claiming to reach net zero by 2030.

With 13.15 billion tonnes CO₂e estimated as the full F500 impact for 2019, the true supply/demand gap for carbon removal and reduction is astounding.

The most viable—and productive—removal solutions currently available for closing this gap involve combining efforts to increase both renewable energy reliance and greenhouse gas removal. GHG removal occurs namely through natural sequestration, such as by trees and soil, and through new technology such as direct air capture. However, the current removal capacity of technological sequestration is only around 10,000 metric tons per year, and natural sequestration requires sustained conservation and growth over decades and centuries.¹⁸

15 Stephen Donofrio et al., "Voluntary Carbon and the Post-Pandemic Recovery: A Special Climate Week NYC 2020 Installment of Ecosystem Marketplace's *State of the Voluntary Carbon Markets 2020 Report*" (Ecosystem Marketplace, September 21, 2020), <https://share.hsforms.com/1lCNqRm4gSRGccSuyRZF-dg1yp8f>.

16 Stephen Donofrio et al., "Markets in Motion: State of the Voluntary Carbon Markets 2021 Installment 1" (Ecosystem Marketplace, September 15, 2021), <https://www.ecosystemmarketplace.com/publications/state-of-the-voluntary-carbon-markets-2021>.

17 Ibid; and Patrick Maguire et al., "A Green Growth Spurt: State of Forest Carbon Finance 2021" (Forest Trends' Ecosystem Marketplace: Washington DC, June 2021), <https://www.ecosystemmarketplace.com/publications/state-of-forest-carbon-finance-2021/>.

18 Adele Peters, "The Carbon Removal Industry Needs to Grow to Be the Size of the Oil and Gas Industry," Fast Company (July 21, 2021), <https://www.fastcompany.com/90657209/the-carbon-removal-industry-needs-grow-to-be-the-size-of-the-oil-and-gas-industry>.

On the other hand, while the capacity for technological removal is actively increasing, the massive scaling needed to create an economic system that is capable of sequestering the more than 13 billion tonnes of CO₂e produced each year by the activities of the Fortune 500 alone will require "a growth factor of a million over a few decades . . . at a growth rate of 60%" just to meet science-based targets set by the Paris Agreement demanding a 90% emission reduction by 2050.¹⁹ This is not something that can be conjured up in the 11th hour, as Mischa Repmann, Senior Environmental Management Specialist at Swiss Re, points out: "The problem is, we can't wait until 2049 to consider how to do 10 billion tonnes of removals the next year. So we have to do both [cut emissions and carbon removal] in parallel."²⁰

Scaling the transition to renewable energy to support overall emission reduction is no less of a hurdle. While energy generation from renewable sources has steadily grown over the past 20 years, annual investments need to increase 200% by 2030 to meet global targets.²¹

Given these realities, it is clear that corporate net zero commitments setting targets for 2030 are impractical at best, and misguided at worst.²² Tighter regulation, incentives, alternative solutions, and targeted strategies are needed.

The voluntary nature of the current carbon market means participation and acceleration in GHG reporting, offsetting, and removal activities lack a motivating factor other than the goodwill of the companies themselves and the societal pressure placed on brand reputations.

16 Dr. Mischa Repmann et al., "The Insurance Rationale for Carbon Removal Solutions," ed. Paul Ronke (Zurich: Swiss Re Institute, 2021), <https://www.swissre.com/dam/jcr:31e39033-0ca6-418e-a540-d61b8e7d7b31/swiss-re-institute-expertise-publication-insurance-%20rationale-for-carbon-removal-solutions.pdf>.

17 Ibid.

21 United Nations, "Climate Action Fast Facts: Key Findings," United Nations, 2020, <https://www.un.org/en/climate-change/science/key-findings>; and, Heymi Bahar and Piotr Bojek, "Renewable Power," IEA: Analysis (Paris: IEA, June 2020), <https://www.iea.org/reports/renewable-power>.

22 See the *Science-Based Target Setting Manual*, version 4.1 published April 2020 by the Science-Based Targets coalition, which states "If a company has significant scope 3 emissions (over 40% of total scope 1, 2 and 3 emissions), it should set a scope 3 target." Notably, the manual also clarifies that "[o]ffsets and avoided emissions should not count toward SBTs." <https://sciencebasedtargets.org/resources/legacy/2017/04/SBTi-manual.pdf>.



David Antonioli
Chief Executive Officer @ Verra

There's this understanding and excitement about the voluntary market, which is great; I think that it can do a lot of good. But the voluntary market on its own is not going to solve the problem.

We really do need comprehensive government action across the board. The voluntary market can add to that action and help out, but we need to make sure that we're not distracting our attention from what governments need to do.

This may be evident in the findings in this report that show a less than 2% rate of increase year-over-year in the number of F500 companies accounting for their GHG emissions. Whether this low adoption rate indicates companies are not incentivized enough to reduce their carbon footprint, or they have just not yet caught up with implementing their own commitments, the current pace of new data coming on board is simply too slow.

David Antonioli, CEO of Verra, says "Yes, and..." to voluntary markets as long as there is oversight.

Governmental regulation and oversight is likely required to ensure climate activities accelerate GHG emission reporting and reduction at a pace on target with science-based goals. David Antonioli, CEO of Verra—the nonprofit organization responsible for setting the standard that certifies carbon credits exchanged on the voluntary carbon market—affirms the need for greater teeth in net zero regulation: "There's this understanding and excitement about the voluntary market, which is great; I think that it can do a lot of good. But the voluntary market on its own is not going to solve the problem. We really do need comprehensive government action across the board. The voluntary market can add to that [action] and help out, but we need to make sure that we're not distracting our attention from what governments need to do."²³

The situation is not hopeless, but it is dire.

While the challenge facing humanity is immense, it is not without hope. Investment, policy, and research are rapidly increasing every day in support of the development of carbon removal solutions, clean power, renewable energy distribution, and the necessary infrastructure to buttress the unprecedented growth of these new industries. But integrity, transparency, and participation in emission accounting and reporting are vital components to ensure that growth fully manifests. If we do not understand the full scope of the problem, how can we attempt to solve it?

²³ David Antonioli, interview by Adele Barbato and María Elisa Vollmer, April 29, 2021.

Appendix A: The Fortune 500 GHG Footprint

Published emissions for 2018 in the below table include companies present on the Fortune 500 list in 2018, but not present for 2019. In order to reduce the number of unnecessary pages in the report for previous years, we decided to make this data available upon request. The 2018 reported emissions column includes emissions data from a handful of companies that were not on the 2018 list but ranked higher in 2019. Those companies can be found in the 2018 rank column. For example, Levi Strauss was ranked 530 in 2018 and 500 in 2019. Additionally, some companies with emissions figures for 2019 may not have had reported emissions figures for 2018 due to mergers and acquisitions. An example of this can be seen with Dupont de Nemours after a successful merger in 2018 and a successful unmerging in 2019. Finally, some reports were not available at the time of data gathering. For example, Netflix published 2019 ESG metrics related to the company's carbon footprint in July of 2021, two years after earnings reports for financial performance. The estimated emissions for Netflix were lower than the company's reported emissions on their 2020 ESG report. Instances where estimation is lower than actual figures further the importance of establishing a standardized reporting methodology across all companies. To request access to the full data set for both the 2018 and 2019 years, please visit the report page on Recapture's website.

e – indicates emissions with partial estimation for at least one emission scope due to lack of reporting data during the window of data gathering.

ee – indicates emissions with full estimation of all three scopes due to lack of reporting data during the window of data gathering.

