

State of Green Business 2021

By Joel Makower
and the editors at GreenBiz

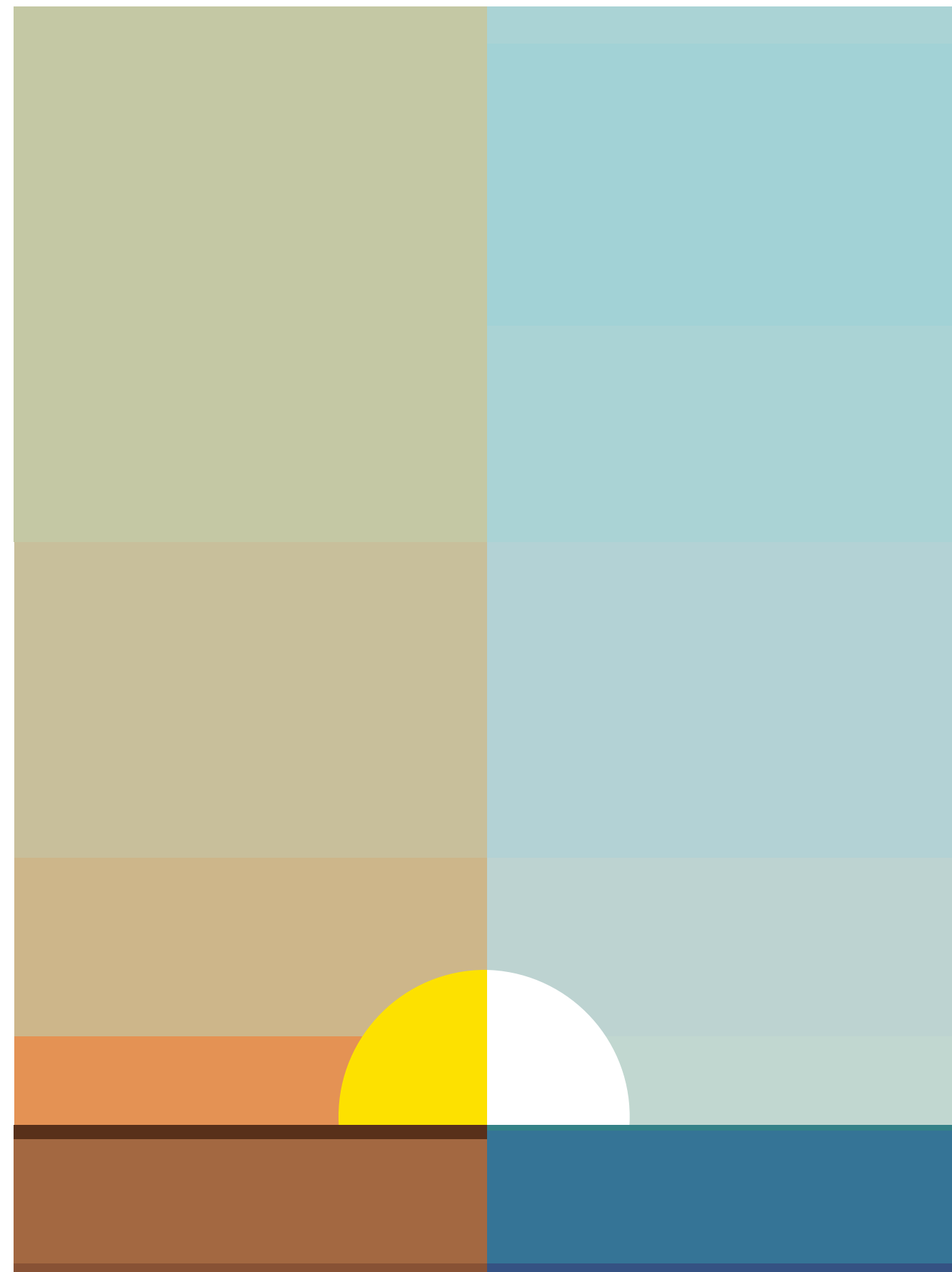


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State
of Green
Business
2021

Introduction

by Joel Makower

Chairman & Executive Editor, GreenBiz Group

There never has been a moment as opportune as this one to be talking about the intersection of business and sustainability. Our world has been rocked on several fronts, most notably by a global pandemic that has caused unspeakable carnage and hardship in every nation, none more so than the United States. Social unrest, the growing ravages of a changing climate,



increasing economic inequality, continued racial strife – all contribute to the feeling that the world is unraveling before our eyes.

At the same time, the world is turning to big institutions to take on these big challenges. Governments, nonprofits and companies are being asked to step up their commitments and leadership across the full range

of social and environmental issues. “Justice” is the new mantra — social, racial, climate, economic, environmental and others.

Tracking corporate progress on many of these issues has been the focus of the annual State of Green Business report, now in its 14th year. And while the emphasis has been primarily on environmental issues, the scope of this year’s report extends to include social impacts as well — how the environmental challenges we face affect the well-being of families and communities across the economic spectrum.

Once again, we have partnered with S&P Global Trucost, which has provided the metrics and analysis for the State of Green Business Index, which begins on page 88. While these metrics are lagging indicators, they nonetheless provide insight into the direction companies are headed — and whether the private sector is moving at the scale,

scope and speed necessary to address the challenges and seize the opportunities before us.

During 2020, amid the economic, social, political and public health crises we encountered, corporate sustainability continued to move forward. Indeed, somewhat paradoxically, it was given a lift by the attention paid to these other issues. Like sustainability, all are viewed as systemic challenges requiring massive shifts in how economies and societies operate, and in a way that not only takes care of those whose economic welfare may be at risk due to these transitions, but that expands opportunity for all. Thanks to COVID-19 and the other challenges we’ve encountered, the idea of rapid, large-scale global action now seems more than a mere pipe dream.

In this report, we look at how, and how much, the private sector is doing its part to lead the change.

All told, it's an encouraging story at a dispiriting time.

The march of progress in sustainable business continues inexorably, as the leading edge continues to push forward. During 2020, for example, the notion of net-zero climate (and other) commitments accelerated, to the point where “yet another” net-zero announcement was a non-story to those of us in the news business. Just a couple years ago, the idea was barely on our radar. A few years before that, zero-waste factories, sustainable finance and circular products and services were similarly seen as improbable, even exotic. Now, they're mainstream.

What will the next-next thing be in sustainable business? We offer some hints in the first half of this report, where we present 10 trends to watch in the year ahead. But we also love to be surprised, to watch trends emerge and become the new normal, seemingly out of nowhere. Of course, they don't just magically appear. They are the result of visionary leaders taking bold stands and doing

hard work over months and years.

The aforementioned State of Green Business Index makes up the balance of this report, looking back over the past five years on a wide range of metrics, including some new ones this year, such as how environmental, social and governance, or ESG, scores have aligned with companies' financial performance.

Looking forward, looking back: It's how we gain perspective and realign ourselves to the challenges and opportunities before us. We at GreenBiz Group have been doing that for more than two decades. It continues to be an inspiring, invigorating perch from which to watch companies, communities and systems of commerce evolve to meet the moment.

As always, I hope you enjoy this year's report and look forward to your comments.

Foreword

by Richard Mattison

Chief Executive Officer, S&P Global Trucost

The global COVID -19 pandemic put a spotlight on the value of environmental, social and corporate governance considerations in capital markets. Global sustainability market benchmarks outperformed mainstream indices and ESG investments achieved record inflows as mainstream funds suffered widespread losses. The long held belief of ESG pioneers that top ESG performing companies, with

their healthy balance sheets and advanced social license to operate, could be expected to show greater resilience to such market shocks bore out. Demand for ESG investing accelerated, along with the opportunity to derive more meaningful investment outcomes.

ESG Capital Allocation Surges

According to the U.S. SIF Foundation's 2020 biennial "Report on US Sustainable and Impact Investing Trends," sustainable investing assets now total \$17.1 trillion, or 33 percent of the \$51.4 trillion in total U.S. assets under professional money management – a 42 percent jump from 2018.

A majority of asset owners around the world

actively integrate ESG factors into their investment process, according to a 2020 survey by Morgan Stanley Institute for Sustainable Investing. With nearly 95 percent of millennials being interested in sustainable investing, and 75 percent believing that their investment decisions could impact climate change policy, the growth in ESG investing is [likely to continue](#).

A further indication of the increased commitment to ESG factors in investment decision-making and ownership can be found in the number of organizations signing up to the United Nations backed Principles for Responsible Investment (PRI). As of September 2020, the PRI counted over 3,000 signatories with \$103 trillion in assets under management (AUM), up from just 63 signatories with \$6.5 trillion in AUM in 2006.

Disclosure and Reporting Increasing

As of October 2020, more than 1,500 organizations had expressed their support for the Taskforce on Climate-related Financial Disclosures (TCFD), an increase of over 85 percent since June 2020. Nearly 60 percent of the world's 100 largest public companies support the TCFD, report in line with the recommendations, or both. On average across the recommendations, 42 percent of companies with a market capitalization greater than \$10 billion disclosed at least some information in line with each individual TCFD recommendation in 2019.

Supporting the adoption of the recommendations of the TCFD is a high priority for the PRI, and the organization announced that reporting against the governance and strategy indicators would become mandatory in 2020

for investor signatories. As a result, there was a [3.5x increase](#) in TCFD-based investor reporting to the PRI in the first quarter of 2020. This represented 2,097 investors, up from 591 in 2019.

Governments are also taking steps to make reporting mandatory. In September 2020, New Zealand announced that it will implement mandatory climate risk reporting in line with the TCFD recommendations, becoming the first country to do so. This was quickly followed in November 2020 with the UK announcing that TCFD climate risk reporting will become mandatory for large companies and financial institutions as early as 2021. In addition, in May 2020, Canada announced that businesses would be required to disclose their climate impacts and commit to making environmentally sustainable decisions in order to receive COVID-19 economic aid.

Building Back Better

The COVID-19 pandemic has brought many weaknesses to the surface, in particular highlighting the destructive impacts of many business models on our natural resource base. [According to the OECD](#), for the economic recovery from the crisis to be durable and resilient, a return to business as usual and environmentally destructive investment patterns and activities must be avoided. Unchecked, global environmental emergencies, such as climate change and biodiversity loss, could cause social and economic damages far larger than those caused by the virus.

We now have an opportunity to take some of the lessons learned over the past year to create a better world by embracing a sustainable recovery. A crisis can generate

creativity and new ways to handle old situations. We will likely see more flexible working environments, the continued growth in the number and sophistication of digital collaboration tools and, based on recent evidence, increasing prominence of ESG considerations in the capital allocation strategies of financial institutions. We will need solutions to help restore ecosystems, enhance biodiversity protection and create additional jobs around the world to reduce inequalities.

Now, more than ever, integrating ESG goals into business and government strategies can be a critical driver of long-term success.

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Top Sustainable Business Trends 2021

by Joel Makower

*Glimmers of hope amid
tough times*

Now, where were we?

A year ago at this time, we looked ahead and confidently saw more engagement, new initiatives and a continuation of the forward march of progress that constitutes a typical year in the world of sustainable business. We took in the enormity of the problems facing humanity and the planet, and scanned the horizon. What we saw were companies continuing to make commitments, form alliances and reach new levels of achievement in sustainability. And the year ahead certainly would bring more of the same. Or so we predicted.

And then 2020 happened.

Suffice to say, it was a year like no other: Crisis after grim crisis, as the ravages of a changing climate revealed themselves in ways large and small, a pandemic devastated families and nations alike, racial justice protests roiled communities, the global economy convulsed and political leaders the world over scrambled to respond – some more successfully than others.

Such turmoil easily could have spelled the end, or at least the pause, of anything having to do with business and sustainability.

But it didn't. The forward march of progress not only continued but accelerated.

What happened? Two words: business fundamentals.

At last, sustainability has emerged from the shadows to be considered part and parcel of corporate success. Indeed, for many of the world's largest companies, sustainability is now seen as key to minimizing risk, increasing resilience, enhancing competitiveness

and unlocking new opportunities. The management of environmental and social risks – as viewed through the lens of ESG metrics – “will likely emerge as the new standard of comprehensive corporate governance and underscore how non-financial E, S and G factors may affect long-term valuation,” Brie P. Williams, a vice president at State Street Global Advisors, said last fall.

Put another way, a company’s sustainability profile increasingly may be baked into its stock price and creditworthiness, possibly affecting the cost of capital it may need for growth. That’s a game changer.

So, where are we?

Ambition uptick

Despite the disheartening headlines, action on ESG concerns has continued relatively unabated in corporate C-suites and boardrooms. To our immense satisfaction, we saw little carnage within corporate sustainability departments during 2020 relative to previous economic downturns, when such functions were often among the first to be downsized or jettisoned.

“Sustainability leaders are in a unique position, with their experience in navigating across their organization’s functions, to help align CEOs and their employees toward common environmental and social causes,” wrote GreenBiz Vice President and Senior Analyst John Davies in “State of the Profession 2020,” the latest edition of GreenBiz’s

biennial report on the role of sustainability professionals inside companies. The report found that “in large companies, there has been a significant increase in terms of the sustainability leader reporting to the CEO, from 19 percent in 2018 to 26 percent today.”

Given this, it was not surprising to see an uptick in corporate ambition on sustainability issues. “Net-zero” became a key commitment during 2020 — goals that aim to eliminate, at least on paper, a company’s greenhouse gas emissions, water extractions, fossil-fuel use or deforestation activities by a given date. And while those target dates are typically decades hence, they set the stage for activists, investors and other self-appointed watchdogs to monitor corporate progress toward their stated goals.

Perhaps more surprising is the rise of “restorative” and “regenerative” among large companies in describing their ambitions to address human and planetary woes. The idea is simple but profound: a switch in thinking from “doing less harm” to “doing more good.” In other words, the leading edge of sustainable business is shifting from companies having inadvertently negative impacts to having deliberately positive ones. And while most such corporate statements are still more aspirational than actionable, they signal a critical shift in thinking about the role companies can play in the years to come.

It’s a lot to take in, especially for the many critics of sustainable business activities, who are prone to see virtually any corporate action as too little,

too late. And they might be right: Most corporate commitments and achievements are insufficient to meet the moment, let alone the future. Incremental change won't cut it at a time when so many planetary boundaries are being crossed and so many social and environmental indicators are spiraling out of control.

Peeking around corners

What will it take for companies to dramatically step up their ambition and actions? That is a defining question of the decade. No doubt the answer lies in a combination of investor pressure, technological innovation, consumption shifts, governmental pressure, new circular business models that reward resource efficiency — and more than a little grit and determination.

It's a tall order, to be sure, but the future demands nothing less.

As we dare to look ahead, however tentatively, at 2021 and beyond, we see more of the same. The seeming mundanity of that sentence belies its significance: Corporate sustainability efforts are continuing apace, even amid economic uncertainty and a global pandemic that, as of this writing, is far from contained. It wasn't very many years ago that the future of corporate sustainability was uncertain even during good times.

What's also different about this moment is the alignment and, increasingly, integration of social and environmental issues inside companies. While it has long been known that the poorest among us endure the brunt of air and water pollution, climate

change and other problems, companies largely have focused on social and environmental issues separately and, all too often, unequally.

That's changing. The rise of social justice movements around the world is shining a harsh light on the linkages between environmental sustainability and social cohesion, not to mention economic vitality, and ESG-savvy investors are beginning to reward companies that better align corporate strategy with the interests of both people and the planet.

As the global economy finds its footing in the coming months, and as a new, more environmentally friendly administration takes hold in Washington, D.C., we expect to see the continued rise of concern

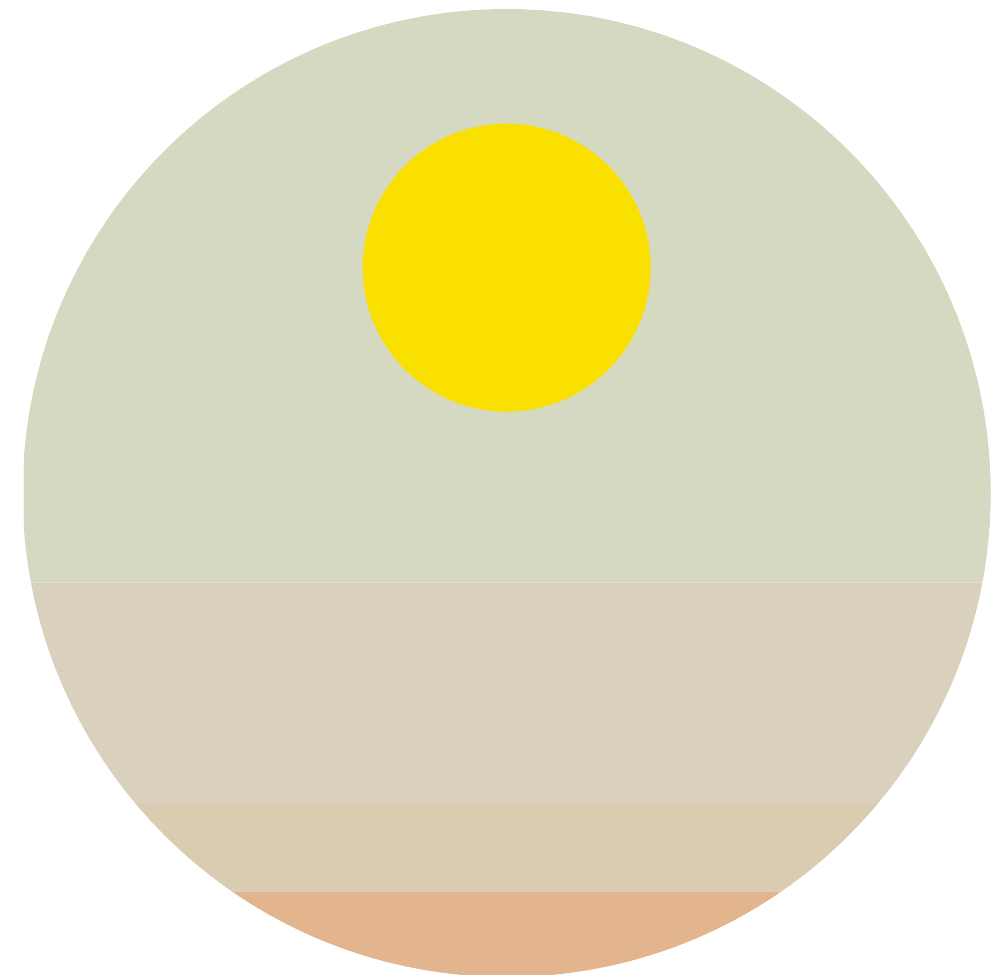
and action on climate, biodiversity, air and water pollution and other pressing issues alongside deeper, more strategic investments in clean energy, green infrastructure, sustainable food systems and other elements of an emerging clean economy.

Indeed, the world's biggest environmental challenges are being seen as inextricably linked to community resilience, economic prosperity, public health and national security. As such, they are rising to the top of the agenda for more and more companies and countries.

These are among the glimmers of hope we see during these turbulent times.

What else can we expect in the coming months? For the 14th consecutive year, we've peeked around corners to identify 10 trends we'll be watching in the year ahead. Here they are, in no particular order.

Joel Makower is Chairman and Executive Editor at GreenBiz Group



Ocean-Based Sequestration Heats Up

By Jim Giles

Over the past few years, as companies have come under steadily increasing pressure to tackle climate change, nature-based solutions have emerged as a particularly exciting method for shrinking corporate carbon footprints. Investing in forests can be a win-win that both sequesters carbon and regenerates nature. That's why [one recent survey](#) recorded almost \$160 million spent on forest offsets in 2019. And a newer option, soil carbon, also [is generating investment from multiple corporate sectors](#).

Yet another natural sink absorbs about as much carbon dioxide as our planet's soils and forests combined: the

world's coastal and ocean waters. Until recently, ocean sequestration, also known as blue carbon, attracted little attention outside academic and think-tank circles. We might be at a turning point, however, because a handful of forward-looking corporations, conservation organizations and startups recently have accelerated efforts to store carbon in marine systems. Thanks to their work, companies of all sizes soon may be able invest in ocean sequestration.

One pioneer in this area is Shopify, an e-commerce company that has committed to spending \$5 million annually on innovative clean technologies. Shopify's [first round of investments](#), announced in September, includes Running Tide, a company based on the coast of Maine. Running Tide's core business is



oyster farming, but Chief Executive Officer Marty Odlin is planning on a new revenue stream: growing kelp and sinking his crop in the deep ocean.

“Once it goes down below 1,000 meters, it’s not coming back up, because the pressures are so great,” [Odlin told Fast Company](#). “So you can get at

least 1,000 years of sequestration. More likely, it will turn into oil or sediment and be sequestered on the geologic timescale — millions of years.”

At Running Tide, engineers will use the Shopify investment to build kelp-growing platforms, which they will launch into ocean current systems selected as having the right temperature and nutrients to support kelp growth. The platforms will be kept afloat by buoys designed to biodegrade once they reach the deep ocean, at which point the kelp will fall to the ocean floor, taking its carbon with it. Running Tide will measure the carbon sequestered in the process and sell credits on the carbon markets.

Shopify also made a bet on [Planetary Hydrogen](#), a startup that aims to produce “green hydrogen” while simultaneously capturing carbon and healing the

ocean. The process begins with a twist on existing green hydrogen technology, in which renewable energy is used to power the production of hydrogen from water, a reaction that produces no carbon. The Planetary Hydrogen team adds a mineral salt to the process, leading to the creation of a waste product — a mineral hydroxide — that binds with atmospheric carbon dioxide. The final step involves adding the bicarbonate compound that results from this reaction to the ocean, where, because the substance is alkaline, it helps counter climate-caused ocean acidification.

According to the company’s calculations, the process can capture and store 40 kilograms of carbon dioxide for every kilogram of hydrogen produced. “Our fuel may be the greenest on



Earth,” boasted Greg Rau, Planetary Hydrogen’s chief technology officer, at GreenBiz Group’s VERGE Carbon conference last fall.

The catch? Let’s start with costs. Green hydrogen [costs two to three times as much](#) as the conventional alternative, and Planetary Hydrogen’s fuel is even more expensive. In most markets that would probably be the end of the story, but the carbon-negative status of Planet Hydrogen’s product means that it could

earn credits from schemes such as California’s Low Carbon Fuel Standard — enough credits, Rau believes, to make it a cheaper option than other forms of hydrogen.

Before that happens, his team will have to scale up the technology, which it plans to do using Shopify’s investment. A pilot plant should come online in 2022, according to Rau.

Another challenge facing both Planetary Hydrogen and Running Tide is the issue of permanence.

For a credit to be traded on carbon markets, an established certification body — [Verra](#) and [Gold Standard](#) are two leading examples — needs to sign off on the process used to store the carbon. Among other things, the certifier would assess how long the carbon is likely to stay sequestered.

The biology and chemistry of the deep oceans suggest that kelp and bicarbonate could offer a better guarantee of long-term storage than, say, forests. But collecting the data needed to demonstrate that will be challenging given the vastness of the oceans and the fact that this is a new frontier for certification bodies. “We need to rethink the basis for calculating the carbon benefits of these projects,” Carlos Duarte, an expert in marine ecosystems at the King Abdullah University of Science and Technology in Saudi Arabia, said at VERGE Carbon.

Given the uncertainties, many companies will wait before investing in the emerging ocean projects. But there are more established blue carbon options that are better understood. In 2018, for instance, Apple announced that it would back a project to [protect and](#)

[restore 27,000 acres of mangrove forest on Colombia’s Caribbean coast](#). According to Conservation International, one of the NGOs behind the project, mangroves and other coastal wetlands can store up to 10 times more carbon per unit area than terrestrial forests. Apple will purchase carbon credits generated by the project, generating a new income stream for the 12,000 local people whose livelihoods depend on the mangroves.

Key Players to Watch

[Conservation International](#) – the NGO’s work with Apple in Colombia is a leading example of how ocean projects can draw down and benefit local communities.

[Running Tide](#) – this Maine-based company is using Shopify’s investment to pilot an innovative carbon sequestration scheme based on farming and sinking kelp.

[Planetary Hydrogen](#) – another beneficiary of Shopify funding, this startup is developing a process that produces carbon-negative hydrogen fuel and counters ocean acidification.

[Ocean-based Climate Solutions](#) – engineers at this New Mexico startup have a system that captures and stores carbon by pumping water between layers within the ocean.

[Blue Carbon Initiative](#) – want more information on how coastal ecosystems can draw down carbon? This NGO has the details.

Jim Giles is Food and Carbon Analyst at GreenBiz Group



The 'S' in ESG Gains Currency

By Manjit Jus

We have seen a rising emphasis on ESG issues in recent years, as customers, investors and other stakeholders look for more transparency on corporate strategies and their impact on society. Companies are making progress in disclosing their environmental impact and governance standards, but social factors have not been given the same attention – until now.

Social factors include how a company manages relationships with its workforce, the communities in which it operates and the geopolitical environment. The COVID-19 pandemic has pushed “S” into the spotlight

by highlighting a range of problematic societal issues as millions of people around the world found themselves suddenly out of work with little protection.

There are a lot of nuances with data on social issues, such as gender equality, human rights and labor standards. [According to](#) the United Nations Principles for Responsible Investment, “The social element of ESG issues can be the most difficult for investors to assess. Unlike environmental and governance issues, which are more easily defined, have an established track record of market data, and are often accompanied by robust regulation, social issues are less tangible, with less mature data to show how they can impact a company’s performance.”

Social sustainability factors are material issues for many industries, however, and their management is directly linked to a company’s reputation and brand equity. Companies are showing a growing awareness that good social performance can translate into improved business performance and better relationships with customers and local communities. The S in ESG is definitely gaining currency.

Two important areas are gender equality and human rights.

