

Investing in Times of Climate Change 2022

Assets in climate funds double as product development accelerates.

Morningstar Manager Research

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In this third edition of [Investing in Times of Climate Change](#), we provide an updated view of the rapidly evolving global landscape of climate funds. Funds with a climate-related mandate represent a wide and growing range of strategies that aim to meet varying investor objectives and preferences, from decarbonizing a portfolio to investing in climate solutions.

Key Takeaways

- ▶ The menu of options for climate-focused investors across the globe expanded considerably in 2021. We identified 860 mutual funds and exchange-traded funds with a climate-related mandate at the end of last year.
- ▶ Assets in these funds doubled in 2021 to USD 408 billion, boosted by increased inflows and an accelerated pace of product development.
- ▶ Fueled by higher investor demand and regulation, Europe remains the largest and most diverse climate funds market, accounting for more than three fourths of global assets.
- ▶ For the first time, China overtook the United States as the second-largest climate funds market, more than doubling in size to about USD 47 billion. Meanwhile, U.S. climate fund assets grew by 45% to USD 31 billion, and the rest of the world also doubled to USD 6.3 billion.
- ▶ The climate funds universe represents a wide range of approaches, which we subdivide into five mutually exclusive categories: Low Carbon, Climate Conscious, Green Bond, Climate Solutions, and Clean Energy/Tech.
- ▶ Climate Solutions and Climate Conscious overtook Clean Energy/Tech as the largest categories in 2021 as investors looked for investment opportunities beyond the renewable energy sector.
- ▶ Low Carbon funds provide the greatest shield from carbon risk but offer little in the way of climate solutions. Conversely, Climate Solutions and Clean Energy/Tech funds offer high exposure to climate solutions but also currently carry high carbon risk. Many of these funds invest in transitioning companies that operate in carbon-intensive sectors such as utilities, energy, and industrials and that are developing solutions to help reduce their own carbon emissions and that of others.

Introduction

In 2021, climate action and commitments accelerated among companies, asset managers, and investors—driven by [COP26](#), a change in the U.S. administration, the [increased adoption of sustainable funds](#), and rapid growth in industry collaborations such as the [Glasgow Financial Alliance for Net Zero](#).

However, it is increasingly clear that we need to see faster and more widespread action. In its [latest report](#), the Intergovernmental Panel on Climate Change warned that the window of opportunity to take any meaningful climate action is rapidly closing. Worldwide emissions must fall by half by 2030 and reach net zero by 2050 to have any chance at keeping global temperature rise under 1.5°C. Our planet's average temperature is already 1.1°C warmer than preindustrial levels, with the last five years the warmest on record.

Climate change poses the biggest long-term threat of our time, impacting not only how we live but also how we invest. By [some estimates](#), the global economy could shrink by 18% in the next 30 years if no action is taken to mitigate climate change. Investors' portfolios are at risk from climate change. Some investments will be disadvantaged in the transition to net zero, while others will find themselves vulnerable to physical risks from extreme events caused by climate change.

The route to net zero is highly uncertain, but [according to the International Energy Agency](#), achieving net-zero carbon emissions by 2050 requires huge declines in the use of coal, oil, and gas, and no investment in new oil & gas fields. Also, [as much as USD 173 trillion](#) of investment capital needs to be directed into climate solutions. Mark Carney, special U.N. envoy for climate action and former Bank of England governor, calls the move to net zero the “[greatest commercial opportunity of our time](#).”

Fund investors globally have a growing number of choices to mitigate climate risk in their portfolios and invest in climate-related opportunities. The year 2021 saw major development in the climate funds universe globally, but especially in Europe. The introduction of the [Sustainable Finance Disclosure Regulation](#) in March ratcheted up the demand for innovative investment strategies incorporating climate considerations. Recent improvements in climate-related data empower asset managers to better understand and interpret the climate profile of companies and countries and, as a result, design strategies that meet clients' needs and preferences.

In this third edition of [Investing in Times of Climate Change](#), we provide a view of the rapidly evolving global landscape of climate-focused funds at the end of 2021. Climate funds represent a wide range of strategies. We examine the continued growth in assets, flows, and products. We also analyze these funds through the lens of Morningstar's carbon metrics. We examine involvement in fossil fuels, participation in carbon solutions, and level of carbon intensity and carbon risk. We also discuss how these climate funds can fit into an investor's portfolio. And finally, we look inside at their most common holdings. The purpose of this report is to help climate-focused investors navigate the expanding array of options available to them.

Defining the Universe of Climate Funds

For the purpose of this report, we have defined the global universe of climate funds as those open-end funds and exchange-traded funds that have a branded, climate-focused mandate.

Morningstar's universe of climate funds is based on intentionality rather than holdings. For example, many sustainable portfolios score well on climate metrics, but if climate issues are not the focus of these funds' investment strategies, they will not be included in our universe. To identify intentionality, we relied on a combination of fund names (a strong indicator of intentionality) and information found in legal filings.

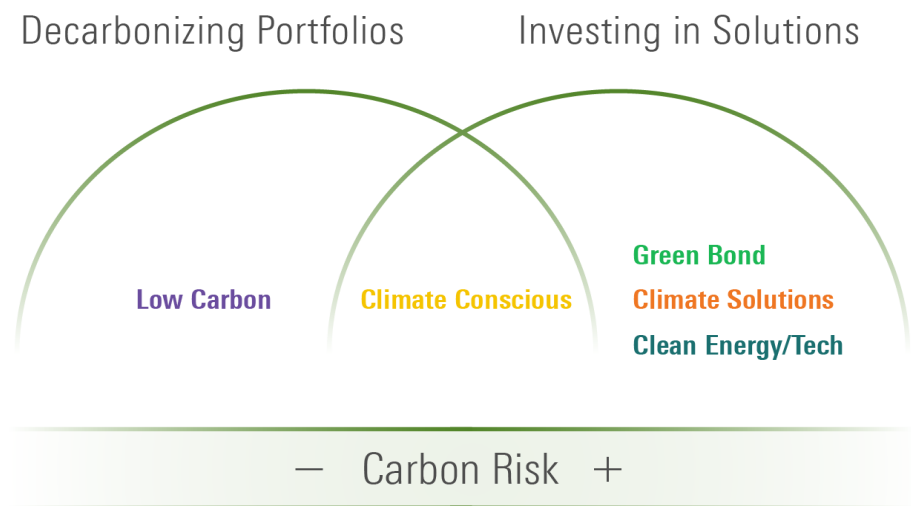
The funds in our list are marketed as climate-themed funds using a range of terms in their names (or index names in the case of passive funds), such as *climate*, *carbon*, *transition*, *green*, and *clean energy*, or environmental funds with a strong focus on climate-related issues. Using natural-language-processing technology to comb Morningstar's comprehensive global fund database, we made efforts to identify as many of these funds as possible. We used this sample to analyze the latest trends in terms of assets, flows, product development, and the climate-related profiles of these portfolios.

In this spirit, we did not include those funds whose sole climate-related mandate is to exclude fossil fuel companies. Globally, a small number of funds market themselves as ex-fossil fuel (including *ex-fossil fuel* in their names), but many more unbranded funds similarly exclude fossil fuels. For many asset managers, fossil fuels have become part of a broader exclusion list, alongside weapons, tobacco, and other controversial activities. Moreover, the scope of fossil fuel exclusions varies greatly, from the limited omission of companies involved in thermal coal extraction and generation to full-scale removal of companies with fossil fuel reserves or any involvement in fossil-fuel-related activities, including exploration, production, and distribution. Excluding fossil fuels is one way to decarbonize a portfolio, but we elected to exclude ex-fossil fuel funds from this study to ensure a well-defined and cohesive universe of climate funds.

Similarly, we have excluded the growing number of funds that seek to maintain a lower carbon intensity than their investable universe without providing a specific carbon reduction target. For most of these funds, climate considerations represent only a small part of the investment process. We have constrained our climate fund universe to those funds that use quantifiable binding climate-related criteria. Therefore, for example, we have included funds that aim to reduce their carbon intensity by at least 20% relative to their reference benchmarks.

Our universe of climate funds¹ is subdivided into five mutually exclusive groups based on investment objective and policy, diversification, and sector exposure: Low Carbon, Climate Conscious, Climate Solutions, Green Bond, and Clean Energy/Tech. Below is a representation of the five groupings, with the role they can play in an investment portfolio, from decarbonizing a portfolio to promoting the climate transition by investing in green solutions.

¹ Our list of funds spans all key asset classes, including equity, fixed income, allocation, and alternatives. We have excluded carbon credit (or carbon allowance) funds.

Exhibit 1 Climate Strategies and Their Role in Portfolios

Source: Morningstar Research.

► **Low Carbon**

Low Carbon funds seek to invest in companies with reduced carbon intensity and/or carbon footprint relative to a reference benchmark. These funds typically market themselves as low-carbon strategies and incorporate quantifiable targets related to carbon emissions reduction. Low Carbon funds tend to offer broad market exposure across all sectors. Examples include strategies such as **Amundi IS Equity Europe Low Carbon** and **TIAA-CREF Social Choice Low Carbon Equity Fund**.

► **Climate Conscious**

Climate Conscious funds select or tilt toward companies that consider climate change in their business strategy and therefore are better prepared for the transition to a low-carbon economy. Climate Conscious funds tend to invest in a mix of companies: those that positively align with the transition and those that provide climate solutions. Examples include **Aviva Investors Climate Transition Euro Equity** and **DNCA Invest Beyond Climate**. Also included in this category are passive funds tracking EU Paris-aligned benchmarks (EU PAB) or climate-transition benchmarks (EU CTB). These benchmarks are designed to account for both risk mitigation and opportunity-seeking, and to match the transition to a climate-resilient economy. An example is **Lyxor Net Zero 2050 S&P Eurozone Climate PAB ETF**. Climate Conscious funds share many characteristics with both Low Carbon and Climate Solutions funds. As such, Climate Conscious represents somewhat of a hybrid group.

► **Green Bond**

Green Bond funds invest in debt instruments that finance projects facilitating the transition to a green economy. The [Green Bond Principles](#), formulated by the International Capital Market Association, provide high-level categories for eligible green projects. The eligible categories include, but are not limited to, renewable energy, energy efficiency, pollution prevention and control, clean transportation,

sustainable water and wastewater, climate change adaptation, eco-efficient and/or circular economy adapted products, and green buildings. We have also included in this grouping a couple of climate bond funds that have slightly broader mandates, including **LO Funds Global Climate Bond** and **DPAM L Bonds Climate Trends Sustainable**.

► **Climate Solutions**

Climate Solutions funds target companies that are contributing to the transition to a low-carbon economy through their products and services and that will benefit from this transition. For example, **Candriam SRI Equity Climate Action Fund** invests in companies for which climate change solutions are central to their growth story and whose products, processes, technologies, and/or services address climate challenges. **Wellington Climate Strategy** has a similar strategy. Also included in this category are funds that provide exposure to companies engaged in the global hydrogen industry, including hydrogen producers, fuel cell manufacturers, or companies in the electrolysis sector.² An example is **L&G Hydrogen Economy ETF**. This category also encompasses several circular economy funds, such as **BlackRock Global Funds - Circular Economy Fund**, which invests in companies that contribute to the advancement of a circular economy across four predefined categories—that is, adopters, enablers, beneficiaries, and business model winners. Climate Solutions funds differ from Climate Conscious funds in that they invest primarily in companies whose goods and services provide solutions for climate change mitigation and adaptation. Their sector exposure is therefore more concentrated.

► **Clean Energy/Tech**

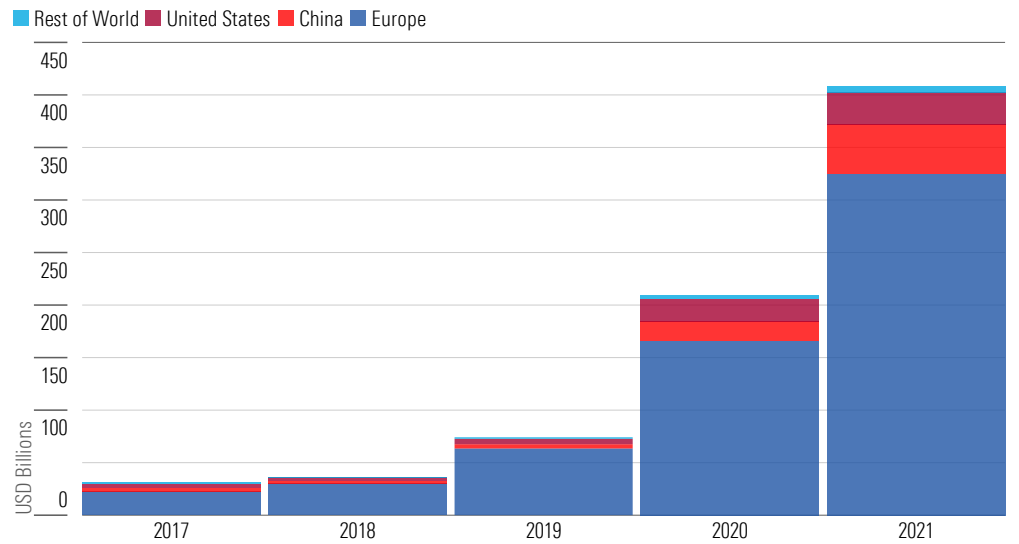
Clean Energy/Tech funds invest in companies that contribute to or facilitate the clean energy transition. This includes renewable energies such as wind, solar, wave, and geothermal power along with grid infrastructure improvements, transmission and distribution, energy storage, and innovative technologies such as carbon capture and storage. Clean Energy/Tech funds are characterized as sector-specific, are typically more concentrated than the first three fund groupings above, and often have a bias toward mid- and small caps. Examples include **First Trust Nasdaq Clean Edge Green Energy Index Fund** and **RobecoSAM Smart Energy**, which invests across renewable energy enablers and producers, “smart-grid” distribution networks, energy efficient storage and power management technologies, and the electrification of end-use applications.

² The hydrogen sector is undergoing a transitional stage, but currently, fossil fuels remain the primary source for hydrogen production, with 6% of global natural gas and 2% of global coal going to hydrogen production, according to IEA.

Global Summary

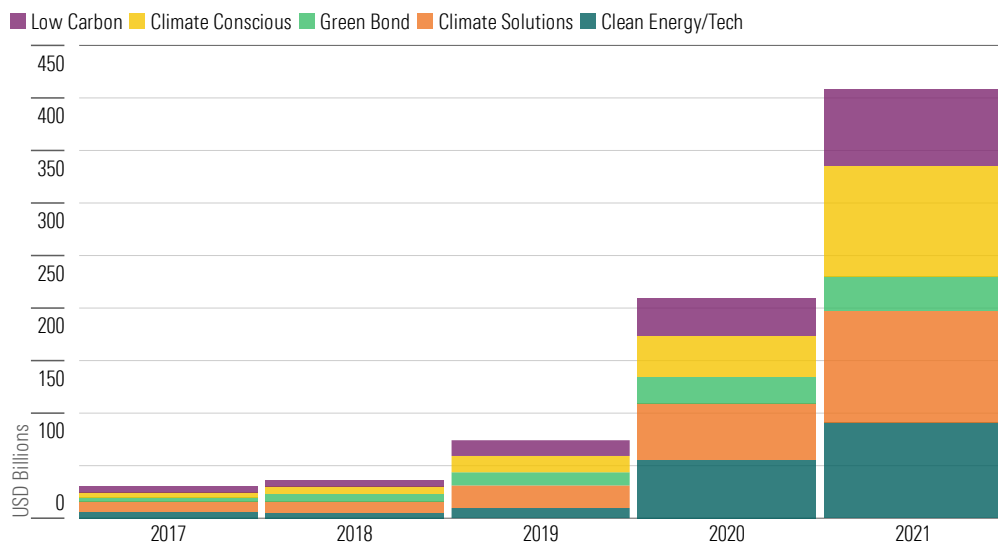
As of December 2021, there were 860 climate funds that fit our definition, with collective assets under management of USD 408 billion worldwide. Global assets have doubled in one year, boosted by continued fund flows and an accelerated pace of product development.

Exhibit 2 Global Landscape of Climate Funds



Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

Unsurprisingly given its greater commitment to a climate agenda, Europe remains the largest climate funds market, accounting for more than three fourths of global assets. For the first time last year, China overtook the United States as the second-largest climate funds market, more than doubling in size in one year to about USD 47 billion. Meanwhile, U.S. climate fund assets grew by 45% to USD 31 billion. In the rest of the world, climate funds gained traction, too. Assets almost doubled over the last year to USD 6.3 billion.

Exhibit 3 Global Landscape of Climate Funds

Source: Morningstar Direct, Morningstar Research. Data as of December 2021.

Both Climate Solutions and Climate Conscious overtook Clean Energy/Tech as the largest categories in 2021 as investors looked for investment opportunities beyond the renewable energy sector. While Climate Solutions fund assets doubled to USD 106 billion, Climate Conscious funds saw an almost threefold increase to USD 105 billion last year.

Europe

Europe continues to dominate the global climate funds universe, housing almost 80% of the global assets and 563 out of the 860 funds that we have identified globally, as of December 2021.

