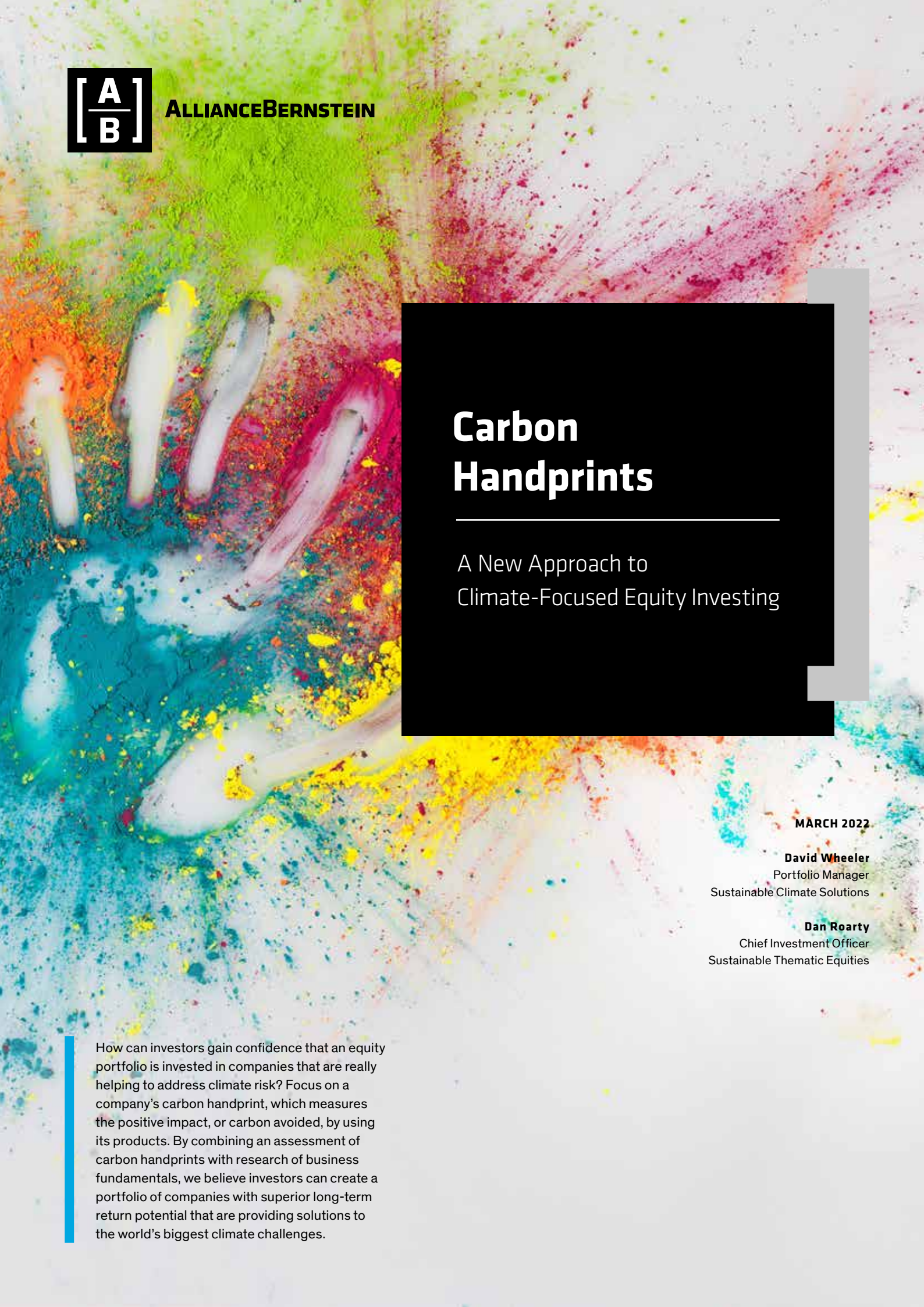


AllianceBernstein

Carbon Handprints

A New Approach to Climate-Focused Equity Investing

MARCH 2022

David Wheeler
Portfolio Manager
Sustainable Climate Solutions

Dan Roarty
Chief Investment Officer
Sustainable Thematic Equities

How can investors gain confidence that an equity portfolio is invested in companies that are really helping to address climate risk? Focus on a company's carbon handprint, which measures the positive impact, or carbon avoided, by using its products. By combining an assessment of carbon handprints with research of business fundamentals, we believe investors can create a portfolio of companies with superior long-term return potential that are providing solutions to the world's biggest climate challenges.

Investors are strengthening their commitment to help combat climate change. But as inflows to climate-focused funds accelerate, more questions are being asked about the investing approaches of these portfolios.

What type of companies are held in climate-focused portfolios? Can you fully assess a company's impact on the environment by looking at its carbon emissions metrics alone? And how does a climate-focused fund contribute to global efforts to accelerate decarbonization?

Investors often seek simple metrics to determine which companies are "good actors" in the fight against climate change. The most common metric for evaluating a company's environmental impact is the carbon footprint—total greenhouse gas (GHG) emissions generated by business activities. But a carbon footprint doesn't tell the whole story of a company's impact, and can also be misleading. There are many other ways for companies to promote a transition to a low-carbon world that simply won't register in carbon footprint data. And there are many ways for companies to lower a carbon footprint that don't help in tackling climate change.

So how can investors gain confidence that an equity portfolio is invested in companies that are really helping to address climate risk? Instead of focusing exclusively on a company's carbon footprint, we believe investors should look at a company's *carbon handprint*. In contrast to a carbon footprint, which measures the negative impact of a company's operations on the environment, a carbon handprint measures the positive impact, or carbon avoided, by using a company's products. These products represent the positive solutions to global climate challenges created by a company. From clean energy to recycling, transportation to energy efficiency, diverse companies with a big carbon handprint are making major contributions to solving the world's climate crisis (*Display 1*).

DISPLAY 1: CARBON HANDPRINTS LEAD THE WAY TO REAL CLIMATE SOLUTIONS

Source: AllianceBernstein (AB)

Changing the terms of reference isn't just semantics. We believe that a carbon handprint lens can transform both investing and environmental outcomes for climate-themed portfolios. In this paper, we explain why climate portfolios need a new approach, and present a comprehensive framework for investing in companies with a formidable carbon handprint across diverse industries. By combining an assessment of carbon handprints with robust research of business fundamentals, we believe investors can create a portfolio of companies with superior long-term return potential that are providing solutions to the world's biggest climate challenges.