Gender diversity enhances corporate governance, talent attraction and human capital development – [all important factors driving long-term competitiveness](#). Corporate policies promoting gender diversity are a reflection of a well-

managed company that realizes diversity's value in stimulating creativity and increasing productivity, in tandem with employee well-being.

While progress is being made on diversity, we are not seeing enough equality in the ranks. [According to the International Monetary Fund](#), women earn 63 percent less than men, and the resulting loss of economic output is staggering. It ranges from 10 percent of GDP in advanced economies to more than 30 percent in South Asia and the Middle East and North Africa.

The latest data from S&P Global's Corporate Sustainability Assessment (CSA) underscores the fact that gender pay gaps are more pronounced in some regions and in some industries, and at different levels of hierarchy within organizations.



The CSA is an annual evaluation of companies' sustainability practices, focusing on criteria that are both industry-specific and financially material.

For the CSA, gender equality means not only equal pay for equal work and equal gender ratios, but also equal access and equal treatment for career-advancing opportunities and corporate support

systems. This includes flexible work arrangements and parental leave policies that go beyond legal minimum requirements. Companies are asked a number of questions about their gender equality policies and practices in the annual survey. Findings suggest that companies with a more diverse and equal workforce are indeed better positioned to outperform.

Additional [research](#) by S&P Global Market Intelligence pointed to evidence of the outperformance of female executives relative to their male peers. Results showed that female CEOs drove more value appreciation (defined as a decrease in the book-to-market multiple relative to the sector average) and improved stock price momentum for their firms. In addition, female CFOs drove more value appreciation, defended profitability moats better and delivered

excess risk-adjusted returns for their firms.

Clearly, an increased focus on both diversity and equality will be needed going forward.

The social factor in ESG is also heavily populated with human rights-related elements. Drivers include internationally recognized standards, such as the U.N.'s Guiding Principles on Business and Human Rights (UNGPs), as well as the growing interest of asset owners and managers in the U.N.'s Sustainable Development Goals. As part of their responsibility to implement the UNGPs, companies must have systems and practices in place enabling them to know and show that they respect human rights.

Crucially, this includes an ongoing risk-management process to identify, prevent, mitigate and account



for how a company addresses any adverse human rights impacts. This human rights due diligence (HRDD) includes four key steps: assessing actual and potential human rights impacts; integrating and acting on the findings; tracking responses; and communicating about how impacts are addressed.

The CSA extended the human rights criterion by adding a section on HRDD. Since then, results have shown a growing interest by participants in

tackling human rights issues, reflected in improved average scores for this criterion across all industries and regions. Based on CSA results over the past several years, companies are expected to continue to report more extensively on their human rights due diligence going forward. Greater transparency in this regard will provide important information for their corporate decision-making.

The coronavirus pandemic has caused stakeholders around the world to take a closer look at how businesses handle human capital and related issues. There likely will be growing pressure on companies to consider social factors in their longer-term plans and goals for senior management, and to disclose how they are performing year over year. As interest in ESG funds continues to grow, companies will need to be firing on all three cylinders to attract capital: E, G plus S.

Key Players to Watch

[EDGE Certified Foundation](#) – a pioneer in educating and certifying companies on their commitments and impacts on diversity.

[European Commission](#) – publishes substantial research on the status of gender equality in Europe.

[European Foundation for the Improvement of Living and Working Conditions \(Eurofound\)](#) – Leading source of knowledge and research on living and working conditions.

[UN Working Group on Business and Human Rights](#) – UNGPs10+/NextdecadeBHR project – laid the foundation for companies to report on salient human rights issues;

[World Benchmarking Alliance](#) – Corporate Human Rights Benchmark – has developed transparent benchmarks to rank the world's largest companies on these topics.

[World Economic Forum Global Gender Gap Report](#) – shows the progress and gaps in gender pay equity.

Manjit Jus is Managing Director and Global Head of ESG Research & Data at S&P Global



Community Investments Pay Dividends

By John Davies

Corporate community investment historically has been the realm of philanthropy and volunteerism departments, but there are a growing number of examples where direct investment by businesses benefits operations as well as the communities in which they serve.

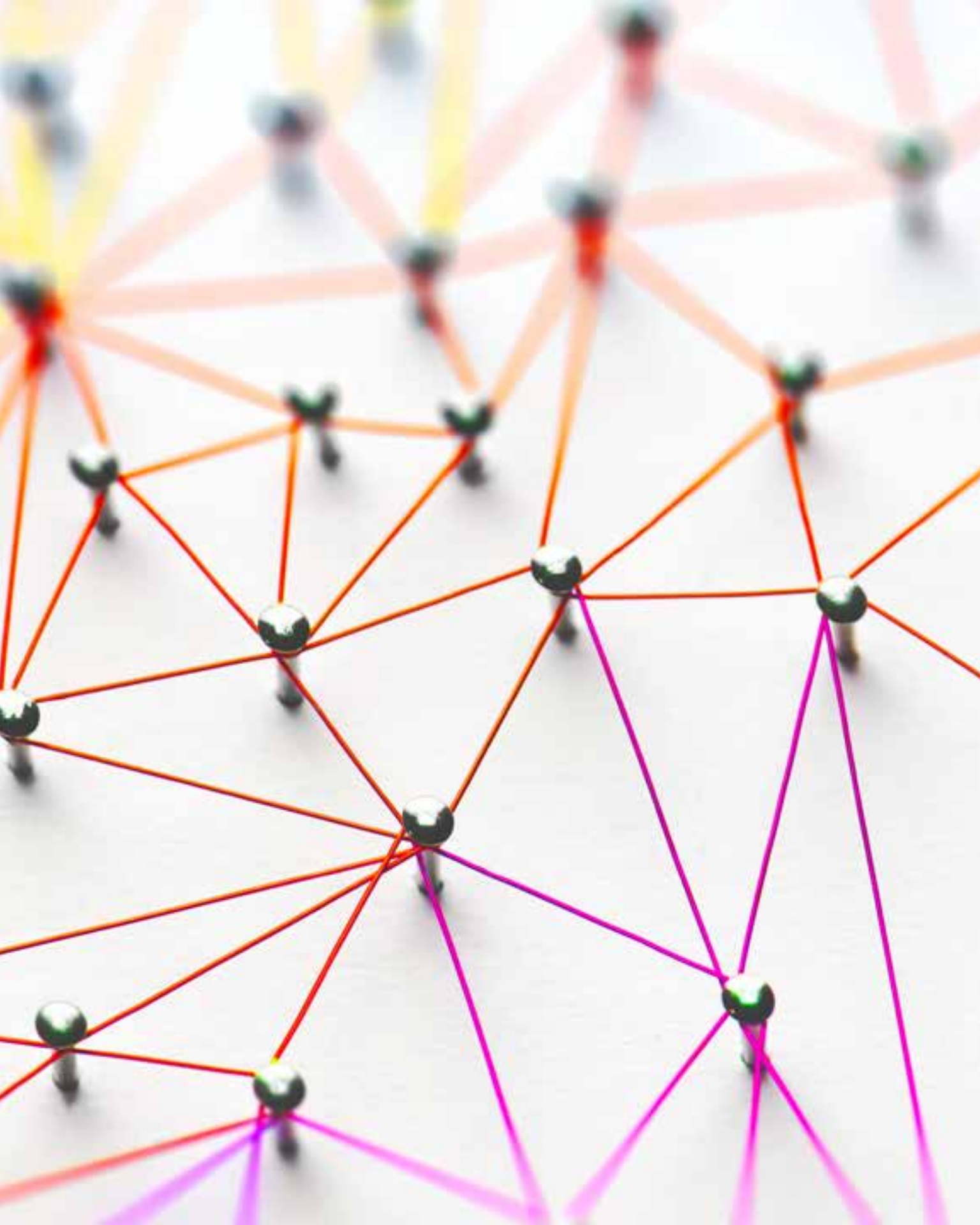
In 2019, the Business Roundtable redefined the purpose of a U.S. corporation as being “to promote an economy that serves all Americans.” In a [survey](#) of 2,511 registered U.S. voters by Real Clear Opinion Research, 77 percent of respondents agreed: “The purpose of a corporation is to maximize financial returns for its shareholders, but also

to deliver value to customers, invest in employees, deal ethically with suppliers, and support the communities where they work.”

When it comes to investing in employees, Tyson Foods faces the challenge of its plants being predominantly in rural areas with limited labor pools, and with many of its front-line team members recent immigrants. To address this labor shortage, the company launched the [Upward Academy](#), offering free and accessible classes in English as a Second Language, High School Equivalency, U.S. citizenship, financial literacy and digital literacy. The program is still in its early stages but all signs point to the investment paying off in terms of employee engagement and retention, and leading to a stronger local community.

Purchasing and sourcing strategies are also getting realigned to support local communities as well as smallholder farmers around the globe. Supply experts at Sodexo, a French foodservice and facilities management company, have worked with the Sustainable Purchasing Leadership Council to target local and seasonal produce, working with local farmers and producers around each of its client sites. This approach evaluates environmental, social and economic impacts on the community and helps local businesses to thrive, which in turn benefits the company’s clients.

Corporate sourcing decisions can drive change for communities around the world. Companies such as Mars and Griffith Foods have established sustainable sourcing programs that seek to create



societal value while generating business benefit. As noted in its 2020 annual report, Griffith receives high-quality raw materials from trusted partners while farmers receive on-farm and in-community support from a consistent buyer.

In these and other examples, community investments typically start with nonprofit engagement, aligning with on-the-ground resources that provide local knowledge and connections. The alignment of capabilities and community is a growing business trend as companies move away from pure checkbook philanthropy.

Companies such as HSBC and PwC have shifted to a more strategic approach by integrating their giving and volunteering. HSBC envisions a Venn diagram of urgent needs and financial literacy, where the overlap identifies opportunities to help the underserved develop soft skills to boost employability and financial capability. PwC took a similar approach to combining philanthropy with

volunteering, providing employees paid time to support educational initiatives in entrepreneurship and financial literacy, leveraging their consulting skills to better the community.

AT&T has reinvented its philanthropic approach so that it looks more like its store franchise model. [AT&T Believes](#) is a localized effort to create positive change in the communities where it operates, letting local employees determine how to best have an impact. Wells Fargo has launched pitch competitions to [fund breakthrough ideas](#) that promise new ways to create urgently needed affordable housing nationwide.

Such initiatives are part and parcel of recent efforts to measure the social contribution of business. There are currently few standards to guide and measure community investment and other social impacts. Danone, Patagonia and others have been certified as

[B Corporations](#), identifying them as businesses that meet the highest standards of verified social and environmental performance, public transparency and legal accountability to balance profit and purpose. B Lab, the organization behind the voluntary standard, offers an assessment tool that can start companies on their journey toward strategic community investment.

Key Players to Watch

[Sustainable Purchasing Leadership Council](#) – convenes buyers, suppliers and public interest advocates to develop programs that simplify and standardize sustainable purchasing efforts by large organizations.

[1% for the Planet](#) – businesses can support environmental nonprofits by donating the equivalent of 1 percent of sales through a combination of monetary, in-kind and approved promotional expenses.

[Uprose](#) — Brooklyn’s oldest Latino community-based organization. Central to its work is advocacy to ensure meaningful community engagement, participatory community planning practices, and sustainable development with justice and governmental accountability.

[Rainforest Alliance](#) — its Forest Allies program aims to create a community of practice beyond individual supply chains to engage and empower local communities in critical forest landscapes.

[Believe Chicago](#) — this AT&T program started in Chicago, where employees identified a major problem, gun violence. It has since contributed over \$2 million to various Chicago-based charities aimed at reducing gun violence and unemployment.

John Davies is Vice President and Senior Analyst at GreenBiz Group

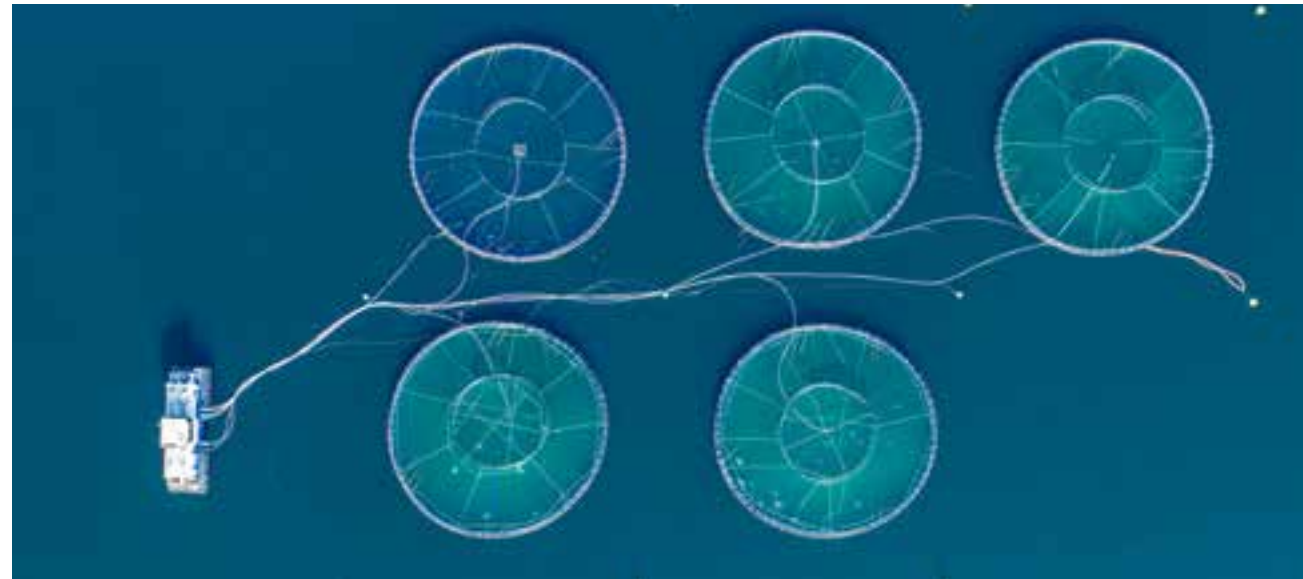


Aquaculture Becomes a Net-Positive

By Heather Clancy

The practice of farming finfish, shellfish and aquatic plants – [by land and by sea](#) – dates back 3,000 years as first the Chinese and then the Romans sought ways to supplement their food supplies with species such as carp and oysters.

In more modern times, support for aquaculture has ebbed and flowed along with [concerns](#) about animal health and welfare, [worries](#) over the effluent pollution caused by wastewater discharges, and the unintended impacts of production infrastructure such as pipes and pumps on natural ecosystems.



Now, a wave of technology innovation and [funding](#) from an eclectic group of companies ranging from Google's parent Alphabet, to the [Seed2Growth fund](#) linked to Lukas Walton (grandson of Walmart founder Sam Walton), to [Cargill](#) and [Chevron Ventures](#) (both focused on fish-feed ventures) is changing the tide again.

In 2018, the last year for which figures were available, worldwide aquaculture production reached an all-

time high of 114.5 million metric tons in "live weight," representing a market value of almost \$264 billion, according to a [2020 report](#) by U.N. Food and Agriculture Organization (FAO). That amount accounted for 52 percent of global fish consumption. The annual growth rate will slow over the next decade, but FAO projects aquaculture will supply close to 60 percent of fish consumed globally by 2030.

Many factors contribute to this renewed surge in interest in farming fish and sea vegetables. Chief among them are worries over the long-term viability of global fisheries and concern over the fragility of food supply chains, which were sorely tested by [disruptions](#) related to the COVID-19 pandemic. The United States, for example, imports a vast majority of the salmon it eats, with long-term consequences for transportation-

related emissions. The most dominant region in the world today for aquaculture production is Asia, particularly China, but Norway (for salmon) and Central America (for tilapia) are also big exporters. “Expanding access to blue food — that is, sustainably grown marine and freshwater organisms including fish, shellfish and sea vegetables — can play an important role in reducing the carbon emissions associated with the food we eat ... While sustainable aquaculture alone won’t solve the problem of reducing carbon emissions, seafood is one of the lowest carbon sources of protein available — so it’s a great place to make an impact on the climate crisis in the next five to 10 years,” said Neil Davé, general manager of [Tidal](#), an Alphabet X moonshot project.

The Tidal research team is testing artificial intelligence and imaging technology as a means to monitor fish health, spot pests and reduce waste at fish farms run by Norwegian seafood company [Mowi](#), the world’s largest Atlantic salmon producer and ranked ([again](#)) in November as the world’s most sustainable protein producer by the FAIRR Initiative, which produces research for institutional investors interested in environment, social and governance issues.

Digital innovations such as Tidal’s that provide better insights into fish farming operations — alongside new recirculating aquaculture system designs and purification advances, such as the “nanobubbles” generators designed by startup [Moleaer](#) — are contributing to rising levels of speculative activity. Over the past four years, for example, more than

20 companies have [filed development permits](#) in Norway for new approaches, including several for semi-enclosed or enclosed cages that decrease the potential impact on ocean ecosystems.

The number of companies building land-based operations is also growing, notably in the United States. That's important as more countries consider investing in sustainable domestic sources of production. [A recent study](#) by nonprofit WorldFish suggested that "inland freshwater aquaculture and marine capture fisheries have far greater potential to continue to supply most of the world's aquatic food and contribute to human equity and food security than offshore marine finfish farming." These self-contained operations are designed to address concerns about wastewater discharges in coastal



waters, as well as concerns over viruses, parasites and microplastics that plague ocean and coastal operations.

The downside: They are incredibly capital-intensive, costing millions to get up and running. Among the emerging U.S. players are [Aquabang](#) (a Maine salmon concern), [Infinity Blue](#) (a brand raising barramundi with

[aspirations in Arizona](#)), [Innovasea Systems](#) (based in Boston) and Pure Salmon (which is building an operation in Virginia).

[Atlantic Sapphire](#), which is raising Bluehouse salmon on land in southern Florida and has invested upwards of \$100 million in the facilities to do so, in November began selling its first fish raised without hormones, antibiotics or pesticides to supermarkets including the Publix super market chain. While its initial capacity is limited to about 10,000 metric tons of fish, the company aspires to supply 12 percent of the market by 2026. Its ultimate goal: 220 metric tons annually by 2030 — that’s nearly 1 billion salmon meals.

“By producing an increasing amount of seafood sustainably as farmers, the industry can help

relieve pressure on wild stocks that might currently be overfished commercially. Raising salmon on land helps to avoid the effect on coastal areas, ensuring the well-being of our planet,” observed Damien Claire, chief sales and marketing officer at Atlantic Sapphire.

Publix Super Markets is already making a big bet on [aquaculture](#), not just with salmon but with species such as cobia, shrimp, pompano and tripletail. “You have to be engaged in aquaculture, you have to be successful in aquaculture, to be successful in seafood,” noted Guy Pizzuti, business development director for seafood at Publix.

Of course, there are other creatures in the sea aside from finfish. One notable difference between the aquaculture industry emerging this decade and the focus of the past is that it’s not all about cultivating



more animals. Seaweed is the [fastest-growing segment](#) of the industry. It is being considered more often as a [sustainable alternative to plastic packaging](#), which gives farmers another potential buyer.

For example, materials pioneer [Loliware](#) is creating seaweed straws that will be used by the likes of hotel chain Marriott and fast-casual restaurant chain Sweetgreen, which also has put [kelp-inspired dishes](#) on its menu. Food startup [Akua](#) is using kelp as a staple for jerky and pasta, and [Blue Evolution](#) is selling a range of products, including kelp popcorn. And in November, the Bezos Earth Fund made a \$100 million grant to the World Wildlife Fund to support, among other things, the development of new markets for seaweed as an alternative to fossil fuel-based products.

One nonprofit organization, [GreenWave](#), is even advocating the idea of “regenerative ocean farming.” Its aim is to

support the development of polycultural operations that combine a mix of seaweeds and shellfish that require zero artificial inputs.

GreenWave's pitch is that those with access to 20 acres, a boat and startup costs of \$20,000 to \$50,000 can start their own farm. Not only can these farms revive economic livelihoods for fishing communities that have seen local fisheries decline, they also can provide carbon sequestration benefits. One figure touted by the [Eat More Kelp campaign](#) suggests that the process of growing regenerative kelp can capture five times more CO₂ than leafy vegetables such as kale or lettuce. "These are farms that bring back to the ocean as they bring back food," said GreenWave founder Bren Smith.

For food retailers such as Publix, the primary environmental benefit of supporting aquaculture



includes the ability to offer customers a certified product vetted for ecological considerations such as wastewater management, water quality, effluent discharge and health. Two of the biggest challenges the evolving aquaculture industry must overcome, Pizzuti noted, are customer perceptions over the impact of aquaculture practices and the price premium they still must pay over fish and seafood sold by commercial fishing operations.

Still, as more food companies, investors and entrepreneurs cast their ideas into the ocean of aquaculture innovation, the greater the chances for a bountiful, sustainable catch.

Key Players to Watch

[Akua](#) – makes jerky and pasta from a variety of kelp called Saccharina Latissima.

[Atlantic Sapphire](#) – a Norwegian-born company that opened its first U.S. Bluehouse salmon production facility in Florida in summer 2020.

[GreenWave](#) – is promoting the idea of “regenerative ocean farms” that combine cultivation of kelp with oyster beds.

[Loliware](#) – makes plastic-alternative straws from seaweed that will be used by the likes of Marriott and Sweetgreen.

[Tidal](#) – uses AI and imaging technology to monitor fish health, spot pests and reduce waste.

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Industrial Decarbonization Picks Up Steam

By Sarah Golden

The industrial sector is the backbone of the economy, producing the materials that build everything from cities to phones. It's also a significant contributor to the climate crisis: Industrial processes — from the creation of raw materials to chemicals — are responsible for more emissions than any other sector, making up [a third](#) of greenhouse gas emissions globally.

Increasingly, the stars are aligning for industrial emissions to take center stage, for three key reasons: demand for clean solutions is growing, technologies are maturing and the conditions for policy solutions are ripe.

The emissions associated with manufacturing and other heavy industries could broadly be divided into [three categories](#): indirect energy (from purchased electricity and heat, responsible for about 44 percent of emissions); industrial processes (such as the use of chemicals that release greenhouse gases, 19 percent); and onsite combustion (37 percent, usually for heat processing).

All three are in urgent need of innovations and deployments, but the last of those three – combustion – has, until now, received the least attention.

Climate-conscious companies that depend on thermal processing – used to produce everything from food to ferrous metals – seek better solutions. Historically, these have been inadequate or unaffordable, but a new generation of technologies is promising to change that.

For example, in 2019 [L'Oréal USA](#) announced that [14 of its factories](#) were “carbon neutral,” and the beauty giant continues to look for renewable options for all of its thermal loads as part of its science-based targets. [U.S. Steel Corporation](#) had a goal to reduce its emission intensity by 20 percent by 2030, based on 2018 baseline levels. While a modest target, the commitment is an acknowledgement that the sector needs to make progress, as steel is one of the most emission-intensive sectors (together with cement and chemicals).

Companies are banding together to reach breakthroughs faster. In 2019, General Motors, Cargill, Mars and L'Oreal USA, formed the [Renewable Thermal Collaborative](#) (RTC), and since have been joined by more than a dozen other large energy users. Modeled



after the success of the [Renewable Energy Buyers Alliance](#), which brought together large energy purchasers to accelerate the availability and affordability of renewable power, the RTC provides a space for companies to learn best practices to decarbonize manufacturing.

“These companies and other institutions are trying to send a signal to the marketplace: If people can

produce renewable thermal technology that is cost-effective, there are buyers out there that want them,” said David Gardiner, a facilitator of the RTC, in an interview with [GreenBiz](#).

Companies are also pushing for industrial decarbonization outside their four walls. Apple, for example, last year announced a carbon-neutrality target throughout its entire [supply chain](#). As more organizations follow suit, corporations can leverage their market influence to help accelerate the deployment of cleaner industrial processes.

Finding renewable alternatives for industrial heat is a complicated business. Different applications require different [working temperatures](#), which necessitate different solutions. Some applications – such as cooking, pressurizing and sterilization – require

lower temperatures (150 to 250 degrees Fahrenheit), while chemical, concrete and steel processes require much higher temperatures (above 400 F).

Today, most process heating in the United States is fueled by natural gas, which can be plugged into many technologies and which already enjoys a robust infrastructure. Globally, [coal](#) meets the majority of thermal fuel demands for both steel and cement.

Renewable options, on the other hand, often require [specialized](#) equipment that is still early-stage, and may require [retraining](#) or operational shifts, which add costs. While many consumer-facing brands want renewable options, most are price-sensitive and unwilling to pay a premium for these cleaner technologies, especially during a time of rock-bottom natural gas prices. Moreover, clean technologies are



at different stages of innovation, feasibility and cost, all with their own constraints, including temperature, quality and flow rates.

Key pathways to decarbonize thermal energy include:

- **Efficiency.** An oldie but a goodie, the promise of deep efficiency still has not been fully realized.

According to energy-efficiency expert [Amory Lovins](#), whole-system redesign today can yield 30 to 60 percent of energy savings in retrofits and 40 to 90 percent savings in new construction.

- **Electrification.** While innovations are emerging quickly for applications ranging from [roasting coffee](#) to [alloying steel](#), the technologies are expensive and require [specific](#) equipment. Still, costs are falling quickly and [experts](#) anticipate wide-scale adoption of electric appliances for industrial applications in the coming decade.
- **Green hydrogen.** The perennial “fuel of tomorrow,” it has long tantalized experts, who [envision](#) that excess renewable power can be used to create hydrogen, which can be plugged



into applications as easily as natural gas. However, because hydrogen molecules are much smaller than methane molecules, today's natural gas infrastructure is too leaky to hold or transport hydrogen. Expect this to be in the R&D phase with limited deployment for onsite applications until [midcentury](#).