Growth has accelerated over the past couple of years, fueled by increased investor demand and regulation. The years 2020 and 2021 were pivotal for sustainable investing in Europe with the rollout of two groundbreaking classification and disclosure regulatory frameworks as part of the European Union's Action Plan for Financing Sustainable Growth³: the [EU Taxonomy](#)⁴ and the [Sustainable Finance Disclosure Regulation](#)⁵. Both initiatives have had a ripple effect across multiple areas, including climate investing.

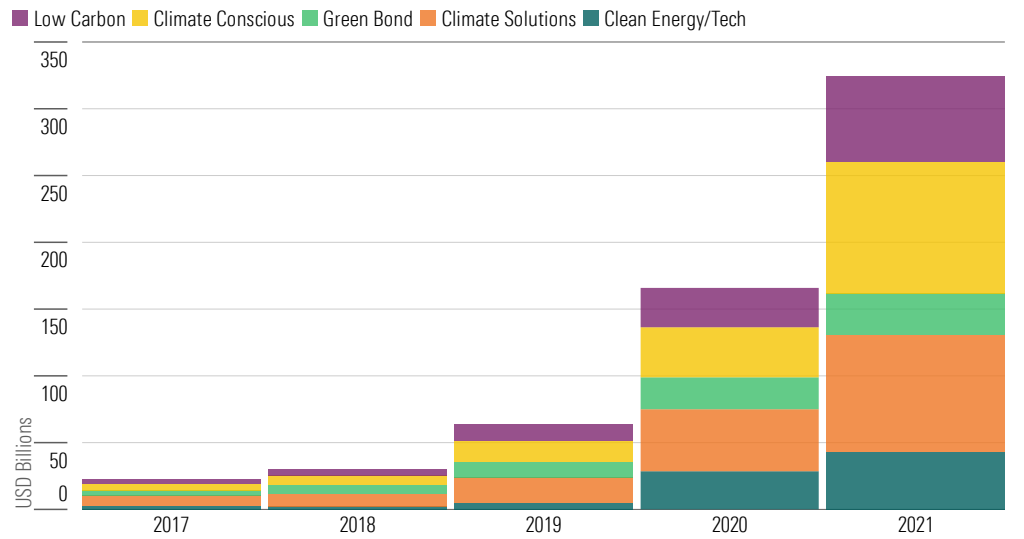
³ The EU Action Plan for Financing Sustainable Growth agreed in 2018 laid the groundwork for a number of political agreements, which aim to define sustainable activities, create rules and increase disclosure related to sustainability products and sustainable investments, and provide climate benchmarks. This includes introducing amendments to existing regulatory frameworks (e.g. the Markets in Financial Instruments Directive (MiFID II), undertakings for the collective investment in transferable securities (UCITS), the Alternative Investment Fund Managers Directive (AIFMD), Solvency II) as well as introducing new regulations affecting the asset management industry, such as the SFDR, the EU Taxonomy Regulation, and Benchmark Regulations for EU climate benchmarks and ESG disclosures.

⁴ The EU Taxonomy, agreed by the EU in 2019, is a classification system defining environmentally sustainable economic activities. It establishes six environmental objectives: 1. climate change mitigation; 2. climate change adaptation; 3. sustainable use and protection of water and marine resources; 4. transition to a circular economy; 5. pollution prevention and control; and 6. protection and restoration of biodiversity and ecosystems.

⁵ The Sustainable Finance Disclosure Regulation, which came into effect on 10 March 2021, aims to trigger changes in behavioral patterns in the financial sector, discouraging greenwashing and promoting responsible and sustainable investments. It requires that asset-management companies provide information about their investments' ESG risks as well as their impact on society and the planet.

Assets in European climate funds expanded over fivefold in the past two years. In 2021 alone, European climate funds almost doubled to USD 325 billion. The most significant growth was observed among Climate Conscious and Low Carbon funds: Assets in the former rose by 164% and the latter by 116%, and Climate Conscious became the largest category, housing 31% of European climate fund assets ahead of Climate Solutions (27%).

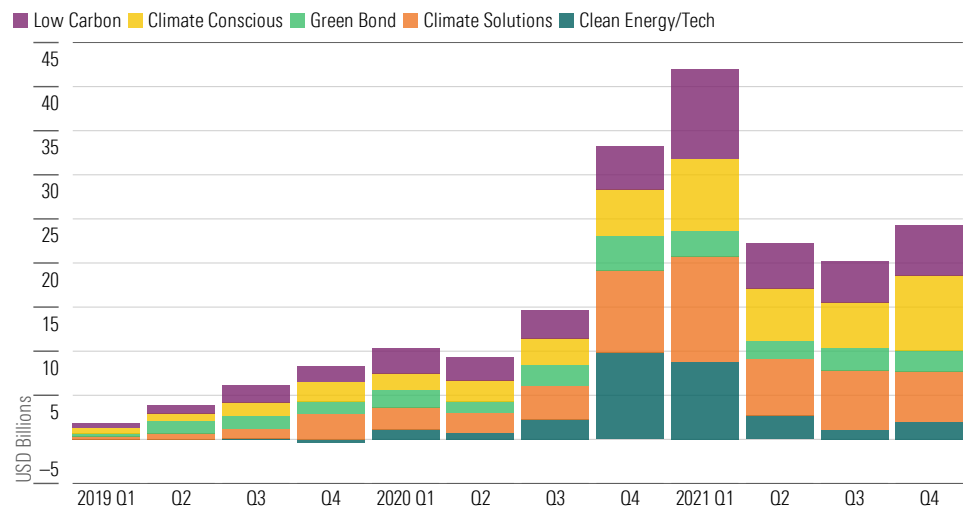
Exhibit 4 Assets in European Climate Funds



Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

The accelerated asset growth can be mainly explained by the increased inflows of money poured into these funds, especially Climate Solutions and Climate Conscious funds.

Exhibit 5 Flows Into European Climate Funds

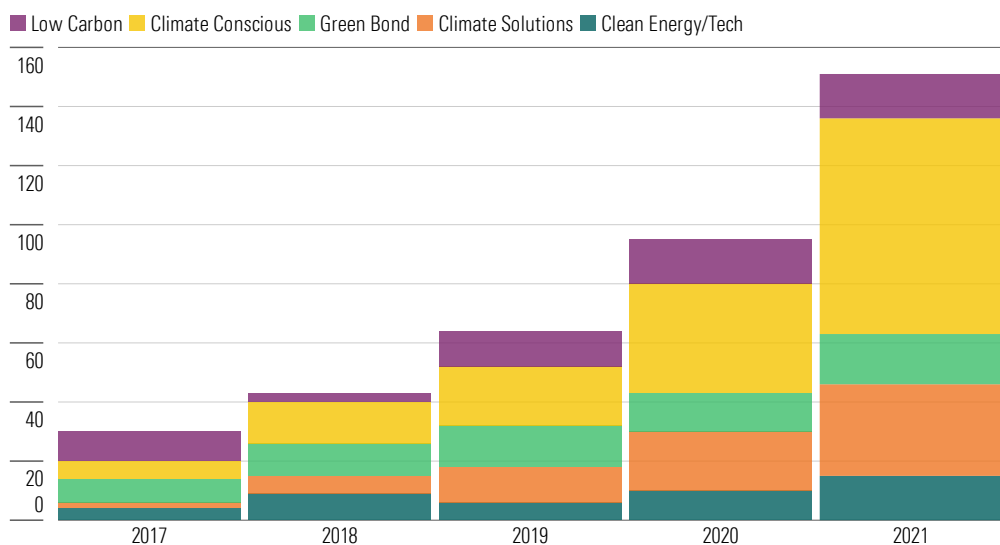


Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

In the first quarter, fund flows into this universe reached a high of USD 42 billion, with January being a record-breaking month, hitting almost USD 18 billion on high valuation for renewable energy stocks. Flows into climate funds slid thereafter [amid a general fund market slowdown after the first quarter](#). Over the full year, flows into the European climate fund universe still amounted to a record high of over USD 108 billion, up 61% compared with 2020.

Along with the strong inflows, the number of funds available to European climate-focused investors saw significant growth, with the launch of 151 new climate funds last year. Climate Conscious strategies represented almost half of the new launches (73 funds), including **L&G ESG Paris Aligned World Equity Index Fund** (USD 945 million) and **Aviva Investors - Climate Transition Global Credit Fund** (USD 561 million). The former tracks a Paris-aligned benchmark (more detail on funds tracking EU climate benchmarks later in this section), while the Aviva fund allocates investment grades to companies that are either providing solutions to climate change or orienting their business models to a low-carbon economy.

Exhibit 6 Launches of European Climate Funds



Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

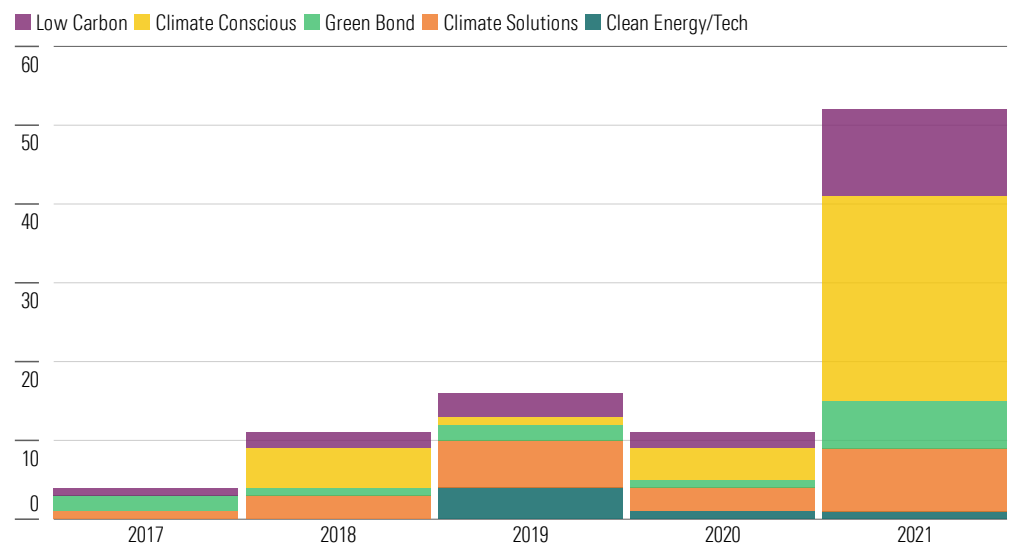
In other climate categories, notable launches in terms of assets include **Northern Trust World Sustainable Select SDG Index Fund** (USD 3.5 billion). The fund tracks the MSCI World Select ESG Leaders Low Carbon Impact Index, which seeks to achieve at least 50% carbon footprint reduction relative to the parent benchmark by excluding companies with the highest carbon emissions intensity and the largest owners of fossil fuel reserves. **AXA World Funds - ACT US High Yield Bonds Low Carbon** stood out as another successful Low Carbon fund launch last year. The fund targets 20% reduced average carbon intensity and water intensity relative to its reference benchmark.

Examples of new Climate Solutions funds include **Amundi Soluzioni Italia - Progetto Azione Energy Transition** and **Mandarine Global Transition**. With assets of USD 1.2 billion, the former invests in

companies that contribute to and benefit from the process of energy transition and development of green technologies. The latter targets companies whose economic model, products, or services respond significantly and positively to the challenges of energy and ecological transition.

Recent regulatory development and investor demand have also given rise to repurposed funds and the inclusion of explicit climate-related characteristics in investment objectives. Last year, we identified 52 such funds, clustered in the Climate Conscious (26) and Low Carbon (11) categories. The larger representation of these two groupings is not surprising given their broad industry exposure. Repurposing a traditional strategy or tweaking a sustainable one into a climate-flavored product typically involves reducing the portfolio's allocation to the most carbon-intensive companies and controversial sectors and/or increasing exposure to more climate-friendly securities.

Exhibit 7 European Repurposed Climate Funds



Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

Recent examples of repurposed funds include a range of **Lombard Odier - TargetNetZero** equity and corporate bond funds, which now focus on companies with decarbonization pathways. In addition to market capitalization and carbon footprints, companies in each of the portfolios are weighted according to their respective decarbonization paces estimated by Lombard Odier's proprietary approach in order to achieve a faster rate of reduction in carbon emissions when compared with the benchmark. These funds feature in our Climate Conscious category.

Other notable repurposed funds in size include two ranges of **Handelsbanken Index Criteria** strategies and **iShare MSCI ESG ETFs**, which switched to EU Climate Benchmarks. Total assets in these two fund ranges amounted to USD 28 billion at the end of 2021.

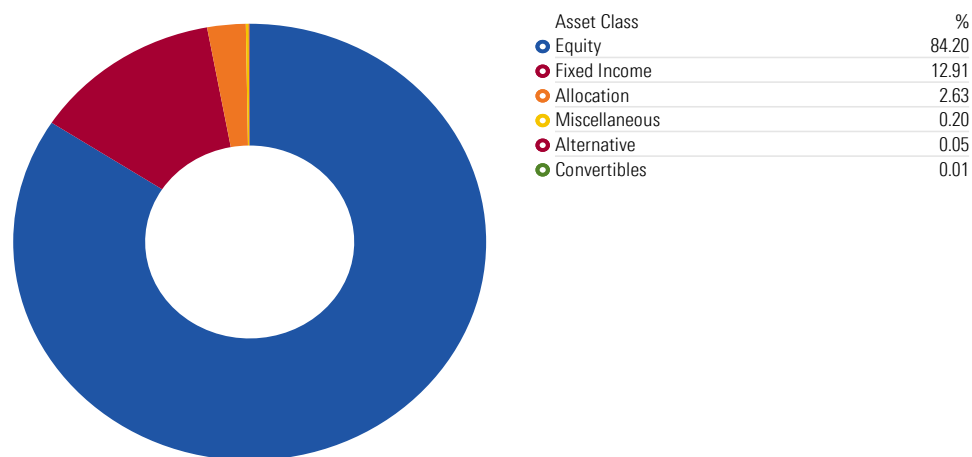
Also noteworthy are four Tikehau strategies, including **Tikehau Global Short Duration**, which recently incorporated a specific climate target into its investment process. Using proprietary ESG and climate risk

data, the weighted average carbon intensity of the portfolio must be kept at least 20% lower than a composite reference index. In a similar vein, other Tikehau funds aim for between 20% and 30% reduction in their overall greenhouse gas emissions compared with the corresponding benchmark indexes. These funds have been added to our Low Carbon category.

Following the introduction of SFDR in March, many more funds have committed to lower carbon intensity relative to their benchmarks without specifying the extent of the reduction. As more asset managers commit to Net Zero by 2050 and start implementing their decarbonization plans, we expect to see more existing funds tweak their investment objectives to include quantified emission reduction targets.

Last year, as is customary with sustainable funds, equity strategies dominated the climate fund universe, representing more than 84% of climate-offering assets, while fixed-income products accounted for close to 13%. Out of the 384 equity funds, exactly half (192) offered global exposure, with a majority (149) focused on large-cap companies. Out of the 141 fixed-income strategies, 55 provided global exposure, representing half of the assets.

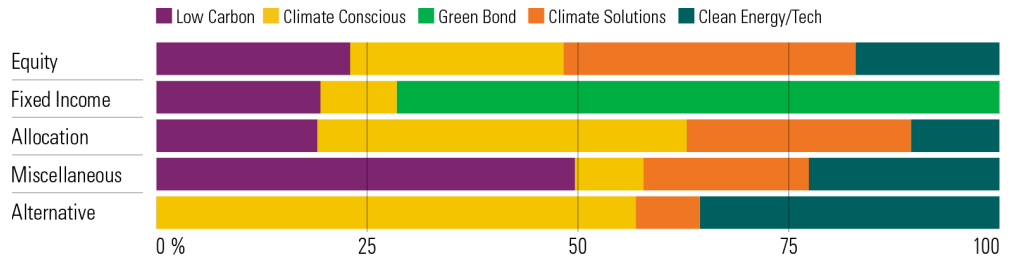
Exhibit 8 Asset Class Breakdown of European Climate Funds



Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

Looking at equity funds, the split between the different climate approaches was relatively balanced, albeit overtopped by Climate Solutions funds, which captured a 33% market share. In the fixed-income space, unsurprisingly, green-bond funds towered above all other types of climate strategies with a sweeping 75% market share.

