



Financing Mechanisms to Support Sustainable Practices

By Tom Manning

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This paper is a survey of financing mechanisms supporting sustainable practices, examining current practice and promising ideas under development. It divides the financing spectrum into the standard categories of equity and debt, plus policy-based practices and public/private partnerships (a/k/a blended finance). Each section includes a brief description of financing categories and practices; examples of each, i.e., what they are being used to accomplish and by whom; and provides estimates of the current scale of the markets, where available.

Introduction & Summary of Findings

Investment to support sustainable practices is conducted at scale across the spectrum of debt and equity financing instruments and has moved very much into the mainstream of finance, leaving its niche status behind.

Global debt and equity financing for clean energy and a green transition, for instance, totaled \$1.3 trillion in 2022, up 70% from 2019.¹ This growth is expected to continue. The International Energy Agency (IEA), an Organization for Economic Co-operation and Development (OECD) affiliate, projects non-fossil fuel investment to grow to \$1.7 trillion in 2023, with investment in solar energy to exceed that in oil production for the first time.²

Another measure, the value of assets under management (AUM) in the United States identified as integrating environmental, social and governance (ESG) considerations into its investment strategies, or meeting other measures of sustainability, is placed at \$8.4 trillion in 2022, representing 1 in 8 dollars under management. This figure, reported by the US Sustainable Investment Forum (US SIF), uses a new methodology and is actually less than half of the figure US SIF reported in its most recent prior report (2020).³ This doesn't mean sustainable investment has plunged or even decreased. The new methodology requires investment managers to more specifically identify their ESG strategies and resulted in the elimination of many funds from the survey. In other words, US SIF has taken steps to combat greenwashing and unverified claims of ESG investment.

The value of assets under management is an indirect measure of sustainable investment, as it largely reflects the market value of companies and not necessarily new investment into any particular sustainable activity. That difference is important, as sustainable investment falls not only into categories of debt and equity, but also categories of direct and indirect investment.

Broadly speaking, direct investment can include loans and bonds designated for specific purposes, as well as equity investments, often in privately held start-up companies that are developing products solving sustainability problems. Indirect sustainable investment, such as purchasing the stock of a public company, doesn't typically fund a new activity,

¹ International Renewable Energy Agency (IRENA) & Climate Policy Initiative (CPI); Global Landscape of Renewable Energy Finance, 2023

² International Energy Agency (IEA); Clean Energy Investment is Extending its Lead Over Fossil Fuels, Boosted by Energy Security Strengths; May 25, 2023

³ US SIF Foundation (US SIF); 2022 Report on US Sustainable Investing Trends. Report on US Sustainable and Impact Investing Trends 2020. US SIF Foundation

but can support the value of a company pursuing ESG objectives and can be a driver of change if shareholders use their positions as owners to press corporate management to adopt more sustainable practices.

How effective is shareholder engagement in driving companies towards sustainable practices? That is a subject of some debate, though it can be a factor shaping corporate behavior.⁴ Most recently, in the United States, perhaps the most visible impact of shareholder engagement has been to trigger a backlash – coming not from targeted companies, but primarily from Republican regulators and elected officials. The backlash is largely aimed at institutional investors' use of ESG investment strategies, which is characterized by opponents as non-financial, ideologically driven and contrary to fiduciary responsibility.⁵

This raises the question of what, exactly, defines an ESG investment strategy? Proponents argue that it is the very essence of fiduciary responsibility – a value creation strategy, as well as a risk management framework, fully compatible with traditional financial analysis and particularly well-suited for long-term holdings, such as retirement funds.⁶ An ESG framework looks at a company's current practices, and also looks forward, considering a variety of factors, which could include:

- How is a company positioned to take advantage of market opportunities associated with climate solutions, resilience and adaptation? Will it respond to the preferences of a marketplace that is not only increasingly diverse, but also increasingly aware of product sustainability issues?⁷
- To what degree is a company, including its physical assets, its products, its markets and supply chain, subject to the storms, droughts, heat waves and floods, as well as changing attitudes and regulations, associated with climate risk?
- Can it attract and retain talented employees in a work force that increasingly wants to work for companies that are solving, not causing, sustainability issues?⁸
- Are its labor practices fair, and likely to build stability and expertise or trigger unrest? How about in its supply chain?
- How strong are internal controls? Does its governance reflect a variety of viewpoints?
- How will these factors impact financial performance over time?

The answers to these and many other ESG considerations are generally a combination

⁴ Gatti, M.; How Does Board-Shareholder Engagement Really Work?; Oxford Business Law Blog; Nov 28, 2022. Financial Times Editorial Board; Saving Capitalism From the Culture Wars; Financial Times Jun 21, 2023. Rose-Smith, I.; For ESG Month, Let's Have an Honest Discussion About the Limits of Shareholder Engagement; Impact Alpha; Jul 18, 2023. Dimson, E., et al.; Coordinated Engagements; European Corporate Governance Institute; May 2023

⁵ Rubinfeld, J. & Barr, W.; ESG Can't Square With Fiduciary Duty; Wall Street Journal; Sep 6, 2022. Florida, State of; Governor Ron DeSantis Eliminates ESG Considerations from State Pension Investments; News Release; Aug 23, 2022

⁶ Lipton, M.; Understanding the Role of ESG and Stakeholder Governance Within the Framework of Fiduciary Duties; Harvard Law School Forum on Corporate Governance; Jul 30, 2023

⁷ Frey, S., et al.; Consumers Care about Sustainability—and Back it Up with Their Wallets; McKinsey & NielsenIQ; Feb 2023.

⁸ Jiang, L., et al.; ESG as a Workforce Strategy; Marsh & McLennan; 2020. Novik, M. & Eaton, C.; Big Oil's Talent Crisis: High Salaries Are No Longer Enough; Wall Street Journal; Aug 6, 2023

of facts and judgement. But the same is true for traditional financial analysis – which includes not only the straight math of historical financial trends and ratios, but also a great deal of judgement regarding the capabilities of a company’s management team, its strategies, its position in the marketplace, its strengths relative to competitors, etc. In addition, given that a thorough financial analysis includes any and all material factors, there is every reason to assume that “standard” financial analysis should and does include material ESG factors, even if the term ESG is not used. No competent financial analysis can simply stick to the numbers and stick to the facts. The whole point of the exercise – making the best possible investment decisions – is inherently a non-factual judgement call about what may happen in the future, where facts and financial results don’t yet exist.

If ESG is focused on market opportunities, maximizing value and managing risk, what is the “war on ESG” all about? How can, for instance, a risk management framework be controversial? Actually, risk management is often controversial, because identified risks suggest the need for de-risking actions. Companies and investors, and certainly their regulators, can and do disagree on what constitutes a risk and what should be done about it. But the disagreement is often behind the scenes. ESG risk management, on the other hand, includes a focus on issues that are society-wide hot buttons, particularly climate change and diversity in governance and the workforce. And if climate change, per se, is now widely accepted as a fact and a risk, the question of what to do about it remains hugely controversial, as do the questions of what, if anything, to do about diversity and other workforce and governance issues.

Beyond political considerations, if ESG is a guide to making the best investment decisions, how about 2021 and 2022, when the value of oil and gas stocks gained 135% as compared to 2.2% for the S&P 500 as a whole?⁹ In fact, many funds incorporating ESG considerations include oil and gas stocks as part of a broad diversification strategy, as well as part of an engagement strategy, which they can only conduct if they are shareholders. Nonetheless, if funds pursuing ESG strategies are lighter in oil and gas shares than other funds, they probably missed out on some of the recent gains. In fact, many ESG funds did underperform the market in 2022,¹⁰ as 50% of all investments must each year. But it wasn’t universally the case,¹¹ and it certainly doesn’t mean they are sacrificing fiduciary responsibilities in pursuit of an ideology. For instance, one study of six state employee pension funds showed that their 10-year performance (2013-2022) would have been 5% better had they held no energy stocks, even fully incorporating the extraordinary oil and gas gains of 2021 and 2022.¹² As the math suggests, this is because for the prior decade, energy stocks substantially underperformed the broader market.¹³ An NYU Center for Sustainable Business meta-analysis of over 1100 peer-reviewed papers published between 2015 and 2020 found that ESG investing can provide benefits during a social or economic crisis, and that the financial benefits grow

⁹ Morgan, G.; ESG Investors’ Best Intentions Slam Into Surging Oil Stocks; Bloomberg; Mar 14, 2023

¹⁰ Van Steenis, H.; New Generation of Funds Signals Evolution of ESG; Financial Times; Aug 7, 2023

¹¹ Comptroller, Office of the NYC; BREAKING: NYC’s pension funds achieve net return of +8.0%; Statement; Aug 8, 2023

¹² Zonta, M., et al.; The Impact of Energy Investments on the Financial Value and the Emissions of Pension Funds; University of Waterloo; May 24, 2023

¹³ Krauskopf, L. & Resnick-Ault, J.; U.S. Energy Shareholders Seek to Leave Behind a Lost Decade; Reuters; Dec 27, 2019

stronger over a longer investment time horizon.¹⁴

While there's no particular percentage of fossil fuel stocks in a portfolio that defines meeting fiduciary responsibilities, a reduced holding would be consistent with a longer-term view that oil and gas companies' stock value will decline over time as their products, central though they are to the economy today, will be less and less so over time. Deloitte projects that a status quo emissions trajectory, resulting in a 3°C global average temperature rise, would cost the global economy \$178 trillion by 2070, not to mention the attendant human misery. In contrast, the 1.5°C, net-zero by 2050 scenario would increase the world economy by \$43 trillion by 2070.¹⁵ A sustainable investment strategy is intended to steer away from the status quo and to enable the latter outcome.

Although, of course, no one knows what the world economy will look like in 2070, Deloitte's is not the only credible analysis to project a better economy under net zero emissions.¹⁶ The data shows that the world is not remotely on a 2050 net zero path, with worldwide emissions still rising¹⁷ and \$4 trillion of investment needed on an annual basis until 2050 – two to three times the current level.¹⁸ It is nonetheless also true that there is progress. In the US, greenhouse gas (GHG) emissions peaked in 2007 and are down 18% since then.¹⁹ In that same timeframe, the US GDP has increased by 65%. Even accounting for trade and outsourced manufacturing, the improvement is nearly the same.²⁰ EU emissions, through 2021, were down 30% compared to 1990.²¹ The costs of wind and solar power continue to plummet, dropping 70% and 89% respectively, from 2009 to 2019.²² They have continued to fall since, and renewables are now the unsubsidized, low-cost option for new power capacity in much of the world.²³ The cost of lithium-ion batteries needed to store renewables-generated power fell by 97% from 1991 to 2018, including a 50% drop from 2014 to 2018.²⁴ China, though by far the world's largest GHG emitter, is also by far the world's leader in renewables installations (n.b., US emissions are double those of China on a per capita basis).²⁵

¹⁴ Atz, Ulrich, et. al.; Do Corporate Sustainability and Sustainable Finance Generate Better Financial Performance? A Review and Meta-analysis; SSRN; Sep 9, 2020

¹⁵ Philip, P., et al.; The Turning Point; Deloitte Economics Institute; May 2022

¹⁶ Examples include: Swiss Re Institute; The economics of climate change: no action not an option; April 2021. International Monetary Fund (IMF); World Economic Outlook, October 2020: A Long and Difficult Ascent; Oct 2020

¹⁷ International Energy Agency; Global CO2 emissions rose less than initially feared in 2022 as clean energy growth offset much of the impact of greater coal and oil use; Mar 2, 2023

¹⁸ Examples include: International Energy Agency (IEA); Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach 2023 Update; Sep 2023. IRENA; World Energy Transition Outlook: 1.5°C Pathway; 2021. OECD/The World Bank/UN Environment; Financing Climate Futures: Rethinking Infrastructure; OECD publishing; 2018

¹⁹ Ritchie, H. & Roser, M.; CO₂ and Greenhouse Gas Emissions, United States CO₂ Country Profile; OurWorldInData.org

²⁰ U.S. Bureau of Economic Analysis; Gross Domestic Product, retrieved from FRED, Federal Reserve Bank of St. Louis. Our World in Data; Per Capita Consumption-Based CO₂ Emissions; University of Oxford

²¹ Hodgson, C. & Hancock, A.; EU Must Speed Up Emissions Cuts to Meet Net Zero Climate Target, Says Report; Financial Times; Jun 25, 2023

²² Roser, M.; Why Did Renewables Become So Cheap So Fast? And What Can We Do to Use This Global Opportunity for Green Growth? Our World in Data; University of Oxford; Dec 1, 2020

²³ United Nations Framework Convention on Climate Change (UNFCCC); Renewable Power Remains Cost-Competitive amid Fossil Fuel Crisis; Press Release; Jul 14, 2022. Gelles, D., et al.; The Clean Energy Future Is Arriving Faster Than You Think; NY Times; Aug 17, 2023

²⁴ Hannah, Ritchie; The price of batteries has declined by 97% in the last three decades; Our World in Data; University of Oxford; Jun 4, 2021

²⁵ International Renewable Energy Agency website; Installed Renewable Energy Capacity/Country-Rankings. World Economic Forum; Global Per Capita Emissions Explained; May 11, 2023

So there has been a great deal of progress, with a great deal more progress to be made.

Looking forward, ideas and trends that apply widely across the sustainable financing spectrum include:

- Although sustainable investment is logically measured by dollars invested, levels of investment do not necessarily equate to direct sustainability impact. Aside from greenwashing, this can be for several legitimate reasons. Most broadly, it relates to the direct and indirect investment discussed above. That is, financing can go directly into creating assets supporting sustainable goals, such as a wind farm or new affordable housing units; it can also simply represent a change of ownership, such as most stock market activity, or a change of the financial structure underlying a particular asset, which is often the case for a debt financing.
- Financing that results in a change of ownership or a change in financial structure without creating a new sustainable asset can nonetheless materially support, promote and expand ESG activities. Perhaps most important is that the stock market and the ability to refinance debt obligations both promote liquidity in capital markets, a necessary pre-condition that most investors need to see and trust before they will make a loan or investment. That is, liquidity, in the form of selling stock or refinancing debt, provides the exit strategy investors require. Without a reliable exit strategy, the vast majority of investors would not make the primary investment needed to create the sustainable asset in the first place.
- Policy support for sustainable finance is increasing. In the US, the Inflation Reduction Act contains a new set of financial incentives, estimated at about \$400 billion over 10 years,²⁶ designed to induce total investment at several multiples of that figure. The funding is targeted to help the US cut emissions and get closer to its 2030 Paris Agreement targets while supporting American manufacturing jobs. Similarly, the European Union's Green Deal includes €250 billion in subsidies.²⁷ McKinsey estimated, in a 2020 report, that roughly 50% of the investment needed for the EU to reach net zero by 2050 was not currently profitable and would require interventions such as a price on carbon.²⁸ Similar observations have been made about the need for US policy measures.²⁹ In fact, in the European Union (EU), there is now a meaningful price on carbon for large sectors of the economy, and we will soon see the degree to which it helps trigger a material clean transition.
- Definitions are becoming more clear and more enforceable, strengthening market integrity. In part, this is driven by funding availability and the need to define what qualifies. The EU, in connection with its Green Deal, has a Taxonomy Regulation of hundreds of pages, defining sustainable economic activity. Broadly, the activity must contribute towards one or more specified environmental objectives while simultaneously doing "no significant harm" to other objectives and also respecting human rights and labor standards. The Taxonomy definitions feed into

²⁶ McKinsey & Company; The Inflation Reduction Act: Here's What's in It; Oct 24, 2022

²⁷ European Union (EU); Fact Sheet: The Green Deal Industrial Plan; Feb 1, 2023.

²⁸ McKinsey; How the European Union Could Achieve Net-Zero Emissions at Net-Zero Cost; Dec 3, 2020

²⁹ See: Commodity Futures Trading Commission (CFTC), Climate-Related Market Risk Subcommittee report; 2020

new EU sustainability reporting requirements, the Corporate Sustainability Reporting Directive (CSRD), which phase in over several years starting in 2024. The CSRD requires companies (over a certain size) conducting business in the EU, including companies not based in the EU, to report on a broad range of ESG factors, including scope 1, 2 and 3 emissions.³⁰ In the US, the SEC has been acting to protect investors from false claims. The SEC has also proposed ESG reporting requirements, though they are not yet finalized. Regulatory and enforcement actions have prompted an initial shake-out, with many funds dropping their ESG label, getting a downgraded ESG rating, or losing their ESG rating altogether.³¹

- Clarifying regulatory definitions often implies tightening, but in debt markets, which have well-established guidelines and transparency protocols, some definitions are becoming broader. Broader standards do not necessarily mean relaxed standards. Instead, there is a recognition that a wider variety of activities support a sustainable future. Transition finance – helping a critical sector become more sustainable – is a growing area. For instance, electric vehicles (EVs) are widely seen as the stereotypical green investment and activity. But growth of EVs is only possible with growth in mining, a stereotypical brown activity. Mining can be more or less destructive, with better or worse employment practices, creating opportunities for impactful transition investment.
- With increased scrutiny on standards and definitions, the importance of transparency is paramount. Attempts to define what is or is not a sustainable investment will always generate levels of disagreement. With whatever definitions or guidelines are in place, to the extent that they are accompanied by strict transparency and reporting protocols, investors can judge whether a particular investment is sufficiently sustainable to meet their objectives.
- For the time being, ESG, tied as it is to politically contested issues, will remain controversial in some quarters and under attack. That only heightens the importance of continued improvement in ESG standards and reporting transparency. And the continued ability to show value will remain of paramount importance.
- Perhaps the area that lags the most is actual measurement of sustainable impact. It's easy enough to measure dollars invested, but impacts are often imputed or estimated by formula. There are good reasons for this – it is hard, if not impossible, to measure, for instance, reductions in poverty levels or improvements in health associated with a specific investment. It is even hard to measure more straightforward matters, such as GHG emissions avoided. But these impacts are the point of sustainable investment, and to the extent measurements are imprecise, investments will be placed with levels of inefficiency and critical sustainability goals will remain elusive. The importance of accurate measurement may be most contested, at the moment, in the realm of offsets. Studies question the validity of many offsets that companies and nations are using as they report progress towards net zero targets.³²

³⁰ EU website; EU taxonomy for sustainable activities. Doyle, D.H.; A Short Guide to the EU's Taxonomy Regulation; S&P Global; May 12, 2021. European Commission website; Corporate Sustainability Reporting.

