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# Climate Action: Positioning Your Portfolio for Decarbonization



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As our energy systems, technology and infrastructure are reimagined to address a changing climate, capital will be a powerful enabler of the global transition to a low-carbon economy.

What does that mean for investor portfolios? This primer and the accompanying climate action implementation guide can serve as a road map for investors seeking to develop an investment strategy that mitigates climate change-related risks, advances decarbonization solutions and aligns with long-term financial and impact goals.

With continual developments across economic, environmental, scientific, political and technological arenas, the approach to climate action investing has evolved significantly since the first edition of this primer in February 2016. We define climate action investing as the effort to direct capital toward climate solutions and transition to a less carbon-intensive economy, while also seeking to mitigate risk. Definitions for climate action investing and other terms used in this report can be found in the Climate Action Investing Terminology section.

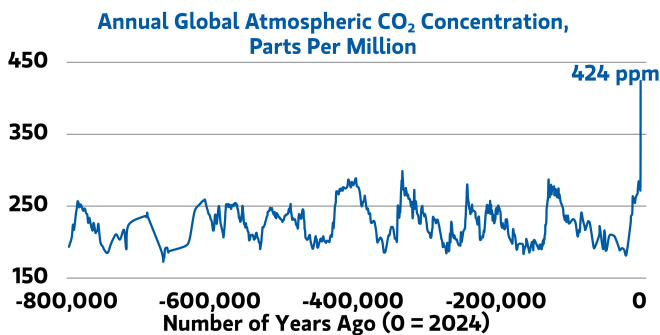
# Climate Change Is Here

## The Scope of the Crisis

Earth’s temperature, on average, has increased by at least 1.1 degrees Celsius (°C) since 1880, with most of the warming occurring since 1975, at a rate of approximately 0.15 to 0.20°C per decade.<sup>1</sup> Experts agree that human activity—specifically, the burning of fossil fuels, which has increased heat-trapping greenhouse gases (GHGs) in the atmosphere—is responsible for the accelerated rise in temperatures.<sup>2</sup> Around 50 billion metric tons of GHGs are emitted globally each year.<sup>3</sup> GHGs include carbon dioxide (CO<sub>2</sub>), methane, nitrous oxide and fluorinated gases that are byproducts of a variety of household, commercial and industrial processes.<sup>4</sup>

CO<sub>2</sub> is the most abundant GHG released by human activities.<sup>5</sup> Current global atmospheric CO<sub>2</sub> concentration is more than 50% higher than preindustrial levels (see Exhibit 1). Roughly 70% of CO<sub>2</sub> emissions are tied to energy use, with the remainder primarily from agriculture, forestry and other land uses.<sup>6</sup> In 2023, global energy-related CO<sub>2</sub> emissions rose by 1.1%, reaching the highest level ever recorded.<sup>7</sup>

**Exhibit 1: Global Atmospheric CO<sub>2</sub> Concentration Is More Than 50% Above Preindustrial Levels**



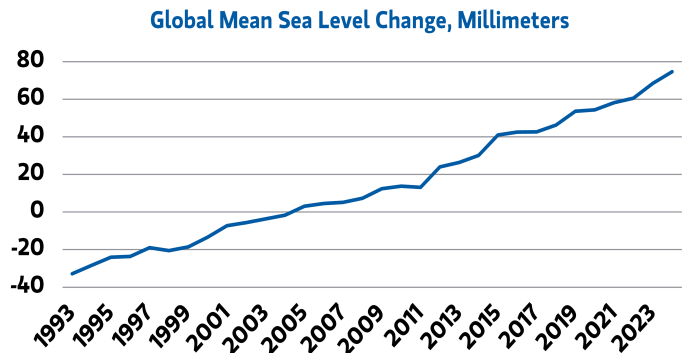
Source: Scripps Institute of Oceanography, National Oceanic and Atmospheric Administration (NOAA), Morgan Stanley Wealth Management Global Investment Office as of April 2024

## Consequences of the Current Emissions Trajectory

When GHGs are released faster than they can be absorbed by carbon sinks, such as oceans, forests, soil layers and other forms of natural carbon storage, they cause short- and long-term environmental dislocations. According to the World Meteorological Organization, the past nine years have been the warmest in recorded history, while three other key climate change indicators—sea level rise (see Exhibit 2), ocean heat and ocean acidification—climbed to new records in 2023.<sup>8</sup> The effects of acute and chronic disruptions to climate patterns and ecosystems are most evident during severe weather events, such as heavy rain and snow, droughts, heat waves, cold waves, cyclones and tropical storms. Substantial evidence indicates that rising GHG