Exhibit 9 Asset Class Breakdown of European Climate Funds by Climate Category



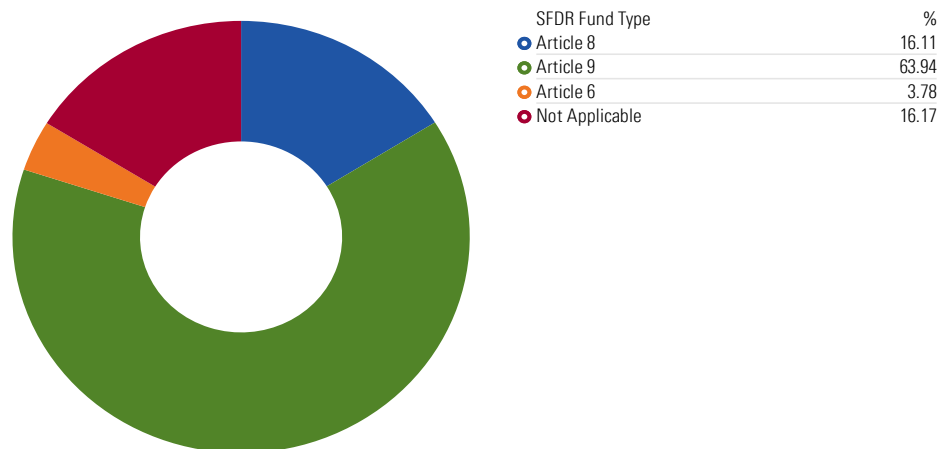
Source: Morningstar Direct. Morningstar Research. Data as of December 2021. Excluded from the exhibit, convertibles consisted of one Climate Conscious fund.

Meanwhile, Climate Conscious funds constituted the majority of the allocation products, followed by Climate Solutions. In the Clean Energy/Tech category, we find **Anima Investimento Clean Energy 2026** (USD 892 million), which invests in a diversified portfolio of equities, fixed income, and derivatives, with equity exposure targeted at companies offering products and services that promote the production of energy using renewable sources and companies operating in the production and trading of energy from inexhaustible sources.

SFDR

Since the introduction of the Sustainable Finance Disclosure Regulation on 10 March 2021, funds available for sale in the European Union have been classified by their managers as Article 6, 8, or 9, depending on their sustainability objectives. Article 8 refers to financial products that promote “environmental and/or social characteristics,” while Article 9 refers to products that have a sustainable investment objective or a reduction in carbon emissions as their objective (for more details, see [SFDR Article 8 and Article 9 Funds: 2021 in Review](#)).

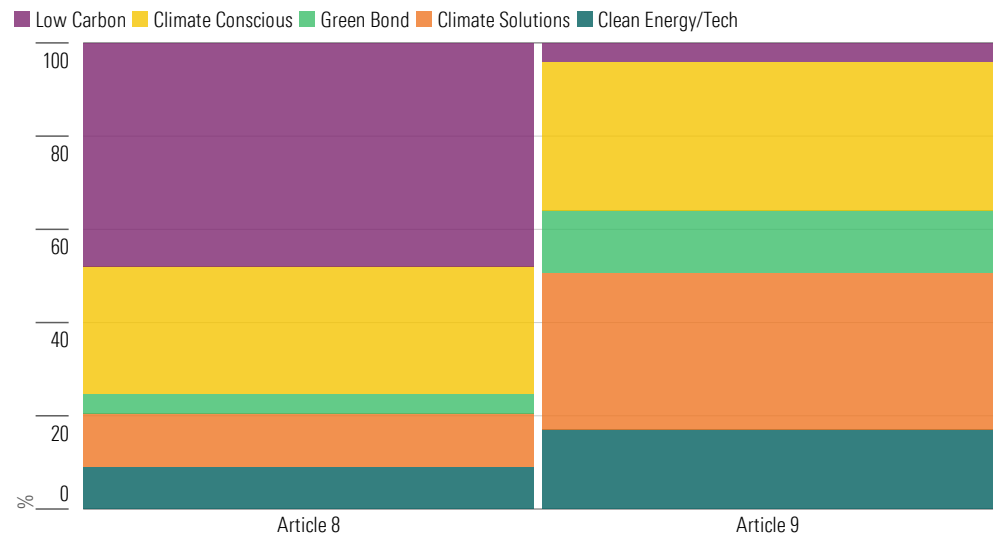
Exhibit 10 European Climate Funds Broken Down by SFDR Fund Type



Source: Morningstar Direct. Morningstar Research. Data as of December 2021. “Not Applicable” refers to funds domiciled in Europe that are out of SFDR scope.

At the end of 2021, Article 9 funds dominated the European climate fund landscape, with USD 208 billion (almost 64%) of the assets. Climate funds classified as Article 8 funds accounted for USD 52 billion, or 16% of the universe.

Exhibit 11 Article 8 and Article 9 Climate Funds



Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

Low Carbon was the largest climate-fund grouping in the Article 8 category, housing 48% of the assets, followed by Climate Conscious.

In contrast, the Article 9 category, which encompasses a more diversified range of climate strategies, has Climate Solutions as the dominating grouping (34%), followed by Climate Conscious (32%), and Clean Energy/Tech (17%). The larger representation of Climate Solutions and Clean Energy/Tech here is hardly surprising. These "dark green" funds focus on companies that offer products and services that contribute to the transition to a low-carbon economy.

What may look surprising to some is that similar strategies in the Article 9 category feature in the Article 8 category, too. For example, a number of Clean Energy/Tech funds, including **Invesco Global Clean Energy ETF** and **Vontobel Energy Revolution**, have been classified by their managers as Article 8. The former tracks an equally weighted index that invests in companies focused on wind, solar, biofuels, hydro, and other renewable energy sources. It also invests in companies involved in energy conversion, storage, conservation, and efficiency. The latter targets companies that operate in the future resources sector that includes the main themes of alternative energy (for example, wind and solar energy, biofuel) and resource scarcity (such as raw materials, product innovation, clean water, forestry, agriculture, and so on).

In [previous research](#), we discussed the different interpretations of SFDR made by asset managers, which have resulted in not only a wide range of investment products classified as Article 8 or Article 9 but also

similar strategies featuring in both categories. We see this playing out very clearly here, especially with Clean Energy/Tech funds. This suggests that some managers may have taken a too-prudent classification approach. It may also be that managers who parked their Clean Energy/Tech funds into Article 8 are less confident in their ability to demonstrate the “sustainable” nature of their investments in their future disclosures and prefer to wait for company data to be available.

Exhibit 12 Largest European Climate Funds

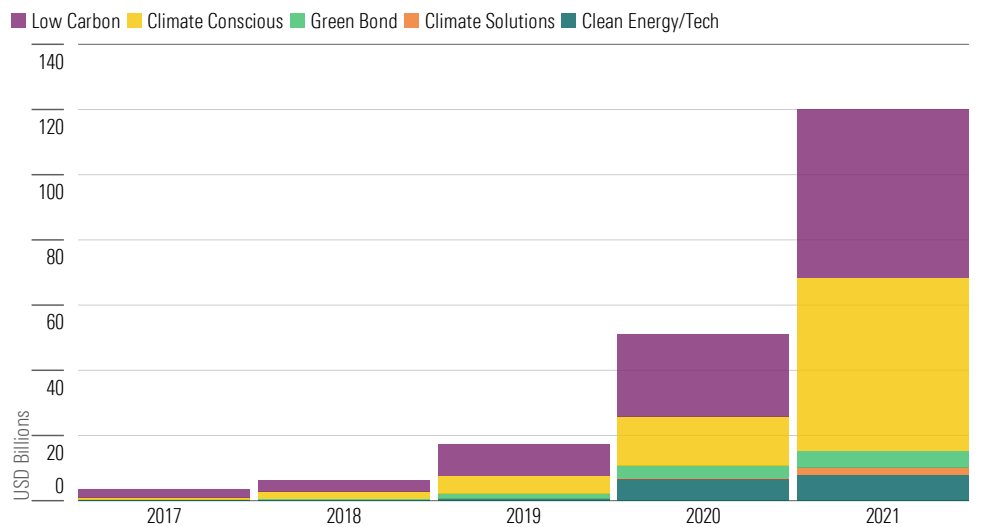
Name	Climate Category	AUM (USD, Bil)
Nordea 1 - Global Climate and Environment Fund	Climate Solutions	12.9
Pictet - Global Environmental Opportunities	Climate Solutions	11.8
Blackrock ACS World ESG Equity Tracker Fund	Low Carbon	9.5
BlackRock Global Funds - Sustainable Energy Fund	Clean Energy/Tech	8.3
Blackrock ACS World Low Carbon Equity Tracker Fund	Low Carbon	7.2
Handelsbanken Global Index Criteria	Climate Conscious	7.1
ACS Climate Transition World Equity Fund	Climate Conscious	6.6
Pictet-Clean Energy	Clean Energy/Tech	6.1
iShares Global Clean Energy ETF	Clean Energy/Tech	5.5
iShares MSCI USA ESG Enhanced ETF	Climate Conscious	5.4

Source: Morningstar Direct, Morningstar Research. Data as of December 2021.

Of the 10 largest climate funds in Europe at the end of 2021, three were newcomers, namely BlackRock's **ACS Climate Transition World Equity Fund**, the **iShares MSCI USA ESG Enhanced ETF**, which tracks a climate-transition benchmark, and **Handelsbanken Global Index Criteria**, which switched to reference a Paris-aligned benchmark in May 2021. Passive funds took over half of the top 10 list.

The Rise of Passive Funds

The increased demand for strategies that incorporate climate factors combined with the continued interest in passive investing are evidenced by the exponential growth of climate index funds and ETFs. Assets totaled USD 121 billion at the end of 2021, more than doubling the previous year's assets.

Exhibit 13 Assets in European Passive Climate Funds

Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

Last year, Climate Conscious funds marginally overtook their Low Carbon peers and housed 45% of the passive climate fund assets. The year 2021 saw a proliferation of funds tracking the newly created [EU Paris-aligned benchmarks and climate-transition benchmarks](#). The two types of benchmarks were designed to consider both climate risk mitigation and investment opportunity-seeking, and to be in line with the transition to a climate-resilient economy, while ensuring a yearly decarbonization target of at least 7%, in line with the decarbonization trajectory of the IPCC's 1.5°C scenario⁶. EU Paris-aligned benchmarks must have a carbon footprint (including scope 3 emissions) 50% below that of the investable universe. For EU climate-transition benchmarks, the carbon footprint only must be at least 30% lower. EU PABs also employ additional activity exclusions on high-emitting fossil fuels and electricity producers, which EU CTBs do not have.

As the end of 2021, we identified as many as 48 passive funds tracking an EU climate benchmark. Among the largest ones are a few **Handelsbanken Index Criteria** funds, which switched to Paris-aligned benchmarks in May, and a range of **iShares ESG Enhanced ETFs**, which converted to climate-transition benchmarks in December.

Meanwhile, the passive Low Carbon fund category saw considerable growth as well. These funds typically track low carbon-branded indexes that offer lower carbon intensity than their parent indexes. Examples include **BlackRock ACS World Low Carbon Equity Tracker Fund** (USD 7.2 billion), which tracks the MSCI World ESG Focus Low Carbon Screened Index. The index selects and weighs the constituents of the MSCI World index in a manner that maximizes its exposure to ESG factors and reduces the carbon

⁶ The main objectives of the new climate benchmarks are to (i) allow a significant level of comparability of climate benchmarks methodologies while leaving benchmarks' administrators with an important level of flexibility in designing their methodologies; (ii) provide investors with an appropriate tool that is aligned with their investment strategy; (iii) increase transparency on investors' impact, specifically with regard to climate change and the energy transition; and (iv) disincentivize greenwashing.

exposure by half with respect to the latter. Meanwhile, **UBS MSCI ACWI ESG Universal Low Carbon Select ETF** (USD 3.5 billion) tracks the MSCI ACWI ESG Universal Low Carbon Select 5% Issuer Capped Index, which excludes the companies in the parent index whose scope 1 and scope 2 carbon emissions intensity is within the top 5%.

Although passive Climate Solutions underwent exponential growth from USD 36.5 million in 2019 to USD 2.3 billion in 2021, its market share is trivial compared with other strategies. Both Clean Energy/Tech and Green Bonds index funds saw steady growth.

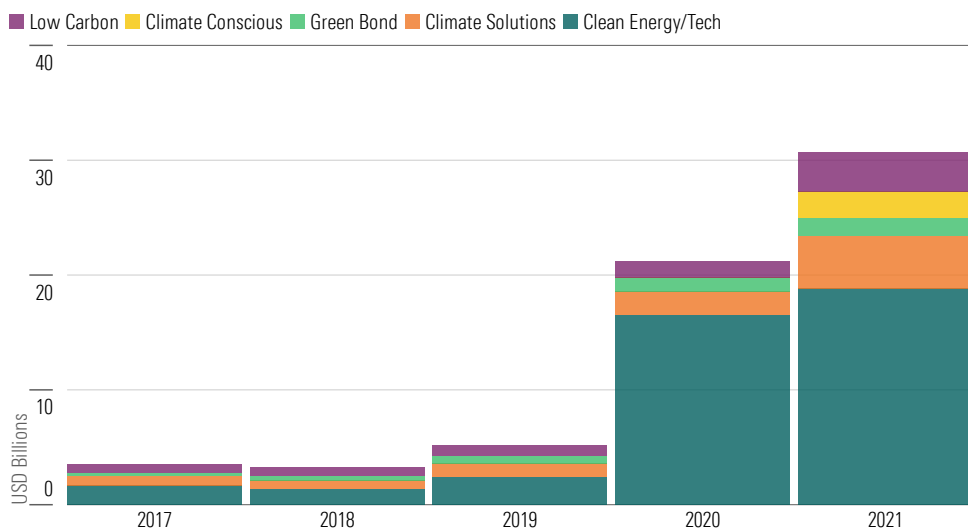
United States

For the third consecutive year, U.S. climate funds set an annual record for net flows in 2021, propelling assets in these funds over the USD 30 billion mark for the first time.

While Clean Energy/Tech funds retain the majority of assets in U.S. climate funds, other categories are gaining ground. At the end of 2021, Clean Energy/Tech funds accounted for USD 18.8 billion in assets, or 61% of the total, down from a record 78% of market share at the end of 2020. This decline in market share can be attributed to strong growth from funds in the Low Carbon, Climate Solutions, and, above all else, Climate Conscious categories.

Climate Conscious funds debuted in the U.S. with the inception of **JPMorgan Carbon Transition U.S. Equity ETF JCTR** in December 2020, but their assets barely registered on the chart in 2020. Thanks in large part to an eye-popping open from **BlackRock US Carbon Transition Readiness ETF LCTU** in April 2021, this category strengthened its presence on the league table over the course of the year.

Exhibit 14 Assets in U.S. Climate Funds



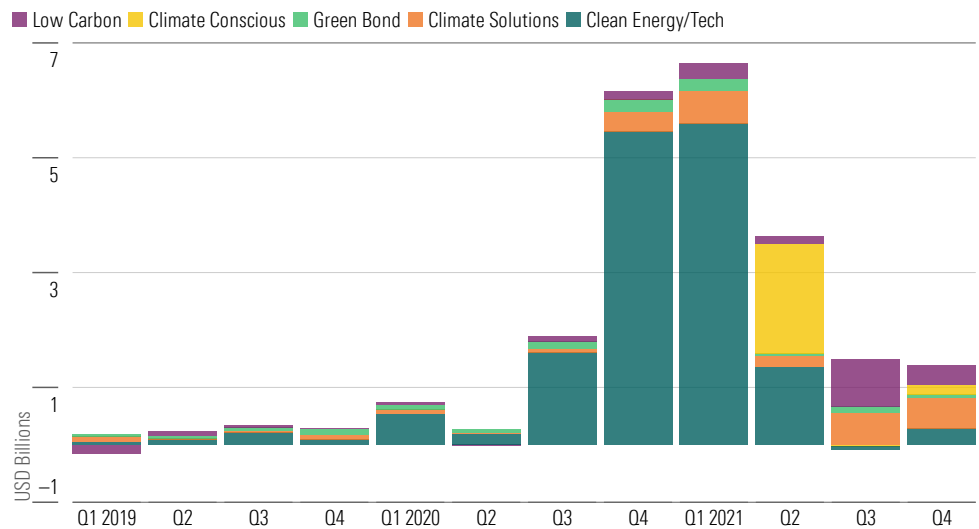
Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

In 2021, climate funds enjoyed nearly USD 13 billion in net flows, a 43% increase over 2020's record. Once again, Clean Energy/Tech funds were the winners, attracting USD 7.2 billion, or 55%, of the total for the year, but their dominance peaked in the first quarter and declined steadily in subsequent quarters. This matches the trend seen in the [U.S. Sustainable Funds Landscape](#), as well as that seen for renewable energy stocks, which were broadly considered to be overvalued for most of 2020.

Investors continue to prefer index-based options, but actively managed strategies gained some ground on their passive peers in 2021. In part, this has to do with the rise of active ETFs, such as **Goldman Sachs Future Planet Equity ETF GSFP** and **Janus Henderson Net Zero Transition Resources ETF JZRO**. These funds are both Climate Solutions funds that seek investments in themes such as clean energy, resource efficiency, sustainable agriculture, and the circular economy. In 2021, active funds netted USD 5.2 billion, nearly 40% of the total for the year. By comparison, active funds attracted only 15% of flows in 2020.

