Task Force on Climate-Related Financial Disclosure

J.P. Morgan Asset Management
2022 Inaugural Report

J.P.Morgan
ASSET MANAGEMENT

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Foreword

At J.P. Morgan Asset Management[1], we believe contributing to addressing climate change is important to creating long-term value for our clients. This report provides insights into our approach and our developing commitment to integrating climate considerations throughout our business and investment processes.

As of December 31, 2021, J.P. Morgan Asset Management has more than USD 2.65 trillion in assets under management across a broad range of investment strategies and operates in every major market in the world to serve our diversified client base – from institutions to financial intermediaries and individual investors.

Our parent company, JPMorgan Chase & Co., published its first Task Force on Climate-Related Financial Disclosures (TCFD) report in 2019.

We are now pleased to present the inaugural TCFD report specific to J.P. Morgan Asset Management. This report is a significant milestone in our journey towards providing more transparency and disclosure, aligned to our stewardship expectations for investee companies. As investors on behalf of our clients, we have been strong advocates for TCFD disclosure guidance to encourage companies to share more information that is useful for investment decisions.

We have made significant investments in our climate-related investment capabilities and enhanced our efforts to help clients consider the material implications of climate change within their portfolios.

We believe we can meaningfully reduce greenhouse gas (GHG) emissions in our assets under management in several ways. First, we can actively engage with our investee companies to help them set net-zero commitments and pursue emission-reduction pathways.

We can also invest in companies that are well positioned to benefit from the transition to a low-carbon economy and reduce exposure to the largest carbon-emitting companies or sectors. Finally, we will continue to expand our sustainable product offering.

In 2021, J.P. Morgan Asset Management became a signatory of the Net Zero Asset Managers initiative (NZAM). As part of this commitment, we are partnering with our clients on their transition to net zero and setting a target to manage a proportion of our client assets in line with the goal to achieve net-zero GHG emissions by 2050 or sooner.

This inaugural TCFD Report reflects our current efforts and business practices on our journey to integrating climate considerations in our business. We recognize the opportunity to continue to refine our disclosures over time. We expect to evolve our reporting in line with industry developments and regulatory requirements, as well as to reflect our growing climate expertise and the improvement in climate data availability and quality.

We look forward to enhancing our transparency as we continue to focus on climate as a critically important topic.

George Gatch
CEO, J.P. Morgan Asset Management

Jennifer Wu
Global Head of Sustainable Investing

1 This Report is issued by J.P. Morgan Asset Management ("JPMAM"). JPMAM is the marketing name for the investment management businesses of JPMorgan Chase & Co. and its affiliates worldwide. Unless otherwise noted, the focus of this report throughout is on J.P. Morgan Asset Management in its role as asset manager for its clients. References to "we", "us", "our", "the firm", "firmwide" are references to JPMAM."

Executive Summary

Climate change presents important risks and opportunities to investors. To best serve our clients, we are committed to providing insights, products and capabilities to help them navigate the climate transition.

In this report, we disclose how we consider climate-related risks and opportunities in the assets we manage on behalf of our clients.[2] In line with TCFD recommendations, this report is structured in four sections. The Governance section discusses how climate risks and opportunities feature in our governance and management structures. The Strategy section focuses on the key climate-related components of our strategy: ESG integration and research, our sustainable product offering and investment stewardship. The Risk Management section explores how we identify and manage climate risks through our continuously evolving ESG and climate research capabilities, and through our risk management and compliance functions. Finally, in the Metrics and Targets section, we disclose the data and metrics we currently use and are in the process of onboarding, and also report our 2021 carbon emissions baseline.

In this Executive Summary, we present the key highlights of the report and provide a summary of our disclosures for each of the TCFD recommendations in Exhibit II.

2 The information provided in this report reflects J.P. Morgan Asset Management's approach to ESG as at the date of this report and is subject to change without notice. We do not undertake to update any of such information in this report.

We are advancing sustainable investing governance

In 2021, to enhance the governance of our sustainable investing related activities, J.P. Morgan Asset Management established the Sustainable Investing Oversight Committee (SIOC). SIOC provides strategic oversight of sustainable investing activities including, among others, reviewing the implementation plans for the firm's commitment to Net Zero Asset Managers initiative.

Exhibit I. ESG Integration is a foundation for assessing and managing climate risk

Since 2016

We leverage our extensive ESG research, comprised of both qualitative and quantitative assessments. Our recently published ESG Integration report outlines our approach in detail.

▼

Assessing and integrating financially material ESG factors

Climate-related risks and opportunities

▼

Investment process for certain actively managed strategies

Our sustainable investment[3] solutions continue to grow

We offer sustainable investment solutions to clients seeking to generate long-term returns and contribute to sustainable outcomes, including strategies that incorporate climate-related risks and opportunities. In 2021, we launched new sustainable thematic strategies, including strategies that seek to invest in companies that are offering solutions through their products or services to address climate change mitigation or adaptation challenges.

3 J.P. Morgan Asset Management takes a global approach to sustainable investing, and the solutions offered through our sustainable investing platform meet our internally defined criteria for a sustainable investment. The evolving nature of sustainable finance regulations and the development of jurisdiction-specific legislation setting out the regulatory criteria for a "sustainable investment" or "ESG" investment mean that there is likely to be a degree of divergence as to the regulatory meaning of such terms. This is already the case in the European Union where, for example, under the Sustainable Finance Disclosure Regulation (EU) (2019/2088) certain criteria must be satisfied in order for a product to be classified as a "sustainable investment." Any references to "sustainable investing," "SI" or "ESG" in this document are intended as references to our internally defined criteria only and not to any jurisdiction-specific regulatory definition.

Our approach to engagement on climate risk is to focus on the sectors and companies where, in our view, climate risk poses the greatest material risk to our clients' investments.

We also acquired Campbell Global, LLC, a recognized leader in global timberland investment and natural resource management, with 5 million acres of forest globally[4] managed by Campbell Global, a firm acquired by J.P. Morgan Asset Management.

We continue developing our climate analytics capabilities

We continue to develop our climate data and analytics capabilities. This includes working towards integrating climate-related data and metrics into a centralized J.P. Morgan Asset Management platform alongside other material information used for portfolio management and research. The approach integrates what J.P. Morgan Asset Management has identified to be the most appropriate data, scenarios and analytical tools, combined with the expertise from our dedicated climate researchers in the Sustainable Investing team and our 200+ fundamental researchers.