Growing Demand for Climate Solutions

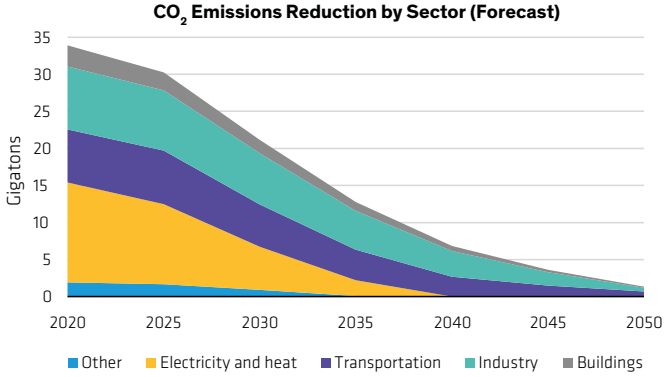
Reducing carbon emissions will require a Herculean global effort. Bold policies, new technology and changes to consumer behavior are all needed to wean the world off its addiction to fossil fuels, particularly in industries such as electricity, transportation and materials (*Display 2, left below*).

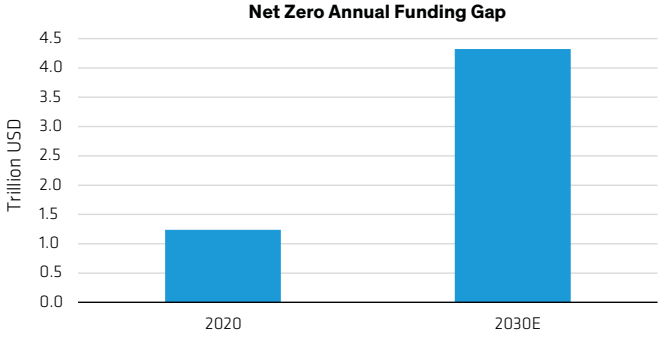
Individuals, policymakers and corporations are increasingly focused on net-zero pledges. By late 2021, 137 countries had committed to carbon neutrality. Of the world's 2,000 largest public companies, at least one-fifth (21%) now have net-zero commitments, representing annual sales of nearly $14 trillion, according to the Energy & Climate Intelligence Unit.

It will also take money—and lots of it. The International Energy Agency estimates that the global annual investment required to pursue a net-zero world by 2050 will leap from $1.2 trillion in 2020 to $4.3 trillion in 2030 (*Display 2, right below*).

DISPLAY 2: WHAT IS NEEDED TO ACHIEVE NET ZERO?

Carbon Reduction Coupled with Increased Spending





For informational purposes only.

As of September 30, 2021

Source: International Energy Agency, United Nations (UN) and AB

Those investments will be channeled in many directions—and there is no silver bullet. While clean energy and resource efficiency will account for more than half the CO_2 emissions reductions required, these solutions alone won't solve the global problem. Reducing emissions from transportation and agriculture, while promoting sustainability in food waste and recycling, are also essential ingredients in limiting temperature change to no more than 1.5 degrees, in line with the Paris agreement of 2015, and avoid a climate catastrophe (*Display 3, page 4*). We believe the United Nations Sustainable Development Goals (SDGs) provide a robust roadmap for investors to identify the private sector products and services that will help solve the world's climate challenges (*see "UN Sustainable Development Goals: A Map for Climate Investors," page 3*).

UN Sustainable Development Goals: A Map for Climate Investors

The United Nations Sustainable Development Goals (SDGs) represent an aspirational view of what the world could look like by 2030. First introduced in 2015, the SDGs include 17 goals and 169 specific targets that address areas of critical importance to humanity, including eliminating poverty and hunger, improving access to education and healthcare, and addressing the negative impact of climate change.

Crafted and agreed to by 193 nations, the SDGs attempt to build on the earlier Millennium Development Goals by broadening the focus beyond developing markets, and explicitly considering a role for the private sector. These important changes make the SDGs a more useful tool for equity investors.

Fulfilling these goals will require about $90 trillion of investment over 15 years, from 2015 to 2030, according to the UN. Philanthropy and government spending will play an important role but won't be enough to get the job done. The private sector—and equity investors—must be the biggest part of the solution, in our view.

Our efforts to invest in climate solutions draw on the SDGs. For example, developing clean energy and transportation both align with SDG 7: "Ensure access to affordable, reliable, sustainable and modern energy for all." Several target areas align with SDG 13: "Take urgent action to combat climate change and its impacts." Sustainable consumption and production are the focus of SDG 12, which informs our understanding of climate solutions, including agriculture, recycling and water.

We believe the SDGs provide a road map for equity investors to target private sector solutions to the world's biggest challenges. Following the SDGs can help environmentally focused investors identify the products, services and companies that are at the forefront of efforts to deliver powerful climate solutions.

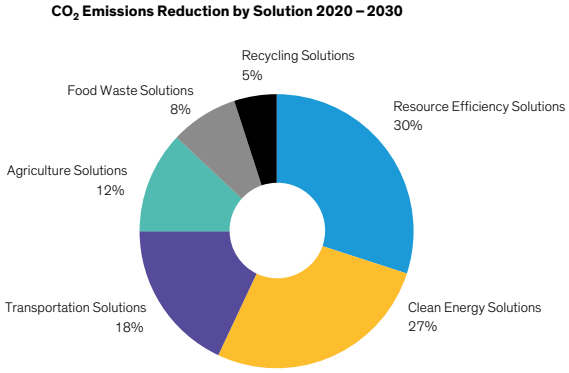
Some products that address these challenges are economically viable, scalable and available today, such as wind and solar power, electric vehicles, and energy efficiency solutions for buildings. Other technologies are small and not yet commercial but have the potential to grow into massive markets over the next decade through innovation, cost improvements and increased scale. For example, green hydrogen and carbon capture may ultimately become critical carbon-reduction products, especially in sectors like industrials and transportation, where cutting CO_2 emissions is an inherently difficult task.