Rank 2019	Company	GHG Emissions Tons CO ₂ e Scope 1+2+3			Rank 2018
		2019	2018	% Change	
1	Walmart	202,038,007	202,598,135	-0%	1
2	Exxon Mobil ^e	1,150,677,299	1,133,870,270	1%	2
3	Apple	25,115,749	24,663,320	2%	4
4	Berkshire Hathaway ^{ee}	983,913	961,283	2%	3
5	Amazon.com	51,170,000	44,400,000	15%	8
6	UnitedHealth Group	596,938	473,375	26%	5
7	McKesson	397,580	378,802	5%	6
8	CVS Health	17,051,069	12,449,378	37%	7
9	AT&T	12,816,588	14,514,487	-12%	9
10	AmerisourceBergen	148,381	148,448	-0%	12

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
11	Chevron	470,000,000	458,000,000	3%	13
12	Ford Motor	187,597,851	179,126,148	5%	11
13	General Motors	254,624,971	270,183,291	-6%	10
14	Costco ^e	45,576,725	44,911,022	1%	15
15	Alphabet	12,529,953	15,774,981	-21%	22
16	Cardinal Health	535,000	543,400	-2%	14
17	Walgreens	39,895,000	2,079,000	1819%	19
18	JPMorgan Chase	851,030	861,232	-1%	20
19	Verizon	21,406,102	4,517,008	374%	16
20	Kroger	8,145,322	8,073,116	1%	17
21	General Electric	3,253,123	5,345,919	-39%	18
22	Fannie Mae ^{ee}	1,652,590	1,546,541	7%	21
23	Phillips 66 ^e	370,642,686	365,229,003	1%	28
24	Valero Energy ^e	464,326,373	457,544,326	1%	31
25	Bank of America	4,948,003	5,012,872	-1%	24
26	Microsoft	12,361,314	18,108,572	-32%	30
27	Home Depot	206,494,563	319,941,212	-35%	23
28	Boeing	1,636,000	1,719,000	-5%	27
29	Wells Fargo	3,707,432	3,883,091	-5%	26
30	Citigroup	1,130,948	11,348,970	-90%	32
31	Marathon Petroleum ^e	293,952,593	289,659,061	1%	41
32	Comcast ^e	12,967,185	11,631,157	11%	33
33	Anthem	1,307,329	230,394	467%	29
34	Dell Technologies	16,536,451	18,074,191	-9%	35
35	DuPont de Nemours	6,892,937	N/A	N/A	47
36	State Farm Insurance Cos. ^{ee}	324,476	310,974	4%	36
37	Johnson & Johnson	21,233,690	20,647,929	3%	37
38	IBM	2,103,506	2,434,639	-14%	34
39	Target	54,347,450	81,264,377	-33%	39
40	Freddie Mac ^{ee}	1,012,708	1,027,540	-1%	38
41	UPS	35,962,000	36,418,000	-1%	44
42	Lowe's	125,753,796	345,049,176	-64%	40
43	Intel	23,132,000	12,661,000	83%	46
44	MetLife	5,565,856	7,247,665	-23%	43
45	Procter & Gamble	385,363,540	214,470,947	80%	42
46	United Technologies	12,787,774	392,708,216	-97%	51

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
47	FedEx	19,501,454	19,023,335	3%	50
48	PepsiCo	55,442,736	67,953,413	-18%	45
49	Archer Daniels Midland	55,890,000	51,353,000	9%	48
50	Prudential Financial	406,321	344,082	18%	52
51	Centene ^{ee}	797,438	644,308	24%	61
52	Albertsons ^{ee}	4,545,311	4,526,620	0%	53
53	Walt Disney ^e	2,004,399	1,880,711	7%	55
54	Sysco	1,405,659	1,466,093	-4%	54
55	HP	51,145,800	49,079,600	4%	58
56	Humana	702,450	198,823	253%	56
57	Facebook	5,954,000	1,008,000	491%	76
58	Caterpillar ^e	72,363,395	71,306,440	1%	65
59	Energy Transfer Equity ^{ee}	281,178,270	245,284,601	15%	64
60	Lockheed Martin	31,771,435	31,819,548	-0%	59
61	Pfizer	7,077,352	5,342,521	32%	57
62	Goldman Sachs Group	1,426,246	1,387,900	3%	70
63	Morgan Stanley	1,579,040	2,004,520	-21%	67
64	Cisco Systems	26,799,606	39,766,870	-33%	62
65	Cigna	160,014	91,324	75%	73
66	AIG	155,597	162,426	-4%	60
67	HCA Healthcare ^{ee}	3,393,884	3,464,849	-2%	63
68	American Airlines Group	63,459,982	65,385,845	-3%	71
69	Delta Air Lines	41,969,334	41,184,621	2%	75
70	Charter Communications ^{ee}	6,020,183	5,736,931	5%	74
71	New York Life Insurance ^{ee}	167,838	163,474	3%	69
72	American Express	2,196,713	2,368,514	-7%	86
73	Nationwide ^{ee}	171,782	174,442	-2%	66
74	Best Buy	23,351,385	23,322,371	0%	72
75	Liberty Mutual Insurance Group	144,596	149,456	-3%	68
76	Merck	8,037,570	7,404,900	9%	78
77	Honeywell International	20,111,183	21,379,936	-6%	77
78	United Continental Holdings	56,728,339	54,229,332	5%	81
79	TIAA ^{ee}	158,666	139,237	14%	84
80	Tyson Foods ^e	34,150,338	32,622,389	5%	80
81	Oracle	1,908,082	2,145,580	-11%	82
82	Allstate	151,049	168,884	-11%	79

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
83	World Fuel Services ^e	155,354,528	131,693,740	18%	91
84	Massachusetts Mutual Life Insurance ^{ee}	151,767	129,458	17%	93
85	TJX	748,584	812,340	-8%	85
86	ConocoPhillips	215,621,939	200,441,709	8%	95
87	Deere	2,488,821	2,838,229	-12%	102
88	Tech Data ^{ee}	193,643	191,230	1%	83
89	Enterprise Products Partners ^e	188,709,070	151,043,703	25%	105
90	Nike	16,032,779	20,255,510	-21%	89
91	Publix Super Markets ^{ee}	11,058,196	10,584,526	4%	88
92	General Dynamics ^e	47,620,398	46,924,844	1%	99
93	Exelon	195,040,525	211,719,413	-8%	92
94	Plains GP Holdings ^{ee}	175,904,291	135,449,662	30%	115
95	3M	14,755,800	15,905,000	-7%	97
96	AbbVie	1,898,407	1,630,736	16%	110
97	CHS ^{ee}	27,867,160	27,229,377	2%	96
98	Capital One Financial	547,140	545,403	0%	101
99	Progressive	141,048	138,234	2%	112
100	Coca-Cola	58,606,638	59,184,790	-1%	87
101	USAA ^{ee}	124,531	119,164	5%	100
102	Hewlett Packard Enterprise	8,294,324	10,291,514	-19%	107
103	Abbott Laboratories	15,335,000	976,000	1471%	111
104	Twenty-First Century Fox ^{ee}	1,057,312	991,230	7%	109
105	Micron Technology	6,700,000	11,288,166	-41%	150
106	Travelers Cos.	69,535	74,056	-6%	106
107	Rite Aid ^{ee}	9,180,223	9,979,296	-8%	94
108	Northrop Grumman	1,951,364	1,807,017	8%	118
109	Arrow Electronics ^{ee}	154,320	139,428	11%	113
110	Philip Morris International	4,682,492	5,503,710	-15%	108
111	Northwestern Mutual ^{ee}	112,564	113,364	-1%	104
112	INTL FCStone ^{ee}	380,092	404,874	-6%	103
113	PBF Energy ^{ee}	159,573,846	157,243,077	1%	135
114	Raytheon	12,787,774	734,354	1641%	119
115	Kraft Heinz	24,699,851	24,674,343	0%	114
116	Mondelez International	21,615,149	23,508,504	-8%	117
117	U.S. Bancorp	403,502	382,519	5%	122
118	Macy's	593,653	640,952	-7%	120