As an active investment manager, we engage with investee companies

As stewards of our clients' capital, we engage with certain investee companies to encourage positive change as an important part of our investment process across asset classes. Climate risk is one of our firmwide investment stewardship priorities. In 2021, we engaged with over 600 companies engaged on climate risk across 47 markets and 25 sectors. Our approach to engagement on climate risk is to focus on the sectors and companies where, in our view, climate risk poses the greatest material risk to our clients' investments.

Voting on shareholder proposals relating to climate change is another important way of expressing our views where we think management could better manage climate risk.

The journey ahead

We have made significant advancements in the ways we help our clients to address climate risks and act upon opportunities presented by the transition to a low-carbon economy and we will continue to deepen these capabilities.

4 Please note that this document is not an offer of any particular product.

Exhibit II. Summary of disclosure alignment to TCFD guidance for all sectors and supplemental guidance for asset managers*

Governance

Board's oversight of climate risks and opportunities

Legal entity boards oversee senior management, providing challenge of business activities and controls, including sustainability-related matters.

Management's role in assessing and managing risks and opportunities

We created the SIOC to oversee sustainable investing activities, including our commitments under Net Zero Asset Managers initiative.

Business units and functional groups are responsible for overseeing climate-related risks and opportunities as part of oversight in their respective roles.

Strategy

Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.

Transition risks and opportunities (Policy and Legal, Reputation, Market and Consumer Preferences, Energy and Technology Transformations) are particularly important in the near term (3 to 10 years), while physical risks (acute and chronic) are increasingly important over longer time horizons (up to 30 years), although these will vary by asset class and risk type.

Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.

A preliminary assessment of a subset of our equities portfolios found the highest risk exposure within the Extractive Minerals sector. Transition risks from Policy and Legal impacts were highest, while most transition related opportunities were from shifts in Market and Consumer preferences.

Describe how climate-related risks and opportunities are factored into relevant products or investment strategies.*

Describe how each product or investment strategy might be affected by the transition to a low-carbon economy.*

ESG integration in our actively managed investment processes considers financially material ESG factors, including climate-related risks and opportunities. Our broad product capabilities and global research allow us to partner with clients to meet their needs across a spectrum of solutions, including strategies that incorporate risks and opportunities of climate change.

Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or ower scenario.

We are in the process of developing our firmwide approach to scenario modeling, formalizing the work that is currently being done by a number of investment teams. The approach will assess the resilience of our assets under management to different futures, including achieving net zero by 2050.

Risk Management

Describe the processes for identifying and assessing climate-related risks.

Describe how material climate-related risks for each product or investment strategy are identified and assessed. This might include a description of the resources and tools used in the process.*

We identify climate-related risks through our ESG quantitative and qualitative research. ESG Integration in our actively managed investment processes considers financially material ESG risks, including climate-related risks. We are currently in the process of further developing and integrating our dedicated climate-related capabilities into the central technology platform.

Describe engagement activity with investee companies to encourage better disclosure and practices related to climate-related risks in order to improve data availability and asset managers' ability to assess climate-related risks.*

As an active investment manager, we consider engagement with investee companies to encourage positive change an integral part of our investment process across asset classes. Climate risk is one of our firmwide investment stewardship priorities. We discuss our investment stewardship approach in the Strategy section.

Describe the processes for managing climate-related risks.

Describe how material climate-related risks for each product or investment strategy are managed.*

Describe the processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.

We employ a multi-line defense approach to managing risks in client portfolios. As primary risk owners, investment teams are responsible for considering climate as a core topic in our investment analysis, alongside all other material financial risks, as part of ESG integration. In addition to J.P. Morgan Asset Management's risk management process, Investment Directors monitor and assess how investment teams are incorporating material sustainability risks into their investment strategies. Our independent Risk Management and Compliance functions are part of the second line of defense.

Metrics and Targets

Metrics to assess risks and opportunities, including in products and strategies

We are evaluating the most appropriate metrics to use for assessing climate related risks and opportunities, taking into account data and methodology, quality and availability, the needs of our clients, and regulatory requirements.

GHG emissions for assets under management*

Our carbon exposure metrics for our assets under management for 2021 are: See Exhibit XXI.

Targets to manage risks and opportunities

J.P. Morgan Asset Management signed up to Net Zero Asset Managers initiative in 2021, supporting investment aligned with the goal of achieving net-zero GHG emissions by 2050 or sooner.

*Reflects recommendations that are included in the Supplemental Guidance for Asset Managers, which incorporates updates to the guidance for the financial sector released by the TCFD in 2021 (https://assets.bbhub.io/company/sites/60/2021/07/2021-TCFD-Implementing_Guidance.pdf)

Governance

Governance

Board oversight

Under the oversight of our boards and the leadership of our senior management, we are committed to fostering an effective and efficient risk and control environment. Sustainability-related matters, including climate, form an important component of our business strategy.

From an enterprise-level perspective, the JPMorgan Chase & Co. Board of Directors is responsible for overall oversight of the business and affairs of the firm.

At a business segment level, the J.P. Morgan Asset Management Risk Committee oversees risk management, as well as various governance frameworks, and also serves as a board escalation channel. It is co-chaired by the J.P. Morgan Asset Management Chief Executive Officer (CEO) and J.P. Morgan Asset Management Chief Risk Officer (CRO).

Locally, legal entity boards oversee regional senior management, who are responsible for setting business strategy aligned to long-term value creation for our clients. Legal entity boards provide oversight to senior management and challenge of business activities and controls. In the Asia Pacific (APAC) and Europe, Middle East and Africa (EMEA) region, we have an escalation path to the legal entity boards on sustainability-related matters, including climate risk strategy, in J.P. Morgan Asset Management funds and client accounts.

Climate risks and opportunities are considered in our actively managed investment strategies through ESG integration, which is overseen by management and, if required by local regulatory frameworks, these legal entity boards.