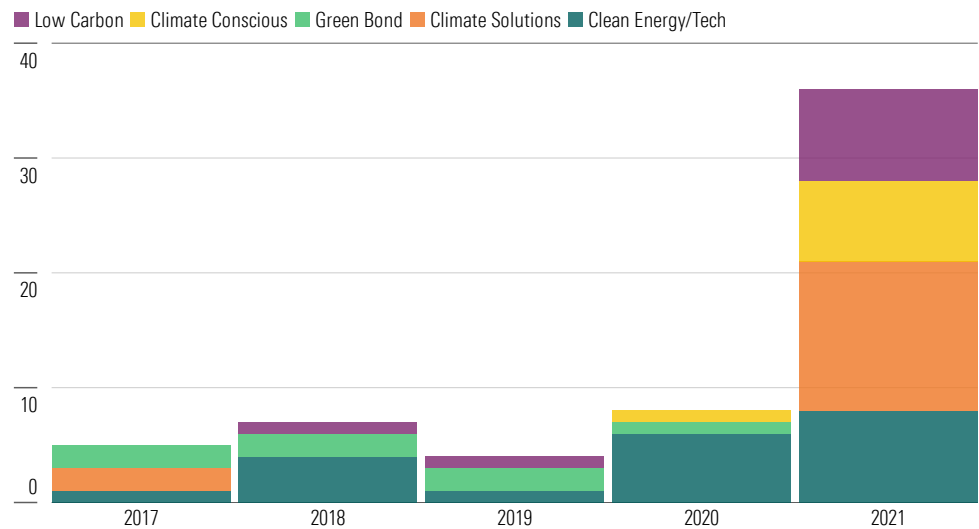
In the U.S. climate fund landscape, **iShares Global Clean Energy ETF ICLN** stands out. Despite suffering outflows in the fourth quarter of 2021, this fund managed to secure the top spot in terms of assets largely because of chart-topping annual net flows of more than USD 2.8 billion, nearly double the runner-up—**BlackRock US Carbon Transition Readiness ETF**.

Exhibit 15 Flows Into U.S. Climate Funds



Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

In the U.S., climate funds made up more than one fourth of all funds launched in 2021. A record 36 climate strategies launched in the U.S. over the year, more than 4 times the total in any previous year.

Exhibit 16 Launches of U.S. Climate Funds

Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

Although Clean Energy/Tech funds continued to dominate flows and assets in U.S. climate funds, they accounted for less than one fourth of climate funds launched over the year.

Most of 2021's new climate funds focus on Climate Solutions, or those companies whose products and services aim to contribute to the transition to a low-carbon economy. For example, **JPMorgan Climate Change Solutions ETF TEMP** invests in companies developing sustainable forms of transportation and less carbon-intensive forms of construction and agriculture.

These funds tend to be more concentrated in terms of sector exposure than funds in the Low Carbon or Climate Conscious categories, but the solutions they target vary. For example, two of the new Climate Solutions strategies—**IQ Clean Oceans ETF OCEN** and **ETFMG Breakwave Sea Decarbonization Tech ETF BSEA**—focus specifically on reducing pollution in waterways and oceans. Some of the companies in these portfolios include Hamburger Hafen und Logistik **HHFA**, an infrastructure company focused on marine ports and green transportation services, and American Water Works **AWK**, a water utilities company.

In the Low Carbon category, **AQR**, a firm that is well known for its alternative strategies, opened its first climate fund in December 2021. **AQR Sustainable Long-Short Equity Carbon Aware QNZIX** targets a net zero carbon positioning by issuing short positions in carbon-intensive companies to offset the carbon emissions of its long portfolio. In other words, the short portfolio serves two main purposes: to hedge against ESG and climate risks arising from companies in the long portfolio and to express the fund manager's views of ESG- and climate-related alpha signals more fully than is possible by underweighting and divesting. This manager believes this approach may drive carbon-intensive companies to adapt their operations more efficiently than other sustainable-investing approaches.

FlexShares launched four of the seven new Low Carbon funds in the third quarter of 2021. This series of passive strategies comprised USD 86.6 million in assets at the end of last year, led by **FlexShares ESG & Climate Investment Grade Corporate Core Index Fund FEIG**, which seeks to maintain lower carbon risk and emissions relative to its benchmark. These new launches bring the total number of climate funds in the U.S. to 82 at the end of 2021.

Exhibit 17 Largest U.S. Climate Funds

Name	Climate Category	AUM (USD, Bil)
iShares Global Clean Energy ETF	Clean Energy/Tech	5.6
First Trust Nasdaq Clean Edge Green Energy ETF	Clean Energy/Tech	2.8
Pax Global Environmental Markets	Climate Solutions	2.7
Invesco Solar ETF	Clean Energy/Tech	2.7
BlackRock U.S. Carbon Transition Readiness ETF	Climate Conscious	1.6
Invesco WilderHill Clean Energy ETF	Clean Energy/Tech	1.6
iShares MSCI ACWI Low Carbon Target ETF	Low Carbon	1.3
TIAA-CREF Social Choice Low Carbon Equity	Low Carbon	1.1
Calvert Green Bond	Green Bond	1.0
Fidelity Environment and Alternative Energy	Climate Solutions	0.9

Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

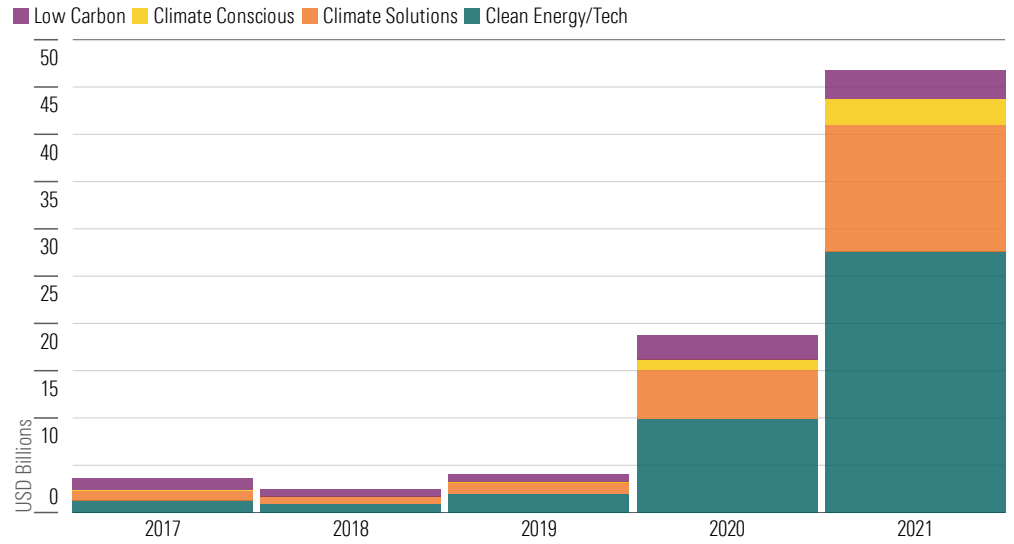
Four of the 10 largest climate funds available to U.S. investors are Clean Energy/Tech funds. New to this year's top 10 list are **BlackRock U.S. Carbon Transition Readiness ETF** and **Fidelity Environment and Alternative Energy Fund FSLEX**. In April 2021, the former broke the record for the largest ETF launch. The latter netted USD 474 million for the year, nearly 8 times the fund's net flows in 2020.

China

Albeit in its nascent stage, China overshot the U.S. in 2021 to become the largest climate fund universe outside of Europe, boosted by accelerated inflows and new fund launches. Assets hit a record high of USD 46.7 billion, representing a 149% increase compared with the previous year.

Clean Energy/Tech funds continued to tower over other climate strategies, taking up almost 60% of the assets in the Chinese universe at the end of last year, while Climate Solutions products accounted for close to 30% of the assets. Low Carbon and Climate Conscious strategies remained less popular. As mentioned later, the absence of Green Bond in the Chinese universe is in part due to the ambiguity in the definition of eligible green bond issuers before the promulgation of the latest [Catalog of Rules for Green Bond Issuances](#).

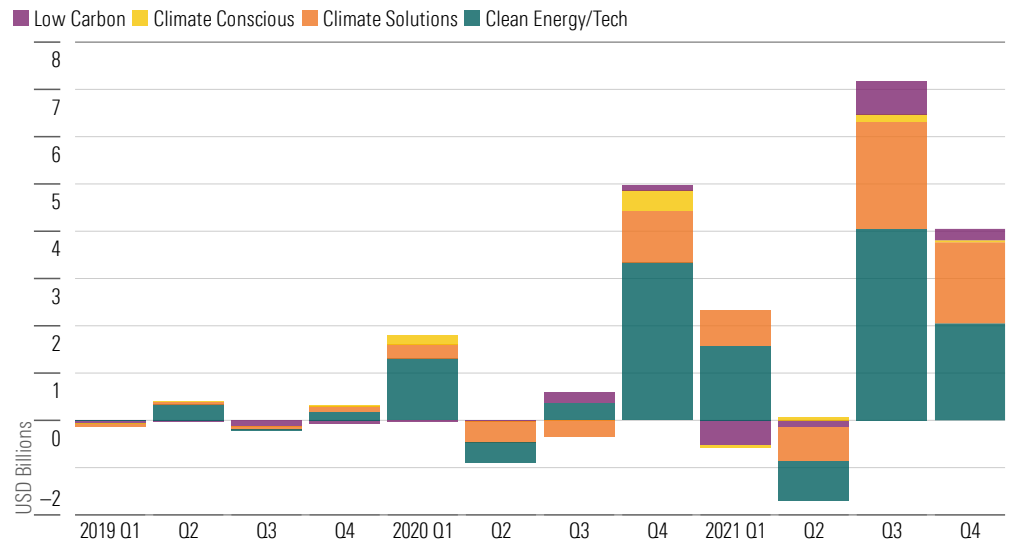
Exhibit 18 Assets in Chinese Climate Funds



Source: Morningstar Direct. Morningstar Research. Data as of December 2021. Data includes Hong Kong SAR.

Annual fund inflows into Chinese climate funds reached a new high of USD 73 billion last year, an 81% increase over 2020's record. Clean Energy/Tech and Climate Solutions funds continued to be favored by local investors, accounting for over 60% and 35% of the yearly inflows, respectively.

Exhibit 19 Flows in Chinese Climate Funds



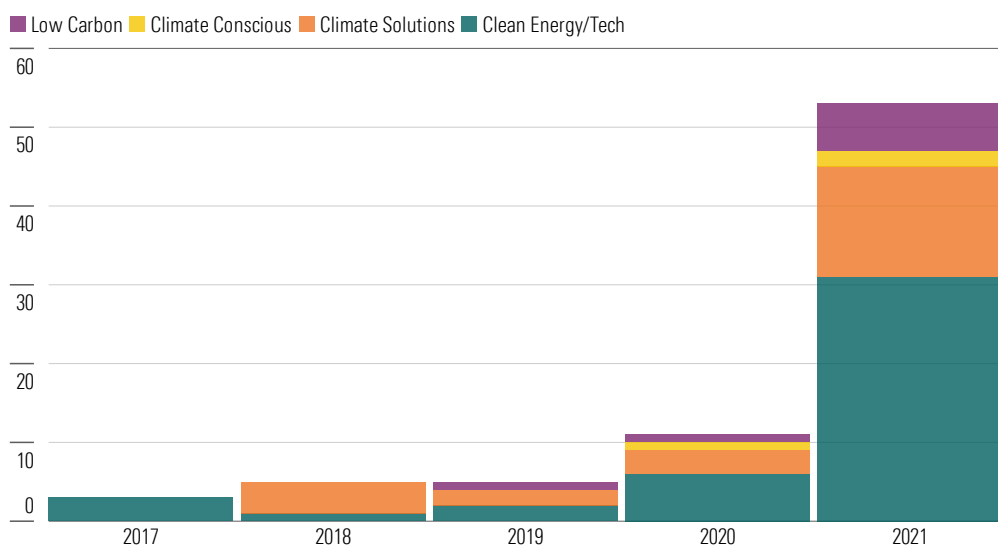
Source: Morningstar Direct. Morningstar Research. Data as of December 2021. Data includes Hong Kong SAR.

However, flows into Chinese climate funds exhibited greater volatility last year than in previous years. Instead of sustaining the growth momentum of the last quarter of 2020, fund flows plunged during the

first half of 2021 before recovering and netting a record USD 7.2 billion in the third quarter. The large-scale outflows in the second quarter were associated both with the overheated electric vehicle and renewable energy sectors after their stellar performance in 2020 and with the industrial and monetary policy uncertainties in the months leading up to and after the 13th National People's Congress in March. By and large, Chinese investors' appetite for climate strategies are influenced by a combination of sectoral performance, market conditions, and the broader policy and regulatory environment.

Meanwhile, new Chinese climate fund launches quintupled in 2021, reaching 53, among which featured an astonishing 31 Clean Energy/Tech funds.

Exhibit 20 Launches in Chinese Climate Funds



Source: Morningstar Direct. Morningstar Research. Data as of December 2021. Data includes Hong Kong SAR.

New energy technologies and materials, including wind turbines, solar panels, and photovoltaic systems, remained the most favored industries for exposure. With most climate funds launched by local asset managers and brokerage firms, we also see Sino-Western joint ventures rising in the Chinese climate fund landscape. For example, Invesco Great Wall Fund Management, a joint venture between Invesco and state-owned Great Wall Securities, launched **Invesco Great Wall New Energy Industries Equity Fund** with a special focus on developers and manufacturers of power semiconductor devices applicable in new energy automobiles, photovoltaic systems, and energy storage. The fund ended the year with over USD 1.7 billion in assets.

The rapid expansion of China's climate fund market can be mostly attributed to the heightened focus on climate change and other environmental issues in the ruling party's agenda for economic transformation.

In China, in February 2021, the State Council promulgated the "Guiding Opinions of the State Council on Accelerating the Establishment of a Sound Economic System with Green, Low-carbon and Circular Development." In March, "peaking carbon dioxide emissions before 2030" and "reaching carbon neutrality before 2060" targets were unveiled as part of the country's 14th Five-Year Plan by the Fourth Session of the 13th National People's Congress.

Under these overarching objectives, energy and carbon intensity are targeted to decline by 13.5% and 18% per unit of gross domestic product, respectively, between 2021 and 2025. Other objectives include improving air quality in cities, surface water, and forest coverage. In addition, governments of certain provinces, autonomous regions, and municipalities are encouraged to devise and implement their own initiatives paired with tighter emission reduction targets and/or energy efficiency regulations based on local socioeconomic realities.

Against this backdrop, energy transition, energy efficiency, and circular economy feature prominently in the development of climate-related financial products and services in China, including carbon credit and the first national emissions-trading system. The evolution of related regulatory frameworks will likely bring forth more structural changes to the Chinese fund market.

The most noticeable regulatory advancement related to China's green and climate finance is the enactment of the latest Catalog of Rules for Green Bond Issuances ("the catalog") in April 2021. The catalog provides the most up-to-date and unified definitions of green economic activities and is considered as China's equivalent to the EU taxonomy.⁷

Exhibit 21 Largest Chinese Climate Funds

Name	Climate Category	AUM (USD, Bil)
ABC-CA New Energy Theme Mix	Clean Energy/Tech	4.5
ChinaAMC Energy Innovation Equity	Clean Energy/Tech	3.7
Orient Sectors Green Energy Car Allocation	Climate Solutions	3.5
First State Cinda New Energy Industry Stock	Clean Energy/Tech	2.7
Huatai-PB CSI Photovoltaic Industry ETF	Clean Energy/Tech	2.2
TianHong CSI Photovoltaic Industry Index	Clean Energy/Tech	2.1
ICBCCS Green Energy Car Theme Allocation	Climate Solutions	2.0
HSBC Jintrust Carbon Awareness Equity	Climate Conscious	1.8
Fullgoal China Sectors New Energy Vehicles	Climate Solutions	1.8
IGW New Energy Industry Equity	Clean Energy/Tech	1.7

Source: Morningstar Direct. Morningstar Research. Data as of December 2021. Data includes Hong Kong SAR.

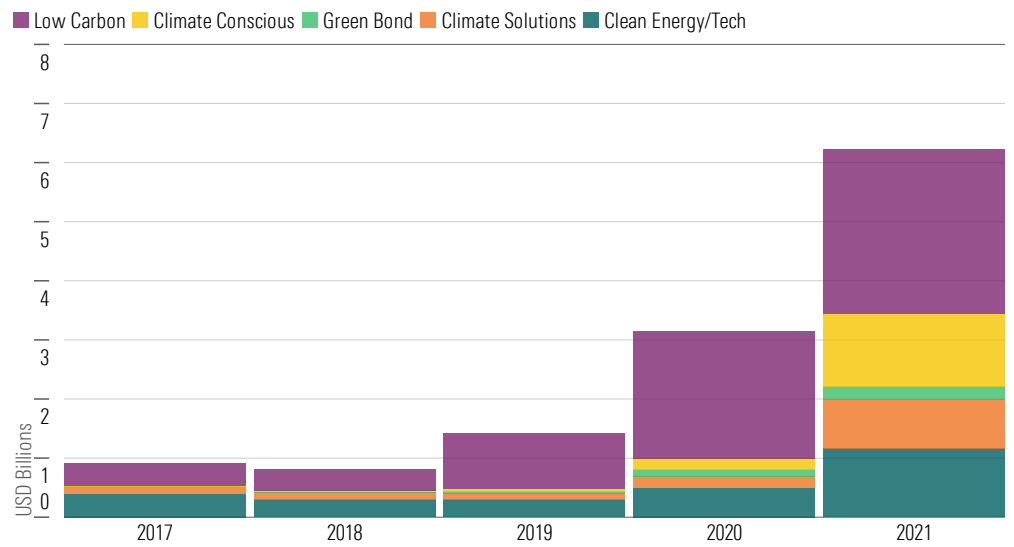
⁷ In July 2020, the EU and China initiated a Working Group on taxonomies to undertake a comprehensive assessment of the existing taxonomies for environmentally sustainable investments, including identifying the commonalities and differences in their respective approaches and outcomes. The first publication, the Common Ground Taxonomy, covers the initial phase of work, which will be expanded over time. For more details, visit: https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/211104-ipsf-common-ground-taxonomy-instruction-report-2021_en.pdf. The latest version of the Chinese taxonomy includes emerging green industries such as green agriculture, green construction, sustainable construction, water conservation, and unconventional use of water and eliminates companies using fossil fuels from the list of eligible economic activities and projects. This makes China's green bond issuance align better with global practices than did the previous version. Convergence with international norms and standards brings the benefits of reducing the costs associated with issuance, trading, and management and improving the pricing efficiency of the green bonds, although the Chinese green bond market remains in a nascent stage.