Reducing carbon emissions isn't the only climate challenge facing the planet. We also must find ways to improve resiliency and adaptation against the physical effects of climate change that the world is unlikely to escape. This challenge will also require a ramp up in investments in the years ahead to adapt to climate change impacts such as higher temperatures, extreme weather, rising sea levels and water scarcity. Products and services that address the physical effects of climate change include drought-resistant crops, coastal infrastructure to protect cities and communities and smart irrigation systems to improve water use efficiency.

With so much capital being funneled to climate solutions, these industries are poised to enjoy solid annual growth rates in the years to come. For investors, we believe demand for products including recycled plastics, environmental sensors, wind turbines and electric vehicles will underpin attractive sources of stable growth potential that should persist regardless of the surrounding economic environment (*Display 4*).

DISPLAY 3: PROGRESS IS NEEDED IN MANY AREAS

There Is No Single Solution

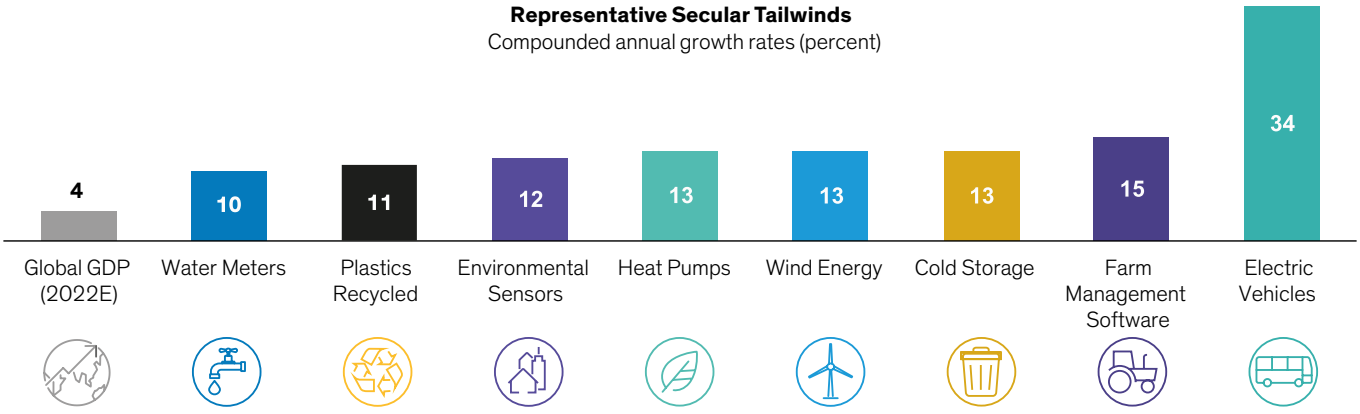


For informational purposes only.

As of September 30, 2021

Source: UN and AB

DISPLAY 4: CLIMATE SOLUTIONS OFFER DIFFERENTIATED OPPORTUNITIES FOR GROWTH



Current forecasts do not guarantee future results.

Global GDP consensus estimate is from Bloomberg, as of March 16, 2022. Water meters annual units sold 2020–2026, annual demand for plastics recycled 2020–2030, environmental sensors 2021–2027, heat pumps annual units installed 2020–2030, annual capacity of wind power installed 2020–2030, cold storage annual market size 2020–2028, farm management software annual market size 2021–2026 and annual electric vehicle sales 2020–2030.

As of September 30, 2021

Source: Bloomberg, Grand View Research, International Energy Agency, MarketsandMarkets, Mordor Intelligence, Bernstein and AB

Reconsidering Carbon Footprints

Despite the promising demand drivers, these trends aren't always targeted by climate portfolios. That's because many climate-aware portfolios focus exclusively on carbon footprints. To be sure, it's important for companies to reduce carbon emissions from their operations. And a carbon footprint can be a useful way to gauge a company's exposure to environmental risks. However, investors need to dig much deeper into a company's business and emission policies to understand whether a low carbon footprint is truly indicative of a good environmental actor. When managed actively with an eye on the snags, low-carbon portfolios that closely scrutinize the sources of a company's carbon footprint can be effective vehicles for climate-aware investors. Unfortunately, many do not.

Where do climate funds fall short? First, companies that have a relatively large carbon footprint might be overlooked even if they are making significant contributions to decarbonization through climate solutions. That's because many products needed to help curb global emissions over the long term require industrial commodities such as steel, cement, lithium and cobalt, which are energy intensive to produce.

Second, companies with a low carbon footprint might be included even if they rely heavily on carbon offsets. Carbon offsets help make up for the GHGs that an entity produces by allowing it to buy, sponsor or fund a carbon-reduction initiative elsewhere. But offset projects that aren't certified by reliable third parties may not be as effective as advertised. For example, offsets may include redundant purchases of forests and land that were already protected. And a company that relies too much on offsets as part of a net-zero strategy may be using the mechanism as a fig leaf to cover its lack of real action to curb its own emissions.

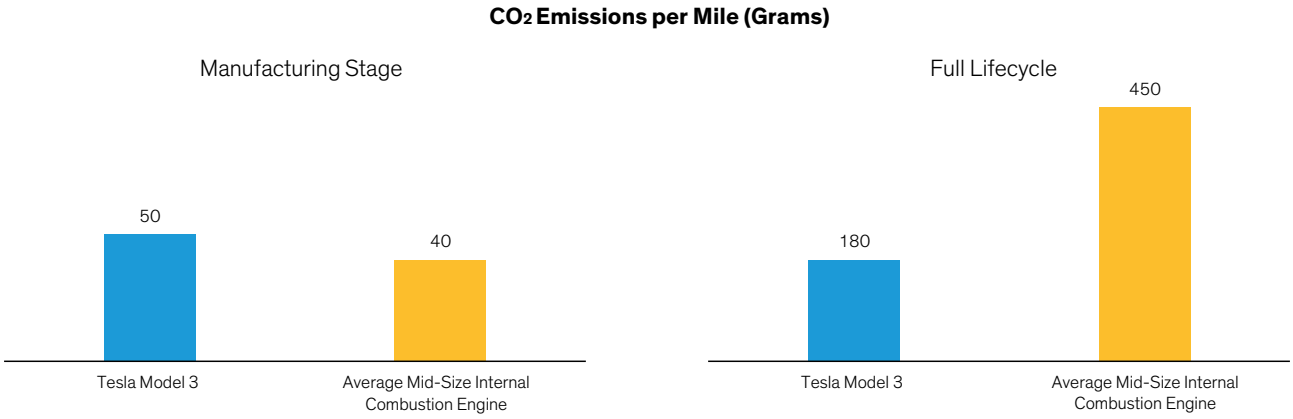
Many large US companies view carbon offsets as a key component of their environmental strategies. Between 2018 and 2020, at least 36% of S&P 500 companies purchased carbon offsets, according to a report by Ecosystem Marketplace. Companies that are simply lowering their carbon footprint—and especially those making heavy use of offsets—aren't necessarily going to help the world achieve carbon neutrality.