- **Biomethane.** Capturing methane emissions from dairies, landfills and wastewater treatment facilities holds great promise. While seductive, the resulting fuel (sometimes called renewable natural gas, or RNG) has a limited supply (it could only cover [3 to 7 percent](#) of natural gas used today) and issues with [land use](#) (large dairies impact surrounding, low-income communities). Meanwhile, [natural gas utilities](#) are overstating its

potential to justify infrastructure investments, which runs the risk of slowing electrification of appliances that already have market-ready electric alternatives.

Additional technologies include solar thermal, geothermal, nuclear, cogeneration and carbon capture and storage. All have economic and technical tradeoffs, and with corporations and policymakers backing the transition, innovators have a lot to gain by cracking the renewable thermal energy code.

Robust policy support will be key to rapidly scaling the transition. Despite corporate commitments to decarbonize, emissions from heavy industry are [on track](#) to rise 0.4 percent annually through 2050 – at a time when they need to be dropping precipitously.

According to [30 leading experts](#) on energy and policy, high-impact policies to decarbonize industry include carbon pricing, government support for R&D, industrial process emissions standards and energy-efficiency support.

The good news is many of these policies align with components of President Joe Biden's [climate plan](#), which include financial support for innovation and deployment, boosting markets through federal purchase requirements, and workforce training and education. The new administration also has placed a specific emphasis on industrial heat needed for steel, concrete and chemicals.

Policy also has an important role in supporting financing on these innovations. Given that new infrastructure development works on roughly 25-year

cycles, policy direction now can help us avoid making climate-busting investments down the highway.

While time will tell if the Biden administration will realize all of its goals, it bodes well that decarbonization is seen as a boon for the economy.

[Rewiring America](#) research shows how decarbonizing the economy can create around 25 million jobs in the United States alone. According to separate reports from [Columbia University's Center on Global Energy Policy](#) and [the Industrial Innovation Initiative \(I3\)](#), a coalition of industry, NGO and public sector players dedicated to decarbonizing industry, investment in R&D for clean breakthroughs will stimulate jobs and economic growth. Meanwhile, Bill Gates' Breakthrough Energy commissioned a report that crunched the numbers to show that the spillover economic gains

from such an investment would be significant – all of which bodes well for political action.

Key Players to Watch

[Apple](#) – the tech giant is striving for carbon neutrality throughout its supply chain by 2030. That means it will need to use its influence as a buyer to shift international markets – something we’re already seeing in Taiwan and Denmark.

[Boston Metal](#) – this Massachusetts-based steel producer is using molten oxide electrolysis, removing the need for coal as a feedstock.

[DBL Partners](#) – this venture capital firm sees how companies are looking for electrified solutions for thermal energy, and it is investing in startups to get there. It is an investor in Bellwether Coffee and

partner Nancy Pfund has signaled her continued interest.

[Mars, Inc.](#) – this founding member of the Renewable Thermal Collaborative is working towards all fossil-free energy by 2040 – no easy feat for a company in the low-margin business of pet food and confectionery.

[Renewable Thermal Collaborative](#) – Is pulling together companies to accelerate cost-effective renewable technologies, spearheading buyers principles, working groups and research, all with the goal of scaling solutions faster.

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Nature Takes Root on the Balance Sheet

By Richard Mattison

ESG issues continue to gain prominence, with climate change getting the most attention today. We see customers demanding action on carbon emissions, investment firms structuring new green products and governments developing regulations to support the transition to a sustainable future. This has led to a strong focus on two main sectors: energy and transportation.

Of course, moving to renewable energy wherever possible and reducing emissions across cars, shipping and aerospace are important initiatives. If the focus remains narrow, however, all other patterns of consumption will

stay the same. This will have a tremendous impact on nature that, in turn, will affect businesses and the global economy. As with climate-related risks, nature-related risks need to be better understood and acted upon. The World Economic Forum [analyzed](#) 163 industry sectors and their supply chains and found that over half of the world's GDP is [moderately or highly dependent](#) on nature and its services. Highly dependent industries generate 15 percent of global GDP (\$13 trillion), while moderately dependent ones generate 37 percent (\$31 trillion). Despite this reliance, human behavior continues to push species into extinction, reduce the world's acreage of forests and deplete the water supply.

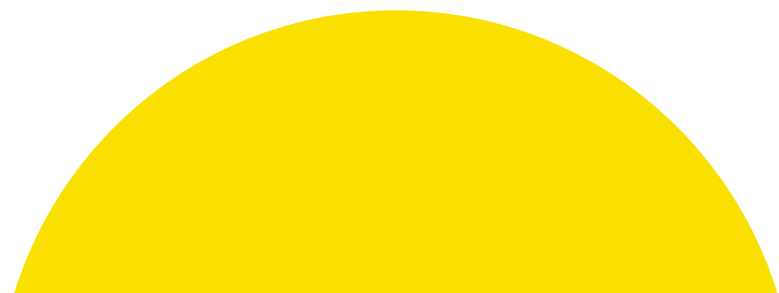
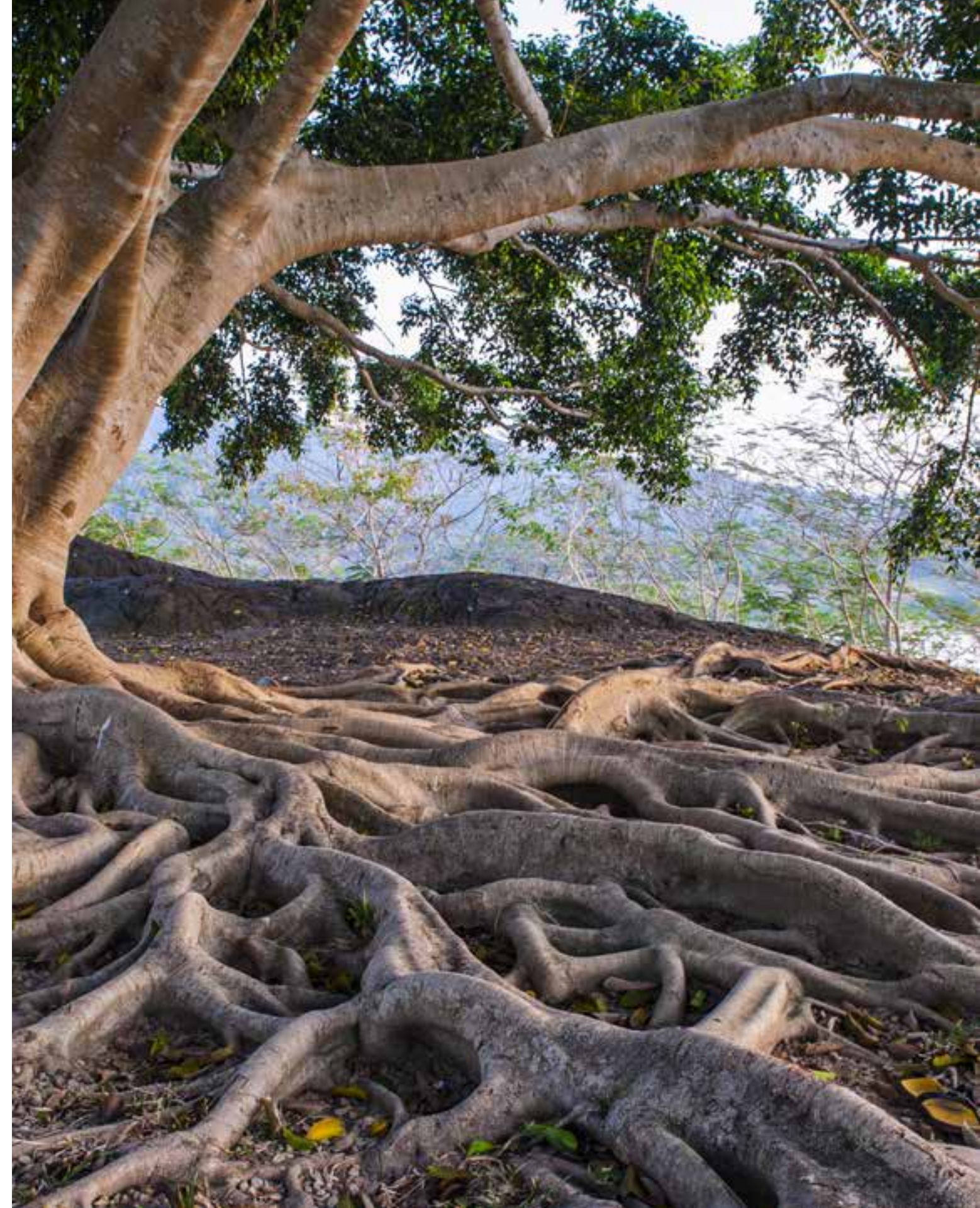
The Financial Stability Board recognized that climate change presents a financial risk to the global economy. By creating the [Task Force on Climate-](#)



[related Financial Disclosures](#) (TCFD), a framework is in place for organizations to better understand and report on these risks. This increased awareness is helping companies make more informed strategic decisions, while also providing better access to capital by increasing investors' and lenders' confidence that a company's climate-related risks are being appropriately assessed and managed.

The TCFD provides a framework to help understand and report on nature-related risk, but only in climate terms. Its framework excludes areas such as plastics in the oceanic food chain and the loss of soil fertility. In response, a Task Force on Nature-related Financial Disclosures (TNFD) will be launched in 2021 to operate alongside the TCFD. The aim is to translate nature-related risks into financial terms and help redirect flows of finance towards nature-positive activities.

Valuing the economic benefits of nature is a complicated undertaking, but some firms have been taking steps to tackle the challenge. Puma,



a leading sports lifestyle company, believes that businesses should account for and, ultimately, pay for the cost to nature of doing business. It recognizes that these costs could hit the financial bottom line as a result of new government policies, environmental activism, consumer demand or a growing scarcity of raw materials.

Back in 2011, the company worked with Trucost to develop an environmental profit and loss (EP&L) account to help measure and manage environmental impacts across its operations and supply chain. An extension to this analysis helped assess the environmental impacts of a product at each stage of its lifecycle, from the generation of raw materials and production processes all the way to the consumer phase when the owner uses, washes, dries, irons and

ultimately disposes of a product. The work helped Puma realize the value of nature's services, without which it could not sustain its operations.

The Dow Chemical Company is another example of a company that is taking action. Its 2025 sustainability goals include one for valuing nature, which is a commitment to consider nature in all business decisions. The valuing-nature goal builds on work that began in 2011 in partnership with The Nature Conservancy. Scientists, engineers and economists from both organizations have worked together to create tools to assess the various services that nature provides to Dow's operations and the community, including water, land, air, oceans and a variety of plant and animal life.



But much more is needed. While certain steps are being taken, it is important to ask what really has been accomplished to date. According to a [2020 report](#) by the World Wildlife Fund, nature is worth \$125 trillion, but humanity's increasing destructive behavior is having catastrophic impacts. The report points out that human activities have caused the world's wildlife populations to plummet by more than two-thirds in the last 50 years. In addition, marine ecosystems have been negatively affected through overfishing and pollution, and deforestation is increasing the abundance of carbon dioxide in the air.

Without question, nature is an even bigger issue than climate change. After all, climate change accelerates as nature is harmed. As the TNFD is launched, more information should become available to better understand the monetary value of nature. Once nature firmly takes root on the balance sheet, more companies likely will make investments that will help heal the natural ecosystem and preserve the world's wealth.



Key Players to Watch

[Business For Nature](#) – a global coalition of organizations and networks working with businesses to reverse the loss of nature.

[Planet Tracker](#) – is a non-profit think tank aligning capital markets with planetary boundaries.

[Taskforce on Nature](#) – related Financial Disclosures (TNFD): a working group to help financial institutions

to shift finance from destructive activities and towards nature-based solutions.

[U.N.'s Sustainable Insurance Forum \(SIF\)](#) – a global leadership group of insurance supervisors and regulators working together to strengthen understanding and responses to sustainability issues.

Richard Mattison is CEO of S&P Global Trucost.

Sustainable Mobility Drives the Newest Perk

By Katie Fehrenbacher

San Francisco Bay Area biotech giant Genentech is a world leader in making medicines for diseases such as cancer and cystic fibrosis; it's even trialing one of its medicines for helping treat COVID-19. It's safe to say that the company, a division of Swiss pharmaceutical giant Roche, isn't officially in the transportation business.

But over the past few years the company has aggressively built out an electric commuter shuttle program for its employees, as well as developed other sustainable mobility offerings such as easy access to carpooling, transit services and ferry lines. The goal: Move the more



than 10,000 employees that normally commute to its South San Francisco campus (pre-pandemic) with the lowest carbon footprint possible, and offer its traveling salesforce across the country access to EVs.

Why? One big reason — rising in importance at companies across the globe — is employee engagement. “It matters to our employees,” said Andy Jefferson, Genentech’s

director of transportation, at the VERGE 20 conference in October.

Retaining the best talent is crucial to Genentech’s ability to stay ahead with biotech innovation. Enabling employees to make sustainable choices about their commutes and transportation is the latest perk it can offer to an elite workforce. And Genentech isn’t the only one.

Companies around the world, from Sweden’s Inkg Group (the holding company for the IKEA retail chain) to Clif Bar (with operations in the Bay Area and Twin Falls, Idaho) are developing sustainable mobility offerings for employees. These programs can include an array of services, from on-campus EV chargers, access to carpooling programs, financial incentives for buying bikes, e-bikes and EVs, and — for the lucky few — rides to and from work in electric buses.

For most companies, tackling the carbon emissions associated with employee travel is a big part of the decision to offer these perks. For Inka Group, 15 percent of the company's greenhouse gas emissions come from transportation, a combination of employee and customer travel as well as goods delivery. IKEA is developing plans to halve its emissions from customer and employee travel, and is piloting a program to better help its 160,000 coworkers carpool together.

But attracting and retaining employees remains a solid byproduct of overarching corporate sustainability goals. "A significant part of our employees are under 25 and we want to attract the best talent on the market. So we need to figure out how to get people to us," said IKEA Head of Sustainability Angela Hultberg at VERGE 20.

Nonprofits such as The Climate Group are increasingly working with these companies to help set goals around EVs. Genentech, Inka Group and Clif Bar are all members of the [EV100](#), a group of companies that have pledged to deploy EV chargers on campuses and, when possible, convert vehicle fleets to electric. So far, [92 companies](#) have joined the EV100, representing major growth from the program's launch three years ago.

Another driving force behind the growth in corporate sustainable mobility programs is evolving consumer and political sentiment. Most Americans now agree that [global warming is happening](#), and the new Biden administration is [touting the most ambitious climate agenda](#) in American history. Transportation emissions are the single largest source of greenhouse gases in the United States, and American cities, and some states



such as California, are making big moves, including phasing out or banning fossil fuel vehicles altogether.

Companies with many employees commuting to their campuses also have learned that it's smart to work closely with cities on the most sustainable ways to move hoards of workers to campuses. Their quality of life rises and the air gets cleaner. In communities when fewer single-occupancy vehicles are on the roads, there's less traffic and shorter commute times.

Then there's the advancing technology of electric vehicles, one of the leading solutions for slashing transportation emissions. The costs of the batteries that power EVs continue to drop, making electric vehicles cheaper, and global automakers including Volkswagen, GM and Daimler are investing billions of dollars into electrifying vehicle lines.

Years ago, an electric commuter bus would be far too expensive for a company such as Genentech to invest in, let alone own and operate dozens of them. But as battery prices plummet, electric buses actually can save companies money on fuel and maintenance costs over time.

The ubiquity of mobile computing, social networks and big data is also playing a role in new sustainable mobility services. Carpooling startup [Scoop](#) has developed an app that offers companies a way to help employees strategically carpool with coworkers and neighbors and even provide back-up rides with ride-hailing ones from Lyft.

Scoop says it is America's largest carpooling app and works with 15 percent of the Fortune 100, including LinkedIn, Samsung and Rakuten. Rakuten HR Business



Partner Elva Huang provides a testimonial for the app: “Building community and offering unique programs is the best way to attract and retain great talent. Scoop helps us provide our employees with an organic and genuine way to connect with one another on a shared experience.”

Of course, like much in 2020, COVID-19 has upended how employees travel to work. Many are working from home

for the foreseeable future, transportation emissions unexpectedly have dropped and public transit in particular has seen a disturbing decline in ridership.

A silver lining of the shift to remote work has been an increasing reliance and interest in telecommuting. Expect some key aspects of this trend to remain in place after employees return to offices, including significantly reduced business air travel and an increase in video conference calls. In 2021, companies will continue to leverage the sustainability and efficiency boosts of working from home, at least much more than pre-COVID.

Some policy makers are even looking to codify such COVID-era sustainable transport trends into new mandates and goals. The San Francisco region's Metropolitan Transportation Commission [recently](#)

[proposed](#) developing sustainable commute targets for companies that have more than 50 employees.

But eventually, as vaccines are widely deployed, employees across the globe will return to workplaces in greater numbers. It's now the role of forward-looking companies – and their transportation leaders – to lean into sustainable mobility offerings for employees to enable their transition back in the greenest way possible.

Key Players to Watch

[Genentech](#) – the biotech giant recently received approval to potentially double its South San Francisco campus and employee headcount. Expect to see Genentech's unique sustainable mobility program kick into overdrive as it designs for major growth.

[Ingka Group](#) — the Swedish parent company of IKEA looks at sustainable mobility holistically across its sweeping empire, from the vehicles that deliver its products, to the employees that commute to its offices, to the customers that mostly drive to its stores.

[Clif Bar](#) — the protein bar maker developed one of the earlier sustainable mobility programs in 2006 with its [Cool Commute](#) initiative. Today, hundreds of its employees take advantage of perks such as cash incentives to buy bikes and EVs in order to eliminate cars in employee commutes.

[The Climate Group's EV 100 Program](#) — launched in 2017, it now has 92 members that make pledges to adopt electric vehicles and deploy EV chargers by 2030.

[Scoop](#) — the carpooling startup launched in 2015 says it works with 15 percent of the Fortune 100, including LinkedIn, Samsung and Rakuten.

Katie Fehrenbacher is Senior Writer & Analyst, Transportation at GreenBiz Group

Aviation Plots a Sustainable Course

By Joel Makower

Modern aviation had never seen a year like 2020. The COVID-19 pandemic led to a near-total halt in air travel, with airlines hemorrhaging billions of dollars and shedding hundreds of thousands of jobs. It wasn't just that the economy was in a holding pattern. People didn't want to spend hours inside a closed container with scores of their fellow humans. Add to that the rise of virtual meetings and sales calls, and suddenly there were far fewer reasons to head to an airport.

That forced grounding provided airlines with a reckoning — and an opportunity for a reset. And it begs the question:



Can sustainable aviation finally get off the ground?

The answer is yes. But like modern planes themselves, a lot of moving parts are involved.

In the climate world, aviation is referred to as a hard-to-abate sector, alongside other heavy industries — shipping, aluminum, cement and concrete, among others — that aren't easy to decarbonize through

redesign or electrification. Regardless, pressure has been on aviation to join other sectors in dramatically cutting greenhouse gas emissions.

The industry has responded, or at least has been pushed to do better. In 2016, the International Civil Aviation Organization (ICAO), a U.N. body, set a course for airlines to offset emissions of international flights above a 2019-20 baseline. In other words, aviation emissions wouldn't grow beyond the baseline, even as air travel increased. The pandemic led ICAO to scale back the program, called [CORSA](#) (for Carbon Offsetting and Reduction Scheme for International Aviation) to make it easier for airlines to comply.

That may have been shortsighted. [Research](#) has found that robust implementation of CORSIA could significantly reduce aviation's climate

impact, and that aviation's contribution to future warming could be cut by roughly 90 percent if the sector aggressively pursued decarbonization.

"As airlines scramble to recover from the COVID-19 crisis, they can't afford to ignore the looming global crisis of climate change," said Annie Petsonk, an aviation expert at the Environmental Defense Fund. "Real leadership means setting the aviation sector on a path toward net-zero climate impacts as swiftly as possible. The sooner that the costs of carbon control are included in the costs of doing business, the sooner new technologies will be developed."

Three things essentially can be done to reduce aviation's climate impact. Some measures, such as fuel efficiency, go straight to airlines' bottom line. Fuel costs account for about 24 percent of operating expenses,

[according to](#) the International Air Transport Association. Anything airlines can do to cut that — through improved taxiing or takeoff and landing practices, for example — saves both costs and emissions.

The heavier lift comes from sustainable aviation fuel — SAF, for short — which can be made from a variety of substances, including used fats and oil as well as agricultural waste. A so-called "drop-in fuel," it can directly substitute for Jet A-1, the fuel most commonly used globally in jet engines, although most jets can accommodate mixes that include no more than about 50 percent SAF. To date, SAF is expensive — several times the price of Jet A-1 — and its availability is extremely limited.

Still, airlines are fueling up where they can — notably, at California airports, thanks to a Low-Carbon Fuel



Standard designed to decrease the carbon intensity of the Golden State's transportation, and in Europe, where governments are poised this year to mandate the growth of SAF. At airports in San Francisco and Frankfurt, for example, some planes already fuel up with a blend that includes a tiny amount of SAF – less than 1 percent, almost literally a drop in the bucket.

That drop could grow considerably. A bill introduced in the U.S. Congress in November aims to set a national goal for SAF to enable the U.S. aviation sector to achieve a 35 percent reduction in carbon emissions by 2035 and net-zero emissions by 2050.

Policy already is playing a key role elsewhere. Norway has mandated that 30 percent of aviation fuel in the country must be sustainable by 2030 and that all short-haul flights be 100 percent electric by 2040. Canada implemented a

carbon tax on domestic flights, based on the amount of fuel used. Germany has raised taxes on intra-European flights and cut taxes on train travel.

Airlines, for their part, are getting on board. United Airlines began buying SAF in 2013, and in 2016 became the first airline to use SAF on a continuous basis. Last year, JetBlue [agreed](#) to purchase SAF from Finnish company Neste and began using SAF on flights from San Francisco. Delta has [committed](#) \$1 billion to become the world's first carbon-neutral airline, and signed SAF offtake agreements with two biofuel producers. Japan Airlines [said](#) it will start using biofuel made from household waste beginning in 2022. Neste is working with Lufthansa, Finnair and KLM on sustainable fuel programs.

It's not just passenger carriers. Last year, Amazon Air, the

logistics arm of the online retailer, [said](#) it plans to buy 6 million gallons of SAF via a division of Shell and produced by World Energy.

Another encouraging sign is the ability to push the envelope on SAF's limitations. Late last year, for example, aircraft engine maker [Rolls-Royce announced](#) it is testing 100 percent SAF on next-gen engines.

And fuel makers are getting pumped up about SAF. In September, for example, Shell Aviation and Neste agreed to collaborate to increase the production of SAF. That sort of partnership — Shell and Neste are also SAF competitors — will be needed to bring greener aviation fuels to scale. So, too, will the participation of airports, plane manufacturers, fuel blenders and other parts of the aviation value chain.

And, notably, the flying public – especially corporate travel buyers – who can send critical demand signals to help accelerate sustainable aviation’s growth. For example, Microsoft last year [said](#) it would purchase SAF credits from SkyNRG, with the SAF delivered to the airport fueling system used by Alaska Airlines for all flights between its global headquarters in Redmond, Washington, and California.

Given SAF’s limitations, airlines are turning to [carbon offsets](#) as the third strategy for making aviation sustainable. CORSIA – “carbon offset” is part of its name – requires operators to purchase carbon offsets to cover emissions. Shell is among the companies making significant bets on offsets, with trading operations on three continents. But offsetting is seen as transitional – and controversial: Some critics view it as greenwash.



Longer-term fixes, such as [hydrogen technologies](#) and [batteries](#), stand to make air travel nearly emissions-free. Airplane electrification [is gradually gaining altitude](#), at least for shorter-hop flights. Depending on who you ask, it could be between 10 and 30 years before electric and hydrogen planes are hurtling through the skies in significant numbers.



And, of course, there's the option of not flying at all, or at least not as much. Such movements as #flygskam ("flight shaming") and Fridays for Future are having an impact, particularly among younger travelers. And some airlines are feeling the heat. KLM's [Fly Responsibly campaign](#) asks, "Could you take the train instead?"

After all, the most sustainable flight is the one you don't take.

Key Players to Watch

[Airbus](#) – the world's largest aircraft manufacturer says it will decide by 2025 whether the market can support hydrogen-fueled airliners. Assuming that it can, the

company projects its first hydrogen airliners will enter service in 2035.

[International Civil Aviation Organisation](#) – the U.N. body responsible for international aviation oversees CORSIA, the scheme to halt the growth of aviation’s carbon emissions, even as the sector continues to grow.

[JetBlue](#) – is the first U.S. airline to commit to and achieve carbon neutrality for all domestic flights, and aims to achieve carbon-neutral growth from 2020 levels via carbon offsetting and emissions reductions.

[Shell Aviation](#) – is one of the major oil and gas companies to invest in sustainable aviation fuel as well as offering offsets with the goal of creating carbon-neutral aviation solutions.

[World Energy](#) – one of the oldest biofuel companies, it produces a drop-in sustainable aviation fuel that requires no changes in aircraft or engines, distribution infrastructure or storage facilities.

Joel Makower is Chairman and Executive Editor at GreenBiz Group

The Circular Economy Shows Its Human Side

By Lauren Phipps

As the circular economy ramps up, we've seen impressive innovation in materials, products, models and processes – but innovation on how we treat people has been notably absent. However, as companies, cities and countries alike adopt a more holistic lens and embrace circular principles, they are recognizing the opportunity to drive social change in lockstep with an economic transformation that puts people at the center.