³¹ Johnson, S.; Hundreds of Funds to be Stripped of ESG Rating; Financial Times; Mar 24, 2023

³² Examples include: West, T.A.P. et al.; Action Needed to Make Carbon Offsets from Forest Conservation Work for Climate Change Mitigation; Science; Aug 23, 2023. Coffield, S. & Randerson, J.; Satellites Detect

Overview of Sustainable Investment Strategies

The Global Sustainable Investment Alliance identifies seven strategies³³ investors can pursue to support sustainability:

- ESG integration is the broadest category, with Bloomberg putting it at about two-thirds of sustainable investment. As noted, it is not a well-defined term, and different investors and different funds give the term different meanings, ranging from careful evaluation of ESG ratings to non-specific and undisclosed consideration of ESG factors. There is a very wide range of factors that can be attributed to ESG, and the US SIF reports that climate change/emissions is the most common ESG factor considered by US money managers and institutional asset owners.³⁴
- Shareholder engagement, which covers an array of activities and communications between investors and companies, can also be a specific investment strategy, with investors purchasing shares with the intent of engagement to change corporate policies.
- The earliest “socially responsible” funds tended to use negative screens – often excluding arms manufacturers, or perhaps tobacco or alcohol, as many of these early funds were faith-based. The negative screen concept remains relevant, both in its original iterations, as well as more recent screens such as excluding fossil fuels or firms scoring low on ESG factors. The UN’s Principles for Responsible Investment (PRI) summarize negative screening as a strategy to “avoid the worst performers.”³⁵
- Positive screening is the strategy of including the best performers relative to industry peers, and/or actively including companies due to the environmental or social benefits of their products and services.³⁶
- Thematic investing, sometimes considered a subset of positive screening, specifically targets certain sectors or niches of the market for inclusion in a portfolio. It could be a specific asset class, such as green buildings, or a specific attribute, such as companies scoring high in diversity or gender equity evaluations.
- Norms-based screening involves screening investments against minimum standards of business practice, such as those issued by the International Labour Organization or the OECD.
- Impact and community investing tends to be most directly focused on particular positive social or environmental outcomes, and is often associated with investment in specific projects creating specific and measurable impacts. Although the term “impact investing” is frequently used, it is somewhat vague as an investment strategy, with investors defining impact in accordance with their own preferences. Community investing is intentionally directed to markets that

No Real Climate Benefit from 10 Years of Forest Carbon Offsets in California; The Conversation; Dec 1, 2022

³³ Global Sustainable Investment Alliance; Global Sustainable Investment Review; 2020

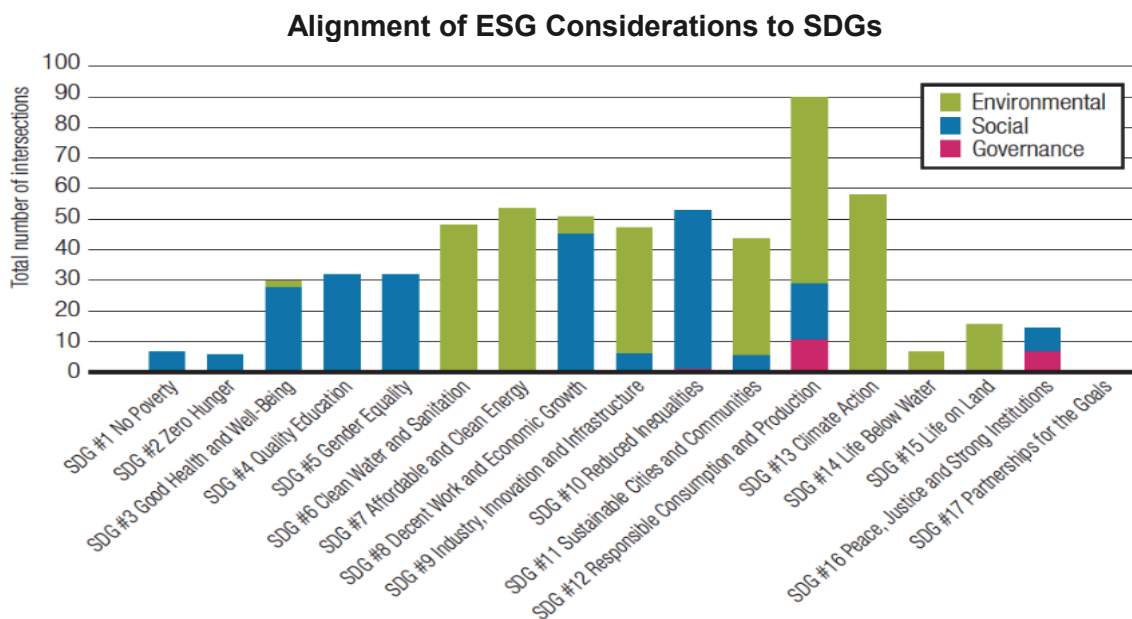
³⁴ Kishan, S.; Good Business newsletter; Bloomberg Green; Aug 18, 2021. US SIF; 2022 Report.

³⁵ Principles for Responsible Investment; Screening; May 29, 2020

³⁶ *ibid*

have been historically underserved by traditional investors, and is often conducted by mission-oriented funds such as, in the US, community development financial institutions (CDFIs).

In the context of these strategies, it useful to look at the UN's Sustainable Development Goals (SDGs), which is something of a universal language for categorizing meaningful sustainable investment. The many specific targets underlying the SDGs' 17 broad goals closely track many ESG factors. The table below shows the alignment of the SDGs to ESG considerations as analyzed and categorized by ClearBridge Investments.



Source: McQuillen, M.J., Clearbridge Investments; Sustainable Development Goals Provide Practical Framework for ESG Investing; As You Sow Proxy Preview; 2021

It is not unusual to see both investment firms and firms receiving investments define their work in terms of alignment with various SDGs.³⁷ That said, the SDGs, like ESG considerations, are broad enough that almost any company could plausibly claim alignment with at least one of the SDG goals and targets. Accordingly, transparency is once again paramount, as investors must be able to ascertain the extent to which a particular investment aligns with a preferred investment strategy and meets investors' sustainability objectives.

Use of one sustainable investment strategy does not preclude use of another, and investors often use them in combination with each other. It's also important to keep in mind that these strategies tend to be general descriptions of investment approaches, rather than strict and sharply defined strategies (though negative and positive screens can be fairly clearly delineated). In addition, while these strategies can be used to support sustainability objectives, certain of them can also be used for other objectives. A thematic investor, for instance, could choose oil production companies just as easily as renewable energy companies. Similarly, shareholder engagement could be directed towards expanding fossil fuel production, rather than limiting emissions.

³⁷ US SIF; Investing to Achieve the UN Sustainable Development Goals; 2020

Sustainable Investment and the “War on ESG” — In the context of these strategies, it’s worth taking another look at the “war on ESG.” One could characterize it as a political effort to protect fossil fuel interests and combat diversity and equity programs, but it is also true that sustainability advocates see problems with ESG as it is actually practiced on Wall Street. Recognizing the strong investor interest in ESG concepts, many investment firms have seen this as a new marketing and money-making vehicle without demonstrable adherence to sustainability principles.

That’s what the US SIF is combatting by changing its methodology, reducing its reported volume of sustainable investment by 50%. It is also related to the SEC’s Climate and ESG Task Force, created to enforce disclosure violations, “including material gaps or misstatements in issuers’ disclosure of climate risks under existing rules, and disclosure and compliance issues relating to investment advisers’ and funds’ ESG strategies.”³⁸

Whether or not specific matters rise to the level of SEC violations, there are many practices at odds with the expectations of investors supporting sustainability and seeking to make a positive impact:

- *ESG funds indistinguishable from index funds* – One analysis of certain ESG funds’ holdings found that many correlate quite closely to the S&P 500. Funds that essentially track to a market-wide index, of course, will not differentiate themselves on sustainable impact. Vanguard’s ESG U.S. Stock ETF had a 99.7% correlation to the S&P 500, with fees triple those of Vanguard’s standard S&P 500 index fund.³⁹
- *High fees* – The higher fees in the Vanguard ESG fund are not unique. One data set showed average fees on ESG funds 43% higher than their non-ESG counterparts, despite being no more expensive to run. A Citigroup executive said of ESG, “It’s fresh, feels good and new, but it’s not any different than anything else. These things aren’t any more expensive to run.” One observer noted, sustainability is “good for Wall Street’s bottom line.”⁴⁰
- *Lack of standardization in ESG ratings, essentially leading to a lack of useful meaning* – Unlike credit ratings, it is basically impossible to know what the ESG score of an individual firm means. One analysis looked at the ESG ratings of 400 companies and found correlations generally below 50% when comparing the ratings provided by 6 different agencies. Credit ratings on long-term debt for the same 400 companies showed agreement about 95% of the time. The analyst observed that “[d]ifferent ratings methodologies told vastly different stories about the same company,” and that this “demonstrates the immaturity of the current ESG ratings environment and highlights the need for improvements.” He concluded that “the disparities between today’s ESG ratings limit their usefulness in extracting meaningful insights about a company’s financial resiliency and long-term value.” In August 2023, S&P Global, one of the agencies included in the

³⁸ SEC website; Enforcement Task Force Focused on Climate and ESG Issues

³⁹ Brown, A.; Many ESG Funds are Just Expensive S&P 500 Indexers; Bloomberg; May 7, 2021. Schwegler, Dr. R., et. al.; Sustainability Funds Hardly Direct Capital Towards Sustainability: A Statistical Evaluation of Sustainability Funds in Switzerland & Luxembourg; INFRAS Research & Consulting; May 3, 2021. Fees found on Vanguard website.

⁴⁰ Wursthorn, M.; Tidal Wave of ESG Funds Brings Profit to Wall Street; Wall Street Journal; Mar 16, 2021. Carlson, D.; Your ESG Investment May be a ‘Light-Touch’ Fund and Not as Green as You Think; Marketwatch; Jan. 4, 2021. Zweig, Jason; You Want to Invest Responsibly. Wall Street Smells Opportunity.; Wall Street Journal; Apr 16, 2021.

ESG analysis, dropped its numerical ESG scores, but is continuing to provide written ESG evaluations.⁴¹

None of this means ESG is meaningless – the effort and need to build a sustainable economy is certainly real. It does mean that reform is needed. Some reform may come quite quickly – in the EU, as the required use of the EU’s Taxonomy and CSRD reporting standards phases in, and in the US, as the SEC continues to enforce existing investor protections and builds in new climate risk standards. As these standards come into force, it may well mean that the overall reported numbers of sustainable investment may go down yet further, even as other, more accurately measured numbers with transparent uses — like green bonds and private equity investment — continue to rise.

Meanwhile, while there is every reason to assume that Republican officials will continue their criticisms of ESG, there is something of a backlash against the backlash. Anti-ESG policies at the state level often seek to prohibit public pension funds from doing business with investment firms deemed to be using ESG strategies. Those firms, which tend to be Wall Street’s biggest, such as BlackRock and JPMorgan, also tend to be able to offer the lowest-cost financial services to the pension funds (ironically, they also tend to be major investors in fossil fuel companies).

Pension managers in several Republican-controlled states have complained that anti-ESG prohibitions are increasing pension plans’ costs and therefore reducing plan returns. As such, they point out, the bans are contrary to the officials’ fiduciary responsibilities. Policies adopted by the state of Texas, an early adopter of anti-ESG measures, led to the exit of five of the largest municipal bond underwriters from doing business in the state. A Wharton study found that in the first eight months after the adoption of the policy, Texas municipal issuers incurred higher interest rates, which will lead to extra costs estimated at \$303 to \$532 million over the life of the bonds. The Texas experience, and analyses showing the likelihood of similar outcomes in other states, has led some to pull back from anti-ESG actions, if not from anti-ESG rhetoric.⁴²

The remainder of this paper looks at specific activity across the financing spectrum, examining practices in equity investment, debt financing, policy interventions designed to spur private investment and blended approaches, with combinations of private for-profit, public and private philanthropic investment.

⁴¹ Prall, K.; ESG Ratings: Navigating Through the Haze; Enterprising Investor; CFA Institute Blogs; Aug 10, 2021. Temple-West, P.; S&P Drops ESG Scores from Debt Ratings Amid Scrutiny; Financial Times; Aug 8, 2023

⁴² Celarier, M.; The Backlash Against ESG Faces Its Own Backlash; Institutional investor; Mar 7, 2023. Garrett, D. & Ivanov, I.; Gas, Guns, and Government: Financial Costs of Anti-ESG Policies; Wharton School, University of Pennsylvania; May 30, 2022

Equity Investment

Secondary market equity investment, otherwise known as purchasing shares of publicly listed companies through the stock market or investing through mutual funds or exchange-traded funds (ETFs), measures in the trillions of dollars and is the largest area of sustainable finance by dollar volume.

This category of investment, trading shares after the initial public offering, isn't direct investment in sustainability. Instead, it is taking ownership of the company, in some fraction. As owners, shareholders can promote sustainability in at least two ways – direct shareholder engagement/activism and the indirect market pressures and incentives that flow from demand for ESG-directed investment. Both reflect investors' desire to place their investments in companies supporting long-term sustainability. The two strategies are related, as ESG investment also gives the investors standing to engage with management.

There's a related category – active and targeted divestment – that can also have a sustainability impact, though its effectiveness is much debated.

Shareholder engagement and activism. The rapidly growing interest in sustainable investing creates incentives for asset managers to pressure companies to adopt longer-term thinking. Private asset managers, who seek to attract more investment (i.e., get more business) by touting their ESG strategies, can use their positions as major shareholders to press companies for real change. Similarly, public pension funds directly or indirectly accountable to elected officials can use both activism and ESG-directed investment as a means of reflecting policy preferences of their constituents.

In addition to helping attract more customers, an ESG engagement strategy also helps asset managers better balance their investment portfolio with the nature of their obligations. That is, pension funds, as well as the many institutional investors managing retirement funds, need to be looking well into the future, and they can use their position as major shareholders to press companies to adopt a similar longer-term framework. Historically, major asset managers have voted as recommended by companies' management, i.e., typically against shareholder proposals, a position activists found increasingly at odds with sustainability goals, including the stated objectives of ESG funds. This was also noticed by the SEC, which cited proxy voting "inconsistent with advisers' stated approaches" in an April 2021 ESG Investing Risk Alert.⁴³ Please note that this isn't SEC enforcement in favor of ESG, but old-fashioned truth-in-advertising enforcement.

Many asset managers responded, increasingly supporting shareholder proposals.⁴⁴ Ernst & Young (EY), which conducts an annual survey of 60+ institutional investors with over \$48 trillion AUM, has described the increase in company-shareholder engagement as one of "the most dramatic shifts" they have observed over the past decade, calling it "a defining governance trend."⁴⁵ And just as sustainability has shifted "from a CSR to a

⁴³ SEC; Apr 9, 2021

⁴⁴ Lim, D.; BlackRock Starts to Use Voting Power More Aggressively; Wall Street Journal; Apr 30, 2021

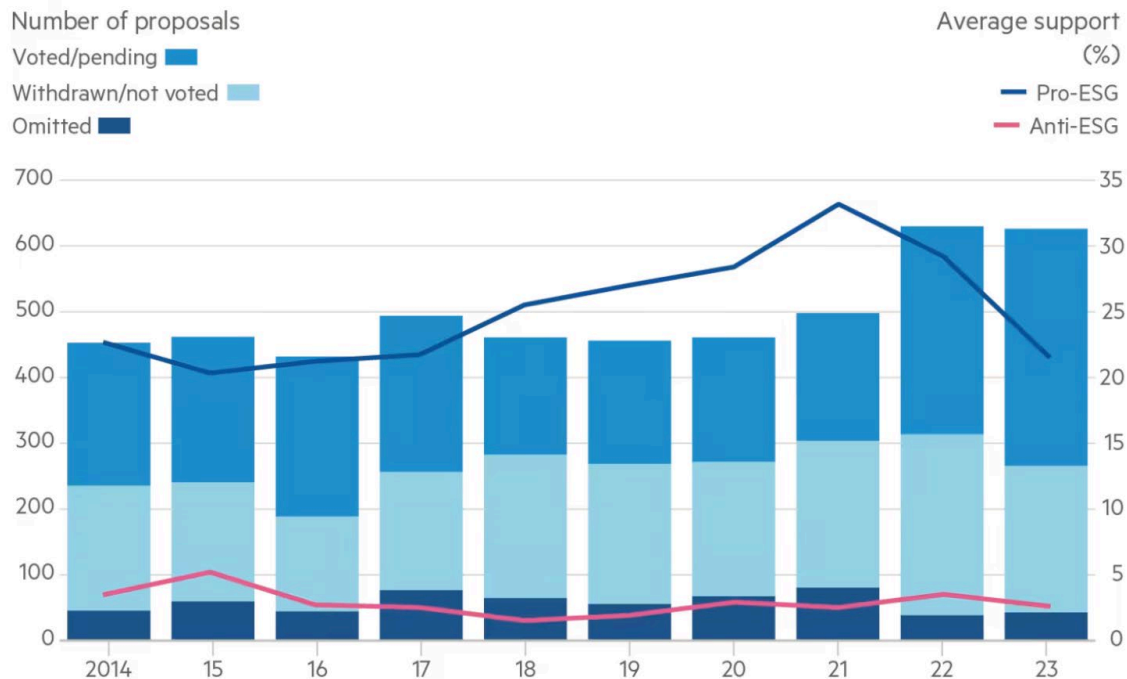
⁴⁵ Ernst & Young (EY); 2021 Proxy Season Preview

C-suite issue” within corporations,⁴⁶ engagement on ESG matters has similarly shifted from the province of niche socially responsible funds very much into the institutional investor mainstream.

In EY’s 2023 investor survey, integration of material ESG opportunities and risks into corporate strategy was the most-cited key driver of corporate success. It was cited by 60% of investors and, despite the ESG backlash, this is the third year in a row that ESG integration has been the most-cited strategic driver. The survey noted that, between the anti-ESG criticisms on one side and greenwashing criticisms on the other, the ESG concept may be maturing, with companies and investors forced to focus on and defend the materiality of ESG concerns.⁴⁷

Nonetheless, the backlash appears to have had an impact on the outcomes of shareholder proposals, with support for ESG issues sharply down in the past two years, as seen in the chart below, even as the total number of proposals remains high by historical standards.⁴⁸

US environmental, social & related governance shareholder proposal outcomes



As of 1 June 2023

Data Source: Sustainable Investments Institute, cited in Financial Times

While the drop in average support for voted ESG proposals is the headline, that is not the full story or only conclusion:

⁴⁶ Kelly, J.; Bloomberg Invest Talks: A Conversation with Mark Carney; Feb 10, 2021

⁴⁷ Raval, A. & Mooney, A.; Money Managers: The New Warriors of Climate Change; Financial Times; Dec 26, 2018. EY; 2023 Proxy Season Preview

⁴⁸ Temple-West, P. & Mooney, A.; Investors Pull Back Support for Green and Social Measures Amid US Political Pressure; Financial Times; June 8, 2023

- Support for anti-ESG proposals is minimal, has not risen and remains a fraction of support for pro-ESG proposals.⁴⁹
- There is evidence that a focus on material and near-term risk can bring support. For instance, a majority of Starbucks shareholders supported a proposal for a third-party assessment of the company’s labor practices. The company has been cited by the National Labor Relations Board (NLRB) for interfering in unionization activities. Similarly, Dollar General shareholders voted in favor of a health and safety audit for its workers. OSHA has placed Dollar General on its “severe violator” list of companies with working conditions that endanger employees.⁵⁰
- Withdrawn resolutions often signify a successful shareholder engagement, as management and shareholders come to an agreement in advance of the annual shareholder meeting. Ceres, a nonprofit focused on sustainability solutions, tracked 256 climate-related shareholder proposals in 2023, of which 79 proposals were withdrawn based on an agreement. Ceres said that 2023 “was actually the second most successful proxy season ever for corporate commitments to climate action.”⁵¹

To the extent that a withdrawn resolution represents an agreement, as it often does, it can be more impactful than a voted resolution, as resolutions are advisory, even if they receive over 50% approval. That is, resolutions represent shareholders expressing a preference, whereas an agreement, although typically also not binding, represents management hearing that preference and saying yes.

Of the 79 climate-related resolutions Ceres tracked, 45 were related to corporate emissions targets, nine represented agreements to publicly disclose corporate-funded climate lobbying activities, and eight to protect forests.⁵²

The success of shareholder engagement is mixed. Some of the more publicized proxy engagements over the past several years involved fossil fuel companies, including ExxonMobil, Shell and Glencore, a mining company with substantial coal holdings. Although they made certain representations in response to shareholder pressure about disclosures, net zero targets and caps on coal production, they also expanded operations as possible in the past couple years in response to higher prices and market opportunities. A Shell executive, commenting internally about Shell’s net zero pledge, said it “has nothing to do with our business plans.”⁵³ Glencore, despite its cap pledge, has been in the market for additional coal assets.⁵⁴ Fossil fuels, after all, is the business they are in.

As suggested by these examples, engagement can involve shareholders working with management to create a path forward, or it can involve a proxy fight, with shareholders trying to force change by voting against the wishes of company management.