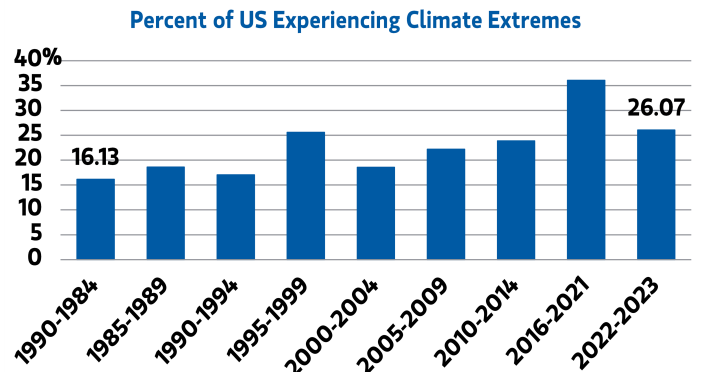
emissions have led to greater intensity and frequency of these high-impact events (see Exhibit 3).<sup>9</sup>

**Exhibit 2: Sea Levels Have Risen Approximately Three to Four Millimeters Per Year Since 1993**



Source: NOAA, NASA, Morgan Stanley Wealth Management Global Investment Office as of Jan. 2024

**Exhibit 3: The Frequency and Magnitude of Acute Weather Events (Storms, Floods, Wildfires and Droughts) Is Rising in the US**



Source: NOAA, NASA, Morgan Stanley Wealth Management Global Investment Office as of Dec. 31, 2023

Why does this matter for investors? Shifting business practices as a result of a changing climate are costly. It is estimated that the current emissions path would lead to a \$10-\$20 trillion loss in global gross domestic product by 2100,<sup>10</sup> largely driven by damage to physical infrastructure and supply chains and related productivity disruptions. In the US alone, in each of the past five years, on average, there were 20.4 climate-related events that resulted in damages of at least \$1 billion, adjusted for inflation.<sup>11</sup> This is a significantly higher rate than across the period going back to 1980, which has averaged only 8.5 events per year, as the frequency and scale of these episodes is on the rise.<sup>12</sup>

Not only do the adverse effects of climate change take a toll on the economy, they have negative humanitarian

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consequences and contribute to greater human health risks, diminished food security and water supply, and increased migration and displacement.<sup>13</sup> It is estimated there could be as many as 200 million “climate refugees” by 2050.<sup>14</sup> On top of that, rapid urbanization and population growth further strain the world’s resources and food systems, putting more people at risk. There is also heightened awareness of the complex ways that climate change and corresponding responses coincide with issues of income inequality and social justice (see Debate 4: A Just Transition), which is an important consideration for investors as they work to develop a climate action plan. Where do we go from here?

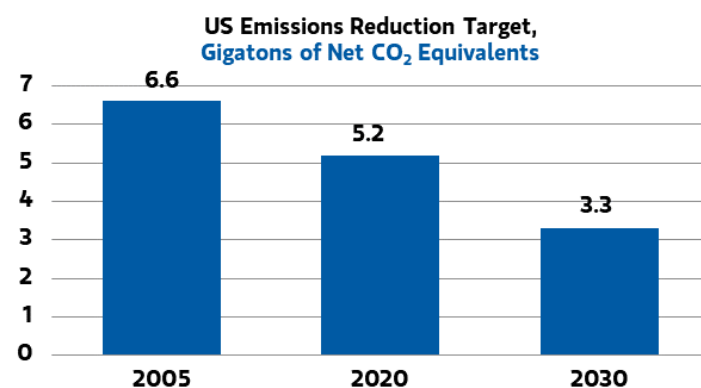
### The Path to Decarbonization: Ambitious Goals to Address Climate Change

#### Climate Commitments

Current research suggests that limiting the long-term global temperature rise to around 1.5 °C would substantially reduce economic loss.<sup>15</sup> According to the Intergovernmental Panel on Climate Change (IPCC), limiting warming to 1.5 °C would require annual global GHG emissions to decline 45%-46% by 2030 and 81%-88% by 2050, with CO<sub>2</sub> emissions alone declining 40%-53% and 92%-94% over the same periods, respectively.<sup>16</sup>

Governments, corporations, asset owners and asset managers are increasingly setting ambitious GHG emissions reduction goals. The Paris Agreement—a landmark international climate treaty that came out of the 2015 UN Climate Change Conference in Paris—was introduced to ideally limit the global temperature increase to around 1.5 °C. Signatories committed to significantly reduce GHG emissions, and it was signed by every country except Iran, Eritrea, Libya and Yemen.<sup>17</sup> Upon rejoining the Paris Agreement in 2021, the US committed to a 50%-52% reduction in net emissions relative to 2005 levels by 2030 (see Exhibit 4).<sup>18</sup> This marked the beginning of a shift toward a net-zero carbon emissions world, which, to be clear, is different from a true-zero carbon emission world—perhaps an underappreciated dynamic (see the Climate Action Investing Terminology section for a definition of net zero).

