# Net Zero: The Next Frontier for Corporate Sustainability

9 Data Visualizations that Reveal the US S&P 100's GHG Emissions and Path to Net Zero

**DECEMBER 2020** 



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# Introduction

When it comes to climate change, the science is unequivocal: global temperatures will continue to rise for decades, largely due to greenhouse gases produced by human activities. This will have <u>catastrophic effects</u> on human health, infrastructure, energy, agriculture, fisheries, sea levels, natural ecosystems, and more. For many, the consequences have felt distant and theoretical — until now. Unprecedented <u>wildfires</u>, the world's first <u>climate-induced war</u> in Syria, PG&E's <u>climate-fueled</u> <u>bankruptcy</u>, devastating <u>hurricanes</u>, and deadly <u>heatwaves</u> — among a litany of other environmental, social, and economic disasters — have changed this. Following the US' withdrawal from the Paris Agreement on November 4, it is up to corporations to take direct responsibility for their impact on climate change.

While many corporations, investors, regulators, and consumers agree that corporate sustainability is imperative, identifying best practices and which companies are 'walking the walk' can be challenging. Corporate metrics, certifications, and coalitions abound, including the Sustainable Accounting Standards Bureau (SASB), the Global Reporting Initiative (GRI), the Science-Based Targets Initiative (SBTi), the Task Force on Climate-related Financial Disclosures (TCFD), the Greenhouse Gas Protocol, the Renewable Energy 100 (RE100), the Business Roundtable, B Corps, and benefit corporations. Greenwashing — a form of marketing that creates a false perception of a company's environmental sustainability — exacerbates this confusion.

To cut through the noise, our team from the Yale School of Management narrowed in on one, universal metric that is the single biggest driver of climate change: greenhouse gas emissions (GHGs), measured in metric tons of carbon dioxide equivalents. It seems obvious to catalog GHGs from the US' largest public companies and track their goals for reducing them, but after scouring the internet, it became clear that the data is not publicly available in a free, consolidated format. The <u>Carbon Disclosure</u> Project houses a robust data set on corporate emissions, but requires payment to access, and a <u>crowdsourced Google Doc</u> helps document net zero pledges, but no data source seems to collect and analyze all of this data in aggregate. To change this, we manually tracked down data on the US S&P 100's historical GHG emissions since 2015, emissions reduction goals, and emissions reduction initiatives. We then analyzed what we found and have summarized our findings below. While our insights cover a range of topics relevant to corporate emissions, two common themes emerged. First, the private sector desperately needs standardized guidelines for GHG emissions measurement and disclosure. Second, the goal of reaching 'net zero' emissions, defined by the IPCC as the equal balancing of anthropogenic greenhouse emissions with anthropogenic greenhouse gas removals over a specific period, has become the new North Star for corporate sustainability.

Our goals are to:

- 1 inspire companies to learn best practices from their peers on the path to 'net zero,'
- **2** provide a publicly available data source and collection of insights for academics, nonprofits, think tanks, corporations, and others to study, and
- **3** empower concerned global citizens and consumers with information on the culpability of specific US corporations in fueling climate change so that they can more effectively vote with their dollars, select their employers, and support climate policies.

The report is structured around nine data visualizations that communicate the current state of GHG emissions among the US S&P 100 and their stated goals for reducing them. Each visualization is accompanied by an explanation of select insights that can be drawn from them. A full list of the 100 companies included in the analysis can be found in the appendix, and the assembled data source can be downloaded <u>here</u>, in support of goal #2 described above.

# **The State of Emissions**

There's no consensus yet on emissions measurement and disclosure practices and what it means to be 'net zero.'