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
119	Dollar General ^{ee}	33,599,500	30,778,175	9%	123
120	Nucor ^{ee}	57,798,955	56,954,732	1%	151
121	Starbucks	15,626,886	23,680,546	-34%	132
122	DXC Technology	875,213	933,407	-6%	374
123	Eli Lilly	1,104,000	1,659,409	-33%	129
124	Thermo Fisher Scientific ^{ee}	1,223,015	1,050,272	16%	144
125	US Foods Holding	740,883	774,271	-4%	121
126	Duke Energy	115,245,313	135,958,600	-15%	125
127	Halliburton	4,912,118	5,083,574	-3%	146
128	Cummins	932,598,160	816,677,742	14%	149
129	Amgen	3,125,669	3,177,316	-2%	130
130	Paccar	83,168,851	175,790,951	-53%	155
131	Southern	127,022,581	141,673,904	-10%	126
132	CenturyLink	3,933,771	4,376,164	-10%	166
133	International Paper	44,517,367	29,490,371	51%	124
134	Union Pacific	13,556,090	16,441,349	-18%	141
135	Dollar Tree ^{ee}	29,925,517	29,168,955	3%	134
136	Penske Automotive Group ^{ee}	18,086,733	16,978,588	7%	139
137	Qualcomm	301,602	310,313	-3%	133
138	Bristol-Myers Squibb	17,485,269	17,508,372	-0%	145
139	Gilead Sciences	1,510,032	145,489	938%	116
140	Jabil	2,699,681	2,579,347	5%	159
141	ManpowerGroup	91,942	91,942	0%	143
142	Southwest Airlines	20,726,192	20,867,430	-1%	142
143	Aflac	36,660	29,275	25%	137
144	Tesla ^e	473,612	864,449	-45%	260
145	AutoNation ^{ee}	16,997,639	17,094,483	-1%	138
146	CBRE Group	28,087,742	90,492	30939%	207
147	Lear ^{ee}	7,550,193	7,306,719	3%	148
148	Whirlpool	68,284,411	66,953,572	2%	140
149	McDonald's	53,554,787	9,235,576	480%	131
150	Broadcom ^{ee}	2,240,118	1,894,988	18.21%	N/A
151	Marriott International	14,839,009	15,771,637	-6%	127
152	Western Digital	1,096,422	1,171,929	-6%	158
153	Visa	583,877	294,479	98%	161
154	Lennar ^{ee}	763,673	645,202	18%	230

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
155	WellCare Health Plans ^{ee}	270,792	225,598	20%	170
156	Kohl's	974,835	1,045,823	-7%	157
157	AECOM ^e	1,315,582	1,188,110	11%	164
158	Synnex ^{ee}	104,281	88,639	18%	169
159	PNC Financial Services	349,050	379,421	-8%	165
160	Danaher ^{ee}	7,607,083	7,009,392	9%	162
161	Hartford Financial Services	60,687	82,259	-26%	156
162	Altria Group	5,870,437	5,574,436	5%	154
163	Bank of New York Mellon	446,458	461,012	-3%	175
164	Fluor	92,950	103,080	-10%	153
165	Avnet	99,000	118,934	-17%	128
166	Icahn Enterprises ^{ee}	261,151	299,197	-13%	136
167	Occidental Petroleum	131,850,198	87,410,000	51%	220
168	Molina Healthcare ^{ee}	250,576	263,748	-5%	152
169	Genuine Parts ^{ee}	29,628,091	25,791,541	15%	177
170	Freeport-McMoRan	8,704,787	9,155,314	-5%	176
171	Kimberly-Clark	16,258,000	16,603,000	-2%	163
172	Tenet Healthcare ^{ee}	1,331,538	1,498,771	-11%	147
173	Synchrony Financial ^{lee}	251,161	229,723	9%	173
174	CarMax ^{ee}	14,270,143	13,206,451	8%	174
175	HollyFrontier ^e	70,955,974	69,919,576	1%	206
176	Performance Food Group ^{ee}	32,164,605	30,598,361	5%	171
177	Sherwin-Williams	8,599,076	8,630,070	-0%	190
178	Emerson Electric ^e	3,126,476	2,927,659	7%	178
179	NGL Energy Partners ^{ee}	67,546,976	50,893,752	33%	223
180	XPO Logistics	2,792,651	2,949,233	-5%	186
181	EOG Resources ^e	79,722,641	78,558,196	1%	270
182	Applied Materials	175,331	286,848	-39%	201
183	PG&E Corp.	46,878,450	48,581,399	-4%	168
184	NextEra Energy ^e	73,344,048	75,396,120	-3%	167
185	C.H. Robinson Worldwide ^e	2,680,807	2,403,128	12%	193
186	Gap	8,194,561	8,410,707	-3%	181
187	Lincoln National	53,938	51,656	4%	205
188	DaVita	1,189,698	350,908	239%	179
189	Jones Lang LaSalle	13,070,949	13,888,131	-6%	356
190	WestRock	18,931,000	18,603,823	2%	194

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
191	CDW ^{ee}	431,686	403,803	7%	189
192	American Electric Power	83,054,178	95,965,052	-13%	185
193	Cognizant Technology Solutions ^{ee}	428,603	393,650	9%	195
194	D.R. Horton ^{ee}	657,669	401,234	64%	211
195	Becton Dickinson	2,832,450	2,620,492	8%	251
196	Nordstrom	205,504	232,302	-12%	183
197	Netflix ^{ee}	549,315	406,682	35%	261
198	Aramark	635,098	587,373	8%	200
199	Texas Instruments	1,007,553	1,200,506	-16%	192
200	General Mills	15,313,348	15,103,306	1%	182
201	Supervalu ^{ee}	4,763,750	4,864,014	-2%	180
202	Colgate-Palmolive	49,161,030	51,700,063	-5%	184
203	Goodyear Tire & Rubber	92,860,006	168,172,947	-45%	187
204	PayPal Holdings	91,900	99,600	-8%	222
205	PPG Industries ^e	13,224,715	12,894,613	3%	191
206	Omnicom Group	200,376	240,124	-17%	188
207	Celgene ^{ee}	122,248	73,228	67%	224
208	Jacobs Engineering Group	975,604	654,201	49%	297
209	Ross Stores	325,348	306,871	6%	209
210	Marsh & McLennan	220,751	197,505	12%	212
211	Mastercard	507,932	504,189	1%	212
212	Land O'Lakes ^{ee}	12,217,648	11,239,320	9%	216
213	Waste Management	19,074,638	27,723,664	-31%	202
214	Illinois Tool Works	1,024,927	1,144,875	-10%	204
215	Ecolab	7,660,988	709,317	980%	215
216	Booking Holdings ^e	1,669,152	1,457,046	15%	229
217	CBS	493,015	233,216	111%	197
218	Parker-Hannifin	695,766	775,990	-10%	256
219	Principal Financial	52,668	49,312	7%	210
220	DTE Energy	50,163,380	53,573,775	-6%	232
221	BlackRock	445,972	63,380	604%	237
222	United States Steel ^e	45,215,338	44,554,913	1%	246
223	Community Health Systems ^{ee}	1,029,210	1,343,463	-23%	160
224	Kinder Morgan ^{ee}	73,058,003	70,790,437	3%	218
225	Qurate Retail ^{ee}	1,616,643	1,195,420	35%	288
226	Loews ^{ee}	55,842	54,528	2%	217