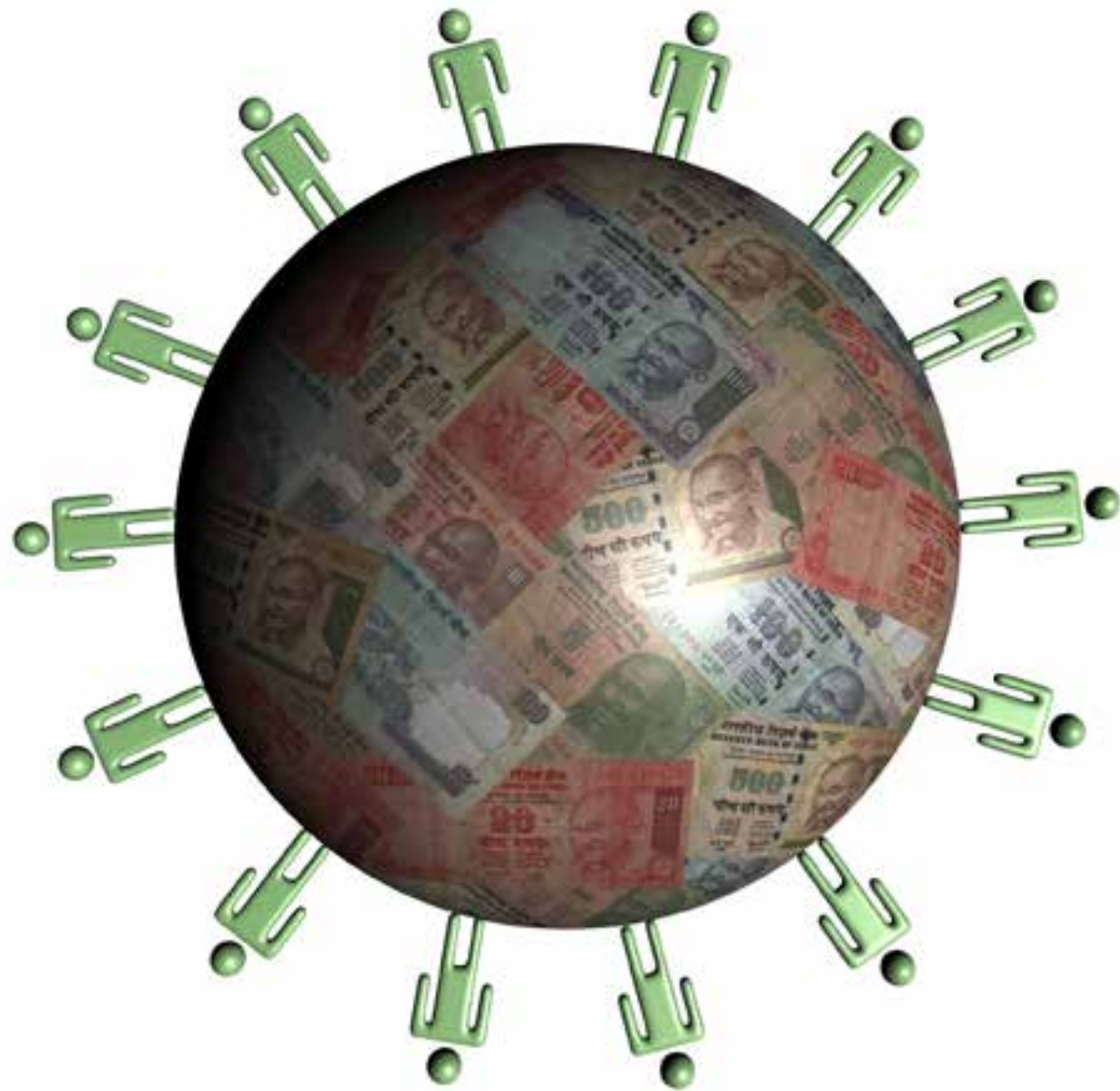
In the context of sourcing and supply chains, we've seen this movie before. Facing legal pressure from governments, reputational risk from consumers and pushback from NGOs, the past two decades have seen a dramatic shift in

sourcing protocols and upstream supplier engagement in an attempt to eradicate forced and child labor, conflict minerals and other human rights violations in supply chains. Yet, these efforts traditionally only have acknowledged one phase of a material's life.

In a circular supply chain, sourcing no longer focuses exclusively on virgin materials. As companies take responsibility for the entire lifecycle of their products, hazardous conditions in which a child disassembles a smartphone is as problematic as cobalt sourced using forced child labor in a conflict zone to make the smartphone in the first place. While the Basel Convention criminalized transboundary movement of hazardous waste (of which most electronics are classified) to limit some human health implications of electronics waste streams, plastic waste is another story, having only recently been included in the convention.

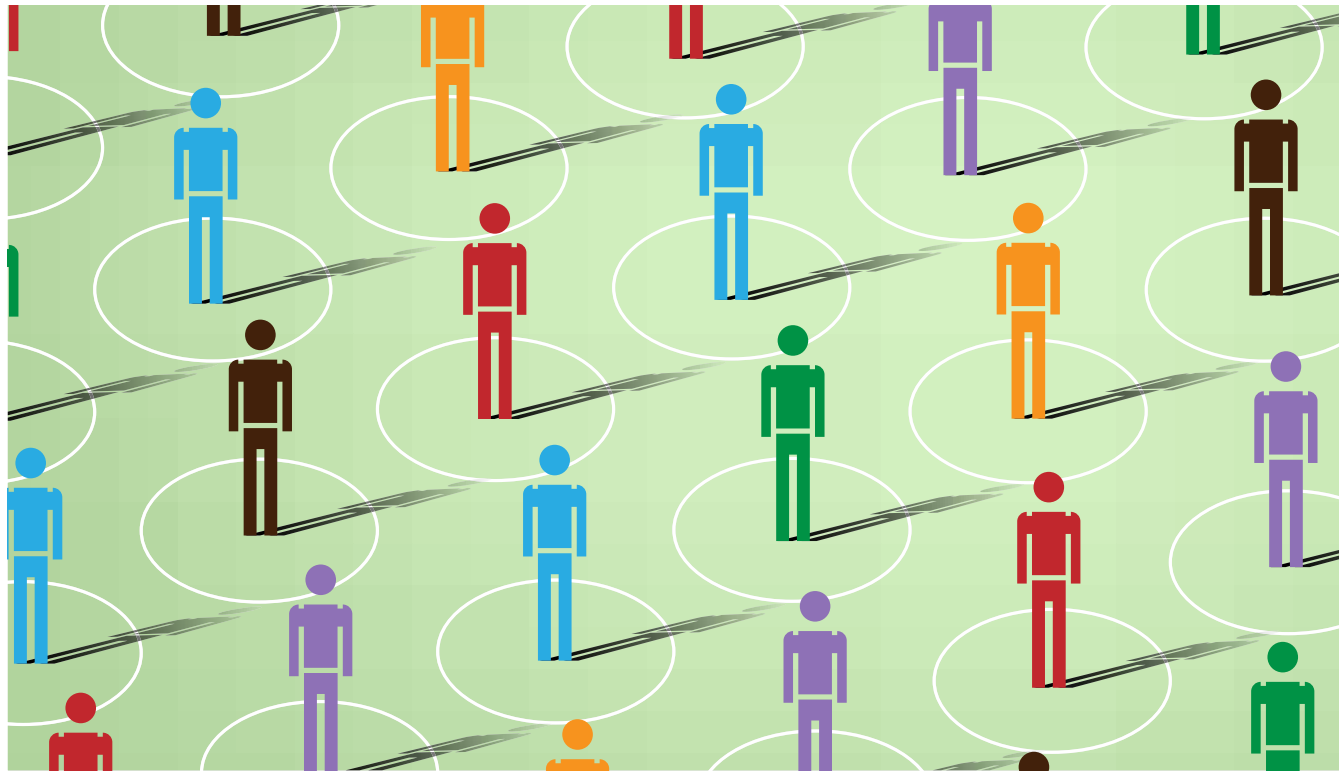
In the absence of formal materials management infrastructure, waste collectors — skilled entrepreneurs in the informal economy that gather, sort and sell used bottles, caps and other valuable materials, sometimes culling them from landfills — have filled in a necessary gap to slow the leakage of plastic waste into waterways and through coastal communities. And as a growing number of companies commit to recycled plastics targets and circular plastics aspirations, the opportunity and necessity of partnering with these communities is becoming increasingly clear.

[HP Inc.](#) offers a now-iconic example of meaningful downstream collaboration in Haiti, having partnered with waste-collection communities with the help of [First Mile Coalition](#), an initiative of the nonprofit organization [Work.](#) to support the social infrastructure of plastic waste as well as the physical infrastructure of materials recovery.



In 2019, HP invested \$2 million in a new plastics washing line in Port-au-Prince to support the collection of ocean-bound plastic in the community, which the company buys from a local business to use in its laptops and ink cartridges. The effort has not only provided HP with a reliable supply of post-consumer recycled plastics to slowly wean itself off virgin materials, it's created more than 1,000 new jobs in Haiti by expanding the region's recycling capacity.

HP's investment is an example of how capital is being deployed differently in the fight against plastic waste, focusing on community leadership rather than solely a technical, infrastructure development intervention. We're seeing a similar, holistic approach to capital deployment to address the plastic waste crisis globally, including the Alliance to End Plastic Waste's stated commitment to community engagement.



Just as companies have prioritized transparency and traceability in upstream operations to address human rights, a circular supply chain calls for the same level of scrutiny downstream. Companies are beginning to expand the scope of sourcing considerations, deploying what they have learned in sourcing virgin materials to sourcing from previously used products and materials and applying these learnings downstream.

But the opportunity for economic improvement isn't limited to efforts in the Global South, and currently national governments are leading the way in a human-centered circular economy transition. At the forefront is [Europe's Green Deal](#), the policy framework intended to bring the European Union to net-zero greenhouse gas emissions by 2050 while decoupling economic growth from resource extraction and leaving no person or place behind. The aim is not one or the other, but rather an integrated approach to resource stewardship, responsibility and climate mitigation. The European Commission's associated [Circular Economy Action Plan](#) emphasizes the opportunity for social and economic development through circular value chains – to the tune of 700,000 new employment opportunities by 2030 in Europe alone.

Circular business models require a suite of new expertise, from repair and refurbishment to disassembly,



recovery and recycling, making way for a new class of sustainable and dignified jobs. One U.S.-based example is [Homeboy Electronics Recycling](#), a social enterprise offering e-waste management and IT disposal while providing employment and training to people who face systemic barriers to work.

A human-centered circular economy can't focus solely on jobs and material management, but also must ensure access to the benefits of these new models.

Consider the benefit to consumers of saving money by buying in bulk: Whether you're buying dog food, rice or ibuprofen, buying more than a single serving upfront

saves money and packaging. But without the cash to invest upfront, low-resource communities are burdened with a poverty tax in the form of a markup – up to 50 percent – for buying food and other necessities in small formats rather than in bulk.

Chilean startup [Algramo](#) aims to address this by offering consumers the ability to buy the exact quantity they need but allowing them to pay the bulk price. Algramo partnered with consumer goods companies, including Colgate-Palmolive, Nestlé, Clorox and Unilever, to make their products and reusable packaging formats available and accessible to everyone.

The circular economy is a means, not an end, offering strategies and frameworks to create economic flows on top of material flows in support of a more sustainable, resilient and prosperous system. It works only if it can

transform systems, not reinforce existing ones. As human rights, economic inclusion and social equity come into focus within circular initiatives, the opportunity for a holistic understanding of what circular economies can enable is becoming increasingly clear.



Key Players to Watch

[Work](#) – with a mission to help bring families in Haiti out of poverty through good, dignified jobs, it works with waste collectors to support themselves while diverting ocean and landfill-bound plastic.

[Algramo](#) – the Chilean-based startup centers economic accessibility in its reusable packaging model that sells food and household staples “by the gram” to customers.

[Circle Economy](#) – its Circular Jobs Initiative works to define, identify and track new employment opportunities within the circular economy that maximize social benefits alongside environmental need.

[Women in Informal Employment: Globalizing and Organizing \(WIEGO\)](#) – the global network focuses on empowering the working poor in the informal economy to secure their livelihoods.

[HP Inc.](#) – since 2016, it has partnered with suppliers and the waste collection community in Haiti to divert ocean-bound plastic while creating jobs and education opportunities locally.

Lauren Phipps is Director & Senior Analyst, Circular Economy at GreenBiz Group

Corporate Advocacy Gets Louder

By Deonna Anderson

For decades, companies have been lobbying in Washington D.C., and at other capitals around the world. And much of it has gone against the interest of sustainable outcomes. As just one example, oil companies have [spent millions of dollars lobbying](#) to block climate change policies, according to a [2019 report from InfluenceMap](#). Others have lobbied to support roads over public transit, or conventional energy facilities over renewables, or the interests of Big Ag over organic and regenerative farmers.

There are signs this is changing. More companies understand that their interests are directly linked to a clean



environment, healthy citizens and a cohesive society. More recently, there has been a push for companies to do better. Fred Krupp, president of the nonprofit Environmental Defense Fund (EDF), said the business world needs to “unleash the most powerful tool they have to fight climate change: their political influence.”

And now, with a new administration in the United States, there may be room for companies to advocate

for a national response to climate change that has been missing — or at least moving in the wrong direction — in recent years. President Joe Biden already has signaled that he will re-enter the Paris Climate Agreement and named [environmental issues as one of his four priorities](#) along with racial justice. It’s a start.

But pro-climate policy changes won’t take hold without a bold push from companies.

“There’s a way in which the activism is meeting the traditional Capitol Hill lobbying in a way that [nobody] could have predicted,” said Anne Kelly, vice president of government relations at Ceres, where she leads the Ceres Policy Network and [Business for Innovative Climate and Energy Policy](#), better known as BICEP.



Until relatively recently, it's been safe for companies to stay on the sidelines of sustainability-related policy issues. While climate change may have been deemed an important issue, there were always more pressing ones: wages; healthcare; tax policies; and others. Environmental and social issues rarely rose to the top of those lists.

Moreover, policy engagement was never part of the coveted sustainability rankings companies sought. "Most corporate sustainability rankings do little to encourage companies to engage in climate policy, as they neither recognize support for nor penalize opposition to climate policy," [according to a 2019 report from EDF](#). "This blind spot prevents them from presenting a complete picture of sustainability performance and diminishes their value by omitting the most important measure of sustainability leadership."

A number of factors are pushing companies to act. There's the physical manifestation of climate change right in

front of us. The western United States was on fire for weeks. Hurricane seasons have been intensifying and lasting longer. These go right to the heart of the work companies do.

But some are stepping into the breach.

Take food and pet care company Mars, for example. It has an agricultural supply chain, which is vulnerable to the impacts of climate change. As a result, many of its suppliers — who farm a wide variety of commodities, [from cocoa](#) to coffee — may go out of business if their farms are no longer viable due to floods, droughts or other climate-induced impacts. The company, along with Danone, Unilever and others, formed the [Sustainable Food Policy Alliance](#) to, among other things, press for the development of agricultural carbon markets.

“I think they see the long-term threat to their business. And rather than waiting for the problems and trying to adapt, they want to see real action taken to avoid the problems,” said Bill Wiehl, founder and executive director at ClimateVoice, an organization with the mission to [mobilize workers to urge companies to take a stand on climate](#) in business practices and policy advocacy.

Wiehl’s group offers a case in point of what’s possible. Last year, eight companies — Akamai Technologies, IKEA North America Services, Kaiser Permanente, Mars, Nestlé USA, Schneider Electric, Unilever and Worthen Industries — [signed a letter of support](#) for a bill in the Virginia state legislature to put the state on a path to 100 percent zero-carbon electricity by 2045. They also lobbied legislators to pass it. The bill was signed into law in March.



In some cases, shareholders are among those pushing companies to use their influence on policy issues.

In November, the Interfaith Center on Corporate Responsibility (ICCR), a coalition of shareholder advocates who view managing their investments as a catalyst for social change, called on businesses to lobby in support of pro-climate policies. Specifically,

ICCR asked [25 companies](#) to accelerate their respective company's advocacy to address climate change before national and local governments.

With companies [setting net-zero commitments](#), which [vary in detail and approach](#), it's become increasingly important for their government affairs teams or public policy board committees to connect the dots to ensure

that a company's efforts align with the goals of the Paris Agreement, including the nationally determined contributions in the countries in which they operate.

"Are they really matching that with policy advocacy that serves the same interest?" asks Laura Devenney, senior ESG research analyst at Boston Trust Walden, a member of ICCR. "The context is changing and is poised to potentially accelerate even more here [in the United States], very quickly on the policy front. I think, as an investor, it's incumbent upon us to ask companies to make sure they are connecting those dots."

The 2020 ICCR initiative builds on previous calls to action. In July, a group of 72 private- and public-sector leaders, including investors, former regulators, lawmakers, NGOs and foundations, [sent a letter to the U.S. Federal Reserve](#) and other key financial regulatory

agencies asking them to take immediate action to address climate change. In November 2019, the Fed sent signals that [highlight the risks of climate change](#) to our financial system.

All together, these acts have laid the foundation for more corporate advocacy to come. So, what might that look like?

Ceres' Kelly said she believes that companies would like to see carbon pricing because they believe it's the most efficient mechanism for lowering carbon emissions.

"You'll see record numbers of them getting behind it," she said. The schemes matter, along with the details. "But what's shifted is you have increasing numbers of companies saying, 'Wow, this is really serious. This is really urgent.'"

As ClimateVoice's Wehl put it: "Important climate policies are being debated at every level of government — in cities, counties, states and countries. Companies have influence everywhere they operate, and when they choose to stay silent on climate policies, they enable the fossil-fuel industry to dominate the debates."

Key Players to Watch

[Business for Innovative Climate and Energy Policy](#) — part of the Ceres organization, is made up of more than 50 companies who, together, advocate for increased corporate advocacy on pro-sustainability policy issues.

[ClimateVoice](#) — the nonprofit launched Change the Chamber to stop the powerful U.S. Chamber of Commerce from blocking science-based climate legislation and lobbying against environmental policies.

[Interfaith Center on Corporate Responsibility](#) — the

coalition of shareholder advocates called on 25 companies to lobby on pro-climate policies.

[Mars](#) — known for Snickers and Pedigree, it was among 300 companies that met virtually on Capitol Hill last spring to push congressional leaders on climate-smart policies.

[VF Corp.](#) — the apparel and footwear company — and its brands such as The North Face and Timberland — voluntarily discloses its political giving.

Deonna Anderson is an Associate Editor at GreenBiz Group

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State of Green Business The Index

Welcome to the annual State of Green Business Index, a review of trends in sustainability performance over the last five years for the largest 500 companies in the United States, as well as the largest 1,200 companies globally.

Produced in collaboration with S&P Global, the 2021 assessment includes close to 30 corporate sustainability performance indicators derived from S&P Global Trucost environmental, climate and impact data intelligence, boosted for the first time with ESG data intelligence from S&P Global ESG Scores and its bedrock, the SAM Corporate Sustainability Assessment (CSA).


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Highlights of Key Findings


The Big Picture


 **90%**
of major U.S. companies* published a sustainability report in 2019, up from 86% in 2018 and 20% in 2011.


 **16%**
of public U.S. companies mentioned ESG in their SEC filings
NEW METRIC FOR 2021!

 **>1,500**
companies backed the reporting framework in 2020, 5X the number in 2017.

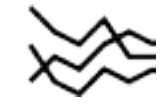
Natural Capital Impacts


In 2019, natural capital costs were
 **90%**
higher than net income for major global companies* and 55% higher for major U.S. companies*.


64%
of major global companies (up 7%) and
 **58%**
of major U.S. companies (up 6%) publicly disclosed carbon targets.

For the first time major global and U.S. companies reported year-over-year declines in water use:
 **6%** and **8%** respectively.

Climate Risk

Major global companies* are on track for >3°C warming, falling
 **72%**
short of required emissions reductions to achieve the Paris Agreement**.

Major global companies face \$284 billion carbon pricing costs in 2025, representing
 **13%**
of earnings.

Nearly
 **95%**
of major U.S. companies and 80% of major global companies will face moderate physical risk by 2050.

Positive Impact

 **53%**
53% of revenues of major U.S. companies and 49% of revenues of major global companies are generated in business activities that support the United Nations Sustainable Development Goals.

 **27%**
of revenues generated by major U.S. companies and 31% by major global companies are aligned to the EU Taxonomy for Sustainable Activities.

Corporate Performance

Major U.S. companies achieved an average S&P Global ESG score of
 **40/100**
in 2019, while their major global companies achieved 47/100.

*Major U.S. companies are those listed on the S&P 500® index & major global companies are those listed on the S&P Global 1200 index.

**Alignment with the Paris Agreement goal to limit global warming to well below 2°C from pre-industrial levels. S&P Global Trucost analysis from a 2012 baseline by 2025.

The Big Picture

Many investors and other stakeholders are actively expressing the need for deeper transparency on the ESG strategies of companies. What's more, the COVID-19 pandemic has brought sustainability further into the spotlight, raising awareness about the negative impact climate change and social justice issues are having on the world. At the same time, the pandemic has highlighted the value of ESG considerations in financial markets, as global sustainability benchmarks outperformed traditional market benchmarks and ESG funds [achieved record inflows](#).

The pandemic seemed to confirm what ESG pioneers have long propagated: Companies with superior ESG performance can be expected to be better prepared

to weather such crises and to operate in the post-crisis world.

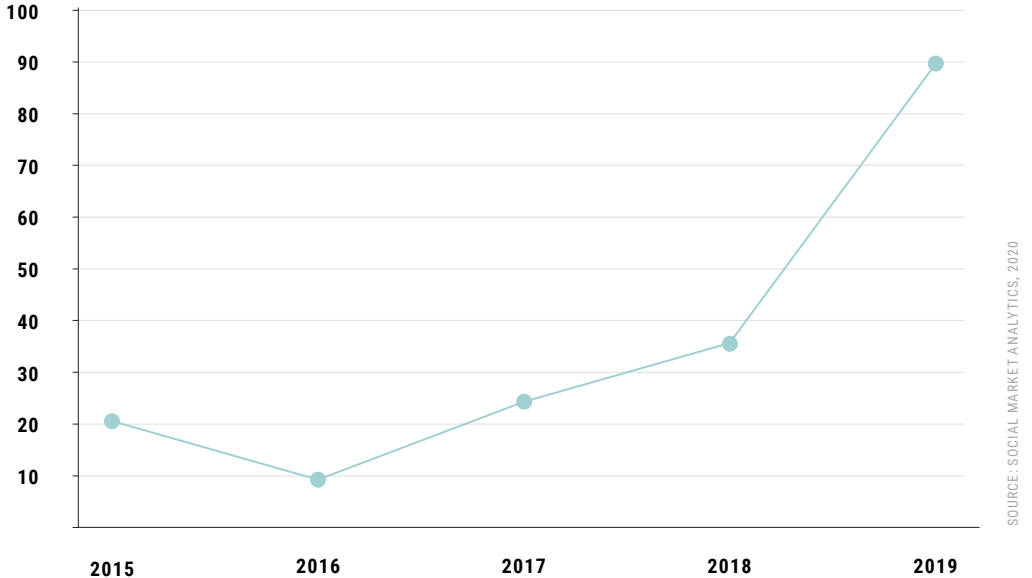
This is because [they are well-managed companies](#), with stronger competitive advantages, healthier balance sheets and a better social license to operate than their non-ESG peers.

This heightened attention is underscored in this year's look at progress being made on environmental sustainability, as many publicly traded companies take additional steps to improve their situations. For example, in 2011 approximately 20 percent of the largest 500 companies in the U.S. published a sustainability report. The [volume has increased steadily](#) ever since, reaching 75 percent of these companies in 2014 and a record 90 percent in 2019.

This section highlights a number of important trends we are seeing as corporations focus more effort on their environmental performance. It should be noted that company-reported data does not yet provide coverage of the abrupt COVID-19-related decreases in global carbon emissions observed since March 2020.

Companies Mentioning ESG for the First Time in SEC Filings Are on the Rise

NUMBER OF COMPANIES

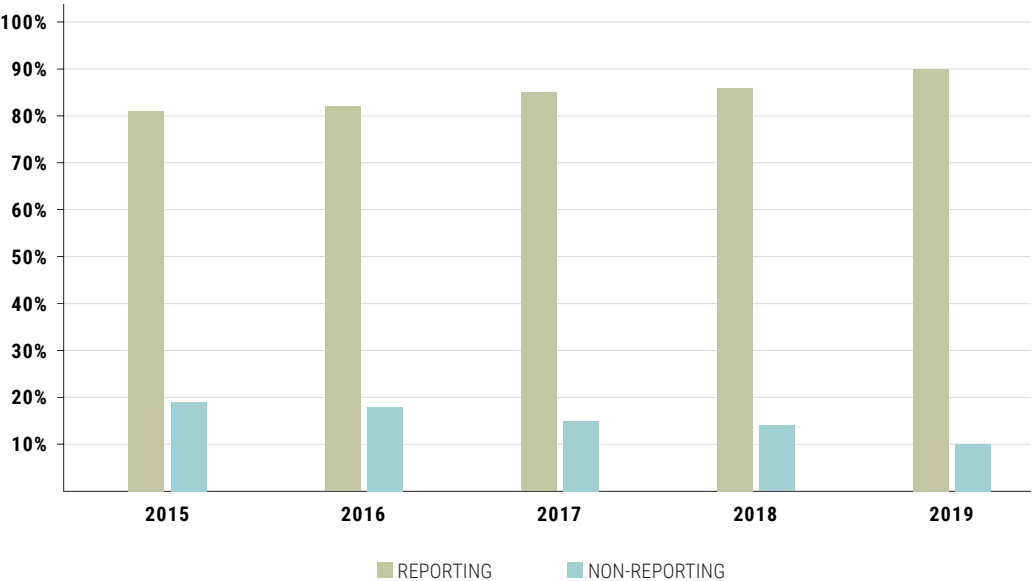


SOURCE: SOCIAL MARKET ANALYTICS, 2020

ESG reporting has remained largely voluntary in the United States. General disclosure guidance provided by the Securities and Exchange Commission (SEC) – which includes ESG issues – emphasizes materiality, the extent to which a reasonable investor would consider information important in relation to an investment decision.