**Exhibit 4: The US Recently Committed to a 50%-52% Reduction in Net Emissions Relative to 2005 Levels by 2030**



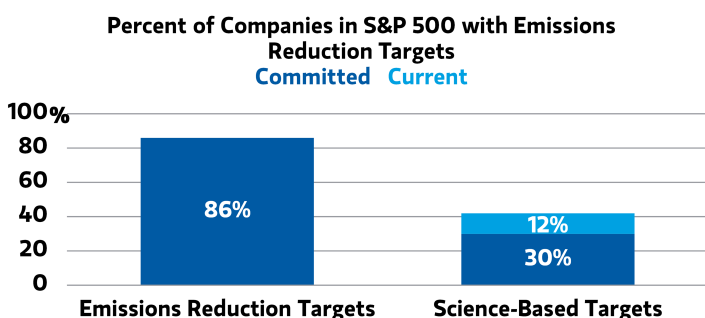
Source: Environmental Protection Agency, Greenhouse Gas Inventory Data Explorer, Morgan Stanley & Co. Research, Morgan Stanley Wealth Management Global Investment Office as of June 24, 2022

Asset owners and managers have also committed to achieving net zero across their portfolios by 2050. These include 315 institutional investors, representing around \$57 trillion in assets,<sup>19</sup> and 144 banks, including Morgan Stanley, representing almost 41% of global banking assets.<sup>20</sup> Beyond banks, corporations broadly are responding as well. Around 80% of companies in the S&P 500 Index have disclosed an emissions reduction target.<sup>21</sup>

There is growing momentum from the Securities and Exchange Commission (SEC), proxy advisers and investors to shift the market toward science-based emissions reduction targets under a framework providing prescriptive guidelines for setting corporate emissions targets. These science-based targets (SBTs) are generally considered a best practice. In addition to third-party verification requirements, the framework calls for interim emissions reduction targets every five to 10 years, with annual reduction targets of 4%-6%. Notably, it does not allow for carbon offsets to count toward net-zero goals.<sup>22</sup> Only 42% of companies in the S&P 500 Index have SBTs or have committed to setting them (see Exhibit 5), but that percent is expected to grow.<sup>23</sup>

Why does this matter for investors? As the world embraces material commitments to address a changing climate, investors have an opportunity to capitalize on the changes required to meet these targets.

**Exhibit 5: Corporations Are Increasingly Disclosing Emissions Reduction Targets, With a Rising Percentage of SBTs**



Source: Refinitiv Eikon, Science Based Targets Initiative, Morgan Stanley & Co. Research, Morgan Stanley Wealth Management Global Investment Office as of March 2023

**Shifting US Policy and Regulatory Backdrop**

Climate-related legislation in the US, including the \$1.2 trillion Infrastructure Investment and Jobs Act and the \$790 billion Inflation Reduction Act (IRA), will help accelerate the decarbonization capital expenditure cycle. The IRA, notably, allocates \$369 billion in energy security and climate change programs over the next 10 years—the single largest federal investment in clean energy in US history.<sup>24</sup>

Together with other government investments, the IRA puts the US on track for a 40% reduction in emissions by 2030. It provides significant, wide-ranging support for domestic manufacturing and advancement of low-carbon solutions. This features the use of tax credits and subsidies for a number of initiatives, including renewables like on- and off-shore wind and solar. There are also tax credits and subsidies for energy storage, batteries, battery electric vehicles (BEVs), carbon-capture utilization and storage (CCUS), green and blue hydrogen and nuclear energy (see more on each of these technologies in the Climate Solutions section).<sup>25</sup>

Regulatory bodies are also increasingly focusing on climate change. In March, the SEC issued a rule requiring corporations to provide standardized climate-related disclosures in their 10-Ks in order to improve transparency for investors and drive more informed climate-risk mitigation. This rule requires companies registered with the SEC to disclose material Scope 1 and 2 carbon emissions, report governance and strategy around climate-related risks and include descriptions of transition plans. They would also have to report material discussions of scenario analysis, including those pertaining to carbon price assumptions and climate impact of select financial statement line items. While this rule has not yet been signed into law, despite a temporary stay from the second-highest court in the US, it signals regulatory focus on increased transparency through climate-related disclosure.<sup>26</sup>