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
227	Arconic	12,776,766	19,439,526	-34%	225
228	Stanley Black & Decker	9,896,058	10,485,663	-6%	228
229	Textron	1,265,912	717,911	76%	208
230	Las Vegas Sands	1,486,895	1,555,404	-4%	227
231	Estee Lauder	2,127,830	2,667,981	-20%	258
232	DISH Network ^{ee}	1,879,289	1,985,526	-5%	203
233	Stryker	180,441	159,173	13%	240
234	Kellogg	10,481,672	15,076,645	-30%	226
235	Biogen	491,674	504,774	-3%	245
236	Alcoa ^e	34,936,220	34,425,934	1%	262
237	Anadarko Petroleum	131,850,197	17,522,268	652%	257
238	Dominion Energy	58,512,638	48,530,447	21%	233
239	ADP	338,633	1,166,191	-71%	243
240	Salesforce.com	1,191,298	1,088,974	9%	285
241	L Brands	1,025,606	1,097,518	-7%	231
242	Henry Schein	76,769	64,683	19%	238
243	Newell Brands ^{ee}	9,390,146	10,621,463	-12%	196
244	Guardian Life Ins. Co. of America ^{ee}	50,303	48,139	4%	239
245	BJ's Wholesale Club ^{ee}	4,103,448	4,023,947	1.98%	N/A
246	BB&T Corp. ^{ee}	511,782	478,703	7%	250
247	State Street Corp.	130,795	216,638	-40%	259
248	Viacom	56,506	55,794	1%	221
249	Ameriprise Financial ^e	172,608	166,152	4%	252
250	Core-Mark Holding ^{ee}	23,555,736	22,316,249	6%	247
251	Reinsurance Group of America ^{ee}	49,766	48,374	3%	234
252	VF	6,934,627	7,798,418	-11%	242
253	Discover Financial Services ^{ee}	505,954	454,642	11%	263
254	Global Partners ^{ee}	20,041,462	14,107,937	42%	331
255	Edison International	15,800,000	18,100,000	-13%	244
256	Oneok	64,751,390	63,900,000	1%	249
257	Murphy USA ^{ee}	16,421,468	14,230,453	15%	279
258	Bed Bath & Beyond ^{ee}	16,192,008	16,017,619	1%	248
259	Consolidated Edison	39,811,498	42,769,290	-7%	255
260	CSX	6,961,451	8,370,842	-17%	265
261	J.C. Penney	1,135,072	742,050	53%	235
262	LKQ ^{ee}	18,782,644	15,573,923	21%	300

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
263	FirstEnergy	51,146,442	73,206,271	-30%	219
264	Steel Dynamics ^{ee}	27,707,221	22,356,554	24%	312
265	Lithia Motors ^e	9,383,510	8,007,061	17%	294
266	MGM Resorts International	3,286,389	3,528,532	-7%	280
267	Tenneco ^e	4,199,391	3,310,818	27%	320
268	Nvidia	483,946	490,256	-1%	306
269	Sempra Energy	73,037,781	58,527,282	25%	271
270	Farmers Insurance Exchange ^{ee}	46,251	47,926	-3%	253
271	Ball	9,878,987	10,660,042	-7%	277
272	Group 1 Automotive ^{ee}	9,208,873	8,830,231	4%	273
273	Unum Group	60,655	96,606	-37%	267
274	Xcel Energy ^{ee}	56,984,704	55,831,057	2%	266
275	Reliance Steel & Aluminum ^{ee}	27,034,580	22,783,108	19%	305
276	Huntsman ^e	9,915,525	9,111,238	9%	282
277	Norfolk Southern	11,542,890	11,182,272	3%	284
278	Laboratory Corp. of America	467,330	365,297	28%	286
279	Corning ^{ee}	21,041,512	18,853,493	12%	293
280	Expedia Group ^{ee}	1,289,523	1,155,894	12%	295
281	AutoZone ^{ee}	14,712,975	14,277,657	3%	278
282	W.W. Grainger	17,743,050	25,947,904	-32%	287
283	Quanta Services ^{ee}	729,131	617,911	18%	316
284	Crown Holdings	12,539,958	14,101,473	-11%	338
285	Office Depot ^e	14,539,656	14,098,022	3%	281
286	Baxter International	5,506,000	5,829,000	-6%	283
287	Lam Research	144,462	136,177	6%	354
288	Entergy	39,244,311	39,475,952	-1%	274
289	Charles Schwab	71,407	58,240	23%	330
290	L3 Technologies	492,023	220,718	123%	276
291	NRG Energy	42,197,800	49,913,981	-15%	269
292	Live Nation Entertainment ^{ee}	375,206	359,520	4%	290
293	Universal Health Services ^{ee}	783,232	820,096	-4%	268
294	Molson Coors Brewing	5,633,400	6,053,670	-7%	275
295	eBay	263,288	661,327	-60%	309
296	AES	59,591,871	65,411,301	-9%	214
297	Devon Energy ^e	83,526,667	82,306,660	1%	213
298	Pacific Life ^{ee}	41,352	36,756	13%	313

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
299	CenterPoint Energy	35,588,749	36,617,088	-3%	308
300	Discovery ^{ee}	367,033	239,043	54%	409
301	BorgWarner	375,240	433,883	-14%	301
302	Targa Resources	54,400,000	44,600,000	22%	334
303	Ally Financial ^{ee}	144,012	135,756	6%	299
304	SunTrust Banks ^{ee}	410,773	383,601	7%	303
305	IQVIA Holdings	167,440	181,559	-8%	304
306	American Family Insurance Group	82,898	82,252	1%	311
307	Delek US Holdings ^e	33,598,359	24,054,933	40%	384
308	Navistar International ^e	55,191,776	50,213,997	10%	342
309	Chesapeake Energy ^{ee}	78,714,245	73,059,375	8%	314
310	United Natural Foods	18,668,946	9,320,628	100%	319
311	Leidos Holdings	144,787	143,721	1%	292
312	PulteGroup ^{ee}	349,672	338,988	3%	341
313	Eastman Chemical	14,191,042	16,550,790	-14%	310
314	Republic Services	17,609,606	16,807,311	5%	296
315	Mohawk Industries	3,741,028	3,556,273	5%	315
316	Sonic Automotive ^{ee}	7,899,897	7,832,425	1%	298
317	Owens & Minor ^{ee}	38,175	36,153	6%	318
318	Xerox	952,652	228,423	317%	291
319	Boston Scientific	148,296	85,127	74%	328
320	DCP Midstream ^{ee}	50,733,576	43,708,765	16%	344
321	Autoliv ^e	3,498,957	3,706,731	-6%	289
322	Interpublic Group ^{ee}	117,539	95,377	23%	359
323	Public Service Enterprise Group	31,691,262	33,152,802	-4%	327
324	PVH	2,818,053	7,667,018	-63%	332
325	Mosaic	9,880,000	9,670,000	2%	382
326	Advance Auto Parts ^{ee}	12,562,607	12,291,189	2%	317
327	Altice USA	172,766	247,429	-30%	N/A
328	Hormel Foods ^e	7,808,628	7,553,073	3%	323
329	O'Reilly Automotive ^{ee}	12,503,603	11,771,953	6%	329
330	Calpine ^{ee}	37,175,654	34,205,354	9%	336
331	Hertz Global Holdings	7,797,910	3,725,788	109%	335
332	First Data ^{ee}	333,759	423,507	-21%	254
333	Pioneer Natural Resources ^{ee}	72,436,186	41,969,133	73%	497
334	Coty	1,598,510	1,363,692	17%	371

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
335	AGCO ^{ee}	32,011,896	28,434,861	13%	347
336	Mutual of Omaha Insurance ^{ee}	36,126	33,749	7%	337
337	Vistra Energy	105,772,432	118,650,466	-11%	499
338	Avis Budget Group	7,000,644	6,873,458	2%	333
339	Adobe	598,753	574,032	4%	389
340	Peter Kiewit Sons ^{ee}	589,062	566,413	4%	339
341	News Corp.	1,458,616	1,421,783	3%	350
342	Brighthouse Financial ^{ee}	34,650	26,444	31.03%	N/A
343	Voya Financial	98,434	356,062	-72%	307
344	Air Products & Chemicals	33,800,000	32,520,100	4%	345
345	Hilton Worldwide Holdings	7,641,786	7,856,388	-3%	324
346	GameStop ^{ee}	11,605,431	12,095,820	-4%	322
347	Veritiv ^{ee}	13,752,115	13,228,662	4%	346
348	Williams ^e	44,868,796	41,482,524	8%	353
349	Campbell Soup	4,759,516	734,937	548%	358
350	Rockwell Collins ^{ee}	6,248,332	4,919,344	27%	415
351	Thrivent Financial for Lutherans ^{ee}	33,374	32,961	1%	343
352	Westlake Chemical ^{ee}	7,427,827	6,916,868	7%	352
353	Univar	222,473	212,706	5%	349
354	J.B. Hunt Transport Services	3,445,203	6,196,643	-44%	395
355	Frontier Communications ^{ee}	1,188,060	1,259,390	-6%	325
356	Jones Financial (Edward Jones) ^{ee}	55,173	48,773	13%	376
357	National Oilwell Varco ^{ee}	1,725,173	1,490,673	16%	388
358	Eversource Energy	19,759,663	20,471,869	-3%	364
359	Dick's Sporting Goods ^{ee}	11,062,594	11,264,519	-2%	340
360	Genworth Financial	14,591	8,246	77%	348
361	Fidelity National Information Services ^e	295,984	320,582	-8%	326
362	Yum China Holdings ^{ee}	13,479,147	11,443,259	18%	397
363	Ryder System	11,127,152	11,545,295	-4%	387
364	Anixter International ^{ee}	43,680	41,220	6%	357
365	Caesars Entertainment	2,897,317	2,666,544	9%	536
366	Masco ^{ee}	250,770	231,279	8%	373
367	Thor Industries ^{ee}	12,105,618	10,533,007	15%	392
368	Alaska Air Group ^e	9,637,477	9,251,467	4%	355
369	Amphenol ^{ee}	3,329,847	2,846,326	17%	403
370	WESCO International	64,258	60,357	6%	370