Exhibit III. Overview of J.P. Morgan Asset Management's board oversight governance structure in EMEA and APAC

Exhibit IV. Description of governance bodies/committees

Governance body/ committee name	Responsibility for climate-related risks and opportunities
J.P. Morgan Asset Management Legal Entity Boards (APAC and EMEA)	Oversight of each legal entity's business. Ad hoc meetings when required.
Business Controls Committees (Global, APAC and EMEA)	Point of escalation for controls/risk to relevant Legal Entity Boards. Generally meetings are held monthly.
Sustainable Investing Oversight Committee (Global)	Oversees ESG integration review process, supervises Net Zero Asset Managers initiative implementation, and when necessary, escalates to the Business Controls Committee(s).
Asset Management Risk Committee	Provides oversight of risks inherent in the asset management business. The Committee also provides an escalation channel for issues and risks, as well as oversight of the various governance frameworks.

Governance structure

In 2021, to enhance the governance of our activities related to sustainable investing, J.P. Morgan Asset Management established the SIOC. SIOC's responsibilities are outlined in further detail in the Management section below.

SIOC can escalate risk and controls issues to the Business Control Committees (BCC) of the relevant region, where required. These regional BCCs provide oversight of the operational risks and control environment across the entire asset management business, in order to properly identify, manage and monitor existing and emerging operational risks, control issues and trends.

These BCCs serve as a point of escalation to the relevant J.P. Morgan Asset Management legal entity boards cited above. Legal entity boards also have oversight of relevant risk management activities and receive investment risk updates from J.P. Morgan Asset Management's Risk team. As part of the Risk team's development of a framework to monitor material ESG factors and their consideration in the investment process of our active strategies, sustainability risk information will be provided to select regional legal entity boards, such as APAC, where required by the applicable regulatory framework, from 2022 onwards.

In APAC, in addition to having an escalation path, the legal entity boards receive periodic progress updates on climate-related issues from teams such as the Sustainable Investing team, when required. While the legal entity boards outside of APAC do not currently receive similar standing updates, updates may be expanded to other regions in the future.

Sustainable Investing Operating Committee

To enhance the governance of our activities related to sustainable investing, J.P. Morgan Asset Management established the Sustainable Investing Oversight Committee (SIOC)

Management oversight

Management operating committees across multiple levels of the organization are comprised of cross-functional senior leaders and are accountable for business strategy oversight and implementation including sustainability-related matters.

The JPMorgan Chase & Co. Operating Committee is the senior management body for the firm and includes the Chief Executive Officer of Asset & Wealth Management (AWM).

Subsidiary level executive management bodies tasked with overseeing progress towards strategic AWM business objectives include the J.P. Morgan Asset & Wealth Management Operating Committee and the J.P. Morgan Asset Management Operating Committee.

Exhibit V. Management Committees

Management Committee	Responsibilities
JPMorgan Chase & Co. Operating Committee	• Most senior firmwide management body, responsible for developing and implementing corporate strategy and managing operations. • J.P. Morgan Asset Management AWM CEO is a member of the JPMorgan Chase & Co. Operating Committee.
J.P. Morgan Asset & Wealth Management Operating Committee	• Senior management body overseeing business segment operations and strategy across J.P. Morgan Asset Management and J.P. Morgan Wealth Management businesses. • J.P. Morgan Asset Management CEO is a member of the AWM Operating Committee.
J.P. Morgan Asset Management Operating Committee	• Led by the CEO of J.P. Morgan Asset Management business segment, the Asset Management Operating Committee sets the firm's priorities and business vision. This body of senior leaders receives periodic updates on sustainability and climate-related initiatives, such as the firm's 2021 decision to become a Net Zero Asset Managers signatory. It is expected that this management team will provide input to setting our Net Zero Asset Managers initiative interim emissions reductions targets to be published in 2022. • AM Global Head of Sustainable Investing, Jennifer Wu, is a member of the Asset Management Operating Committee and provides regular updates to that body on climate-related topics, including the firm's strategy for developing climate analytical tools, climate-related research projects and climate-aware investment solutions.

Role of functional groups

At J.P. Morgan Asset Management, each business unit and functional group across the firm is responsible for overseeing sustainability-related matters as a part of their oversight.

Consideration of sustainability-related matters is led by specialist groups across J.P. Morgan Asset Management as well as incorporated throughout existing responsibilities of broader functions.

Exhibit VI. Role of Functional Groups

Team	Responsibilities/Description	Reporting line
Sustainable Investing team		
J.P. Morgan Asset Management Global Sustainable Investing Team	• Spearheads sustainable investing globally in partnership with investment professionals. • Provides detailed global sustainable investing research and insights on thematic ESG issues including climate change that can be applied across asset classes. The team is structured into three pillars with dedicated sustainability responsibilities: • The **ESG Research and Data** pillar develops proprietary ESG and climate modeling and research by partnering with data scientists, research analysts and portfolio managers, to enhance our investment capabilities and product innovation. In 2021, we established a dedicated Climate Research team with extensive expertise in climate-related transition and physical risks. • The **Client Solutions** pillar provides ESG expertise to design and build sustainable investment products and customized client solutions, engages with clients to help them meet their ESG objectives and partners with a broad range of functions and teams to advance our sustainable leadership through education and commitment to ESG standards. • The **Investment Stewardship** pillar defines and directs company and industry level engagements on our five global stewardship priorities, including providing ESG expertise for our broader investment-led engagement efforts, and exercises our voting rights globally, aligned to clients' portfolio objectives.	• Global Head is a member of Asset Management Operating Committee. • Global Head reports into both the Chief Investment Officer for Global Equities and the Chief Investment Officer for Global Fixed Income, Currencies and Commodities, both of whom serve as co-chairs of Asset Management Investment Committee, an executive management body that oversees investment performance and investment principles.

Team	Responsibilities/Description	Reporting line
Broader Functional Groups embedding sustainability considerations		
Investment Groups[5]	• Our portfolio managers are accountable for the performance of relevant funds/ strategies and contribution to client's risk and return objectives, including consideration of material climate related risks and opportunities. • **Investment Groups** are responsible for implementing consideration of financially material ESG factors including climate-related risks and opportunities as applicable into the day-to-day investment decision-making process. • Our investors' assessment of performance takes into account adherence to our firm's Sustainability Risk Policy which contains relevant environmental factors, including climate change.	• Chief Investment Officers of respective asset classes are members of the Asset Management Investment Committee and the Asset Management Operating Committee.
AM Risk team	• Responsible for providing independent challenge, monitoring and review of the investment process.	• AM Risk is responsible for independent risk oversight and challenge, including climate related items presented to the relevant Boards and Committees. Chief Risk Officer is a member of Asset Management Operating Committee, Sustainable Investing Oversight Committee and Asset Management Business Controls Committee.