The lack of consolidated, universal analysis of corporate GHG emissions is due in part to the heterogeneity of companies' measurement and disclosure practices. Measurement variables include:

- Value Chain Scope: Scope 1 measures direct emissions from sources owned or controlled by the company, such as on-site fossil fuel combustion or fleet fuel consumption. Scope 2 measures indirect emissions from the generation of purchased electricity, i.e., emissions from utility providers proportional to the amount of energy purchased and consumed. Scope 3 measures all other indirect emissions from entities not controlled or owned by the company, such as emissions from purchased materials, employee commuting, and use of sold products. Almost all of the 100 companies measure and disclose their Scope 1 + 2 emissions (93 in 2018 and 90 in 2019), but fewer companies report their Scope 3 emissions (78 in 2018 and 77 in 2019). The companies who failed to disclose this information in either 2018 or 2019 are named in the table below. The key question is: should Scope 3 reporting be required?
- Geographical Scope: Some US companies separate out their emissions by country borders, while others report on global emissions broadly. For the purposes of this analysis, all global emissions were included due to the global and interconnected nature of climate change, while recognizing that some of the US S&P 100 companies have larger international footprints than others.

- Business Unit Scope: When it comes to GHG emissions reduction goals, some companies apportion specific business units to strive for the cache of touting 'carbon neutral flights,' or 'net zero cloud computing.' While these efforts are a step in the right direction, in general they tend to be misleading claims that obfuscate the total carbon footprint of a company. For this analysis, all business units were included in companies' GHG emissions data.
- Use of offsets: 24 of the 100 companies discussed purchasing carbon offsets to mitigate their carbon footprint. Most subtract out their carbon offsets when reporting on their GHG emissions, but not all. While carbon offsets can be a powerful, market-based tool that allows companies to reduce their net carbon emissions in a cost-effective manner, not all carbon offsets are created equal. For example, a company might purchase an offset to help pay for a new wind farm, only to find out later that the wind farm would have been built anyway. According to the <u>American Meteorological Society</u>, for an offset to be effective it must meet the following criteria: (1) additionality: the emissions reduction would not occur without the offset, (2) no leakage: the reductions cannot simply shift the emissions to another location, (3) no double-counting: offsets for the same programs cannot be sold more than once, and (4) no perverse incentives: an organization that sells offsets through emissions reduction projects should not have an incentive to fight climate policy for self-gain. Despite the range of effectiveness of carbon offset programs, this analysis honored companies' claims of subtracting out offsets from their emissions totals.

No Emissions Reporting*	Scope 1 + 2 Reporting Only (No Scope 3)*	
Berkshire Hathaway Inc.	Altria Group Inc	Danaher
Charter Communications Inc.	AIG	Emerson Electric
Kinder Morgan Inc.	American Tower	Exxon Mobil
Netflix Inc.	Booking Holdings Inc.	Facebook, Inc.
	Bristol Myers Squibb	General Dynamics
	Caterpillar Inc.	Nextera Energy Inc.
	Coca-Cola	Texas Instruments
	Comcast	The Walt Disney Company
	Costco	Thermo Fisher Scientific

\*Companies included on this list failed to meet the stated criteria in both 2018 or 2019. If a company reported their emissions in either 2018 or 2019, they were credited for their reporting and omitted from this list.

# The 5 biggest emitters contribute over 60% of total S&P 100 Scope 1 and 2 emissions.





\*Note: Click on the visual above and the others in the report to explore interactive versions of the data.

In the visual above, the size of each bubble corresponds to the total number of each company's 2019 Scope 1 and 2 emissions. For a handful of companies who have not yet reported 2019 figures, 2018 data was used as a proxy.

Exxon Mobil, Nextera, Duke Energy, Southern Company, and Chevron contribute a significantly outsized proportion (64%) of the S&P 100's total Scope 1 and 2 emissions. It is not surprising to see these fossil-fuel-intensive oil and gas and utilities companies at the top of the list, but the magnitude of their emissions is striking.

While some of these companies have begun modest transitions to lower-carbon business models, others have resisted entirely and are starting to pay the price. Take Exxon Mobil, for example, which embodies "Big Oil" in the US. Exxon emits more Scope 1 and 2 emissions than any other US company, and recently <u>leaked documents</u> revealed the company's plans to increase their emissions by 17% by 2025, which represents an increase greater than the current GHG emissions of the entire country of Greece. Nextera, by contrast, is shifting to a renewables portfolio. In early October, Nextera <u>usurped</u> Exxon as the most valuable energy company in the US – a powerful symbol of renewables' eclipse of oil. Exxon, which was the most valuable company in the world just seven years ago, has since <u>lost roughly 60% of its value</u> and has faced greater scrutiny by activists, governments, and investors regarding their handling of climate risk. With renewable energy prices <u>below fossil fuel prices</u> in most states, similar economic collapses are likely within the oil and gas sector, with Exxon serving as a salient example of what can happen to companies that resist the natural transition to a low-carbon economy that is already underway.

