



State of Green Business 2022

BY JOEL MAKOWER & THE EDITORS & ANALYSTS AT GREENBIZ



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Foreword

BY JOEL MAKOWER

CHAIRMAN AND CO-FOUNDER, GREENBIZ GROUP



Welcome to the 15th annual edition of State of Green Business.

This 2022 report comes at an exciting and perilous time for companies, their stakeholders and the world in general. The impacts of a changing climate are upon us as storms, droughts, wildfires, heat waves and other weather phenomena become more frequent and extreme. They impact lives and livelihoods, of course, but also economies — disrupting supply chains, upending communities that are home to facilities and employees, and putting critical facilities and infrastructure at risk.

It's not just the climate crisis. The accelerating loss of biodiversity, and all of the economic activity it enables, is of growing concern. So, too, is the increasing economic inequality in the world. Unconscionable numbers of people still lack adequate food, shelter, water, electricity and sanitation, while those with financial means are, as a rule, doing better and better.

Companies are recognizing these risks — sometimes at the behest of investors, customers, competitors or activists — and many are doubling down on previous pledges. The rise of “net zero” commitments by companies and countries was one of the themes of 2021, along with the pushback from activists, regulators and investors that many of these claims weren't backed by credible action or plans. It's not necessarily that companies aren't serious about reaching these goals, say critics. It's that they're not serious about the speed at which they need to reach them.

The finance component of sustainable business is proving to be powerful, as many of us knew it could be. The world's largest financial institutions are committing trillions of dollars to fund the transition to a net-zero world, though many of them also continue to back fossil fuel companies and projects. Still, the trajectory away from coal, oil and natural gas is clear — though, once again, the pace of change may be way too slow.

All of this together — the perils and the promise — suggest that business — and, indeed, humankind — is undergoing an epochal transition. Those who view tomorrow's world as a continuation of today's are increasingly having those assumptions challenged. As we face these existential threats, there is an opportunity to renew and regenerate the structures upon which we rely for our health, wealth and security. Nearly everything, it seems, must be reinvented if we are to prosper into the future, indefinitely and for all.

If any institution on the planet has the resources and wherewithal to provide the human and financial firepower to get it done, it's business.

* * * * *

In the spirit of change, this year's report is a departure from the past. As longtime readers will note, we've cleaved off the "State of Green Business Index" that has traditionally consumed the back half of this annual publication. It will become the centerpiece of a new annual report, due out in Spring 2022, focusing on corporate environmental, social and governance data, and on the world of sustainable finance. Our partner for that report, S&P Global, offers a preview of that data starting on page 9.

We're also pleased to welcome LinkedIn as a contributor this year, focusing on the growing markets for green jobs and skills. You'll find data on the fast-rising demand for talent needed by companies to address their myriad sustainability challenges and opportunities. As you'll see, most of these jobs aren't found in the sustainability department.

The annual State of Green Business report will continue to evolve alongside the field of sustainable business itself. We look forward, year in and year out, to helping define, assess and accelerate the changes we need, and to elevating and amplifying the leaders showing the way.

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



The State of Net Zero

BY RICHARD MATTISON

PRESIDENT, S&P GLOBAL SUSTAINABLE1



From a slew of company announcements to [COP26](#) in Glasgow, “net zero” dominated conversations in the sustainability world in 2021. Large corporations and financial institutions are increasingly [pledging](#) to bring their greenhouse gas emissions as close to zero as possible by the distant deadline of 2050.

However, achieving net zero is not just a simple matter of setting targets. Companies must also lay out clear pathways to reach those goals, and they need to act with urgency.

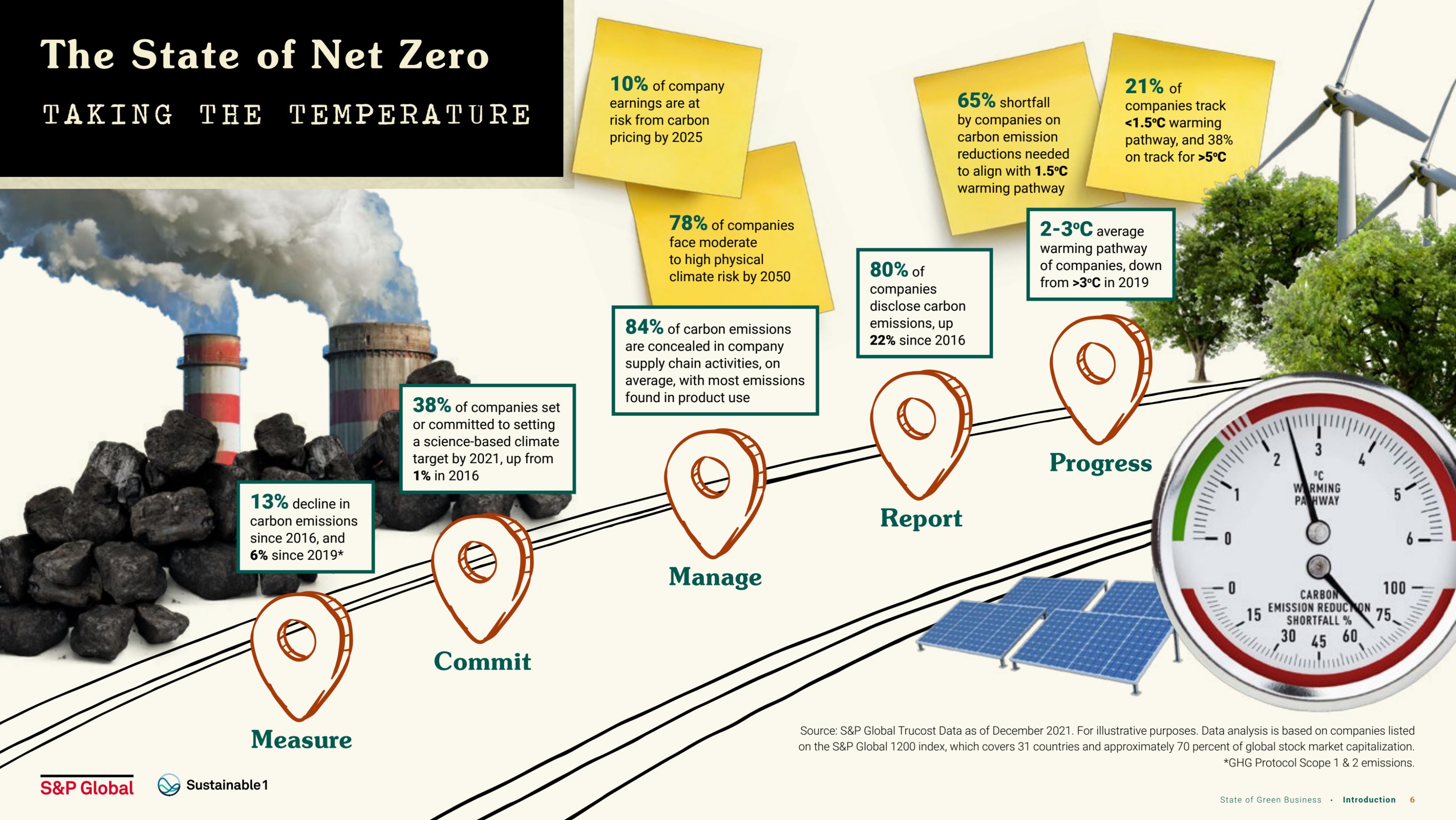
Scientists say the world needs to attain [net-zero emissions](#) by 2050 to limit global warming to no more than 1.5 degrees Celsius above pre-industrial levels to avert some of the worst impacts of climate change. The U.N.’s Intergovernmental Panel on Climate Change has [found](#) that net human-caused carbon dioxide emissions would [need to fall](#) by about 45 percent from 2010 levels by 2030 in order to have any hope of achieving net-zero emissions by 2050.

Climate change could have huge financial costs for corporations that don’t act now. Almost 80 percent of the S&P Global 1200, which includes the world’s largest companies, will be exposed to moderate-to-high physical risks from climate change by 2050, according to S&P Global Trucost data. That’s under a moderate climate scenario that assumes strong mitigation actions to reduce emissions to half of current levels by 2080. This scenario is likely to result in warming of over 2 degrees C by 2100, overshooting the goals of the 2015 Paris Agreement.

Under such a scenario, our analysis finds that 16 percent of S&P Global 1200 companies will suffer moderate-to-high water stress risk while 8 percent of major global companies face moderate-to-high wildfire risk. Water stress reflects the balance between renewable water supply and total water withdrawals, including municipal, industrial and agricultural use.

The State of Net Zero

TAKING THE TEMPERATURE



Source: S&P Global Trucost Data as of December 2021. For illustrative purposes. Data analysis is based on companies listed on the S&P Global 1200 index, which covers 31 countries and approximately 70 percent of global stock market capitalization.
*GHG Protocol Scope 1 & 2 emissions.

Private sector filling the gap

With 70 countries adopting some form of net-zero pledge, either as a proposal, a stated policy or national law, S&P Global Platts Analytics finds approximately 80 percent of today's direct CO2 emissions from energy combustion are covered by some long-term net-zero decarbonization target. However, Platts data shows major shortfalls in the expected execution of country-level net-zero targets.

And where governments are not taking the needed policy steps, the private sector might be expected to take on more of the burden of leadership and action.

Companies are moving slowly. Analysis by S&P Global Sustainable1, based on data from CDP, a global environmental disclosure framework for investors and companies, demonstrates that less than a quarter of all companies that responded to CDP's climate survey and were assessed in the 2021 S&P Global Corporate Sustainability Assessment as of November 2021 have set a net-zero target.

The lack of progress by a large universe of companies contrasts starkly with the widespread net-zero commitments made by top firms. The majority of the 30 largest companies in several sectors have made net-zero pledges as of December 2021, according to an [analysis](#) by S&P Global Market Intelligence. That includes 21 of the 30 largest U.S. and European oil and gas firms, 26 of the largest U.S. utilities and all 30 of the largest American, Canadian and European banks.

The location of a company's headquarters may also influence whether it can achieve net-zero goals. For example, an analysis by Platts demonstrates that Japan is expected to reduce current emissions by more than 50 percent thanks to favorable policies and regulations, supportive market conditions as well as advances in technology.

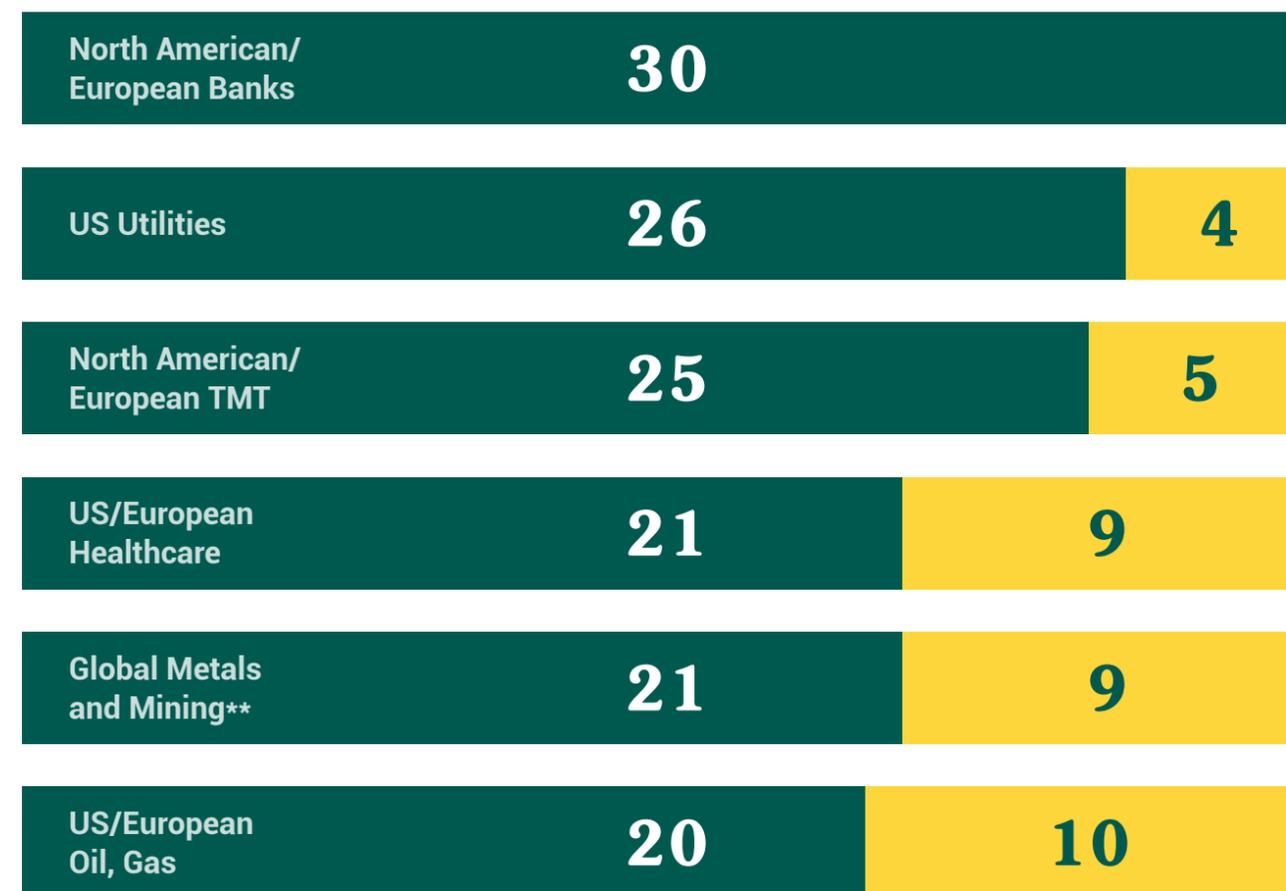
Where credit is due

The way that companies tackle the impact of climate change on their business can also influence their credit ratings. Out of 30 ratings changes by S&P Global Ratings on corporates or infrastructure due to environmental concerns in 2021 (through October), 27 of these were negative, with 12 downgrades, while 11 were placed on credit watch with negative implications and four were downward outlook revisions. Most of the rating changes in corporations due to environmental factors were among energy firms and utilities.