There have been a total of 597 different publicly traded U.S. companies [mentioning ESG](#) in SEC filings since 2006. While this only represents approximately 16 percent of all U.S. public companies, the number mentioning ESG in SEC filings for the first time has increased steadily in recent years – from nine companies in 2016 to 36 in 2018 and 90 in 2019. We look forward to the opportunity to provide continued updates on this significant trend.

A Growing Share of Companies Are Publishing Sustainability Reports

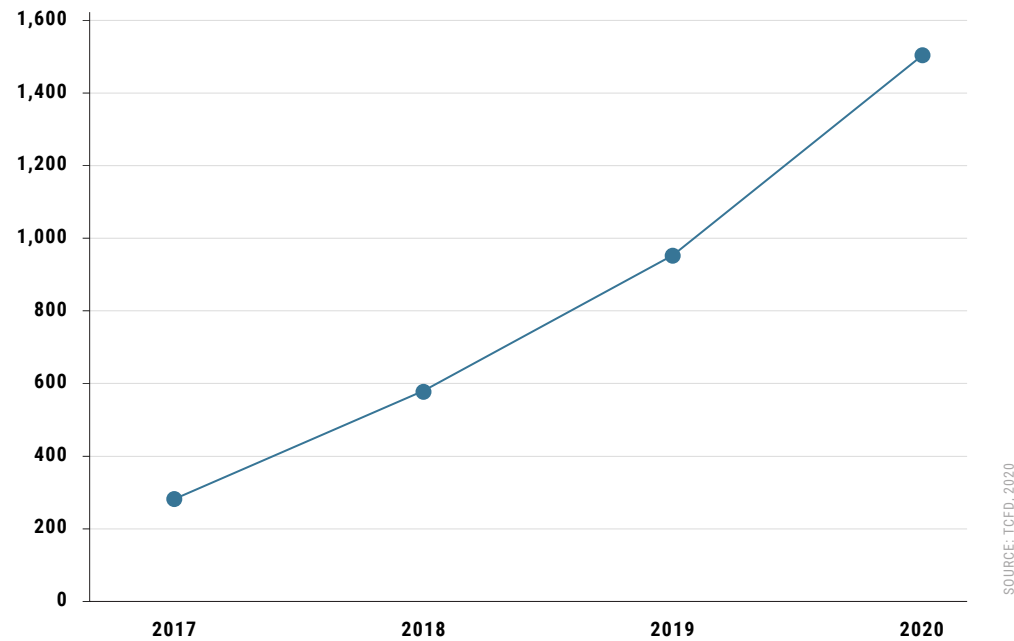


SOURCE: G&A INSTITUTE, 2020

Over the past five years, more companies have begun publishing sustainability reports, with 90 percent of the largest 500 U.S. public companies reporting in 2019 – an 11 percent increase since 2015. A range of frameworks and standards are being used, including those provided by the Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB) and the Task Force on Climate-related Financial Disclosures (TCFD). While 51 percent of the S&P 500 reporting companies use the GRI standards, support continues to grow worldwide for the framework recommended by the TCFD – which is increasingly mandated by regional governments.

There's Been a Steady Growth in the Number of Companies Supporting TCFD

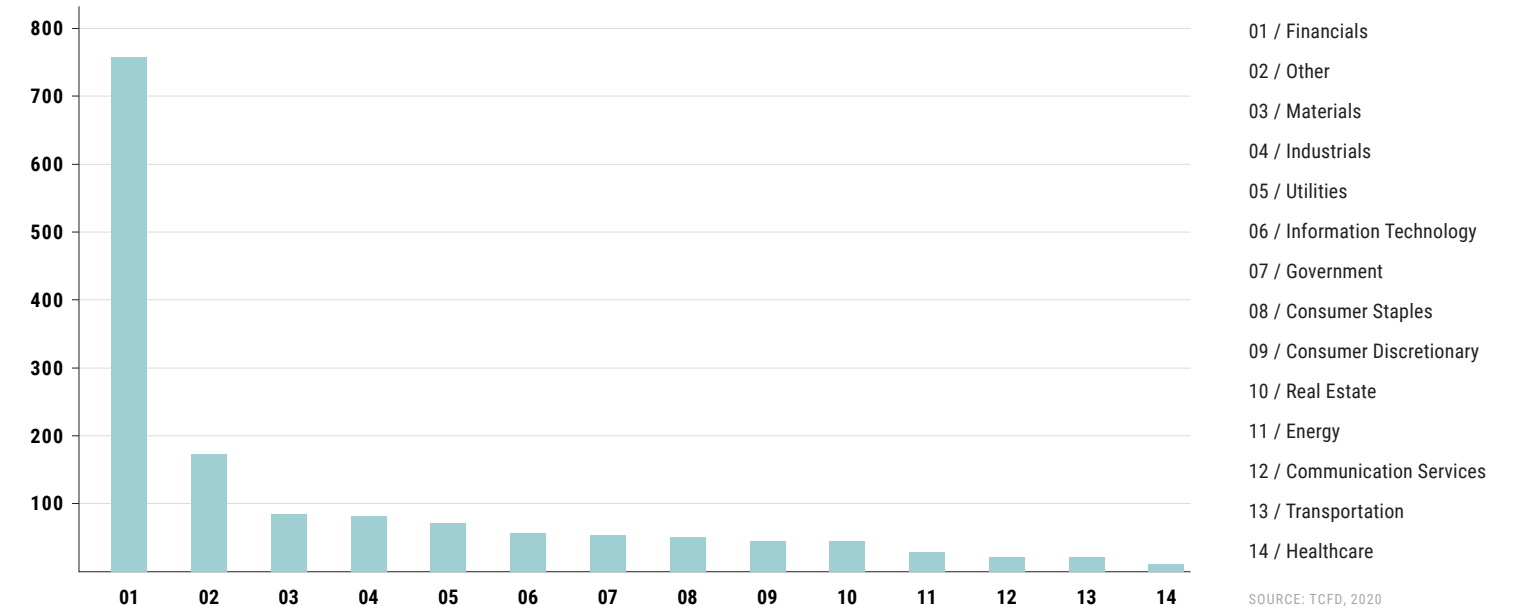
NUMBER OF COMPANIES



According to the TCFD, which was established in 2015, better disclosure will lead to more informed and more efficient allocation of capital and help facilitate the transition to a lower-carbon economy. [Backing for the framework](#) has surpassed initial expectations, with the number of supporting companies exceeding 1,500 in 2020 – over five times that in 2017. Supporters include every major type of financial market participant. What’s more, nearly 60 percent of the world’s 100 largest public companies either support the TCFD, report in line with its recommendations – or do both.

Financial Sector Accounts for Half of TCFD Supporters

NUMBER OF COMPANIES

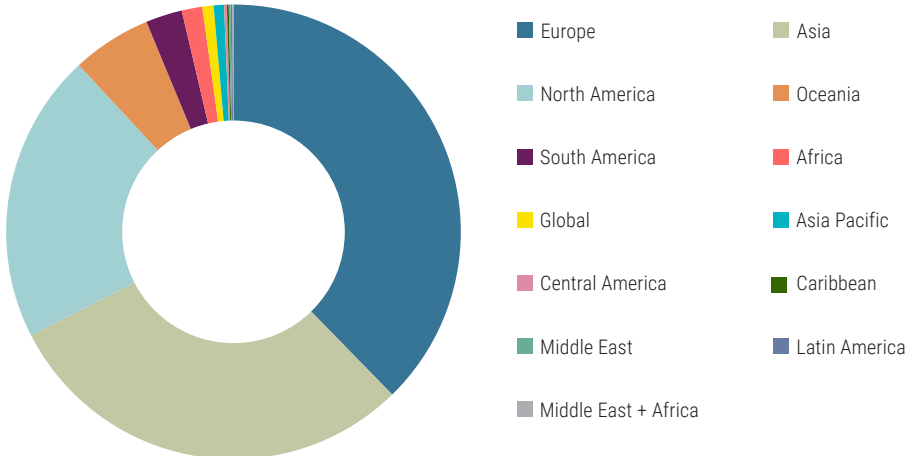


Half of all companies that support the TCFD framework are in the financial sector. Asset management/investment management, banks and pension funds together represent 75 percent of the supporting organizations in the sector. According to the TCFD, larger companies are more likely to disclose information aligned with the recommendations. On average, 42 percent of companies with a market capitalization greater than \$10 billion U.S. disclosed in 2019, while the average was 15 percent for companies with a market cap less than \$2.8 billion.

The European Union is [among the leading major economies](#) when it comes to tackling greenhouse gas (GHG) emissions. By 2018, it had cut GHG emissions by 23 percent compared to 1990 levels, and is committed to achieving a 40 percent reduction by 2030. Not surprisingly, therefore, it represented 38 percent of organizations supporting the TCFD in 2020. With typhoons and floods becoming [more intense and frequent in Asia](#), companies here are showing their concern with climate change, with the region representing 30 percent of organizations supporting the TCFD in 2020. North America was third at 21 percent, leaving these three regions accounting for 88 percent of overall support in this year.

Europe, Asia and North America Are Home to Most TCFD Supporters

NUMBER OF COMPANIES



SOURCE: TCFD, 2020

Natural Capital

Businesses and society depend on environmental resources for prosperity and well-being. These natural capital assets fall into two categories: assets that are non-renewable and traded, such as fossil fuel and mineral commodities; and those that provide finite renewable goods and services where no price typically exists, such as clean air, groundwater and biodiversity. Growing corporate demand for natural capital, coupled with decreasing supply due to environmental impacts and climate change-related events such as droughts, are contributing to natural resource constraints, including water scarcity.

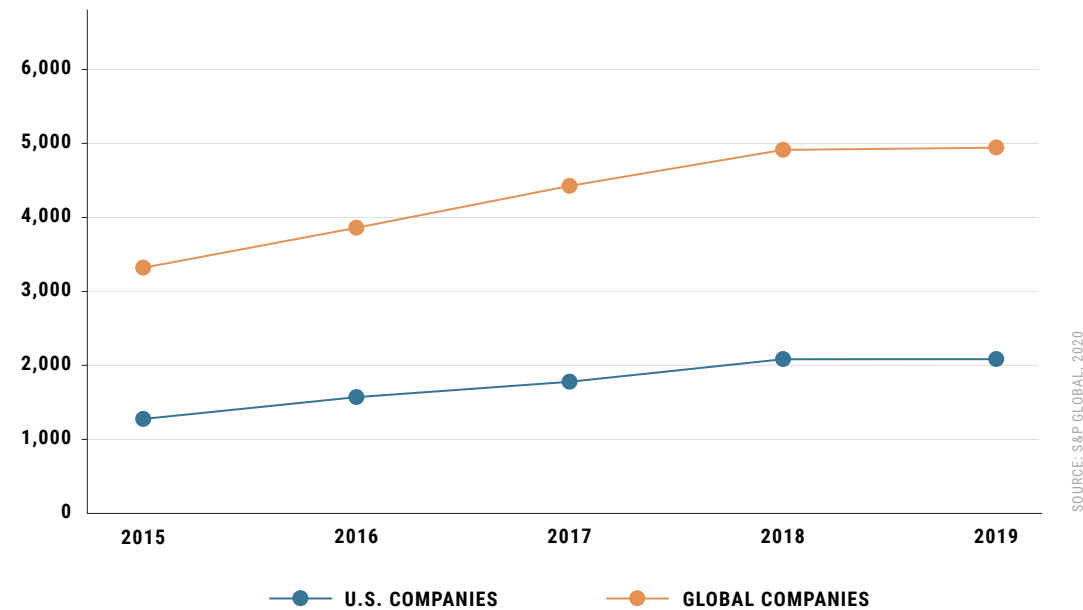
The production, use and disposal of most company products and services carry environmental and social

costs that are not reflected in the market prices of goods and services. Applying environmental or “natural capital valuation” techniques enables businesses to understand and communicate environmental impacts in monetary terms, alongside traditional financial performance measures. Lower natural capital costs equate to lower risk to a company and its shareholders.

In this chapter, we provide more details on natural capital costs for major global companies, as well as the subset of these companies that are in the United States. Natural capital costs rose between 2015 and 2018 but saw little change in 2019. The ratio of natural capital costs to net income remained high, however, so internalization of these costs, should companies be required to pay for their natural capital impacts, generally would exceed a company’s income. Companies have begun to assess and disclose impacts across their supply chains, however, and corporate reduction targets for both GHG emissions and water consumption increased significantly over the last year — both encouraging trends.

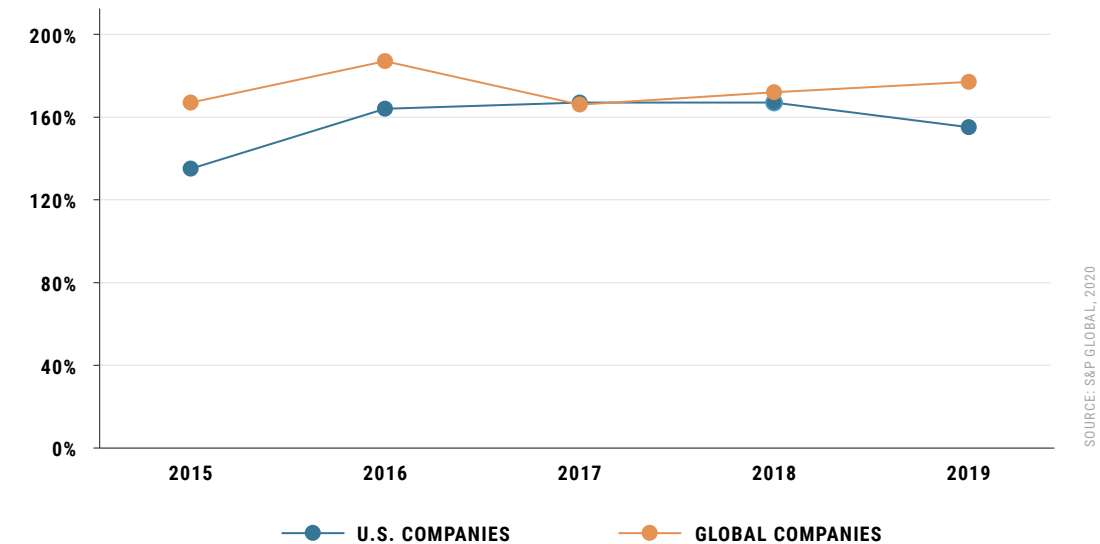
Total Natural Capital Costs Hover Near \$5 Trillion

TOTAL NATURAL CAPITAL COST (BILLION USD)



Natural Capital Costs Are Rising Steadily vs. Net Income

TOTAL NATURAL CAPITAL COST AS % OF NET INCOME



Between 2015 and 2018, both global and U.S. companies reported a rise in the cost of natural capital impacts. According to S&P Global, these costs were about \$5 trillion in 2018 for the largest 1,200 global companies and over \$2 trillion for the largest U.S. companies assessed for the State of Green Business Index. This represents increases of 48 percent and 63 percent, respectively, from 2015. Costs remained quite flat in 2019 on a year-over-year basis, however, with a 1 percent increase for global companies and no increase for U.S. companies.

In 2019, natural capital costs were 77 percent higher than net income for global companies and 55 percent higher for U.S. companies. While this ratio has fluctuated since 2015, all annual levels since that time indicate that an internalization of these costs, perhaps due to increased regulations or new carbon taxes, would exceed the income generated by a company. It is expected that the ratio will decline in 2020 given the global pandemic lockdowns. That said, its level signals the need for companies to further decouple financial growth from resource use – that is, use fewer resources

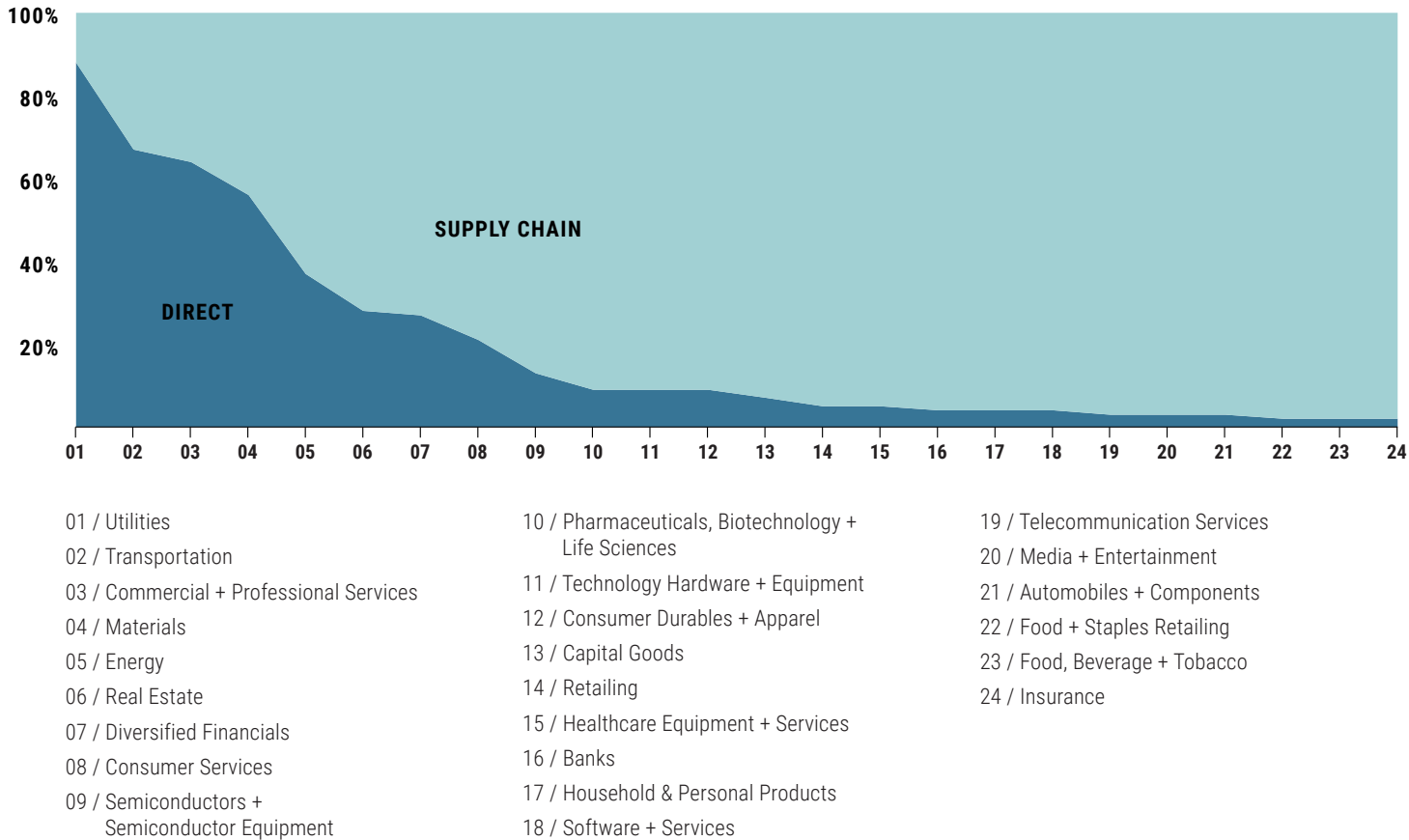
per unit of economic output and reduce the environmental impact of any resources used or economic activities undertaken.

In the post-pandemic world, businesses will face an enormous challenge to provide products and services against a backdrop of increasingly scarce resources such as water. Government policies to address diminishing resources include environmental regulations and market-based instruments, which may help to internalize natural capital costs and reduce the profitability of polluting activities. In the absence of regulation, these costs usually remain externalized unless an event, such as a drought, causes rapid internalization along supply chains in the form of commodity price increases.

Successful business models will be those that understand and recognize [the value of natural systems](#) that provide these resources and how these systems can be managed as part of the production of greener products and services. Even though many natural capital costs occur in the developing world, the resulting products are generally consumed by supply chains in developed economies, making it a global challenge.

Supply Chains Account for the Bulk of Natural Capital Costs

NATURAL CAPITAL COSTS (%)

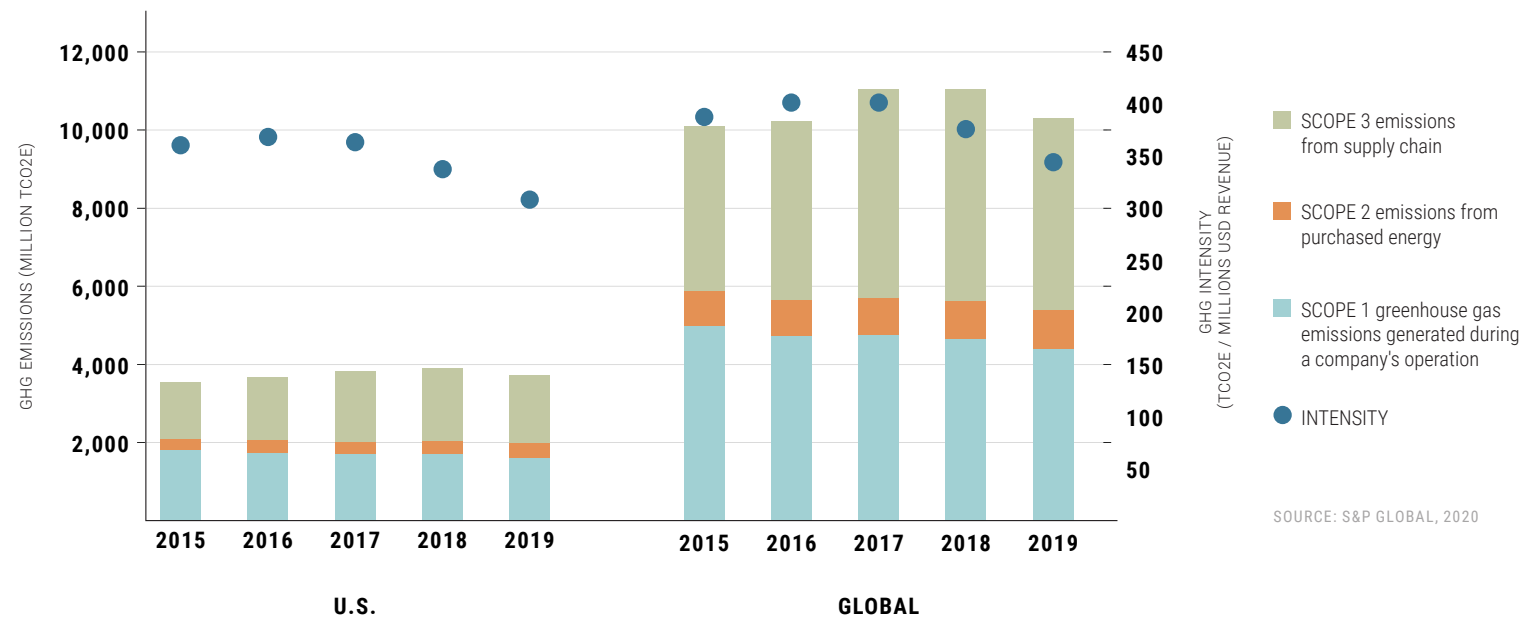


Direct operations account for a relatively low percentage of the environmental impact related to many economic sectors. Most natural capital costs are embedded in value chains – from material sourcing to consumer use and return. Supply-chain activities represent 80 percent of the total natural capital impact across sectors, on average.

In 2019, the top five sectors where supply chain costs were most pronounced included insurance; food, beverage and tobacco; food and staples retailing; automobiles and components; and media and entertainment. To effectively manage these impacts requires collaboration between customers and suppliers – and even between competitors where there are common suppliers – with the goal of encouraging all players to take steps towards more resource efficiency and sustainable supply chains.