Among the 10 largest Chinese climate funds, six were in the Clean Energy/Tech category as the category expanded its dominance further this year. The only two Low Carbon funds in last year's top 10 list were overtaken by two newcomers, **ICBCCS Green Energy Car Theme Allocation** and **IGW New Energy Industry Equity Fund**. The former is another example of a Sino-Western joint venture product between the Industrial and Commercial Bank of China and Credit Suisse.

Rest of World

Climate funds outside of Europe, the U.S., and China represent a small universe, but their assets almost doubled over the last year to USD 6.3 billion on continued fund flows and an accelerated pace of new fund launches. While Climate Conscious and Climate Solutions funds almost sextupled and quadrupled their sizes, respectively, Low Carbon continued to be the dominant strategy, taking up 44% of the assets in this universe.

Exhibit 22 Assets in Climate Funds in Rest of World



Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

As for the geographical distribution, Australia's leadership has been challenged by South Korea. In fact, South Korea bypassed both Australia and Canada with the highest number (30) of climate funds, although assets in Australian funds continued to dominate the universe.

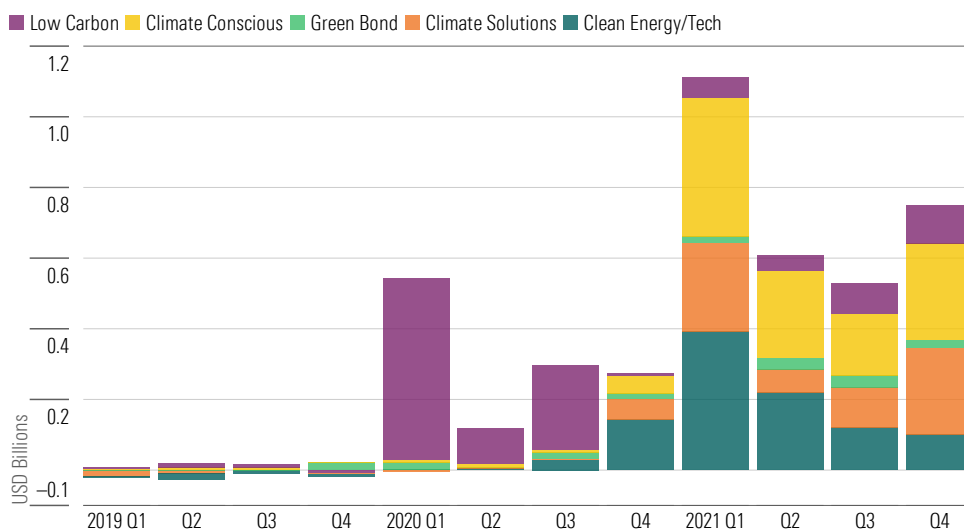
Exhibit 23 Climate Funds in Rest of World

Country	Number of Climate Funds	AUM (USD, Mil)
Australia	18	2,447
Canada	24	1,849
South Korea	30	1,173
Japan	8	342
Taiwan	5	179
Israel	7	108
Malaysia	1	107
India	1	101
Chile	1	17
Singapore	1	6

Source: Morningstar Direct, Morningstar Research. Data as of December 2021.

Australia, the largest market in the Rest of World group, grew by 67% in assets in 2021, Low Carbon funds taking up almost 70% of the assets.

Flows into climate funds in this universe declined after registering a record high of USD 1.1 billion in the first quarter 2021, followed by a modest recovery toward the end of the year. While Climate Conscious funds pocketed most of the flows throughout the whole year, the share of Climate Solutions funds expanded steadily over time.

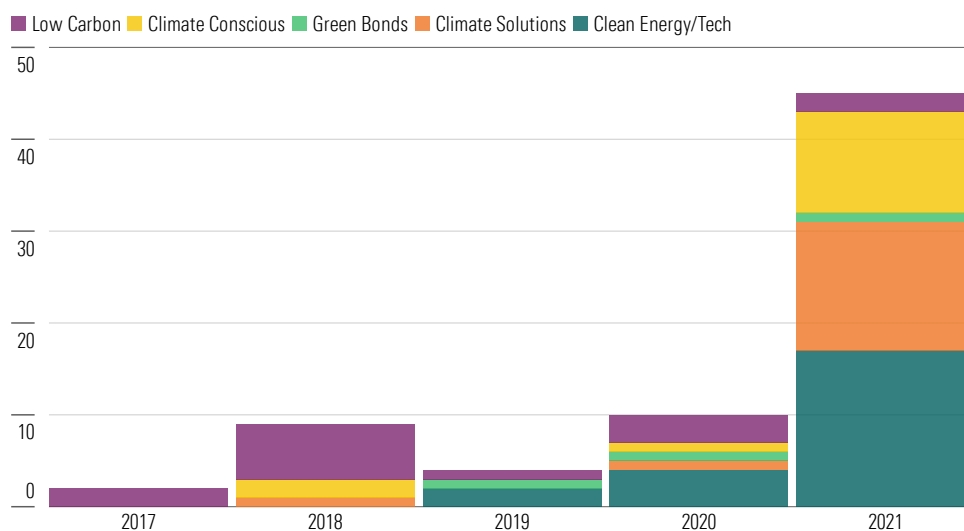
Exhibit 24 Flows of Climate Funds in Rest of World

Source: Morningstar Direct, Morningstar Research. Data as of December 2021.

In parallel to the noticeable asset growth, 2021 also saw an accelerated pace of fund launches. The number of newly launched climate funds in the group more than quadrupled by the end of the year.

Clean Energy/Tech and Climate Solutions funds accounted for 17 and 14 of the 45 new launches, respectively. The largest was Australia's BetaShares Climate Change Innovation ETF with year-end assets of USD 143 million. Its portfolio is dedicated to cover clean energy providers, along with leading companies tackling green transport, waste management, sustainable product development, and improved energy efficiency and storage.

Exhibit 25 Launches of Climate Funds in Rest of World



Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

South Korea hosted most of the new launches, followed by Canada. Among the 18 South Korean funds launched last year, eight were Clean Energy/Tech funds, six were Climate Solutions funds, and four were Climate Conscious funds. As shown earlier, while new launches bring the total of climate funds in South Korea to 30, the country lags Australia in terms of both the funds' average and aggregate asset sizes.

Exhibit 26 Countries in Rest of World by Number of Climate Fund Launches

Country	Number of Newly Launched Funds	AUM (USD, Mil)
Canada	11	638
South Korea	18	470
Australia	6	372
Taiwan	2	123
Malaysia	1	107

Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

The upshoot of South Korean climate funds should be viewed in the context of the country's renewed greenhouse gas emission reduction goal from the initial 26.3% to 40% by 2030 (compared with the 2018 level).⁸ Prior to this, the South Korean government unveiled a Green New Deal in July 2020 as part of a

⁸ <https://www.undp.org/blog/south-koreas-green-new-deal-year-transition>

wider stimulus package for the country's pandemic-afflicted economy. The USD 62 billion plan focuses on renewable energy, green infrastructure, and the industrials sector. As part of the stimulus, a green car subsidy program offers up to USD 17 million in subsidies to people buying electric cars in 2021 and up to USD 33 million for hydrogen fuel-cell electric vehicles as the country is seeking to accelerate the transition toward electric and hydrogen-powered vehicles. This in part explains the concentration of Clean Energy/Tech and Climate Solutions strategies, 15 out of 19, among South Korea's climate fund launches between 2020 and 2021.

In line with the asset breakdown, the top 10 climate funds in the Rest of World are dominated by Australia and Canada, as well as Low Carbon funds. Four of the 10 largest funds in this universe are domiciled in Australia and three in Canada. Four Low Carbon funds also feature here.

Exhibit 27 Largest Climate Funds in Rest of World

Name	Climate Category	AUM (USD, Mil)
Russell Investments Low Carbon Global Shares	Low Carbon	899
Fidelity Climate Leadership	Climate Conscious	430
KB KBSTAR Fn Hydrogen Economy ETF	Climate Solutions	284
NZAM ETF S&P/JPX Carbon Efficient Index	Low Carbon	258
Desjardins RI Canada Multifactor	Low Carbon	254
State Street Climate ESG International Equity	Low Carbon	247
MultiAsset Global Clean Energy Master Equity	Clean Energy/Tech	218
SPDR® S&P World ex Australia Carbon Control	Low Carbon	218
Pengana WHEB Sustainable Impact	Climate Conscious	209
Desjardins SocieTerra Cleantech	Clean Energy/Tech	189

Source: Morningstar Direct. Morningstar Research. Data as of December 2021.

The largest fund is **Russell Investments Low Carbon Global Shares Fund**, which had its inception in October 2017. The fund employs a decarbonization strategy that uses a combination of factors, including carbon footprint, fossil fuel reserves, and a proprietary green energy ratio and ESG scoring, to determine the companies to include in the portfolio and their weighting. **Fidelity Climate Leadership Fund**, domiciled in Canada, targets equities that are positioned to benefit from the opportunities associated with climate-related issues or the global transition to a low carbon economy.

How Climate Funds Incorporate Climate-Related Factors

Climate funds use various approaches to incorporate climate-related factors and address investors' preferences and investment objectives. In this section, we outline the main approaches adapted from the [Morningstar Sustainable-Investing Framework](#): applying exclusions, limiting climate risk, seeking climate opportunities, practicing active ownership, targeting climate themes, and assessing impact.

Exhibit 28 Approaches Applied by Climate Strategies



Source: Morningstar Research.

Most of the time, climate strategies combine these approaches, as they are interrelated and largely complementary.

► Apply Exclusions

This approach refers to excluding sectors, companies, or countries based on certain climate-related criteria. Examples of exclusionary screens that might be applied include companies with greenhouse gas emissions over a certain threshold and companies where a certain proportion of revenues comes from sectors with the worst climate impacts (such as thermal coal extraction, Arctic exploration, or tar sands drilling). More recently, amid rising concerns about climate risks, the list of climate-related exclusions has expanded to include traditional oil and gas producers and distributors.

Examples:

- **Aviva Investors - Climate Transition European Equity Fund** invests principally in equities of European companies responding to climate change that meet the investment manager's eligibility criteria. It excludes companies involved in coal, unconventional fossil fuels, Arctic gas & oil production, or thermal coal electricity generation, as well as companies generating more than 10% of their revenues from oil & gas production and liquid fuels electricity generation, and companies with more than 15% revenues from natural gas electricity generation.
- **Invesco FTSE All Share ESG Climate ETF** tracks an index that excludes from the parent index securities that: 1) have faced very severe controversies pertaining to ESG issues; and 2) are involved in Arctic oil and gas exploration, adult entertainment, controversial weapons, small arms, gambling, military contracting, nuclear power, oil sands, thermal coal, recreational cannabis, or tobacco. The index also seeks to increase exposure to those companies demonstrating a robust ESG profile, those generating an increased percentage of their revenue from green projects, and those that exhibit lower levels of carbon emissions and fossil fuel reserves.

Portfolio optimization techniques can be used to reduce the impact of exclusions on a portfolio's tracking error to a market benchmark.

► **Limit Climate Risk**

Investors can address climate-related concerns by using climate-related metrics and data to assess climate risks. Investors may price climate risk into valuation models or seek to avoid investments with a certain level of climate risk regardless of valuation.

Examples:

- **Invesco MSCI World ESG Climate Paris Aligned ETF** tracks an index that is constructed from the MSCI Europe Index by reducing the weighting of companies exposed to climate transition risks and maximizing the weighting of companies with the highest exposure to climate transition opportunities. This provides investors with exposure to companies with high ESG metrics, incorporates recommendations from the Task Force on Climate-Related Financial Disclosures, and is designed to exceed the minimum standards of the EU Paris-aligned benchmark.
- **AXA ACT Framlington Clean Economy Fund** uses the issuer's ESG score (produced by an internal ESG scoring system) to exclude those issuers in the lowest 10% in respect of their Environment, or "E," scores. It will then seek to identify issuers with exposure to the clean economy.

► **Seek Climate Opportunities**

Investors may also use climate-related information to identify companies that are climate leaders or those seeking to improve their practices. This approach includes what is sometimes called "best-in-class" or "positive screening." A best-in-class approach typically favors companies with better climate-related factors on a sector basis. Examples of climate-related factors include carbon emissions, carbon intensity, and green revenues. Some investors look for companies with so-called "momentum" that are improving their overall performance on climate metrics in ways that will enhance their financial performance.

Examples:

- **Candriam Sustainable Equity Climate Action** targets companies that aim to be the future leaders of climate change actions. All selected companies have been identified as a provider of direct and tangible solutions to tackle climate change. Furthermore, the fund's carbon footprint is at least 20% lower than its benchmark. The fund aims to further reduce its carbon footprint and commits to achieve carbon footprint reduction of at least 25% compared with its benchmark by 2025.
- **Eurizon Fund Equity Planet** selects eligible companies primarily by using positive screening criteria to identify those offering products and services that enable mitigation of climate change and other forms of environmental harm. These include wind turbines, solar panels, electric vehicles and battery technologies, energy efficiency equipment, pollution control, and sustainable water.

Some strategies take a tilting approach. This method underweights climate laggards and overweights climate leaders, using some of the factors listed above. It is often used in passive portfolios. Unlike portfolios that use exclusions, tilted strategies continue to invest in the most carbon-intensive sectors and companies.

Example:

- ▶ **UBS MSCI ACWI ESG Universal Low Carbon Select ETF** tracks the MSCI ACWI ESG Universal Low Carbon Select 5% Issuer Capped Index, which is designed to measure the performance of an investment strategy that, by tilting away from free-float market-cap weights, seeks to gain exposure to those companies demonstrating both a robust ESG profile as well as a positive trend in improving that profile, using minimal exclusions from the MSCI ACWI Index.

▶ **Practice Active Ownership**

This approach refers to activities that include direct engagement with companies, proposing shareholder resolutions, voting proxies, participating in investor coalitions, and advocating for public policy measures that address climate-related issues. Through engagement activities, investors seek to understand how companies manage climate-related risks and opportunities and seek to improve climate-related disclosure. In addition, investors can encourage corporate leaders to future-proof their businesses by committing to net zero and [setting carbon reduction targets in line with what the latest climate science](#) deems necessary to meet the goals of the Paris Agreement. Investors can foster transition through active ownership and reap the reward of improving the portfolio's climate characteristics.

Examples:

- ▶ **Aberdeen Standard Climate Transition Bond Fund** invests in bonds, which, in the view of the investment manager, support the transition to a low carbon economy and society's adaptation to climate change. The fund engages with companies at various stages of the stock-selection and portfolio-construction process, including data gathering and screening, eligibility scrutinization, peer review, and ongoing monitoring, to better understand and influence companies' climate credentials and wider ESG strategies.
- ▶ **Wellington Global Stewards** invests in companies considered "global stewards." The investment manager will seek to make a positive impact to climate change by actively engaging with companies to meet net-zero emissions by 2050, in alignment with the Paris Agreement to limit global warming. In addition, the fund will maintain a carbon footprint that is at least 50% lower than MSCI All Country World Index.

▶ **Target Climate Themes**

Thematic investing focuses on identifying long-term structural trends and the investments that stand to benefit from those trends. In targeting climate-related themes, investors seek to take advantage of

opportunities created as the world transitions to a low carbon economy, such as renewable energy and electric vehicles. Circular economy is another example of a long-term climate-related trend.

Examples:

- ▶ **VanEck Vectors Solar Energy ETF** invests in companies of which at least 50% of their revenues are derived from photovoltaic and solar power, solar power equipment/technologies, and materials or services to solar power equipment/technologies producers.
- ▶ **Thematica – Future Mobility** favors companies operating in areas such as exploration, mining, and refining of lithium, cobalt, graphite, and nickel; production of batteries; and electric transportation and also in other companies involved in the electric vehicle supply chain.