Markets appear to have rewarded companies that are compatible with a net-zero economy. S&P Paris-Aligned & Climate Transition Indices, which track equities collectively aligned to a 1.5 degrees C scenario and net-zero emissions by 2050, have generally outperformed their market cap-weighted parent indices across all regions. While much of this outperformance can be attributed to industry and factor allocation, there is still stock-specific alpha, which is positive for

Net-Zero Emissions Targets Among Largest 30 Companies by Sector*

■ Has net-zero target ■ No apparent net-zero target



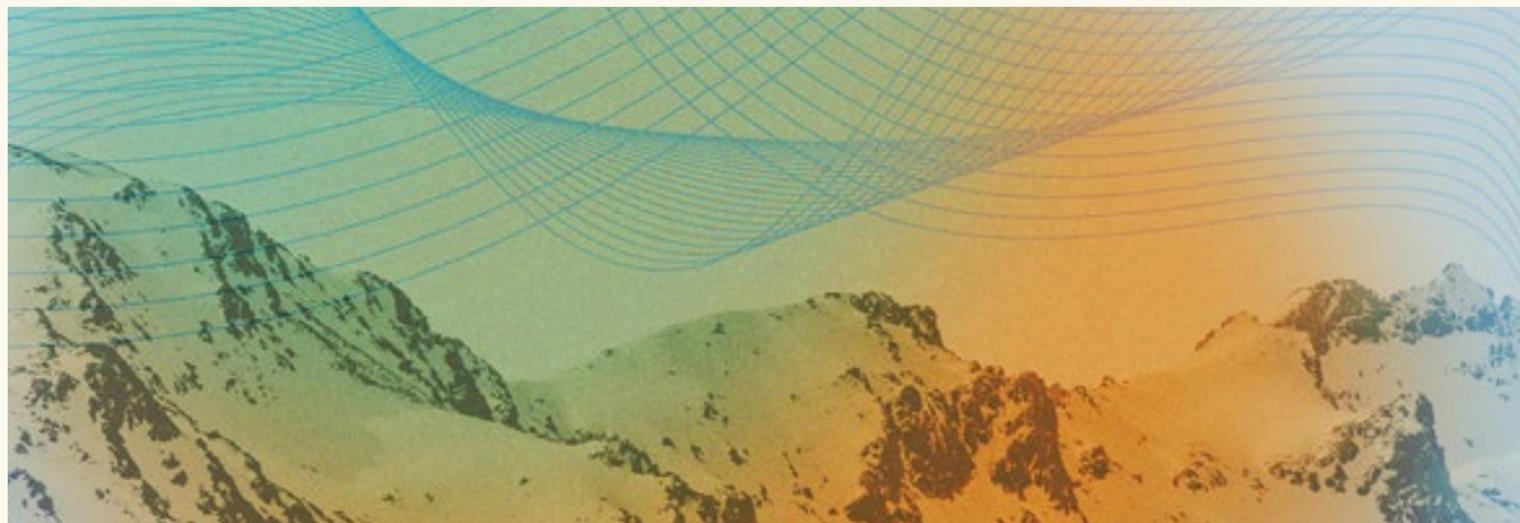
Data as of Dec. 10, 2021.

TMT = technology, media and telecommunication

* Includes net-zero targets of the largest companies by market capitalization in each sector/region as of Sept. 30, except for banks where those with the largest assets were included. For this analysis, a company was considered to have a net-zero target if the goal covered Scope 1 and/or Scope 2 emissions.

** Excludes companies that trade on Shenzhen, Hong Kong, or Shanghai Stock Exchanges.

Source: S&P Global Market Intelligence



the most part. However, it is important to note that there is no clear evidence to prove this alpha is driven by climate or environmental, social and governance factors.

Companies make inroads

S&P Global Trucost data shows a general trend of declining Scope 1 and 2 emissions. Scope 1 emissions, which are direct emissions from owned or controlled sources, and Scope 2 emissions, which are indirect emissions from the generation of purchased electricity, steam, heating and cooling, fell 13 percent among S&P Global 1200 companies between 2016 and 2020. There was a 6 percent drop in emissions from 2019 to 2020 alone. That can be attributed in part to the start of the global COVID-19 pandemic, which put a brake on economic activity globally.

Scope 1 and 2 emissions intensity, which is a measure of a company's carbon emissions relative to the revenues it generates, declined 21 percent from 2016 to 2020 among the S&P Global 1200, signaling that companies can generate revenues while lowering their carbon footprint. However, emissions intensity was unchanged between 2019 and 2020, largely due to a rise in Scope 2 emissions, while Scope 1 emissions fell.

The real challenge ahead for companies will be how to address Scope 3 emissions, which stem from assets not owned or controlled by the company or organization but upstream or downstream of the company in its value chain. S&P Global Trucost data shows that, on average, Scope 3 emissions account for 84 percent of total emissions.

Scope 3 emissions are [inherently harder](#) to calculate, partly because they depend on accurate emissions information from suppliers. The lack of transparency and accountability for emissions created in corporate supply chains is a significant concern when assessing the achievability of net-zero commitments and completeness of reporting against these targets.

Science-based commitments increase

The reduction in Scope 1 and 2 emissions comes as the number of companies committing to science-based climate targets has sharply risen. Science-based targets help companies reduce their share of carbon emissions in line with what scientists say aligns with the goals of the Paris Agreement. As of 2021, more than a third of S&P Global 1200 companies have set or committed to setting a science-based target, according to figures from the Science Based Targets initiative, or SBTi, which has developed a standard for corporate net-zero target setting. Of those companies, 39 percent have also pledged to achieve net zero. In 2016, just 13 companies had set or committed to a science-based target.

The role of mandatory disclosure

Net-zero commitments may be voluntary, but companies with a clear pathway to carbon neutrality will be better prepared for a raft of forthcoming climate-related regulation and mandatory disclosures in jurisdictions around the world. The European Union took the lead in 2018 with the launch of its Sustainable Finance Action Plan, which led to the creation of a broad package of rules that are significantly changing the sustainability landscape. There is the EU green taxonomy – a dictionary of sustainable activities designed to steer companies as they adapt their business strategies to climate change – and several countries are developing their own taxonomies. U.S. regulators are developing a slew of climate-related disclosure rules.

There is also growing momentum for making voluntary disclosure frameworks mandatory, such as the influential Task Force on Climate-related Financial Disclosures, or TCFD. A strong signal for compulsory TCFD disclosure came in June 2021, when the G7 group of countries said they backed the idea.

Starting in April 2022, the TCFD will become mandatory for more than 1,300 of the largest UK-registered companies and financial institutions. Switzerland has said it would make TCFD reporting binding, and while the EU has not officially adopted the TCFD for its 27 member states, it is undertaking a reform of its Non-Financial Reporting Directive. Calls for consistent climate disclosures also prompted the creation of an International Sustainability Standards Board in November 2021.

Against that backdrop, the number of companies disclosing emissions is rising. From 2016 to 2020, there was a 16 percent increase in the number of major global companies with full or partial emissions disclosure. More than half of S&P Global 1200 companies disclosed an emission reduction from 2015 to 2019, while 67 percent did so between 2016 to 2020.

There are increasing signs that companies are taking disclosure of the climate risks in their business seriously. There has been a tenfold increase in the number of companies supporting

TCFD reporting, with nearly 3,000 companies backing the framework in 2021, according to TCFD data. That compares to just 280 in 2017, the year companies could start disclosing climate risks using the TCFD framework.

It's important to note that [supporting the TCFD](#) is not the same as making climate-related disclosures. A 2021 TCFD status report [reviewed the disclosure](#) of 1,651 public companies over the 2018 to 2020 period and noted "significant progress is still needed." On average, only one in three of the companies reviewed disclosed climate-related information aligned with the TCFD recommendations, although disclosure increased at a much faster pace between 2019 and 2020 than in previous years. Disclosure of climate-related information grew by 9 percent between 2019 and 2020 compared to 4 percent growth between 2018 and 2019.

The role of carbon pricing

Amid the transition to a low-carbon economy, companies will have to factor carbon pricing into their business strategy. Carbon pricing is a mechanism that entices countries and companies to lower their emissions by switching to renewable energy, and is increasingly set by governments or markets to charge [emitters for each ton](#) of carbon emissions. A 2021 World Bank report [noted](#) that "potential of carbon pricing is still largely untapped, with most carbon prices below the levels needed to drive significant decarbonization."

Carbon prices in the EU have hit record highs buoyed in part by political announcements, such as measures announced by Germany's new coalition government to align the country's decarbonization pathway to 1.5 degrees C.

As carbon prices rise, companies will increasingly need to set internal carbon prices, which basically means assigning a cost to their own greenhouse gas emissions. A company can thus use that internal carbon price to offset future risks from climate change when making business or investment decisions.

Major companies face \$256 billion in carbon pricing costs by 2025, representing 10 percent of earnings, according to S&P Global Trucost data. Figures from the CDP show that 43 percent of S&P Global 1200 companies have set an internal carbon price. Another 24 percent have indicated they intend to do so in the next two years, while almost a third have no plans to do so.

While disclosure is increasing and companies are making headway in reducing their emissions, major companies are on track for more than 3 degrees Celsius warming above pre-industrial levels, falling far short of required emission reductions to achieve the goals of the Paris Agreement. In other words, they need to accelerate emission reductions. S&P Global Trucost data shows only 21 percent of S&P Global 1200 companies are currently in line with the 1.5 degrees Celsius target, while 38 percent are on track for over 5 degrees Celsius of warming. In all, major global

companies are 65 percent short of the reductions needed to attain the 1.5 degrees Celsius goal recommended by scientists.

Companies will need to ensure that they step up their commitments to reduce emissions further and have clear net-zero pathways, if they are to be in line with the Paris Agreement by 2050. Increasing mandatory disclosure will enable them to assess their climate exposure, while rising carbon costs and internal carbon pricing will act as mechanisms to protect their businesses from the worst impacts of climate change.

After a year when the United Nations warned that the world is facing a "code red" for humanity, progress by the world's largest companies in reaching net-zero emissions remains worryingly slow. As investors accelerate their net-zero strategies, companies need to be more proactive and transparent in how they are managing climate risk and opportunity. Supply-chain emissions present a particular challenge. Measuring emissions across a business, setting robust science-based targets and reporting climate-related risks in line with TCFD recommendations will set companies on the right road to achieve net zero.

This piece was written by S&P Global Sustainable1 and not by S&P Global Ratings, which is a separately managed division of S&P Global.



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The State of Green Jobs and Skills

BY KARIN KIMBROUGH

CHIEF ECONOMIST, LINKEDIN



The transition to a green economy will require a large shift in the roles and skills of workers across the globe. That means growing demand and opportunities for those possessing “green” skills, as well as upskilling many workers with green skills so they can meet that demand and access these new opportunities.

What is a green job, anyway? It’s a complex question. Our research has shown us that jobs aren’t solely “green” or “not green” but rather fall on a spectrum of greenness to the degree that their primary function is to move toward a low-carbon economy. Many jobs are important to the greening of the economy, such as logistics managers, yet are not traditionally green. We identify green jobs by measuring the greenness of the skills in different jobs.

Since we have a list of the most representative skills for each occupation on LinkedIn, we can calculate the intensity of green skills in the occupation by dividing the number of green skills by the total number of skills. LinkedIn met with experts, reviewed studies and hand-reviewed thousands of skills. We identified more than 600 core green skills and more than 400 green-related skills across 12 categories, including pollution prevention, waste prevention, renewable energy and sustainability.

Using this method, we looked at the skill content of jobs to determine which jobs are more and less intensive in green skills. We also calculate how many times an occupation uses green skills to calculate its prevalence across the economy.

The chart on the next page illustrates our approach. It plots the green-skill intensity of a variety of jobs against their prevalence in those jobs across industries. Jobs in the upper-right corner strongly use green skills and people in those jobs use those green skills in every industry where we find that job. (It’s no surprise to see ecologist and environmental scientist in the upper-right since they are easily recognizable as green.) By contrast, jobs in the lower-left corner don’t use many green skills, and people who use green skills aren’t very widely spread among industries with that job.

To achieve a green economy, jobs need to shift “up” and “right.” Certain jobs in the lower left are high-value targets for greater green skilling. Charting out where a job is today helps identify occupations that can gain the most from green-skilling investments by governments, employers and workers.

Let's see how this plays out in three diverse occupations:

- **Risk management officers'** green-skills intensity is relatively low across the many industries that employ risk management officers. Yet, assessing and measuring risks associated with climate change are increasingly part of the risk management landscape. This presents a large opportunity for upskilling risk management officers — effectively pushing them up and to the right on the graph over time.
- **Facilities managers** have a lower skills intensity than risk management officers, even though the use of green skills among facilities managers is more prevalent across industries. Increasing the intensity of green skills among facilities managers and boosting their understanding of the environmental impacts of their facilities would help them find ways to mitigate those impacts on facility operations.
- **Public health officers** could also benefit from additional green skilling. Though they have a relatively wide prevalence of green skills across industries, likely due to the need to understand the impacts of pollution on public health, there is an opportunity to expand and deepen the use of green skills among public health officers. This is all the more relevant in the wake of COVID-19 and the increasing [evidence of the linkages](#) between climate change and pandemics.

Fastest-growing

Green skills are already deployed across the economy today. The prevalence of and demand for these skills will grow as government and private sector commitments are carried out.

Many green skills reported by our members have seen double- and triple-digit growth over the last three years. The fastest-growing green skills are in ecosystem management, environmental policy and sustainable procurement.

- Ecosystem management skills focus on the costs of climate-induced natural disasters and extreme events, from hurricanes to fires.
- The fast growth in environmental policy skills, especially related to health and safety, indicates a strong global focus on the impacts of environmental degradation on our well-being.
- The near triple-digit growth in sustainable procurement skills reflects new corporate behavior. Suppliers are fielding more questions about their products and services from global industry leaders, such as [Microsoft](#) (the parent company of LinkedIn), which are taking action to reduce their environmental footprint throughout their supply chain.



Many of these skills are highly specialized and are primarily concentrated among traditional green careers, such as environmental scientists, sustainability managers, and wildlife biologists. But we found an increasing trend of green skills among professionals in roles that are not traditionally considered "green." For example:

- In **pollution prevention**, knowledge of sustainable fashion is increasingly popular among salespeople, designers and stylists.
- In **environmental finance**, sustainable investment is increasingly being reported by portfolio managers and investment analysts.
- **Across all categories**, project managers, program managers and business development specialists are upskilling in the circular economy.

What's ahead?

We expect a shift in skills required in a wide range of existing jobs. For example:

- **Product designers** will be increasingly expected to understand the nuances of sustainable product design, including low-profile packaging design and designing products that are intended for reuse at inception.
- **Investment analysts** will need to understand how to assess a business's exposure to climate risk and make investment recommendations that account for this risk.
- **Data engineers** will increasingly be focused on reducing the energy load of their computing infrastructure.