⁴⁹ *ibid*

⁵⁰ Green, J. & Kishan, S.; Support for ESG Shareholder Proposals Plumets Amid GOP Backlash; Bloomberg; Jun 9, 2023. Russ, H.; Starbucks shareholders approve review of labor union practices; Reuters; Mar 29, 2023

⁵¹ Berridge, R.; Comment: Why Climate Agreements are the Untold Story of the 2023 Proxy Season; Reuters; Jun 28, 2023

⁵² *ibid*

⁵³ Tabuchi, H.; Oil Executives Privately Contradicted Public Statements on Climate, Files Show; NY Times; Sep 14, 2022

⁵⁴ Hay, G. & Kwok, K.; Glencore Deal Epitomises Net Zero’s Reduced Status; Reuters; Jul 27, 2023

Institutional investors have generally preferred to work with management, rather than engage in public proxy fights. Institutional investors' willingness, in recent years, to vote against management on ESG issues was one of the triggers of the ESG backlash, and several states have shifted their investments away from firms, like BlackRock, seen as too friendly to ESG concerns.⁵⁵

Some investors are far more likely to fight management publicly. Large public pension funds, such as California Public Employees' Retirement System (CalPERS), tend to be more willing to fight publicly than private asset managers. The reasons they fight tends to vary with the local political environment, but the sequence often starts with filing a shareholder resolution, which can be withdrawn upon reaching a negotiated agreement. Absent an agreement, they may lead a proxy fight. Other investors, like many hedge funds, are specifically activist, investing in companies for the very reason that it gives them standing to oppose management, with the goal of forcing changes intended to improve the company's performance and value. With regard to hedge funds, it's worth noting that their typical fee structures favor immediate gains for investors, i.e., a shorter-term outlook, and research suggests hedge fund investment is more likely to result in reduced sustainability performance over time.⁵⁶

Asset managers also work collectively to exert influence towards sustainability. One such effort is Climate Action 100+. Climate Action 100+ is an investor initiative, launched in 2017, "to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change." Its membership currently includes over 700 investors with \$68 trillion in collective AUM. It is specifically engaging with 171 (i.e., "100+") companies accounting for an estimated 80% of annual global industrial emissions. The initiative's goals are to create long-term shareholder value by improving governance, curbing emissions throughout the value chain and strengthening climate-related financial disclosures and transition plans.⁵⁷

The Climate Action 100+ strategy includes engagement and transparency, and it releases a periodic assessment of the 100+ companies' progress towards a Paris-aligned 2050 net-zero target. The assessment, termed the Net-Zero Company Benchmark, shows progress while making plain how much more work there is to be done. It shows the following:

- 75% of the companies have announced a 2050 net-zero goal covering at least their scope 1 and 2 GHG emissions, but only 10% have short-term (2025) targets aligned with 1.5°C, and 20% have medium-term (2035) targets consistent with 1.5°C.
- Only one company has committed to aligning future expenditures with the goal of limiting temperature rise to 1.5°C.
- 92% of the companies have board-level oversight of climate-related matters.
- 23% have committed to aligning their direct lobbying activities with the Paris Agreement, and 18% have committed to ensuring their trade associations do so.

⁵⁵ Celarier, M.; The Backlash Against ESG Faces Its Own Backlash; Institutional investor; Mar 7, 2023

⁵⁶ DesJardine, M. R. & Durand, R.; Disentangling the Effects of Hedge Fund Activism on Firm Financial and Social Performance; Strategic Management Journal; Jan 3, 2020

⁵⁷ Climate Action 100+ website

- Almost all (91%) have committed to using the disclosure recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), but only 33% have committed to using climate-scenario planning.⁵⁸

What is one to make of the many net zero pledges and the minimal near-term progress towards net-zero targets? The legal disclosures accompanying Shell's 2021 plan update stated that "Shell's operating plans and budgets do not reflect Shell's Net-Zero Emissions target", noting that it is Shell's "aim" to do so in the future, "in step with the movement towards a Net Zero Emissions economy within society and among Shell's customers."⁵⁹ The evidence suggests that most companies share this outlook. Meanwhile, Climate Action 100+ and others are doing what they can to advance the "Net Zero economy within society" that Shell and others are waiting for.

What's next in shareholder engagement? The backlash against ESG has shifted the ground on engagement, with the major institutional investors backing away from public and leading stances. Nonetheless, investors – and companies – know that climate change is real, as is a diverse workforce and marketplace. That would explain continued progress in shareholder engagement, even as the average support for voted pro-ESG resolutions has recently dropped.

Other changes under way:

- More "shareholder democracy" – As asset managers pressed for improvements in companies' ESG performance, they were highlighting their concentrated power. Under current US regulation, asset managers have voting power over the shares they hold for millions of investors. This gives BlackRock, Vanguard, State Street, Fidelity and a handful of others collective voting control over virtually every large US corporation. Jack Bogle, the late founder of Vanguard, observing the success of the index fund industry he founded, stated that he does "not believe that such concentration would serve the national interest."⁶⁰ Many policy makers agree, and this voting power has been a particular target in the ESG backlash. Asset managers are eager for this controversy to go away, and are devising ways to provide investors with voting options. First steps include encouraging large pension funds to use voting rights they already have, even when they invest via a firm like BlackRock. Next steps underway include investor surveys, allowing investors to state preferences that can guide asset managers' voting. The impact of voting changes on sustainable investing is hard to predict, but it would likely strengthen investors' and policy makers' confidence that shareholder engagement reflects the preferences of investors.⁶¹
- Regulatory changes – Perhaps the next step is that some of these matters won't require shareholder engagement at all, particularly related to disclosures. It is a long-standing requirement that companies disclose material matters, but SEC rules can bring clarity, as well as a level playing field, by creating definitions and mandating that companies disclose certain information. The SEC has released, but not yet finalized, rules requiring companies to disclose "information about

⁵⁸ Climate Action 100+ website; Climate Action 100+ Net Zero Company Benchmark Interim Assessments; October 2022

⁵⁹ Shell Media Relations; Feb 11, 2021

⁶⁰ Bogle, J.; Bogle Sounds a Warning on Index Funds; Wall Street Journal; Nov 29, 2018

⁶¹ Charles Schwab; Schwab Asset Management Pilots New Proxy Polling Solution to Gain Insight into Shareholder Preferences; Oct 13, 2022. BlackRock; It's All About Choice; Jun 2022

climate-related risks that are reasonably likely to have a material impact on their business,” including “climate-related financial statement metrics in a note to their audited financial statements.” The required information would include disclosure of a company’s greenhouse gas emissions.⁶² Republican officials have made it clear that they will do everything they can to block implementation of the new rules, and would likely repeal them as quickly as possible should they be in a position to do so. For companies operating internationally, however, it is possible that what the SEC ultimately does or does not do maybe secondary to rules promulgated by the EU. The EU’s Corporate Sustainability Reporting Directive (CSRD) is now in force, with various rules phasing in over the next several years. The rules include a “double-materiality” test – with companies required to report not only on their exposure to various ESG risks, but also their companies’ impact on ESG concerns. Broadly, companies will disclose how their operations are compatible with a 1.5°C warming limit and a 2050 net zero target, including disclosing scope 1, 2 and 3 emissions, as well as respecting human rights conventions, worker rights and gender equality.⁶³

The SEC is going a similar direction on diversity, equity and inclusion (DEI) issues. In August 2021, it approved a Nasdaq stock exchange requirement for listed companies to meet certain board diversity objectives, or explain why they are unable to do so. Nasdaq specifically cited an analysis of “over two dozen studies that found an association between diverse boards and better financial performance and corporate governance.”⁶⁴

These changes move the US stock market closer to the objectives of the UN’s Sustainable Stock Exchanges Initiative. There are now 34 stock exchanges around the world mandating ESG disclosure as a condition of listing.⁶⁵

Divestment. How about divestment? Can selling fossil fuel stocks be considered a reverse financing mechanism to promote sustainability?

Divestment has a number of angles. The current divestment movement traces its roots to a 2011 Carbon Tracker report that found fossil fuel reserves were five times the level consistent with a 2°C scenario,⁶⁶ and divestment is perhaps most commonly seen as a statement of personal or institutional values. But it is also a portfolio diversification and risk management strategy, as in the decision of the Norwegian sovereign fund (itself a product of Norway’s oil profits) to eliminate oil and gas exploration companies from its portfolio.⁶⁷ And it can enable an investor to purchase more stable stocks, as energy stocks are among the more volatile. In that regard, a divestment decision can certainly

⁶² SEC; SEC Proposes Rules to Enhance and Standardize Climate-Related Disclosures for Investors; Press Release; Mar 21, 2022

⁶³ Meynier, T., et al.; EU Finalizes ESG Reporting Rules with International Impacts; Harvard Law School Forum on Corporate Governance; Jan 30, 2023

⁶⁴ Nasdaq website; Nasdaq’s Board Diversity Rule: What Companies Should Know; Feb 28, 2023. Hood, D.; Nasdaq Board Diversity Rule Boosted LGBTQ Policies, Report Says; Bloomberg Law; Apr 19, 2023. Nasdaq website; Nasdaq to Advance Diversity through New Proposed Listing Requirements. Dec 1, 2020.

⁶⁵ Sustainable Stock Exchange Initiative website; Stock Exchange Database

⁶⁶ Carbon Tracker Initiative; Unburnable Carbon: Are the World’s Financial Markets Carrying a Carbon Bubble?; Jul 13, 2011. McKibben, Bill; The Powerful New Financial Argument for Fossil-Fuel Divestment; The New Yorker; Apr 3, 2021

⁶⁷ Milne, R.; Norway’s Oil Fund Shake-up Raises Hackles; Financial Times; Mar 11, 2019

be a responsible fiduciary decision.⁶⁸ One study, for instance, showed that despite the extraordinary gains of energy stocks over the past two years, a portfolio without them would have performed better over the past 10 years.⁶⁹

Does divestment promote sustainability, meaning, in this context, reduced CO₂ emissions? Perhaps, but the evidence from prior divestment campaigns suggests it is more likely to succeed as a political strategy rather than from financial pressure that may flow from the sale of stock shares. Studies to date are mixed on the effect of the divestment campaign on share prices of fossil fuel companies. Evidence from various divestment campaigns have generally found no effect on share prices.⁷⁰

And there can be a counterproductive aspect. Divestment of stock shares means replacing one share owner with another. The likely result over time is the companies' shares become more concentrated in the hands of investors who are not interested in challenging management on sustainability issues.

The political side of a divestment campaign is another matter. Successful divestment campaigns result in heightened awareness of a problem, stigma towards those contributing to the problem and support for alternatives⁷¹ – which in this case would mean such things as greater demand for renewables, and perhaps support for carbon taxes, demand for EVs and higher auto mileage standards, and other steps that drive down demand for fossil fuels. But there is a flip side. To the extent divestment is understood as a political strategy, rather than an analytically-based investment strategy, it becomes a two-way street, as we are seeing.⁷²

In the face of these various considerations, different funds are adopting different strategies. The University of California, for instance, explained that it made its endowment divestment decision simply on financial grounds, seeing fossil fuel assets as “a financial risk.”⁷³ CalPERS is a founding member of Carbon Action 100+, which is to say it is heavily involved with engagement strategies. CalPERS has divested its shares in coal companies, but has more broadly chosen to maintain a voice with management as a shareholder, rather than severing ties.⁷⁴ New York State's pension plan has chosen

⁶⁸ Grantham, J.; *The Mythical Peril of Divesting from Fossil Fuels*; London School of Economics, Grantham Research Institute on Climate Change and the Environment; Jun 13, 2018. BlackRock Sustainable investing; *Investment and Fiduciary Analysis for Potential Fossil Fuel Divestment: Phase 1*; 2020. Lefkowitz, D. & Solberg, L. Apr 12, 2021. Plantinga, A. & Scholtens, B.; *The Financial Impact of Fossil Fuel Divestment*; *Climate Policy*, Vol. 21, 2021 - Issue 1; Aug 17, 2020.

⁶⁹ Denning, L.; *With Energy Stocks, It's the Volatility that Kills You*; Bloomberg; Feb 16, 2022. Zonta, M., et al.; *The Impact of Energy Investments on the Financial Value and the Emissions of Pension Funds*; University of Waterloo; May 24, 2023

⁷⁰ Pollin, R. & Hansen, T.; *Economics and Climate Justice Activism: Assessing the Fossil Fuel Divestment Movement*; University of Massachusetts Amherst, Political Economy Research Institute; April 24, 2018. Ansar, A. et al.; *Stranded Assets and the Fossil Fuel Divestment Campaign: What Does Divestment Mean for the Valuation of Fossil Fuel Assets?* University of Oxford, Smith School of Enterprises and the Environment; Oct 2013. Dordi, T. & Weber, O.; *The Impact of Divestment Announcements on the Share Price of Fossil Fuel Stocks*; *Sustainability*, MDPI, Open Access Journal, vol. 11; Jun 2019. Gelfand, A.; *Why Divestment Doesn't Hurt "Dirty" Companies*; Stanford Graduate School of Business; Oct 27, 2021

⁷¹ *ibid*

⁷² State of West Virginia, Office of the State Treasurer; *Letter to John Kerry, Special Presidential Envoy for Climate*; May 24, 2021

⁷³ Bachher, J.S. & Sherman, R.; *Opinion: UC Investments are Going Fossil Free. But Not Exactly for the Reasons You May Think*; Los Angeles Times; Sep 17, 2019

⁷⁴ CalPERS; *CalPERS' Investment Strategy on Climate Change*; Jun 2020

to divest over the course of several years.⁷⁵

Whatever the strategies and whatever their impact, one thing is quite clear – many investors are joining this divestment campaign. A divestment campaign organizer, 350.org, puts the figure at nearly 1,600 institutions, heavily weighted towards faith-based organizations, universities, foundations, cities and other public entities. The institutions collectively control \$40 trillion in investment assets.⁷⁶

Private Equity & Venture Capital refer to direct investment into firms that are not publicly listed. Both private equity and venture capital investors seek returns well above standard market levels, and there is every indication that these investors see substantial opportunity in sustainable investing.

Private investment largely follows two sustainability investment strategies – ESG integration and thematic investment. With ESG integration, the investor pursues value-enhancing sustainability opportunities in essentially any kind of company, such as through efficiencies in production processes. Thematic investment tends to be focused on companies whose products are specifically targeted towards sustainability solutions, such as climate tech companies.

Venture capital is early-stage investment, often into start-up companies controlled by an entrepreneur with a promising but unproven idea and vision. Control of the company generally remains with the founding entrepreneur, and venture firms profit by selling shares when the promising idea works out and turns into a revenue-generating product. Depending on the stage of a company's development, venture investment into a single company is generally in the low millions.

Private equity investment is generally at a later stage of corporate development, and the private equity firms typically purchase a controlling interest in a firm. As compared to institutional investors purchasing shares of publicly listed companies, private equity investors don't seek to engage with and attempt to influence management. Instead, they go far beyond that, taking control and directing management. The firms they purchase are typically smaller than publicly listed firms, but they can nonetheless be quite large, with assets in the tens and even hundreds of millions.

There are efforts underway to guide more private investment into sustainability initiatives. The U.N.'s Principles for Responsible Investment (PRI), noting private equity's "long-term investment horizon and stewardship-based style," has recognized the alignment of private equity with sustainable investment and created a series of investment guides specifically geared towards private equity and venture capital. Similarly, NYU's Center for Sustainable Business, convening practitioners and stakeholders, has created a framework to guide positive private equity investment.⁷⁷

In addition, there are initiatives and data frameworks now available to help privately held companies, as well as private equity investors, establish and work towards ESG goals.

⁷⁵ Barnard, A.; New York's \$226 Billion Pension Fund Is Dropping Fossil Fuel Stocks; NY Times; Dec 9, 2020

⁷⁶ Go Fossil Free website; <https://gofossilfree.org/divestment/commitments/>

⁷⁷ Principles for Responsible Investment; Investment Tools; Private Equity. Balakumar, U. & Whelan, T.; The Road to Responsible Private Equity; NYU Stern Center for Sustainable Business; Feb 2023

Novata, a public benefit corporation (B Corp) launched in 2021 by S&P Global, the Ford Foundation and others, is one such effort. Its mission is “to empower private markets to achieve a more sustainable and inclusive form of capitalism,” and it describes itself as a “consortium of non-profit and for-profit organizations that are experts in financial data, private markets, and social justice.” Novata reports that its clients have \$7.5 trillion in assets under management, and it is working with 5,300 companies.⁷⁸ Novata is not alone. Carlyle, a global investment firm, working with CalPERS and others, created the ESG Data Convergence Initiative (EDCI) in 2021. EDCI is an effort born out of the proliferation of ESG frameworks, which frustrated investment managers’ ability to collect standardized and comparable ESG data across their portfolios. EDCI now has over 300 investment fund members with approximately \$26 trillion in assets under management.⁷⁹

Historically, firms engaged in private equity and venture capital investment are not well known to the public, and often prefer privacy to publicity. But the urgency and high-profile nature of climate change, in particular, has attracted certain well-known investors who not only see opportunity, but also appear to want to be seen as providing solutions.

In 2021, Bridgewater Associates, described in the Wall Street Journal as the world’s largest hedge fund, launched a sustainable-investing venture to provide “investment solutions for clients pursuing sustainability goals alongside their financial targets.” Bridgewater described it as a response to client demand. “Every day we hear from a different client who we didn’t think would be into” sustainable investing, “Now they are saying, ‘It’s part of my mandate.’”⁸⁰

Examples of private equity and venture capital investment for sustainable purposes include:

- In 2018, KKR launched a \$1 billion fund to invest in companies aligned with the UN Sustainable Development Goals (SDGs).⁸¹ Its initial investments through the fund were a Singapore-based energy efficiency company and an Indian waste collection company, supporting the Indian government’s “Clean India” campaign.⁸² KKR had previously teamed with the Environmental Defense Fund to improve the environmental performance of companies in KKR’s portfolio through an effort called the “Green Solutions Platform.”⁸³
- Bill Gates launched Breakthrough Energy Ventures in 2015, raising \$2 billion in two rounds from about 30 individuals. The fund invests in solutions towards getting to “net-zero emissions while making sure everyone, everywhere has access to the affordable, reliable energy they need to thrive.” The fund’s investments include a company developing an electric car battery intended to charge more quickly and hold more power at a lower cost compared to EV batteries currently available. It also invests in new designs for nuclear energy, which it considers a necessary element of an energy mix that is net zero at

⁷⁸ Novata website. Wealthbriefing.com; Private Markets ESG Reporting Firm Is Launched; Oct 11, 2021

⁷⁹ ESG Data Convergence Initiative website (esgdc.org)

⁸⁰ Bridgewater Associates; Bridgewater Associates Launches Sustainable Investing Venture; Apr 14, 2021. Patterson, S. & Ramkumar, A.; Green Finance Goes Mainstream, Lining Up Trillions Behind Global Energy Transition; Wall Street Journal; May 22, 2021

⁸¹ Bank, D.; What We Know About KKR’s \$1 Billion Global Impact Fund; Impact Alpha; Apr 30, 2018

⁸² Chasan, E.; KKR Turns to Impact Fund Co-Investing With \$510 Million Deal; Bloomberg; Feb 10, 2019

⁸³ KKR website

supply levels adequate to meet demand in a world with reduced poverty.⁸⁴

- Amazon created a \$2 billion fund, The Climate Pledge Fund, to invest in companies developing products or services that “reduce carbon emissions and help preserve the natural world.” Amazon created the fund in conjunction with the Amazon-initiated Climate Pledge, under which signatory companies agree to “meet the Paris Agreement 10 years early” – net zero by 2040 through “real business changes and innovations, including efficiency improvements, renewable energy, materials reductions, and other carbon emission elimination strategies,” while neutralizing “any remaining emissions with additional, quantifiable, real, permanent, and socially-beneficial offsets.” Technical partners to the Pledge include The Nature Conservancy and the Science Based Targets initiative (SBTi).