▶ **Assess Impact**

Investors may wish to integrate impact assessments into security selection and portfolio construction. Green bond investors, for example, consider a bond's use of proceeds, focusing on bonds that finance decarbonization projects or the development of products and services that contribute to the transition to a low-carbon economy. Equity investors may consider whether a company's products and services, as well as its policies and behaviors, support or detract from the goal of the Paris Agreement. At the portfolio level, investors may assess the overall impact of their portfolio holdings in relation to that goal or a climate benchmark.

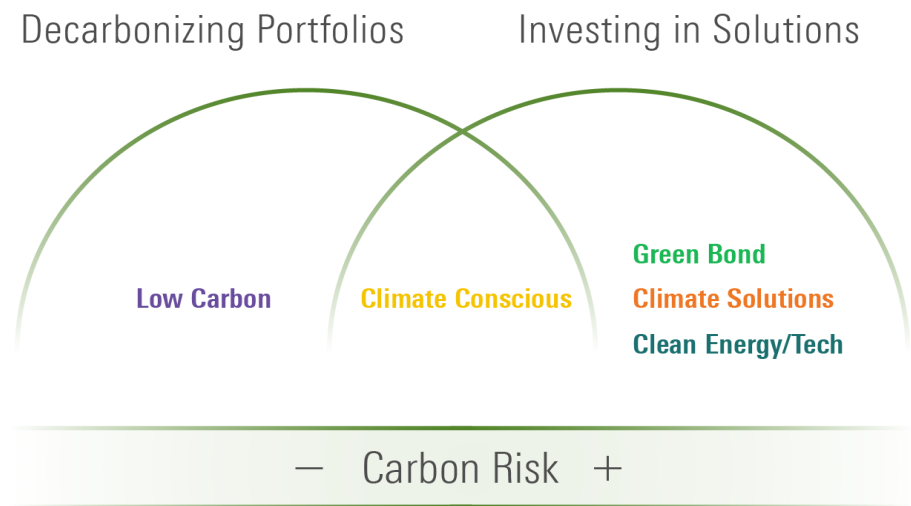
Examples:

- ▶ **Allianz Global Investors Fund - Allianz Green Transition Bond** focuses on issuers that provide positive contribution to sustainable and environmentally friendly solutions and transition into a low-carbon economy. The fund follows the Green Transition Strategy by mobilizing capital markets toward the transition to a low carbon society, natural capital preservation, and adaptation to climate change, with simultaneous application of certain minimum exclusion criteria.
- ▶ **AllianceBernstein Sustainable Climate Solutions Portfolio**, instead of focusing exclusively on the carbon footprints generated during companies' production and operation processes, evaluates companies based on the ability of its products and solutions for carbon avoidance or reduction and develops the proprietary metrics of carbon handprint to carbon footprint ratio. It identifies over 50 products from eight sectors that are at the forefront of enabling transition to low-carbon economy and improving resiliency against climate change, ranging from agriculture and clean energy to transportation and infrastructure.

How Climate Funds Fit Into an Investor's Portfolio

The five climate-fund groupings we have identified represent a broad range of approaches globally that aim to meet different investor needs and preferences. The choice of one type over another largely depends on an investor's investment goals, risk appetite, and preferences.

Exhibit 29 Climate Strategies and Their Role in Portfolios



Source: Morningstar Research.

Investors who simply want to protect their portfolios against climate change risks can use Low Carbon funds to "decarbonize" their portfolios. As we will see in the next part, these approaches provide broad and diversified exposure to the market. They are therefore suitable as part of a portfolio core allocation. In fact, within an asset allocation, Low Carbon funds can substitute for a lot of core equity exposure. They would, however, be less suitable for investors who want to benefit from the opportunities offered by the climate transition. For that, investors must choose among the remaining types.

Risk-conscious investors looking also to take advantage of this transition can turn toward Climate Conscious funds. These typically exhibit low carbon risk—like Low Carbon funds—with the added benefit of higher Carbon Solutions Involvement. These are suitable for investors wanting to strike a balance between mitigating risk and looking to benefit from the green transition. In Europe, funds tracking Paris-aligned benchmarks are more suited for investors who want to benefit from the opportunities offered by the climate transition, while funds tracking climate-transition benchmarks are a better choice for investors who simply want to protect their portfolios against climate change risks while tracking the pace of transition toward a low carbon economy.

Further along the risk-opportunity spectrum, Climate Solutions and Clean Energy/Tech strategies can appeal to investors with a greater risk appetite and who consider climate change as an alpha-generating opportunity. Because of their narrower market exposure and often mid- and small-cap bias, Climate Solutions and Clean Energy/Tech funds represent more-volatile investments. Sharp price fluctuations in

the clean energy sector over the past couple of years are testament to this. After registering their best annual performance in 2020, with returns of up to more than 200%, Clean Energy/Tech funds lagged the market in 2021.

Climate Solutions and Clean Energy/Tech funds also currently often come with higher carbon risk. We have seen this begin to change gradually as the transitioning companies implement their solutions. Given their less diversified and higher risk profile, Climate Solutions and Clean Energy/Tech funds are more suitable as part of a satellite allocation to complement rather than replace existing core holdings.

Meanwhile, Green Bonds may be inherently lower risk, but investors must be sure that the projects sitting within the bonds are indeed providing green solutions, as many green-bond issuers have high exposure to traditional brown industries such as those involved with thermal coal. Ideally, in the coming years, we would like to see increased disclosure on Green Bond projects and how they serve to lower the environmental impact of their issuer in a material way. For instance, a distribution company issuing a green bond to electrify its fleet has greater impact on the issuer than an oil and gas firm issuing a green bond to electrify warehouse operations.

How Do These Funds Stack Up?

In this section, we analyze our list of funds by climate strategy type to ascertain how they compare against one another and whether they deliver what they claim to deliver. For example, do Low Carbon funds exhibit lower exposure to high-carbon-emitting companies relative to a broad market index? Do Climate Solution and Clean Energy/Tech funds achieve higher exposure to green solutions or metrics? Do climate funds mitigate investors' exposure to climate risk and give investors access to companies that address climate challenges?

The next few exhibits compare funds in the five climate strategy groups against the Morningstar Global Target Market Exposure Index⁹, a broad market benchmark that provides exposure to developed and emerging markets. We use the following Morningstar metrics for comparison: Carbon Intensity, Fossil Fuel Involvement, Oil & Gas Production Involvement, Thermal Coal Involvement, Carbon Solutions Involvement, and Carbon Risk. For each, Morningstar leverages Sustainalytics¹⁰ company-level carbon metrics, which it aggregates at the fund level on an asset-weighted basis. In most of these tests, a lower score is optimal; for Carbon Solutions Involvement, a higher percentage is better.

Carbon Intensity

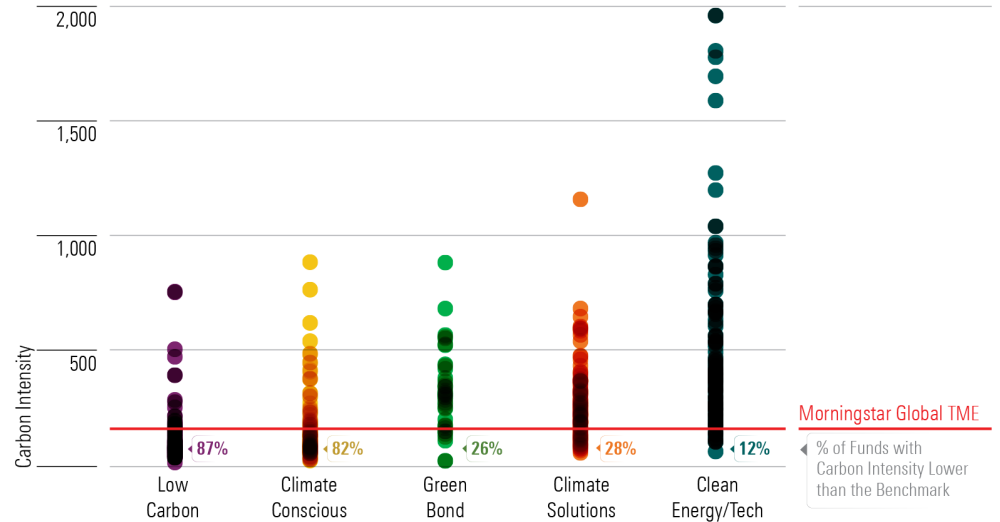
First, we test each fund's level of carbon intensity, which is computed for each portfolio holding as follows: Total Emissions (metric tons of CO₂) / Revenue (Mil USD) and aggregated at the fund level. Sustainalytics looks at the latest reported scope 1 (direct emissions from owned or controlled sources) and scope 2 (indirect emissions from the generation of purchased energy) emissions. A lower score is better.

Each marker in Exhibit 30 represents a fund and its carbon intensity. The callout boxes display the percentage of funds in each climate strategy group that exhibit lower carbon intensity than the Morningstar Global Target Market Exposure Index.

⁹ The Morningstar® Global Target Market Exposure Index is designed to provide exposure to the top 85% market capitalization by free float in each of two economic segments, developed markets and emerging markets. Together, these two economic segment indexes make up the Global Target Market Exposure Index. For more detail, refer to Construction Rules for the Morningstar® Global Target Market Exposure Index Family, Morningstar Indexes, July 2019. https://indexes.morningstar.com/resources/PDF/upload/Morningstar_Global_Target_Market_Exposure_Indexes_Final.pdf. As of March 2022, the top three sectors were Technology (20.7%), Financial Services (16.2%), and Healthcare (11.9%). Energy stocks represented 4.3% of the index (compared with 3.4% a year earlier). In terms of regional exposure, North America was the largest exposure (63.2%), followed by developed Europe (12.2%). Emerging markets accounted for only 7.8% of the index.

¹⁰ Sustainalytics is a Morningstar company and a leading provider of environmental, social, and governance research and ratings.

Exhibit 30 Carbon Intensity for All Fund Groups vs. Morningstar Global Target Market Exposure Index



Source: Morningstar Direct. Morningstar Research. Data as of March 2022. For Green Bonds, the analysis is carried out at issuer level, not on the issuance itself.

Of 575 funds with Carbon Intensity numbers, 290, or 50%, offer an improvement on the benchmark. The majority of these are Low Carbon and Climate Conscious funds.

By contrast, most Green Bond, Climate Solutions, and Clean Energy/Tech funds exhibit higher Carbon Intensity scores than the Morningstar Global Target Market Exposure Index. This reflects the fact that alongside pure-plays in the renewable energy sector like wind turbine manufacturers Siemens Gamesa Renewable Energy and Vestas Wind Systems, which score low on Carbon Intensity, many Climate Solutions and Clean Energy/Tech portfolios invest in more-diversified companies that operate carbon-intensive businesses.

An example is Linde PLC, the largest industrial gas supplier in the world. The industrial gases sector is one of the most greenhouse-gas-intensive industries, but Linde has established a strong greenhouse gas reduction program, and managerial responsibility for the issue is evident. This helps to mitigate the company's exposure to carbon risk, resulting in a Medium Carbon Risk Rating overall. In contrast, Denmark's Ørsted, one of the world's largest renewable energy companies, carries nearly 90% of its energy mix in renewables¹¹. Although the electric utilities industry is still very carbon-intensive, Ørsted's carbon footprint has significantly improved in the last several years, following a divestment of its oil and gas assets, reduction in reliance on coal, and aggressive investment in wind energy. Further improvements are expected in 2023 when the company plans to completely phase out the use of coal.

Carbon Intensity is a normalized metric dependent on both carbon footprint and revenue. Large-cap equity stocks can often have a lower Carbon Intensity because of higher revenue and lower scope 1

¹¹ <https://orsted.co.uk/business/sustainable-energy/our-fuel-mix>

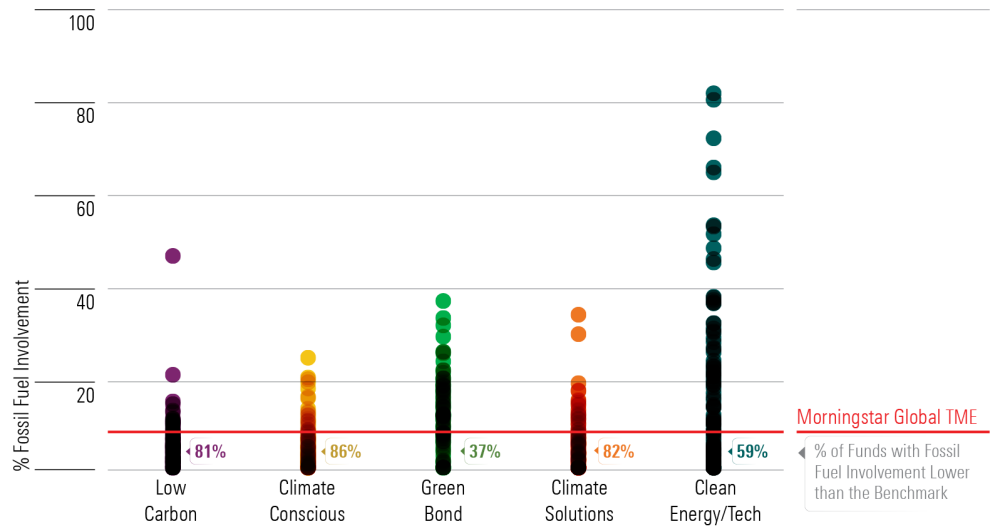
emissions¹² when compared with the type of industrial companies that would be involved in engineering green energy solutions.

Fossil Fuel Involvement

Next, we test the exposure of climate funds to fossil fuel companies. For this, we use the Morningstar Portfolio Fossil Fuel Involvement metric, the fund’s percentage exposure to fossil fuels, averaged over the trailing 12 months. Companies are considered involved in fossil fuels if they derive at least an aggregate 5% share of total revenue from the following activities: thermal coal extraction, thermal coal power generation, oil and gas production, and oil and gas power generation. Companies deriving at least 50% of their revenue from oil and gas products & services are also included. Companies involved in arctic oil & gas exploration and oil sands extraction will be included only if there is no involvement in oil & gas production.

Each marker in Exhibit 31 represents a fund and its exposure to fossil fuels. A lower involvement percentage is optimal.

Exhibit 31 % Fossil Fuel Involvement vs. Morningstar Global Target Market Exposure Index



Source: Morningstar Direct. Morningstar Research. Data as of March 2022. For Green Bonds, the analysis is carried out at issuer level, not on the issuance itself.

Over 80% of Low Carbon, Climate Conscious, and Climate Solutions funds have lower Fossil Fuel Involvement than the index. However, only 37% of Green Bond funds and 59% of Clean Energy/Tech funds meet this criterion. This is because, as previously mentioned, many of these portfolios invest in utilities companies that have built large renewable energy operations but still operate their legacy fossil fuel businesses. For example, NextEra Energy, a leading wind farm and solar builder and operator in the U.S., still derives approximately half of its energy mix from fossil fuels, and NextEra still builds and

12 Scope 1 describes direct emissions from owned or controlled resources. Scope 2 describes indirect emissions from purchased electricity. Scope 3 describes all other indirect emissions that occur in a company’s value chain, including business travel and procurement.

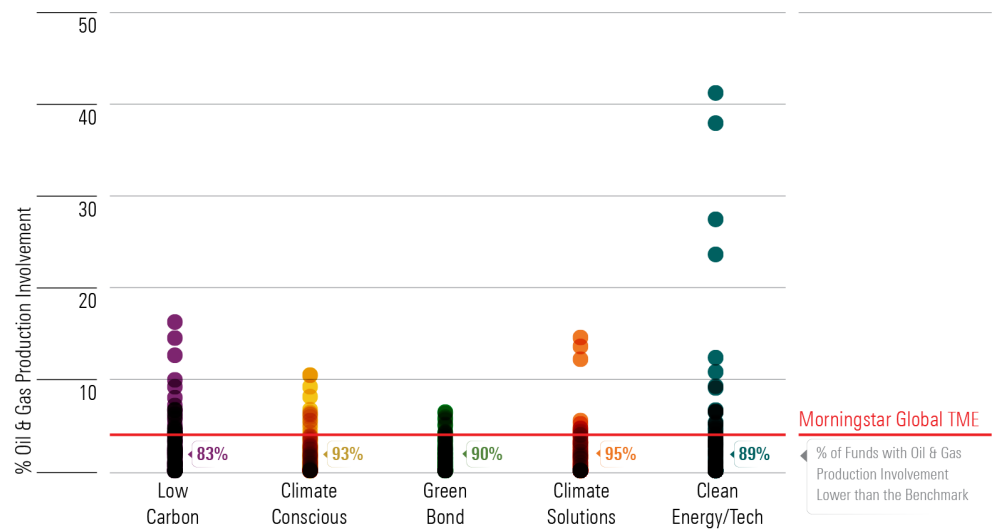
operates gas transmission pipelines. Many companies that issue green bonds are transitioning away from traditional forms of energy.

Oil & Gas Production Involvement

We now test the exposure of climate-related funds to oil & gas production. Oil & Gas Production Involvement is the portfolio's asset-weighted exposure to companies that derive at least 5% of revenue from oil & gas production, exploration, transportation, storage, and refining.

Each marker in Exhibit 32 represents a fund and its involvement in oil & gas production. A lower involvement percentage is optimal.