As these examples suggest, there will be many jobs outside of the renewable energy industry that will require green skills. Although green talent development is growing faster in energy and mining, green jobs and green talent have higher shares in healthcare, agriculture, transportation, construction and manufacturing than in energy and mining.

We also expect to see millions of new jobs created globally in the next decade due to new climate policies and commitments. The International Labor Organization [estimates](#) that 24 million jobs worldwide could be created by the green economy by 2030 alone. Since 2017, we've seen the demand for talent with green skills steadily increase as governments and companies step up their commitments and actions to achieve their climate and sustainability goals.

We believe real change to address the global climate crisis and facilitate the transition to a greener economy will come through a skills-based approach to opportunity. Real-time data on the skills and jobs needed to get us there can provide important insights that help make this transition a reality and LinkedIn will continue doing its part to help policymakers, business leaders and workers discern the most promising opportunities and manage the risks as they navigate this transition.

Top Sustainable Business Trends of 2022

BY JOEL MAKOWER



We find ourselves in uncharted and unfamiliar territory. Again.

The worlds we collectively inhabit — corporate sustainability, sustainable finance, the circular economy, climate tech — are all reaching inflection points, growing and changing faster than many could have imagined. Along the way, they're roiling industries, companies, jobs and career paths — mostly for the better but also in a be-careful-what-you-wish-for kind of way.

The Age of COVID has coincided with the rise of nearly every aspect of sustainable business: companies' commitments to achieving net-zero greenhouse gas emissions; the mind-blowing uptake of green bonds and sustainability-linked loans; the inexorable growth of renewable energy, alongside its declining price; the mainstreaming of electric vehicles; the rise of concern about biodiversity loss and its economic impact, and more.

Indeed, the past two years of pandemic life seem to have left sustainable business relatively unscathed. With good reason: Despite our self-imposed isolation, the klieg lights focused on companies' environmental and social commitments and performance have grown increasingly brighter and hotter, in lockstep with the rise of concern about the scale, scope and pace of change. With the signs of a changing climate becoming ever more apparent — and costly — the business world is finally recognizing that sustainability is not merely a nice-to-do activity.

Which is not to say that companies are solidly on the case. True, the pace of change has quickened, with more companies making bigger commitments, but it's far from what's needed to address the challenges before us. Carbon emissions, which dropped in tandem with the tanking global economy during 2020, resumed their relentless climb in 2021, faster than many scientists predicted, according to the Global Carbon Project. And scientists expect emissions to rise even further in 2022 as the global economy continues to pick up steam.

That's just one data point, albeit a significant one, casting a pall over the corporate sustainability landscape. There's the continued loss of biodiversity spurred by land-use changes from economic growth coupled with the ravages of a changing climate. There's the ongoing loss of fisheries and marine ecosystems upending the seafood industry. There's the growth of water stress due largely to population and economic growth: Just over half — 52 percent — of the world's projected 9.7 billion people will live in water-stressed regions by 2050, with most in developing economies,

according to the MIT Integrated Global System Model Water Resource System.

That's the duality in which the world of sustainable business exists: Impressive progress, innovation and achievements, but nowhere near enough to stem the tide of the terrifying environmental and socioeconomic challenges ahead.

Still, there's no denying that the pace of change is quickening inside companies. The number of consortia, partnerships, initiatives and innovations can be overwhelming, even breathtaking at times. Whereas not long ago, the center of gravity could be found inside a handful of sectors – consumer goods, information technology, retail and apparel come to mind – today, there's no part of the economy untouched by sustainable innovation.

Witness the rise of climate tech, shorthand for a stunning array of technologies and solutions aimed at decarbonizing business and commerce. They represent the convergence of leading-edge thinking in artificial intelligence, blockchain, green chemistry, synthetic biology, advanced materials, remote sensing and other disciplines and technologies. Individually and in concert, these future-facing advances stand to reinvent large swaths of the economy.

We're already seeing the fruits of those innovations: plant-based proteins, textiles and chemicals; advanced, low-carbon steel, concrete and other materials; the electrification of buildings and vehicles; cleaner and more resilient energy systems; adaptive, climate-resilient infrastructure.

One challenge, and opportunity, is whether and how these innovations scale quickly enough to offset the growing global economy, and whether they will be accessible to those at every rung of the economic ladder – in particular, communities, businesses and individuals in rapidly growing economies in Asia, Africa and South America.

It won't be easy. If the inequitable distribution of COVID vaccines is any indication, the world's richest countries are ill-prepared to adequately care for those in need. To the extent that we can view the current pandemic as a peek into the kinds of global emergencies we may increasingly be confronting – well, it's a sobering reality check.

One bright spot in all this is the world of finance, which has finally recognized both the business risks and opportunities of a climate-changing world. The world's largest banks, insurance companies, institutional investors and pension funds are increasingly moving funds out of polluting industries – or, at least, companies within those industries deemed to be least prepared to meet the new environmental realities – and into companies and funds that seem to be part of the solutions.

It's a highly imperfect process. The ability to accurately distinguish climate leaders from laggards continues to befuddle the world's largest investors and financial markets. Many of the banks that profess to be shifting funding away from polluting companies and industries are still backing coal mines and oil wells. Investment funds purporting to focus on companies that score well

on environmental, social and governance (ESG) issues still have polluting companies in their portfolios.

It will be a long, slow process to shift completely away from the bad to the good, assuming we can agree on what "good" even means. The sobering challenge: We don't have that kind of time.

One area of growing focus are companies' lobbying efforts and political support of legislation and public policy that can accelerate the kinds of changes scientists say we need to make. For years, companies willing to stand up against the well-funded fossil-fuel lobby were relatively few and far between. That's just beginning to change. The pressure of activist and advocacy groups pushing businesses to get off the sidelines and take a stand is rising. If corporations do – and that's a big "if" – the private sector could further burnish its credentials as a positive force for change. However, if businesses opt for short-term profit over longer-term survival, it will be that much tougher to make progress. Either way, the story of corporate climate advocacy will be one of the more interesting to watch in the year ahead.

There are other story lines we'll be following in 2022 and beyond, some of which are detailed in this report: the challenges of driving sustainability and decarbonization through company supply chains; how "true zero" is becoming the new mantra for clean-energy buyers; regulators' newfound focus on sustainable finance and ESG reporting; the professionalization of the circular economy; the growth of resale in consumer markets, and more.

There's plenty to be hopeful about – and even more to instill fear for our collective future. Which will predominate in 2022?



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HR Ups Its Sustainability Game

BY JOHN DAVIES

These are certainly challenging times for chief human resource officers (CHROs), with diversity, equity and inclusion (DEI) initiatives rightfully forced to the top of their agenda; the [great resignation](#) leaving many industries scrambling for workers; and, lest we forget, a global pandemic that forced some to work from home while others face challenging frontline risks of infection. Even with all that going on, the human resources department in many organizations is seen as the ultimate check-the-box function; the “R” may just as easily stand for resistance.

The irony is that HR professionals more than ever have a seat in the C-suite, but many have been reluctant to harness that power. Organizations now face increased focus on climate change and ESG performance and must reassess their strategy to meet these new demands and ensure they are aligned with increased interest in [stakeholder capitalism](#). For HR professionals, it’s time they walk down the path many sustainability leaders already have traveled to go “beyond compliance” and embrace a purpose-led sustainability strategy.

The most visible ESG initiatives undertaken by HR departments are social ones, historically those involving philanthropic dollars and employee volunteer hours. The past two years of marches, protests and demonstrations in response to social, racial and economic inequities have brought into clearer focus the systemic nature of these problems in the United States and around the

world. These are not new issues, but a greater understanding of the role that business can play in addressing them has been elevated by such initiatives as the pledge to act on supporting more inclusive workplaces, signed by more than 2,000 chief executives as part of the [CEO Action for Diversity & Inclusion](#).

Leading CHROs know that their impact can extend well beyond their DEI remit to focus on aligning the purpose of their organization in a way that brings along all employees. In a recent [McKinsey analysis](#) of employee sentiment, 63 percent of employees surveyed said they want their employer to provide more opportunities for purpose in their day-to-day work. Individual purpose is not one-size-fits-all, but HR professionals can establish programs that connect employee purpose with the overall goals of the organization.

Professional services firm Deloitte in August launched a [climate learning program](#) that will reach all 330,000 employees. The program, developed in partnership with the World Wildlife Fund, aims to inform, challenge and inspire employees to learn about the impacts of climate change and empower them to make climate-responsible choices at home, at work and in advising clients.

Deloitte is not alone. Firms such as Jones Lang LaSalle and Schneider Electric are leveraging [Climate School](#), an online learning experience from insurance giant AXA, built to support organizations pursuing a sustainable business transition. More persistent engagement can occur using sustainability-centric software platforms such as that offered by [WeSpire](#), which uses gamification and targeted campaigns to encourage employees to continue being active long after training sessions have ended.

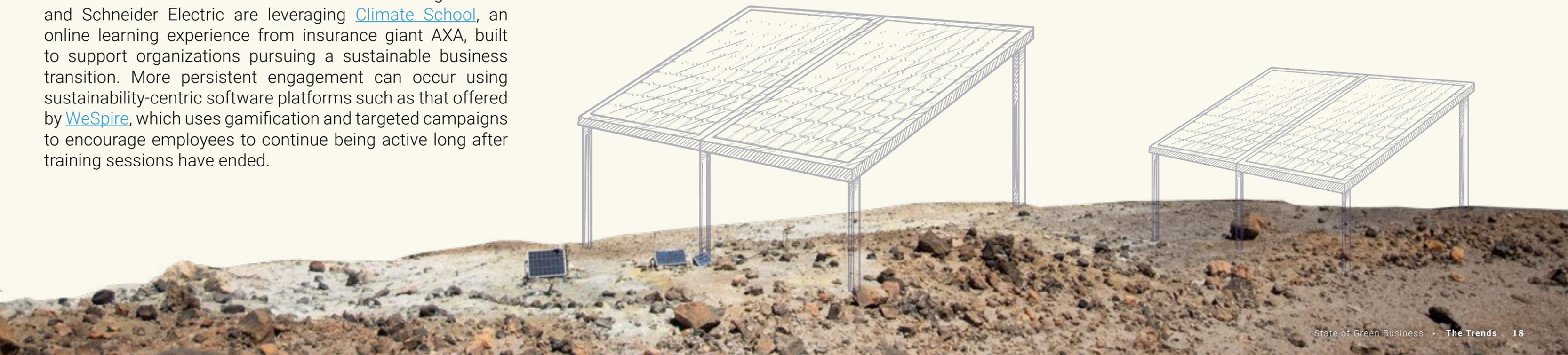
Other organizations connect individual purpose with organizational impact through the use of employee resource groups, or ERGs. These voluntary groups are usually led and participated in by employees who share a characteristic, whether it's gender, ethnicity, religious affiliation, lifestyle or interest. These can be particularly effective in raising awareness around social and environmental issues while also acting as listening posts for HR professionals to understand issues of concern and encourage positive actions by their employees.

Perhaps the most important priority for CHROs is talent attraction and retention. According to Deloitte's 2021 [Millennial and Gen Z Survey](#), these younger generations want to work for companies that share their values for a purpose beyond profit and in which they feel more empowered to make a difference as part of an organization. Savvy recruiters are leveraging purpose-driven sustainability and DEI knowledge to attract these workers.

As part of an organization's recruiting pitch, its purpose-driven culture can be reinforced by the benefits it provides, such as a sustainable investment option in employee 401(k) and retirement plans. According to Mercer, only 8 percent of companies offer that today. Even fewer are linking employee bonuses to the achievement of sustainability goals.

Not all such benefits are monetary. Post-pandemic benefits are expanding to accommodate different expectations of the new work environment. PwC announced in September that moving forward, it will allow 40,000 U.S. client services employees the ability to work from anywhere in the continental U.S. Many other companies are treading lightly as they seek to understand what will constitute their new work environment and the impact it will have on the business.

The rise of ESG issues is a clarion call for HR. Investors are looking at more than the bottom line as they consider the environmental and social impacts of an organization. CHROs are in a unique position to drive a strategy that creates opportunities for their greatest resource — their people — to deliver greater performance for their business and positively impact the communities in which they operate.





KEY PLAYERS TO WATCH

[AXA Climate School](#) – offers customizable online learning to engage and upskill employees to understand their role in a sustainable transition.

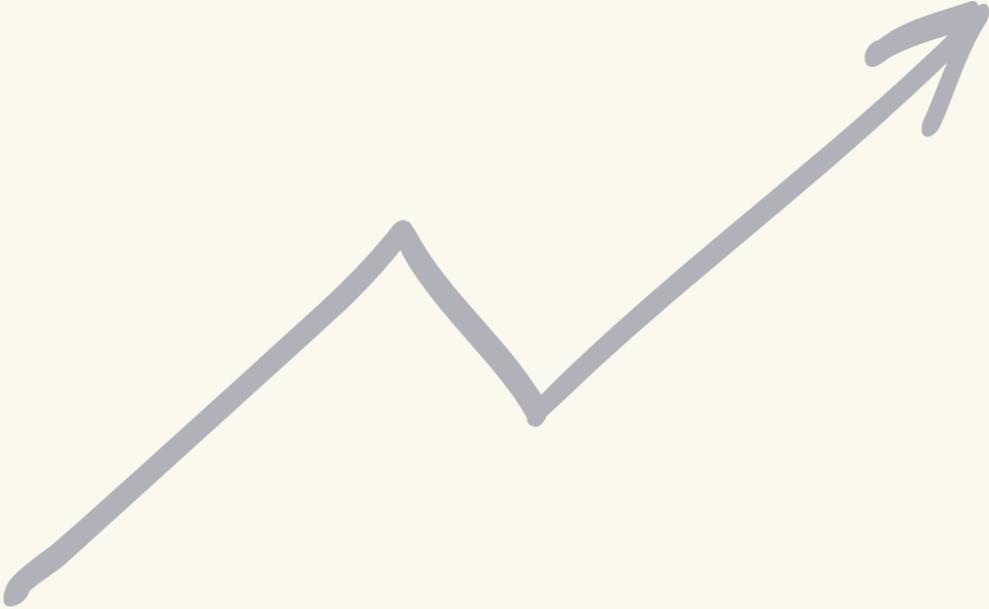
[CEO Action for Diversity & Inclusion](#) – is a purpose-driven initiative to rally the business community to advance diversity and inclusion within the workplace.