Introducing Carbon Handprints: A Climate-Positive Indicator

Many companies that are playing an instrumental role in efforts to combat climate change might not be identified on the basis of carbon footprint alone. That's because carbon emissions avoided by using a company's products are not captured in its carbon footprint. Products such as wind turbines, solar panels and electric vehicles are basic ingredients in a greener world. The companies that manufacture them may generate significant emissions in their production processes, yet the amount of emissions avoided by the company's products over their lifetime can dwarf the emissions generated during the manufacturing phase. This won't factor into an investor's analysis that only uses traditional carbon footprint metrics.

Take electric vehicles (EVs). Manufacturing EVs is a carbon-intensive process that generates about 25% more CO_2 emissions than the production of a traditional vehicle with an internal combustion engine (ICE) (*Display 5, left below*). But looking just at the emissions generated during the manufacturing stage misses the bigger picture. During the lifetime of an EV, the vehicle will generate 60% less emissions than its ICE counterpart, according to Tesla (*Display 5, right below*). In other words, Tesla's carbon footprint might be larger than a traditional carmaker per car manufactured, but because its carbon handprint is so much larger, on balance, the company is a major contributor to climate solutions.

DISPLAY 5: ELECTRIC VEHICLES: HOW MUCH CARBON EMISSIONS ARE AVOIDED?



As of April 2021

Full lifecycle includes CO_2 generated during manufacturing and vehicle operation, based on 200,000 miles driven. The source of electricity in the full lifecycle calculation is assumed to be the US grid average in terms of its carbon emissions. The calculation assumes that the emissions mix in the US is unchanged over the vehicle's lifetime. However, electricity generation should become "greener" over time with the addition of cleaner energy sources to the grid. As a result, emissions generated through EV charging should continue to decline over time, making the EV's relative emissions even better versus ICE autos.

Source: Tesla

Carbon avoided by a company's products are not captured in its carbon footprint.

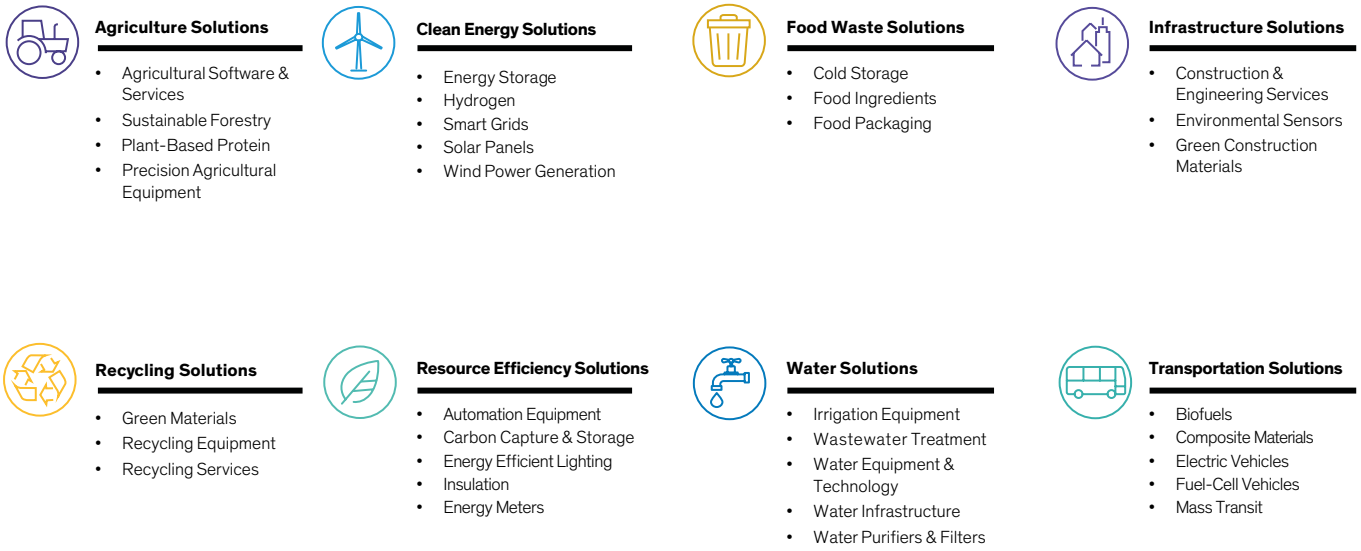
The EV example illustrates why we believe carbon handprints open new doors to climate-focused investors. Companies with an outsize carbon handprint will be at the forefront of efforts to reduce the world's carbon intensity. To find these companies, our research has identified more than 50 products and services that will enable the transition to a lower-carbon world (*Display 6*) and provide resiliency against the impacts of climate change.

But evaluating a company's carbon handprint is no easy task. A carbon handprint lacks the widespread disclosure that make carbon footprint metrics attractive to investors. There is no one-size-fits-all metric. Since a company's handprint is unique to the products and services it sells, measuring carbon avoided requires deep research.

So how can investors deploy carbon handprints as a useful framework for equity portfolios? The key is to apply a single principle that evaluates a company by the ability of its products and solutions to avoid or reduce carbon emissions. Since individual company reporting can be confusing for investors, this simple and transparent framework can provide a meaningful assessment of a company's carbon handprint versus its carbon footprint, while also allowing us to draw comparisons to competitors in similar industries.

DISPLAY 6: CLIMATE SOLUTIONS REQUIRE DIVERSE PRODUCTS

Illustrative Examples



Products subject to change. For illustrative purposes only.