Notably, Conoco made recent headlines as the first US oil company to announce a <u>carbon neutral</u> <u>goal</u>, with plans to reach net zero by 2050. Other oil giants hold a significant opportunity to curtail US corporate emissions by following suit. Automotive and retail companies' emissions increase significantly when accounting for Scope 3.



Scope 1, 2, & 3 Emissions by Sector & Industry

While Scope 1 and 2 emissions point to clear culprits in the oil and gas and utilities sectors, accounting for Scope 3 emissions provides a more complete picture of companies' total impact on the planet. As described above, Scope 3 measures indirect emissions including purchasing of raw materials and use of sold products. Under this accounting method, GM and Ford are held responsible for the emissions that result from the cars they put on the road, and these companies jump to the third and eighth highest emitters, respectively, of total Scope 1, 2 and 3 emitters among the 78 companies reporting. This is relatively unsurprising given that the transportation sector recently toppled electricity as the largest emissions sector in the US, at 28%, but it highlights the importance of incorporating a Scope 3 lens and accelerating the shift towards electric and hybrid vehicles.

The retail industry within the Consumer Discretionary sector similarly climbs the list of biggest emitters when accounting for Scope 3, trailing only oil and gas. These companies include Procter & Gamble, Home Depot, and Walmart, who rank second, fourth, and fifth, respectively, among those reporting total Scope 1, 2 and 3 emissions. These companies sell a high volume of products with ubiquitous usage, so the emissions from their supply chains and use of sold products (both Scope 3) are astronomically high. Procter & Gamble's emissions, for example, are approximately 98% Scope 3. These emissions include high volumes of plastic procurement, consumers running washing machines with Tide detergent, and consumers showering with Pantene shampoo.

Contextualizing companies' emissions relative to their revenues separates sustainability leaders and laggards.



# 2019 Revenue & Emissions by Company

When considering the carbon footprints of US companies, it is useful to consider them in the context of their revenues, with the understanding that the more revenue a company contributes to the economy, the more it should be permitted to emit. For example, one would not hold Walmart accountable to the same absolute GHG emissions standards as a small mom and pop shop. To account for this, the above graph plots revenue against Scope 1 and 2 emissions (the emissions axis is presented on a logarithmic scale to compress outlier data points, as well as a reverse scale, so that the upper right quadrant represents a more favorable position). The color of each point indicates the sector of the company.

Companies that fall in the top right quadrant represent the sustainability leaders who have kept emissions in check while earning high revenues. These sustainability leaders include Apple, United Health, Bank of America, and Wells Fargo. The top left quadrant holds the companies with both high revenues and high emissions, and therefore should be viewed as some of the biggest opportunities for emissions reduction. These corporate behemoths include Exxon, Amazon, Chevon, AT&T, and CVS. The bottom left represents the 'worst offenders,' who emit disproportionately high levels of GHG relative to their role in the US economy. Some of the worst offenders are Nextera, Southern Company, American Tower, and Occidental Petroleum. Finally, the bottom right quadrant includes companies with low revenues and low emissions. Like the companies in the top left, these companies meet the status quo in terms of proportional emissions and revenues, and include Adobe, Nvidia, Biogen, and BlackRock.

# The Race to Net Zero

26 of the US S&P 100 companies have a net zero goal in place.



Count of Company Net Zero Goals by Sector

Corporate sustainability has a new North Star: net zero. 26 S&P 100 companies have set goals to reach either carbon neutrality or net zero emissions for their Scope 1 and 2 emissions, and of these 26, 20 announced their goals in 2020. Pressure from industry peers, activist NGOs, consumers, employees, and public policy have ushered in a new wave of corporate sustainability commitments that align with the Paris Agreement's target of net zero emissions by 2050.