[Just Capital](#) – the stakeholder capital rating and ranking organization found that how a company invests in its employees and supports communities accounts for 41 and 21 percent of its total score, respectively.

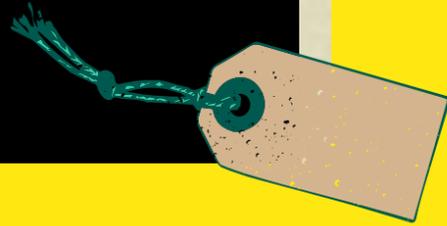
[Mercer](#) – its annual global talent trends survey highlights the importance of connecting HR and sustainability work.

[WeSpire](#) – provides engagement software and campaigns to encourage employees to make a positive impact at work and in their communities.

John Davies is Vice President and Senior Analyst at GreenBiz Group



WHAT'S IN
STORE



TROVE
\$77.5 million
Vestiaire Collective
\$209 million
depop
\$1.62 billion

Resale Finds Its Second Life

BY DEONNA ANDERSON

When it comes to addressing the climate impacts of the fashion industry, resale sits among a suite of solutions, including rental and repair. Resale has been around for decades as vintage or thrift. But thrift, in particular, had negative connotations attached to it, stigmatized as a lesser than or cheap option to find used apparel or shoes.

More recently, resale has donned a trendier, climate-conscious persona. Three benefits of resale are often cited: It keeps garments out of landfills. It displaces the carbon that would be needed to manufacture new clothes. And it saves consumers money.

“Right now, resale is the belle of the ball,” says Caroline Brown, managing director at Closed Loop Partners (CLP), a circularity-focused investment firm.

A lot has happened in the past five years to put fashion resale in a place poised for growth, and at least three companies in the space — ThredUp, Poshmark and The RealReal — have gone public since 2019. That has put resale squarely in the sights of investors and consumers.

Consider ThredUp. Since launching its resale-as-a-service offering in 2018, it has partnered with more than [20 retailers and apparel manufacturers](#), including Adidas, Madewell and Gap, to take back used items from customers — with incentives, of course — and make them available to other shoppers.

It's becoming big business. By 2024, the secondhand market — which includes traditional thrift and newer resale models — is expected to grow to \$77 billion from \$36 billion in 2021 in the United States alone, according to the [2021 resale report](#) from ThredUp. The analysis noted that two in five thrifters said they were replacing fast-fashion purchases with secondhand clothing. And younger people seem to be driving that push: More than 40 percent of Gen Z and Millennials shopped secondhand in 2020, compared to 23 percent in 2016.

“Consumers are refreshing their closets and turning to resale as a way to sustainably discard garments and acquire new ones,” says Neil Saunders, managing director at GlobalData, in the ThredUp report. “Retailers recognize this shift, which is why so many of them are now looking to get into resale.”

To meet that shift, the industry will need to put some attention on its recapture mechanisms, such as [blockchain technology](#) that allows garments to be tracked through their life cycle and [QR codes](#) that validate their authenticity. Sixty percent of U.S. retailers have or are open to offering resale to their customers, according to GlobalData's Fashion Retailer Survey, conducted last spring. [Madewell](#), [Lululemon](#) and [H&M](#) are examples of retailers that have launched resale programs.

“The data really reflect the strong growth of resale and the desire of many mainstream retailers to jump on the secondhand bandwagon, both to generate growth and to meet the needs of their shoppers,” says Saunders. “Of course, more retailers coming on board will also help the secondhand sector grow as it expands choice.”

But how to do it? Today, retailers face three decisions, [as noted by Commerce Ventures](#), an early-stage venture capital firm: “Engage with companies that can enable resale capability like [Trove](#), build out their own recommerce functionality or altogether avoid consumer demands and forgo secondary sale profits.”

For retailers and brands alike, setting up resale isn't as simple

as other e-commerce activities. In many parts of the world, there is a [lack of infrastructure](#) — think physical waste recovery, reuse and recycling facilities that allow for the necessary processing to get items from one person to another, and digital technologies that enable connection between value chain actors — to support circular business models.

And because retailers aren't experts in reverse logistics — the systems needed to capture returned items, catalog and warehouse them — they'll likely partner with companies that have already proven themselves as trusted partners, such as ThredUp or Trove, to get duds from one customer to the next. Even then, some of the returned items won't be resellable. A whopping [5 billion pounds of returned goods end up in landfills](#) across the United States each year, largely because they need to be cleaned or repaired before being returned to the shelves. That's not always cost-effective for companies. It [costs more to process a return](#) than to sell it.

To make resale work, resellers will need to add more steps and complexity to the way they do business. Reverse logistics is one of the biggest hurdles but also an area where CLP's Brown expects to see companies making headway in 2022.

In addition to long-time resale players, there are other companies, such as [Treet](#) and [Recurate](#), stepping out to help companies succeed at resale by doing what they don't have the capacity to handle.

Apparel is at the center of the action, but there are other industries making resale moves as well. For example, Back Market, a refurbished electronics marketplace, last May announced a [\\$335 million investment round](#) led by General Atlantic. Patagonia has for a few years offered a resale option for its gear — in addition to apparel — through its [WornWear program](#). [Home textile brand Coyuchi](#) has a [takeback and resale program](#) for its linens. There's also IKEA, which signaled its desire to [make its takeback program a permanent fixture](#), including in the United States.





With consumers being less resistant to secondhand goods, brands and retailers have the opportunity to capture even more market share. Resale has the potential to grow significantly over the next decade but whether or not it makes up a significant portion of the retail landscape is to be determined.

For the projected \$77 billion market value to become a reality, merchants will need to make resale easy and accessible for customers, both online and in stores. They'll also have to make secondhand goods a larger portion of their offerings. Simply put, resale needs to become part of the new normal in retail.

KEY PLAYERS TO WATCH

Depop — Etsy acquired the resale platform last summer, calling it “the resale home for Gen Z consumers.”

IKEA — the furniture manufacturer and retailer has launched several resale pilots in the last few years. Those experiments put it in a position to make resale permanent.

Lizee — the recommerce software company is on a mission to “transform the retail industry from linear to circular.”

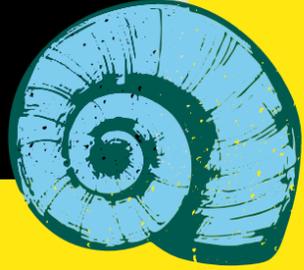
The Renewal Workshop — last July, it moved into a 30,000-square-foot factory in Oregon, tripling its space to accelerate resale.

Thrilling — its online marketplace hosts more than 400 thrift and vintage stores in more than 100 U.S. cities.

Deonna Anderson is Senior Editor at GreenBiz Group



JOB WON



The Circular Economy Professional Gets Promoted

BY LAUREN PHIPPS

There's been plenty of talk within companies in the past few years about the circular economy. In fact, "circular economy" was the fastest-rising skill among all LinkedIn users in 2019, according to that year's [State of Green Business report](#). But just as architect and author Bill McDonough often says design is the first signal of human intention, headcount is the first signal of meaningful corporate action.

There's a new role appearing on org charts at companies across industries: the circular economy lead. Responsible for curbing a company's role in the linear systems of extraction, manufacturing, consumption and disposal, the emergent head of circularity has the potential to influence an entire organization. This strategic lens can be applied to nearly every material flow and business model, and in late 2021 there were more than 1,200 circular economy jobs listed in the U.S. alone.

The rise of the corporate circular economy exec is following a maturity curve similar to that of the sustainability professional. It's taken over two decades for the sustainability title to move into the C-suite. As the circular

economy concept is still in its relative infancy, the job of helping to advance it inside a company is gaining momentum and similarly evolving in scope, scale and influence. High-level titles are cropping up on org charts across the tech industry, for example, at companies including Amazon, Cisco and Google.

The corporate circular economy role typically begins as a potpourri of existing tasks and projects reorganized and rebranded under this thematic umbrella. In many cases, it's an internal hire with the words "circular economy" aspirationally appended to their title – just as the sustainability headcount often sprouted from a corporate social responsibility or environment, health and safety role when it emerged in the 1990s. The majority of these new circular economy roles evolve from a sustainability hire that's tasked with "figuring it out."

In this first phase, the individual is typically more aspirational than effective, with little influence across the organization. They reactively manage waste or optimize a discrete material flow and occasionally focus more on reputation – sitting within marketing or public affairs – than on transforming core operations. At its inception, this role is often more of a label than a strategy.

In the next phase comes a pilot project. The circular economy lead identifies an opportunity to bring a circular lens to one facet of the business. There are dozens of such pilots capturing headlines each month: a consumer electronics company sourcing a specific reclaimed material, a retailer offering a product takeback or recycling initiative, an apparel company piloting a resale program – something that's an easy win for the company with strong storytelling potential. These projects are time-bound and limited in scale, sometimes serving as jumping-off points for a broader initiative. Primarily, they serve as a catalyst for internal collaboration and demonstrate the potential of circularity internally, whether measured environmentally, economically or in terms of engagement.

As the circular economy role matures, it focuses on setting strategy. Engaging with teams across the organization, the professional is responsible for the development of cross-cutting goals and charting a course of action to maximize the reuse of finite resources across operations, products and supply chains.

Philips, one example of a company supporting a mature corporate circular economy program, began that journey in 2010. "We are responsible for helping our businesses, markets and functions to achieve our circular targets, and we have worked hard to embed our circularity ambitions into all of our strategies," explains Harald Tepper, global leader of the circular economy program at Philips.

At more mature organizations, the role is characterized by its intention: influencing design, sourcing and business models to design out waste from the onset and identify new opportunities. This requires thoughtful communication, weaving value propositions and benefits for diverse stakeholders internally and externally to clients or customers.

As lead for circular economy at Google, [Mike Werner says](#) he is "responsible for the development of our company-wide circular economy strategy and achieving our mission to maximize the reuse of finite resources across our operations, products and supply chains, and enable others to do the same through the use of our technology." At European e-commerce company Zalando, Head of Circularity Laura Coppen explains that she leads the circularity strategy and is responsible for driving our product, service and business model goals.

A mature corporate circular economy practitioner holds a product-, business- and systems-level lens. They cut across internal silos and operate with an understanding of the economic, environmental and political context, both up and downstream.

Through industry partnerships, the circular economy leader works to create the conditions for circularity at scale, which

fall beyond a company's individual sphere of influence. This includes engaging in pre-competitive collaboration to build infrastructure, research and develop new technologies, test new business models and share best practices. One example is the Center for the Circular Economy at Closed Loop Partners which brings together brands, investors, NGOs and industry





leaders to identify, test and scale circular economy solutions for systemic challenges that extend beyond one company's operations. The Center's Beyond the Bag pilot project brought together leading retailers including Walmart, Target and CVS Health to address the industry challenge of plastic bag waste.

The end state is not a robust team of circular economy practitioners at every company. The trajectory of the role plateaus to become a core team of generalists that influences the entire company. Internally, they serve as both strategic leaders – setting and advancing a vision – and tactical consultants – supporting initiatives across the organization. They continue to launch new projects and pilots, but these are handed off to other departments for long-term ownership.

At Cisco, the circular economy team acts as a program management office. Katie Schindall, director of circular economy, explains: "My team is responsible and accountable for setting and implementing strategy – but we do that in a very networked way." Schindall's team convenes internal advisory groups to increase executive buy-in and engage employees from across the company on circular economy topics. "When you're trying to transform the entire business, everyone has to feel ownership and accountability."

To ensure the ongoing operationalization of circularity, circular economy teams work to upskill colleagues across the organization, providing the tools, resources and training necessary to apply a circular economy lens to their work on an ongoing basis. This could mean working with sourcing teams to prioritize non-virgin materials; training designers to make products that will be disassembled, repaired, durable or recycled; partnering with the supply chain team to establish reverse-logistics programs and end markets for materials and goods, to name a few.

Following the path of the corporate sustainability professional, it's only a matter of time until we see more heads of the circular economy added to the payrolls of most large companies around the world.

KEY PLAYERS TO WATCH

Amazon – its recent establishment of a global circular economy team, \$10 million investment in the Closed Loop Infrastructure Fund and notable circular economy hiring spree makes Amazon a player to watch.

Circular Economy Institute – it offers a circular economy certification program, providing training, tools and credentials to people looking to advance their work in circularity.

Cisco – its holistic circular economy strategy serves as a model for how to structure and implement the principles of circularity across an organization.

Circle Economy's Circular Jobs Initiative – it defines the skills, education and training programs needed to upskill and reskill the workforce to advance circularity at businesses and in governments.

Ellen MacArthur Foundation – its network brings together circular economy professionals from companies, cities and universities to share insights, participate in events and contribute to research-based projects.

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





Biodiversity Meets the Bottom Line

BY JESSE KLEIN

Net-zero commitments exploded last year, with the number of companies making them [doubling](#). [Race to Zero](#), part of the U.N. Framework Convention on Climate Change, estimated that net-zero commitments covered about 68 percent of the global economy in 2021, compared to just 16 percent in 2019, a more than fourfold increase.

While there are still concerns over the nature of some net-zero commitments, to effectively address the climate crisis, carbon reduction targets need to go hand in hand with biodiversity goals, which are far less common in the corporate world. While there is no exact number for biodiversity pledges, it's likely far, far lower.

This sphere of environmental work can refer to [many different things](#), including land preservation, restoration and conservation; regenerative agriculture techniques, and decreased air and water pollution, all integrated with the preservation of critters and plants great and small.

Companies are waking up to the fact that their operations and supply chains are heavily dependent on the natural environment. In fact, [\\$44 trillion of the global GDP](#), about half of all economic activity, at least moderately relies on nature. This puts a broad range of sectors at risk, such as tourism and agriculture, but also everything from pharmaceuticals to textiles to

construction. Within the next few decades, [a million species](#), many of which have current or potential benefits to supply chains and product innovation, are threatened with extinction.

The first movers in biodiversity have been businesses most at risk from nature loss. Agriculture companies such as [Danone and General Mills](#) have invested in regenerative farming programs, partnering with farmers and ranchers to restore soils and pollinator habitats. Natura, the Brazilian beauty products company that sources many of its ingredients from the Amazon, has focused on [rainforest protection and nature restoration](#) to ensure the sustainability and longevity of its supply chains.