Exhibit 32 % Oil & Gas Production vs. Morningstar Global Target Market Exposure Index



Source: Morningstar Direct. Morningstar Research. Data as of March 2022. For Green Bonds, the analysis is carried out at issuer level, not on the issuance itself.

The vast majority of funds in our list have lower exposure to oil & gas producers than the benchmark, which at the end of March 2022 amounted to 4.3%. We see the most severe outliers in the Clean Energy/Tech category. For example, First Trust EIP Carbon Impact ETF ECLN has more than 35% exposure to oil & gas production as of March 2022. This is driven in part by the fund manager's conviction that "natural gas pipeline companies that supply natural gas power generation facilities have a positive carbon impact by enabling the use of wind and solar power because natural gas power generation facilities serve to back-up and compensate for the intermittent availability of wind and solar power."¹³

Thermal Coal Involvement

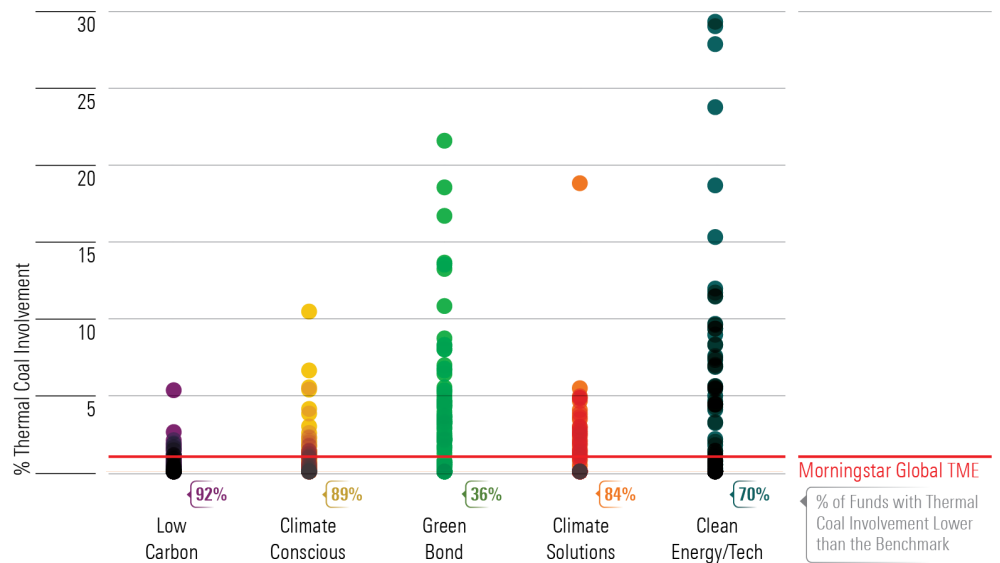
Here, we test the exposure of our list of funds to one of the most carbon-intensive energy sources. Thermal Coal Involvement tracks the percentage of a company's generating capacity that comes from

¹³ Summary Prospectus for First Trust EIP Carbon Impact ETF ECLN, dated March 1, 2022.

coal (instead of the percentage of revenue, like the other carbon metrics). Companies with Thermal Coal Involvement are defined as those that extract thermal coal for coal mining and exploration (direct involvement) and those that generate electricity from thermal coal, including utilities that own or operate coal-fired power plants (indirect involvement). On a lifecycle basis, thermal coal is the most carbon-intensive fossil fuel source, while from an energy-generation perspective, it is easily substitutable.

Each marker in Exhibit 33 represents a fund and its involvement in thermal coal. In this test, again, a lower involvement percentage is optimal.

Exhibit 33 % Thermal Coal Involvement vs. Morningstar Global Target Market Exposure Index



Source: Morningstar Direct. Morningstar Research. Data as of March 2022. For Green Bonds, the analysis is carried out at issuer level, not on the issuance itself.

Most notable is the high level of Thermal Coal Involvement with Green Bond funds, with only 36% beating the benchmark. But this is unsurprising given the relatively high exposure of these funds to traditional utilities companies that are looking to finance green projects and transition away from their highly intensive coal-fired electricity generation activities. Meanwhile, 70% of Clean Energy/Tech funds exhibit lower Thermal Coal Involvement than the Morningstar Global Target Market Exposure Index.

Low Carbon, Climate Conscious, and Climate Solutions funds exhibit much lower levels of Thermal Coal Involvement; more than 80% of these portfolios have less exposure to coal than the Morningstar Global Target Market Exposure Index.

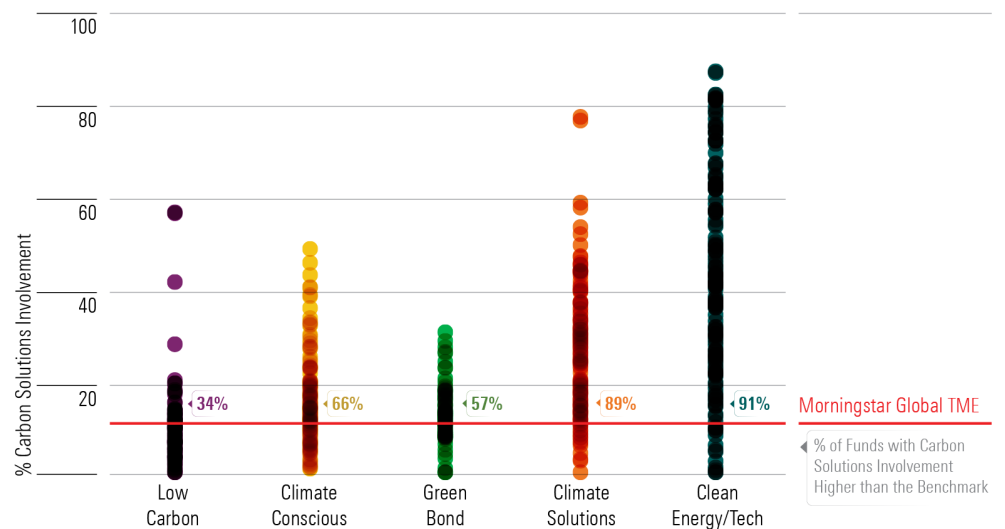
Carbon Solutions Involvement

Here, we analyze how much exposure to carbon solutions investors can expect from climate funds. Morningstar's Carbon Solutions Involvement is defined as a fund's asset-weighted percentage exposure

to carbon solutions, including renewable energy production, renewable energy supporting products & services, and green transportation. Holdings are considered involved with carbon solutions if they have at least 0.1% exposure.

Each marker in Exhibit 34 represents a fund and its Carbon Solutions Involvement. In this test, a higher involvement percentage is optimal.

Exhibit 34 % Carbon Solutions Involvement vs. Morningstar Global Target Market Exposure Index



Source: Morningstar Direct. Morningstar Research. Data as of March 2022. For Green Bonds, the analysis is carried out at issuer level, not on the issuance itself.

As expected, the funds offering the highest exposure to carbon solutions are Clean Energy/Tech and Climate Solutions, although the level of involvement across offerings varies greatly. EDP Renovaveis SA, a top holding in many of these portfolios, is a renewable energy developer that builds, owns, and operates electricity facilities. This company is mostly focused on onshore wind, offshore wind, and solar, and it ranks in the top decile versus Renewable Power Production peers on metrics such as ESG risk and carbon risk.

By contrast, only about one third of Low Carbon funds beat the global market benchmark in terms of carbon solutions exposure. By excluding or reducing exposure to fossil fuel or other carbon-intensive companies, Low Carbon funds may be missing out on exposure to climate solutions, as these companies are increasingly developing products and services that address climate change.

Carbon Risk

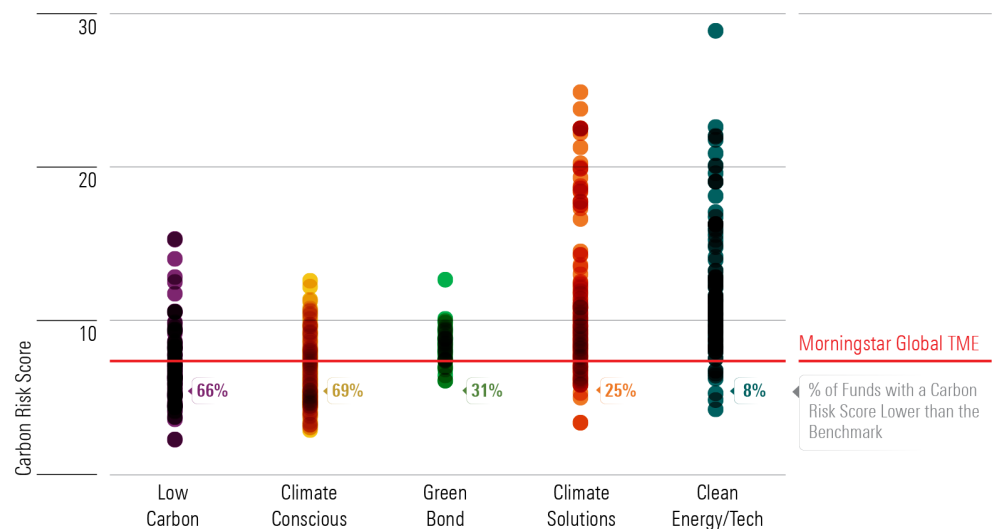
Finally, we examine the carbon risk embedded in each climate strategy type. At a company level, the [Sustainalytics Carbon Risk Rating](#) indicates the degree to which a company’s economic value is at risk in the transition to a low-carbon economy. Unlike the involvement metrics used in our previous tests, which are purely quantitative, the Carbon Risk Rating is the result of a qualitative analytical process

performed by Sustainalytics' analysts. Carbon risk goes beyond traditional carbon footprinting, taking account of management actions to mitigate a firm's carbon risk. Sustainalytics arrives at a company's Carbon Risk Rating by evaluating carbon intensity, fossil fuel involvement, stranded assets exposure, mitigation strategies, and green solutions.

At the fund level, the [Morningstar Portfolio Carbon Risk Score](#) is the asset-weighted carbon risk score of the equity or corporate bond holdings in a fund. At least 67% of portfolio assets must have a Carbon Risk Rating from Sustainalytics in order for a fund's Carbon Risk Score to be calculated. The percentage of assets covered is rescaled to 100% before calculating the score.

Each marker in Exhibit 35 represents a fund and its Portfolio Carbon Risk Score. A lower score is optimal.

Exhibit 35 Carbon Risk Score of All Fund Groups vs. the Morningstar Global Target Market Exposure Index



Source: Morningstar Direct. Morningstar Research. Data as of March 2022. For Green Bonds, the analysis is carried out at issuer level, not on the issuance itself.

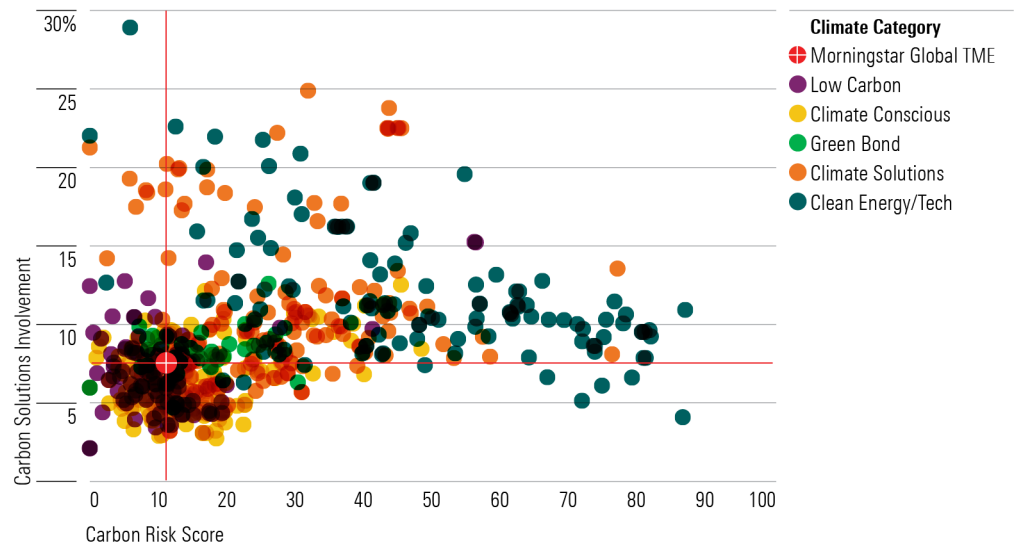
The fund groups with the lowest Carbon Risk scores are Climate Conscious and Low Carbon, while Climate Solutions and Clean Energy/Tech funds tend to carry more carbon risk. Again, two factors are at play here. First, many companies that offer green solutions operate in carbon-intensive sectors like utilities and energy. These companies are transitioning. They are developing solutions to help reduce their own carbon emissions and that of others. Examples include utilities companies RWE and AES. RWE's carbon risk has decreased considerably in recent years with coal retirements and the addition of significant new renewables capacity. AES has wind and solar farms and has announced a plan to reach net-zero carbon emissions from electricity sales by 2040, but the majority of AES' power generation capacity remains fossil-fuel-fired.

The second factor explaining the high carbon risk of Climate Solutions and Clean Energy/Tech funds is that some companies can be focused on products and services that are climate-friendly, but the

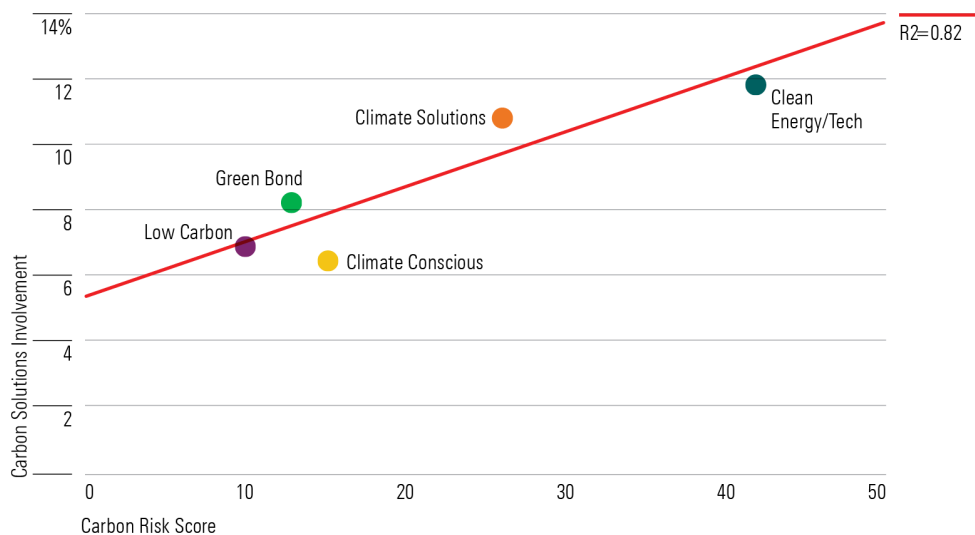
operational activities required to produce those goods and services may remain carbon-intensive. This is the case with industrial companies like Panasonic PCRFY, which supplies electric vehicle batteries. Its manufacturing business remains energy intensive, and although management has established a plan to switch 100% of electricity used in operations to renewable energy by 2050, it had made no measurable progress on this front as of 2021.

Exhibit 36 plots all the funds in our list on the basis of their Carbon Solutions Involvement and Carbon Risk scores. Exhibit 37 plots the average fund in each grouping.

Exhibit 36 Relationship Between Carbon Solutions Involvement and Carbon Risk



Source: Morningstar Direct. Morningstar Research. Data as of March 2022. For Green Bonds, the analysis is carried out at issuer level, not on the issuance itself.

Exhibit 37 Relationship Between Carbon Solutions Involvement and Carbon Risk—Averages

Source: Morningstar Direct. Morningstar Research. Data as of March 2022. For Green Bonds, the analysis is carried out at issuer level, not on the issuance itself.

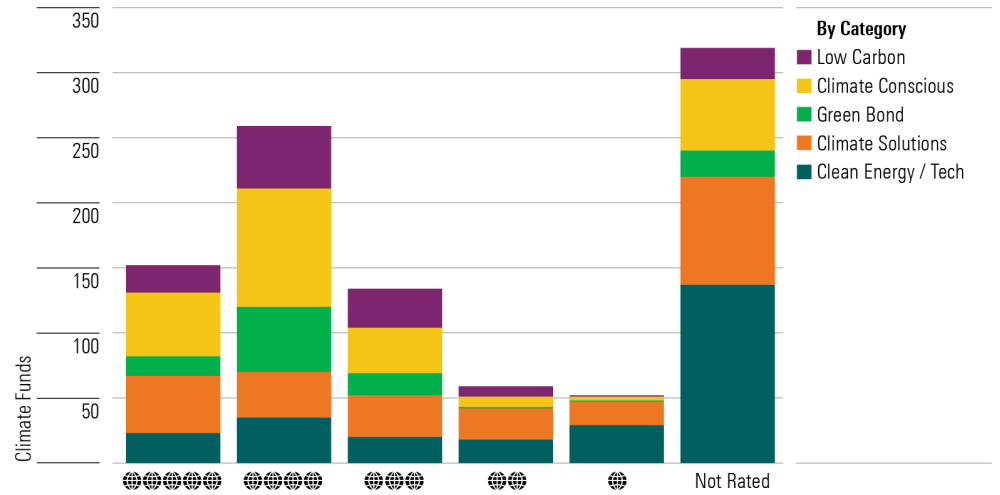
As shown in these exhibits, most Clean Energy/Tech funds sit on the upper right-hand side of the graph, which signals that exposure to renewable energy is often achieved by taking some extra carbon risk. Climate Solutions funds land underneath, carrying less carbon risk than Clean Energy/Tech funds but more carbon risk on average than the rest of the groupings. This supports a common narrative that the companies trying to solve the carbon challenge often operate in the most carbon-intensive sectors. These are the transitioning companies which, as they develop and implement climate solutions over time, should see their exposure to Carbon Risk decrease. That said, it is possible to find funds that score high on Carbon Solutions Involvement and keep a lid on their Carbon Risk. For example, **DWS Invest ESG Climate Tech** maintains below-benchmark levels of carbon risk and above-average exposure to climate solutions in areas like health, agriculture, and disaster prevention.