The Intergovernmental Panel on Climate Change (IPCC) defines <u>net zero emissions</u> as the equal balancing of anthropogenic greenhouse emissions with anthropogenic greenhouse gas removals over a specific period. Given the lack of standardized measurement tools and methodologies for emissions,

there is some heterogeneity among these net zero claims. Some firms discuss 'carbon neutrality,' which technically would require balancing only CO2 emissions with CO2 removals. Net zero, by contrast, covers all six greenhouse gas emissions, such as methane and nitrous oxide. In practice, some firms use the term 'carbon neutral' to include the CO2-equivalents of all greenhouse gas emissions, and thus use the terms interchangeably.

These goals also vary by value chain scope. All 26 companies include Scope 1 and 2 emissions as part of their net zero goals, some include elements of Scope 3 emissions, and none include Scope 3 entirely. These differences among net zero goals point to a need for a <u>shared definition of net zero</u>, similar to the need for standardized measurement and disclosure practices.

### The Science-Based Targets initiative verifies the credibility of these net zero goals.



# Count of Company SBTi-Approved Goals by Sector

Not all net zero targets are created equal. The Science Based Targets initiative (SBTi) is addressing this by creating a global, science-based standard for companies to set net zero targets. SBTi assesses companies' emissions targets against a robust set of criteria to validate that they: (1) include the proper emission sources and activities, (2) align with a Paris Agreement timeline, and (3) include a viable path to being accomplished. To achieve a successful corporate net-zero strategy, <u>SBTi</u> advocates for reducing value chain emissions with the depth of abatement required to limit warming to 1.5°C and neutralizing the impact of any residual emissions that remain unfeasible to be eliminated through permanent removal of GHG.

Only ten of the 26 S&P 100 companies with net zero or carbon neutral goals have had their targets approved by SBTi. These companies include Biogen, Philip Morris, Facebook, AT&T, Amazon, Nike, Starbucks, Microsoft, Salesforce, and Walmart. It is important to note, however, that because SBTi is focused on helping companies reach net zero by 2050, they are not limited to working with companies who have already set firm targets for net zero. They also partner with and evaluate companies based on intermediate goals for emissions reduction that are consistent with the level of decarbonization required to limit warming to 1.5°C or well-below 2°C, such as McDonald's SBTi-approved goal of reducing GHG emissions from restaurants and offices by 36% by 2030 from a 2015 base year. Among the US S&P 100, 27 companies have SBTi-approved emission reduction goals, including the 9 with net zero goals.

The consumer staples sector – with companies such as PepsiCo, Target, and Kraft Heinz – leads the way on SBTi-approved targets. The financial services sector, by contrast, leads in net zero targets but has very few emissions reduction goals – two of 18 – that are SBTi-approved.

### Net zero target dates are clustered heavily by industry.



# NetZero Company Targets by Sector

Several clusters emerge among the S&P 100 companies with a stated date for reaching net zero. The seven financial services companies range from 2015 to 2022; Apple and Microsoft both target 2030; AT&T and Verizon sit together at 2035; and four of the five consumer discretionary companies with net zero targets are aiming for 2050. This is no coincidence – it illustrates three key drivers behind companies' net zero timelines.

First, and most obviously, some industries face much more challenging paths to reaching net zero than others. Dow, DuPont, and Duke Energy — whose core businesses are extractive and fossil-fuel intensive — must transform fundamentally their products, services, and business models to reach net zero. Financial services companies, by contrast, need only to shift to renewable energy power for their small footprint of office buildings and invest in a modest level of carbon offsets in order to net out their Scope 1 and 2 emissions.

More interestingly, this trend illustrates the power of industry and competitor pressure. Consumers and investors are increasingly demanding sustainable practices from the companies they patronize and finance, so when Verizon announced its goal of net zero by 2035 in 2019, its biggest competitor, AT&T, matched their target date in 2020. Similarly, Ford and GM each announced their net zero target dates of 2050 just months apart.

Finally, the timeline of net zero targets underscores the private sector's acknowledgement of 2050 as a critical date for net zero emissions in order to hold global temperature rise to 1.5°C, as recommended by the Paris Agreement and the Intergovernmental Panel on Climate Change. Eight companies cluster at 2050 for their net zero timeline and no S&P 100 companies have set target dates beyond 2050.