Deforestation is one of the biggest threats to biodiversity as old growth forests, rich in animal and plant species, are cleared for agriculture and ranching. The rate of deforestation has decreased over the past five years but remains at 10 million hectares – nearly 39,000 square miles, an area roughly the size of Virginia or South Korea – per year, according to the [U.N. 2020 State of the World's Forests report](#). Beyond deforestation, other threats to biodiversity include increased urbanization, turning wild spaces into agricultural land, invasive species, increased pollution, overharvesting or water overuse and climate change crises like drought.

The past year saw concerted efforts to stop the destruction. One of the more celebrated outcomes of COP26 was a [commitment](#) to stop forest loss and land degradation that was signed by more than 100 countries, including Brazil, China, Russia and the United States, as well as by 30 global financial institutions, which pledged to stop investing in companies responsible for deforestation.

Biodiversity is tightly linked to climate issues, and solving one can't be done without addressing the others. Climate change destroys biodiversity in many parts of the world, but investing in nature could offer [30 percent of the carbon dioxide](#) reductions needed by 2030, according to research by The Nature Conservancy and 15 other institutions.

Increasingly, companies are stepping up. For example, Apple last year invested in protecting [110,000 acres of mangrove forests](#). This conservation project will protect 31 species of mangroves, an efficient carbon sequestration ecosystem, enabling them to remove more carbon from the atmosphere. Other projects, such as planting cover crops, which are those not for harvest but to protect the soil from erosion and improve its health, as well as planting trees on agricultural land and conserving forests, can similarly benefit biodiversity and sequester carbon.

"I think we're going to see a much closer integration of biodiversity loss and climate change coming together in company commitments," says Lucy Coast, communications director at Business for Nature, a nonprofit group bringing together corporations and conservation organizations. "Companies are recognizing that they need to, as part of a net-zero commitment, also think about biodiversity."

Funding is one barrier. Only [14 percent of funding](#) for nature-based solutions is provided by the private sector, and it has traditionally been thought of as philanthropic work. Getting the business community to focus on nature the way it has invested in net zero goals could be the turning point. It could be doubly helpful if companies invest in nature-based solutions that draw down carbon while also increasing biodiversity.

For example, Suzano, a Brazil-based paper maker, is one of the leading corporate voices on deforestation. It has restored 30,000 hectares (about 74,000 acres) since 2012 and preserved over 900,000 hectares (about 2.2 million acres) in the [Amazon, Cerrado and Atlantic forest](#) biomes. Meanwhile, it is keeping records of 2,700 plant, bird and mammalian species as part of its [overarching goal](#) to connect a half-million hectares of priority biodiversity conservation corridors by 2030.

But corporate biodiversity plans could face challenges akin to net-zero commitments. Biodiversity doesn't have a clean, quantifiable and buzzy number to work towards. It is





project-based and harder to measure. It will be more difficult to create a market for buying and selling natural assets than creating a carbon market, and businesses will have a hard time putting a monetary value on nature within their operations. Biodiversity can also be unfamiliar terrain for a company whose value chain is not closely connected to nature.

“For some companies, biodiversity is not part of their business,” says Leticia Kawanami, global sustainability manager at Suzano. “They don’t necessarily have nature close to their operations. These companies are investing in projects outside of the scope of their operations and thus rely on other institutions for the expertise and development of the project.”

And then there are the standards. If net zero is the Wild West when it comes to credible verifications, biodiversity is more like a barren undeveloped tundra, with standards few and far between. But that could change. The Taskforce on Nature-related Financial Disclosures announced in September that it will spend two years working on a [framework](#) for risk management and financial disclosure with the goal of shifting money away from nature-degrading operations. Corporate members of the initiative include Bank of America, BlackRock, BNP Paribas, AB InBev, Natura, Nestle, Suzano and 23 others that will work together to define nature-related risks, identify data sources and work to develop metrics. This potential standard will be welcome guidance and should help companies identify opportunities to reduce their biodiversity impacts.

KEY PLAYERS TO WATCH

BNP Paribas — the international banking group includes natural capital risk as part of its investment decisions and, along with AXA, Sycomore and Mirova, is developing a pioneering tool for measuring investment impact on biodiversity.

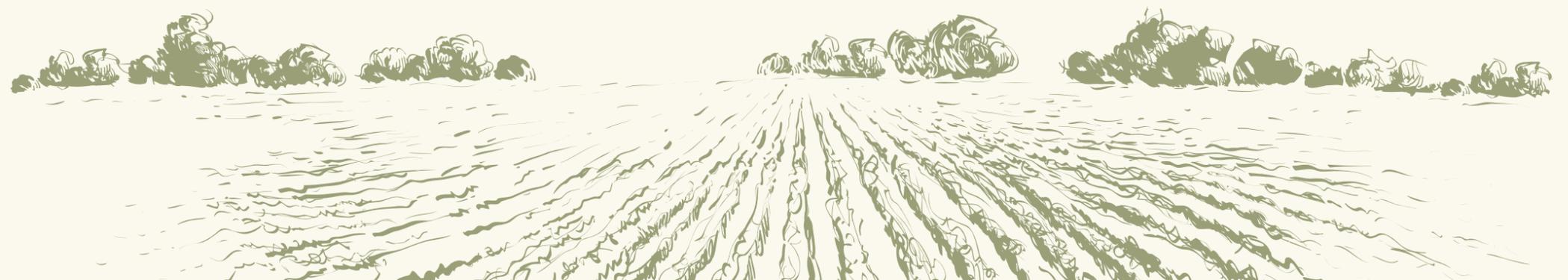
General Mills — the large packaged food company is also working deeply on regenerative agriculture pilots with its farmers with the goal of moving at least 1 million acres of land by 2030 to these more sustainable methods.

HSBC — the bank partnered with [Pollination](#), a climate-asset management group, to launch the first large-scale investment fund, aiming for \$1 billion solely for nature conservation and restoration.

Suzano — the Brazilian paper and pulp company uses only sustainably grown wood from eucalyptus plantations and has a strict zero-deforestation policy.

Taskforce on Nature-related Financial Disclosures — is working on a new framework for moving investments away from nature-negative outcomes, expected in 2023.

Jesse Klein is Associate Editor at GreenBiz Group



ON THE
MENU



Sustainability Gets Baked into Food Design

BY THERESA LIEB

Here's an easy rule of thumb when it comes to sustainable food: What we eat matters more than how it is produced. For example, a plant-based burger patty with ingredients sourced from around the world will most likely have a lower environmental footprint than a local and organic beef patty.

Yet, the traditional focus of food companies' sustainability programs has been on uncovering and improving the way ingredients were grown and products manufactured. Sustainability only enters the conversation after an existing product has been on shelves for years or after new products have successfully passed the innovation process. This is a big missed opportunity.

"When you're thinking about a product that's already on shelves, there are a few interventions that you can make to reduce emissions — things like changing packaging or changing a given supplier," says Julia Collins, founder and CEO of the carbon footprint startup PlanetFWD. "But frankly, you're limited in terms of just how much reduction you can drive. But when we think about new product innovation, there's a tremendous opportunity to drive emissions reductions during product development."

Slowly but surely, this awareness is spreading in business circles, and sustainability is

gaining a spot in R&D shops. Instead of only focusing on sustainable production, companies are now also considering the sustainability of the products themselves. This serves as an exciting environment for a new food design ecosystem of companies, technology platforms, startups and dot-connecting industry organizations.

Rather than appearing as a straightforward framework, sustainable food design comes in different shapes and flavors. The snack startup [Simple Mills](#), for example, scouts novel ingredients that come with inherent nutritional and ecological benefits and can incentivize farmers to adopt regenerative practices. Its innovation process is cross-functional, bringing together R&D, marketing, strategic sourcing and sustainability teams to find such ingredients and transform them into unique snacks.

“We seek to create market demand for ingredients that help diversify agriculture and in turn boost ecosystem resilience, food security and dietary diversity,” says Christina Skonberg, director of sustainability and strategic sourcing at Simple Mills. One such ingredient is chestnut, a tree crop with large carbon storage potential, which the company uses as a novel flour for pancakes.

Other growing trends fit into this framework. The explosive growth of the alternative protein market is one example. Instead of trying to reduce the resource intensity of foods such as meat, milk and cheese that have large environmental footprints, this emerging industry is looking for fundamentally new ways to produce protein. And it’s remarkably successful at that.

The journey of mainstreaming plant-based proteins wasn’t quick. Tofu, veggie burgers and other early innovations have led rather uneventful lives for decades. A breakthrough came in 2019 when Impossible Foods entered a partnership with Burger King, bringing a plant-based Whopper to the United States. The trend accelerated in 2020, as consumers invested in healthier diets during the COVID-19 lockdowns. Sales of

[plant-based foods](#) rose nearly twice as much as for overall U.S. retail foods in 2020, with 57 percent of households shopping for them. At the same time, most major food companies now have their own plant-based lines.

As this market segment matures, it gives way to further specialization. Alternative meats are often criticized for being too highly processed and having complicated ingredient lists. In response, startups like [Nowadays](#) are bringing next-level food design to the industry. It creates “chicken nuggets” that bring home the environmental benefits of plant-based foods while counting on only seven pronounceable ingredients. There’s lots more innovation where that came from.

Centering new products around upcycled foods is another stellar way of putting sustainability front and center by addressing the [roughly 8 percent](#) of global greenhouse gas emissions that stem from food loss and waste. Startups such as [ReGrained](#), [Renewal Mill](#) and [the Spare Food Co.](#) are at the forefront of a movement transforming ingredients that were formerly lost during harvest, left over as by-products in manufacturing processes or wasted due to minor imperfections, and turning them into new food products. And along the way, these upstarts are inspiring larger packaged food companies to follow suit.

Case in point: [Danone](#) partnered with the produce-rescuing startup [Full Harvest](#) to incorporate surplus fruits and vegetables into its new [Two Good](#) yogurts. [Del Monte](#) tapped into the opportunity by launching [upcycled canned beans](#). Both products bring mass-market clout to food rescue. With the creation of the [Upcycled Food Association](#) in 2019, the movement has also gained a valuable organizing body. Last year, the association launched the world’s first upcycled food certification, signaling that this trend is here to stay and grow.

As brands scale design innovations in these different ways, they need reliable partners in crime. A range of software platforms has emerged, providing insights into the social and





environmental footprint of each ingredient – a key first step toward uncovering better alternatives.

[HowGood](#) is one such tool, helping product designers understand how replacing ingredients of a product can impact its overall score in just a few clicks. [Journey Foods](#) is getting to the heart of the matter with an artificial intelligence (AI) software that aims to provide information about the potential cost and timeline of ingredient swap-outs in addition to its nutritional and environmental benefits. [Planet FWD](#) is yet another player in the field, doubling down on insights from its extensive life-cycle assessment database that was 14 years in the making and is now available for commercial use.

With design-related innovations taking place at many different corners of the food system, this new way of evaluating and improving product impact is starting to gain enough traction to make a difference in the industry's overall sustainability performance. Stay tuned for step two: mainstreaming these approaches across a company's entire food portfolio, rather than reserving it for special product lines.

KEY PLAYERS TO WATCH

[Danone](#) – is integrating sustainable food design into many aspects of its business, from producing yogurt with upcycled fruit to launching plant-based dairy products and centering R&D processes around sustainability.

[HowGood](#) – works with food companies that use its product sustainability database to gain ingredient-level insights to improve their social and environmental impact.

[Nowadays](#) – entered the food world in 2021 with a double design innovation: making tasty “chicken wings” from plants and limiting the recipe to just seven ingredients.

[Simple Mills](#) – is developing new food products from ingredients that can scale regenerative farm practices and bring back nutritional and crop diversity.

[Upcycled Food Association](#) – is giving a grassroots movement a home and certification, helping it go from niche to mainstream.

Theresa Lieb is Food Systems Analyst at GreenBiz Group



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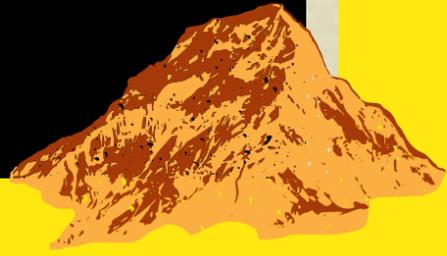
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DIGGING
IN



Circular ‘Mining’ Reaches for the Mainstream

BY HEATHER CLANCY

Cobalt. Copper. Lithium. Nickel. Platinum. Zinc. And don’t forget the rare earth elements, especially neodymium. These and dozens of other metals and minerals are critical for technologies central to the clean economy transition – especially electric vehicles. And none are in particularly abundant supply, at least not in the places where they are needed.

That reality, coupled with growing pains related to the [semiconductor shortage and supply chain disruptions](#) that dragged down the electronics and automotive sectors throughout 2021, is the catalyst for a marked rise in initiatives aimed at “mining” materials from products already in circulation and out of the waste streams associated with virgin extraction of natural resources.

Virtually every member of the metals value chain is digging into this – notably specialized recyclers such as [Aurubis](#) (copper), [Johnson Matthey](#) (platinum) and [Umicore](#) (gold) and some of the world’s largest mining companies, including [Rio Tinto](#), [Anglo American](#), [Glencore](#) and [Sibanye](#). Vulnerable manufacturers, especially big automakers, are also leaning into projects.

“It is clear that the biggest mine of the future has to be the car that we already built, and

that we need to get into a 100 percent or near-100 percent recyclability of these precious resources,” noted Daimler AG Chairman Ola Källenius during a speech at COP26, the global climate summit held in November 2021. He was referring primarily to EV batteries, although many car manufacturers are using recycled metals and minerals for other purposes. Källenius added: “It’s something that comes later, but you need to develop the technology now to get it done.”

Clearly, we’re at an inflection point. Witness the [multibillion-dollar investment](#) announced in September by Ford Motor Co. to build out a domestic supply chain for battery production in Tennessee and Kentucky. Plus Ford has [invested millions in Redwood Materials](#), a Nevada-based startup led by Tesla co-founder JB Straubel that can recover up to 95 percent of the nickel, cobalt, lithium and copper out of spent EV batteries and turn it into anode copper foil and other materials for future production. Redwood already works with Amazon and Tesla to mine batteries and electronic waste. Pretty much any automotive OEM you can name, from [Volkswagen](#) to [General Motors](#), is piloting metals recovery.

How important will recycling and circular mining activities be for the future of metals, precious and otherwise?