**Key Risks and Opportunities**

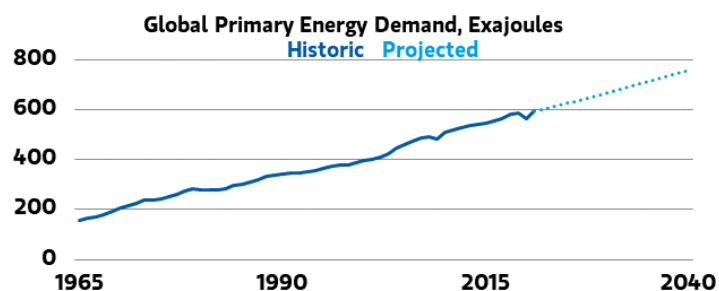
As the world embraces material commitments to facilitate a global energy transition toward lower-carbon sources, investors have a variety of mechanisms to engage in climate action investing. This transition will require a large capex cycle that will disrupt supply/demand dynamics in various sectors and fuel growth in emerging industries and technologies—presenting attractive investment opportunities, as well as the need for disciplined climate change-related risk mitigation.

**Energy Mix Shifts: Expect Near-Term Volatility**

As investors consider climate change-related risks and opportunities, it is important to understand the current global energy mix relative to demand. While the shift to a lower-carbon economy is a secular trend that is already underway, it will not be a straight line, and we have already seen short-term gyrations of the energy transition play out. Sparked by Russia's invasion of Ukraine in 2022, higher energy prices, along with inflationary pressures and supply chain bottlenecks exacerbated by COVID, fueled an energy crisis that coincided with the urgent need to accelerate the sector's transition to net zero.

For the past few years, there has been a growing mismatch between rising energy demand (see Exhibit 6) and falling investment in traditional sources (coal, natural gas, oil) driven by the global effort to align with net-zero targets. Not only have some investors resolved to direct capital away from carbon-intensive technologies, but suppliers of these traditional energy sources are expected to scale back investment, with power capex more heavily weighted toward clean energy.<sup>27</sup>

**Exhibit 6: Projected Population and GDP Trends Indicate Upward Sloping Primary Energy Demand**



Source: IEA, BP Statistics Review, Morgan Stanley & Co. Research, Morgan Stanley Wealth Management Global Investment Office as of Dec. 31, 2021

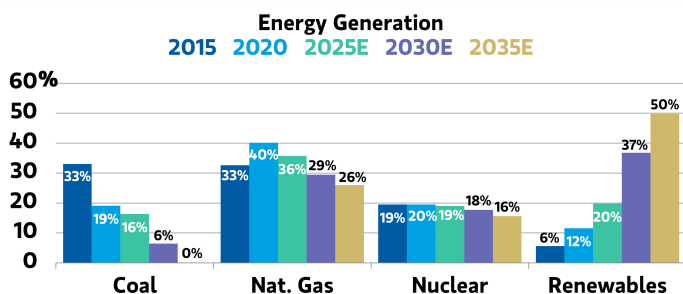
While this drop-off in traditional energy investment is inevitable and necessary to reduce fossil fuel emissions in line with the net-zero carbon budget, global energy demand

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continues to grow. Despite its growth rate slowing from 5.8% to 1.1% in 2021, primary energy demand is expected to continue to slope upward.<sup>28</sup>

The goal, ideally, is to meet this demand with lower-carbon-intensity sources, such as renewables, and to reduce energy use through efficiency. While the use of renewables as a primary energy source is on the rise, it is still short of where it needs to be to align with net-zero ambitions and meet a higher share of demand. In 2022, wind and solar accounted for just 12% of global power generation<sup>29</sup> and 14% of US power generation (see Exhibit 7).<sup>30</sup> Although these are record levels, they represent only a modest share of the current energy mix, with fossil fuels accounting for approximately 82% of primary energy use globally.<sup>31</sup> This means fossil fuels will still need to play a significant role in meeting primary energy demand in the near term.

### Exhibit 7: Morgan Stanley & Co. Research Expects Renewables Generation to Reach 57% of the US Energy Mix by 2035



Source: EIA, S&P Capital IQ, BNEF, Morgan Stanley & Co. Research, Morgan Stanley Wealth Management Global Investment Office as of March 2024

That said, demand for fossil fuels is expected to peak within the next decade.<sup>32</sup> A recent report from McKinsey & Company estimates that coal demand has already peaked, with oil and gas soon to follow.<sup>33</sup> In contrast, demand for renewables is expected to accelerate, especially as government incentives and falling technology costs have made them more cost-competitive with traditional energy sources. Pressure on the system rises when investments in carbon-intensive sources of energy and fossil fuels are scaled back *faster* than demand for them tails off. In the near term, this will be a fine line for governments, corporations and investors to walk.