# Some net zero goals seem more feasible than others.



Scope 1 & 2 Emissions by Company, Forecasted to Net Zero Target Data

Comparing companies' emissions trends over the past five years against a plotted path to their net zero target dates illustrates which companies have the most work to do to achieve their goal. In the chart above, companies' emissions are forecasted from their 2019 figure to the date by which they plan to be net zero, assuming a linear decrease in emissions over time.

Duke Energy, which was not included on the graph for space limitations because it currently emits over 100 million metric tons of CO2-equivalent per year, roughly three times as much as the next net-zeropledging company, has a long way to go to reach net zero by 2050. ConocoPhillips and Walmart must similarly reduce tens of millions of CO2-equivalent emissions per year, but their trendlines from 2015 to 2019 suggest that they are on the right path. Banks have staked misleading claims of carbon neutrality, but change is finally underway.





In terms of Scope 1 and 2 emissions, the financial sector is a clear leader. The median revenue among these companies is higher than the S&P 100's median revenue yet the median emissions are less than one tenth that of the cohort. Further, the sector leads with the most stated goals for net zero (seven companies) and has by far the most near-term targets. Target dates range from 2015 to 2022 for reaching net zero, with most of these seven companies already operating at net zero in terms of Scope 1 and 2 emissions.

However, these net-zero operations come with a significant asterisk: they omit Scope 3 emissions. While some banks partially include Scope 3 emissions such as business travel, no major US bank reports their total Scope 3 emissions. In the financial services sector, which bankrolls fossil fuels and other extractive industries, these Scope 3 emissions from investments and use of sold products can be colossal. It is difficult to say precisely how large, however, in the absence of complete measurement and reporting.

In July, Morgan Stanley bucked this trend by becoming the first major US bank to commit to <u>measuring</u> and <u>disclosing</u> the emissions of its investments and loans. It also joined the Steering Committee of the Partnership for Carbon Accounting Financials (PCAF) to help address the lack of consistent measurement tools and methodologies for emissions. In September, the bank made a more notable announcement by pledging to reach <u>net zero for financed emissions</u> by 2050. Morgan Stanley, which financed nearly \$11 billion in fossil fuel expansion in 2019, has a long way to reach net zero for its investments and loans and has not provided detail on its plans for reaching the goal, but its intention represents a step forward for the industry and has put pressure on competitors to follow their lead.

Likely responding to this pressure, JP Morgan announced just two weeks later that it would adopt a <u>financing commitment</u> that aligns with the goals of the Paris Agreement. To do so, the bank will work with clients in the high-emissions sectors of oil and gas, electric power, and automotive manufacturing to set emissions targets specific to each sector. The firm will establish its own intermediate emissions targets for 2030 on the path to the Paris Agreement's stated goal of net zero emissions by 2050 and will expand its investments in low- and zero-carbon energy sources and technologies. The firm stopped short, however, of divesting from fossil fuel clients, of which it is the largest funder globally.

Bank of America will be an important next mover to watch. On a panel on stakeholder capitalism and ESG disclosure earlier this year, their CEO proclaimed that <u>all public companies should reach net zero</u>. While Bank of America has been carbon neutral for its Scope 1 and 2 emissions since 2016, they were the <u>fourth largest financier</u> of fossil fuels globally in 2019. If the bank expands its net zero ambition to its investment and loan portfolio, it could play a significant leadership role in reducing emissions and creating a more sustainable financing system in the US and globally.

Renewable energy, supplier partnerships, and core business initiatives are the most promising net zero strategies.