Last October, the think tank Wilson Center published a [frank analysis](#) of the U.S. supply chain for minerals critical for the energy transition, citing recycling as important in satisfying growing demand. Recovered materials already account for half of the U.S. supply of nickel, as well as 29 percent of cobalt consumption and 38 percent of the copper. Giulia Siccardi, an associate partner at McKinsey focused on the automotive sector, says materials recovered from what she dubs “urban mining” operations could account for up to 40 percent of the demand for EV batteries by 2040. “The demand is clear, the need is clear,” she notes. “We’re going to need to tap into this sustainable resource that we are sitting on.”

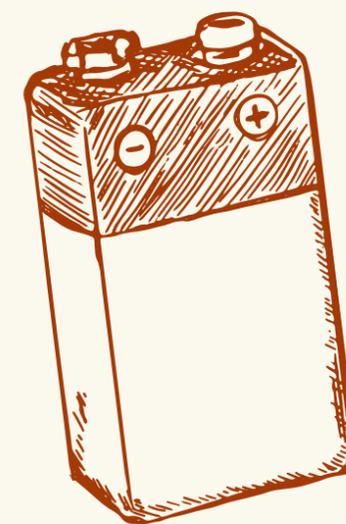
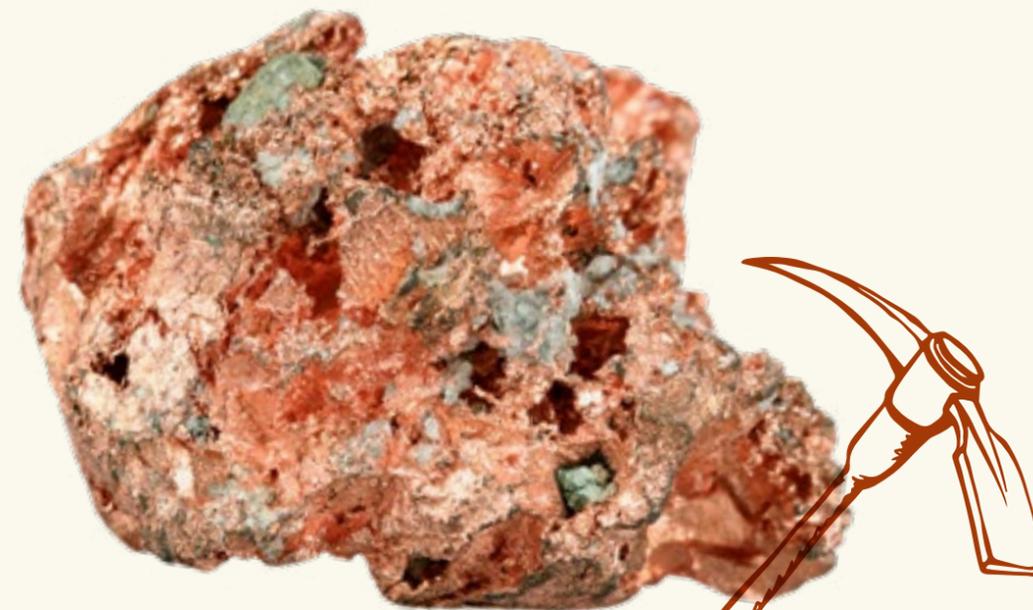
The matter of which organization “owns” this activity — as well as the recovered materials — is still very much in flux.

Consider Rio Tinto, the world’s second-largest metals and mining corporation, which is [refining methods](#) for extracting at least six materials from waste. In Boron, California, it is testing a way to extract lithium, potentially producing up to 5,000 metric tons annually, enough for about 70,000 EVs. Rio Tinto is recovering scandium (used in fuel cells), tellurium (in thin-film photovoltaic solar panels) and anhydrite (for safer fertilizer). One company buying into these initiatives is Schneider Electric, which in June signed on with Rio Tinto to support low-carbon, circular sourcing of metals such as aluminum and copper.

As Anglo American CEO Mark Cutifani [told Accenture](#): “A shift toward a more circular economy presents a significant opportunity for mining companies that are willing to embrace it by reimagining their businesses and partnering with the intermediate and end users of the essential metals and minerals they produce.”

Several large-scale metals recycling companies are forging innovative strategies to mine materials from ore and objects outside of actual mines. London-based Johnson Matthey is [one of the largest players](#) in the recovery of platinum group metals, critical for fuel cells, laboratory equipment and in membranes for electrolyzers used in the production of green hydrogen. And Aurubis, of Hamburg, Germany, in November announced plans to invest more than \$325 million to start building [the first U.S. smelter for multi-metal recycling](#), in Augusta, Georgia. The site, slated to open in 2024, will produce about 35,000 tons annually of blister copper, used for chemical refining.

Alongside improved supply-chain resilience, the most obvious environmental and social benefit of circular mining activities is the potential to minimize the [impacts of developing new mines](#), which scar natural landscapes, damage fragile ecosystems, threaten biodiversity, negatively impact water quality, and affect the health and livelihoods of communities where they’re located. In some instances, circular mining





could help remediate damage at old sites; in June, [the U.S. Department of Energy awarded \\$18 million](#) to eight projects developing ways to extract rare earths and other minerals from coal waste and coal ash sites. [The idea](#), in part, is to create new economic development opportunities and jobs for these struggling coal communities.

There's certainly [no shortage of potential feedstock for metals extraction](#): Of the roughly 50 million metric tons of electronic waste produced annually, only 20 to 25 percent is recycled in any fashion, [according to research](#) by the World Economic Forum. Tycho Moencks, managing director at Boston Consulting Group, notes the biggest gating factor to circular mining will be how to recover stuff and get it to the places where it can be processed safely, while ensuring individuals involved in the collection are treated humanely and compensated fairly. That's regardless of where collection happens, whether a rural Appalachian community or a critically important existing source for metals, such as the Democratic Republic of the Congo.

While circular mining has potential application across all industries, it's likely to progress most quickly in sectors where there is a high degree of consumer scrutiny of environmental, social and governance (ESG) practices and where companies are willing to support the price premium of 1 to 2 percent attached to many of these materials. "The general demand for materials with a low carbon footprint is strong and will grow stronger and stronger," Moencks says. "The question is whether someone is willing to pay more per ton."

KEY PLAYERS TO WATCH

Aurubis — the world's largest copper recycler, from Germany, is investing more than \$325 million in a multi-metal recycling plant in Georgia slated to open in 2024.

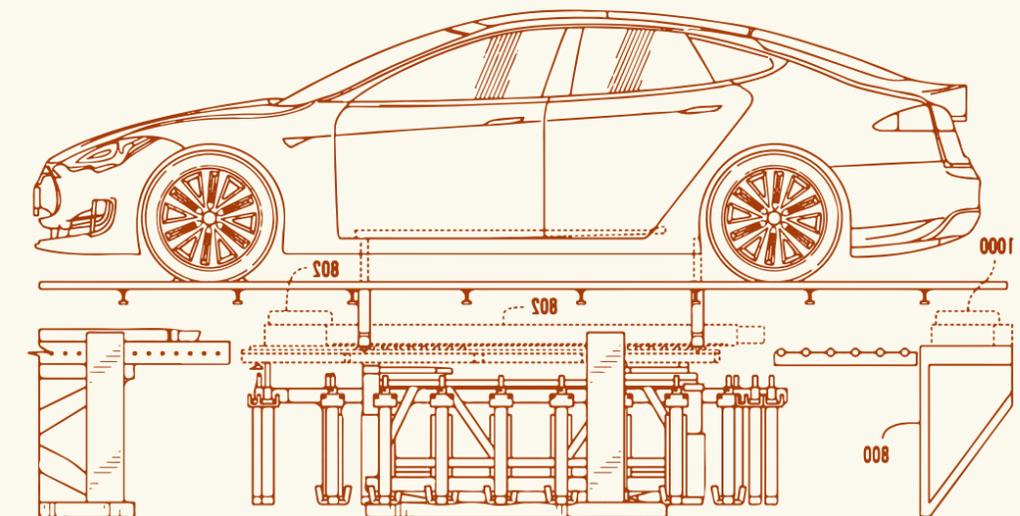
Circular Electronics Partnership — is a multistakeholder initiative focused on building systemic approaches to electronics collection so that a higher percentage can be reused.

Ford Motor Co. — is making a multibillion-dollar bet on EV battery recycling with new factories in Kentucky and Tennessee.

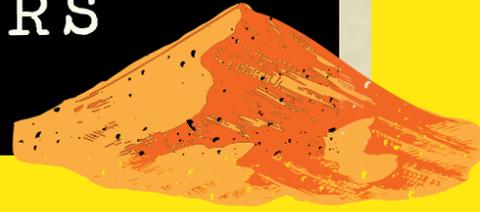
Redwood Materials — is a Nevada-based startup fronted by Tesla co-founder JB Straubel that can extract up to 95 percent of the lithium, nickel, cobalt and copper from spent EV batteries.

Rio Tinto — the Anglo-Australian mining giant is refining methods for extracting at least six metals and minerals from waste ore and other sources.

Heather Clancy is Vice President and Editorial Director at GreenBiz Group



BY THE
NUMBERS



Supply-Chain Data Gets Granular

BY JIM GILES



A bewildering array of goods crisscrosses global supply networks at every moment: shipping containers packed with consumer products, tankers full of oil, railcars heaped high with grain. Each was created by processes that released greenhouse gases into the atmosphere, yet very few travel with any record of those emissions. That's a significant stumbling block for companies committed to net zero carbon. As the saying goes, you can't change — or in this case, reduce — what you can't measure.

Imagine what would happen if things were different — if every product, from cardboard and cotton to computers and cereal bars, came with documentation that detailed the associated emissions. Buyers could switch to suppliers with lower carbon footprints. Carbon labels might appear on consumer products. Investors and regulators would be able to identify — and put pressure on — companies with unusually high Scope 3 emissions.

These developments are closer to reality than many realize. Over the past few years, multiple initiatives and products have been developed to track carbon through supply chains. These are gathering pace, and have recently been accompanied by plans to unify the projects under a single overarching framework. "Suddenly...there's a sexy thing in the room called carbon

accounting,” Nicolette Bartlett, chief impact officer at CDP, joked to an audience at [last November’s COP26 meeting](#).

The need for a unified system of carbon accounting is urgent, because Scope 3 is for most sectors the largest source of emissions: three-quarters of the total in pharmaceuticals, 92 percent in consumer goods and 98 percent in automotive, according to CDP. “Scopes 1 and 2 are a sliver. They might as well not be there, they are so small,” says Jason Kibbey, CEO of [Higg](#), a company that tracks sustainability data through apparel supply chains. “When it comes to making stuff it’s all in Scope 3.”

Getting a handle on the Scope 3 problem is, however, notoriously difficult. Many suppliers don’t measure their emissions, forcing buyers to rely on what are known as emission factors. A vehicle manufacturer purchasing steel, for example, might multiply the quantity it purchases by an average for the emissions generated per unit of steel production in the country of origin. This crude measure is better than nothing, but it obscures differences between suppliers and lessens their incentive to implement emissions reductions.

Even when more detailed numbers exist, comparisons can be difficult. A supplier may have a relatively small footprint, but is that because its analysis excluded certain activities, such as transport, that rivals included? There’s also the issue of trust. What’s to stop a supplier from knowingly bending the rules and claiming that, for example, its operations were powered by renewables when in truth the electricity came from fossil fuels?

Attempts to remedy these problems tend to be clustered around specific sectors. Higg, for instance, was created when the Sustainable Apparel Coalition spun out a tool it developed for companies to track impact metrics across the value chain. The tool’s data, used by VF Corporation and others, comes from more than 20,000 factories that have opted into the Higg network and now share energy use data and other ESG metrics.

The immediate focus for Higg is expanding its network of factories so that the tool covers as many suppliers as possible, Kibbey says. He hopes to make the data more granular further down the road. To fade denim, for example, it is usually washed with chemicals and hot water. But the same effect can be achieved by shining a laser onto the material, which, if renewables are used to produce the electricity required, reduces emissions and toxic effluent. Future versions of the Higg tool may contain data on which of the two processes a denim supplier uses.

Other sectors are developing related initiatives. Just over a year ago, Together for Sustainability, a chemical-industry body, began developing rules for [generating and sharing emission data](#) among its 34 members, which include big names such as Dow and BASF. There are also numerous solutions emerging from service providers, such as the [Carbon Action Module](#), a tool from sustainability ratings organization EcoVadis that provides procurement teams with insight into suppliers’ carbon management practices. In addition, a slew of startups — such as [Planet FWD](#) and [HowGood](#) in food — offer sector-specific data.

One danger is that these parallel projects remain siloed, a risk with significant consequences for companies that have suppliers spread across multiple sectors. Averting such an outcome is one reason why the World Business Council for Sustainable Development launched its Pathfinder Framework last March. The framework’s guidelines for [creating and sharing carbon data](#) build on product environmental footprinting rules being trialed by the European Commission as well as other existing standards, including the GHG Protocol. Next year, the initiative will begin piloting standards designed to help different carbon accounting technologies share data, says Anna Stanley, director for climate action at the WBCSD.

If these multiple initiatives prove successful, a remarkable number of changes could follow. Kibbey gave the example of one Higg customer — a large fashion company he was unable





to name for confidentiality reasons — that recently used his system to compare the emissions from 60 textile mills in its supplier network. Some were clear leaders, justifying more business. The middle 40 or so needed to raise their game, prompting the company to partner with them on efficiency projects. The 10 remaining laggards lost the company's business.

That's just one example. In finance, investors that have committed to net-zero targets, including members of the [Glasgow Financial Alliance for Net Zero](#), will have more of the data they need to assess progress. In other industries, notably tech, environmentally-minded employees will likely use the data to demand change. Marketing departments may opt to add carbon labels to products, in turn enabling consumers to leverage buying power to push companies toward further emissions cuts.

With regulators, startups and major corporations all aligned, these gains are already emerging, with many more to follow in the near future. As the CDP's Bartlett told the COP26 audience: "It's going to be an extraordinary five years."

KEY PLAYERS TO WATCH

Pathfinder Framework — the World Business Council on Sustainable Development's cross-sectoral initiative is backed by many major corporate players, from Unilever to Chevron.