Global Emissions Dip Slightly, with Scope 3 Sources Accounting for a Larger Share

TOTAL EMISSIONS (METRIC TONNES CO₂e)



SOURCE: S&P GLOBAL, 2020

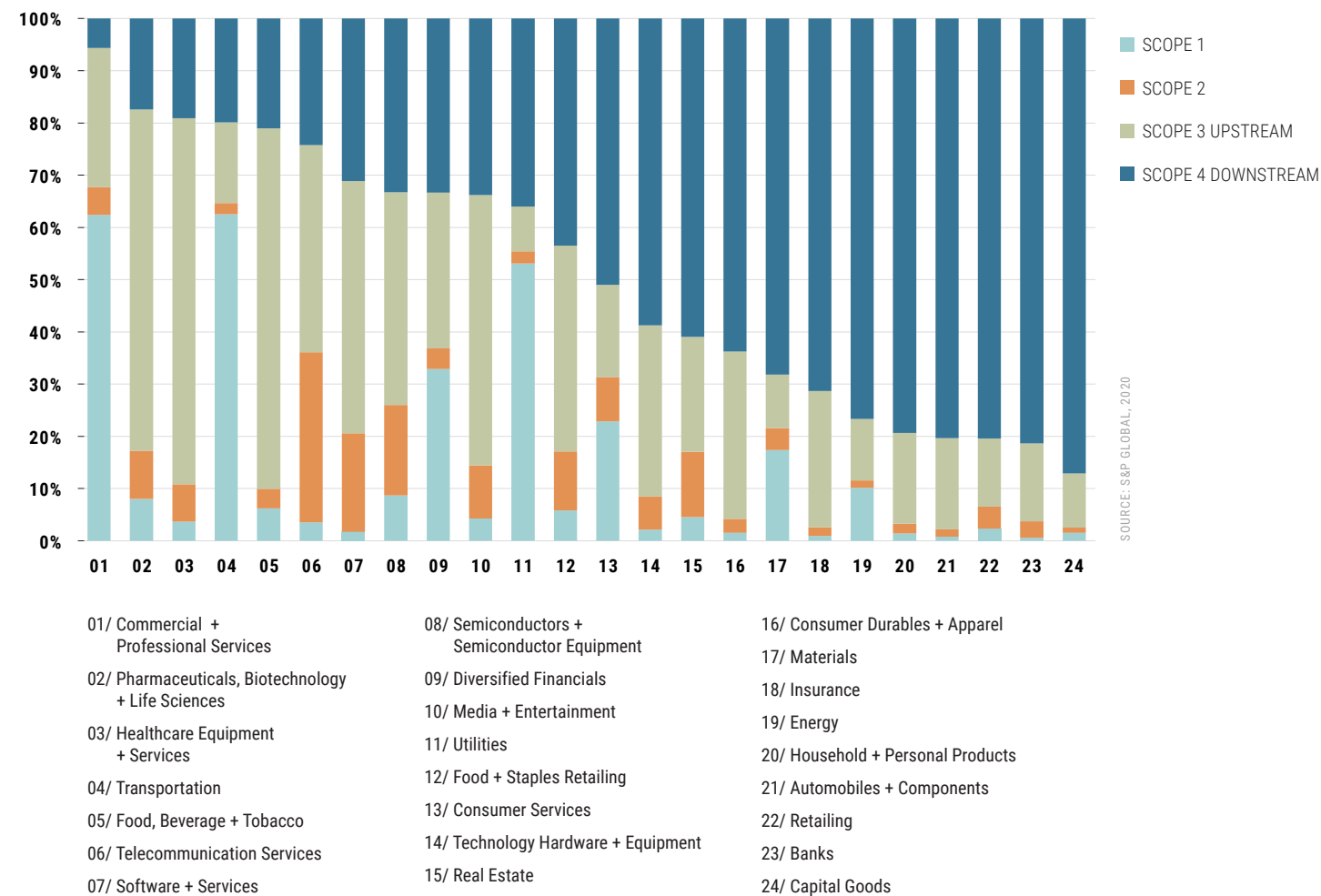
As noted, most natural capital impacts arise from supply chains, with GHG emissions and water consumption being the most material. Total GHG emissions showed a year-over-year decline in 2019 by about 7 percent for global companies and 5 percent for U.S. companies. Of this, Scope 1 (direct emissions from owned or controlled sources) fell about 6 percent year-over-year for both global and U.S. businesses, while Scope 3 emissions (from supply chains) fell 10 percent for global companies and 7 percent for U.S. firms.

Scope 2 (indirect emissions from the generation of purchased electricity, steam, heating and cooling) increased in 2019 for both global and U.S. companies but represented only 10 percent of total emissions in both cases. Scope 3 was much more significant, representing about 47 percent of all emissions. This large share underscores the importance of accounting for indirect value chain emissions and the need to engage with suppliers, customers and competitors to reduce overall impacts.

Emission intensities, which compare the GHG emissions of an activity or economic sector to the economic value it generates, have recorded a steady decline since 2016, with 2019 levels being 14 percent lower for global companies and 16 percent lower for U.S. companies since that time. This is an encouraging sign that should continue to improve as companies learn to decouple their economic growth from natural resource use.

Scope 3 Downstream Sources Are a Major Contributor to Total GHG Emissions

% OF TOTAL GHG EMISSIONS FOR GLOBAL COMPANIES IN 2019



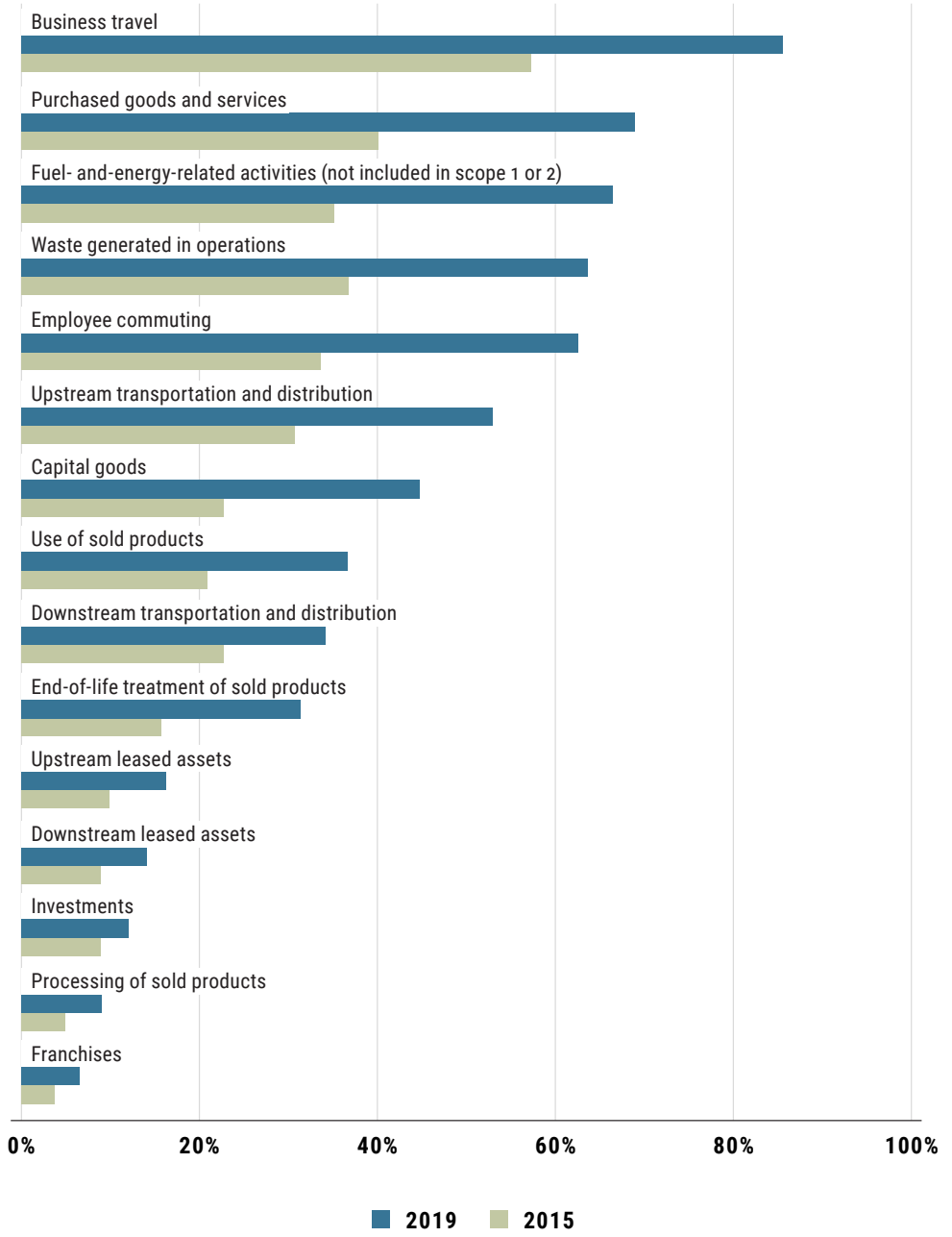
Scope 3 downstream emissions that happen after a product or service leaves a company’s control/ownership represented about 49 percent of global GHG emissions in 2019. Capital goods (87 percent), banks (81 percent) and retailing (80 percent) had the highest percentage of Scope 3 downstream emissions relative to their total emissions.

These downstream emissions can come from a variety of sources. For example, capital goods activities include emissions from raw material manufacturing and transport. Banks emit few GHGs to run their operations – but finance the emissions of other companies through loans and investments.

The GHG Protocol has responded to the demand for an internationally accepted method to enable GHG management of companies’ value chains by developing the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard. The GHG Protocol and its partners proactively work with industry groups and governments to promote the widespread use of this standard to enable more effective GHG management worldwide. The standard enables companies to assess the emissions impact of their entire value chain and identify where to focus reduction activities.

Companies Are Becoming More Transparent About Value Chain Emissions

PERCENTAGE OF COMPANIES DISCLOSING EACH OF THE 15 GHG SCOPE 3 CATEGORIES



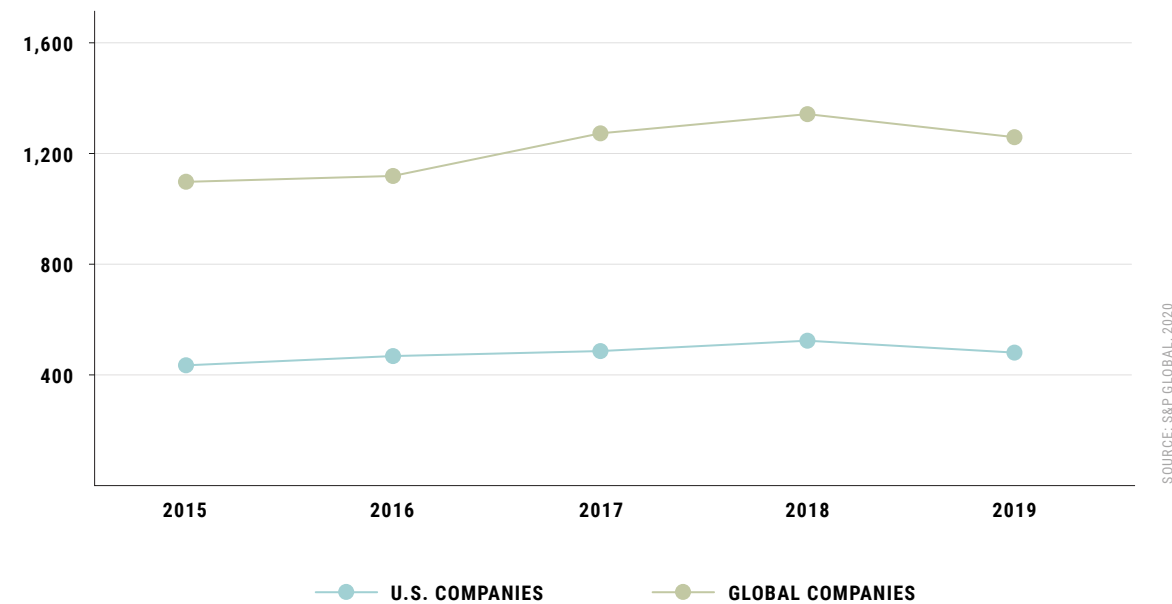
SOURCE: S&P GLOBAL, 2020

Scope 3 emission sources include both upstream and downstream activities that fall into 15 categories, although not every category is relevant for each organization. According to the GHG Protocol, the categories are intended to provide companies with a systematic framework to measure, manage and reduce emissions across their value chains. What’s more, the categories are designed to be mutually exclusive, to avoid double counting of emissions among categories. Sample categories include upstream transportation and distribution, waste generated in operations and business travel.

More companies have begun assessing and disclosing impacts across their value chains, including increased disclosure across the 15 categories of Scope 3. In 2019, there was an average year-over-year increase of 17 percent in disclosure across all categories. Nearly 86 percent of the largest global companies reported business travel emissions, followed by 69 percent reporting emissions from purchased goods and services. Only 12 percent of companies reported emissions from investments, however.

Water Use Dips in 2019, Breaking a Five-Year Trend

TOTAL WATER USE (BILLION CUBIC FEET)



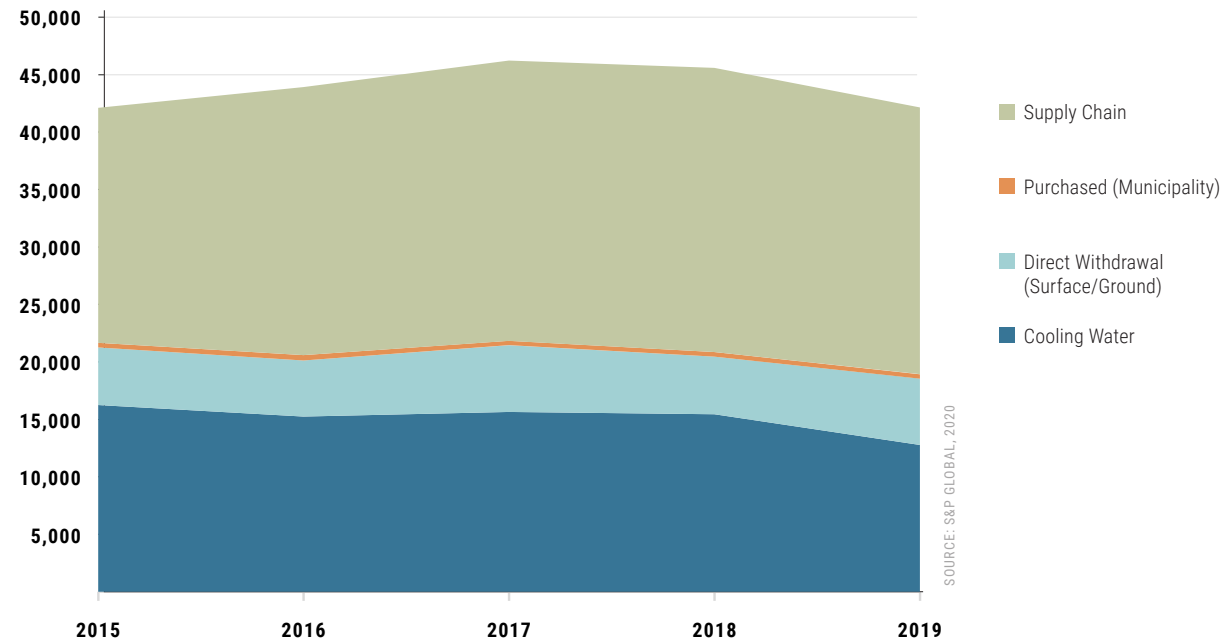
Water is essential to the production and delivery of nearly all goods and services. Many businesses rely on a sufficient flow of clean water to operate and realize their growth ambitions. Overconsumption of water, pollution, environmental degradation and changing climatic conditions are making clean water an increasingly scarce resource.

According to the United Nations, [global water demand](#) is expected to increase by 20 percent to 30 percent above current levels, mainly due to rising demand in the industrial and domestic sectors. More than 2 billion people live in countries experiencing high water stress, and about 4 billion experience severe water scarcity during at least one month of the year.

Water usage increased slightly more than 20 percent for both global and U.S. companies between 2015 and 2018. The trend turned in 2019, with both global and U.S. companies reporting year-over-year declines of 6 percent and 8 percent, respectively. Innovative water conservation efforts are coming forward, but additional creative strategies will be needed to address the U.N.'s dire view of the future.

Water Intensity Decreases for First Time in Five Years

WATER USE INTENSITY (CUBIC METERS PER MILLION USD REVENUE)

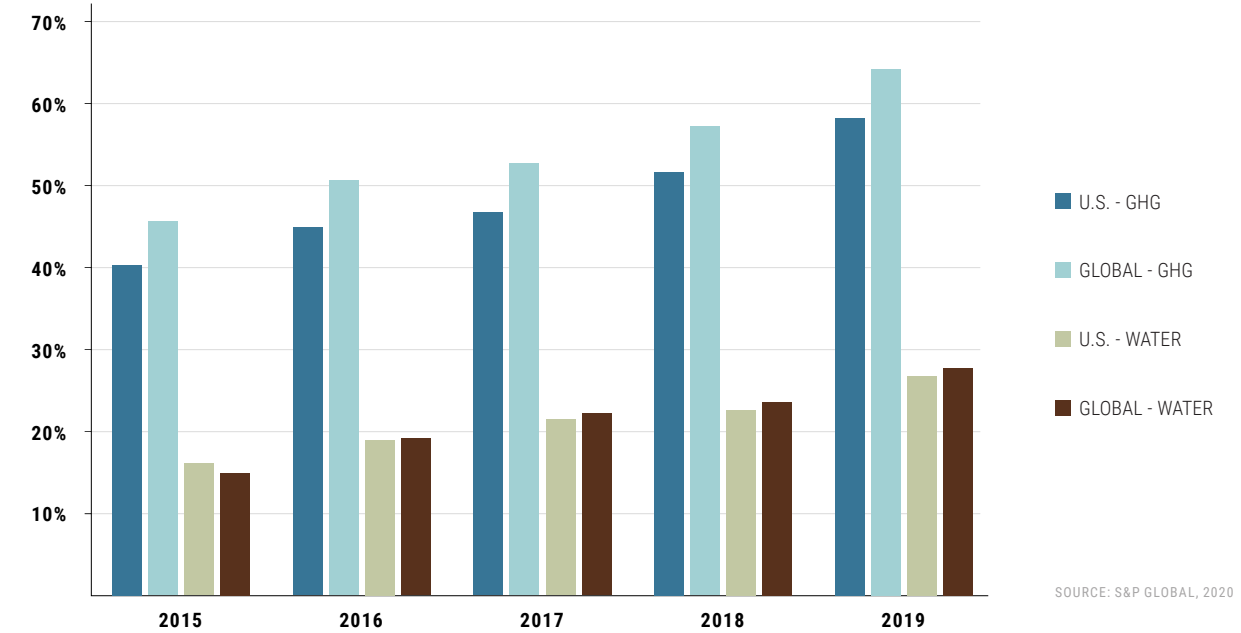


More than half of companies' water usage comes from supply chains, so even companies operating in water-abundant regions can be affected by scarcity given the global nature of suppliers. Water intensity, defined as cubic meters of water used per unit of value added (in U.S. dollars), declined by 8 percent in 2019 – the first time in five years.

Supply chains accounted for 55 percent of this water intensity, however, up from 49 percent in 2015. As with GHG emissions, this shows that most corporate water risk comes from beyond their operations and direct control. This underscores the importance for companies to evaluate their water footprint and define ways to be better stewards of this important resource.

More Companies Set Carbon and Water Reduction Targets

% OF COMPANIES DISCLOSING TARGETS



Companies are demonstrating a growing commitment to further reduce environmental impacts and publicly disclose reduction targets. The share of global and U.S. companies with GHG reduction targets grew by 7 percent and 6 percent, respectively, in 2019 on a year-over-year basis. That represented 64 percent of major global companies and 58 percent of major U.S. companies publicly disclosing carbon targets. Similarly, the percentage of both global and U.S. companies with water reduction targets grew by 4 percent during this time. That represented 28 percent of major global companies and 27 percent of major U.S. companies publicly disclosing these targets.

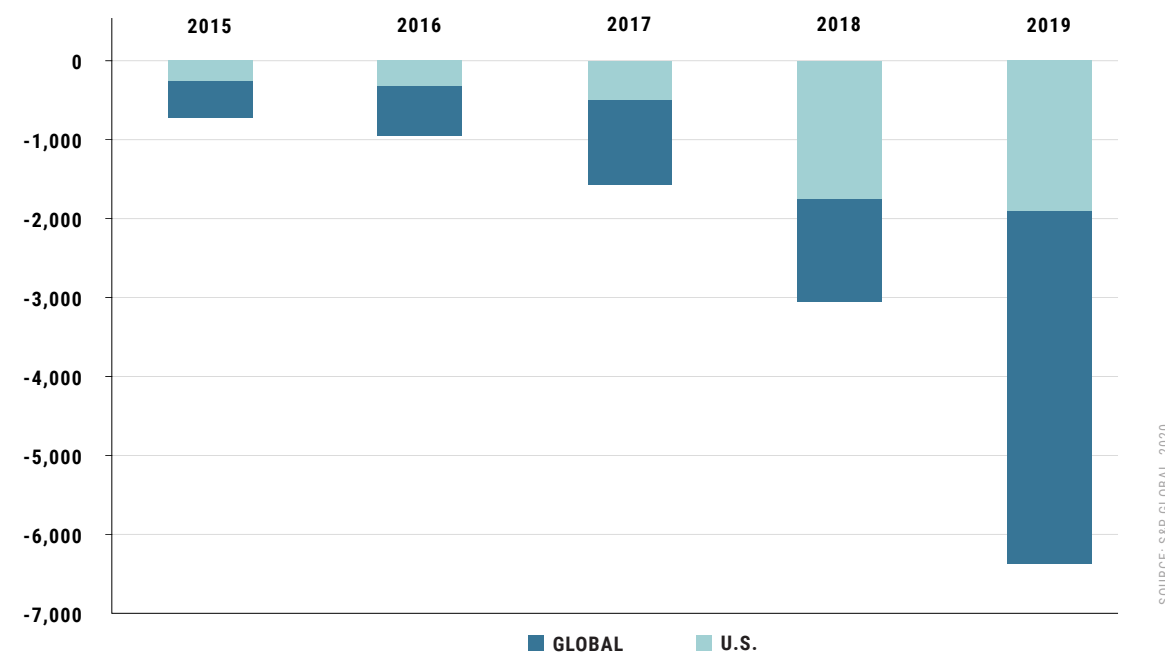
The positive trends are likely to continue as stakeholders ask companies to disclose ESG strategies and their progress over time. For example, in October 2020 a group of large financial institutions [urged companies](#) producing 25 percent of global emissions to set science-based targets. This can help investors and companies address climate-related issues in a uniform and comparable way.

GHG emissions captured in reduction targets have significantly increased globally since 2015. There has been nearly an eight-fold increase in the total emissions covered by a reduction target, topping out at 6 billion tCO₂e in 2019. However, this reduction only represents 18 percent of the total 2019 emissions of the 1,200 largest global companies. Significantly more ambitious targets will have to be adopted in order to achieve the reductions required for a 2 degree future.

By setting science-based targets, companies can demonstrate that they are taking their environmental responsibilities seriously. They can communicate to customers, investors and other stakeholders that they are ready to compete and succeed in a low-carbon world. According to the Science Based Targets initiative, action is gaining pace with over a thousand companies worldwide leading the zero-carbon transition by setting emissions reduction targets grounded in climate science through the initiative.

Companies Embrace More Ambitious Absolute GHG Emissions Reduction Targets

GHG EMISSIONS REDUCTION TARGETS (MILLION TONNES CO₂E)



Climate Risks

2020 is on track to become the [warmest year on record](#), even without any major El Niño event — a factor that has contributed to most prior record warm years.

From wildfires to hurricanes, extreme weather conditions are starting to have a material impact on the global financial system. The Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) recommends companies should evaluate two main categories of climate risk: transitional and physical.

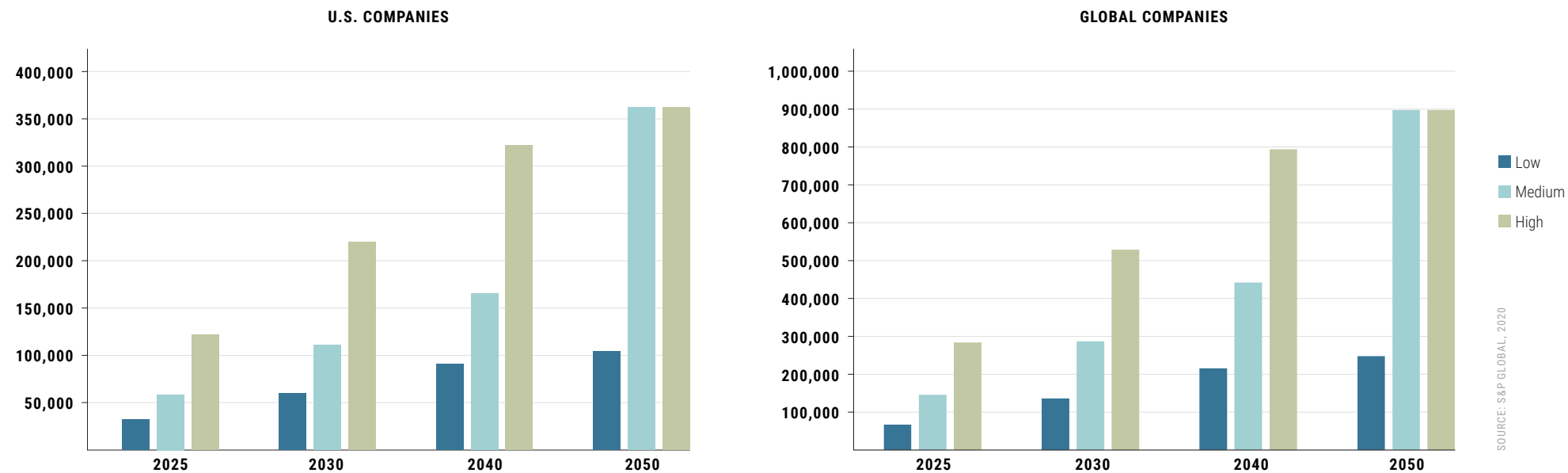
Transitional risks are associated with any market, policy or technology disruption resulting from actions taken to limit climate risk by delivering the low-carbon economy. One such action is putting a price on carbon. Physical risks

are associated with intensifying climate-related weather events, such as droughts, floods, wildfires, hurricanes, water stress and heatwaves.

This Climate Risks chapter was added last year to provide greater visibility into the future transitional and physical risks for companies.

Hundreds of Billions in Unpriced Carbon Costs Expected by 2050

UNPRICED CARBON COST UNDER DIFFERENT SCENARIOS AND YEARS IN MILLION USD



Carbon pricing mechanisms are an important policy tool to reduce GHG emissions and direct capital towards cleaner energy and lower-carbon solutions. Globally, there are currently [57 carbon pricing schemes](#) either in operation or scheduled for implementation at a regional, national or sub-national level, covering about 20 percent of global GHG emissions. According to the World Bank, however, both the amount of emissions covered

by carbon pricing and the price levels are still too low to meet the objectives of the 2015 Paris Agreement to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels, and to pursue efforts to limit the temperature increase even further, to 1.5 degrees Celsius. Carbon pricing policies are likely to ramp up as regions

seek to achieve their Nationally Determined Contributions (NDCs) to reduce emissions and deliver on the Paris Agreement.