More than 400 companies, with nine million employees, have committed to the Pledge.⁸⁵ Initial Pledge Fund investments include a company reducing and sequestering CO₂ in cement (CarbonCure Technologies), a company recycling batteries and e-waste to reclaim high value metals (Redwood Materials) and a new start electric vehicle company (Rivian Automotive) from which Amazon is purchasing delivery vehicles with over 5,000 already in use.⁸⁶

Amazon’s efforts have triggered accusations of greenwashing. The Pledge and the Pledge Fund were launched after an internal campaign by Amazon employees to get the company to reduce its carbon footprint and overall use of resources, and there is no doubt that there is a substantial public relations element involved. It appears that Amazon has gone to some lengths to bring in substantive partners to make the work of the Pledge and the Pledge Fund real. Nonetheless, as of August 2023, SBTi has removed Amazon from its list of companies with a science-based net-zero plan, noting that Amazon has failed to set actual targets that can be measured and monitored as the company progresses towards net zero.⁸⁷

- Circulate Capital is an investment firm focused on reducing ocean plastics by investing in waste management and recycling firms, with a focus on five countries in south and southeast Asia that are the source of most ocean plastics. Through 2022, it had invested \$80 million, largely raised from consumer product corporate partners, including Pepsico, Coca-Cola, Unilever and Danone, that are major users of plastics and have an interest in solving this waste “leakage” problem. Circulate’s fund is backed by a partial guarantee from the US International Development Finance Corporation in collaboration with USAID.⁸⁸
- Congruent Ventures is an early-stage fund with \$700 million in AUM. It has invested in 51 companies with, now, over 2,000 employees. Congruent describes itself as a fund that invests in “incredible entrepreneurs solving critical problems across the climate landscape.” One of its portfolio companies, Meati, has

⁸⁴ Breakthrough Energy website. Binkley, C. Bill Gates Has a Master Plan for Battling Climate Change; Wall Street Journal; Feb 15, 2021. Quantumscape website

⁸⁵ Amazon website; The Climate Pledge Fund. The Climate Pledge website; Net Zero by 2020. Amazon website; The Climate Pledge Celebrates Surpassing 100 Signatories; Apr 21, 2021

⁸⁶ Amazon; Everything you need to know about Amazon’s electric delivery vans from Rivian; Jul 6, 2023

⁸⁷ Amazon; Amazon Announces First Recipients of Investments from \$2 Billion Climate Pledge Fund; Business Wire; Sep 17, 2020. Ethical Consumer; Amazon and Microsoft: Greenwashing in the Technology Industry?

⁸⁸ Circulate Capital website

developed mushroom-based “meats,” which are now available nationally in Whole Foods. Congruent launched its first fund in 2017.⁸⁹

These examples are but a few of the many funds and investors seeing opportunity in new companies creating efficiencies and other sustainable improvements. With corporations by the hundreds making net-zero pledges, and countries as well, there is a very large market looking for innovative solutions.

While recognizing these positive developments, it’s important to acknowledge that private investment markets also include incentives that work in quite the opposite direction. As noted in the Financial Times, “Private markets, where companies can get away with minimal disclosure about their business, have been criticised as the underworld where polluting assets can go to hide.”⁹⁰ As an example, BP, a publicly traded company, has reduced its carbon footprint by selling (i.e., divesting) certain carbon-intensive assets. With these sales, BP transferred emissions to the carbon account of a different company, without necessarily any reduction in emissions into the atmosphere. In 2020, BP’s emissions reductions from divestments were five times greater than its reductions from operational efficiencies. And the acquirers’ future profits likely depend on them exploiting their newly acquired assets to the fullest. Further, to the extent that these assets are sold to privately held companies, as has happened, public disclosure requirements are reduced and the likelihood of public pressure is far lower, simply due to lack of information and visibility. Indeed, as the SEC steps up its disclosure requirements, going private is a strategy to avoid those requirements.⁹¹

Initial Public Offerings (IPOs). IPOs for green companies, sometimes called green IPOs, is not a precise category, as there is no precise definition of a green company, but it could include renewable and energy efficiency companies, recycling and waste management companies and clean transport, such as Tesla, which had an IPO in 2010.⁹²

IPOs mark the transition of a company from private equity to publicly owned and traded shares (i.e, “going public”). The IPO enables a company to raise new capital from institutional and individual investors. It also sets a market valuation for the company’s shares and creates a liquid market for existing shareholders (those who were private equity before the IPO) should they wish to sell.

Rivian Automotive, the electric vehicle start-up backed in part by Amazon’s Climate Pledge Fund, raised \$12 billion in new funding via an IPO in November 2021. With shares initially priced at \$78, the company’s market valuation (based total shares outstanding) stood at \$86 billion, which was more than Ford Motor at that time and equivalent to General Motors. At the time of the IPO, Rivian had only recently sold its first vehicles, with its valuation reflecting expectations for the EV market. Rivian’s share prices have fallen substantially since the IPO, trading in the \$20 range for most of

⁸⁹ Kohler, J.; Meati Foods Teams Up with Whole Foods to Launch its Plant-Based Products Nationwide; Denver Post; Jul 27, 2023; Congruent Ventures website; Scaling Our Impact With More Capital; Apr 19, 2023

⁹⁰ Temple-West, P., et al.; Pulling Back the Curtain on Private Equity’s ESG Impact; Financial Times; Mar 30, 2022

⁹¹ Adams-Heard, R.; What Happens When an Oil Giant Walks Away; Bloomberg Green; Apr 15, 2021. BP; 2020 Sustainability Report

⁹² Kiersz, A.; Tesla’s IPO Was 8 Years Ago; Business Insider; Jun 29, 2018

2023.⁹³

IPOs are regulated by the SEC, which requires certain disclosures about the company prior to approving the IPO. They include information about the company's business, strategy, financial condition, risk factors and the company's plans for use of IPO proceeds. The SEC reviews the information, but does not vouch for its accuracy, and offers no opinion with regard to risk levels or the likelihood of a company's success. After the IPO, companies are subject to public reporting requirements on a quarterly and annual basis. The reports provide current updates on financial condition and other information provided with the IPO. These ongoing reporting requirements are those for which the SEC has proposed to include emissions and climate risk information.⁹⁴

The process of getting SEC approval for an IPO generally takes 6 to 12 months,⁹⁵ which is to say, the process is long and difficult, and one does not know what the capital market conditions will be like when the company is finally ready for its IPO. The process also includes certain restrictions designed to maintain a fair and sober public sale. These include an enforced "quiet period," during which companies' approved documents, available to all, must do the talking in the marketplace. And the documents' financial information is limited historical actuals, and do not include financial forecasts, so as to preclude marketplace swindles based on wild predictions of soaring success.

Yieldcos were an investment structure that went through a highly visible green IPO growth stage several years ago.⁹⁶ Although potentially available for any number of uses, yieldcos have been particularly associated with wind and solar projects. The first yieldco IPO was in 2013,⁹⁷ and by mid-2015, the yieldco market had raised \$16 billion through nine IPOs and secondary capital offerings. By 2016, two aggressively expanding companies in the field had declared bankruptcy,⁹⁸ and there has been little new activity since.

Although yieldcos have perhaps been insufficiently flexible under varying market conditions, the structure of the instrument itself is instructive. The yieldco concept is akin to an equity version of asset-backed securities (ABS) and comparable to real estate investment trusts (REITs), in which performing assets, such as solar fields with long-term power purchase agreements (PPAs) in place, are transferred from a parent company into a spin-off entity with predictable cash flow based on the PPAs. Investors purchase shares in the spin-off (the yieldco), which typically makes quarterly dividend payments. The funds raised through the equity sale (the IPO) can then be used by the parent to develop the next set of projects, which, when completed and with PPAs in place, can be spun-off into the same or another yieldco.

Yieldcos, as companies and unlike ABS, are designed to be perpetual. To maintain

⁹³ Foldy, B.; Rivian Shares Surge in Largest U.S. IPO Since 2014; Wall Street Journal; Nov 10, 2021. Chamaria, N.; Better Buy: Nio vs. Rivian Stock; The Motley Fool; Sep 1, 2023

⁹⁴ SEC; Investor Bulletin: Investing in an IPO

⁹⁵ PwC; Roadmap for an IPO; A Guide for Going Public

⁹⁶ Konrad, T.; The YieldCo Boom and Bust: The Consequences of Greed and a Return to Normalcy; GreenTech Media; May 13, 2016

⁹⁷ Kinrade, T.; A Sixth YieldCo Goes Public as the Asset Class Has its First Anniversary; Solsystems.com; Jul 18, 2014

⁹⁸ Hals, T. & Groom, N.; Solar Developer SunEdison in Bankruptcy as Aggressive Growth Plan Unravels; Reuters; Apr 21, 2016; Fitzgerald, P.; Spain's Abengoa Files for Chapter 15 Bankruptcy in U.S.; Wall Street Journal; Mar 29, 2016

share value, they depend on a continually renewing stream of projects and PPAs, but the yieldco model can be financially vulnerable under rising interest rate environments. Because yieldcos are, as the name implies, designed for yield, they are most attractive to investors when their dividend payments are high as compared to alternative investments. When interest rates rise, yieldcos tend to lose value.⁹⁹ Similarly, as a way to raise capital, yieldco IPOs only make sense when the cost of equity capital is lower than debt. Large utility companies can often borrow at lower rates and thereby become a lower cost source of capital for renewable resources as compared to a yieldco.¹⁰⁰

⁹⁹ Sweet, C.; IPOs Bring Fresh Wind for Green Investing; Wall Street Journal; May 5, 2015

¹⁰⁰ Hoiium, T.; Why Utilities (Not Yieldcos) Are Dominating Renewable Energy Finance; The Motley Fool; Mar 16, 2018

Debt Financing

Debt financing to support sustainable activities, including bonds and loans, is divided between “use of proceeds” financings, such as green bonds, that specifically delineate how funds can be spent, and “sustainability-linked” financings, where borrowers can use funds as they choose, but must hit designated sustainability-linked performance indicators or suffer a financial penalty, typically a higher interest rate.

Use of proceeds financings predominate, and they include corporate, municipal and sovereign bonds, as well as certain loans. As financial instruments, use of proceeds bonds do not differ from other bond financings, but uses of the funds raised are limited to green and/or social uses, which are disclosed in advance. The labels enable investors to target their investments to these uses (and these bonds are often referred to as “labeled bonds”).

Uses of debt financing are often more clearly delineated than equity financing. That is, when purchasing stock in a company, one in effect purchases a sliver of every single activity of the company. With use of proceeds financings, funds go to specific and identified tasks and projects. Nonetheless, there are inherent questions as to what can and should qualify as “green” or “social,” and as sustainable debt investment grows, so does the pressure for greater clarity and stricter oversight, as it has in equity markets.

The International Capital Market Association (ICMA) has established Green, Social, Sustainability (GSS), and Sustainability-Linked (SLB) Bond Principles,¹⁰¹ and these frameworks have largely formed the basis of the market to date:

- Green bonds are designed to have an environmental benefit.
- Social bonds intend to achieve a positive social outcome, typically for a lower-income or otherwise underserved population, and uses include affordable housing and access to essential services such as healthcare and education.
- Labeled sustainability bonds¹⁰² combine both environmental and social uses.
- Sustainability-linked bonds (SLBs) differ from the other categories in that borrowers commit to pre-disclosed sustainability performance targets and outcomes within a given timeframe (key performance indicators), without specific restrictions on exactly how they will use the funds to meet those ends. The outcomes should be measurable, externally verifiable and should represent a material advance towards ESG goals beyond a business-as-usual trajectory. It is important to note that many investors focused on sustainability steer clear of SLBs, primarily because the sustainability targets are often viewed as unambitious and not necessarily a material advance towards ESG goals (i.e., they view SLBs as a potential exercise in greenwashing, which use of proceeds bonds avoid by identifying specific uses).¹⁰³

¹⁰¹ International Capital Market Association (ICMA) website (<https://www.icmagroup.org>); Sustainable Finance link.

¹⁰² A note on terminology – “sustainability bonds” is a defined term. To distinguish this specific category of financing from the general category of sustainable bonds, the word “labeled” accompanies sustainability bonds.

¹⁰³ Webb, D. SLB Issuers ‘Likely to Miss Majority of 2022 and 2023 Targets’; Responsible Investor; Feb 6, 2023. Sugrue, D. & Popoola, B.; Sustainable Bond Issuance Will Return to Growth in 2023; S&P Global; Mar 20, 2023

The GSS and SLB Principles are voluntary, so they don't literally govern the market. They are nonetheless effective, particularly for use of proceeds bonds, for several reasons. The Principles are based in disclosure and transparency, and they build upon the substantial foundation of financial and legal disclosure already required of bond offerings. The concept of identifying the uses of bond proceeds (i.e., what the funds will be spent on), for instance, is a long-standing feature of the bond market. The International Capital Markets Association (ICMA), which put the Principles together, is composed of major capital markets participants with a great deal of credibility and influence.

The disclosures required of use of proceeds bond issues are more or less one more step in a well-established process, rather than anything fundamentally different, and they are therefore easily adopted. Bond issues following the Principles generally include third-party reviews, and the Principles provide a standard framework guiding issuers to provide the type of information investors demand. ICMA maintains a database of GSS and SLB issuers who have followed its framework, with links to third-party reports.¹⁰⁴

Not all issues have a third-party, publicly available review (confirming that funds have been used as planned), but a 2021 study by the Climate Bonds Initiative (CBI), a UK-based NGO, found that 88% of use of proceeds bond issues, by dollar volume, had made a report available, with the percentage of issuers providing these public reports rising over time.¹⁰⁵ Keeping in mind that all public bond offerings include official statements with a great deal of disclosure, vetted by outside counsel who affirm that the information is accurate, there is general confidence in the use of proceeds market, whether or not there is a separate, published, third-party review. SLBs, as noted and as contrasted with GSS use of proceeds bonds, do not enjoy the same level of confidence.

Financial market regulators in some countries, including China and India, have established their own frameworks. They largely track the ICMA principles, although with some divergence. "Harmonization" of frameworks is an on-going process, prodded forward by the considerable incentive of attracting investors from around the globe.

In the United States, many sustainable bond uses fall within the longstanding domain of the municipal bond market, including environmental bonds for clean water and affordable housing bonds. This means that last year's housing bond might be this year's social bond, and some of the market's growth is from exactly this kind of switch in nomenclature for normal activities of government. On the other hand, many bonds for qualified activities do not carry a sustainability label. In a 2018 study, CBI put US climate-aligned municipal outstanding issuance at \$264 billion, of which only \$14 billion specifically carried a sustainability label.¹⁰⁶ This gap has closed somewhat since then, but labeled sustainable debt remains a fraction of the municipal market.¹⁰⁷ Nonetheless, it remains the fact that the size of the sustainable bond market does not equate to the size of the underlying sustainable activities, and growth in the sustainable bond market does not necessarily mean growth in the underlying activities. As a result, there is some discussion as to how meaningful the labels are. Several factors suggest the labels are

¹⁰⁴ ICMA website; Sustainable Finance, Green, Social and Sustainability Bonds Database

¹⁰⁵ Climate Bonds Initiative (CBI); Post Issuance Reporting in the Green Bond Market; 2021. The study covers bonds issued from Q4 2017 through Q1 2019

¹⁰⁶ CBI; Bonds and Climate Change: The State of the Market 2018

¹⁰⁷ S&P Global; 2021 Sustainable Finance Outlook: Large Growth in Green, Social, Sustainable Labels as Municipal Market Embraces ESG; Feb 16, 2021

meaningful and useful:

- Bond purchasers find the labels useful to the extent that labeled bonds' transparency processes enable investors to align investments with specific preferences. In fact, the first specifically-named "green bonds," issued by the World Bank in 2008, were structured at the request of Swedish investors wanting to support climate solutions.¹⁰⁸
- Many countries, particularly those with emerging markets, are newly able, with economic growth, to address sustainability matters at scale. Sustainable bond issuance in those countries therefore more closely tracks growth in sustainable activities.
- Labeled bond issues regularly attract more orders than other bonds. Some analyses show this additional demand resulting, in some cases, in slightly lower interest rates for sustainable bond issuers (a "greenium"), reducing the costs of sustainable activities¹⁰⁹ – e.g., lower costs for water systems, affordable housing or renewable energy. Other studies have found no greenium.¹¹⁰ It likely comes and goes depending ultimately on supply, demand and other fundamental market conditions. Issuers, who see the extra orders, tend to be great enthusiasts for labeled bonds. As one example of what they see in the capital markets, Verizon, in a September 2020 \$1 billion green bond issue funding renewable energy projects, found a 14 basis point greenium relative to its other debt, resulting in \$1.4 million in reduced annual interest costs.¹¹¹

The success of the concept is demonstrated by the market's growth in volume, as well as its spread from green to broader concepts of sustainability. In 2021, labeled sustainable debt financing totaled \$1.1 trillion globally, roughly 10 times the 2016 figure. Volume was down in 2022 (to \$863 billion), but that was in line with broader market trends, with rising interest rates and economic uncertainty suppressing bond issuance globally. Volume has rebounded in the first half of 2023 (to \$574 billion), and is on pace towards the 2021 level.¹¹²

Strong credit performance has also been a hallmark of this market, to date, with a 15-year default rate of 0.45% of principal outstanding for green bonds. That is low by bond market standards, and the defaults are concentrated in China's real estate market, a known economic weak spot.¹¹³

The chart below shows the growth trends of labelled sustainable debt issuance (note that the 2015 bar includes the combined volume of 2015 plus all prior years going back to the first green bonds in 2008). The explosion in social bond issuance in 2020 reflects

¹⁰⁸ World Bank; Green Bonds

¹⁰⁹ Harrison, C., Green Bond Pricing in the Primary Market H2 2021, Climate Bonds Initiative, Sept 2022. Schuele, F. and Wessel, D.; Municipalities Could Benefit from Issuing More Green Bonds; Brookings; Jul 16, 2018

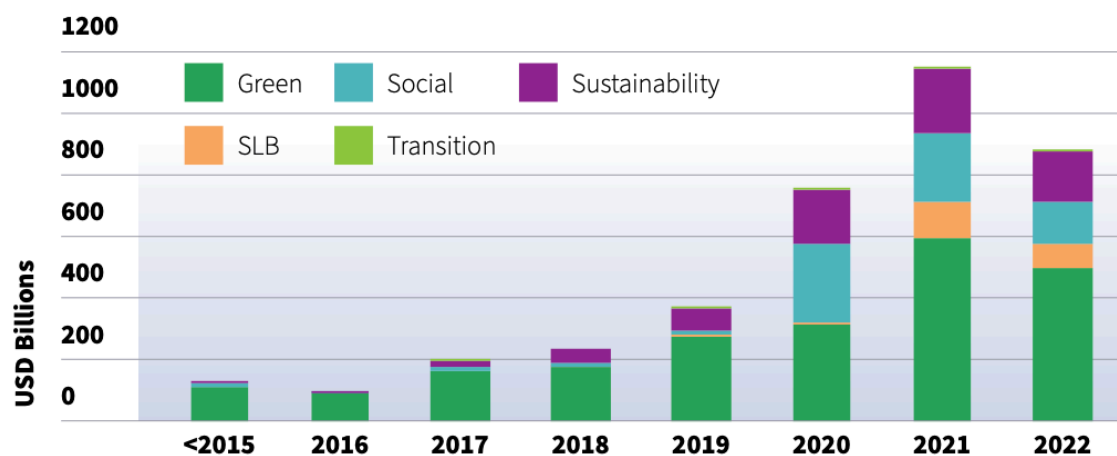
¹¹⁰ Larker, D. & Watts, E.; Where's the Greenium?; Stanford University, Graduate School of Business; Oct 3, 2019. Gilbert, M.; The Explosion in Green Bonds Comes Without a Premium; Bloomberg; Oct 28, 2019

¹¹¹ Wirz, M.; Why Going Green Saves Bond Borrowers Money; Wall Street Journal; Dec 17, 2020

¹¹² CBI; Sustainable Debt Global State of the Market 2022; Apr 2023. CBI; Green and other Labelled Bonds Held Market Share in 2022 Amidst Fall of Global Fixed income; Jan 31, 2023. Gardiner, J. & Freke, T.; Green Bonds Boom in First Half of 2023; Bloomberg Professional Services; Jul 27, 2023

¹¹³ Meng, A. & Clements, L.; Reading tea leaves on green bonds: current headwinds and market outlook; FTSA Russell; Feb 22, 2023

EU Covid relief spending, which was funded in part via labeled social bonds.