Count of Company RE100 Members by Sector

Emission reduction strategies vary widely across the companies surveyed, but several common themes emerged, and are listed roughly in order from least to most effective practices:

Offsets: While offsets and carbon credits do play an important role in reaching net zero by 2050, in isolation they do not represent a credible approach to emissions mitigation. Under this strategy, companies purchase certificates that represent the reduction of a specified number of metric tons of CO2. The certificate is linked to a project elsewhere in the world, run by an external organization that promises to reduce emissions by averting an otherwise harmful project. Some companies claim to be carbon neutral through their use of offsets, but Microsoft's President Brad Smith explains the shortcomings of this approach: "[Paying] someone not to cut down the trees on the land they own...is a good thing, but in effect it pays someone not to do something that would have a negative

impact. It doesn't lead to planting more trees that would have a positive impact by removing carbon." While some offset programs do include carbon removal activities such as planting trees, these are less common, difficult to verify, and take a long time to become effective. Relying on offsets alone does not prevent a company's GHG emissions from accruing in the atmosphere. They should be used primarily to neutralize any remaining emissions that are unfeasible for a company to reduce or permanently store after the company has employed meaningful emissions reduction practices for its own operations.

- Energy efficiency projects: This table stakes approach entails LED lighting retrofits, HVAC upgrades, infrastructure upgrades, demand metering, occupancy sensors, and other basic strategies to reduce the amount of energy needed to power company-owned buildings and operations. Almost all of the S&P 100 are engaged in some form of energy efficiency projects.
- Negative emissions: Distinctive from carbon offsets, which are administered through a third-party organization, negative emissions entail direct corporate activity to sequester and permanently store GHG from the atmosphere. Microsoft leads in this category and recently launched a \$1 billion Climate Innovation Fund to accelerate the global development of carbon reduction, capture, and removal technologies. The company plans to remove all of its historical emissions since the company's founding in 1975 by the year 2050. In theory, this represents a very promising opportunity for reaching sustainable levels of atmospheric carbon, but in practice it is complicated by technical feasibility, commercial viability, disruption to the earth during the storage process, and open questions about the permanence of such storage. When done correctly, this can be very powerful, but it has not yet been proven with certainty to be an effective, scalable strategy.
- Carbon pricing: Incorporating the cost of GHG externalities into the selection of projects and suppliers can help to embed emissions reduction into the core strategic decision-making of a company. Only a handful of S&P 100 companies discuss this practice. Dow integrates carbon pricing into business planning and prioritizing capital projects, and Philip Morris similarly uses an internal carbon price of \$17 per metric ton to allocate its capital. Microsoft, which spearheaded this approach by implementing an internal carbon fee in 2012, has taken this one step further by actually charging internal business units and suppliers based on their price of \$15 per metric ton, whereas Dow and Philip Morris use the pricing theoretically to compare across projects.
- Renewable energy: Often one of the biggest drivers of a company's emissions, energy represents a significant opportunity for emissions reduction. To facilitate and structure a path to renewable energy, the RE100 initiative oversees a pledge for corporations to commit to 100% renewable energy by a specified date, no later than 2050, in keeping with the Paris Agreement timeline. 29 of the S&P 100 companies have signed on to the pledge, with dates ranging from 2014 to 2050. Biogen, Microsoft, and Alphabet lead the way in this category, followed by a series of financial services companies.
- Supplier partnerships: More sophisticated sustainability strategies involve upstream and downstream partnerships to reduce emissions throughout the entire value chain. For example, MetLife required all 103 of their suppliers to disclose their GHG emissions and emissions reduction activities publicly in 2019. McDonald's works with farmers, ranchers, beef suppliers, and industry

leaders to identify and share best practices on farming, grazing, and conservation. Kraft Heinz maps its complete supply chain of palm oil and soy to assess and mitigate deforestation risks. Salesforce has committed that its suppliers representing 60% of its Scope 3 emissions will set science-based targets by 2024. These efforts to expand beyond Scope 1 and 2 emissions reductions can have expansive impacts on reducing the total carbon footprint of a company and can have a ripple effect on other companies by influencing their supplier activity.