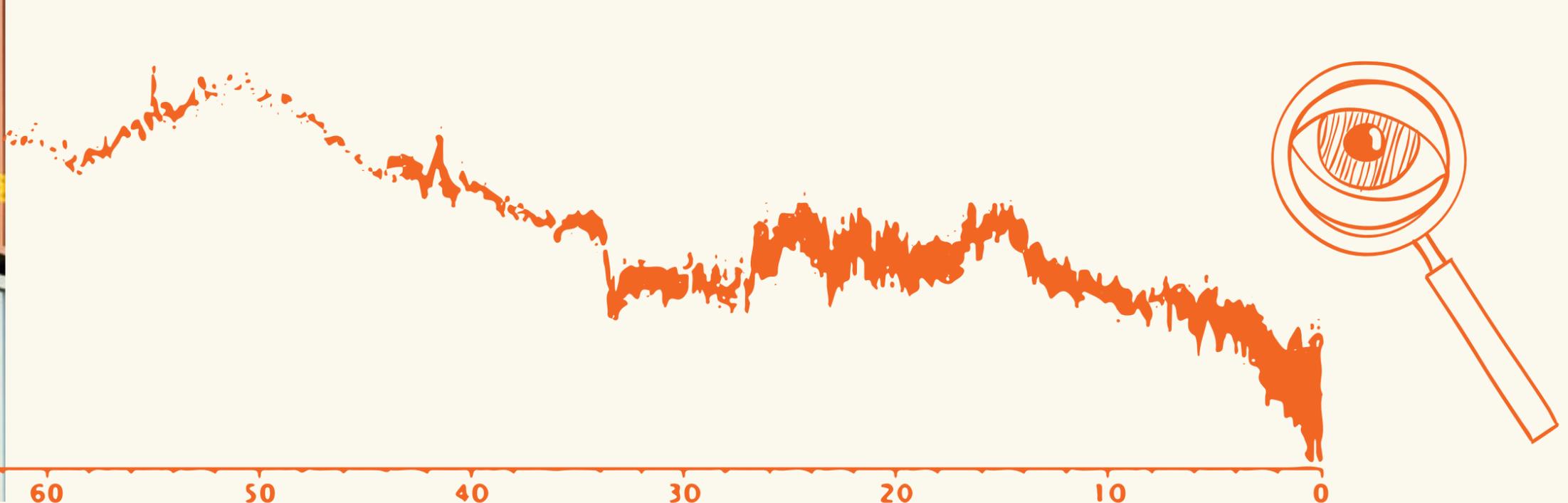
Higg — the Bay Area startup is working with apparel companies and suppliers to generate accurate data on emissions across the value chain.

EcoVadis — the established sustainability rating provider is helping make supply chains more transparent with its Climate Action Module.

SupplyShift — the Santa Cruz-based company tracks climate and other impact metrics in the supply chains of multiple industries.

Product Environmental Footprint — the European Commission is consulting on plans to expand its pilot carbon footprinting scheme for products.

Jim Giles is Vice President, Net Zero at GreenBiz Group



POWER
SHIFT



Clean Energy Aims for True Zero

BY SARAH GOLDEN

Corporations have been a major driving force in the scaling of renewable energy over the last decade. Indeed, those on the forefront made ambitious commitments before they knew how they would get there.

That moxie paid off. Voluntary procurements have given rise to new contract models, driven down the price of technologies and instilled confidence in investors, inspiring more capital to flow to the space. Thanks to these efforts, hundreds of companies, communities and institutions hopped on the [100 percent clean energy](#) bandwagon, committing to procure enough renewable energy to offset their annual electricity consumption.

Now, leading organizations are setting their sights on the next, seemingly impossible frontier: figuring out how to match energy use with clean energy supply in real time. That means ensuring clean energy is available where and when it's needed, all day, every day.

Cracking this nut is key for the power sector to reach deep decarbonization and to have a chance at meeting global climate goals. While large-scale renewable-energy purchases help decarbonize the grid overall, customers remain dependent on carbon-emitting energy sources when clean resources aren't available. Yet the conditions are right for meaningful change.

The goal goes by many names. Google, the first to articulate the challenge in [2018](#) and to commit to achieving it by [2030](#), calls it [24/7 Carbon-Free Energy](#) (CFE) — the phrase the Biden administration used in a [December executive order](#) calling for 50 percent CFE by 2030. Microsoft calls it [100/100/0](#) (100 percent electricity 100 percent of the time to be matched by 0 carbon energy). IBM calls it [true zero](#).

Whatever you call it, organizations agree that it will be very hard to achieve carbon-free energy at all hours of each day for every facility while ensuring grid reliability, affordability and accessibility. Thankfully, this is the type of Gordian knot the wizards at Google and Microsoft like to figure out. And the road to success is littered with co-benefits, including:

Driving deeper emissions reductions in the power sector.

Analysis from Princeton University's [Zero Lab](#) found that CFE procurement slashes more emissions than standard 100 percent renewable goals — for both the energy buyer and the grid as a whole. That's because CFE procurements factor in when energy is generated, meaning it is better suited to displace dirty energy alternatives, like a natural gas peaker plant.

Incentivizing new technologies. Just as traditional renewable procurements helped drive down both the technology costs and soft costs of solar and wind, CFE procurement strategies will accelerate solutions to fill the gap for the intermittent nature of renewables, according to RMI's report, "[Clean Power by the Hour](#)." Technologies ripe for growth include long-duration energy storage, pumped hydro, green hydrogen, geothermal and advanced nuclear.

Hedging against energy price volatility. CFE procurement contracts lock in a price at specific times — meaning corporations that sign these deals may be better protected from price volatility when the unexpected happens (such as a polar vortex or a heat dome), according to both [Zero Lab](#) and [RMI](#).

While it's unclear exactly how this goal will be achieved, a suite of strategies will be key:

- **Deploying more clean energy.** Parts of the grid could significantly reduce emissions simply by adding in plain old cheap, intermittent solar and wind. There may also be a case to overbuild renewable energy (meaning there would be excess capacity at some points of the day), which could reduce energy storage demands.
- **Diversifying clean energy resources.** This could mean building out complementary energy sources, such as combining intermittent wind and solar with sources that provide continuous power, such as geothermal and hydro. It is possible that clean, continuous energy sources such as nuclear and pumped hydro will play a larger role in the future, but unlikely by the 2030 timeline, the year to which many organizations have pegged their 24/7 CFE goals.
- **Shifting energy load profiles.** Energy users can help by shifting consumption patterns to match generation. This could be done with [carbon-aware software](#), demand response programs or by shifting when nonessential, energy-intensive functions are scheduled.
- **Installing traceability software.** Key to ensuring that electricity is carbon-free is an accounting system that is temporal and location-based. This will enable early movers to know they're doing the right thing and will open up a market for others to join.
- **Using energy storage.** Reaching true zero will require storing clean energy for when it's needed, with technologies such as [long-duration storage](#), [green hydrogen](#) or [pumped hydro](#).

Of these buckets, energy storage is the Holy Grail in the short term. It's the aspect that makes reaching true zero so expensive — at least until we decipher the code to cheap, plentiful, [long-duration energy storage](#). Based on today's energy system, hourly load matching beyond about 50 percent of the time will be highly reliant on energy storage, according to [analysis](#)

[from RMI](#). But early leaders believe that the price premium is worth it, if their leadership makes it easier for others to follow.

"Corporates compete," says Caroline Golin, global lead for energy policy and market development at Google. She referred to "a gold rush on wind and solar" during 2021 in the United States, where companies were [fighting over projects](#) to meet near-term clean energy goals and capitalize on sunset tax credits. "I think we need to get out of the space of competing over megawatt hours and start to compete over impact."

There are already a handful of contracts and power purchase agreements (PPAs) that promise to deliver carbon-free electricity to customers. These are the early whisperings of standardized models that will enable the space to take off. Among them:

- Microsoft, which has committed to powering all of its buildings and data centers with CFE by 2025, inked a [deal](#) with the utility Vattenfall in 2020 to power three of its data centers in Sweden with clean energy. (It is worth mentioning that Vattenfall enjoys a unique abundance of hydropower).





- [Google](#) and [Microsoft](#) each signed agreements in 2021 with AES Corporation to supply their respective data centers in Virginia with around-the-clock renewable energy.
- [JPMorgan Chase](#) plans to run all of its U.K. offices on clean energy all day, thanks to a partnership with EDF and ClearTrace.
- Last fall, Google introduced a smart thermostat, [Nest Renew](#), which allows homeowners to better match their energy consumption habits to when clean energy is plentiful on the grid.

Additionally, Google [partnered](#) with Sustainable Energy for All and UN Energy to develop the [24/7 Carbon-free Energy Compact](#), a commitment for signatories to become “part of a global community actively engaged in accelerating the technologies, policies, tools, ideas and advocacy” that will collectively realize a truly carbon-free power sector. By the end of 2021, 40 organizations, both large and small, had signed on.

KEY PLAYERS TO WATCH

[24/7 Carbon-free Energy Compact](#) — it is bringing more organizations onboard with the true-zero vision.

[Google](#) — the tech giant was an early mover in this space and has just the right competitive spirit to strive to stay ahead of the other climate leaders nipping at its heels.

[Green Software Foundation](#) — it is working to embed carbon-aware principles into software used to power all parts of the economy, which will be essential to shifting load curves.

[Microsoft](#) — the software company has signed some of the first CFE PPAs in Europe and the U.S. It is also a major backer of carbon-aware software.

[Zero Lab](#) — it is doing innovative modeling to understand what a carbon-free grid will look like at a market-level.

Sarah Golden is Senior Energy Analyst & Chair of VERGE Energy and VERGE Electrify at GreenBiz Group

THE NEW
RULES



Regulators Rein in the ESG Bandwagon

BY GRANT HARRISON

In March 2021, then-acting chair of the U.S. Securities and Exchange Commission, Allison Herren Lee, set the stage for the next act in sustainable finance and investing.

“Human capital, human rights, climate change — these issues are fundamental to our markets, and investors want to and can help drive sustainable solutions on these issues,” she [told an audience](#) at the Center for American Progress. “We see that unmistakably in shifts in capital toward ESG investing ... [W]e understand these issues are key to investors — and therefore key to our core mission.”

Around the world, ESG’s explosion is echoing in markets and the media, and has thus become a matter of serious concern for regulators — not to mention companies and investors.

Just how immense has this shift been? [PwC found](#) last fall that 49 percent of investors globally would divest from companies that aren’t taking sufficient action on ESG issues, and 79 percent identified a firm’s management of ESG risks and opportunities as an important factor in investment decision-making. In June, more than 550 organizations had responded to the SEC’s [request for comment](#) on climate disclosure. Just a few months later, about one in three dollars managed globally was invested with some form of ESG strategy — more than \$35 trillion in total.

The G7, composed of the world's largest advanced economies, is clear in [its support of](#) mandatory climate disclosure.

Today, the ESG bandwagon is rolling at top speed, and the SEC is determined to gently pump the brakes to minimize potential injuries to investors jumping aboard. In the U.S., the SEC has [responded to](#) soaring investor demand for ESG information with what it's calling an "all-agency approach." Across the pond, the EU's Sustainable Finance Disclosure Regulation (SFDR) is mandating ESG disclosure for asset managers across the 27-nation bloc, though regulators in Europe [are uncovering](#) unsupported ESG claims, and watchdogs like the International Organization of Securities are already moving beyond SFDR to take direct action. Countries [across Asia](#) are ushering in a paradigm shift in ESG for the region, with numerous countries' regulators mandating funds' ESG disclosure in the coming one to three years.

So, what is ahead for ESG regulation?

In a word, change. Roughly 75 percent of the comment letters submitted to the SEC by June 2021 were in support of mandatory climate disclosure, though there are notable [ideological and practical disagreements](#) over the appropriate substance of the rules. These rifts will certainly influence what shape regulations take in the coming years, most notably with respect to how or whether social – the "S" pillar of ESG – criteria will be recognized as material investment factors. Many social factors lack the pragmatism inherent in the measurability of environmental and governance issues, but as the currency of the "S" [continues to grow](#) so, too, will pressure to meaningfully incorporate these factors into regulation.

For added context in the U.S., the SEC [has not formally updated](#) its guidance on disclosures for environmental issues in more than a decade. That guidance relied on the established materiality standard, whereby information is material if there is a substantial likelihood that a "reasonable investor" would view a "particular fact" as significantly altering the information available. There are now [ample particular facts](#) that point

to a changing climate's effect on financial markets, and ever-growing agreement on the veracity of those facts.

2021 saw what could serve as one of the most significant changes in corporate reporting since the 1930s: the formation of the [International Sustainability Standards Board](#) (ISSB), an organization meant to deliver a comprehensive global baseline of sustainability-related disclosure standards that provide investors and other capital market participants.

The ISSB is meant to encourage the voluntary uptake of the standards globally. But "global standards, like global trade, are a myth," [according to](#) Jean Rogers, founder of the Sustainability Accounting Standards Board and now global head of ESG at Blackstone, a major alternative investment management firm. She says that the key opportunity for the ISSB will be to align global markets around an approach to sustainability standards-setting and core principles, while allowing for jurisdictional differences in implementation.

And if standardization was the clarion call for the ESG space in the past decade, looking forward it will be harmonization. As such, Europe's SFDR sets harmonized rules for market participants as it regards transparency on the furnishing of sustainability-related information for financial products. Under the European Union's regulatory regime, asset managers and owners will, for the first time, need to [tell investors](#) where ESG risks lie in their fund portfolios. If they don't take sustainability risks into consideration, they will have to explain why.

SFDR imposes mandatory ESG disclosure on asset managers with the aim of [preventing greenwashing](#), as [defined by](#) the EU when a firm "gives a false impression of their environmental impact or benefits." Similar progress in the United States has been widely celebrated, but Larry Fink, founder and CEO of BlackRock, has [sounded the alarm](#) for what he sees as the "biggest arbitrage in our lifetime": the transferring of dirty assets to privately held firms, thereby giving the impression of decarbonizing but actually transferring dirty assets to firms with less disclosure.





With pressure for ESG disclosure focused on public equity markets, awareness is growing that dirty assets are sliding into the darkness of privately held companies – a concerning trend. Promisingly, IHS Markit, a data provider, [found that](#) 87 percent of private-equity investment managers surveyed pointed to regulation and political pressure for why they are taking account of ESG factors for investments; over half said pending regulation was the primary reason.

Financial regulations are meant to foster trust, ensure stability and protect investors. But trust across the globe is in short supply, evidenced by Edelman’s 2021 “Trust Barometer Special Report: Institutional Investors.” Of the 700 institutional [investors surveyed](#) – financial analysts, chief investment officers and portfolio managers across global geographies – 86 percent said companies frequently exaggerate their ESG progress in disclosures, and 72 percent said they don’t believe companies will meet their ESG commitments. Nearly all – 94 percent – said they expect a rise in litigation due to companies not delivering on ESG pledges. Lawyers are starting to see [real green](#) in fighting greenwash.