Source: Climate Bonds Initiative; Sustainable Debt: Global State of the Market 2022; Apr 2023

Looking forward, there are at least three big trends in this market – resumed growth in volume; an expanded agenda; and with it, continued improvements in transparency, definitions, disclosure and monitoring to maintain the sector’s credibility:

- Market observers expect sustainable bond issuance to rebound with the overall bond market, and likely to resume its growth into the foreseeable future. Factors include continued evidence of investor demand, as well as a favorable policy environment, particularly in the EU, but also in the US, with the climate features of the Inflation Reduction Act of 2022. Per S&P, the EU was 45% of the sustainable debt market in 2022, Asia/Oceania was 23% and North America 15%. Given North America’s share of the sustainable debt market, anti-ESG backlash will probably be a fairly minor countervailing factor relative to the total market. It’s also important to recognize that a good deal of the backlash is simply labeling. Florida’s new legislation, for instance, does not ban public bond issuance for environmental or social uses (such as affordable housing), but it prohibits public debt issuance that is labeled green or marketed as promoting an environmental or social objective. Given demonstrated investor preference for those labels, the question is whether Florida will follow in Texas’ footsteps and simply incur higher interest rates than it otherwise might have.¹¹⁴
- The growth will be further fueled as the agenda for sustainable debt financing continues to move toward the full range of the UN’s Sustainable Development Goals (SDGs), i.e., a fairly high percentage of all categories of human activity. Two key concepts – transition and resilience/adaptation – may define areas of new growth.

The ICMA has created a Climate Transition Finance Handbook particularly designed to assist “hard to abate” sectors, but relevant to virtually any issuer. The intent is to provide transparency guidance so issuers can credibly use GSS bonds as they transition from brown towards green. The transition disclosures include a science-

¹¹⁴ Sugrue, D. & Popoola, B.; Mar 20, 2023. Moody’s; Sustainable Bonds Fare Better than Broader Market, Despite Third Quarter Decline; Nov 2, 2022. Moody’s; Sustainable Bond Issuance on Course to Hit \$950 Billion in 2023 Despite Challenges; Jul 27, 2023. Popik, V. & Wiener, M. New Florida ESG Law Impacts Rating Agencies, Market Participants, Municipal Issuers; Holland & Knight; Jul 5, 2023

based, Paris-aligned strategy, with short, medium and long-term targets; a discussion of how the financed activities will materially advance the strategy; and disclosure of all actions taken to ensure a just transition for impacted employees and communities.¹¹⁵

For resilience, CBI has created a set of Climate Resilience Principles for use in conjunction with the Green Bond Principles. The Resilience Principles are designed to help issuers and investors assess the adaptation and resilience benefits of financed projects with the overall goal of improving the ability of “assets and systems to persist, adapt and/or transform in the face of climate-related stresses and shocks...” That is, the issuer must demonstrate that they understand the climate risk they face, and that the financed project addresses those risks and creates resilience over and above the anticipated risks. With the growing need to adapt to climate risks, these Resilience Principles may drive a growing share of green bond issuance.¹¹⁶

- With the expanding list of eligible activities, it will be increasingly important to define what qualifies as a sustainable activity, as opposed to business as usual, and to monitor actual achievement. Both are critical if the labels are to retain meaning and the sustainable debt market to retain credibility. The Transition Handbook and the Resilience Principles are good examples of guides to an expanding universe of qualified activities, helping issuers and investors define the path to sustainability.

Greenwashing, in the sense of funds being used contrary to claimed uses, is generally not considered a problem in the use of proceeds bond market, where so much information is disclosed. Greenwashing concerns are more likely to arise when they fund a particular green activity conducted by a fundamentally non-green actor. For instance, some investors objected to a green designation for eco-conscious renovations at the Amsterdam airport. Similarly, some feel that the sustainability-linked concept opens up the market to abuse. But there is no path to 1.5° without brown industries getting to greener, and the Transition Principles, as well as the Sustainability-linked Principles with its key performance indicators, are specifically designed to guide those non-green activities towards best available practices.¹¹⁷

To date, the market has largely monitored itself, although the EU is implementing specific, regulated definitions of “green” and “sustainable” through its EU Taxonomy regulation coupled with disclosure requirements (the Sustainable Finance Disclosure Regulation, or SFDR).¹¹⁸

For use of proceeds bonds, self-monitoring can work reasonably well, as bond issues are mostly publicly-issued with extensive documentation – everyone can see what’s being done, and investors can decide if they agree with the label. And there is a self-regulating aspect, as issuers do not want to trigger a controversy at the very moment they are in the market trying to sell bonds.

Self-regulation, of course, has its limits, and as the agenda expands and the market

¹¹⁵ ICMA; Climate Transition Finance Handbook; Jun 2023

¹¹⁶ CBI; Climate Resilience Principles; Sep 2019

¹¹⁷ Ritchie, G., et. al.; Bond Investor Revolt Brews Over Bogus Green Debt Flooding Market; Bloomberg Green; Mar 29, 2021

¹¹⁸ EU Taxonomy Info Portal; EU Taxonomy Overview

grows – and as the urgency for climate progress rises – there is considerable pressure to move beyond simple disclosure and to require specific standards and definitions. This is particularly advanced for green bonds. The EU green taxonomy builds off science-based standards created by the Climate Bonds Initiative along with other contributors.¹¹⁹

Regulation, as well, has its limits. As the EU moved towards its green definitions, it was under a great deal of pressure to be less strict rather than more, and to include, for instance, natural gas and nuclear uses, which it has done as transitional uses in certain circumstances.¹²⁰ Some have argued for a “fifty shades of green” approach, accompanied by strict disclosure requirements, so as to side step arguments over “in or out” and let investors decide what level of green they are willing to finance. And even with a taxonomy, however strict or lax, issuers can simply decide to forgo the label and do what they want to do. Presumably there would be some kind of penalty in the market, but that has not yet played out.¹²¹ And that penalty might be out of the hands of investors and more in the hands of those who make and enforce building codes and pollutions standards or decide insurance premiums.

Categories and Examples of Sustainable Debt. Debt financing for sustainable finance includes the standard categories of corporate/general obligation debt, repaid from any and all assets of a company, country, state or city, as well as debt where the repayment obligation is limited to a specific source. This includes securitizations (asset-backed and mortgage-backed securities), revenue bonds and project finance. Each of these is described below, with examples of uses for sustainable purposes.

Corporate/General Obligation Debt can be repaid, generally, by any and all assets of the borrower. Most debt is a general obligation of the issuer, issued with the expectation that it will be repaid from the operating cash flow of the borrowing entity. In the context of this discussion, this category of debt can include, generally, corporate bonds and loans, bonds sold by Multilateral Development Banks (MDBs), as well as municipal bonds, including general obligation debt of countries (sovereign debt), states and municipalities, and 501(c)3 bonds sold on behalf of nonprofit institutions.

Examples of corporate and general obligation debt include:

- The World Bank has issued \$19.5 billion in green bonds since 2008 supporting projects in 35 countries designed to mitigate climate change or help affected people adapt to it. Projects include renewable energy, energy efficiency, transport, water management, waste water and solid waste management, agricultural pollution control, forest restoration and resilient infrastructure. In FY2022, 90% of new projects financed by the World Bank were either directly climate-related or included a climate component. Moreover, the World Bank has committed to a “Paris Alignment” in all its operations and financings, starting July 1, 2023. More broadly, the World Bank, with its economic development and poverty reduction mandate, is also mapping its

¹¹⁹ European Commission; https://ec.europa.eu/finance/docs/level-2-measures/taxonomy-regulation-delegated-act-2021-2800-annex-1_en.pdf

¹²⁰ EU; EU Taxonomy: Commission Welcomes the Result of Today’s Vote by the European Parliament on the Complementary Delegated Act; Jul 6, 2022

¹²¹ Scriven, Guy; The Climate Issue; The Economist; Apr 19, 2021

financings to the SDGs. It reports 577 active sustainable development projects, including 103 for project financings closed in FY2022.¹²²

- In the US, the Bank of America (B of A) has been a green and sustainable bond leader, with 10 green, social and sustainability bonds issued totaling \$13.85 billion since 2013. These bonds fund wind, solar, energy efficiency projects, affordable housing, health care and projects “to advance equality and economic opportunity by focusing on financing and investments that provide people of color or women with expanded access to essential services, including ... business capital.” These bonds, with B of A as the obligor, are a fraction of its lending activity, which includes a pledge to provide \$1.5 trillion in financing to advance the SDGs in the decade from 2021 to 2030, a goal it is well on the way towards meeting.¹²³ As discussed below, because lending is their business, banks are in a special category of sustainable finance and, by a wide margin, most of their carbon footprint is not in their operations or supply chain, but in the activities they enable through their lending. Several initiatives are underway to account for that and to bring it into whatever net-zero pledges they have made.
- Apple has raised \$4.7 billion through four green bond issues since 2016 to fund solar and wind energy projects, enabling the company’s conversion to 100% renewable energy and supporting progress towards its 2030 net-zero pledge throughout its operations, supply chain and the life cycle of all products it sells. Apple reports that it now uses 100% renewable electricity at its stores, data centers and offices, and that it has reduced its overall carbon footprint by 46% since 2015. For its net-zero pledge, Apple seeks a 75% carbon footprint reduction paired with offsets equal to its remaining 25% of emissions.¹²⁴
- The City of Los Angeles has issued \$665 million in general obligation bonds in 2018 and 2022, labeled social bonds, to fund programs including housing construction for homeless people.¹²⁵ As of July 2023, the LA Mayor’s Office reports 2,877 units complete, and 5,719 units in various stages of development and construction towards a goal of 10,000 units.¹²⁶
- In July 2019, the Low Income Investment Fund, a San Francisco-based community development financial institution (CDFI), issued a \$100 million SDG-linked sustainability bond, described as the first sustainability bond specifically linked to the SDGs. The issue funds projects expanding the availability of affordable housing, healthy foods, community health care, education and child care, all serving low-income communities and all with green benefits in the form of LEED certifications, energy efficiency retrofitting and/or transit-friendly locations (i.e., transit-oriented development). The issue received a second opinion from Sustainalytics and was 10 times oversubscribed. In the wake of the success of this issue, several more CDFIs have issued social and sustainability bonds to fund affordable housing and other

¹²² World Bank Sustainable Development Bonds & Green Bonds Impact Report 2022; June 2023

¹²³ Bank of America website; 2022 Performance Data Summary and Global Reporting Initiative Index. B of A website; Bank of America Issues Its Third Equality Progress Sustainability Bond for \$2 Billion; Nov 10, 2022. B of A website; Bank of America Introduces Framework to Support Future ESG-Themed Issuances; Nov 17, 2021.

¹²⁴ Apple website; Annual Green Bond Impact Report; Fiscal Year 2022 Update. Apple; 2023 Environmental Progress Report

¹²⁵ Ghori, I.; With Proceeds Tackling Homelessness, Los Angeles Brings Social Bonds; The Bond Buyer; Jun 26, 2018. Nixon Peabody website; Nixon Peabody Serves as Bond Counsel on Social Bonds, Helping to Reduce Homelessness in the City of Los Angeles; Sept 29, 2022.

¹²⁶ Los Angeles Housing Department website; Supportive Housing Update; Jul 2023

community development activities.¹²⁷

- Many American universities have issued green bonds (often through a state-authorized intermediary issuer) for LEED-certified real estate development. New York University, in February 2019, backed \$83 million in green bonds for sustainable construction projects in support of its twin goals of building to a LEED silver designation, at a minimum, in all new projects and to achieve carbon neutrality by 2040. Projects at various buildings include energy efficient windows, green roofs and vegetated terraces to reduce energy needs and mitigate the urban heat island effect. Other universities using green bonds include Columbia, Cornell, MIT, Virginia, Texas and Arizona State.¹²⁸
- Through 2022, 43 countries have issued \$325 billion in green, social, sustainability and sustainability-linked bonds. The issues are predominantly green bonds (81%), with the Republic of France the lead issuer at \$58.8 billion. Proceeds fund public projects to meet Paris commitments while also making an important leadership statement, signaling a country's commitment to climate change mitigation, as well as social priorities, including mitigation of Covid impacts.¹²⁹

SLBs are also typically issued as general obligation corporate debt. Examples include:

- Enel, an Italian electric and gas power utility, was a pioneer and is the most active issuer of sustainability-linked bonds (SLBs), with \$11.6 billion issued in 2022 alone. The Enel SLBs have interest rates pegged to reductions in the company's scope 1 carbon intensity (not absolute emissions), which it seeks to reduce via solar installations. A Barclays analysis found that Enel was likely to miss its carbon intensity reduction targets in 2023, and that due to the exclusion of forces beyond Enel's control (in this case, Russia's invasion of Ukraine and the ensuing energy market turbulence), this may or may not trigger the SLB interest rate penalties. All of this goes a long way in explaining the skepticism with which many sustainable investors view the SLB market.¹³⁰
- A series of airports have issued SLBs, generally tied to reducing emissions associated with airport operations. Heathrow Airport, serving London, is the first to include a plan towards reducing flight emissions. Heathrow's framework is in two parts – On the Ground and In the Air. It is using £207 million to decarbonize operations in line with a 1.5°C target, and it has created a transition plan towards requiring planes using the airport to use Sustainable Aviation Fuel as it becomes available, or to use Carbon Capture. Are these "In the Air" targets credible? That remains to be seen.¹³¹

Banks are a special category of sustainable finance as they can be major suppliers of capital for sustainable purposes, while simultaneously financing the full spectrum of carbon-intensive industries, including all types of fossil fuels. A study based on data from Bloomberg Finance found \$5.5 trillion of fossil fuel investment from the world's 60 largest commercial and investment banks in the seven full years since the Paris Agreement

¹²⁷ Low Income Investment Fund press release; Over-subscribed \$100 Million Issuance by Low Income Investment Fund Signals High Institutional Investor Demand for Sustainable Bonds; Jul 31, 2019. Sustainalytics; LIIF Sustainability Bond Second-Party Opinion; June 28, 2019.

¹²⁸ Jordan, John; DASNY Issues \$863M in Bonds for NYU Projects; GlobeSt.com; Mar 1, 2019. Columbia University website; Columbia University website; Columbia Issues First Green Bonds; 2016

¹²⁹ CBI; Sustainable Debt Global State of the Market 2022

¹³⁰ Ibid. Webb, D. Feb 6, 2023. Sugrue, D. & Popoola, B.; Mar 20, 2023

¹³¹ CBI; Sustainable Debt Market Summary H1 2023; Aug 2023

(2016-2022). That comes to \$2.1 billion per day of fossil fuel investment. JPMorgan Chase, Citi, Wells Fargo, and B of A were the leaders, in that order, collectively raising \$1.36 trillion for the companies.¹³² At the same time, the banks can be sustainable finance leaders, with green and sustainable bonds just a fraction of their overall sustainability financings. B of A reports investing \$410 billion in 2021 and 2022 towards its \$1.5 trillion goal of investment, consistent with the UN SDGs from 2021 to 2030.¹³³

Many banks are working to understand and publicly report on the carbon footprint in their loan portfolios. Citi and B of A, for instance, are among 417 financial institutions around the world that have joined the Partnership for Carbon Accounting Financials (PCAF), which describes itself as an industry-led initiative to measure and disclose, under a consistent standard, GHG emissions financed by loans and investments. The disclosure is intended to “trigger changes in banks’ and investors’ portfolios which align with the goals of the Paris Agreement.”¹³⁴ B of A, in announcing its net zero plan, committed to disclosing financed emissions “no later than 2023.”¹³⁵ As of mid-2023, the PCAF lists B of A as “Committed” to disclosure, having not yet “Disclosed.”¹³⁶ As in so many aspects of the route to sustainability, the PCAF is joined by several similar efforts, including the Net Zero Banking Alliance, the Glasgow Financial Alliance for Net Zero, and the Climate Safe Lending Network. They, in turn, build on certain foundational efforts, such as the UN’s Principles for Responsible Investment (PRI).

Securitizations (Asset-Backed Securities and Mortgage-Backed Securities). The SEC defines asset-backed securities (ABS) as securities backed by a discrete pool of self-liquidating financial assets, and asset-backed securitization as a financing technique in which financial assets, in many cases themselves less liquid, are pooled and converted into instruments that may be offered and sold in the capital markets.¹³⁷ The pooled financial assets can include leases, loans, contracts, receivables or other non-real estate financial assets. Mortgage-backed securities (MBS) are essentially exactly like ABS, with payments flowing from pools of real estate mortgage loans. ABS and MBS succeed or fail based on the strength and quality of the financial assets backing the securities.

The securitization examples below include pools of car loans, solar leases and energy efficiency projects. As buildings account for roughly 40% of US energy consumption, split roughly evenly between commercial and residential uses,¹³⁸ there is a very large potential market for energy efficiency retrofits, leading to the multiple benefits of reduced carbon emissions and water use, lower utility bills and more clean energy jobs.

Green securitizations include:

- Hannon Armstrong, a financing firm specializing in renewable energy and energy efficiency projects, issued the first labeled green ABS in December 2013. The \$100 million private placement was backed by wind, solar and energy efficiency projects at

¹³² Rainforest Action Network; Banking on Climate Chaos: Fossil Fuel Finance Report 2023; Feb 8, 2023. Carothers, A.; Is Paris Burning? Why Banks Have Sunk \$4 Trillion into Fossil Fuels Since Treaty; Climate & Capital Media; Mar 24, 2021

¹³³ Bank of America press release; Bank of America Increases Environmental Business Initiative Target to \$1 Trillion by 2030; Apr 8, 2021. Bank of America Annual Report 2022.

¹³⁴ Partnership for Carbon Accounting Financials (PCAF) website; FAQs page; What is PCAF

¹³⁵ Bank of America press release; Bank of America Announces Actions to Achieve Net Zero Greenhouse Gas Emissions before 2050; Feb 11, 2021

¹³⁶ PCAF website; Financial Institutions Taking Action page

¹³⁷ SEC; https://www.sec.gov/rules/final/33-8518.htm#P174_14586; Mar 8, 2005

¹³⁸ US Department of Energy; 2011 Buildings Energy Data Book; March 2012

20 properties.¹³⁹ Hannon Armstrong has issued \$8.7 billion in green debt, of which \$4.8 billion are ABS. Hannon Armstrong estimates that its investments result in 6.6 million tons of avoided CO₂ emissions annually. In addition to standard financial metrics, Hannon Armstrong measures the efficiency of its investments in GHG reductions per dollar invested.¹⁴⁰

- Fannie Mae, the US mortgage financing agency, has issued green MBS issues exceeding \$100 billion. To receive financing through this program, residential building owners must commit to combined energy and water use reductions of 30%, including a minimum 15% energy use reduction. The loan proceeds fund the efficiency installations. Fannie Mae's program has received a Light Green second opinion from CICERO.¹⁴¹
- Toyota has issued green bonds totaling \$7.6 billion through 2021, predominantly ABS used to fund purchase and lease contracts for Prius and other hybrid and low-emission vehicles. As an example, Toyota estimated that its June 2021 \$1.5 billion ABS financed 46,000 vehicles that are 40% more fuel efficient than comparable vehicles, saving 115 million gallons of gas and reducing CO₂ emissions by 1.2 million tons over the vehicles' lifetime. Noting that Toyota's activities are "green-er," rather than specifically green, future Toyota issues might include transition-related disclosures outlined above.¹⁴²
- In November 2018, SunPower, in partnership with Hannon Armstrong, issued \$440 million in securities backed by some 37,500 residential rooftop solar leases. 83% of the residential customers had FICO scores of 753 or better, and the issue was rated single-A.¹⁴³ This was one of seven solar ABS totaling \$2.2 billion issued in 2018. Solar ABS can be backed by leases, Power Purchase Agreements (PPAs) and/or loans, and annual overall solar ABS volume has remained in the range of \$2 to \$3 billion over the last few years.¹⁴⁴

The PPAs that are the building blocks of many green ABS are attractive for power purchasers because they can be used to lock in power prices at a reasonable and stable level (often at a discount to prevailing utility rates) over a long time period. In that way, PPAs can provide a hedge against volatile and rising energy costs. So, along with power, a PPA buys stability and predictability in an often volatile market. Volatile, however, means that sometimes prices drop, as they have been for solar and wind. So PPAs are like fixed-rate loans, which can be great or not, depending on whether your interest rate is above or below current rates.