Material emissions abatement: While energy pricing, carbon pricing, renewable energy, and supplier partnerships can all help reduce a company's core operational emissions, it is worth separately noting that, for most companies, the most important work a company can do to achieve net zero is to curtail its direct emissions. Initiatives to accomplish this include Lowe's collaboration with vendors, stores, and distribution centers to reduce empty truck miles; Disney's pilot of electric generators on set for film and TV productions; Amazon's deployment of 100,000 electric delivery vehicles starting in 2021; and Walmart's improvements in the performance of its refrigerators, to name a few. The Sustainable Accounting Standards Bureau (SASB) has created a "Materiality Map" that identifies the sustainability topics in each industry that are reasonably likely to have material impacts on a company's financial returns. For example, water & wastewater management is material for household & personal product companies, energy management is material for internet media & services companies, and ecological impact is material for metal & mining companies. In others words, these represent the "win wins" for both environmental and financial returns. A Harvard study found that "firms with good performance on material sustainability issues significantly outperform firms with poor performance on these issues, suggesting that investments in sustainability issues are shareholder-value enhancing." These findings underscore the importance of strategic and efficient investments in sustainability initiatives that drive value for the core business, external stakeholders, and the environment.

# Conclusion

The path to widespread corporate net zero emissions will require significant technological, political, and behavioral shifts, but its progress is steady and gaining momentum. There are several factors that can help accelerate this new corporate trend and keep global temperature rise to 1.5°C.

 Standardized measurement and disclosure framework: The Sustainable Accounting Standards Bureau's (SASB) and the Global Reporting Initiative's (GRI) July announcement to collaborate promises to clarify how the two standards are compatible and help users better understand the sustainability data they provide. Initiatives with leadership from the US S&P 100 companies included in this study — such as Morgan Stanley's and Bank of America's membership in the Partnership for Carbon Accounting Financials (PCAF) — similarly offer hope for a more unified system. This will be essential for universal, standardized reporting and increased pressure on firms to set and achieve science-based targets.

- Technology advancement: Investing in research and development through both private and public capital — will be critical for creating the technology needed to make net zero feasible. A recent report from the <u>International Energy Agency</u> argues that clean energy technology is well behind where it needs to be to avert climate change. Some technologies that will be essential to further develop include electric vehicles, batteries, cleaner heat, bioenergy, green hydrogen, and carbon capture, utilization, and storage (CCUS).
- Public policy: International commitments such as the Paris Agreement can help mandate a transition to net zero by 2050. Domestically, carbon pricing, phasing out fossil fuel subsidies, and supporting professional retraining programs for displaced workers can help address the significant portion of emissions generated by just a handful of companies. For transportation, the government can help accelerate a sustainable shift by investing in research and development, expanding public transportation, offering financial incentives for electric vehicles, building electric vehicle infrastructure, and strengthening fuel efficiency standards. Guidelines for low-carbon buildings, regenerative agriculture, reduced food waste, and land conservation similarly represent opportunities for substantial emissions reductions.
- Investor pressure: This lever for change is best personified by Larry Fink's annual letter to CEOs, in which he most recently asserted that "climate risk is investment risk," and that his company, BlackRock, will start "exiting investments that present a high sustainability-related risk," among a list of other protocols that place sustainability at the center of their investing strategy. As the world's largest asset manager with over \$7 trillion in investments, BlackRock has the power to back this up, namely through withdrawing funding and exercising shareholder voting rights. After the letter was published in January of 2020, Microsoft, Delta, Amazon notably announced massive new initiatives to reduce emissions within just weeks. The mining industry's decarbonization trend similarly illustrates the power of investor pressure. As the market size for responsible investing grows, shifts towards ESG investing will only increase pressure on companies to adopt climate-focused strategies and operations.
- Consumer and employee pressure: Consumers increasingly demand greater transparency on the products and services they purchase, as evidenced by a recent <u>NYU study</u> that found that 50% of CPG growth from 2013 to 2018 came from sustainability-marketed products. Their ability to "vote with their dollars" is already shaping sustainable consumer behavior. Similarly, employee demands and walkouts can pressure firms to address climate change. Most notably, Amazon's recent "Climate Pledge" seemed to be triggered directly by <u>employee activism</u>. Google continues to face pressure from its employees to cut ties with fossil fuel companies and stop funding lobbyists who fight against climate change legislation.

These five key areas can help provide the structure and incentives needed to drive corporations towards a shared vision of net zero emissions by 2050. With the latest scientific research painting a dire picture of the future of the planet unless these milestones are achieved, this will be the greatest imperative and business opportunity of the century.