While the road will be bumpy, the transformation of the global economy toward alignment with net-zero goals is happening, and capital will be a powerful accelerator. It is estimated that to reach net zero by 2050, global spending on physical assets will need to climb to approximately \$275 trillion, or \$9 trillion per year, on average. This represents an increase of \$3.5 trillion annually<sup>34</sup>—a significant opportunity for investors. Investors can capitalize on the increased decarbonization spending by developing a disciplined climate action investing plan that mitigates climate risks and identifies attractive opportunities to help them meet their financial goals. We have developed an investment framework to help support this process.

### Investing With Impact Framework Aligned With Climate Action

The three pillars of the Investing with Impact framework (see Exhibit 8) are *intentionality*, *influence* and *inclusion*, which we refer to as the Three I's of Impact. A continuum of approaches within *intentionality*—from minimizing climate change-related risk, to incorporating ESG criteria into the investment process in order to identify environmental leaders, to advancing climate solutions—can align the core framework with climate action.

### Exhibit 8: Investing with Impact Framework

The Three I's of Impact: Intentionality, Influence and Inclusion; customizable to a client's unique goals, represent the range of approaches that investors can pursue across asset classes to maximize positive impact.



\*Morgan Stanley's Global Investment Manager Analysis team defines diverse asset managers as those with 33% or greater ownership by women and/or racially/ethnically diverse individuals. The categories that make up the racially/ethnically diverse individuals as defined by Morgan Stanley align with those of the U.S. Equal Employment Opportunity Commission and includes: Hispanic or Latino, Black or African American, Asian, American Indian or Alaska Native, or Native Hawaiian or other Pacific Islander.

Source: Morgan Stanley Wealth Management Investing with Impact

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### Intentionality

#### 1) Restriction Screening: Fossil Fuel Divestment to Mitigate Risks

This approach focuses on reducing or eliminating (divesting) portfolio exposure to companies tied to coal, oil, gas and other energy sources and activities most directly tied to GHG emissions. The Global Fossil Fuel Divestment Commitments Database, which is maintained by two nonprofit divestiture advocacy groups—Stand.earth and 350.org—estimates that approximately 1,500 institutions representing \$39 trillion in assets are planning to divest funds from fossil fuels.<sup>35</sup> These institutions, including pension funds and governmental, philanthropic, faith-based and educational organizations and endowments, have publicly committed to partially or completely divest from fossil fuel investments over time. While some values-based investors focus on screening out fossil fuel exposure because they are committed to avoiding investments in industries and companies that are most responsible for climate change, others see fossil fuels as representing a key long-term investment risk. This leads to the next approach: integration and the assessment of climate change-related risks.

#### 2) ESG Integration: Incorporating Environmental Criteria to Mitigate Risk and Position for Opportunities

For disciplined investors, a holistic approach to investing that considers environmental, social and governance criteria along with financial metrics can help balance risk and return. As it pertains to environmental criteria, climate considerations may include a company's carbon footprint, use of natural resources and the amount of revenue derived from products that provide new climate solutions. Furthermore, while not explicitly environmental-related, social and governance criteria, such as operational excellence and employee safety, as well as diversity of the board of directors and senior management, are evaluated as part of buy and sell decisions. In addition to identifying environmental leaders, this approach can help mitigate climate change-related risks, including physical and transition risks:

- *Physical risks* stem from the damage to physical infrastructure that climate change can produce via severe weather events, flooding, wildfires, landslides and droughts. These risks can be acute or chronic. Acute risks are related to short-term events such as tropical storms, wildfires and river flooding. Chronic risks are more persistent and longer term in nature; they may include drought, sea-level rise and extended periods of extreme heat. Among major global companies, over 90% have at least one physical asset that will be highly exposed to physical climate risk by 2050 if we continue at the current emissions rate.<sup>36</sup>

- *Transition risks* are business risks related to societal and economic shifts driven by the global energy transition. They stem from the changes many global systems and incumbent technologies will encounter during the transition to a low-carbon economy. These risks can include policy and regulatory risks, technological risks, financial and market risks, reputational risks and legal risks. Stranded assets—unburned carbon reserves that must be abandoned before generating their full projected value—are a key example of transition risk. Carbon reserves are counted as positive assets on a company's balance sheet; the long-term associated transition risk is potential destroyed value for specific companies or even entire sectors if these reserves become stranded assets.

#### 3) Climate Solutions: Six Key Decarbonization Technologies to Position for Opportunities

While far from complete, the list of six below (see Exhibit 9), which focus only on reducing energy-related emissions, are key beneficiaries of the shift.