Illustrative examples of more than 50 products that AB has identified as enabling the transition to a lower-carbon world

Source: AB

Applying the Carbon Handprint Principle

There are different ways to quantify a carbon handprint for each solution group. But across solutions—from agriculture to clean energy to transportation or energy efficiency—the unifying principal that anchors our analysis is how much carbon is avoided. This metric becomes the lens for identifying and evaluating a carbon handprint. For example, clean energy companies will be judged on the amount of zero-carbon energy generated, while resource efficiency companies are ranked on their ability to save energy for other companies and entities.

Disclosure of carbon avoided is not an industry standard. As a result, investors can't rely on company reports or third-party rating agencies to understand how much carbon is avoided through climate solutions. By actively engaging with management and conducting independent research, we believe investors can obtain the information needed to measure a company's carbon handprint accurately and convincingly.

Establishing a clear carbon handprint metric allows investors to assess how a company is contributing to the fight against climate change, and how its contribution is evolving over time.

Case Studies | From Clean Energy to Transportation

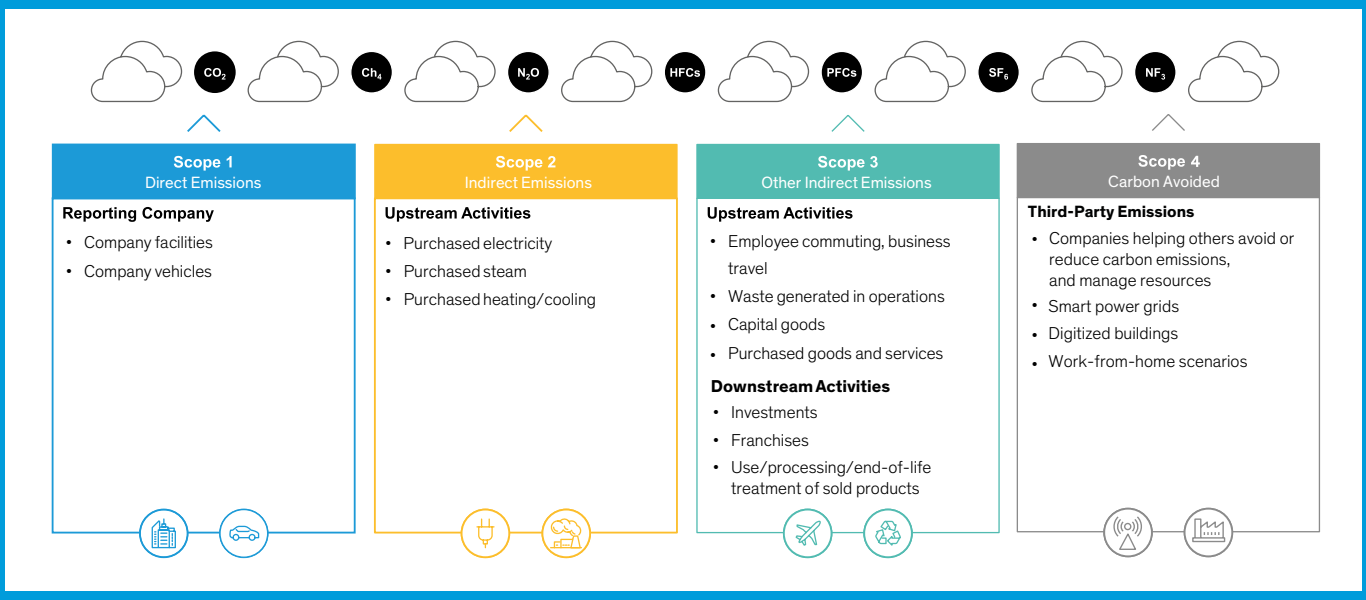
CASE STUDY | Vestas Wind Systems

Electricity generation is the largest source of energy-related carbon emissions globally, accounting for 36% of energy-related CO_2 emissions, according to the International Energy Agency. These emissions come from fossil-fuel power generation. Technologies to decarbonize electricity generation are affordable and ready to deploy including renewables, energy storage and smart grids.

Vestas Wind Systems is a Danish manufacturer of wind equipment, which also constructs and maintains wind farms.

The company's products help utilities, independent power producers and companies in 83 countries reduce their carbon emissions. Yet manufacturing wind turbines isn't a "clean" business. In 2020, Vestas generated 73,000 metric tons of CO_2 (Scope 1 and Scope 2, generated directly from the company's operations and indirectly from purchases of electricity and other emitting services, see *Display 7*). That's similar to the emissions generated by 73,000 passengers taking a round-trip flight from Boston to London.

DISPLAY 7: THE FOUR "SCOPES" OF CARBON EMISSIONS

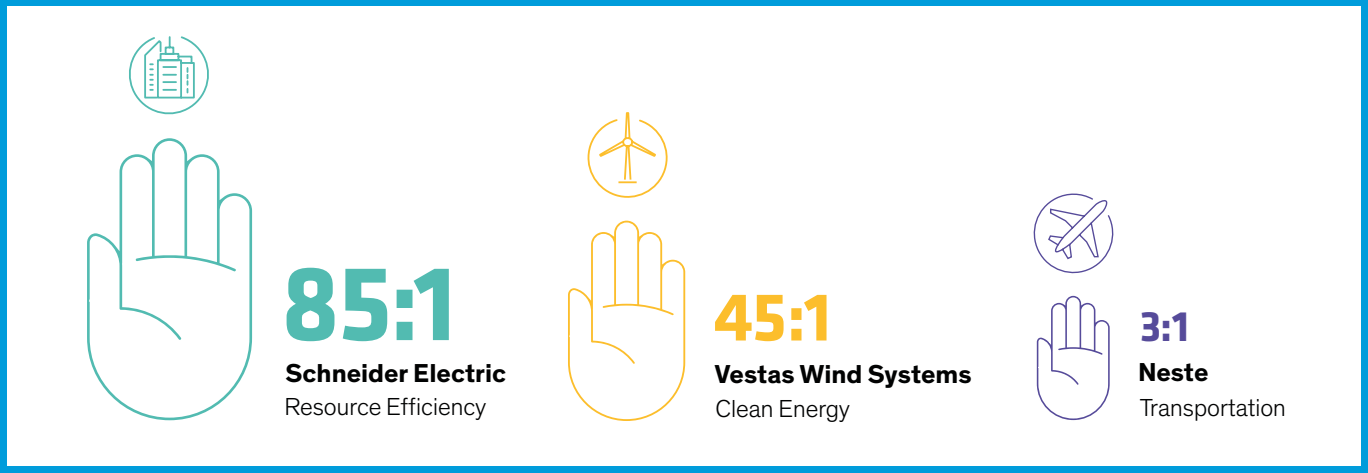


For illustrative purposes only.
Source: AB

Some climate-aware investors might be put off by Vestas's carbon footprint. However, the wind equipment installed by Vestas in 2020 will enable customers to reduce GHG emissions by 24.8 million metric tons annually for the next 20 years. The company's carbon handprint massively outweighs its carbon footprint, and in our view, makes the company an attractive investment candidate for a climate-focused portfolio (*Display 8*).