To help stakeholders navigate carbon-pricing risk, Trucost has quantified current pricing schemes in more than 130 regions together with potential future carbon pricing scenarios required to deliver the Paris Agreement. The dataset is used by companies to stress-test their ability to absorb future costs and get ahead of carbon pricing risk. Investors typically apply the dataset at the portfolio level to assess portfolio earnings at risk and identify company outliers. Integral to this analysis is the quantification of an Unpriced Carbon Cost (UCC) – the difference between what a company pays for emitting carbon today and what it may pay in the future.

The UCC varies depending on its sector and geographical locations (where it emits). It also depends on the scenario and reference year chosen. Three scenarios are presented: Low, Moderate and High. By 2050, both Moderate and

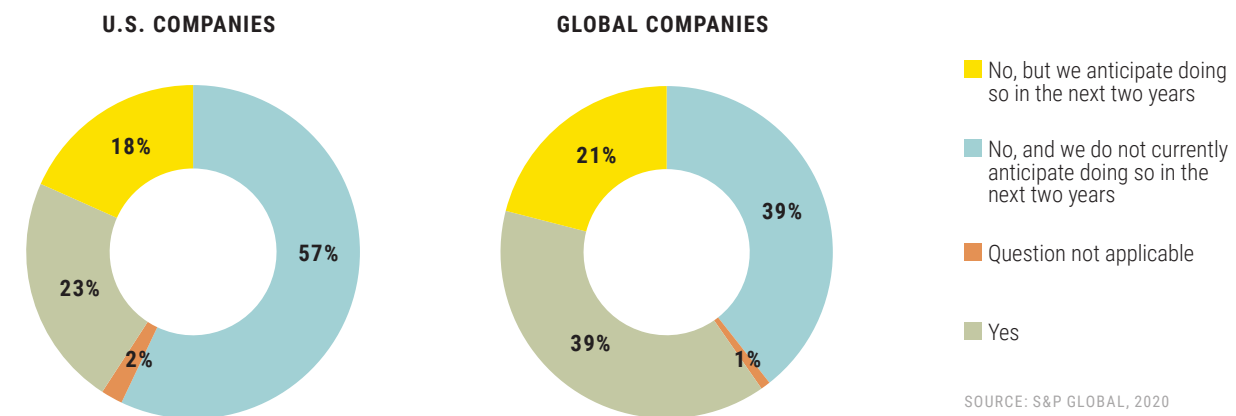
High scenarios arrive at a price deemed to be sufficient to keep global warming to within 2 degrees C above pre-industrial levels (in the former, action is delayed in the short term). The Low scenario is not 2 degrees C-aligned but assumes the implementation of the NDCs.

Under the High pricing scenario, the 500 largest U.S. companies face \$122 billion in UCC in 2025, equating to 11 percent of earnings.

For the 1,200 largest global companies, that figure is about \$284 billion, representing 13 percent of earnings. By 2050, the UCCs balloon to \$363 billion and \$898 billion for U.S. and global companies, respectively, under both the Moderate and High pricing scenario.

Minority of Companies Have Set Internal Carbon Prices, but More Plan to Do So in Next Two Years

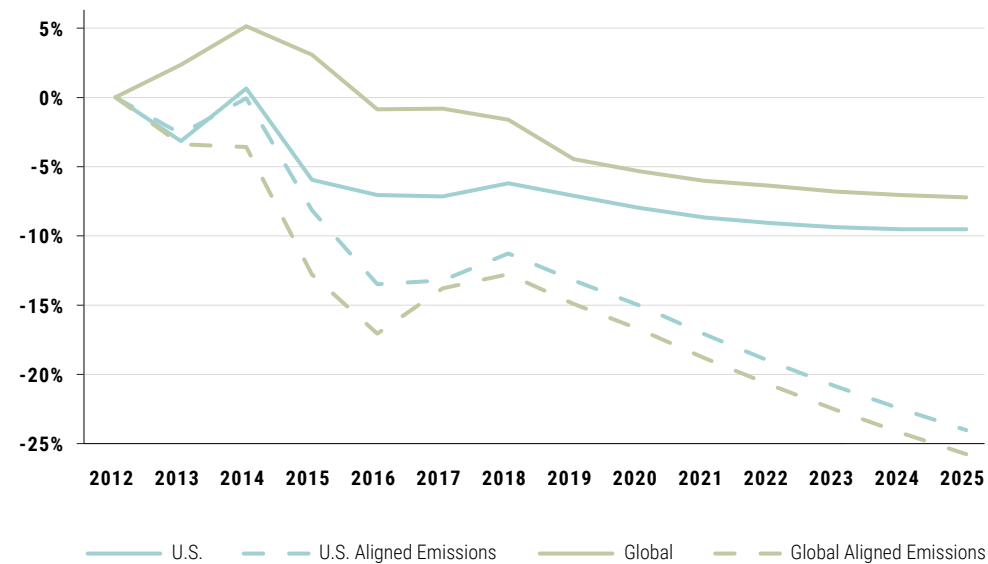
% OF COMPANIES SETTING A CARBON PRICE



An internal carbon price places a monetary value on GHG emissions to inform low-carbon business strategies. For example, by integrating internal carbon pricing into product development and supply-chain decision-making, companies can inform the business case for low-carbon innovation and risk management. U.S. and global companies face significant monetary risks from carbon pricing policies, yet only 23 percent of U.S. companies and 39 percent of global companies have set an internal carbon price. These figures are expected to increase by 18 percent in the U.S. and 21 percent globally in the next two years.

Significant Emissions Reductions Are Needed to Align With a 2 Degrees Celsius Scenario

% CHANGE FROM 2012 EMISSIONS



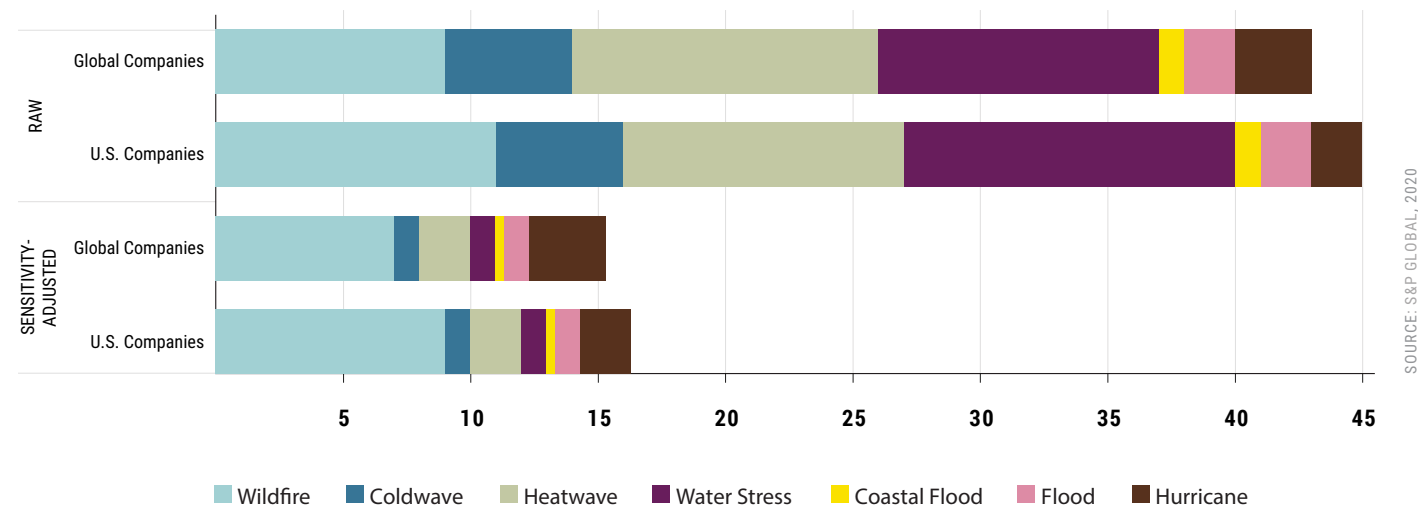
SOURCE: S&P GLOBAL, 2020

A Paris Alignment assessment looks at companies' alignment with the Paris Agreement goal to limit global warming to well below 2 degrees C from pre-industrial levels. The approach taken by Trucost is a transition pathway assessment, which examines the adequacy of emissions reductions over time in meeting a 2 degrees C carbon budget. For this analysis, a medium-term time horizon was applied, informed by seven years of historical data and seven years of projected future emissions.

The findings showed that U.S. companies are on a trajectory to fall short of the required reductions, achieving only a 10 percent decrease from a 2012 baseline by 2025; 60 percent short of the 24 percent reduction needed to align with the Paris Agreement goal of 2 degrees warming by 2025. Large global companies are on track to exceed a 3 degrees warming pathway, achieving only a 7 percent reduction in carbon emissions from a 2012 baseline by 2025, 72 percent short of the 26 percent reduction needed to achieve the Paris Agreement goal of 2 degrees warming by 2025.

Heatwave and Water Stress Are Greatest Drivers of Physical Risk for Both U.S. and Global Companies

PHYSICAL RISK SCORE BY CLIMATE RISK INDICATOR IN 2050 UNDER RCP 8.5



SOURCE: S&P GLOBAL, 2020

Climate change physical risks are expected to vary widely across the globe. Existing hazards likely will increase in intensity in some regions, while other regions will become subject to hazards not previously experienced. These changes, combined with the increasingly global nature of corporate operations and supply chains, may present significant variation in the intensity and range of physical risk exposures across global capital markets.

Some sectors are more at risk than others, but it depends on the specific type of hazard in question. Certain predictions for rising sea levels, for

example, show a possible change of 1.5 meters beyond 2100, which could affect a large portion of lower Manhattan and a great deal of real estate around the world. Heatwaves and wildfires, on the other hand, could have a serious impact on the power grid and electricity producers. In addition, floods and droughts could affect power stations, as well as farmers.

The Trucost Climate Change Physical Risk dataset provides detailed information to help understand the exposure of company-owned facilities and capital assets to climate-related physical impacts under different climate change scenarios and time intervals.

Trucost analyzed the average asset-level physical risk exposure of the 500 largest U.S. companies and 1,200 largest global companies under a High Climate Change scenario ([the so-called RCP 8.5 global warming scenario](#)) by 2050, which would occur if fossil fuels continue to dominate and emissions continue to rise. Companies are scored from 1 to 100 for each of the seven risk types (water stress, wildfire, flood, heatwave, coldwave, hurricane and coastal flood). A score of 100 indicates the highest possible exposure and sensitivity to a given risk, while 1 indicates the lowest.

Findings showed that water stress, heatwaves and wildfires linked to increasing global average temperatures represent the greatest driver of physical risk across both U.S. and global companies. Under a High Climate Change scenario, nearly 95 percent of U.S. companies and 80 percent of global companies will face moderate physical risk (score > 33) by 2050. 44 percent of the 500 largest U.S. companies and 30 percent of the 1,200 largest global companies own at least one asset located in an area facing high water stress risk. 13 percent and 17 percent of these U.S. and global companies, respectively, own at least one asset at high risk for wildfire.

Trucost also provides a sensitivity-adjusted physical risk score to reflect the potential materiality of events to an asset owner's business. For example, businesses with high water dependency are more likely to be impacted by water scarcity, while businesses with high capital intensity are more likely to be impacted by wildfires or floods. Wildfire remains the most important physical risk for both U.S. and global companies when making these adjustments. However, the sensitivity-adjusted physical risk score decreases significantly for both U.S. and global companies.

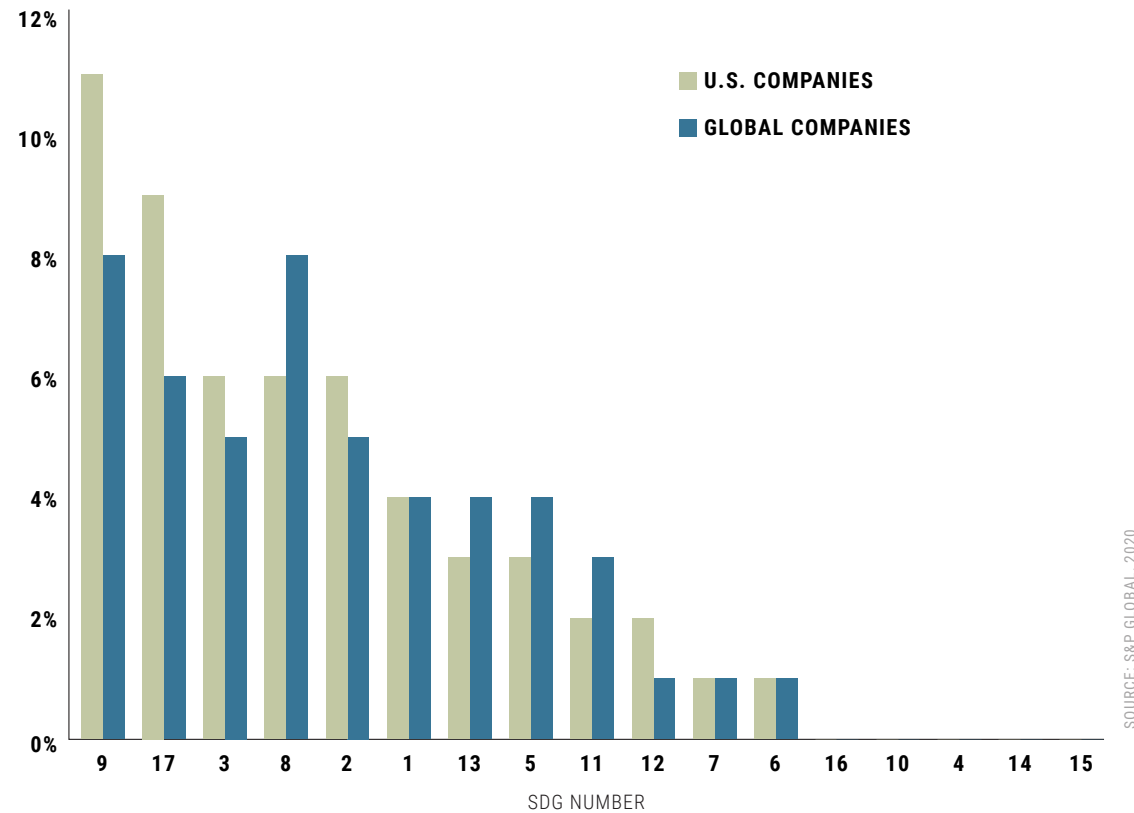
Positive Impact

This section examines progress being made towards achieving the 17 U.N. Sustainable Development Goals (SDGs) launched in 2015. [According to the Business and Sustainable Development Commission](#), putting the SDGs at the heart of the world's economic strategy could unlock \$12 trillion in economic opportunities and 380 million jobs by 2030.

We also review important steps being taken in Europe to establish performance thresholds for economic activities that contribute to select environmental objectives and that are intended to help market participants gain access to green financing through the European Union Taxonomy for Sustainable Activities. We close with a focus on the incredible growth of green bonds – which set records every year – providing insight into the most active regions and the industries that are benefiting.

Half of Revenues are Generated by Business Activities Supporting SDGs

PERCENTAGE OF COMPANIES SUPPORTING SDGs



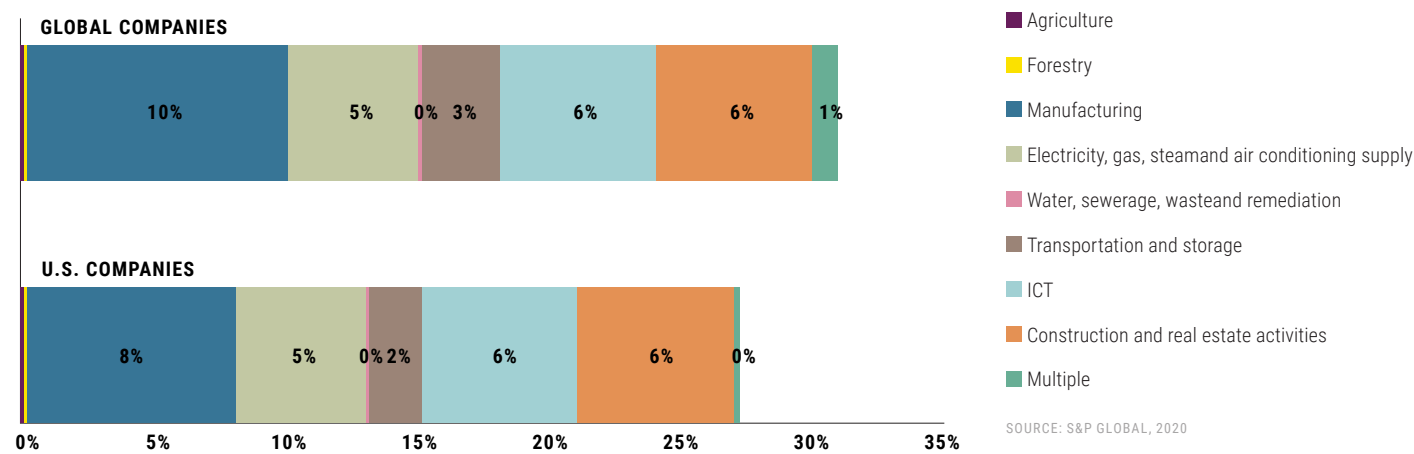
Formally adopted by 193 countries, the SDGs outline a set of objectives to be achieved by 2030 that aim to end poverty, hunger and inequality, while tackling climate change, improving health and education, and spurring economic growth. In contrast to the earlier Millennium Development Goals, the SDGs not only emphasize the role of government and nongovernmental sectors but also that of businesses to operate responsibly and pursue opportunities to solve societal challenges.

SDG Positive Impact Alignment refers to the contribution a company may make to the SDGs by directing its business model towards priorities that help achieve any of the goals. Most commonly, this happens through the sale of SDG-aligned products and services.

Currently, 53 percent of revenues of the 500 largest U.S. companies and 49 percent of revenues of the 1,200 largest global companies are generated in business activities that support SDGs. The three most supported SDGs for U.S. companies are SDG 9: Industry, innovation and infrastructure (11 percent), SDG 17: Partnerships (9 percent) and SDG 3: Good health and well-being (6 percent). While SDG 9 and 17 are also in the top three when looking globally, SDG 8: Decent work and economic growth is the top-supported across global companies (8 percent). SDG 4: Quality education, SDG 14: Life below water and SDG 15: Life on land receive almost no support, both in the U.S. and globally.

Nearly a Third of Revenues by U.S. and Global Companies Align with the EU Taxonomy for Sustainable Activities

EU TAXONOMY REVENUE SHARE BY SECTOR



In March 2018, the European Commission adopted an action plan on sustainable finance as part of a strategy to integrate ESG considerations into its financial policy framework and mobilize finance for sustainable growth. Two months later, the commission released the first legislative package under the action plan and established a Technical Expert Group on Sustainable Finance (TEG) to inform its development. One proposal was the development of a unified EU classification system, or EU Taxonomy that would define which economic activities are environmentally sustainable. In March 2020, the TEG published its final report that outlined recommendations on the design and implementation of the taxonomy.

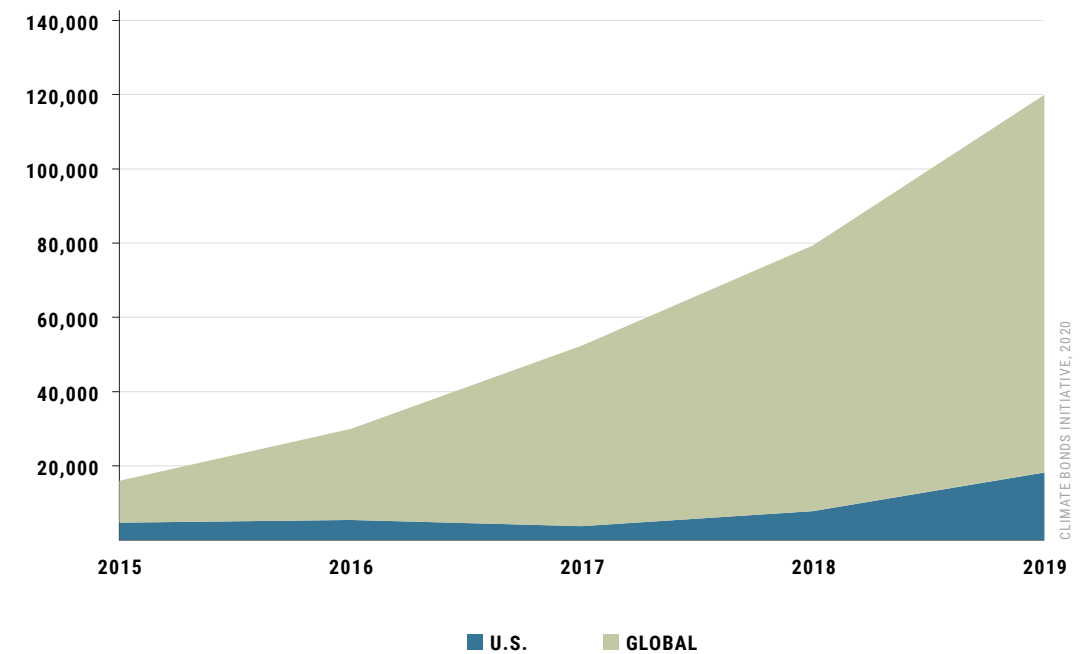
The taxonomy is a tool that can help companies and investors navigate the transition to a low-carbon, resilient and resource-efficient economy. It sets performance thresholds for economic activities that make a substantive contribution to one of six environmental objectives: climate change mitigation, climate change adaptation, sustainable and protection of water and marine resources, transition to a circular economy, pollution prevention/control, and protection and restoration of biodiversity and ecosystems. The performance thresholds will help companies, project promoters and issuers access green financing to improve their environmental performance, as well as help identify activities that are already environmentally friendly. The aim is to grow low-carbon sectors, while decarbonizing high-carbon ones.

The taxonomy outlines 70 business activities linked to seven macro sectors. These include transition activities that either have low-carbon intensity and direct carbon mitigation potential (e.g., renewable energy), or relatively higher carbon intensity, but significant carbon mitigation potential over time (e.g., steel manufacturing). It also includes enabling activities that could support carbon emission reductions in other sectors (e.g., wind turbine manufacturing).

A 2019 analysis by Trucost showed that nearly 27 percent of revenues generated by the 500 largest U.S. companies and 31 percent of revenues generated by the 1,200 largest global companies were aligned to the EU Taxonomy. The majority of EU Taxonomy-aligned revenues are generated in the manufacturing sector, followed by construction and real estate and information and communications.

Global Issuances of Green Bonds Grew Sharply in the Last Five Years

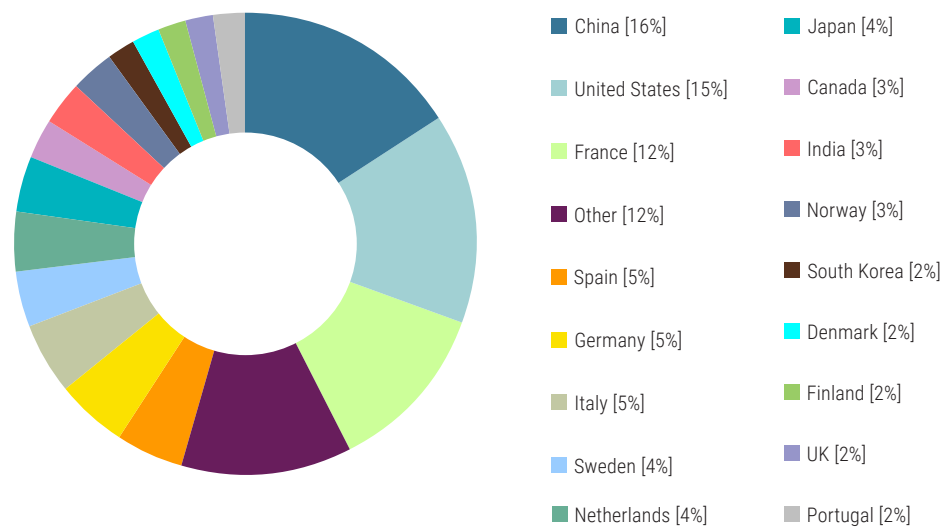
CORPORATE GREEN BOND ISSUANCE (MILLION USD)



Green bond issuances are on a clear upward trajectory, propelled by the 2015 Paris Agreement and the impetus the accord created to finance \$1 trillion a year in investments for renewable energy and other initiatives that limit global warming. Green bonds, designed to channel funds to environmentally friendly projects, reached a global record of more than \$255 billion in issuances in 2019, a 51 percent growth over the previous year, with corporate green bonds accounting for nearly \$120 billion of this total. Most of the proceeds were used for energy, building and transport, in that order.

In Aggregate, European Firms Dominate Issuances of Green Bonds

GREEN BOND ISSUANCE MILLION USD



SOURCE: CLIMATE BONDS INITIATIVE, 2020

A number of corporate sectors have had [reasonable success](#) issuing green debt – with shipping, autos, airlines, cement and, selectively, the metals, mining and hydrocarbon (oil and gas, chemicals, etc.) industries all playing an important role in the transition to sustainability. Corporate green bonds were issued from 59 countries in 2019. Chinese companies accounted for 16 percent of the total by value, followed closely by businesses in the U.S. (15 percent) and France (13 percent). In aggregate, however, European firms accounted for nearly half of the total.

Although corporate debt issuers in North America are increasingly willing to consider sustainable financing as part of their capital funding, green bonds are still only a very small share of the mix. According to S&P Global Ratings, one reason why issuance has not been significant in the United States is because about 95 percent of green issuers are investment-grade companies where spreads between rating categories are typically narrower, especially when interest rates are low. The spread between green and “vanilla” (or conventional) bonds likely will be larger as interest rates rise and a broader swath of the credit spectrum issues green bonds.

ESG Performance

The fast-rising prominence of ESG issues is reshaping requirements for corporate disclosure and analytics. Stakeholders are demanding to learn more about companies' ESG track record, while business leaders are looking to dig deeper into strengths and weaknesses to identify new sources of value creation.