### Influence







Shareholder engagement is a critical tool employed by asset managers across the Investing with Impact framework (see Debate 3: Engagement Versus Divestment). It complements investment approaches across the spectrum and provides a way for clients to drive positive environmental change. Climate change remains the top issue prioritized by asset managers. According to the nonprofit shareholder advocacy organization, As You Sow, and as detailed in its 2023 Shareholder Impact Review, climate change accounts for 81% of total engagement efforts.<sup>37</sup>

### Inclusion

Increasingly, climate action investors are considering inclusion in their investment selection process and examining the diversity of an asset management firm's ownership and/or the professionals guiding the investment process. There is heightened awareness of the complex ways that climate change and the corresponding public and private sector responses coincide with issues of racial justice and gender equality. Advancing inclusion therefore not only supports diverse-owned managers but brings diverse perspectives to the climate conversation and capital allocation decisions for a more equitable transition away from a carbon-intensive economy (see Debate 4: A Just Transition).

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### Exhibit 9: Six Technologies That Offer Potential Solutions for the Global Transition to a Lower-Carbon Economy

	Description	Considerations
<p><b>Renewables</b></p> 	<p>Energy derived from sources that are naturally replenished at a higher rate than they are consumed, including:</p> <ul style="list-style-type: none"> <li>• Biomass – generating power or fuel from plant-based inputs</li> <li>• Geothermal – harnessing heat from the Earth’s core to generate electricity</li> <li>• Wind – using the power of the wind to generate electricity</li> <li>• Solar – converting energy from the sun to generate electricity</li> </ul>	<p>Favorable economics are increasingly making renewables cost-competitive with conventional energy. Coupled with improving technology and policy support, this is driving material growth in solar and wind generation specifically. The challenge of both wind and solar is that they are intermittent resources, with energy output that varies by geography and time of day</p>
<p><b>Battery Storage</b></p> 	<p>Batteries allow excess energy from the electrical grid to be stored for later use. When applied to the grid, battery storage is a key enabler for scaling renewables and can improve overall power system flexibility. Rechargeable batteries are also essential for powering battery electric vehicles (BEVs)</p>	<p>While batteries will be critical for the transition to a low-carbon economy, their manufacturing, as well as the mining of underlying materials, may entail high carbon- and resource-intensity. That said, their end-use cases arguably work to offset these negative environmental externalities</p>
<p><b>Battery Electric Vehicles (BEVs)</b></p> 	<p>BEVs are powered by rechargeable lithium-ion batteries rather than traditional internal combustion engines that get energy from gasoline or diesel</p>	<p>The overall carbon reduction potential of BEVs will be highly dependent on growth in renewable electricity to cleanly power the batteries, as well as other variable factors like the size of the vehicle and the carbon intensity of the battery manufacturing process</p>
<p><b>Carbon Capture Utilization and Storage (CCUS)</b></p> 	<p>The process of capturing carbon from emission sources and either:</p> <ul style="list-style-type: none"> <li>• Storing the carbon permanently underground in depleted oil and gas reservoirs, or</li> <li>• Using captured carbon to produce low-emissions products, including synthetic fuels<sup>38</sup></li> </ul> <p>CCUS technology has evolved to include direct air capture (DAC), which removes carbon directly from the atmosphere</p>	<p>The emissions-reduction potential for CCUS in industry is significant, especially for decarbonizing the industrial and power sectors, where fossil fuels are unlikely to disappear completely. While it is costly, and the technology still needs to prove scalability, increasing policy support and investment should drive cost improvements over time, with estimates for current costs to fall 30% by 2050<sup>39</sup></p>
<p><b>Hydrogen</b></p> 	<p>Generates energy in the form of heat when it is burned, with only water as a byproduct. Producing hydrogen requires energy, however. There are two main low-carbon types:</p> <ul style="list-style-type: none"> <li>• Green hydrogen is produced by separating water into hydrogen and oxygen using renewables-powered electrolysis</li> <li>• blue hydrogen is produced by separating hydrogen from methane, with the CO<sub>2</sub> byproduct captured and stored through CCUS</li> </ul>	<p>While blue hydrogen is still a lower-carbon option, it has a larger carbon footprint than green hydrogen since approximately 10%-20% of the generated CO<sub>2</sub> cannot be captured.<sup>40</sup> Nonetheless, both offer a scalable and cost-effective option in the near term to reduce emissions in hard-to-abate industries like cement and steel,<sup>41</sup> with green hydrogen in the long term helping to manage the stability of a grid that is highly indexed to renewables</p>
<p><b>Nuclear Power</b></p> 	<p>Generated by using nuclear reactions to produce electricity, nuclear power is carbon-free since nuclear power plants do not burn fuel. It can produce massive amounts of energy and has benefits over renewable power generation due to its high relative capacity factor, which makes it reliable and appropriate as a base-load source of power</p>	<p>Nuclear as a low-carbon solution has historically been approached with more caution given concerns over security and radioactive waste. As it stands today, nuclear power is more expensive than solar photovoltaic and onshore wind. The full lead time for completion of nuclear projects can be 10-15 years, versus just six for solar and four for wind<sup>42</sup></p>

Source: Morgan Stanley Wealth Management Investing with Impact as of October 2022

### Investor Debates and Trade-Offs

Below are some key debates associated with the transition to a low-carbon economy and important issues pertaining to them. Investors may encounter several of these debates as they develop a disciplined climate action investing plan.