What About Broader Environmental, Social, and Governance Concerns?

Although climate change is the chief concern for these funds, many investors will want to limit exposure to broader ESG risks. In Exhibit 38, we assess the universe of climate funds against the [Morningstar Sustainability Rating](#), commonly referred to as the "globe rating." The globes reflect the level of ESG risk present in the portfolio normalized on a peer-relative basis. There is a skew toward strong ESG risk management in this cohort, with more than 60% of rated funds scoring 4 or 5 globes¹⁴. This compares with 67% and 69% for the overall sustainable fund universes in Europe and the U.S., respectively.

¹⁴ A globe rating will be generated if there is ESG risk data available for more than 67% of the portfolio for the trailing 12 months. There are 319 funds in this sample that are not rated due to lack of coverage.

Exhibit 38 Globe Rating of Climate Funds — Total Universe



Source: Morningstar Direct. Morningstar Research. Data as of January 2022.

As expected, Climate Solutions and Clean Energy/Tech funds make up the vast majority (80%) of the climate funds with 1 or 2 globes. Very few Low Carbon and Climate Conscious funds score poorly on the Morningstar Sustainability Rating (less than 7% of rated funds earn either 1 or 2 globes).

What's Inside Climate Funds?

In this section, we look inside climate funds to examine the most commonly held companies in each grouping as well as their domicile, sector, style, [Morningstar Rating](#), 2021 returns, [ESG Risk Rating](#), and [Carbon Risk Rating](#).

Following is a list of the 20 companies most commonly held in Low Carbon funds.

Exhibit 39 Most Commonly Held Companies in Low Carbon Funds





























































Low Carbon

Company	Domicile	Sector	Equity Style Box	Morningstar Rating	2021 Return (%)	ESG Risk Rating Assessment	Carbon Risk Category
Alphabet	United States	Communication Services	Large Growth	★★★★★	65.3	5 globes	Low
Bayerische Motoren Werke	Germany	Consumer Cyclical	Large Value	★★★★★	16.3	5 globes	Medium
Henkel	Germany	Consumer Defensive	Large Blend	★★★★★	-27.0	5 globes	Low
Atlas Copco	Sweden	Industrials	Large Growth	★	36.4	5 globes	Low
Roche Holding	Switzerland	Healthcare	Large Blend	★★★★★	20.9	5 globes	Negligible
SAP SE	Germany	Technology	Large Blend	★★★★★	9.4	5 globes	Negligible
AstraZeneca	United Kingdom	Healthcare	Large Growth	★★★★	20.1	5 globes	Negligible
Microsoft	United States	Technology	Large Growth	★★★★★	52.2	5 globes	Negligible
ASML Holding	Netherlands	Technology	Large Growth	★★★★★	65.9	5 globes	Negligible
Schneider Electric	France	Industrials	Large Blend	★★★★	37.5	5 globes	Low
Discovery	United States	Communication Services	Mid Value	★★★★★	-21.8	5 globes	Negligible
Novo Nordisk	Denmark	Healthcare	Large Growth	★★	61.7	5 globes	Negligible
AXA	France	Financial Services	Large Value	★★★★★	31.5	5 globes	Low
Cisco Systems	United States	Technology	Large Value	★★★★	44.9	5 globes	Negligible
ING Groep	Netherlands	Financial Services	Large Value	★★★★★	55.1	5 globes	Low
L'Oreal	France	Consumer Defensive	Large Growth	★	25.9	5 globes	Low
Visa	United States	Financial Services	Large Growth	★★★★	-0.3	5 globes	Negligible
Kesko Oyj	Finland	Consumer Defensive	Mid Blend	—	29.2	5 globes	Low
Koninklijke DSM	Netherlands	Basic Materials	Large Growth	★★★	32.0	5 globes	Low
Novozymes	Denmark	Basic Materials	Large Blend	★★	44.4	5 globes	Low

Source: Morningstar Direct. Sustainalytics. Data as of March 2022. In the ESG Risk Rating Assessment, 5 globes are equivalent to Negligible ESG Risk, and 1 globe is equivalent to Severe ESG Risk.

Low Carbon funds tend to be well-diversified portfolios with broad sector and stock exposure. All but two of the 20 most represented stocks are large caps, and the median return in this cohort was 31.8% for 2021, a whopping 12.7 percentage points above the 2021 return for the Morningstar Global TME benchmark. Thirteen stocks are classified as having Negligible or Low ESG Risk (represented by 5 or 4 globes, respectively), while seven are exposed to Medium levels of ESG Risk. As expected, the quasi-totality of companies in the top 20 (19 of 20) fall into Carbon Risk categories of Negligible or Low.

Exhibit 40 Most Commonly Held Companies in Climate Conscious Funds**Climate-Conscious**





























































Company	Domicile	Sector	Equity Style Box	Morningstar Rating	2021 Return (%)	ESG Risk Rating Assessment	Carbon Risk Category
Alphabet	United States	 Communication Services	 Large Growth	★★★★★	65.30		Low
Schneider Electric	France	 Industrials	 Large Blend	★★★★	37.54		Low
ASML Holding	Netherlands	 Technology	 Large Growth	★★★★★	65.88		Negligible
Microsoft	United States	 Technology	 Large Growth	★★★★★	52.24		Negligible
Vestas Wind Systems	Denmark	 Industrials	 Large Growth	★★	-34.98		Low
Bayerische Motoren Werke	Germany	 Consumer Cyclical	 Large Value	★★★★★	16.31		Medium
Roche Holding	Switzerland	 Healthcare	 Large Blend	★★★★★	20.88		Negligible
Atlas Copco	Sweden	 Industrials	 Large Growth	★	36.37		Low
Novo Nordisk	Denmark	 Healthcare	 Large Growth	★★	61.73		Negligible
Henkel	Germany	 Consumer Defensive	 Large Blend	★★★★★	-26.99		Low
Infineon Technologies	Germany	 Technology	 Large Growth	★★★★	21.34		Low
Nvidia	United States	 Technology	 Large Growth	★★	125.41		Negligible
L'Oreal	France	 Consumer Defensive	 Large Growth	★	25.88		Low
S&P Global	United States	 Financial Services	 Large Growth	★★★	44.50		Negligible
Apple	United States	 Technology	 Large Growth	★★	34.48		Low
Autodesk	United States	 Technology	 Large Growth	★★★★	-7.91		Negligible
Kingspan Group	Ireland	 Industrials	 Large Growth	—	70.67		Low
SAP	Germany	 Technology	 Large Blend	★★★★	9.45		Negligible
Adobe	United States	 Technology	 Large Growth	★★★★★	13.38		Negligible
EDP Renovaveis	Spain	 Utilities	 Large Blend	—	-10.49		Negligible

Source: Morningstar Direct, Sustainalytics. Data as of March 2022. In the ESG Risk Rating Assessment, 5 globes are equivalent to Negligible ESG Risk, and 1 globe is equivalent to Severe ESG Risk.

As seen previously, Climate Conscious funds share many characteristics with Low Carbon and Climate Solutions funds. They also share many common holdings with these two groupings. Alphabet, ASML Holding, and Microsoft are popular names in Low Carbon portfolios, while Vestas Wind Systems and Infineon Technologies are commonly held by Climate Solutions funds. Notably, Schneider Electric is one of the top common holdings in all of the equity-focused climate-fund groupings: Low Carbon, Climate Conscious, Climate Solutions, and Clean Energy/Tech. Schneider Electric is a leading provider of energy and automation digital solutions to achieve energy efficiency.

All of the most popular stocks in Climate Conscious funds are large caps, and eight of 20 are in the Technology sector. The median return for these stocks was just over 30% in 2021, but NVIDIA blew away the competition with a jaw-dropping 125% gain for the year. NVIDIA designs graphics processing units (GPUs) for the gaming and professional markets, as well as system on a chip units (SoCs) for the mobile computing and automotive market. Notably, all of the commonly held names in this cohort are exposed to Negligible or Low levels of Carbon Risk, and most earn Low ESG Risk Ratings.

Exhibit 41 Most Commonly Held Companies in Climate Solutions Funds**Climate Solutions**

Company	Domicile	Sector	Equity Style Box	Morningstar Rating	2021 Return (%)	ESG Risk Rating Assessment	Carbon Risk Category
Schneider Electric	France	 Industrials	 Large Blend	★★★	37.54		Low
Vestas Wind Systems	Denmark	 Industrials	 Large Growth	★★	-34.98		Low
SolarEdge Technologies	United States	 Technology	 Mid Growth	★★	-12.08		Medium
Aptiv	Jersey	 Consumer Cyclical	 Mid Blend	★★★★	26.60		Low
Infineon Technologies	Germany	 Technology	 Large Growth	★★★★	21.34		Low
Orsted	Denmark	 Utilities	 Large Blend	★★★	-36.90		Low
Linde	Ireland	 Basic Materials	 Large Growth	★★★	33.08		Medium
Koninklijke DSM	Netherlands	 Basic Materials	 Large Growth	★★★	32.05		Low
Plug Power	United States	 Industrials	 Mid Growth	—	-16.75		Medium
Waste Management	United States	 Industrials	 Large Blend	★★	43.47		Low
Ecolab	United States	 Basic Materials	 Large Blend	★★★★	9.33		Low
First Solar	United States	 Technology	 Mid Blend	★★★	-11.89		Low
Johnson Controls International	Ireland	 Industrials	 Large Blend	★★★	76.99		Low
Xylem	United States	 Industrials	 Mid Blend	★★★	18.91		Low
Microsoft	United States	 Technology	 Large Growth	★★★★	52.24		Negligible
EDP Renovaveis	Spain	 Utilities	 Large Blend	—	-10.49		Negligible
Kingspan Group	Ireland	 Industrials	 Large Growth	—	70.67		Low
Tomra Systems	Norway	 Industrials	 Mid Growth	—	45.66		Medium
American Water Works	United States	 Utilities	 Mid Blend	★★	24.60		Low
BYD	China	 Consumer Cyclical	 Large Growth	—	41.67		Medium




























































Source: Morningstar Direct. Sustainalytics. Data as of March 2022. In the ESG Risk Rating Assessment, 5 globes are equivalent to Negligible ESG Risk, and 1 globe is equivalent to Severe ESG Risk.

Climate Solutions funds are typically more concentrated at the sector level than any of the previous three groupings, and this is well reflected here. Industrial companies dominate the league table of the 20 most commonly held stocks in Climate Solutions funds. However, additional sectors, including technology, utilities, basic materials, and consumer cyclical, make Climate Solutions funds still more diversified than Clean Energy/Tech funds. Many Climate Solutions portfolios also tend to have a mid-cap and/or growth tilt.

On the Carbon Risk front, 15 stocks fall into the Negligible or Low category, and five are Medium. One stock, Plug Power, a leading provider of turnkey hydrogen solutions, is exposed to High levels of ESG Risk, largely driven by material ESG issues related to Product Governance, Human Capital, and Business Ethics.

The median return for stocks in this cohort was 25.6% in 2021, led by Johnson Controls International PLC, a building technology firm that manufactures heating, ventilation, and air-conditioning systems; fire and security products; and building automation and control products.

Exhibit 42 Most Commonly Held Companies in Clean Energy/Tech Funds**Clean Energy/Tech**

Company	Domicile	Sector	Equity Style Box	Morningstar Rating	2021 Return (%)	ESG Risk Rating Assessment	Carbon Risk Category
SolarEdge Technologies	United States	 Technology	 Mid Growth	★★	-12.08		Medium
Enphase Energy	United States	 Technology	 Mid Growth	★★	4.26		Medium
First Solar	United States	 Technology	 Mid Blend	★★★	-11.89		Low
Vestas Wind Systems	Denmark	 Industrials	 Large Growth	★★	-34.98		Low
Sunrun	United States	 Technology	 Small Growth	★★★	-50.56		Negligible
Plug Power	United States	 Industrials	 Mid Growth	—	-16.75		Medium
Xinyi Solar Holdings	Cayman Islands	 Technology	 Large Growth	—	-33.73		Negligible
Sunnova Energy International	United States	 Technology	 Small Growth	—	-38.13		Medium
Canadian Solar	Canada	 Technology	 Small Value	—	-38.93	—	—
Orsted	Denmark	 Utilities	 Large Blend	★★★	-36.90		Low
EDP Renovaveis	Spain	 Utilities	 Large Blend	—	-10.49		Negligible
Siemens Gamesa Renewable Energy	Spain	 Industrials	 Large Value	★★★	-40.82		Low
Ballard Power Systems	Canada	 Industrials	 Mid Growth	—	-46.18		Medium
Xinjiang Goldwind Science & Technology	China	 Industrials	 Large Blend	—	20.22		Medium
Ormat Technologies	United States	 Utilities	 Small Blend	—	-11.63		Negligible
Bloom Energy	United States	 Industrials	 Small Blend	—	-23.48		Medium
Scatec	Norway	 Utilities	 Small Growth	—	-56.25		Negligible
Schneider Electric	France	 Industrials	 Large Blend	★★★	37.54		Low
Neoen	France	 Utilities	 Mid Growth	—	-38.52		Negligible
SunPower	United States	 Technology	 Small Value	★★	-18.60		Medium

Source: Morningstar Direct, Sustainalytics. Data as of March 2022. In the ESG Risk Rating Assessment, 5 globes are equivalent to Negligible ESG Risk, and 1 globe is equivalent to Severe ESG Risk.

Clean Energy/Tech funds tend to be concentrated at the sector level, with technology, industrials, and utilities dominating the league table. Small caps and mid-caps account for two thirds of the top 20 most commonly held stocks, up from 35% last year. This speaks to the decline in the share price (and market capitalization) of some of these companies. For example, Sunrun and Canadian Solar both stepped down to small cap from mid-cap during 2021 following significant declines in their share prices. Sunrun lost 50.6% during 2021 after a jaw-dropping 402% gain in 2020. Canadian Solar dropped by 39% after a 132% rise the year before.

In the previous section, we saw that Clean Energy/Tech portfolios typically carry higher carbon risk than other types of climate funds. Out of the 19 stocks assigned a Carbon Risk classification, 11 are Negligible or Low, while eight are Medium. Similarly, three of the stocks in this group carry High levels of ESG Risk: Plug Power, Sunnova Energy International, and SunPower.

Conclusion

The menu of options for climate investors globally has expanded considerably in the past year and will continue to expand as asset managers strive to help reorient capital toward more climate-friendly investments, in line with their [net-zero commitment](#). More choice and better information on the carbon characteristics of their investments will help investors meet their climate goals.

When choosing a climate product, investors should carefully consider their green preferences and carbon-risk appetite. As we have seen, Low Carbon funds provide the greatest shield from carbon risk but will offer little in the way of climate solutions. Conversely, Clean Energy/Tech funds offer high exposure to climate solutions as expected but also currently hold the greatest carbon risk in the bunch. This, however, should not put investors off. The rationale for investing in solutions is not only to profit from their potential success but also to help provide the capital and support to bring those solutions into being. If these companies are able to do so successfully, they will have sidestepped their carbon risk in the process.

It is important that investors do their homework. They should understand the funds' investment objectives and how the portfolios are constructed, ensure they are comfortable with the level of carbon exposure, and, crucially, look at the funds' holdings to avoid any bad surprises. Investors should also bear in mind that some climate change investment strategies can result in narrow and concentrated portfolios, which makes them more suitable as satellite holdings than as core parts of a portfolio. Climate funds also have a relatively short history, with most launched in the past two to three years, making their performance hard to assess.

As more asset managers commit to Net Zero by 2050 and start implementing their decarbonization plans, we expect to see more new climate funds come to market. We will also see more existing conventional and sustainable funds repurpose into fully fledged climate funds or tweak their investment objectives to include emission reduction targets. As companies are being asked to disclose more fulsome and accurate data, we can expect funds with a climate-related mandate to become clearer in their missions and more accountable to investors. This report is a snapshot of the current state of play, but we expect this universe will fluctuate. Morningstar will continue to monitor its progress. ■■

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