Revenue bonds are municipal bonds often issued by a state or local authority and backed by a dedicated tax, user fee or other specific revenue. The repayment obligation for revenue bonds is limited to those dedicated sources, and the city, state or authority associated with the bonds does not have a legal obligation to make up any shortfalls. Should a shortfall occur, they might nonetheless choose to make it up so as to maintain

¹³⁹ Trabish, H.; The \$100 Million Green Bond from Hannon Armstrong; GreenTech Media; Dec 26, 2013

¹⁴⁰ Hannon Armstrong website; 2022 Impact Report. Hannon Armstrong website; CarbonCount

¹⁴¹ Fannie Mae website; Evans, M.; Fannie Mae's Journey to \$100 Billion in Green Bonds and What Lies Ahead; Fannie Mae website; Dec 22, 2021; Fannie Mae Multifamily Green Bond Framework; July 2020

¹⁴² Toyota Financial Services; Green Bond program. Toyota Financial Services; TMCC Green Bond Impact Report; Jun 2022

¹⁴³ Adams, M.; Hannon Armstrong Readies \$440M Solar Lease ABS; Global Capital; Nov 5, 2018
SunStrong Capital Holdings LLC Successfully Completes 400 Million Asset-Backed Securitization;
Sunpower.com; Nov 28, 2018

¹⁴⁴ S&P Global; Solar Securitizations Present Yield, ESG Play for Institutional investors; Dec 16, 2020

fiscal stability, avoid disruptions in services and protect their own credit rating and access to capital markets. Examples of green and social revenue bonds include:

- New York Metropolitan Transportation Authority (MTA) has issued a series of green revenue bond issues totaling over \$11 billion since 2016 for various projects in the public transit agency's capital plan. The bonds are repaid from MTA operating revenues, including subway, bus and train fares, along with NY State and City operating subsidies.¹⁴⁵
- Central Puget Sound Regional Transit Authority issued \$923 million in bonds in 2015 to expand the regional light rail system. The bonds will be repaid from sales tax revenue.¹⁴⁶
- DC Water issued a \$350 million green century bond in 2014 to be repaid from user fees. DC Water, like most water districts, has a monopoly on supply plus the authority to set rates at levels required to cover costs, including debt service costs.¹⁴⁷
- As a part of its effort to address homelessness, California authorized \$2 billion in revenue bonds to create permanent housing through its No Place Like Home program. For the program's most recent funding round, the state's Health Facilities Financing Authority issued \$450 million in social bonds in November 2020. Counties receiving the funding must commit to providing mental health and other supportive services for the residents. The bonds will be repaid from a dedicated portion of a 1-percent state tax on income in excess of \$1 million.¹⁴⁸
- The Alabama Public School and College Authority issued \$1.5 billion in social bonds in October 2020. The funds will be used for capital improvements at public schools, including colleges and universities throughout the state. The bonds will be repaid from various taxes pledged by state law into the state's Education Trust Fund.¹⁴⁹

Project Finance is debt issued to create a specific project, with repayment of the debt generated solely from the cash flow of the financed project. Project finance is typically used for proven models, where the projected cash flow is considered predictable over the term of the financing, and it is a major form of financing for large-scale wind and solar projects. Similar to green bonds, Moody's studies have found that projects with green uses had lower default rates than non-green projects.¹⁵⁰

Examples of project finance:

- A renewable natural gas project in Arizona, where methane from cow manure is captured, processed, piped and sold, was financed in 2018 with \$61 million of tax-exempt industrial development bonds underwritten by Equilibrium Capital.¹⁵¹
- A series of Chinese projects in 2015, including an \$856 million off-shore wind farm, a \$420 million on-shore wind farm and a \$480 million solar project. China has been the

¹⁴⁵ CBI; Certification; New York Metropolitan Transportation Authority. Fitch Ratings website; Fitch Rates MTA, NY's Transportation Rev Bonds 'A-'; Outlook Negative; Feb 2, 2021

¹⁴⁶ Deshais, N.; Seattle Transit Joins Spokane with Green Bonds; The Spokesman-Review; Aug 11, 2015

¹⁴⁷ DC Water; DC Water Announces Successful Sale of \$350 Million Green Century Bonds; Jul 10, 2014

¹⁴⁸ Our Weekly; Revenue Bonds Sold to Support No Place Like Home Program; Nov 5, 2020

¹⁴⁹ Alabama Public School and College Authority Official Statement; Oct 22, 2020

¹⁵⁰ Moody's Investors Service; Moody's: Project Finance Bank Loans for Green Use-Of-Proceeds Projects Demonstrate Lower Default Risk; Sept 18, 2018; Moody's Investor Service; Moody's: Sustainable Project Finance Bank Loans Demonstrate Lower Default Risk; Aug 17, 2020

¹⁵¹ Equilibrium Capital; Turning Livestock Waste into Renewable Fuel: Green Bond Case Study; presentation at Conservation Finance Investor Conference; Jan 9, 2019

leading location for renewables finance for the past several years.¹⁵²

- A solar power plant in Chile, called the largest in Latin America, financed in 2014 by \$47.3 million in project bonds underwritten by Bank of America Merrill Lynch and guaranteed by OPIC.¹⁵³

¹⁵² *ibid*

¹⁵³ Kidney, S.; Now Here's Something to Like; Climate Bonds Initiative website; Sept 25, 2014

Policy-Based Practices

This category is for investment mechanisms specifically created by public policy. In addition to traditional command and control environmental regulation (“you must do this; you may not do that”), accompanied by public spending, governments at all levels also use market-based and incentive-oriented solutions.

Broadly speaking, the policies are designed to create financial value for desired activities and costs for undesirable activities. Such policies can “internalize externalities” by placing a cost on pollution, for example, and a value on conserving air, water, habitat and bio-diversity resources – and thereby trigger investment.

The strategies include traditional policy-based incentive programs such as tax credits for preferred activities, which is just a step away from direct public expenditures, as well as taxes on undesirable activities, plus guarantees and other credit supports such as cap and trade programs. It is important to note, as well, that even command and control environmental regulation, although not a financing mechanism, triggers a great deal of investment and economic activity. The whole industry of environmental services, for instance, is based on meeting environmental regulations.

There is widespread agreement that reaching the level of investment needed to address climate change and other critical sustainability challenges will require public policy support. As noted above, a 2020 McKinsey report found that 50% of the investment needed for the EU to reach net zero by 2050 was not currently profitable and would require an intervention such as a price on carbon. And the US CFTC report, in its call for “an economy-wide price on carbon...at a level that reflects the true social cost of those emissions,” warned that “a world wracked by frequent and devastating shocks from climate change cannot sustain the fundamental conditions supporting our financial system.”¹⁵⁴

As discussed below, EU initiatives have placed a meaningful price on carbon in approximately 40% of the EU economy,¹⁵⁵ so we will soon see if the expected impact of a carbon price meets predictions. In the U.S., the emphasis, dictated by political reality, has been incentives and subsidies to adopt renewables (i.e., carrots), rather than the stick of carbon prices and taxes. So, there may be a natural experiment in place, enabling economists to measure the most effective pathways towards net zero.

Carbon Pricing Initiatives include cap and trade programs as well as direct pricing systems, such as carbon taxes. Per World Bank data, 39 countries and 33 subnational jurisdictions have emissions trading or carbon taxes in operation as of April 2023. In 2022, these initiatives raised \$95 billion (up from \$33 billion in 2017) and collectively cover an estimated 23% of global GHG emissions (up from covering 7% of emissions in 2013).¹⁵⁶

Despite the growth of these pricing initiatives, even where they exist, they tend to be well

¹⁵⁴ e.g., ACTIAM, et al. The Paris Green Bonds Statement; Dec 2015. McKinsey; Dec. 3, 2020. CFTC, Climate-Related Market Risk Subcommittee; 2020.

¹⁵⁵ European Commission website; Climate Action; EU Emissions Trading System (EU ETS)

¹⁵⁶ World Bank; Carbon Pricing Dashboard. World Bank; State and Trends of Carbon Pricing 2023.

below the level the World Bank estimates is needed to meet Paris targets. While most nations and jurisdictions recognize the environmental value (two-thirds of countries' submitted Nationally Determined Contributions include carbon pricing in some form),¹⁵⁷ they are reluctant to disrupt existing energy markets and jeopardize existing jobs. Moreover, they do not want to put themselves at an economic disadvantage relative to others who do not place a price on carbon. There are policies designed to address these concerns, often involving a very visible offset or rebate, but the immediate impact is disruption. And, with such examples in recent years as the Yellow Vest protesters in France and the voters of eco-friendly Washington State, who have now twice voted down a carbon tax, it is clear that there can be serious political hurdles to implementing higher levels of carbon pricing. In the US, the Inflation Reduction Act (IRA), which includes the country's most ambitious green investment programs, does not include a carbon tax.

A Commission on Carbon Prices, convened by the World Bank, concluded that achieving the Paris temperature target would require carbon prices of \$40 to \$80 USD per ton of CO₂ by 2020 and \$50 to \$100 by 2030.¹⁵⁸ As of April 2023, nearly 80% of emissions are not currently covered by any price, and less than 5% of covered emissions are priced within the recommended 2030 range.¹⁵⁹

The World Bank's Carbon Prices Commission based its work on using pricing mechanisms to drive emissions reductions to meet Paris temperature targets (termed "target-consistent pricing"). A different way to price carbon is to look more directly at the costs it inflicts – the costs of the externalities caused by emissions, but not incorporated into fossil fuel prices. The Social Cost of Carbon (SCC) takes this approach, estimating the cost of the damage done by each additional ton of carbon emissions. The US federal government and some state governments use the SCC in cost-benefit analyses, such as regulation of fuel efficiency standards. The current SCC used by the federal government is \$51 per ton of CO₂ emissions. The EPA has proposed an increase to \$190. It is extremely difficult to estimate a "true" SCC, as the figure is highly sensitive to assumptions about future conditions. Nonetheless, to the extent that an SCC at some meaningful level is not incorporated into fossil fuel prices, its absence functions as a fossil fuel subsidy. The International Monetary Fund (IMF), using an approach that includes SCC concepts (identified as "implicit subsidies") along with the cost of direct, "explicit" subsidies, estimates that global subsidies for fossil fuels stood at \$7 trillion in 2022.¹⁶⁰

Cap & Trade and Direct Pricing Systems (i.e., carbon taxes) attempt to capture the currently unpriced costs of carbon and incorporate them into a pricing system, reducing or ending the implicit subsidies fossil fuels now enjoy. Following is a high-level summary of cap & trade and direct pricing systems:

- **Cap & Trade** is a pollution control system that combines command and control regulation with market forces. Under cap and trade (also called emissions trading systems or ETS), a governmental jurisdiction places an absolute cap, declining over time, on a particular pollutant, and then divides that cap, via an allowance permit,

¹⁵⁷ UNFCCC; About Carbon Pricing

¹⁵⁸ World Bank; Report of the High-Level Commission on Carbon Prices; 2017

¹⁵⁹ World Bank; State and Trends of Carbon Pricing 2023

¹⁶⁰ Asdourian, E. & Wessel, D.; What is the Social Cost of Carbon; Brookings; Mar 14, 2023. International Monetary Fund website; Climate Change, Fossil Fuel Subsidies

among all companies subject to the cap. Depending on the particular system, the permits can be distributed at no cost, a set price or via auction. As the cap ratchets down, companies can meet their new, reduced cap by either reducing their emissions or purchasing emissions allowances from another firm. The firm that sells (i.e., trades) pollution allowance under its permit cannot exceed its now-reduced cap, but it has been able to turn its reduced emissions into a source of earned revenues.¹⁶¹

A very successful federally-approved cap & trade program has been in place in the US since 1990 to control sulfur dioxide emissions – the gases responsible for acid rain.¹⁶² Examples of CO₂ cap and trade systems in place include:

- The European Union ETS dates back to 2005 and primarily covers the power sector and certain heavy industries, an estimated 40% of EU emissions. The EU is working towards expansions of the system, including more aggressive emissions reduction targets, as well as the addition of new economic sectors. The EU has set an overall 2030 emissions target at a 55% reduction compared to a 1990 baseline. For sectors now under the ETS, the target is a 62% reduction by 2030 compared to a 2005 baseline.¹⁶³

As with other cap and trade systems, the EU system has, in the past, often acted more like a tax, with excessive permits and allowances rarely forcing companies against hard caps. That has changed in the past several years. Whereas the price of emissions allowances traded below €10 per metric ton of CO₂ for many years prior to early 2018, it has risen since then, trading at €90 and above for most of 2023. Many expect this general price level to hold under the 2030 emissions reduction target, as it now includes a 2.2% reduction in allowances per year.¹⁶⁴ Given its scale, and the prices it has achieved, the EU ETS is perhaps the most successful carbon pricing system currently in place.

- China, which had previously introduced eight regional cap and trade pilots, launched a nationwide system at the beginning of 2021. The nationwide and regional systems will initially operate in tandem. China's system will be limited to the power sector, covering 30% of the country's GHG emissions. Trading of allowances began in the second half of 2021, and trade for about \$10 per metric ton of CO₂ (as of August 2023). Actual emissions reductions attributable to the cap and trade system are likely to be modest in the near future.¹⁶⁵
- Regional Greenhouse Gas Initiative (RGGI) – a cap and trade program jointly administered by 12 Northeast and Mid-Atlantic US states under which CO₂ pollution permits are auctioned to power producers, who may trade them with

¹⁶¹ Environmental Defense Fund website

¹⁶² Conniff, R.; The Political History of Cap and Trade; Smithsonian Magazine; Aug 2009

¹⁶³ The World Bank; State and Trends of Carbon Pricing 2021. International Carbon Action Partnership (ICAP); EU Emissions Trading System (EU ETS); Aug 9, 2021. Khan, M. & Fleming, S.; Poland Pushes Back Over Cost of EU's Climate Targets; Financial Times; May 25, 2021. Edwardes-Evans, H.; EU ETS Reform Raises 2030 Carbon Reduction Target to 62% on 2005 Levels; S&P Global; Dec 18, 2022

¹⁶⁴ Nicholls, M.; Why European Carbon Prices Could be Higher for Good; Energy Monitor; Jun 7, 2021. ICAP; Aug 9, 2021. Trading Economics website; EU Carbon Permits

¹⁶⁵ The World Bank; State and Trends of Carbon Pricing 2021. Nogrady, B.; China Launches World's Largest Carbon Market: But is it Ambitious Enough?; Nature; Jul 20, 2021. Yin, I.; China's Compliance Carbon Price Hits Record High on Stronger Demand; S&P Global; Aug 18, 2023

other power producers within the participating states. States have used the auction proceeds to support energy efficiency and related policy objectives.¹⁶⁶ Connecticut, for instance, uses a portion of its RGGI auction proceeds to capitalize the Connecticut Green Bank.¹⁶⁷

RGGI is the first mandatory GHG reduction program in the US, with its cap in place as of 2009. The system covers an estimated 23% of regional emissions,¹⁶⁸ and the years since RGGI's introduction have coincided with a rapid shift from high-carbon fuel sources (coal and petroleum) to lower cost and lower carbon natural gas, with the result that emissions have fallen below the cap and may well have reached their current level without RGGI. As a result, the Congressional Research Service notes, the auctions have functioned more like a carbon tax. More recently, the states recalibrated the cap, starting from current actual levels, and the program is functioning more closely to the initial intention.¹⁶⁹ In RGGI's most recent auction (June 2023), bids received exceeded available emissions allowances by 1.9 times, and the median price was \$12.73/ton.¹⁷⁰ Since the program began, power sector emissions have fallen by about 50% while the regional GDP has grown, also by about 50%. Both of these figures exceed national averages. Emissions caps are set to drop by another 30% through 2030.¹⁷¹

- **Direct Pricing Systems** – This category includes, most prominently, carbon taxes and other carbon pricing schemes that do not involve a swap. Ideally, the price reflects all external costs – to the environment, to health, etc. – flowing from the use of carbon-based fuels and resources.

Carbon taxes are not necessarily, in and of themselves, sustainable financing mechanisms in that the funds raised can be used for any purpose. In the US, for instance, perhaps the most commonly proposed use of proceeds from a federal carbon tax is a direct repayment to individuals, a “carbon dividend,” something other countries have implemented. Even still, by raising the price of carbon-based resources to levels that more accurately reflect their full costs, these tax and pricing systems can trigger substantial private investment in renewable and other reduced-carbon resources.

Examples include:

- Canada has carbon pricing systems in some provinces (which may be cap and trade or a carbon tax) with a national carbon tax imposed as a back-stop where provincial systems do not exist or do not meet federal minimum standards. Under Canada's plan, the price of allowances gradually rise to \$135 USD per ton in 2030 (at current exchange rates). As of March 2023, they stood at \$48/ton. The program includes rebates to households (“Climate Action Incentive Payments”), and the government estimates that most households will receive more in rebates

¹⁶⁶ Regional Greenhouse Gas Initiative (RGGI) website

¹⁶⁷ Connecticut Dept. of Energy & Environmental Protection; Regional Greenhouse Gas Initiative; Nov 2018

¹⁶⁸ World Bank; State and Trends of Carbon Pricing 2021

¹⁶⁹ Ramseur, J.; The Regional Greenhouse Gas Initiative: Lessons Learned and Issues for Congress. Congressional Research Service; Apr 27, 2016

¹⁷⁰ RGGI website

¹⁷¹ *ibid.* Acadia Center; The Regional Greenhouse Gas Initiative: 10 Years in Review; 2019

than they pay as a result of carbon taxes.¹⁷²

- Sweden's carbon tax, in place since 1991, is one of the world's highest, currently at \$125 per ton. It was implemented as a "green tax-switch" under a broad-based tax reform generally designed to reduce the overall level of taxes. The carbon tax goes into Sweden's general fund and is not targeted towards any particular use. Sweden exempts many areas of industry and the tax covers about 40% of national emissions. Sweden's electric grid is largely powered by nuclear and hydropower, so the tax tends to cover transportation uses, including gas for cars, as well as heating for buildings. Uses covered by the EU ETS are exempted from Sweden's carbon tax.¹⁷³
- Japan's carbon tax, in place since 2012, covers 75% of emissions, but the rate is set below \$3 per ton of CO₂. It uses its revenues for efforts to mitigate climate change, including subsidies for energy conservation projects.¹⁷⁴

As countries design carbon pricing strategies to reduce emissions, they are justifiably concerned about unfair competition from industries based in countries with no or low carbon prices. It is for this reason that many countries have thus far exempted large parts of their economies from carbon taxes. The exemptions, of course, mean that those industries make little headway on carbon reductions. To address this issue, the EU has approved a tariff, a "Carbon Border Adjustment Mechanism," effectively placing a carbon tax on imports, beginning in 2026, to maintain fair competition for domestic industries that are subject to EU carbon taxes. Other countries are also considering such a border tax, and yet other countries are considering challenges to such a tax as a restraint of trade.¹⁷⁵

Carbon taxes are, of course, public levies, but there are also many private carbon pricing systems in place. CDP, based on carbon reporting data from nearly 6,000 companies throughout the world, reports that 853 companies had internal carbon prices in place in 2020, nearly six times the number from 2014, with 1159 additional companies planning on having pricing systems in place within two years. These include 226 of the world's 500 largest companies, as measured by the market capitalization. The average reported internal carbon price was \$25 per ton.¹⁷⁶

Companies cite forward-looking reasons for voluntarily creating internal carbon prices, including:

- Driving efficiencies – Many companies use a carbon price to incentivize energy efficiencies and other savings strategies.

¹⁷² World Bank; State and Trends of Carbon Pricing 2021. World Bank; Carbon Pricing Dashboard. Canada, Government of, Department of Finance Canada; Climate Action Incentive Payment Amounts for 2023-2024

¹⁷³ Jonsson, S., et. al.; Looking Back on 30 Years of Carbon Taxes in Sweden; Tax Foundation; Sep 23, 2020. Johansson, B.; Economic Instruments in Practice 1: Carbon Tax in Sweden; OECD; undated, ca. 2000. IEA; Energy Policies of IEA Countries: Sweden 2019 Review; Apr 2019. World Bank; Carbon Pricing Dashboard.