#### Debate 1: Energy Security Versus Energy Transition

The transition to lower-carbon energy sources will not be a straight line to net zero. The rise in energy prices we saw in 2022 as a result of the Russia-Ukraine conflict and COVID-related disruptions created a short-term setback on the decarbonization path. Nevertheless, governments, corporations and investors continue to offer broad-based support for renewables development, electric vehicle carbon capture and other technologies in a manner that is compatible with ensuring secure traditional energy sources to sustain economic growth.<sup>43</sup>

In our view, the world must reduce emissions to avoid the worst social and financial costs of a changing climate, and longer-term energy security likely will be heavily tied to a successful energy transition. Energy security and the transition are not mutually exclusive and we believe can be pursued in parallel. That said, it will be critical to avoid the costs associated with a poorly managed transition strategy. Governments will need short-term solutions to meet domestic energy demands until renewable sources make up the lion's share of power generation.

#### Debate 2: Short-Term Versus Long-Term Costs

The trade-off between higher near-term costs and long-term gains is relevant to both the energy transition, with potentially heightened short-term energy price volatility as fossil fuels are phased out, and to corporations making low-carbon investments while trying to simultaneously meet quarterly financial targets. Climate solutions often require substantial upfront costs, with many of the benefits realized only later through mechanisms like efficiency gains and fuel savings, as well as minimized exposure to both physical and transition risks.

While the best avenue to take in order to mitigate this trade-off and develop effective incentives is perhaps a source of debate, one potential market mechanism is carbon pricing.<sup>44</sup> Carbon pricing aims to capture the external costs of carbon emissions and tie them to their sources. This should encourage higher-emitting actors to decide for themselves whether to discontinue carbon-intensive activities, reduce them or continue and simply pay for them. Another approach is government subsidization of low-carbon alternatives, which the US government recently pursued with the passage of the Inflation Reduction Act.

#### Debate 3: Engagement Versus Divestment

Thoughtful exclusionary screens centered on fossil fuel

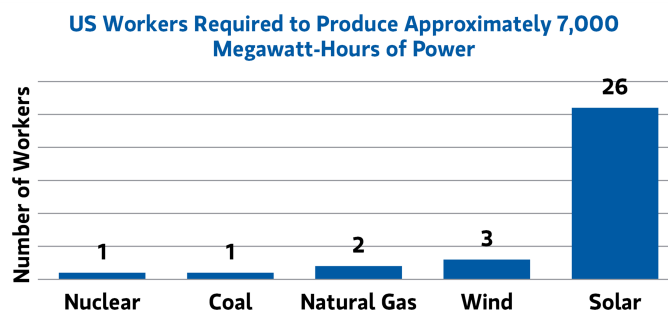
divestment are the most appropriate approach for certain value-based investors. That said, there is growing skepticism about the effectiveness of blanket exclusionary screens in fostering desired impact outcomes and increasing support for a more engagement-driven approach.<sup>45</sup> Engagement—or “influence” in the context of the Investing with Impact Framework—is intended to drive positive environmental change through active dialogue with carbon-intensive investment companies without necessarily having to remove any portfolio holdings.

Engagement advocates view it as a more effective tool for altering corporate behavior than divestment, as well as a more realistic approach given the size of the fossil fuel industry and the role it will likely play in the transition. Read the accompanying climate action implementation guide to further explore these two approaches.

#### Debate 4: A Just Transition

The idea of a “just transition” is an underappreciated aspect of decarbonization. While it is widely acknowledged that a transition away from a carbon-intensive economy will result in short-term job losses in carbon-intensive industries, it is estimated that a successful “just transition” could create a net employment gain of 37 million jobs across the world by 2030, with a direct economic gain of \$26 trillion.<sup>46</sup>

#### Exhibit 10: Potential for Energy Sector Job Creation Is Tied to the Energy Transition



Source: US Department of Energy, Morgan Stanley Wealth Management Global Investment Office as of June 2023

Much of this debate has centered around the energy sector, particularly on the effects of a low-carbon transition in the coal sector where global employment continues to decline.<sup>47</sup> Yet, it is estimated that the transition could ultimately result in a net gain of 25 million energy sector jobs.<sup>48</sup> Production and delivery of renewable energy products, infrastructure and services tend to be *more* labor-intensive than those related to traditional energy. Therefore, the expansion of a lower-carbon economy should translate into higher labor demand across many sectors (see Exhibit 10).