DISPLAY 8: CARBON HANDPRINTS POINT TO REAL CLIMATE SOLUTIONS

Ratio of Carbon Handprint to Carbon Footprint



Past performance and current analysis do not guarantee future results.

For Schneider Electric: 45 million metric tons of CO_2 emissions avoided in 2020 from energy efficiency savings from its energy management and automation products vs. 527,000 metric tons emitted during 2020 (scopes 1, 2 and 3). For Vestas: carbon avoided by a wind turbine over its lifetime vs. carbon emitted during manufacturing, transporting and installing a wind turbine. For Neste: renewable transportation fuel enabled customers to reduce GHG emissions by 10 million metric tons in 2020. Neste's carbon emissions were 2.9 million metric tons in 2020.

As of December 31, 2020

Source: Company reports and AB

CASE STUDY | Schneider Electric

Far from the Vestas wind farms that can be found across rural hilltops around the world, cities and factories are generating massive amounts of GHG emissions every day. Buildings, data centers, infrastructure and industrial facilities are major polluters. Cutting-edge technology is desperately needed to help reduce their emissions.

Schneider Electric, a French multinational company, is helping these companies address their emissions problem. The company develops energy management systems and smart power grids that use technology to optimize electricity usage in commercial buildings, manufacturing facilities and data centers. These systems help customers save or avoid carbon emissions, conserve water and minimize waste.

During 2020, Schneider Electric generated 287,356 metric tons of CO_2 equivalent emissions. But since so much of its business is about helping other companies reduce their emissions, Schneider Electric has an impressive carbon handprint. Its energy efficient products and services helped other companies avoid 45 million tons of CO_2 equivalent in 2020.

CASE STUDY | Neste

Transportation is another critical area for climate solutions. In fact, about 20% of global CO_2 emissions are generated from transportation. And while the shift toward EVs is expected to be a major driver of emission reductions over time, nonelectric vehicles are not going to disappear anytime soon. Jets and ships are even tougher to electrify, so lower-carbon fuels are needed to improve emissions in the aviation and marine sectors.

Enter Neste, a Finland-based refinery that has developed a sustainable method for producing renewable diesel and jet fuel. With animal fat waste, used cooking oil and residues from vegetable oils, Neste produces renewable diesel and jet fuel. In aviation, for example, the company's fuels reduce emissions from jets by up to 80% when compared with fossil fuels.

In 2020, Neste produced 2.97 million metric tons of renewable fuels. That year, the company's operations generated 2.89 million metric tons of CO_2 emissions. However, the renewable transportation fuel produced in 2020 enabled customers to reduce GHG emissions by 10 million metric tons, equivalent to taking 3.7 million passenger cars off the road for a year.

Engagement Underpins Climate Progress

To invest effectively in companies like these, we believe engagement with management teams is essential. Engagement is an important component for any active investor, as it provides opportunities to influence corporate behavior, especially on ESG issues, which can help enhance shareholder returns as well as improve outcomes for society.

For climate-focused portfolios, we believe engagement is especially important. By meeting with company management, regulators and policymakers, investors can gain an informational advantage about the impact of new products, company strategy and ESG issues. Since the entire world is going through a transition to lower carbon emissions, many of the business dynamics and regulatory trends are constantly evolving.

Engagement also allows investors to develop an in-house view of a company's ESG credentials. While third-party ESG ratings can be helpful for investors, we believe they offer an incomplete picture of a company's behavior. Even relatively robust and granular ratings systems cannot accurately capture the full reality of how a company operates, and the data often paint a backward-looking picture of company behavior and performance. The world of ESG analysis doesn't always lend itself to a homogeneous rating system. We believe informed human judgment and comprehensive analysis that assesses information in context is the only way to fully gauge these issues.

By meeting with company management teams, investors can develop independent views on a company's ESG credentials—and collect perspectives needed for evaluating its carbon handprint metrics, especially when these rely on data that may not be readily available.

Handprint Focus Creates Differentiated Portfolios

Using carbon handprints to invest in climate-focused companies can also help investors create differentiated portfolios.