5 We define investment groups as investment teams which share a common investment process and ESG integration approach.

Sustainable investing governance

SIOC provides strategic oversight of sustainable investing activities including engagement, proxy voting, sustainable investments criteria, ESG integration and review of implementation plans for the firm's commitment to Net Zero Asset Managers initiative. SIOC also oversees related policies, programs, targets and performance, and reviews J.P. Morgan Asset Management's sustainable investing frameworks, including those that consider climate change risks and opportunities.

Committee members include the Chief Investment Officers (CIOs) of each asset class and the Global Head of Sustainable Investing, the Global Head of Investment Stewardship and heads of control functions.

The CIOs and the Global Head of Sustainable Investing participate in day-to-day management meetings across their asset classes and with senior management, allowing SIOC to provide strategic oversight across teams and strategies. This also establishes a clear line of escalation, with members providing updates to SIOC where applicable.

Outside of SIOC, we also have regional Proxy Oversight Committees, which are responsible for formulating regional voting policies and guidelines, including guidelines related to climate change. The committees are established in our four key investing regions: North America, EMEA, Asia ex-Japan, and Japan. These committees can escalate issues into SIOC, which will also receive periodic updates from these committees.

We also engage with key external and internal stakeholders on climate change to assess and manage the related risks and opportunities. For example, we seek to understand clients' views and positions on climate change on an ongoing basis, and communicate our approach through our dedicated teams of client advisors around the world, either via direct discussions or written communications. We also do this on an ad-hoc basis through events, training webinars, surveys and due diligence feedback.

The Sustainable Investing team, in partnership with our Client Skills Training Team, has developed an online Sustainable Investing Academy for our employees, with a broad curriculum including climate change. We also conduct informational sessions for some of the distribution and investment teams so they can build a foundation of knowledge around the implications of climate change for our investment portfolios and learn about climate-related metrics.

We also have peer advisory working groups to connect expertise across our investment and distribution platforms, such as the Sustainable Investing Client Strategy Working Groups (organized in three regional chapters) and the ESG Data and Research Working Group. Both Working Groups meet regularly to discuss various matters related to sustainable investing, including climate change.

Strategy

As stewards of our clients' assets, we consider factors that are material to our clients' long-term financial returns, including the investment risks and opportunities arising from the transition to a low-carbon world. Where aligned with our clients' investment objectives, we believe we can address climate-related risks and act on opportunities through meaningful carbon emissions reductions in our portfolios including by reducing exposure to the largest carbon-emitting companies or sectors, investing in companies which are on a path to reduce carbon emissions, growing our sustainable product suite and actively engagement with our investee companies.

Exhibit VII. Our climate-related strategy is built around several key components

ESG integration efforts that include:

- ESG integration process for all asset classes
- Dedicated climate-focused resources
- Identifying climate risks across time horizons
- Fo cusing on transition risks and opportunities
- Scenario modeling and portfolio resilience

Growing our sustainable product suite via:

- Climate-focused investment strategies
- Low-carbon transition framework
- Acquisitions and strategic investments

Investment stewardship activities, such as engagement and proxy voting

Participation in industry associations and advocacy groups

Sustainable investing is a strategic priority of J.P. Morgan Asset Management, with climate change and its associated risks and opportunities being assessed and considered when developing our firmwide strategy and goals.

Exhibit VIII. Milestones of climate-aware sustainable investing

J.P. Morgan Asset Management and JPMorgan Chase & Co. have each reached several key milestones along the journey of climate-aware sustainable investing.

	J.P. Morgan Asset Management Business	JPMorgan Chase & Co.	J.P. Morgan Asset Management Products
2007	• Became a signatory to the Principles for Responsible Investing (PRI)		
	• Formalized ESG integration process with working groups which discuss sustainable investing related matters including climate change • Joined Institutional Investors Group on Climate Change (IIGCC)		
	• Joined Task Force on Climate-Related Financial Disclosures (TCFD)		
		• JPMorgan Chase & Co. publishes first TCFD Climate Report	
2020	• Enhanced our Investment Stewardship Model with a focus on climate risk and opportunities • Joined Climate Action 100+ • LTCMA* flagship thought leadership paper on climate change		• Launched two thematic products which focus on carbon transition
	• Expanded the dedicated Global Sustainable Investment Team including the addition of 3 climate researchers • Joined the Asia Investor Group on Climate Change (AIGCC), Net Zero Asset Managers initiative (NZAM) and UN launched Glasgow Financial Alliance for Net Zero (GFANZ) • Establishment of Global AM SIOC which oversees sustainable investing frameworks including those regarding climate change risks and opportunities, and the implementation of our Net Zero Asset Managers initiative commitment • Built a proprietary ESG scoring System which incorporates key climate metrics • Successful acquisition of Campbell Global adding diversified investment opportunities related to climate change and conservation of biodiversity • Onboarded additional climate data vendors, such as Trucost	• JPMorgan Chase & Co. announces commitment to Paris Agreement and releases the Carbon Compass℠ methodology • JPMorgan Chase & Co. joined Net Zero Banking Alliance (NZBA) and GFANZ	• Launched first SFDR Article 9 product which focuses on Climate Change • Selected real estate products which considers GHG in one of its performance measures ranked #1 amongst peers by GRESB

*Long-Term Capital Market Assumptions

ESG integration incorporates climate considerations in investment processes

J.P. Morgan Asset Management defines ESG integration as the systematic inclusion of material ESG factors (including sustainability risks) as additional inputs into investment analysis and investment decision-making, where possible and appropriate. ESG integration does not change a strategy's investment objective, exclude specific types of companies or constrain a strategy's investable universe. ESG factors encompass a wide range of issues including, but not limited to climate risk, natural resource use, human capital management, diversity, business conduct, governance practices, shareholder right, and executive compensation. We believe that climate-related risks and opportunities are important for many different sectors, and conduct materiality assessments to help us identify the sectors for which these are most relevant.