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There is also concern over inequity between developed and developing countries related to the transition. Developing countries are more vulnerable to food and water insecurity.<sup>49</sup> Additionally, they are far more exposed to natural disasters and the negative consequences of rising temperatures due to their geographical locations, deforestation and lack of access to resources such as air conditioning and cooling centers.<sup>50</sup> Furthermore, there is concern over the fact that developing countries will not just disproportionately bear the adverse effects of climate change, but also the economic burden of the transition, despite being less responsible for global emissions. In 2023, low-income and lower-middle-income countries accounted for only around 18% of global CO<sub>2</sub> emissions from fossil fuel combustion and industrial processes despite accounting for more than half of the world's population.<sup>51</sup>

From a big picture standpoint, climate change is an intersectional problem that coincides with issues of income inequality and social justice. Those who are most vulnerable to its effects and to the short-term dislocations caused by the energy transition tend to also be those who are socioeconomically disadvantaged. It will be critical to design an equitable and inclusive transition plan that accounts for

any adverse impacts on low-income households, health and employment globally. As the energy system shifts to one that is based primarily on clean sources of power, developing countries will need support from developed nations to bridge the gap, with sufficient financing and technology transfer. Workers who are employed in industries with heavy emissions levels must be retrained so they can access decarbonization-related job opportunities and so that the shift to a low-carbon economy does not come at the expense of their financial well-being.

## Conclusion

A changing climate is one of the defining issues of our time, posing significant risks to global health, food, water and energy security, as well as presenting a significant opportunity for investors to capitalize on decarbonization. Morgan Stanley is well-positioned to help investors develop a disciplined plan for climate-action investing that seeks to meet investors' financial and impact goals. Please reference the accompanying climate action implementation guide to learn more.

### Climate Action Investing Terminology

**Climate** The long-term average of weather conditions in a given place. While the weather can change in minutes or hours, a change in climate is something that develops over longer periods of decades or centuries. Climate is defined not only by average temperature and precipitation but also by the type, frequency, duration and intensity of weather events such as heat waves, cold spells, storms, floods and droughts.

**Climate Action** Advancement of solutions to combat climate change and transition to a less carbon-intensive economy.

**Climate Adaptation** Adjustment or preparation of natural or human systems to or for a new or changing environment in order to moderate harm or exploit beneficial opportunities. Climate adaptation solutions include water storage infrastructure to protect from droughts, flood levees to protect from hurricanes and the development of resilient crop varieties.

**Climate Change** Any significant change in climate metrics over an extended period. Among others, these may include major weather changes, such as those pertaining to temperature, precipitation or wind pattern.

**Carbon Footprint** The total amount of greenhouse gases emitted into the atmosphere each year by a person, family, building, organization or company.

**Climate Mitigation** Efforts to reduce or prevent emission of greenhouse gases through the use of new technologies and renewable energies (including making older equipment more energy-efficient) or by changing management practices or consumer behavior. Climate-mitigation solutions include increasing reliance on renewables or alternative energy-fueled vehicles.

**Decarbonization** The removal or reduction of CO<sub>2</sub> from the atmosphere.

**Emissions** Substances released into the atmosphere (usually a gas when referring to climate change).

**Fossil Fuels** A general term for organic materials, formed from decayed plants and animals, that have been converted to crude oil, coal, natural gas or heavy oils by exposure to heat and pressure in the Earth's crust over hundreds of millions of years.

**Greenhouse Gas (GHG)** Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include carbon dioxide, methane, nitrous oxide and fluorinated gases like chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride.

**Net Zero** A concept referring to a reduction in the overall production of greenhouse gases, with any remaining emissions offset by removing an equivalent amount from the atmosphere to reach a level at which no gases are added on a net basis. An increasing number of asset owners, asset managers, corporations and governments have set net-zero emission goals with a targeted date for achieving net zero. This is different from the emerging concept of true-zero emissions, which refers to the elimination of GHG emissions from human activity altogether.

**Renewable Energy** A term (also "renewables") that refers to energy resources that are naturally replenishing, such as biomass, hydro, geothermal, solar, wind, ocean thermal, wave action and tidal action.

**Weather** The state of the atmosphere at any given time and place. Most of the weather that affects people, agriculture and ecosystems takes place in the lower layer of the atmosphere. Familiar aspects of weather include temperature, precipitation, clouds and wind that people experience throughout the course of a day. Severe weather conditions include hurricanes, tornadoes, blizzards and droughts.

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### Disclosure Section

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#### Index Definitions

For other index, indicator and survey definitions referenced in this report please visit the following: <https://www.morganstanley.com/wealth-investmentsolutions/wmir-definitions>

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