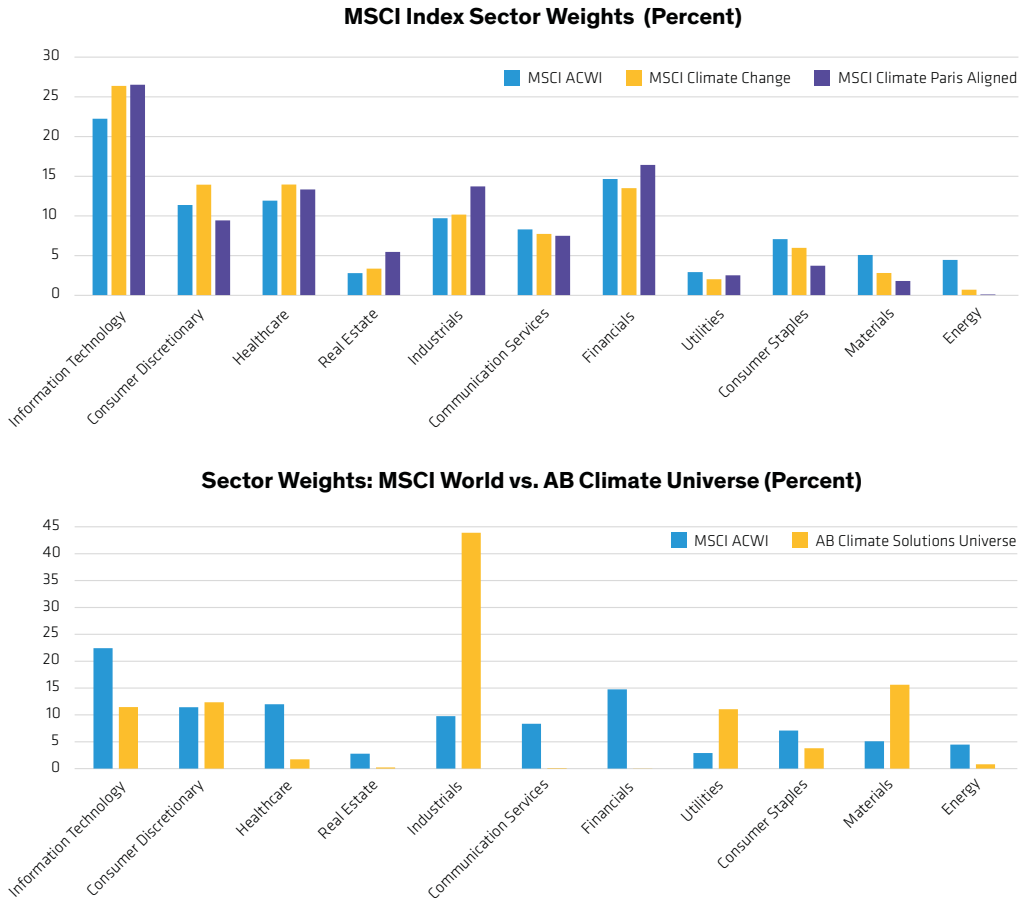
Existing benchmarks, like the MSCI Climate Change Index or the MSCI Climate Paris Aligned Index, are carbon footprint measures. They start with the broad MSCI ACWI Index of global stocks and make slight adjustments to the individual weights of companies, largely based on their carbon footprint.

As a result, these popular climate benchmarks look very similar to the MSCI ACWI. So, portfolios that are investing based on carbon footprints won't look materially different than the broader index itself (*Display 9*). This probably isn't what many climate investors are looking for, in our view.

Our research shows that a carbon handprint index would look very different than the broader equity benchmark. Using our market cap–weighted universe, we see substantial differences versus the MSCI ACWI. For example, the information technology sector accounts for 11.3% of our climate solutions universe—about half the weight in the MSCI ACWI. In contrast, the industrials sector comprises 43.4% of our climate solutions universe—more than four times the weight in the MSCI ACWI.

As a result of the significantly different composition, we believe the performance profile of a portfolio based on carbon handprint metrics will be quite different to the performance profile of climate portfolios looking primarily at the carbon footprint of their holdings.

DISPLAY 9: CARBON HANDPRINT INDEX WOULD LOOK VERY DIFFERENT TO BROADER INDEX



Past performance and current analysis do not guarantee future results.

As of March 9, 2022

Source: MSCI and AB

Finding High-Quality Businesses Aligned with Climate Solutions

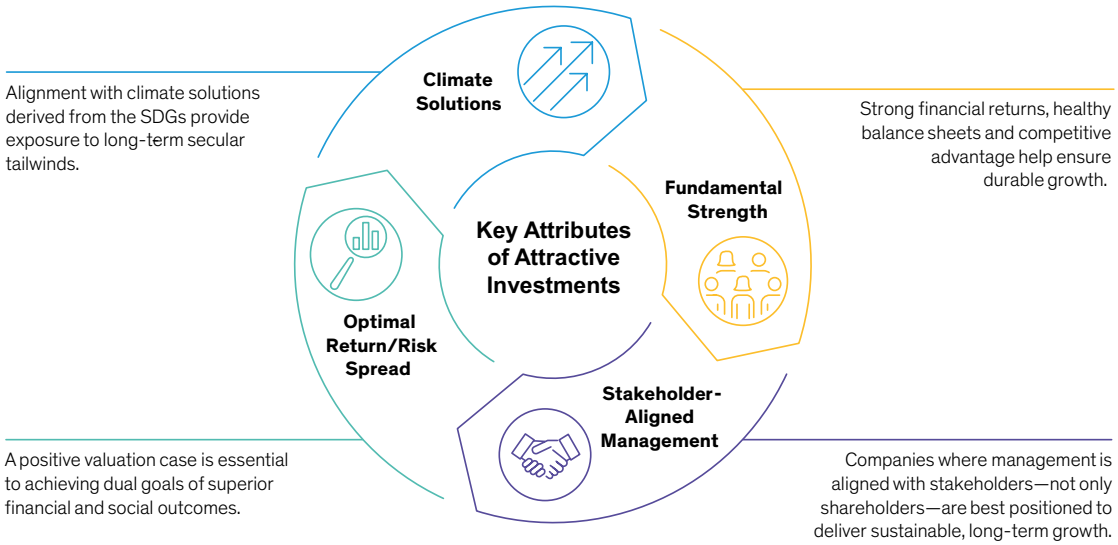
Companies with a strong carbon handprint are appealing to climate-aware investors. But not every climate-solutions contributor is a solid business with strong investment return potential.

Climate portfolios need a robust process for identifying companies whose underlying business models are capable of driving strong long-term returns (*Display 10*). This can be done by adopting the mindset of a private-equity investor, which aims to look beyond the short-term market sentiment by focusing on the internal rate of return—a measure of investor return potential that projects five years ahead. We believe that there are still many misunderstandings in the market about ESG issues and sustainability factors, which creates inefficiencies in stock prices that can be exploited by active investors.

The next step is to estimate the risk, measured by the cost of equity. To do that, an investor should balance ESG risks with traditional risk factors tied to operational, financial and strategic business issues. Third-party tools can contribute to the risk analysis, but fundamental research can provide insight and an analytical edge in these assessments.

After estimating the risk and return potential, investors can gauge the investment's attractiveness. Selecting stocks with a higher return-risk spread can form the backbone of a climate-focused portfolio that is driven by long-term economic value creation rather than short-term earnings trends.

DISPLAY 10: HOW TO INVEST IN HIGH-QUALITY COMPANIES ALIGNED WITH CLIMATE SOLUTIONS



For illustrative purposes only.