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
371	Huntington Ingalls Industries ^{ee}	5,895,713	5,365,705	10%	381
372	Jefferies Financial Group ^{ee}	112,171	170,734	-34%	241
373	Dana	5,459,040	7,979,092	-32%	393
374	Expeditors International of Washington	50,152	14,835	238%	408
375	EMCOR Group ^e	530,710	501,796	6%	368
376	Darden Restaurants ^{ee}	12,942,544	11,484,906	13%	396
377	SpartanNash ^{ee}	14,722,334	14,837,339	-1%	351
378	Assurant	37,824	40,469	-7%	440
379	United Rentals ^e	941,981	777,448	21%	424
380	Liberty Media ^{ee}	279,631	264,119	6%	377
381	Erie Insurance Group ^{ee}	31,883	29,914	7%	378
382	Auto-Owners Insurance ^{ee}	31,756	30,188	5%	375
383	Cheniere Energy ^{ee}	31,215,512	21,890,332	43%	489
384	Fifth Third Bancorp	27,592	88,330	-69%	366
385	Foot Locker ^{ee}	4,082,710	4,001,971	2%	363
386	Conagra Brands	9,589,822	7,299,227	31%	321
387	Zimmer Biomet Holdings	253,308	202,072	25%	361
388	Tractor Supply ^e	10,372,903	9,514,067	9%	391
389	Berry Global Group	12,913,136	10,867,004	19%	399
390	Alliance Data Systems	119,492	129,249	-8%	365
391	Hershey ^{ee}	800,998	604,000	33%	379
392	PPL	35,765,025	36,620,976	-2%	380
393	Dean Foods ^{ee}	6,343,590	6,376,310	-1%	362
394	Builders FirstSource ^{ee}	8,729,250	7,948,420	10%	400
395	Oshkosh	345,140	305,916	13%	414
396	EnLink Midstream ^{ee}	39,767,645	29,648,822	34.13%	N/A
397	W.R. Berkley ^{ee}	8,607	8,601	0%	369
398	WEC Energy Group	58,890,000	62,254,000	-5%	372
399	JetBlue Airways	10,529,685	10,095,705	4%	402
400	UGI ^e	29,902,327	23,922,643	25%	457
401	A-Mark Precious Metals ^{ee}	104,659	96,182	9%	404
402	Fidelity National Financial ^{ee}	30,148	38,783	-22%	302
403	Constellation Brands	12,221,723	1,153,626	959%	386
404	Quest Diagnostics	234,602	251,155	-7%	367
405	Activision Blizzard ^{ee}	260,850	244,051	7%	401
406	Weyerhaeuser	1,119,328	1,130,000	-1%	394

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
407	Raymond James Financial ^{ee}	47,996	41,891	15%	431
408	Casey's General Stores ^{ee}	9,797,286	8,707,679	13%	425
409	Dr Pepper Snapple Group	9,115,780	9,124,038	-0%	418
410	American Tower ^e	5,283,888	4,732,773	12%	419
411	Apache ^e	68,548,478	67,547,244	1%	438
412	Dover	4,238,779	4,292,350	-1%	360
413	KeyCorp	122,912	5,014,538	-98%	412
414	J.M. Smucker	6,780,302	6,833,460	-1%	383
415	Citizens Financial Group	132,421	73,170	81%	435
416	Motorola Solutions	1,903,949	1,981,863	-4%	443
417	Magellan Health ^{ee}	97,020	77,441	25%	475
418	American Axle & Manufacturing ^e	2,595,390	2,236,962	16%	449
419	Newmont Mining	5,911,470	10,194,337	-42%	385
420	Spirit AeroSystems Holdings	438,857	424,357	3%	405
421	Western & Southern Financial ^{ee}	27,847	22,556	23%	476
422	Fortive ^{ee}	1,293,659	1,195,418	8%	420
423	Graybar Electric ^{ee}	11,391,040	10,486,462	9%	426
424	NVR ^{ee}	286,272	140,877	103%	444
425	Avery Dennison	3,795,499	3,772,501	1%	427
426	Celanese ^e	6,120,323	4,835,425	27%	455
427	American Financial Group ^{ee}	28,386	27,254	4%	413
428	Toll Brothers ^{ee}	142,265	136,759	4%	480
429	Sanmina ^{ee}	763,970	738,074	4%	411
430	Insight Enterprises ^{ee}	188,186	178,192	6%	417
431	Owens Corning	7,483,850	7,766,778	-4%	442
432	Packaging Corp. of America	4,260,000	4,220,611	1%	436
433	TravelCenters of America ^{ee}	9,144,308	7,935,382	15%	465
434	Olin ^{ee}	5,974,949	5,391,734	11%	448
435	Arthur J. Gallagher ^{ee}	95,411	84,762	13%	454
436	MasTec ^{ee}	450,950	431,239	5%	428
437	Alleghany ^{ee}	27,341	25,507	7%	437
438	Owens-Illinois ^{ee}	5,053,907	5,048,028	0%	410
439	Asbury Automotive Group ^{ee}	5,456,581	5,125,567	6%	434
440	CMS Energy	34,087,198	29,162,750	17%	429
441	Markel ^e	27,159	24,066	13%	464
442	Blackstone Group ^{ee}	94,022	97,957	-4%	398

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
443	AK Steel Holding	8,438,273	8,859,338	-5%	461
444	Hanesbrands	3,938,553	4,579,470	-14%	433
445	R.R. Donnelley & Sons ^{ee}	1,100,308	1,122,961	-2%	406
446	Wayfair ^{ee}	778,907	542,328	44%	545
447	Regions Financial	1,160,946	118,238	882%	460
448	Wynn Resorts ^e	3,110,434	2,919,678	7%	447
449	Ulta Beauty ^{ee}	8,807,330	7,716,412	14%	471
450	Regeneron Pharmaceuticals	640,050	494,284	29%	473
451	Burlington Stores ^{ee}	3,429,600	3,142,129	9%	459
452	Rockwell Automation	155,786	147,488	6%	445
453	Northern Trust	57,343	56,963	1%	486
454	Chemours	163,488,000	174,751,000	-6%	451
455	Seaboard ^{ee}	5,612,994	4,953,043	13%	481
456	Marathon Oil ^e	63,254,364	62,873,932	1%	518
457	Ascena Retail Group ^{ee}	3,382,802	3,419,829	-1%	423
458	Dillard's ^{ee}	2,051,566	2,026,328	1%	439
459	Cintas ^{ee}	212,903	178,180	19%	500
460	Advanced Micro Devices	1,027,140	982,583	5%	506
461	Hess	53,543,382	47,323,169	13%	501
462	M&T Bank Corp. ^{ee}	254,198	237,028	7%	467
463	ABM Industries	55,971	59,048	-5%	498
464	Beacon Roofing Supply ^{ee}	10,149,617	6,920,337	47%	569
465	NCR ^{ee}	810,104	824,144	-2%	432
466	iHeartMedia ^{ee}	220,018	214,870	2%	452
467	Franklin Resources	51,104	56,270	-9%	441
468	Ameren	25,268,839	30,638,570	-18%	453
469	Intercontinental Exchange ^{ee}	40,292	37,454	8%	477
470	S&P Global	359,149	266,582	35%	463
471	Post Holdings ^{ee}	5,118,226	4,274,050	20%	512
472	Analog Devices	144,352	224,222	-36%	520
473	Ralph Lauren	1,664,742	1,791,586	-7%	421
474	Harris	492,023	220,718	123%	407
475	Booz Allen Hamilton Holding ^{ee}	164,052	154,270	6%	482
476	Polaris Industries ^{ee}	8,961,849	8,001,132	12%	496
477	Clorox	2,227,505	2,282,207	-2%	468
478	Realogy Holdings ^{ee}	4,317,306	4,342,163	-1%	458