¹⁷⁴ Japan For Sustainability website; Japan Introduces New Tax on Carbon Emissions; 2013. Timperley, J.; The Carbon Brief Profile: Japan; carbonbrief.org; Jun 25, 2018. World Bank; Carbon Pricing Dashboard

¹⁷⁵ Dalton, M. & Ramkumar, A.; World's First Carbon Import Tax Approved by EU Lawmakers; Wall Street Journal; Apr 18, 2023. Scriven, Guy; May 17, 2021

¹⁷⁶ CDP; Putting a Price on Carbon: The State of Internal Carbon Pricing by Corporates Globally; 2021

- Managing risk – Companies learn where their vulnerabilities are as they manage GHG regulations or prepare for the imposition of externally mandated carbon prices. Of the reporting companies, 1,113 are already subject to some form of carbon regulation and 717 more expect such regulation within the next three years.
- Discovering opportunities – The transition to a lower carbon economy will create many business opportunities, and companies can use internal pricing to help determine where it may have advantages and to begin developing and rolling out those strategies.¹⁷⁷

Tax credits – The US federal government provides tax credits for solar and wind renewable energy installations, as it does for a wide variety of other activities it seeks to encourage (including oil and gas production). The credits provide a direct deduction against investors' federal income taxes, triggering private investment by effectively lowering the cost and increasing the return on eligible activities.

Tax credits comprise most of the cost of the climate-related sections of the US Inflation Reduction Act (IRA), enacted in 2022. The IRA's initially announced total of \$369 billion related to climate includes an estimate of \$270 billion in tax credits for a variety of uses over a 10-year period (ending in 2032).¹⁷⁸ These figures are estimates because all qualifying activities will trigger a tax credit, with no dollar limit to the qualifying activities. In fact, since the IRA was passed, its provisions have triggered a greater response than expected. That is, there is more climate-positive investment initiated than expected. In the first year after the law was enacted, 272 new clean energy projects were announced, including:

- 91 new battery manufacturing projects;
- 65 new or expanded electric vehicle (EV) manufacturing facilities; and
- 84 wind and solar manufacturing projects.

These 272 projects are estimated to require an investment of \$278 billion while creating 170,000 jobs,¹⁷⁹ and very roughly speaking, generating about \$80 billion in tax credits for the investors. Based on the scale and speed of the private sector response to the IRA's incentives, Goldman Sachs has estimated that the law will induce clean energy investment of \$3 trillion over 10 years, qualifying for \$1.2 trillion in tax credits, and leading towards \$11 trillion in clean energy investment by 2050 in the US. The Goldman study projects that the US power generation will be 80% renewable by 2050.¹⁸⁰

Tax credit programs are often kept on rather short authorization leases. Congress approves them with a sunset date, and tends to provide short-term renewals (such as three years), with industry interest groups lobbying for longer extensions and higher credit values. In that respect, the IRA is unusual, with its 10-year authorization, and that

¹⁷⁷ *ibid*

¹⁷⁸ U.S. Dept. of the Treasury; Treasury Announces Guidance on Inflation Reduction Act's Strong Labor Protections; Press Release; Nov 29, 2022.

¹⁷⁹ Perkins, H. & Aston, A.; It's the IRA's First Birthday. Here Are Five Areas Where Progress Is Piling Up; Rocky Mountain institute; Aug 16, 2023.

¹⁸⁰ Goldman Sachs; The US is Poised for an Energy Revolution; Apr 17, 2023

potential window of investment stability may account for some of the enthusiasm with which investors are taking advantage of its provisions.

The IRA includes tax credits for solar, wind, EVs, energy storage, bio-energy, clean hydrogen and carbon capture.¹⁸¹ Beyond combatting climate change, the federal government also uses tax credits to support other types of sustainable investment:

- *Investment in communities with high poverty and unemployment.* The IRA includes a bonus tax credit for investment in what are termed “Energy Communities.” Energy Communities are areas where jobs and the tax base have been tied to fossil fuel production, and may suffer higher unemployment as a result of the transition to renewables.¹⁸² An entirely different tax credit, the New Markets Tax Credit (NMTC) provides credits for investment in low-income census tracts. The credits are awarded on a competitive basis, with a heavy emphasis on job creation and community benefit. The NMTC is used by community development financial institutions (CDFIs), commercial banks and others to effectively bring down the cost of investment. It is used for a range of uses, including the development of retail, office and manufacturing facilities, as well as community facilities, such as health centers and charter schools. Per the US Treasury Department, the NMTC program has generated \$8 of private investment for every \$1 of tax forgiveness.¹⁸³
- *Production of low-income housing.* The Low-income Housing Tax Credit (LIHTC) can offset up to approximately 70% of the cost of a rental housing development. In return for receiving the credit, rents must be kept, for at least 15 years, at levels affordable to lower income households. There are differing formulas, but generally at least 40% of the tenants must have income upon occupancy at no more than 60% of the area median income. LIHTC has been the primary subsidy for the production of affordable rental housing in the US since the 1990s, supporting the production of over two million units.¹⁸⁴

The Energy Community concept in the IRA bears similarities to the EU’s “Just Transition Mechanism,” a plan of public and private investment to address the social and economic effects of the transition to a low-carbon economy.¹⁸⁵ There are millions of households throughout the world whose livelihoods depend on fossil fuel production and use, and these provisions are intended to help support those families and communities in the transition. In addition, it’s important to note that just as many models show greater economic growth in a net-zero world, so they suggest growth in jobs. The World Economic Forum estimates the transition will generate over 10 million new jobs globally by 2030, more than offsetting 2 million plus jobs lost in the fossil fuel sector. The International Labour Organization puts the figures at 18 million gained by 2030, offsetting 6 million fossil fuel industry jobs lost.¹⁸⁶ The counterbalance to this good news

¹⁸¹ ibid

¹⁸² U.S. Dept. of the Treasury; U.S. Department of the Treasury, IRS Release Updated Guidance to Drive Additional Investment to Energy Communities; Jun 15, 2023

¹⁸³ Novogradac; New Markets Tax Credit Resource Center; Tax Policy Center; What is the New Markets Tax Credit, and How Does it Work?. US Department of the Treasury, CDFI Fund; New Markets Tax Credit Fact Sheet

¹⁸⁴ Novogradac; Affordable Housing Resource Center, About the LIHTC; Tax Policy Center; What is the Low-Income Housing Tax Credit, and How Does it Work?

¹⁸⁵ European Commission; The Just Transition Mechanism: Making Sure No One is Left Behind; Jan 2020

¹⁸⁶ World Economic Forum; How Many Jobs Could the Clean Energy Transition Create?; Mar 25, 2022.

is that those losing their jobs won't necessarily be getting the new jobs, and their interests and potential losses create a powerful and continuing constituency for business as usual. All of this highlights the critical importance of the Energy Community and Just Transition concepts as part of a successful energy transition strategy.

Guarantees & Loan Programs – The U.S. Department of Energy (DOE) has large-scale loan and loan guarantee programs, with a \$35 billion portfolio (as of FY2022). The IRA is enabling a substantial increase in the DOE investment programs, with \$11.6 billion in direct funding to serve as credit support (loan loss reserves, essentially) for approximately \$400 billion in new loan and loan guarantee authority. The loans and guarantees can support “clean energy deployment and energy infrastructure reinvestment” to reduce GHG emissions and air pollution. The typical loan and/or guarantee amount is \$100 million or greater.¹⁸⁷

The DOE reports that the existing portfolio has created more than \$50 billion in total investment in clean energy projects while generating \$500 million in surplus revenues above program costs. The program provided \$465 million to Tesla in 2010, enabling it to open its first factory. Nonetheless, the program may have become most widely known through a \$535 million loss when it guaranteed a loan to Solyndra, a solar power firm that shuttered in 2011. Because of that controversy, the program was essentially dormant from 2011 to 2021, approving only a single loan, a single guarantee and largely limiting its activities to servicing the existing portfolio. Despite the Solyndra loss, the program reports overall losses at 3% of total volume, a reasonably low figure for a program of this type (n.b., this loss factor corresponds to the reserves supporting DOE's expanded loan and guarantee authorization under the IRA). DOE reports that the program has been generating surpluses since 2014.¹⁸⁸

The program's current director describes the DOE's financing program as “a bridge to bankability for technologies that can have a big impact,” with the program serving “as a jumping off point for commercial lenders to come in...”¹⁸⁹ In June 2023, DOE approved a \$9.2 billion loan to a Ford Motor joint venture to build three EV battery factories in Tennessee and Kentucky.¹⁹⁰

A number of states and localities have created Green Banks for investment in clean energy and similar projects. Green Banks often follow a public/private model, with public funds used to leverage larger amounts of private investment. The American Green Bank Consortium reports total investment of \$14.8 billion by its members since 2011, including \$4.6 billion in 2022 alone. In addition to state and local green banks, the consortium includes credit unions and community development financial institutions (CDFIs). With support from Inflation Reduction Act (IRA) funding, Green Bank Consortium members expect to increase their lending yet further. The IRA includes a \$27 billion Greenhouse

World Resources Institute; Just Transition and Equitable Climate Action Resource Center; About Just Transitions page

¹⁸⁷ Dept. of Energy; Loan Programs Office (DOE LPO); Financing Programs. DOE LPO; Portfolio

¹⁸⁸ US Department of Energy Loan Programs Office website. Doom, J.; U.S. Expects \$5 Billion From Program That Funded Solyndra; Bloomberg; Nov 12, 2014; Wolff, E.; DOE's First Task for Loan Guarantees: Calming Industry Nerves; Politico; Mar 17, 2021

¹⁸⁹ Wolff, E.; Mar 17, 2021. Henner, N.; How Could DOE's \$40B Loans Program Fund Efficiency? The New Director has These Ideas; American Council for an Energy-Efficient Economy (ACEEE); May 11, 2021

¹⁹⁰ Rathi, A.; Ford Gets \$9.2 Billion to Help US Catch Up With China's EV Dominance; Bloomberg Green; Jun22, 2023

Gas Reduction Fund, to be distributed on a competitive basis, and designed to mobilize greater amounts of private capital. To date, Consortium members report \$2.54 of private capital invested for each \$1.00 of public funding.¹⁹¹

Water Quality and Habitat Preservation Trading Systems – Regulatory structures can create markets by placing limits on pollutants and environmental damage while allowing flexibility on methods used to meet the limits. Cap and trade is the most prominent example of this, but the model has variants.

In each example, one party purchases credits conferring a right or license to alter or degrade an environment within limits, with the purchase price going to a second party which uses the funds to create an offsetting environmental benefit and receive a return. Each program intends to create no net environmental loss (or, ideally, a net environmental benefit), while creating economic benefits for participants.

Examples include:

- **Mitigation banking and conservation banking** – These programs are designed to restore, create and/or preserve habitat, with mitigation banking focused on wetlands and aquatic resources and conservation banking focused on habitat needs of endangered species. In each case, the “bank” refers to physical property protected from development and managed to preserve the intended environmental benefit. In return, the owners of the property receive credits they can sell to a second party developing property elsewhere that has triggered a need for mitigation. The programs, therefore, create financial incentives for owners of substantial and environmentally significant properties to keep those properties intact.¹⁹² The US Fish and Wildlife Service (FWS), which administers conservation banking credits, reports the establishment of more than 130 conservation banks conserving 142,000 acres of habitat protecting over 70 threatened or endangered species.¹⁹³

As compared to emissions cap and trade systems, which can scale essentially immediately, with known parties and directly measurable emissions, mitigation and conservation banking have a series of impediments to scale, including a lack of publicly available market data, variable levels of demand for credits and the inherent lack of certainty with regard to the scale of mitigation required. These create uncertainties with the timing of approval processes on both the development and mitigation sides of the transaction.¹⁹⁴

- **Stormwater credits** – To reduce pollution of local rivers and streams and to protect the Chesapeake Bay Watershed, the District of Columbia (DC) in 2013 established a rule in which real estate development or redevelopment in excess of 5,000 square feet triggers stormwater retention requirements, at least 50% of which must be provided on-site. Owners can meet the remaining requirement by purchasing privately traded Stormwater Retention Credits from other sites or paying a fee to the

¹⁹¹ Coalition for Green Capital; Green Banks in the United States: 2022 U.S. Green Bank Annual Report. US Environmental Protection Agency (EPA); Greenhouse Gas Reduction Fund

¹⁹² US Fish & Wildlife Service website, Conservation Banking, Incentives for Stewardship; US Environmental Protection Agency website, Mitigation Banking Factsheet

¹⁹³ US Fish & Wildlife Service website; Endangered Species; For Landowners, Conservation Banking

¹⁹⁴ Hook, P. & Shadle, S.; Navigating Wetland Mitigation Markets: A Study of Risks Facing Entrepreneurs and Regulators; Convention on Biological Diversity website; Dec 2013

District Department of Energy and Environment. The District places the fees into a special fund used to build green infrastructure to retain runoff.¹⁹⁵

Though modest in size, the program is growing steadily. Through FY 2019, the Retention Credit trading program has approved 105 sites, many of which are still in various stages of development. The District reports that sites now in use have capacity to retain over 350,000 gallons per year. Although this is small relative to the estimated 2.5 billion gallons of untreated overflow, a Department spokesman estimated that new retention volume is increasing 10 times faster under the new program compared to historical volume growth.¹⁹⁶

To fuel the market for a Stormwater Retention Credit Trading Program, the Nature Conservancy (TNC), Encourage Capital and Prudential Financial created a \$1.7 million fund to build green infrastructure to create credits that can then be sold to developers of sites that need credits to meet retention requirements.¹⁹⁷

Though modest in size, this program appears readily replicable in the growing number of jurisdictions creating stormwater retention programs as a strategy to clean local waterways and maintain clean water supplies. Grand Rapids, Michigan and Chattanooga, Tennessee are developing similar programs.¹⁹⁸ TNC identifies stormwater runoff as the world's fastest growing source of water pollution.¹⁹⁹

The model is also applicable to other types of pollution and demonstrates the kind of private market that can be created once a governing jurisdiction places a limit on a particular source or type of pollution. It can also be seen as a combination of cap & trade plus a pollution-related tax.

PACE - Property-assessed clean energy (PACE) programs provide financings for real property improvements to conserve energy and water. PACE financings, which require enabling state and/or local legislation, are secured by the property and repaid via an assessment added to the property tax bill. Should the owner sell the property, the assessment stays with the property and becomes the responsibility of the new owner. PACE programs are currently available in 30 states, plus the District of Columbia. In most states, PACE is limited to commercial properties, though it is also approved for residential properties in California, Florida and Missouri. Enabling legislation to expand the practice is pending in other states.²⁰⁰

PACE programs are designed to overcome a particular and significant barrier to energy and water efficiency investment – owners do not know if they will own a property long enough to recoup the costs of the efficiency installations. That is, energy and water cost

¹⁹⁵ Branosky, E.; From Grey to Green: Stormwater Trading in Washington D.C. River Voices; The River Network; July 2015

¹⁹⁶ District Of Columbia, Department of Energy and Environment; Stormwater Retention Credit Program Fiscal Year 2019 Summary Report; February 10, 2021. Quantified Ventures website; DC Water: First Ever Environmental Impact Bond. Metropolitan Planning Council website; Stormwater Credit Trading: Lessons from Washington D.C.; Jan 23, 2019

¹⁹⁷ The Nature Conservancy; New Investment Model for Green Infrastructure to Help Protect Chesapeake Bay; Mar 7, 2016

¹⁹⁸ Friedrich, K.; Stormwater Credits in D.C. Could Provide a Blueprint for Other Cities; Conservation Finance Network; Jun 6, 2016. Stormwater Currency; Establishing a Stormwater Volume Credit Trading Program; Sep 2019

¹⁹⁹ The Nature Conservancy; March 7, 2016

²⁰⁰ PACE Nation website, the PACE trade association

savings should exceed the PACE-related property tax increment, and property owners should therefore realize immediate monthly savings. The full costs of the efficiency project, however, take some years to fully recoup. Under PACE, if the owner sells the property, any remaining project costs are transferred to the new owner. In this way, the new owner picks up right where the previous owner left off, benefiting from the continued energy cost savings, but shouldering the remaining project costs.

It is important to note that the level of cost savings from efficiency installations is highly dependent on the quality of the installation. Homeowners seldom have experience with this kind of project and are sometimes victims of shoddy work, leaving them saddled with the cost of the project but inadequate energy savings to cover the cost. In 2020, Los Angeles County discontinued its residential PACE program, concluding that it “could not provide sufficient protection for all consumers.” Similar problems are reported in the Florida and Missouri residential programs. These kinds of problems are not generally associated with commercial properties, which are professionally owned and managed.²⁰¹

The PACE trade association reports over \$13 billion in efficiency investments in 344,000 homes and 3,100 commercial properties.²⁰²

²⁰¹ National Consumer Law Center; Los Angeles County Ends PACE Program Marred by Fraud, Abuse, and Unaffordable Loans; May 20, 2020. Jochim, V.; Are PACE Commercial Loans in Florida Risky or Worthwhile; Fiscal Rangers; Dec 18, 2020. Kohler, J. & Coryne, H.; State-Supported “Clean Energy” Loans Are Putting Borrowers at Risk of Losing Their Homes; Pro Publica; Apr 23, 2021

²⁰² PACE Nation website; PACE Market Data

Public/Private Partnerships

Public policy frames, in some respect, virtually all the financing activities described above. Regulations and limits are set, and private activity flows within the established framework. There are a number of areas, however, where the public and private sectors work much more directly in partnership to craft program initiatives that drive individual transactions.²⁰³

In these situations, the partnership typically includes the public sector working with the private non-profit and the private for-profit sectors. Often, the goal is to test and prove a model or framework that can be spun off and replicated at scale, with a reduced public sector role. Sometimes the nature of the problem is such that, even within a framework, the public sector retains a central role in each transaction.

The financing model generally places the public sector in the role of grantor or guarantor, taking the highest level of financial risk. The non-profit, which is often the advocating force behind the transaction, might provide a middle tier of funding, which could be on concessionary or market terms, and the private sector provides market rate financing in amounts appropriate to the debt-carrying level of the project.

Examples of public/private partnerships include:

- **Community Development Financial Institutions (CDFIs)**²⁰⁴ – CDFIs are investment organizations in the US that direct at least 60% of their investment, and often much more, into low-income communities. The investment is designed to trigger development without displacement, i.e., to improve communities for the benefit of the people living there. CDFIs are certified and monitored by the US Treasury Department. In addition to placing beneficial investments in low-income communities, CDFIs must have representatives of the communities they serve on their governing or advisory boards. Many CDFIs are non-profit entities.

CDFIs use a blended finance, partnership model designed to combine private sector investment discipline while stretching limited public and philanthropic dollars. CDFIs' investment partners include commercial lenders, tax credit equity investors, foundations, municipal bond investors, public agencies, as well as other CDFIs. Bringing together these various partners, with their varying risk tolerances, enables CDFIs to address the different hurdles encountered at different stages in the life of the projects they finance.

Affordable housing is a major focus of the CDFI sector. Additional areas of investment include small businesses, health care facilities and smaller-scale manufacturing. The goal is to create opportunity in communities that have long suffered from disinvestment.

There are nearly 1,500 certified CDFIs, based in all 50 states, managing assets in

²⁰³ In contrast to public loan programs, where the public and private entities are often on opposite sides of each transaction, in partnerships they are typically working together, effectively on the same side of the transaction.

²⁰⁴ The author has professional consulting engagements with multiple CDFIs.

excess of \$450 billion.²⁰⁵ Individual CDFIs serve markets ranging from hyperlocal (a portion of a single city) to nationwide, with assets similarly ranging from the low six figures to several billion. CDFIs can also be important partners in developing policy. As one example, Enterprise, a Maryland-based CDFI with a national market, has developed “Green Community Standards,” which are required or promoted by housing agencies in 31 states, plus DC, bringing green features to affordable housing.²⁰⁶

- **Debt for Nature Swaps** – Debt for nature swaps involve the forgiveness of sovereign debt in exchange for conservation activities. That is, the country whose debt is forgiven must use a portion of its savings for conservation and activities. An NGO is typically involved, coordinating the effort, often raising additional funds for the conservation efforts and assisting in establishing the governance and monitoring protocols for the conservancy area. The swaps involve a country with substantial intact natural resources, as well as substantial sovereign debt, plus budget pressures – and therefore some doubt as to the ability of the country to repay its debt. The International Monetary Fund (IMF) projects that, of 59 developing countries most subject to climate change, 34 are also at risk of fiscal crises.²⁰⁷ These countries are excellent debt for nature candidates.