There can be no assurance that any investment objectives will be achieved.

Three Investing Principles for Carbon Handprints

So how can investors tap into the transition to a low-carbon economy?

1

Search for climate solutions across regions and sectors.

Climate-focused funds are often one-dimensional, with a narrow focus on popular industries such as renewable energy. And at times, investors may wonder whether stocks for a single product like renewables might move into "bubble" territory.

Certainly, as investors become enamored by the vast longer-term opportunities for some clean energy technologies, some stocks might get bid up to excessive levels. But that tends to be a minority of the climate stocks in our investment universe. With a diversified approach, investors can capture change in the drive towards clean energy as well as in areas such as resource efficiency, transportation, agriculture, water and infrastructure. And by including valuation as a key input to selecting diversified holdings, investors can avoid potentially overheated parts of the market while having exposure to climate solutions that offer differentiated opportunities for secular growth.

For example, in the materials sector, DSM of the Netherlands produces improved animal feed that helps cows burp less, which reduces the emission of enteric methane—the largest source of farm greenhouse gas emissions. Waste Management Inc., based in Houston, Texas, generates carbon emissions from waste processing, collection trucks and landfill methane. But the positive impact of its handprint from carbon reduction services is 3.3 times the negative impact of its carbon footprint. In technology, Wolfspeed is leading the transformation from silicon to silicon carbide in semiconductor markets, creating a more efficient component for EV batteries that delivers a 13:1 energy savings versus the incremental energy invested.

2

Make sure that target companies have solid fundamentals.

Not every company focused on solving climate change is a good investment with strong long-term return potential and an attractive valuation. With a disciplined stock selection process, investors can find well-run companies with differentiated products, sustainable competitive advantages, high returns on capital and strong balance sheets. Investors must also incorporate climate risk analysis into the valuation process for portfolio candidates. This is a big challenge for equity investors, as intensifying climate change is amplifying the physical and transition risks to industries and companies. Current scientific and investment climate models are incomplete and are still developing, so portfolio managers must apply fundamental insight to understand how climate data affects valuations of individual companies (*see "Rethinking Climate Research: The Scientific Perspective" on page 14*).

3

Invest in portfolios that actively engage with their portfolio companies.

Portfolio managers who engage with management can get a better idea of the impact and strategy of a company's climate solutions—and the potential risks. Engagement also informs an in-house view that is more comprehensive than third-party ratings. And by encouraging firms to become more responsible corporate actors in their business practices, investors can help create additional shareholder value over time.

There's no simple solution to the world's climate change challenges. As a result, many different technologies—evolving at varying speeds—will make important contributions to solving the world's carbon emissions problem. For equity investors, we believe capturing a diverse set of companies with enduring carbon handprints can foster positive environmental change and strong long-term return potential in a climate portfolio.

Rethinking Climate Research: The Scientific Perspective

By Radley Horton, Lamont Research Professor, Ocean and Climate Physics,
Lamont-Doherty Earth Observatory, The Earth Institute at Columbia Climate School

Research about climate change is changing in ways that will reshape the way scientists and investors think about resilience and risks. Historically, climate risk assessments have tended to consider variables separately from each other, and separately for individual locations. So, for example, a climate risk assessment for a city or company might begin by asking: What temperature extreme might be experienced at a given location, based on climate model projections?

This is an essential endeavor, providing baseline/benchmark data, and ensuring all risk stewards are learning how to ask the climate question. By linking this linear climate information to impact assessment, we can begin to develop useful resilience and mitigation strategies. Some strategies need not wait for the most innovative methods in climate risk assessment.

Innovative Approaches Are Needed

But we still need more innovative mitigation and resilience approaches to prepare for the kind of high-consequence outcomes that we used to assume were low probability. Consider the unprecedented heat waves in the US Pacific Northwest in the summer of 2021. Climate scientists are now asking whether our climate models could be missing key processes—whether related to a changing jet stream, moisture feedbacks with the land surface or other factors—that might lead us to underestimate just how much heat waves could impact local communities. We're also realizing local assessments are not enough. If the risk of simultaneous heat waves across large areas is growing faster than anticipated, virtually the entire world could experience cascading impacts ranging from energy prices and availability to food prices and security.

Qualitative Questions Add Insight

Climate risk assessments being conducted today are riddled with limitations, such as myopia and false precision. Our challenge is to define a best approach. Innovative methods include qualitative approaches that are less shackled to quantitative modeling, often leaning on bottom-up research that starts by asking private- and public-sector decision-makers/stakeholders subjective questions (*Display*).

Just as scientists need to expand their analytical frameworks, investors seeking a broader understanding of how companies are influencing and affected by climate change cannot look through a one-dimensional lens. Engaging with a broader set of climate projections after asking qualitative questions does not guarantee blind spots will be eliminated. But it does increase the probability that we ultimately avoid high-consequence impacts.

AllianceBernstein has a partnership with the Earth Institute at Columbia Climate School, aimed at promoting research collaboration and investor education on climate change issues.

New Approaches to Climate Research Questions

How have you been affected by weather events in the past?

What types of near-miss events from the past leave you with the most concern going forward?

Explain how weather factors into your current decision points?

How do the products and services you sell contribute to climate change mitigation or resilience?

NASHVILLE
501 Commerce Street
Nashville, TN 37203
(615) 622 0000

NEW YORK
1345 Avenue of the Americas
New York, NY 10105
(212) 969 1000

LONDON
50 Berkeley Street
London W1J 8HA
United Kingdom
+44 20 7470 0100

TOKYO
Hibiya Parkfront 14F
2-1-6 Uchisaiwaicho, Chiyoda-ku
Tokyo, 100-0011, Japan
+81 3 5962 9000

TORONTO
Brookfield Place
161 Bay Street, 27th Floor
Toronto, Ontario M5J 2S1, Canada
(416) 572 2534

HONG KONG
39th Floor, One Island East, Taikoo Place
18 Westlands Road
Quarry Bay, Hong Kong
+852 2918 7888

SYDNEY
Level 32, Aurora Place
88 Phillip Street
Sydney NSW 2000, Australia
+61 02 9255 1200

SINGAPORE
One Raffles Quay
#27-11 South Tower
Singapore 048583
+65 6230 4600

INC2022103
AllianceBernstein.com