The [Wild West of ESG](#) will shrink as regulations in North America, Europe and Asia take hold in the coming years. Friction will continue, particularly in the United States, where SEC Commissioner Hester M. Peirce has bitingly [framed ESG advocacy](#) as “labeling based on incomplete information, public shaming, and shunning wrapped in moral rhetoric, preached with cold-hearted, self-righteous oblivion to the consequences.” But as ESG continues its remarkable ascent among investors, the ESG bandwagon is almost certain to imperil some on board without sufficient guardrails. [According to](#) SEC Chair Gary Gensler, “Investors have told us what they want. It’s now time for the Commission to take the baton.”

KEY PLAYERS TO WATCH

[Financial Industry Regulatory Authority](#) – is the largest independent regulator for all securities firms doing business in the United States. It has made the case for increased government regulation of ESG disclosure.

[Glasgow Financial Alliance for Net Zero](#) – has committed \$130 trillion among 450 financial firms across 45 countries to fund investments aimed at achieving net zero greenhouse gas emissions.

[International Sustainability Standards Board](#) – a new global standards setting body is producing a global baseline of sustainability standards that provide investors with information about companies’ sustainability-related risks and opportunities.

[PwC](#) – the global professional services giant is directing \$12 billion toward creating 100,000 net new jobs in ESG by 2026.

[SEC’s Climate and ESG Task Force](#) – a new initiative in the Division of Enforcement will oversee a division-wide effort to proactively identify ESG-related misconduct for U.S. markets.

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MOVING
TARGET



Logistics Gets on a Sustainable Track

BY JOEL MAKOWER



Moving goods from Point A to Point B has long been a polluting process, thanks to the dirty petroleum-based “bunker fuel” used to power most oceangoing vessels, the energy- and carbon-intensive world of aviation and other legacy fuels and technologies. And, alongside both, the trucks and trains that move things on terra firma. All are considerable sources of carbon pollution, not to mention other problematic emissions into the air and water. And all have been under pressure to change.

At long last, those changes may be en route. A truckload of technologies, partnerships and global agreements are putting solutions, some of them decades old, on a fast, or at least faster, track. Combine that with corporate and government purchasing commitments that stoke demand for greener logistics options, along with stepped-up regulatory pressure to decarbonize the transportation sector, and you have the makings of a disruptive shift.

That shift could be seen last fall during “Transport Day” at COP26, in Glasgow, Scotland. Among the commitments: Nations representing 40 percent of aviation emissions committed to support emissions targets for aviation aligned with the Paris Agreement. Twenty airline members of the World Economic Forum’s (WEF) [Target True Zero initiative](#) committed to use new technologies, such as electric, hydrogen and hybrid aircraft, to reduce aviation’s climate footprint. The

[Sustainable Aviation Buyers Alliance](#), launched earlier in 2021, added members to its efforts to aggregate the purchasing power of fuel buyers to stimulate markets for cleaner aviation fuels. Still another group of large companies joined an initiative launched by WEF called the [First Movers Coalition](#). It's focused on eight sectors, including shipping, aviation and trucking, considered among the most challenging to transition to zero emissions. And nearly 20 nations committed to developing [zero-emission shipping routes](#) between ports — so-called “green shipping corridors” that will act as testbeds for emerging technologies.

As these initiatives amply demonstrate, decarbonizing logistics involves the interplay of technologies, policies and market developments: the combination of accelerating the development of new fuels and propulsion systems, implementing regulations and policies, and stimulating demand, which also unlocks both public and private capital. It's a recipe for success we've seen multiple times before in climate tech in ramping up everything from solar energy to electric vehicles to green chemistry innovations.

Take sustainable aviation fuel, a drop-in replacement for the conventional diesel fuel that powers most planes. It's been around for years, plodding along with a market share that's, well, a drop in the bucket. But over the past two years, major corporations that fly millions of miles a year — including Bank of America, Deloitte, JPMorgan Chase, McKinsey, Microsoft, Netflix and Salesforce — have pressed airlines to use more of this low-emissions fuel in their operations, sending much-needed demand signals to the market.

These fuels — which can be made from a variety of feedstocks, including used cooking oil, agricultural residues and municipal solid waste — are aviation's most promising near-term decarbonization solution, given their potential to reduce up to 99 percent of greenhouse emissions on a life-cycle basis compared to conventional jet fuel, according to a 2021 [report](#) from McKinsey and WEF. Aviation currently

accounts for about 2 percent of global carbon emissions, though the industry has committed to decarbonize by mid-century or sooner.

Or take the oceangoing ships that deliver many of the goods we buy, from carpets to car parts. They, too, are being redesigned to run on cleaner fuel or even partly on wind.

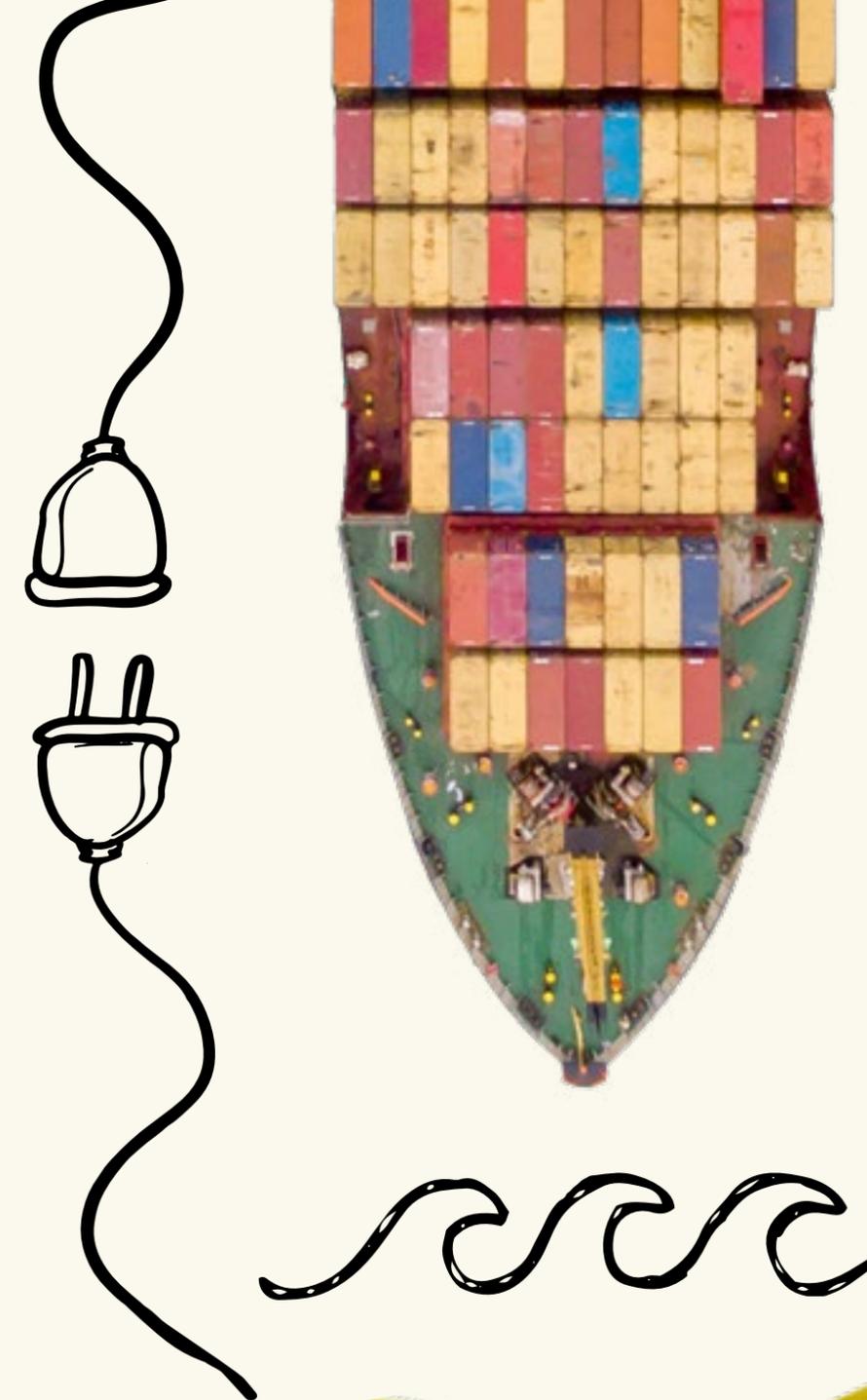
Today, maritime shipping powered by heavy fuel oil produces about a billion metric tons of climate pollution annually — about as much as all of America's coal-fired power plants combined — accounting for 3 percent of global carbon emissions. Cargo ships also produce 10 to 15 percent of the world's manufactured sulfur oxide and nitrous oxide emissions.

In October, a group of companies announced a first-of-its-kind effort to switch all ocean freight to vessels powered by zero-carbon fuels by 2040. Amazon, IKEA, Michelin, Patagonia and Unilever were the first signatories to a statement facilitated by [Cargo Owners for Zero Emission Vessels](#).

Some critics would like to see these initiatives gather steam. More than 50,000 merchant ships currently carry around 80 percent of global trade, and oceangoing cargo volumes are projected to grow by as much as 130 percent by 2050. Last fall, a coalition of “environmental and public health advocates, scientists, shipping experts and shoppers” proactively launched [Ship It Zero](#), a campaign to prod big retailers — Amazon, IKEA, Target and Walmart were on the initial hit list — to commit to move products on zero-emissions ships by 2030.

The decarbonization of trucks is also picking up speed. There, too, the set of solutions is varied, from low-carbon fuels to electrification.

In the United States, [more than 70 percent](#) of goods spend time inside a truck, according to the American Trucking





Association, whose industry is responsible for almost 7 percent of greenhouse gas emissions. Trucks are notoriously hard to decarbonize because the batteries needed to electrify them add substantial weight, not to mention requiring precious recharging time.

Still, electrification efforts are rolling along, with battery-operated big rigs expected from Daimler, Volvo, VW and Tesla in the next few years. The research firm [Wood Mackenzie](#) expects the number of electric trucks on U.S. roads to rise from 2,000 in 2019 to more than 54,000 by 2025. And some of these trucks go a long way to solve range anxiety: Tesla's forthcoming Semi, for example, is claimed to have a range of more than 600 miles, a respectable day's work for most truckers.

What about existing trucks? They, too, can decarbonize. [Remora](#), is commercializing a technology that reduces emissions from long-haul trucking by sucking up carbon dioxide directly from the tailpipe. Another startup, [Booster](#) has converted thousands of diesel vehicles to renewable fuels. If they succeed, Booster, Remora and other innovators could enable existing fleets to keep rolling for years, rather than having to be traded in for electrified models.

Across the transportation spectrum, many of the promising fuels and technologies may simply be bridges to even cleaner and emissions-free logistics. For example, for all the efforts aimed at helping sustainable aviation fuels gain altitude, they may eventually give way to electric- and hydrogen-powered planes, at least for shorter flights.

Similarly, alternatives to bunker fuels for oceangoing ships could be displaced in part by newer technologies. Last August, Maersk, the world's largest shipping company, [said it will introduce](#) eight large container vessels operated on methanol, and [established](#) a new Danish facility to produce the approximately 10,000 tons of carbon neutral e-methanol those vessels will need. Could [wind-powered cargo ships](#) be sailing far behind?

KEY PLAYERS TO WATCH

[First Movers Coalition](#) – [launched](#) at COP26 by the World Economic Forum, it seeks to create demand for low-carbon approaches to shipping, aviation and trucking, among other technologies.

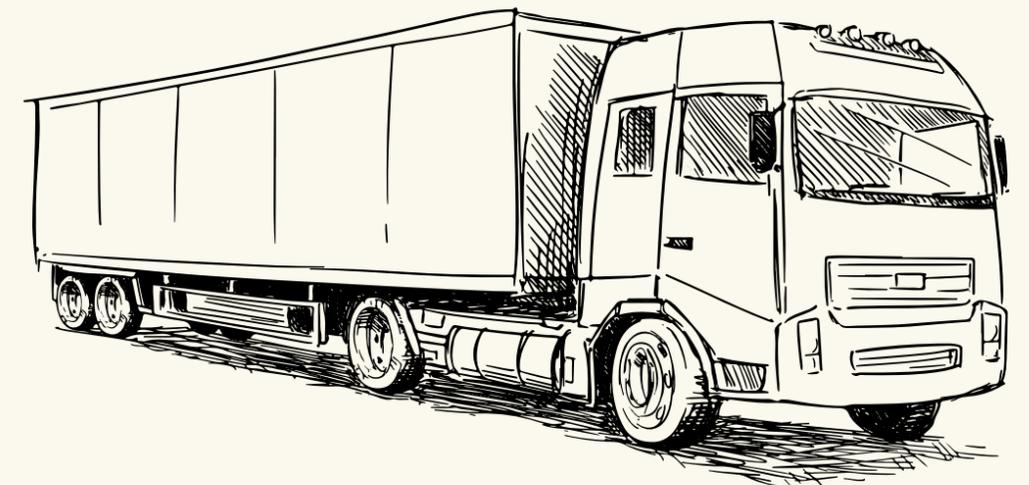
[Maersk](#) – its [historic purchase](#) of eight “carbon neutral” ships could set a new standard for emissions-free shipping.

[Remora](#) – its tailpipe-sucking retrofit for long-haul trucks [could be a game changer](#) in reducing the emissions of existing vehicles.

[Smart Freight Centre](#) – works with the global logistics community towards efficient and zero-emissions global freight.

[Sustainable Aviation Buyers Alliance](#) – this group of companies and airlines last fall [launched an initiative](#) to “drive investment in high-integrity sustainable aviation fuels and accelerate the transition to net-zero emissions air transport.”

Joel Makower is Chairman and Co-founder of GreenBiz Group



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GreenBiz Group is a media and events company that accelerates the just transition to a clean economy. Through events that galvanize, stories that amplify, peer networks that bond and industry-leading analysis, we define markets and advance opportunities at the intersection of business, technology and sustainability. We are a passionate team of people that builds and empowers communities to confront the threats of climate change and solve the thorniest challenges of our time.

GreenBiz recognizes the inextricable link between climate change and social change and works across its platforms to connect the dots between equity, inclusion and sustainability by centering justice as a cornerstone of a clean economy. We recognize the power of our platform and actively work to be intersectional in our content by prioritizing Black, Indigenous and people of color (BIPOC) across our conference programs and editorial coverage.

Our goal is to ensure that GreenBiz Group — and the industry — reflects the world that we live in, and the world we want to see.

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