ESG factors include issue such as:

- Climate risk
- Natural resource use
- Human capital management
- Diversity
- Business conduct
- Governance practices
- Shareholder right
- Executive compensation

Our ESG integration process

As discussed in the Governance section, SIOC reviews ESG integration by investment groups. In order for strategies managed by an investment group (investment teams which share a common investment process and ESG integration approach) to be deemed ESG integrated, they need to be reviewed under J.P. Morgan Asset Management's governance process. We recently published our ESG Integration report detailing our approach.

Our investment groups assess the materiality of different climate-related factors based on the ESG integration process they have adopted. For example, our equity and fixed income sector analysts have implemented a qualitative ESG assessment approach (detailed in the Risk Management section) that is applied to over 3,000 companies. For investment groups with strategies invested in real assets, such as real estate, we believe proactive efforts to manage exposure to climate-related risks, particularly physical risks, are essential. The Global Real Estate Group uses a location-based climate analytic software tool to highlight potential physical risks, such as hurricanes, earthquakes, wildfires, flooding, water stress and heat stress, associated with an asset. They can then assess the potential future risks and evaluate any potential mitigation strategies that can be implemented.

Our Infrastructure Investments Group invests in assets that provide safe, reliable and affordable terminals and infrastructure related to solar and wind power. Environmental performance, such as GHG emissions and water and energy usage of those assets is monitored on a regular basis. The investee companies provide qualitative updates on matters related to climate change that address physical and transition risks, increased severity of extreme weather events and potential results from longer-term changes in climate patterns, including stranded asset risks, and risks related to disruption from policy, legal, technological or market changes.

Dedicated climate-focused resources and capabilities

J.P. Morgan Asset Management's dedicated Global Sustainable Investing team is comprised of specialists with expertise across various pertinent themes. This includes climate researchers within the Data & Research pillar and team members with climate experience within the Investment Stewardship pillar.

One of the team's priorities is to extend existing ESG investment capabilities to provide an enhanced set of climate-related metrics and analytics. This includes providing the framework for calculating carbon exposure metrics, advancing portfolio-level climate scenario analysis capabilities and developing tools to measure portfolio alignment (see the Risk Management Section for further details), as well as identifying companies that are more resilient and better prepared for the transition to a low-carbon economy. Further discussion of these metrics is provided in the Metrics and Targets section.

As part our effort to further develop our data and analytics capabilities, we recently made a minority equity investment in MioTech, a fintech using artificial intelligence (AI) to provide greater access to a wide and evolving range of ESG and climate-related data and analytics in China. In 2022, our focus will be to enhance our dataset using such region-specific data sources so that we can help our clients make better-informed decisions to capture climate-related risks and opportunities.

Identifying climate-related risks and opportunities across time horizons

The relevance and time horizon of climate-related risks and opportunities to the client accounts and products we manage depends on a number of variables, including investment style, guidelines and objectives, region and asset class. While the investment horizon varies across different investment groups and styles, J.P. Morgan Asset Management's fundamental active portfolios typically look to hold investments for five years or more, which is why we consider climate change to be a core topic in our investment analysis.

Even if some climate-related impacts do not materialize within the next five years, we believe there is a significant probability that expected future impacts will start to be reflected in asset prices and affect financial returns within our long-term investment time horizons. We reflect this view in our interactions with companies, such as through our corporate engagement activities.

Defining climate-related risks and opportunities

The time horizons associated with climate-related risks are different from our investment time horizons, and vary by risk type and asset class. Our current view is that transition risks and opportunities, as defined in Exhibit IX, are particularly important in the near term (3 to 10 years). As a result, we have been focused on developing our understanding of these types of risks, as discussed in the next section.

Physical risks, as defined in Exhibit IX, are increasingly important over longer time horizons (up to 30 years), although extreme weather events can have near-term impacts. We are working towards improving our understanding of physical risks across relevant sectors; these are already a key consideration for our infrastructure and real estate strategies.

Our analysts assess the impact of near-term risks on physical assets for the following core components:

- Operation location
- Human capital (e.g. employee) location
- Core business/economy exposure
- Indirect exposure (Supply-chain and distribution network location)

Some teams use the MSCI climate value at risk metric, which aims to measure the financial impact of physical risk associated with climate change by quantifying the difference in the present value of a portfolio under scenarios, with and without climate change.

Transition risks and opportunities across and within economic sectors

In terms of transition risks, J.P. Morgan Asset Management considers both the impact of policies that are intended to mitigate climate change, as well as the impact of shifting demand for products and services resulting from policies. A transition to a low-carbon economy entails legislative and regulatory changes, new national or regional commitments, such as the Paris Agreement and European Union (EU) Green Deal, as well as the natural shift of supply and demand landscape within industries. Additionally, the cost of capital is expected to increase for companies that are more exposed to climate related risks as these become increasingly priced into financing decisions.

At the same time, we recognize that the transition to a low-carbon economy can also present an unprecedented business opportunity for companies that are responding to the challenges of climate change and able to benefit from shifts in market and consumer preferences. By leveraging our global research capabilities within our investment analysis, we are working towards better understanding the balance between potential risks and opportunities arising from this transition.

We provide a detailed breakdown of the transition risks and opportunities we have identified in Exhibit X.

The transition to a low carbon economy can also present an unprecedented business opportunity for companies that are responding to the challenges of climate change.

Exhibit IX. Physical and Transition Risks

Climate change is one of the most critical challenges facing society and the environment today. J.P. Morgan Asset Management is committed to understanding how climate change may influence the risks it manages, including evaluating how our business as well as our clients' portfolios could be impacted through transition or physical risks driven by climate change.

- **Physical risks** are the risks associated with extreme events and changing climate. Physical risks are typically separated into acute risks from natural disasters such as floods, tropical cyclones (including hurricanes and typhoons) and wildfires, and chronic risks, which are related to long-term shifts in the climate, such as changes in rainfall patterns, prolonged droughts or flooding, rising sea levels or a rising heat index.
- **Transition risks** result from the process of adjusting to a low-carbon economy. In addition to possible changes in climate policy and financial regulation, potential transition risks may include economic and other changes engendered by the development of low-carbon technological advances, such as electric vehicles and renewable energy, and/or changes in consumer preferences towards low-carbon goods and services. Carbon taxes, requirements for companies to provide climate-related disclosures, an increased preference from consumers for lower-emissions products and controversies related to perceived climate-related greenwashing are all examples of transition risks.