		GHG Emissions Tons CO ₂ e Scope 1+2+3			
Rank 2019	Company	2019	2018	% Change	Rank 2018
479	HD Supply Holdings ^{ee}	9,562,907	10,333,063	-7%	430
480	Graphic Packaging Holding	5,647,794	4,340,654	30%	565
481	Old Republic International ^{ee}	23,907	24,864	-4%	450
482	Intuit	37,523	49,387	-24%	516
483	NetApp	157,923	167,500	-6%	495
484	Tapestry	147,335	243,783	-40%	555
485	ON Semiconductor	2,750,950	2,146,663	28%	492
486	Ingredion	7,960,791	8,379,978	-5%	478
487	Zoetis ^e	1,138,555	1,037,306	10%	507
488	Fiserv ^{ee}	204,620	200,157	2%	487
489	TreeHouse Foods ^e	4,754,216	5,159,126	-8%	446
490	Robert Half International ^{ee}	27,550	25,018	10%	511
491	First American Financial	4,278	4,252	1%	483
492	Harley-Davidson ^e	8,309,259	8,207,519	1%	488
493	Windstream Holdings ^e	788,223	807,538	-2%	474
494	Yum Brands	36,327,593	29,149,675	25%	472
495	Williams-Sonoma	5,949,304	5,949,314	-0%	508
496	Simon Property Group	846,065	901,038	-6%	493
497	Navient ^e	77,193	17,047	353%	515
498	Western Union ^{ee}	196,433	194,113	1%	494
499	Peabody Energy ^e	389,706,653	384,014,518	1%	491
500	Levi Strauss	5,921,023	5,241,230	13%	530

Appendix B:

Methodology

Reporting Methodology

The mapping of the Fortune 500's GHG footprint began with a comprehensive audit of already available emission figures. Starting in August 2020, the audit was performed by searching through publicly-available sustainability documentation for each company on the Fortune 500 list in the years 2018 and 2019. Documentation existed in the form of Sustainability Reports, Corporate Social Responsibility Reports, "Environmental, Social, and Corporate Governance" Reports, and Annual Reports, as well as publicly available CDP reports. Scope-specific data based off of the GHG Protocol Corporate Accounting and Reporting Standard was tabulated when available, and distinctions were noted as to whether a company used market-based or location-based scope 2 data in both their own reports and CDP filings. This systematic review of self-reported emission figures was completed by the end of December 2020, and included an accounting of all merger and acquisition activity, as well as a tally of all firms coming on and off the F500 list between the two years.

A three-tiered labeling system was then created to denote and track the extent to which a given company was reporting based on the GHG Protocol standards. Companies were labeled as "Fully Reporting" in cases when at least some amount of GHG metric tonnage was provided for each scope 1, 2, and 3, whether via self-reported figures, CDP filings, or both.²⁴ For instance, a company was considered "fully reporting" even if figures for scope 1 and 2 were provided, and only five of the fifteen scope 3 categories.

²⁴ In instances where "full reporting" existed in both company reports and CDP filings with variance in overall emission totals, the greater of the two totals was used as the company's annual total for the purposes of this study.

Companies were labeled as “Partially Reporting” when at least one of the three scopes was not reported or found in any publicly-available source during the research process.²⁵ Companies were labeled as “Non-Reporting” when no GHG emission values were provided by the company.

For the purposes of this report, a company's carbon offsetting activities were not taken into account when calculating their annual footprint totals, with the exception of the scope 2 market-based boundary referenced below. While several examples exist of a company claiming to offset specific emissions, only pre-offset emission figures given via self-reported or CDP sources were assessed. The reason for this has to do with the inherent unreliability of the carbon offset market. Since different offsetting activities offer differing levels of additionality and actual net loss of emissions, the complexity of analyzing offsetting impacts are prohibitive to meaningful comparisons.

Market-Based vs. Location-Based Scope 2 Figures

The GHG Protocol specifies that companies should report and distinguish their scope 2 emissions accounting using both location-based and market-based methods. The location-based method involves an emission factor based on an average specific to the location of the grid from which the purchased energy is produced. The market-based methodology is applied when a company is able to acquire energy certificates or supplier-specific information, allowing for an emission factor specific to the energy being purchased. For the purposes of calculating the F500 footprint, market-based figures were used rather than location-based figures when both were reported by a company. This is because the market-based method accounts for purchased emissions that companies have *purposefully chosen*—including choices to utilize environmentally-friendly or renewable energy providers—while the location-based method offers generic averages associated with a vast, shared energy grid.²⁶

²⁵ The vast majority of “Partially Reporting” companies were reporting scope 1 and scope 2 emissions but not scope 3 emissions. Only a handful reported a single number for their emissions, and in most of those cases that number was a combination of emission sources that would be categorized under both scope 1 and scope 2.

²⁶ Mary Sotos, “GHG Protocol Scope 2 Guidance Executive Summary 2 Scope 2 Guidance” (World Resources Institute, 2015), page 4, https://ghgprotocol.org/sites/default/files/Scope2_ExecSum_Final.pdf.

While concerns have been raised around the potential additionality of emissions created during renewable energy generation, and those additional emissions not being properly accounted for in scope 2 emission accounting, we feel the current GHG scope 2 market-based protocol includes sufficient criteria for certifying the quality of renewable energy instruments.²⁷

Estimation Methodology

Once the research process was carried out for both the 2018 and 2019 Fortune 500 lists, the three-tiered labeling system was used to identify and isolate those companies that did not provide or disclose GHG emissions data across all three scopes in a given year. This data set consisted of “Partially Reporting” companies who almost exclusively provided S1 and S2 data but no S3 accounting, and those “Non-Reporting” companies who did not provide any specific reporting within the construct of the GHG Protocol reporting framework. The latter group of companies consisted primarily of firms that did not publish any type of sustainability reporting, as well as firms that had produced content in the vein of environmental impacts, plans, or activities, but without disclosing specific greenhouse emissions for a given reporting period.

Two estimation models were developed to fill in those gaps: a Historic Trends-Based model and a Revenue-Based model. The Historic Trends-Based model was used in cases where previous emissions data in the form of privately-researched published reports was available to draw from to form estimation metrics for specific companies. The Revenue-Based model was used when no such previous data existed for a company.

Historic Trends-Based Model

The Historic Trends-Based estimation model involved comparing the total historic emissions for a given company as reported by Thomson Reuters & BSD Consulting in *Global 250 Greenhouse Gas Emitters: A New Business Logic*.²⁸

27 Mary Sotos, “GHG Protocol Scope 2 Guidance Executive Summary 2 Scope 2 Guidance” (World Resources Institute, 2015), page 4, https://ghgprotocol.org/sites/default/files/Scope2_ExecSum_Final.pdf.

28 David Lubin, John Moorhead, and Tim Nixon, “Global 250 Greenhouse Gas Emitters: A New Business Logic” (Thomson Reuters, October 2017).