# **About the Authors**



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Pete Edmunds is a recent graduate of the Yale School of Management working at Deloitte Consulting as a Senior Consultant. At Yale, Pete focused on impact venture capital and climate-tech startups. Before graduate school, Pete also worked at Deloitte Consulting with a focus on strategy and innovation for nonprofits and consumer-facing technology companies. During his nights and weekends, he ran Inspire Inc., a national consulting nonprofit that connects pre-MBA management consultants with local nonprofits to help them tackle their toughest challenges. Pete holds a BA in Economics from Bowdoin College, where he was a captain of the varsity sailing team, and enjoys trail running, NPR, powder days, and spending time with friends and family.



### Daniela Chona

Daniela Chona is a recent graduate of the Yale School of Management (Class of 2020) working at Boston Consulting Group as a Consultant. At Yale, Daniela focused on exploring sustainable operations and green tech energy and initiatives in emerging markets. Before graduate school, Daniela worked as an engineer at ExxonMobil for six years for the Refining and Project Development organizations, learning what can and cannot be done within the oil and gas industry to combat climate change. Daniela holds a BS in Chemical Engineering from Rice University. She enjoys gardening, golfing, and spending time with her husband, Roger, and their two corgis.



#### Lesley Meng

Lesley Meng is an Assistant Professor of Operations Management at the Yale School of Management. Professor Meng's research utilizes novel largescale datasets to investigate the (often hidden) impact of management decisions at the organization level on healthcare worker behavior, and subsequently, the effectiveness and efficiency of patient care. Most recently, Professor Meng has been exploring research questions at the intersection of healthcare and sustainability to uncover ways that this large and impactful industry might help to mitigate the climate crisis. Professor Meng holds a Ph.D. in Operations, Information, & Decisions from The Wharton School of the University of Pennsylvania, a Master of Public Health in Health Policy and Management from Columbia University, an Honors Specialization in Medical Science from the University of Western Ontario, and an Honors in Business Administration from the Richard Ivey School of Business.

# **Appendix**

US S&P 100 companies included in the study, by sector.

#### **Communication Services**

Alphabet Inc. / Google AT&T Inc. Charter Communications Inc. Comcast Facebook, Inc. Netflix Inc. The Walt Disney Company Verizon Communications

#### **Consumer Discretionary**

Amazon.com Inc. Booking Holdings Inc. Ford Motor Company General Motors Home Depot Lowe's Companies, Inc. McDonald's Corp. Nike Inc. Starbucks Corp.

#### **Consumer Staples**

Altria Group Inc Coca-Cola Colgate-Palmolive Costco Kraft Heinz Co Mondelez International PepsiCo Inc. Philip Morris International Procter & Gamble Target Corp. Walmart

### Energy

Chevron ConocoPhillips Exxon Mobil Kinder Morgan Inc. Occidental Petroleum Schlumberger Ltd.

#### Financial Services

Allstate Corp American Express American International Group (AIG) Bank of America Berkshire Hathaway Inc. BlackRock Inc. Capital One Financial Citigroup Inc. Goldman Sachs Group JPMorgan Chase & Co. MasterCard Inc. MetLife Inc. Morgan Stanley PayPal The Bank of New York Mellon US Bancorp Visa Inc. Wells Fargo

#### Healthcare

Abbott Laboratories AbbVie Inc. Amgen Inc. Biogen Inc. Bristol Myers Squibb CVS Health Danaher Eli Lilly Gilead Sciences Inc. Johnson & Johnson Medtronic Merck & Co. Pfizer Inc. Thermo Fisher Scientific United Health Group Walgreens Boots Alliance

#### Industrials

3M Boeing Caterpillar Inc. Emerson Electric FedEx General Dynamics General Electric Honeywell Inc. Lockheed Martin Corp. Raytheon Technologies Union Pacific Corp United Parcel Service

#### **Materials**

Dow Inc. DuPont

#### **Real Estate**

American Tower Simon Property Group Inc.

#### Technology

Accenture Adobe Inc. Apple Inc. Cisco Systems IBM Corp. Intel Corp. Microsoft Corp. Nvidia Oracle QUALCOMM Inc. Salesforce Texas Instruments

#### Utilities

Duke Energy Exelon Nextera Energy Inc. Southern Company