  Transition and physical risks are interconnected, and transition risks could be further accelerated by changes in the physical climate. Achieving the goals of the Paris agreement to keep global temperature rise to well below 2°C and reach net-zero emissions, is expected to result in higher transition risks but lower physical risks.

Exhibit X. Climate-related risks and opportunities from a low-carbon transition. Topics highlighted in yellow are considered in the analysis shown in Exhibit XI.

Impact channel	Risk examples	Opportunity examples
Policy and legal	Expected impact of carbon pricing could result in high fixed operating costs and could result in decreased profits for companies with high emissions	Governments may provide incentives and subsidies to encourage a certain transition path
	Increased climate-related disclosures are expected, resulting in increased operating costs	
	Companies with historically high emissions or poor climate performance may be more exposed to future litigation, as well as fines, due to increased climate related regulation	
Reputation	Negative media or stakeholder perceptions or climate-related controversies could result in a loss of reputation, impact future financial performance and loss of future earnings	Being an early mover on climate issues may improve reputation, resulting in improved financial performance
Market and consumer preferences	Companies may be exposed to potentially declining demand for its products of services as consumers increasingly consider environmental impacts, resulting in loss of revenue	Companies offering low-emissions/ low-carbon products may benefit from increased revenues in response to changing consumer preferences
Technology and energy transformation	Costs associated with the transformation of existing technology may be high	Companies offering low-carbon/zero-carbon energy are expected to benefit from increased revenues and profits due to the global energy transformation
	Breakthroughs in new technology, such as renewables or battery storage, may drive a transition away from carbon intensive goods and services and/or persistent changes in fossil fuel prices	Companies involved in breakthroughs in new technology, such as renewables or battery storage, may benefit from increased revenues as demand for these products increases and/or costs decrease
	Stranded assets	

Within a given sector and region, the importance of different climate-related risks and opportunities can vary significantly. Therefore, we believe considering the materiality of these impacts is a key element of the company-specific analysis underlying our ESG integrated products and strategies.

Taking the Oil and Gas sector as an example, most oil companies will likely suffer in any transition to a low-carbon economy for the simple reason that fossil fuel extraction, along with oil consumption, is a significant cause of CO_2 emissions. Thus, companies in this sector along with others in the Utilities, Energy and Materials sectors may be exposed to stranded asset risk. However, companies that are better positioned than their peers, for example those with relatively low emissions intensity, may still see significant opportunities that are not reflected in current asset prices. Therefore, we may still choose to invest in companies that are in sectors which tend to be exposed to high transition risk, but which we have identified as having lower risks than their peers. On the other hand, reducing the portfolio stake of a company that is overly reliant on fossil fuels compared to its peers or benchmark can be another way to manage the climate risk of a portfolio. We have set out these effects in more detail in the context of our 2021 Long-Term Capital Market Assumptions paper.

To manage the climate risk of a portfolio, see 2021 Long-Term Capital Market Assumptions paper.

Results of transition risk and opportunity assessment

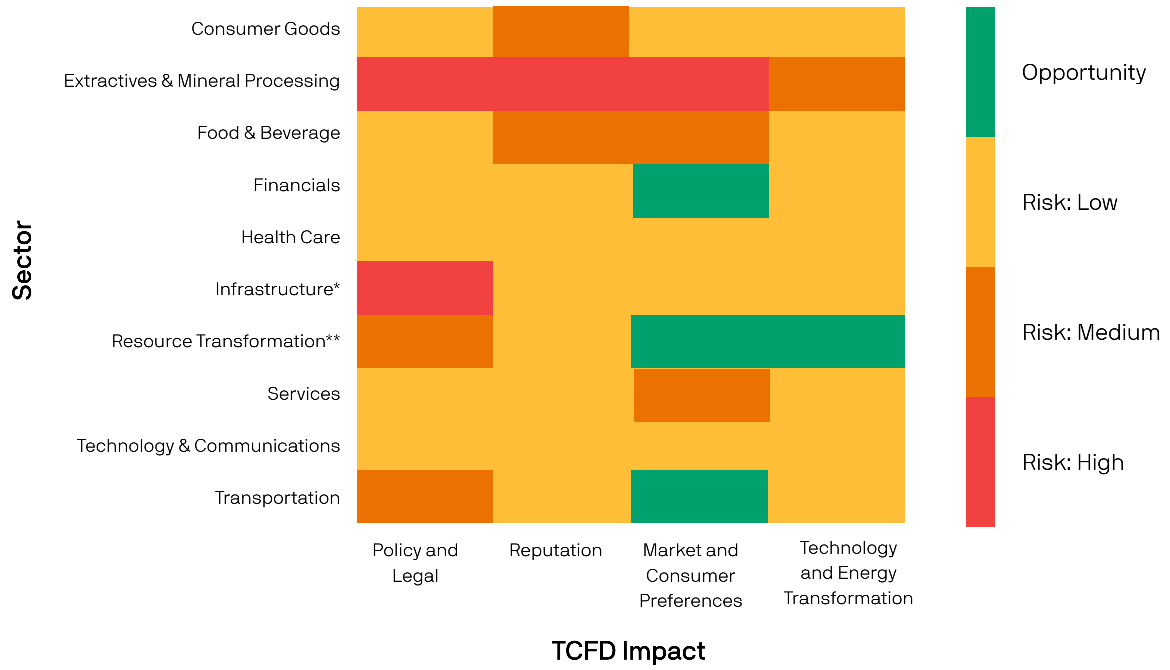
In order to further enhance our understanding of our overall exposure to the climate-related risks and opportunities resulting from a transition to a low-carbon economy (Exhibit X), we have conducted a preliminary assessment[6] covering a subset of our equities portfolios. The purpose of this assessment was to help us gain a more granular understanding of the degree to which we are exposed to each of the climate impacts outlined in Exhibit X, and how this exposure can vary across sectors.

The relative performance of companies was assessed across a range of 32 climate-related metrics that account for a company's current climate action and impact, and the potential impact of climate change on the company. The metrics are sourced from our proprietary ESG assessments based on company-level ESG data and fundamental research (detailed in the Risk Management section). Metrics are categorized into one of the four transition impacts listed in Exhibit XI, and include key inputs, such as company GHG emissions, whether the company has set an emissions reduction target, whether the company is developing sustainable products and the proportion of renewable energy the company is producing.