The US has concluded 20 agreements with 14 countries through the Tropical Forest and Coral Reef Conservation Act, though its authority has currently lapsed.²⁰⁸ Swaps can also be negotiated with the World Bank and other multilateral development banks, as well as with private lenders. Examples include:

- The Nature Conservancy (TNC) has negotiated a series of such swaps, and has recently built on the model using funds from impact investors, enabling more conservation activities. It has raised \$15 million in impact capital loans plus \$5 million in grants to retire Seychelles government debt. Seychelles is using the savings from its more manageable debt to protect marine areas from commercial fishing and oil exploration. The Seychelles sanctuary is about 158,000 square miles (roughly twice the size of Kansas), and comprises 30% of Seychelles’ water.²⁰⁹
- TNC also worked with Belize to use \$364 million in new, lower-cost debt to retire \$554 million in outstanding sovereign debt. The new debt is partly guaranteed by the US International Development Finance Corporation, helping reduce the interest rate. Belize will use 42% of the debt service savings to support an increase in its protected marine area from 15.9% to

²⁰⁵ Scott, J., et al.; Sizing the CDFI Market: Understanding Industry Growth; Federal Reserve Bank of NY; August 2023

²⁰⁶ Enterprise Community Partners; Green Communities

²⁰⁷ Georgieva, K., et al.; Swapping Debt for Climate or Nature Pledges Can Help Fund Resilience; IMF Blog; Dec 14, 2022

²⁰⁸ USAID website. Financing Forest Conservation: An Overview of the Tropical Forest and Coral Reef Conservation Act. Sheikh, P. A.; Debt-for-Nature Initiatives and the Tropical Forest Conservation Act (TFCA): Status and Implementation; Congressional Research Service; Jul 24, 2018

²⁰⁹ NatureVest website. Thande, George; Seychelles Preserves Swathes of Marie Territory in Debt-for-Nature Deal; Reuters; Feb 22, 2018. Williams, T.; Why Conservation Donors Get Behind Debt-For-Nature Deals; Inside Philanthropy; Feb 26, 2018. The Nature Conservancy website; Seychelles Hits 30% Marine Protection Target After Pioneering Debt Restructuring Deal; Mar 26, 2020

30% of its coastline.²¹⁰

- Ecuador, in 2023, completed the largest debt for nature swap to date – issuing \$656 million of new debt to retire \$1.6 billion of old debt. That is, the old debt traded at about 40% of face value due to concerns of default. The new debt includes a partial guarantee from the US Inter-American Development Bank and political risk insurance from the US Development Finance Corporation. It will reduce Ecuador’s debt service obligation by \$1.1 billion. In return, Ecuador will spend \$323 million over the next 18 years to protect the Galapagos Islands and surrounding waters.²¹¹

A Barclays analysis puts the potential debt for nature swap market at \$800 billion and emphasizes the need for monitoring to assure that the nature benefits are delivered over time.²¹²

- **Pay for Success Financing** – This is a type of outcome-based or performance-based contracting in which an investor funds an intervention to solve a costly problem. The investor’s return is based on the degree of success (and cost reduction) achieved by the intervention. Pay for Success (PFS) financing is also referred to as Social Impact Bond (SIB) financing. Despite that name, this structure is generally not an actual “bond financing” as the term is understood in the financial sector.

PFS is designed for situations where an entity, typically a public agency, is stuck in a cycle where it is obligated to direct substantial resources to pay for the high costs of some type of problem and may not have adequate resources for solutions. Often, as an agency or jurisdiction is allocating budget resources, which are always constrained, it is guided by the certainty of its obligation to pay for the consequences of the problem and the certainty of the costs of interventions versus the uncertainty as to when and to what degree a preventive intervention may be effective.

PFS tries to break this cycle by bringing in private investors to fund the intervention. To the extent that the intervention is successful and yields savings, the agency pays the investor for the cost of the intervention, plus a return on the investment. Initial PFS contracts were clustered in social services, such as funding interventions to reduce criminal recidivism, improve job training and provide early childhood supports to reduce the need for special education. Results have been mixed.²¹³ The model is now also being used for environmental sustainability-related transactions:

- The Stormwater Retention Credit trading system discussed above is not the District of Columbia’s only market-oriented pollution control experiment. In 2016, DC issued a \$25 million Environmental Impact Bond (EIB) with a PFS design, to fund the construction of green infrastructure to reduce combined sewer overflows into Rock Creek. A successful green infrastructure program will enable the DC Water Authority to reduce the scope and cost of grey infrastructure tunneling and

²¹⁰ The Nature Conservancy; Case Study: Belize Blue Bonds for Ocean Conservation; 2022. Berwald, J.; Financing a Healthy Future for Coral Reefs; Wall Street Journal; Apr 14, 2022

²¹¹ Einhorn, C.; Ecuador Strikes a Landmark Deal to Protect the Galápagos, and Save Cash; NY Times; May 9, 2023. Inter-American Development Bank; Ecuador Completes World’s Largest Debt-for-Nature Conversion with IDB and DFC Support; New Release; May 9, 2023

²¹² White, N.; Barclays Sees Real Greenwashing Risk in ESG Debt-Swap Market; Bloomberg; Jan 23, 2023

²¹³ Archer-Rosenthal, D.; Pay for Success: The First Generation; Nonprofit Finance Fund; Apr 2016

storage projects currently estimated at \$2.6 billion.²¹⁴

Under the EIB, return to investors depends on the degree to which the green infrastructure successfully meets design expectations and captures rainwater, thereby reducing runoff that is the main source of sewage overflows. The EIB evaluation was completed in May, 2021 and found that the infrastructure successfully retained runoff at expected levels. The investors' return is therefore at a normal market rate. Had the infrastructure performed outside the expected range, investors would have received a financial bonus or penalty.²¹⁵

The concept has attracted several additional cities. The Atlanta Department of Watershed Management issued a similarly structured \$14 million EIB in 2019, funding the construction of green infrastructure to reduce storm water runoff and protect water quality. In June 2021, the Buffalo, NY Sewer Authority issued a \$54 million green infrastructure EIB, the largest such issue to date. Other cities that have closed green infrastructure EIBs include Hampton, VA and New Orleans. The EIBs tend to have a job creation component as well, with a certain percentage of the workforce needed to build the green infrastructure going to local residents.²¹⁶

- A second sustainability-related PFS structure, called a Forest Resilience Bond (FRB), is related to an agency that is too busy putting out fires, literally, to work on prevention – the US Forest Service, which is “trapped in a vicious cycle of paying for today’s fires by borrowing funds intended to prevent tomorrow’s.”²¹⁷ The first FRB, for \$4.6 million, closed in 2018. It is funding forest management services over 15,000 acres in the North Yuba River watershed in Tahoe National Forest designed to reduce burn severity and increase rainwater capture for local water districts. The return to investors is intended to come from savings from reduced fire-fighting costs and from increased revenues from water districts. Initial investors include an insurance company, along with NGOs and foundations. Repayment will come from the Yuba Water Agency and the California Department of Forestry and Fire Protection.²¹⁸

Participants have been pleased with the results, including improved water quality, and the first FRB has been followed by a second \$25 million FRB to fund management of 48,000 acres of adjoining California forest, as well as an FRB to

²¹⁴ Lisle, J.; DC Water Awarded Grant from Harvard University to Develop Innovative Green Infrastructure Financing Model; DC Water and Sewer Authority website; Mar 12, 2015

²¹⁵ Glazier, K.; D.C.'s Social Impact Bond Deal Will Fund Infrastructure; The Bond Buyer; Sept 2, 2016. Goldman Sachs, DC Water, Calvert Foundation; Fact Sheet: DC Water Environmental Impact Bond; 2016.

²¹⁶ Water Finance & Management; Atlanta DWM completes first publicly-issued Environmental Impact Bond; Mar 4, 2019. Quantified Ventures website; Buffalo Sewer Authority Issues Largest-Ever U.S. Environmental Impact Bond; Jun 22, 2021. Goldman Sachs website; Fact Sheet: DC Water Environmental Impact Bond.

Thompson, A. Environmental Impact Bonds: Where are They Now?; University of North Carolina, School of Government, Environmental Finance Center; Jul 2, 2020. DC Water website; DC Water's Pioneering Environmental impact Bond a Success; May 27, 2021. Hampton, VA, City of; Hampton Called “A National Leader” At Groundbreaking For Lake Hampton Resiliency Project; Press Release; Aug 18, 2023

²¹⁷ Madsbjerg, S.; Connaker, A.; Fighting Wildfire with Finance; The Rockefeller Foundation website; Oct 15, 2015

²¹⁸ Blue Forest Conservation & World Resources Institute; Forest Resilience Bond to Help Fund \$4.6 Million Restoration Project to Mitigate Wildfire Risk in Tahoe National Forest; Nov 1, 2018

protect 79,000 acres in the Rogue Valley of southern Oregon.²¹⁹

Outcomes-based, pay for success financing is being tried in a variety of additional settings. Examples include regenerative agriculture; early childhood support systems; job creation in Baltimore via salvaging useable lumber from abandoned row houses and black rhino conservation to build tourism and local jobs in South Africa.²²⁰

In each case, it requires an intervention, largely funded by investors, and a party that can not only benefit, but also capture that benefit financially, in the form of reduced costs or increased revenues, thereby creating a revenue stream to reimburse investors.

Conservation Finance – Whereas regulatory schemes are typically designed to put a price on pollution, the flip side is creating systems to recognize the value of healthy ecosystems in the first place. This would be conservation finance – investing in ecosystems to conserve them for the long term²²¹ – driving towards a “nature-positive economy.”

The University of Cambridge defines a nature-positive economy as one in which “public and private sector actors through choice and incentive take action at scale to reduce and remove the drivers and pressures fueling the degradation of nature, actively improving the state of nature (natural capital) and the ecosystem services it provides.” Natural capital is defined as the “stock of renewable and non-renewable resources (e.g. plants, animals, soils, minerals, ecosystems) that combine to yield a flow of benefits to people, referred to as ecosystem services.”²²² Moody’s notes that natural capital assets are “essential for human habitation and economic activity.”²²³

The World Economic Forum (WEF) estimates that more than half of global gross domestic product (GDP) is highly or moderately dependent on nature. Meanwhile, an international network of scientists estimate that natural ecosystems have declined by 47% on average, and the global rate of species extinction is tens to hundreds of times higher than the average rate over the past 10 million years. Accordingly, the WEF categorizes biodiversity loss and ecosystem collapse as not only an “existential risk” in terms of potential impact, but also one of the highest global risks at this time, due the likelihood of high impact loss over the next five to ten years.²²⁴

²¹⁹ World Resources institute; New Forest Resilience Bond will Finance \$25 Million of Restoration to Reduce Wildfire Risk on the Tahoe National Forest in California; Press Release; Oct 26, 2021. Blue Forest website; Rogue Valley | FRB

²²⁰ Quantified Ventures website; Case Studies. The World Bank; Wildlife Conservation Bond Boosts South Africa’s Efforts to Protect Black Rhinos and Support Local Communities; Press Release; Mar 23, 2022. Social Finance website; Our Work

²²¹ Huwyler, F. et al.; Making Conservation Finance Investable; Stanford Social Innovation Review; Jan 21, 2014

²²² Cambridge, University of; Institute for Sustainability Leadership; Handbook for nature-related financial risks: key concepts and a framework for identification; 2021. Capitals Coalition website; The Capitals Approach

²²³ Moody’s Investor Service; Moody’s - \$2.1 Trillion of Rated Debt Highly Exposed to Natural Capital Impact or Dependency; Jun 16, 2021

²²⁴ World Economic Forum (WEF); Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy; Jan 2020. Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services; Global Assessment Report; 2019. WEF; The Global Risks Report; 2021.

A 2021 Moody's report brings this analysis to the level of individual companies, and finds that companies with \$2.1 trillion in outstanding debt, including all extractive industries, face high or very high "natural capital risk." Additional sectors with \$8.3 trillion in debt, such as homebuilding and apparel, face moderate exposure, which could increase to high exposure under more strict regulatory regimes designed to promote sustainability and conserve resources for future generations. Moody's analyzes natural capital risk based on companies' dependency on natural capital, as well as the companies' impact on natural capital, plus their exposure to reputational risk should they be perceived as, for instance, exploitative and/or contributing to biodiversity loss.²²⁵

Given the risks, a global consortium of NGOs, major financial institutions and technical experts have convened a Taskforce on Nature-related Financial Disclosures (TFND), created on the model of the Task Force on Climate-related Financial Disclosures (TCFD). The TFND is intended to enable companies to understand their impacts and dependencies on nature, and therefore their exposure to nature-related financial risks. The data will also inform other financial market actors, including regulators, lenders and rating agencies. The Finance Ministers of the G7 have endorsed the TFND effort, and the TFND released a disclosure framework, labeled a "final draft," in 2023.²²⁶

Just as the TFND takes the TCFD as a model, so we can expect any movement towards a nature-positive economy to mirror efforts towards a zero-carbon, climate-positive economy. Specifically, many companies that profitably exploit natural resources without particular regard to future consequences will continue to do so as long as they are able. The TFND framework can nonetheless successfully guide capital towards more nature-positive uses if the framework and the data it produces are embraced by regulators, rating agencies, insurance companies, investors and responsible companies with a long-term outlook.

Is such a paradigm shift possible? The WEF puts it succinctly: "Nature is declining at an unprecedented rate," and "[t]here is no future for business as usual."²²⁷ And the WEF sees enormous opportunity in a nature-positive economy – the potential for \$10 trillion in annual revenues and savings and 395 million jobs by 2030, as compared to business as usual. They estimate the investment need at \$2.7 trillion.²²⁸

Nonetheless, business as usual has proven itself to be extremely resilient in setting after setting, and the kind of opportunity the WEF posits will only be possible within a regulatory framework that creates the boundaries, incentives and penalties needed to shift corporate behavior towards nature-positive growth. That is, the roadmap to a nature-positive economy includes the kinds of regulatory activity we have seen elsewhere. Specifically, legal caps are set at limits designed to enable sustainable use of resources, creating shortfalls in availability relative to unregulated use and thereby creating value that can attract investment and shift behavior and practices.

In the meantime, we have smaller-scale efforts, often within the context of a public/private partnership, such as the debt for nature swaps described above. The

²²⁵ Moody's; Jun 16, 2021

²²⁶ Taskforce on Nature-Related Financial Disclosures website.

²²⁷ WEF; The Future of Nature and Business; 2020

²²⁸ *ibid*

World Wildlife Fund (WWF) has catalogued a series of additional such mechanisms,²²⁹ including:

- Payments for watershed services, with payments for water use leveraged to maintain and restore water quality and watershed habitat. A locally prominent example is the substantial investments the City of New York, often working with private landowners, has made to maintain clean watersheds for its reservoirs and avoid far larger costs associated with after-the-fact clean up.
- Revenue from tourism and recreation, such as park entry fees and hunting licenses (eco-tourism).
- Bio-prospecting, where a corporation, such as a pharmaceutical company, makes payments to be able to search for and extract compounds from the flora of a given region. The payments are used to preserve the biodiversity of the region.
- Micro-finance, WWF cites informal Village Savings and Loan Associations in Kenya and Tanzania, where members make loans to each other for projects promoting health, education and environmental sustainability.

Can conservation finance scale up to a level supporting a nature-positive economy? There is investment appetite, but the limiting constraint is a lack of investable projects with both conservation benefits and clear risk-return profiles.²³⁰ And as long as there is a clear financial return produced by exploiting natural resources, but no such clear return on the preservation of clean water and bio-diversity, huge obstacles to the development of nature-positive business opportunities will remain.

WWF et al. identify policy leadership as the key to unlocking conservation finance markets by using regulation to create value in otherwise “non-marketable” conservation benefits (as seen in cap and trade and posited for stormwater credits). “If both conservation and financial benefits are clear and cost-effectively measurable, the associated cash flows have the potential to be scaled up. With scale ... risk can be pooled in a portfolio of projects across countries or across asset types.” In the meantime, there is a continuing need for public and philanthropic investment, particularly as credit enhancement to induce private investment until the risks of this class of investment are better understood.²³¹

Carbon Offsets via Avoided Deforestation – Although deforestation and habitat loss remain a significant problem and threat, it is also true that avoided deforestation has achieved a level of scale as a carbon offset strategy. REDD+ (Reducing Emissions from Deforestation and Forest Degradation) is a prominent framework created under the UN in 2005 and designed to place a monetary value on carbon stored in forests and thereby create incentives for developing countries to protect forest systems. Countries and companies can purchase REDD credits to offset their carbon emissions, with the purchase price intended to support forest conservation. The FAO reports 9 billion tons of CO₂ emissions reductions in 13 countries via the REDD+ program from 2006 to 2018.

²²⁹ World Wildlife Fund; Guide to Conservation Finance; 2009

²³⁰ This point was made repeatedly in #EcoFinanceChat reported in Grady, B. (May 16, 2016)

²³¹ Huwylar, F., et al.; Conservation Finance: Moving Beyond Donor Funding Toward an Investor-Driven Approach; Credit Suisse, World Wildlife Fund & McKinsey; 2014

90% of those reductions are in Brazil.²³² When companies report “net” carbon emissions, they are often using carbon credits they have purchased, such as REDD+ credits, as a deduction from their actual emissions.

While preserving existing forests and increasing forestation are very important elements of any climate strategy (and have numerous co-benefits, such as biodiversity and habitat preservation), it is debatable whether they can also serve as offsets for inclusion in corporate or national net zero strategies. In fact, many argue that they typically cannot. A 2023 study found that only 6% of the reported REDD+ offsets accurately represented additional carbon reductions. A study of California’s forest credit system found no increase in carbon capture above the baseline.²³³

In theory, carbon captured by a specific area of forest can be reasonably estimated and, when a company purchases the credits associated with that forest, that level of carbon can be deducted from the company’s emissions to find a net emissions figure. But successful offset strategies face a series of hurdles. Most important, there must be additionality – they must capture carbon that wouldn’t otherwise have been captured. For instance, preserving existing forest adds zero carbon capture to the equation. Saving a tract of forest that would have been cleared can capture and store carbon that wouldn’t have been captured, but there is no additionality if it simply displaces the logging and deforestation to a different location (which is what the REDD+ and California studies found happening). New forest, meanwhile, takes many years to reach significant levels of carbon capture.

Even assuming that all the math is right and all the pledged offsets would be new and additional, is there enough available arable land on earth to accommodate all that forest? Maybe not. One study suggests that the offset pledge of a single oil company (Eni SpA, based in Italy) would take 6% of the earth’s forest carbon-capture capacity.²³⁴ SBTi takes a skeptical view of avoided emissions and does not count them or purchased offsets towards companies’ net zero targets.²³⁵

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²³² NatureVest; EKO; Investing in Conservation; 2014. Food and Agriculture Organization of The United Nations (FAO); From reference levels to results reporting: REDD+ under the United Nations Framework Convention on Climate Change 2020 update; 2020

²³³ Yeung, P.; REDD+ Carbon and Deforestation Cuts in Amazon Overestimated: Study; Mongabay; Nov 2, 2020. Elgin, B.; A Top U.S. Seller of Carbon Offsets Starts Investigating Its Own Projects; Bloomberg Green; Apr 5, 2021. West, T.A.P. et al.; Aug 23, 2023. Coffield, S. & Randerson, J.; Dec 1, 2022

²³⁴ Mackenzie, K.; Big Oil’s Net-Zero Plans Show the Hard Limits of Carbon Offsets; Bloomberg Green; Mar 1, 2021

²³⁵ Science Based Targets initiative website; FAQs/Does the SBTi Accept all Approaches to Reducing Emissions

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Amazon; The Climate Pledge Fund
Amazon; The Climate Pledge Celebrates Surpassing 100 Signatories; Apr 21, 2021
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