The SAM Corporate Sustainability Assessment (CSA), first established in 1999 and now published by S&P Global, is an annual evaluation of companies' sustainability practices, focusing on criteria that are both industry-specific and financially material.

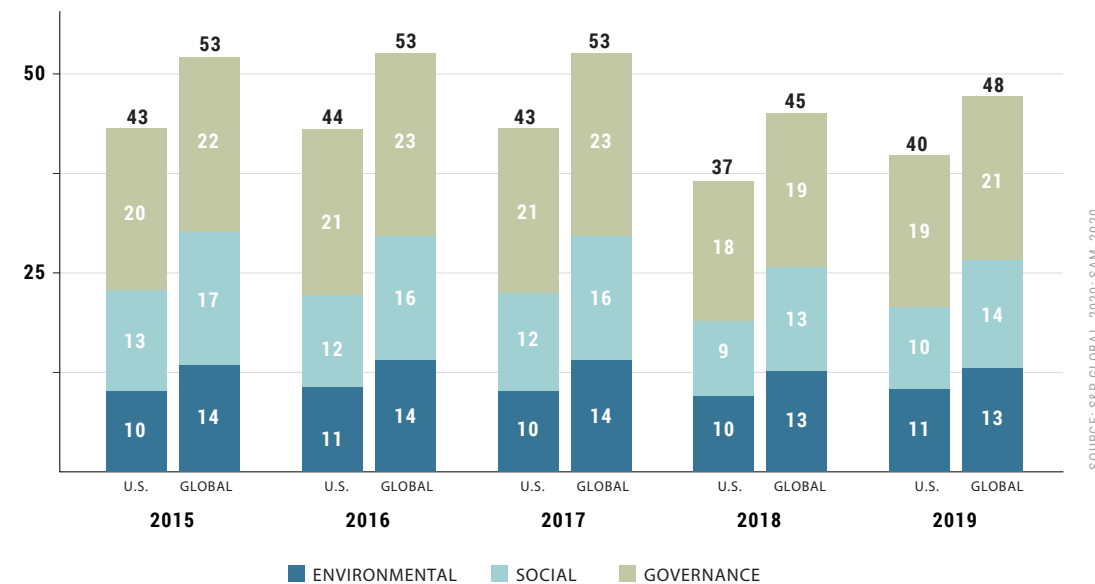
Companies participating in the CSA have long understood the importance of considering ESG criteria

in their business strategies. By directly reporting key sustainability metrics and benchmarking their relative performance on a wide range of industry-specific issues, they have been able to demonstrate dedication to the highest standards of ESG performance management.

Each year, over 3,500 publicly traded companies are invited to participate in the CSA. Of these, the largest 2,500 global companies by market capitalization are eligible for inclusion in the flagship Dow Jones Sustainability World Index (DJSI World). Additional companies are eligible for the growing family of regional and country-specific sustainability indices, such as DJSI North America, Europe, Asia Pacific and Emerging Markets.

Global Companies Outperform U.S. Companies in ESG Scores

5-YEAR ESG SCORES FOR U.S. AND GLOBAL COMPANIES



The CSA survey uses a consistent, rules-based methodology that is specific to 61 industries. There are about 100 questions per company in each industry, with each question falling under, on average, one of 23 themes or criteria. The criteria, in turn, fall under one of the three dimensions: Environmental (E), Social (S) or Governance and Economic (G). Some criteria are common across industries, while others are industry-specific.

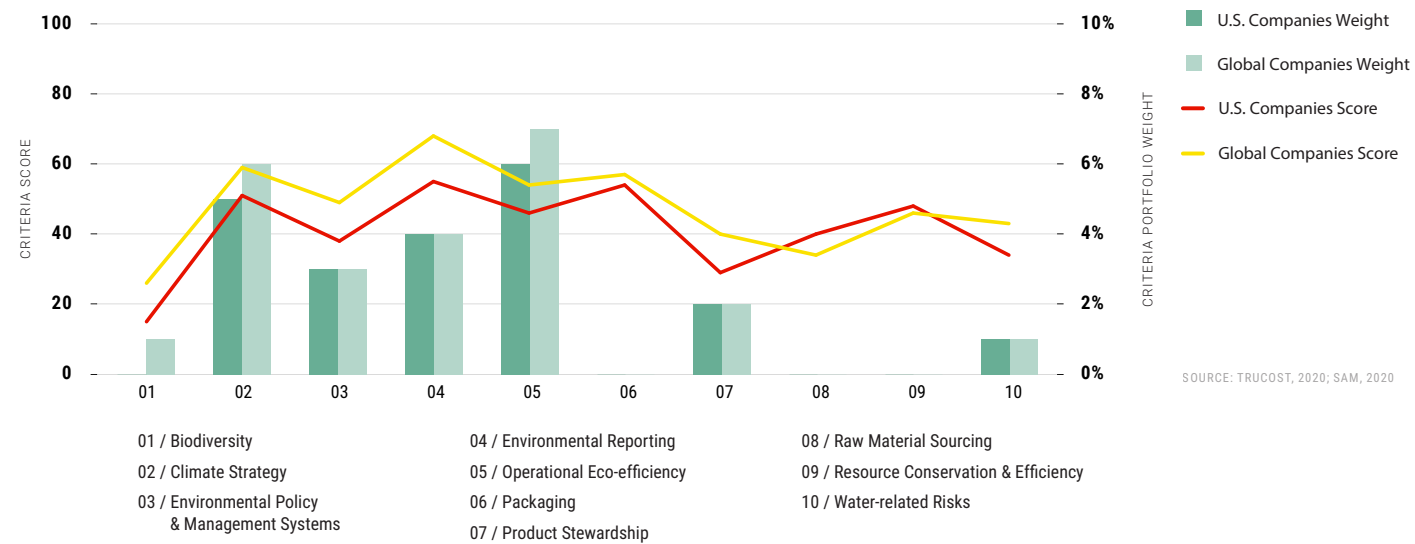
At the heart of the process lies a financial materiality matrix, used to create industry-specific criteria weights. Weights reflect those ESG

factors that have demonstrated the clearest correlations to past financial performance, plus those most likely to affect business value drivers and, ultimately, future financial performance. A company's responses to the questions in the CSA are weighted accordingly to form a criteria-level score. Each of the 23 criteria-level scores is then weighted to form the E, S and G scores. Finally, these are weighted to form an overall S&P Global ESG score for the company. All scores, whether criteria-level, dimension-level or total-level, range from 0 to 100, with 100 representing the best performance.

The largest U.S. companies achieved an average ESG score of 40 in 2019, while their major global counterparts achieved 47. Overall, the largest U.S. companies have a lower average ESG score when compared to the largest global companies, averaging nine points lower over the last five years. This potentially reflects the differences in maturity of sustainability and ESG reporting practices across Europe and Asia (captured in "Global Companies" in the graph) as compared to the U.S. companies. For most industries, governance is the most material ESG dimension, on average, having a higher contribution to the overall ESG score than the environmental or social dimension.

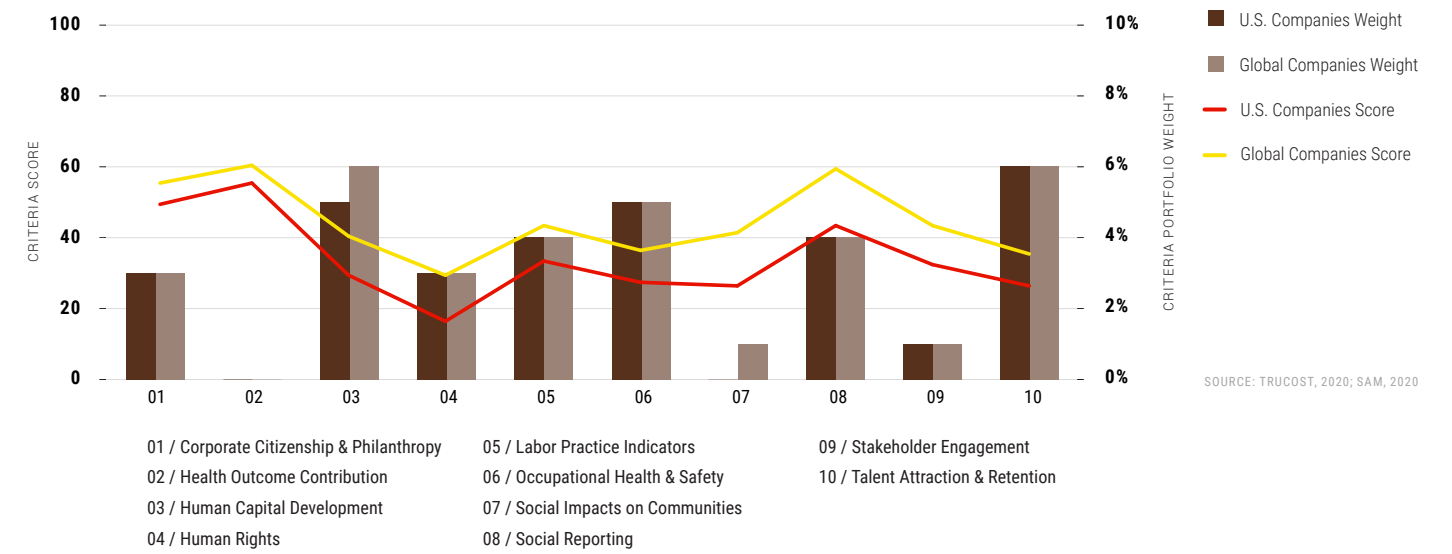
U.S. Companies Score Lower Across Most ESG Criteria, Compared to Global Companies

ENVIRONMENTAL CRITERIA WEIGHTS AND PERFORMANCE



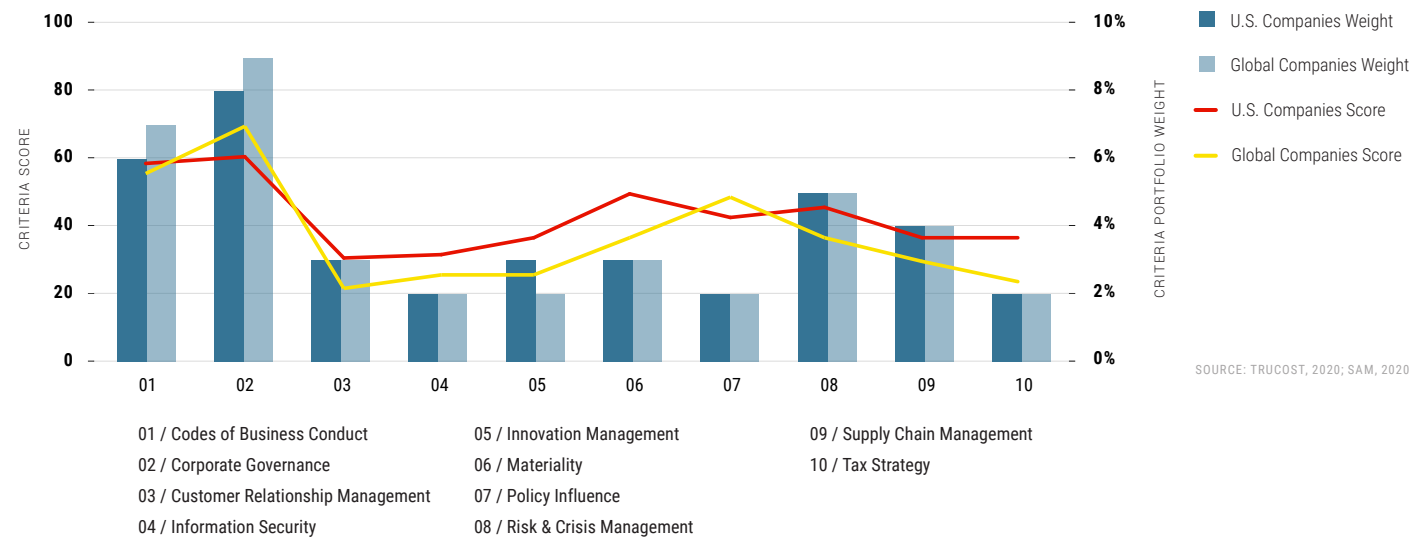
U.S. Companies Score Lower Across Most ESG Criteria, Compared to Global Companies

SOCIAL CRITERIA WEIGHTS AND PERFORMANCE



U.S. Companies Score Lower Across Most ESG Criteria, Compared to Global Companies

GOVERNANCE CRITERIA WEIGHTS AND PERFORMANCE



As mentioned previously, companies are assessed on 23 criteria, on average. Performance across 10 sample criteria is displayed in the exhibits for each of the three dimensions (E, S and G). The lines represent the average criteria score, while the bars represent the average materiality weight given to the criteria for U.S. and global companies. In other words, the lines show the performance of companies against the criteria, while the bars show the relevance of the criteria.

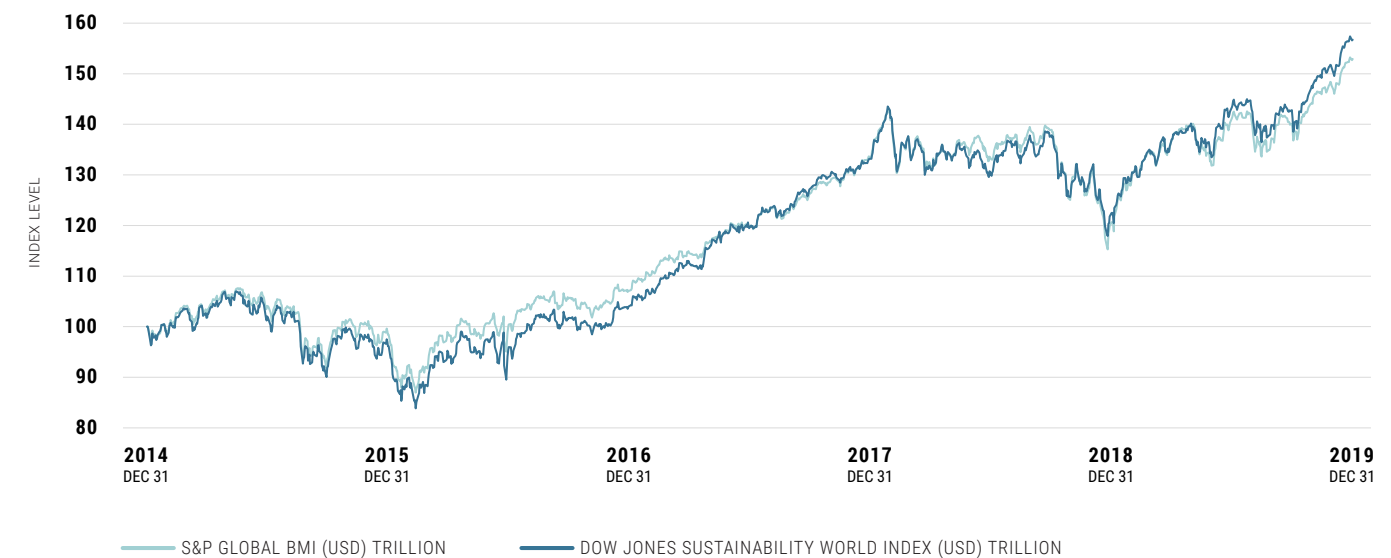
Similar to the overall ESG scores, U.S. companies generally underperform compared to global companies at the criteria level across all three

dimensions. Within G, however, U.S. companies score slightly better than global companies with respect to corporate governance, one of the highest-weighted criterion across all dimensions. It should be noted that criteria scores may be affected by CSA’s Media and Stakeholder Analysis (MSA), which accounts for ongoing company controversies. News stories are tracked for checks and balances to make sure companies are upholding the business standards they claim in their CSA responses. The impact of MSA cases are defined as minor, medium or major, and ultimately may lead to a re-scoring of the relevant criteria for the company in question (the MSA is informed by RepRisk, a firm that provides expertise in ESG risk).

S&P Dow Jones Indices has been a pioneer in ESG indexing for over 20 years, starting with the 1999 launch of the DJSI World index, in partnership with SAM. The index comprises global sustainability leaders as identified by SAM. It represents the top 10 percent of the largest 2,500 companies in the S&P Global Broad Market Index (BMI) based on long-term ESG criteria.

Questions often have been raised as to whether ESG investing can deliver attractive returns. It is therefore noteworthy that the DJSI World index outperformed the S&P Global BMI by 1.22 percent over a one-year period on an annualized total return basis, and by 2.03 percent and 0.54 percent over three- and five-year periods, respectively.

Dow Jones Sustainability World Index Outperforms S&P Global BMI Index on an Annualized Total Returns Basis



Source: S&P Dow Jones Indices LLC. Performance data from December 31, 2014, to December 31 2019. Data for graph from December 31, 2014, to December 31 2019. Index performance based on daily total returns in USD unless stated otherwise. Charts and graphs are provided for illustrative purposes. Past performance is not an indication or guarantee of future results. These charts and graphs may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

ANNUALIZED RETURNS PERFORMANCE	1-YEAR	3-YEAR	5-YEAR
Dow Jones Sustainability World Index (USD) TRILLION	27.98%	14.63%	9.41%
S&P Global BMI (USD) TRILLION	26.76%	12.60%	8.87%
EXCESS ANNUALIZED RETURN	1.22%	2.03%	0.54%

GREENFIN

APRIL 13-14, 2021



Online Event

Corporate ESG ratings are now synonymous with reduced risk and higher returns. Meanwhile, a new category of loans and bonds is being linked to firms' sustainability performance. But the marketplace still faces a lack of definitions and standards.

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Methodology

The State of Green Business Index derives from S&P Global ESG datasets and analytics to inform the metrics in four chapters – Natural Capital, Climate Risk, Positive Impact and ESG Performance. Data were aggregated for both the S&P 500® index of major U.S. companies and the S&P Global 1200, covering about 70 percent of global market capitalization.

In addition to analyzing corporate environmental performance trends, S&P Global Trucost also calculated the cost of companies' environmental

impacts to provide insight into the economic consequences of those impacts. This year's report also extends to additional climate analytics including climate transition and physical risk metrics, impact metrics such as SDG and EU green taxonomy alignment, and analytics leveraging S&P Global ESG scores.

Data sources

Data from each S&P Global ESG dataset were aggregated for the companies in the S&P 500 and S&P Global 1200 indices to represent the largest U.S. and global companies respectively. Metrics pertaining to scores (physical risk, ESG) and alignment (SDG, EU Taxonomy) were averaged on an equal weighted basis, i.e. each company in

the S&P 500 and S&P Global 1200 indices held equal representation in each overall metric.

For more information on each dataset used in this year's The State of Green Business Index, please see the resources below for each section or visit www.trucost.com.

Natural Capital

[Trucost Environmental](#): Corporate environmental performance data is sourced from the Trucost Environmental Register, a database that covers about 15,000-plus companies, representing 98 percent of available global market capitalization. The Trucost Environmental Register is built on information from companies' annual reports, websites and other publicly disclosed data. Trucost's annual engagement program provides an opportunity for companies to review, improve

and verify the research.

Where company disclosure data is not available, Trucost applies a wide range of estimation techniques and environmental modeling tools, including standard and hybridized life cycle assessment (LCA) models to compare environmental impacts across companies, supply chains, regions, sectors and investment benchmarks. For the 2021 analysis, Trucost filled gaps in company disclosure with its environmentally extended input-output LCA model, which estimates the amount of resources a company uses (the inputs) to produce goods or services (outputs), as well as the pollution that results.

Trucost's model calculates the environmental impacts of 464 standard business activities and has been further enhanced to provide additional detail for environmentally intense sectors. The environmental impacts for each

sector are allocated to a company according to its proportion of total revenue. The model also incorporates sector-level inflation data to adjust calculations in line with annual inflation and movements in commodity prices.

Trucost's model draws on robust data from a wide range of government and academic data sources, such as the U.S. Environmental Protection Agency, covering more than 700 environmental indicators including greenhouse gas emissions, toxic pollutants, water consumption and waste. The system is consistent with the U.N. Millennium Ecosystem Assessment. Data on emissions is combined with economic data from sources such as the U.S. Bureau of Economic Analysis to analyze interactions between economic productivity and the environment.

The production, use and disposal of most materials

have environmental and social costs that are not reflected in the market prices of goods and services. Applying environmental or "natural capital" valuation techniques allows businesses to understand and communicate environmental impacts in monetary terms alongside traditional financial performance measures. These costs also can be factored into business and investment decision making, by considering tradeoffs between the implied costs and benefits of financial and economic activity. Natural capital accounting helps companies understand their environmental impacts and potential exposure to increased costs or increased competitiveness due to tightening environmental regulation (such as carbon taxes, reduced water allocations or greater restrictions on use of toxic materials) or consumer pressure to improve environmental performance.

For the 2021 analysis, in addition to measuring environmental performance in physical units (such as metric tons of greenhouse gases or cubic meters of water), Trucost also valued in monetary terms the costs of these impacts. An environmental damage cost (natural-capital cost) was applied to each unit of resource and emission. The costs represent the quantities of natural resources used or pollutants emitted multiplied by the environmental damage costs to the economy and society. Trucost's natural capital valuations draw on extensive international academic research into environmental economics and are informed by an independent International Advisory Panel of leading academics.

Climate Risk

[Trucost Physical Risk](#): Trucost's Physical Risk dataset assesses company exposure to physical risk at the asset-level based on a database of over 500,000 assets mapped

to 15,000-plus listed companies in the S&P Market Intelligence database. The dataset includes:

- Seven climate change physical risk indicators including heatwaves, cold waves, water stress, hurricanes, wildfires, flood and sea level rise
- Low, moderate and high future climate change scenarios based on the Intergovernmental Panel on Climate Change (IPCC) Representative Concentration Pathways (RCP)
- Estimates of climate change physical impacts in 2020, 2030 and 2050

[Trucost Carbon Earnings at Risk](#): Trucost's Carbon Earnings at Risk dataset assesses company-level exposure to current and future carbon pricing scenarios. Integral to this analysis is the calculation of the Unpriced Carbon Cost, defined as the difference between what a

company pays for carbon today and what it may pay at a given future date based on its sector, operations, and under different climate change scenarios. This dataset can be used to stress test a company's current ability to absorb future carbon prices and understand potential earnings at risk from carbon pricing on a portfolio level and report to stakeholders on forward-looking estimates of financial risks in line with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD).

[Trucost Paris Alignment](#): Trucost's Paris Alignment dataset assesses company-level alignment with the Paris Agreement goal to limit global warming to well below 2 degrees Celsius from pre-industrial levels. The approach taken by Trucost is a transition pathway assessment, which examines the adequacy of emissions reductions over time in meeting a 2 degrees C carbon budget. This dataset enables investors

to track their portfolios and benchmarks against the goal of limiting global warming to 1.5 degrees C and 2 degrees C climate change scenarios.

Positive Impact

[Trucost SDG Analytics](#): Trucost's Sustainable Development Goals (SDGs) Analytics quantitatively measure the SDG alignment of a company's products and services, allows investors to benchmark companies against each other in terms of their SDG performance and offers portfolio-level metrics to measure risk exposure and SDG alignment.

[Trucost EU Taxonomy Revenue Share](#): Trucost's EU Taxonomy Revenue Share dataset provides a granular assessment of the proportion of company revenues linked to the sustainable business activities outlined in the EU Taxonomy. The dataset covers 15,000 companies

with history going back to 2005 and can help users identify companies and sectors that have the potential to make a substantive contribution to the low-carbon transition. At the portfolio level, the dataset helps financial institutions to understand, optimize and report on the alignment to the EU Taxonomy. The dataset quantifies revenue alignment at the company and sector level.

ESG Performance

[S&P Global ESG Scores](#): S&P Global ESG Scores are an environmental, social and governance dataset that provides company level, dimension level and criteria level scores based on the SAM Corporate Sustainability Assessment (CSA) process, an annual evaluation of companies' sustainability practices. Drawing upon 20 years of experience analyzing sustainability's impact on

a company's long-term value creation, this is one of the most advanced ESG scoring methodologies. This dataset provides:

- Sustainability scores that have an impact on a company's business value drivers, including growth, profitability, capital efficiency and risk exposure of 7,300-plus companies
- A qualitative screen based on SAM's Media and Stakeholder Analysis (MSA evaluates a company's response to critical sustainability issues that may arise during the year)
- Full data history dating back to 2013

About



GreenBiz Group is the leading media and events company at the intersection of business, sustainability and innovation. Through our media, events, research and membership network, GreenBiz Group drives transformation and accelerates progress – within companies, industries and in the very nature of business.

Since 2000, GreenBiz.com has provided deep-dive, forward-thinking content on a variety of sustainable business topics through seven focused channels: energy, transportation and mobility, circular economy, carbon removal and

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NGOs. Our events combine actionable, solutions-oriented content with high-caliber mainstage presentations, hands-on workshops, deep-dive summits and unparalleled networking opportunities.

The GreenBiz Executive Network (GBEN) is a membership-based, peer-to-peer learning forum for sustainability executives from the world's largest companies. GBEN provides our more than 90 corporate members with access to the latest sustainability insights, through exclusive access to focused research, member-led meetings and a global network of peers.

By conducting monthly surveys of our 3,500-member GreenBiz Intelligence Panel, GreenBiz Group produces

research reports on a wide range of topics related to business, technology and sustainability – including our annual State of Green Business report, as well as custom research reports for corporate clients.

www.greenbiz.com

About

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S&P Global (NYSE: SPGI) is the world's foremost provider of credit ratings, benchmarks and analytics in the global capital and commodity markets, offering ESG solutions, deep data and insights on critical economic, market and business factors. We've been providing essential intelligence that unlocks opportunity, fosters growth and accelerates progress for more than 160 years. Our divisions include S&P Global Ratings, S&P Global Market Intelligence, S&P Dow Jones Indices and S&P Global Platts.

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