An emissions growth rate was applied using 2016 as the base year for estimating a company's total annual emissions in 2018 and 2019. The resultant growth rates provided the following model equations:

$$\begin{aligned} 2018 &= 3.22\% \text{ or } 2016 \text{ BSD emission total} \times 1.0322 \\ 2019 &= 4.75\% \text{ or } 2016 \text{ BSD emission total} \times 1.0475 \end{aligned}$$

Data from ClimateWatch provided the figures for calculating the average rate of change of global greenhouse gas emissions, resulting in the following rates:²⁹

$$\begin{aligned} 2015 \text{ to } 2016 &= 1.4\% \\ 2016 \text{ to } 2017 &= 1.22\% \\ 2017 \text{ to } 2018 &= 1.98\% \end{aligned}$$

An average rate of year-over-year change for these three years results in 1.53%, which was then applied to estimate the rate of change from 2018-2019.

In total, eighteen firms listed in both the above mentioned report and the Fortune 500 company listings for 2018 and/or 2019 were found as either "Partially-Reporting" or "Non-Reporting". In instances when companies reported partial data (S1 and S2 only), the emissions growth rate was applied to the 2016 BSD/Reuters published figures to estimate overall total emissions for a given year. This overall total was then applied to missing data points in 2018 and 2019 by subtracting the reported numbers from the estimated company total to determine an estimated scope 3 emissions total.

Revenue-Based Model

The Revenue-Based estimation model was employed in instances where historic company footprints do not exist in any form, which was the majority of instances. This model relies on a revenue-based framework based on the Fortune-defined industry categories, where a revenue multiplier for each industry category was derived from companies that were already reporting their emissions.

²⁹ "Data Explorer," ClimeWatch, 2021, <https://www.climatewatchdata.org/data-explorer/historical-emissions?historical-emissions-data-sources=cait&historical-emissions-gases=all-ghg&historical-emissions-regions=All%20Selected&historical-emissions-sectors=total-including-lucf&page=1>.

This multiplier was calculated by dividing a company's annual reported revenue by their annual reported emissions, and then averaging all emission-per-revenue rates in a given industry.

The resultant averaged rate was then applied to the "Non-Reporting" and "Partially-Reporting" companies within that industry in order to best estimate a company's total emissions in a given year.³⁰

While this methodology planned for the use of at least 3–5 industry-specific companies in building each multiplier, there were several industries with less than, or even a single, "Fully Reporting" firm available for use in comparison. Additionally, some "Fully Reporting" companies were specifically excluded from the multiplier calculation process, such as "Fully Reporting" firms that were judged to be clearly under-reporting their scope 3 numbers by only claiming emissions associated with "business travel" and no other S3 category.

Notably, there were no "fully" or "partially" reporting Fortune 500 companies within the Home Builders industry. Instead, a revenue-based multiplier was derived from the reported scope 1 and 2 emissions of a top-10, U.S.-based home builder outside of the Fortune 500. To derive a multiplier for estimating scope 3 emissions, a Life Cycle Analysis was conducted on each Fortune 500 Home Builder firm based on the total number and average square footage of homes built by each company.³¹ The multiplier accounted for the operational and embodied emissions produced in the construction of the homes, and for the average household energy use resulting from people living in these homes.

³⁰ Where S1–S3 data existed for one year and not the other for a given company, a company-specific revenue-based multiplier was calculated and used to estimate the missing data points, rather than the industry-based multiplier.

³¹ The three Life Cycle Analysis assumptions were based on the following sources:

Martin Röck et al., "Embodied GHG Emissions of Buildings – the Hidden Challenge for Effective Climate Change Mitigation," *Applied Energy* 258 (January 2020): 114301, <https://doi.org/10.1016/j.apenergy.2019.114107>.

Benjamin Goldstein, Dimitrios Gounaridis, and Joshua P. Newell, "The Carbon Footprint of Household Energy Use in the United States," *Proceedings of the National Academy of Sciences* 117, no. 32 (July 20, 2020): 19122–30, <https://doi.org/10.1073/pnas.1922205117>.

References

Antonioli, David. Interview by Adele Barbato and María Elisa Vollmer, April 29, 2021.

Bahar, Heymi, and Piotr Bojek. "Renewable Power." IEA. Paris: IEA, June 2020. <https://www.iea.org/reports/renewable-power>.

Cervantes, Luz, Tim Letts, Liam Vita, and Tim Juliani. "Power Forward 4.0: A Progress Report of the Fortune 500'S Transition to a Net-Zero Economy." World Wildlife Foundation, June 2021. https://c402277.ssl.cf1.rackcdn.com/publications/1499/files/original/Power_Foward_4.0.pdf?1622608268.

Clime Watch. "Data Explorer." www.climatewatchdata.org, 2021. https://www.climatewatchdata.org/data-explorer/historical-emissions?historical-emissions-data-sources=cait&historical-emissions-gases=all-ghg&historical-emissions-regions=All%20Selected&historical-emissions-sectors=total-including-lucf&page=1&sort_col=2018&sort_dir=DESC.

Donofrio, Stephen, Patrick Maguire, Steve Zwick, and William Merry. "Voluntary Carbon and the Post-Pandemic Recovery: A Special Climate Week NYC 2020 Installment of Ecosystem Marketplace's *State of the Voluntary Carbon Markets 2020* Report." Forest Trends Association. Washington DC: Ecosystem Marketplace, September 21, 2020. <https://share.hsforms.com/1lCNqRm4gSRGccSuyRZF-dg1yp8f>.

Donofrio, Stephen, Patrick Maguire, Kim Myers, Christopher Daley, and Katherine Lin. "Market in Motion: State of the Voluntary Carbon Markets 2021 Installment 1." Forest Trend Association. Washintong DC: Ecosystem Marketplace, September 15, 2021. <https://www.ecosystemmarketplace.com/publications/state-of-the-voluntary-carbon-markets-2021>.

CDP. "Responses." [www.cdp.net](https://www.cdp.net/en/responses?utf8=%E2%9C%93&queries%5Bname%5D=), 2021. <https://www.cdp.net/en/responses?utf8=%E2%9C%93&queries%5Bname%5D=>.

Goldstein, Benjamin, Dimitrios Gounaridis, and Joshua P. Newell. "The Carbon Footprint of Household Energy Use in the United States." *Proceedings of the National Academy of Sciences* 117, no. 32 (July 20, 2020): 19122–30. <https://doi.org/10.1073/pnas.1922205117>.

IEA. "Global CO2 Emissions in 2019." IEA. Paris, February 11, 2020. <https://www.iea.org/articles/global-co2-emissions-in-2019>.

IEA. "Executive Director Speech at the Leaders Summit on Climate." IEA: News, May 23, 2021. <https://www.iea.org/news/executive-director-speech-at-the-leaders-summit-on-climate>.

IPCC, 2018: Summary for Policymakers. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

Lubin, David, John Moorhead, and Tim Nixon. "Global 250 Greenhouse Gas Emitters: A New Business Logic." Thomas Reuters, October 2017. Moorhead, John, and Tim Nixon. "Global 500 Greenhouse Gas Report: The Fossil Fuel Energy Sector." BSD Consulting and Thomas Reuters, May 2015. <https://www.thomsonreuters.com/content/dam/openweb/documents/pdf/corporate/Reports/global-500-greenhouse-gas-report-fossil-fuel-energy-sector.pdf>.

Maguire, Patrick, Stephen Donofrio, William Merry, Kim Myers, Laura Weatherer, Jordan Wildish, and Steve Zwick. "A Green Growth Spurt: State of Forest Carbon Finance 2021." Forest Trends Association. Washington DC: Ecosystem Marketplace, June 2021.

<https://www.ecosystemmarketplace.com/publications/state-of-forest-carbon-finance-2021/>.

Moorhead, John, and Tim Nixon. "Global 500 Greenhouse Gases Performance 2010-2015: 2016 Report on Trends." Thomas Reuters, June 2016. https://www.aiag.org/docs/default-source/corporate-responsibility/global-500-greenhouse-gases-performance-2010-2015.pdf?sfvrsn=2422429d_0.