6 Analysis methodology: For each company in the sample, the 32 metrics are weighted based on sector-level materiality. This weighting is derived by combining the materially matrix used in the quantitative ESG assessment with additional weighting based on qualitative assessments of the climate relevance of each metric. An exposure weighted average is then calculated that accounts for the relevant climate related metrics for each sector and impact channel. The numerical output is transformed into a risk exposure rating based on the relative value of the metric across the universe, resulting in the qualitative output shown in Exhibit XI.

The analysis is based on a core subset of our equities portfolios[7] where we had the highest data coverage. It provides an initial view of where our most material climate-related risks and opportunities may lie within our equities portfolios, serving as a first step towards understanding the broader impact of climate-related risks and opportunities on companies within our portfolios.

Exhibit XI. Climate-related transition risks and opportunities for a subset of our equities portfolio



*Infrastructure includes Utilities, Infrastructure, Real Estate and Waste Management

**Resource Transformation includes Industrials and Chemicals

The results highlight the range of risks and opportunities across and within sectors. The most significant risk exposure is within the Extractives & Mineral Processing sector, where climate-related impacts are high across the categories of Policy and Legal, Reputation, and Market and Consumer Preferences. The results for this sector are not surprising given the high emissions that result from these activities and the expectation that increased regulation will significantly increase costs for these companies. Policy and Legal impacts also pose a high risk for the Infrastructure sector, which includes Utilities, where emissions are high and regulation is expected to increase costs.

7 The analysis covered 60% AUM and 76% of financed emissions (tCO_2e/million USD invested) in our equities portfolios. See Metrics and Targets for further details on the calculation of financed emissions.

The analysis also provides us with novel insights for sectors that are not typically considered to be significantly exposed to climate-related risks. For example, the Food and Beverage sector has medium risk resulting from impacts related to Reputation and Market and Consumer Preferences. These risks stem from this sector's lack of strategies and targets to reduce emissions and the negative impact on profitability resulting from changing consumer demand. Similarly, the Consumer Goods sector has medium risk for Reputation impact primarily due to a lack of strategies and targets to reduce emissions.

We also see that several sectors, such as Transport, Resource Transformation and Financial Services, are poised to benefit from the transition to a low-carbon economy through changes to Market and Consumer Preferences. These opportunities primarily stem from the consideration of sustainability in products and services that are currently offered or in early development stages.

There can be a significant range in the size and direction of impacts within sectors. For example, Infrastructure has a high risk for Policy and Legal impact, but because the sector includes Utilities, there will also be companies within this sector with significant opportunities from renewable energy generation. Over time we aim to deepen our analysis to more explicitly take into account these nuances, as well as broadening it to consider a range of different asset classes, time horizons and data sources.

Scenario modeling capabilities and portfolio resilience

We are currently in the process of developing a formalized approach to scenario modeling across J.P. Morgan Asset Management. Our immediate focus is on capturing and understanding the evolution of transition risks and opportunities, and we plan to enhance our capabilities around physical risk modeling in the future.

Over the last few years, a number of investment teams at J.P. Morgan Asset Management have performed exploratory climate scenario analyses. Thus far, our analysis has typically considered individual funds or asset classes for specific research projects or to provide additional disclosures for clients. For example, we have used the Paris Agreement Capital Transition Assessment (PACTA) tool to assess some of our fixed income portfolios' exposure to climate-related risks.

Developing our climate scenario capabilities is a multi-step process that requires firmwide collaboration, skills and expertise. We will consider such data, scenarios and analytical tools as we believe are appropriate[8], combined with the expertise from our dedicated climate researchers in the Sustainable Investing team and our 200+ fundamental research analysts. Over the past few months, the Sustainable Investing team has begun assessing which data, scenarios and tools would be most suitable for our needs. We have included scenarios that keep global temperatures below 1.5°C and align to net zero, as we are in the process of developing an approach for setting our interim target as part of our commitment to the Net Zero Asset Managers initiative. The nature of the transition impacts the decision regarding which scenarios to use, in particular the reliance on negative emissions technologies and the role of fossil fuels over time. These are important considerations as they will impact how we assess and track net-zero alignment.

As long-term investors, enhancing our climate scenario modeling capabilities will allow us to further identify how climate-related risks and opportunities may manifest over time under different emissions pathways and temperature outcomes. This will in turn inform our strategy and aid our clients in enhancing the resilience of their portfolios.

Expertise from our dedicated climate researchers in the Sustainable Investing team and our

200+

fundamental researchers analysts

8 A number of data and methodological limitations remain when considering the development of climate scenario analysis. These include a reliance on estimated data to fill gaps due to no/incomplete disclosure and a lack of consensus on best practice methodologies for all climate related metrics. As we develop our scenario analysis capabilities, we recognize where these limitations exist, and acknowledge that our approach will continue to evolve as the data and methodologies allow.

Our sustainable product suite continues to grow

Our broad product capabilities and global research allow us to partner with clients to meet their needs across a spectrum of solutions, including strategies that incorporate risks and opportunities associated with climate change.

Exhibit XII. J.P. Morgan Asset Management's range of sustainable products

Exclusions		The exclusion from a fund or portfolio of certain sectors, companies or practices based on specific ESG criteria and/or minimum standards of business practice based on international norms
ESG Promote		A defined percentage of the portfolio is invested in positive ESG issuers / companies.
Sustainable	Positive Tilt	An investment style that seeks to meet its objective by maintaining a portfolio that has a measurable tilt towards companies / issuers with positive ESG characteristics vs benchmark.
	Best-in-Class	Strategy which invests in a defined percentage of companies / issuers that lead in their peer groups in respect of sustainability performance
	Thematic	Strategy invested in well-defined themes or assets specifically related to sustainability. Often seeking an environmental or social outcome.
	Impact	Targeted investments aimed at solving social or environmental problems as well as generating financial return

We have launched a number of dedicated investment strategies in our sustainable Thematic category, including those where climate objectives are targeted within the objectives of the portfolio. We believe climate-aware strategies that explicitly incorporate climate-related factors in the investment decision can help mitigate the downside risks from climate change. Moreover, such strategies may allow clients to recognize the opportunities that are also being created by the move towards a low-carbon world. Our sustainable strategies use exclusions, portfolio-tilt, and corporate engagement as means to incorporate climate-related risks and opportunities.