Peters, Adele. "The Carbon Removal Industry Needs to Grow to Be the Size of the Oil and Gas Industry." Fast Company. July 21, 2021. <https://www.fastcompany.com/90657209/the-carbon-removal-industry-needs-grow-to-be-the-size-of-the-oil-and-gas-industry>.

"Remaining Carbon Budget." Mercator Research Institute on Global Commons and Climate Change (MCC). Accessed August 1, 2021. <https://www.mcc-berlin.net/en/research/co2-budget.html>.

Repmann, Dr. Mischa, Dr. Oliver Schelske, Dara Coljin, and Samendra Prasad. "The Insurance Rationale for Carbon Removal Solutions." Edited by Paul Ronke. Zurich: Swiss Re Institute, 2021. <https://www.swissre.com/dam/jcr:31e39033-0ca6-418e-a540-d61b8e7d7b31/swiss-re-institute-expertise-publication-insurance-%20rationale-for-carbon-removal-solutions.pdf>.

Rickard, Guy. "Scope 2 Reporting Guidance--the Dawn of a New Era for Green Electricity?" The Carbon Trust. January 27, 2015. <https://www.carbontrust.com/news-and-events/insights/scope-2-reporting-guidance-the-dawn-of-a-new-era-for-green-electricity>.

Röck, Martin, Marcella Ruschi Mendes Saade, Maria Balouktsi, Freja Nygaard Rasmussen, Harpa Birgisdottir, Rolf Frischknecht, Guillaume Habert, Thomas Lützkendorf, and Alexander Passer. "Embodied GHG Emissions of Buildings – the Hidden Challenge for Effective Climate Change Mitigation." *Applied Energy* 258 (January 2020): 114301. <https://doi.org/10.1016/j.apenergy.2019.114107>.

Science-Based Targets Setting Manual. Science Based Targets (CDP, UN Global Compact, World Resources Institute, and World Wildlife Foundation), 2020. <https://sciencebasedtargets.org/resources/legacy/2017/04/SBTi-manual.pdf>.

"Science Based Targets." Science Based Targets (CDP, United Nations Global Compact, World Resources Institute, and World Wildlife Foundation), 2021. <https://sciencebasedtargets.org/>.

Sotos, Mary. "GHG Protocol Scope 2 Guidance Executive Summary 2 Scope 2 Guidance." World Resources Institute, 2015. https://ghgprotocol.org/sites/default/files/Scope2_ExecSum_Final.pdf.

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. World Resources Institute and World Business Council, 2004. <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf>.

UN Climate. "Press Release: Commitments to Net Zero Double in Less than a Year." United Nations Climate Change, September 21, 2020. <https://unfccc.int/news/commitments-to-net-zero-double-in-less-than-a-year>.

United Nations. "Climate Action Fast Facts: Key Findings." United Nations, 2020. <https://www.un.org/en/climatechange/science/key-findings>. United Nations. Paris Agreement. United Nations, 2015. https://unfccc.int/sites/default/files/english_paris_agreement.pdf. United Nations Environment Programme (2020). "Emissions Gap Report 2020." Nairobi. <https://www.unep.org/emissions-gap-report-2020>.

Glossary

Many terms relating to climate and carbon economics have multiple published definitions, contributing to an ongoing confusion around GHG activities and outcomes. Recapture's corporate literature and policies apply these definitions for the following terms.

CARBON BUDGET

The amount of CO₂ that humanity can emit while still having a chance to contain global warming within 1.5 °C compared with pre industrial levels, as advocated by the Paris Agreement.

CARBON CREDIT

Also known as Verified Carbon Units (VCUs). The market equates 1 carbon credit to 1 ton of carbon equivalent (tCO₂e) removed or avoided. Credits are purchased either voluntarily or by compliance through brokers representing a portfolio of projects that ideally offer a reduction in global carbon more than would have occurred in the absence of that project.

CARBON DIOXIDE EQUIVALENT (CO₂E)

A unit of measurement that can be used to compare the emissions of various greenhouse gases based on how long they stay in the atmosphere and how much heat they can trap. For example, over a period of 100 years, 1 pound of methane will trap as much heat as 21 pounds of carbon dioxide. Thus, 1 pound of methane is equal to 21 pounds of carbon dioxide equivalents.

CARBON NEUTRAL

An unregulated, subjective approach to carbon emission goal-setting that uses offsets or emission reduction—usually through the purchase of credits via the voluntary carbon market—to balance the carbon emissions a company produces.

CARBON REMOVAL

The process of capturing carbon dioxide (CO₂) from the atmosphere through natural or mechanical sequestration methods in order to permanently or semi-permanently store it in plants, soil, rock, or the ocean.

DEDICATED CARBON REMOVAL SOLUTIONS (CRS)

Carbon removal solutions for businesses developed in collaboration with a single business so that all VCUs produced by the solution are dedicated to permanently or semi-permanently removing that company's emissions from the atmosphere. These solutions should be systematically designed to maximize sequestration efficacy by integrating as many carbon removal solutions as possible, while taking into account the full spectrum of obstacles preventing global businesses from investing in carbon removal as part of their corporate climate strategy---significant financial expenses, the threat of greenwashing, and low-quality carbon credits.

CARBON SEQUESTRATION

The process of storing carbon in a carbon sink (such as in trees, soil, rock, or the ocean) or through mechanized processes (such as through product development).

DIRECT AIR CAPTURE

A technology that mimics natural sequestration processes through a system of machinery engineered to extract atmospheric CO₂ and store it deep within the earth as stone.

EMISSION REDUCTION

The process of directly reducing greenhouse gas emissions through efficiencies, such as through the utilization of clean and renewable energy sources. A company is encouraged to first reduce their emissions as much as they can control, and then remove (or in the case of carbon neutrality, offset) the remaining emissions for which they are responsible.

GREENHOUSE GASES (GHG)

A combination of naturally-occurring and synthesized gases that trap heat in the earth's atmosphere. These gases include carbon dioxide, methane, nitrous oxide, and water vapor (which all occur naturally), and fluorinated gases (which are synthetic). Each gas traps heat with differing efficacy, called its global warming potential (GWP), which is measured by the total energy that a gas absorbs over a given period of time (usually 100 years) relative to the emissions of 1 ton of carbon dioxide. (see Carbon Dioxide Equivalent)

NET ZERO

A measurable, mathematical approach to GHG emission goal-setting using verified standards, such as those outlined by the GHG Protocol and Science-Based Targets Initiative, to balance the removal of GHG emissions a company produces.

OFFSETS

Used in carbon neutrality goals, offsets are trade-offs, where companies get credit for funding external projects that reduce emissions. Offsets are measured in tonnes of carbon dioxide-equivalent (CO₂e). A tonne of carbon offset represents the reduction of a tonne of carbon dioxide or other greenhouse gases.

The Inaugural Report on the Greenhouse Gas Emissions of Fortune 500 Companies

This study—written by Adele Barbato, researched by Eric Kenny, and edited and designed by Trey Pringle and Philip-Michael Weiner—provides the most in-depth look at the carbon footprint and reporting standards of the United States of America's largest and most profitable enterprises.



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About Recapture

Recapture is a profit-driven, carbon project developer born out of the need for net zero solutions that help large enterprises mitigate against the risk of global warming without incurring impossible costs.

Recapture developed the first systems-designed approach for carbon removal that removes 10 times more CO₂ than natural solutions on their own. By combining climate-smart forestry, with sustainable timber harvesting as a financial mechanism for direct air capture, Recapture projects are able to permanently remove a company's entire carbon footprint while earning the business a positive financial return.

OUR VISION

Harness the collective power of the Global Fortune 1000 to reach net zero and halt the progression of global warming in our lifetime.

OUR MISSION

Close the carbon gap through systems-design, objective science, collaboration, and forging unlikely partnerships.

OUR VALUES

- ✘ Scale systems change based on science, not rhetoric
- ✘ Accelerate impact by catalyzing collaboration
- ✘ Provide value without expectations
- ✘ Celebrate diversity, fairness, and equality
- ✘ Bring everyone along