Exclusions on companies

Although we do not apply blanket exclusions to our ESG-integrated strategies, our dedicated sustainable strategies, including those with climate-related objectives, apply values-based exclusions to respond to clients who prefer to further mitigate exposure to transitional risk or avoid adverse impacts to the environment. We implement these preferences by applying maximum percentage thresholds on revenue or production on certain business activities. For example:

Some Positive Tilt and Best-in-Class funds at a minimum apply the below values-based exclusions:

	Positive Tilt	Best-in-Class
Unconventional oil & gas extraction[9]	**30%** of revenue	**10%** of revenue

Certain products and strategies apply a consistent exclusionary screen on thermal coal, with a 30% threshold (turnover from production and/or distribution)

Tilting portfolios based on climate-related metrics

We have built investable solutions on climate change by tilting portfolios based on measurable climate metrics and transition readiness. In order to do so, we leverage our expertise in data science, fundamental research and sustainable investing insights. For example, we have an active thematic strategy that combines expertise in AI and data science with fundamental and sector-specific human insight to identify companies that are developing innovative solutions to address the global challenge of climate change. The strategy leverages our machine learning capabilities that enable the investment team to assess almost 13,000 companies globally on exposure to a specific theme. Based on these results, the investment team conducts active fundamental research and engages with companies to gain a fuller picture, drawing on the insight of our experienced in-house research analysts and the stewardship expertise of the Sustainable Investing team. The process results in unconstrained, high-conviction thematic portfolios of companies sized based on alignment to the theme and related sub-themes.

9 Oil & gas obtained through non-traditional methods e.g. hydraulic fracturing

Exhibit XIII. Case study of sustainable investment approach focusing on climate change

One of our sustainable thematic strategies seeks to invest in companies that J.P. Morgan Asset Management believes are providing the products and services to address climate change and are well positioned to benefit from growing demand for such solutions.

The strategy invests in companies across five main sub-themes:

Renewables & Electrification	Sustainable Construction	Sustainable Transport	Sustainable Food & Water	Recycling & Re-Use
Companies developing clean energy such as wind, solar, or hydro across the full production chain, and enabling electrification across the economy	Companies developing less carbon-intense forms of construction, including energy efficiency of buildings	Companies investing in sustainable forms of transportation across automobiles, trains and planes	Companies investing in less carbon-intense forms of agriculture, sustainable food, or clean water	Companies developing technologies to reduce waste, including equipment and materials recycling

The portfolio managers assess the investment candidates based on their relevance to a specific theme and evaluate and monitor this relevance over time.

Low-carbon transition framework

We have a proprietary framework for investing in the low-carbon transition, developed by the Sustainable Investing Team in partnership with our Quantitative Solutions team. By identifying companies that are well prepared and well positioned to benefit from this transition, we can create portfolios that seek to achieve a meaningful reduction in GHG emissions – without relying on pure exclusions or sector deviations – and also take advantage of the opportunities presented by the transition. Our quantitative framework leverages data sourced directly from companies, insights from third parties and data from our quantitative research and artificial intelligence team. It is highly scalable and can be applied across asset classes, allowing investors to adjust a variety of inputs and parameters in line with their individual objectives, including the benchmark, tracking error and carbon-reduction targets. Our research suggests that there are three key ways that companies can prepare themselves for the transition to a low-carbon world, which covers both transitional and physical risk of climate change: 1) managing emissions; 2) managing resources, such as electricity, waste and water; 3) managing climate-related risks, both physical and reputational.

Exhibit XIV. Three key ways companies can prepare for transition to low-carbon world

Managing Emissions

Site Emissions

Reduce direct emissions and shift towards greener forms of energy

Consumer Emissions & Opportunities

Benefit from a shift in consumer demands towards low carbon alternatives

Managing Resources

Electricity Management

Reduce indirect GHG emissions from the usage of electricity

Water Management

Improve the sustainability of water flow management

Waste Management

Reduce waste materials, both hazardous and non-hazardous

Managing Climate-Related Risks

Physical Risk

Mitigate impact of physical risks from extreme weather conditions

Reputational Risk

Improve climate stewardship

The framework imports primary data sourced directly from companies, as well as alternative data sources from J.P. Morgan Asset Management's proprietary natural language processing tool, which can capture a range of innovative signals. The tool looks through public documentation such as regulatory filings, broker reports, news reports or company profiles and identify companies with textual relevance to a specific theme or signals such as a company's green capital expenditure. The framework's ratings will then determine which companies are emphasized, through underweight and overweight positions, without taking sector bets.

The low-carbon transition framework is also used to construct the J.P. Morgan Asset Management Carbon Transition Global Equity Index and J.P. Morgan Asset Management Carbon Transition US Equity index, which are aligned with the European Union's Climate Transition Benchmark standards for sustainable products. As part of our rules-based approach investment strategies, we have products that track these indices.

Acquisitions and strategic investments

Over the past few years, J.P. Morgan Asset Management has announced several initiatives aimed at making sustainability and climate solutions integral to both our business and platform. In an effort to directly impact the transition to a low-carbon economy and provide diversified investment opportunities related to climate change and conservation of biodiversity, J.P. Morgan Asset Management acquired Campbell Global, LLC in 2021. Campbell Global is a recognized leader in global timberland investment and natural resource management, with forests in 15 U.S. states, New Zealand, Australia and Chile.

Exhibit XV. Campbell Global's footprint and experience on investing in sustainable forests

40
Years of experience
Investing and in sustainable forest management globally

Nearly
5 Million
Acres
Acquired and managed since inception

Committed approximately
150
Dedicated professionals
In 15 U.S. states, and New Zealand

Third-party Forest Certification on
1.7 Million
Acres
All properties are certified under the most applicable certification standard for the region.

We seek certification from third parties to verify that our philosophies and practices comply with internationally recognized and locally accepted standards for the sustainable and socially responsible management of timberland assets.

USD
5.4 Billion
AUM
Campbell Global managed worldwide on behalf of our clients

Forests are well recognized as a natural solution to many of the world's climate, biodiversity and social challenges. Campbell Global is involved throughout a forest's life cycle, from planting trees to maintaining forest health and growth, as well as harvesting a sustainable supply of raw, renewable materials. Investing in timberland can fit into client portfolios as a sustainable or impact investment, an inflation hedge, a reliable source of long-term core income and capital appreciation, and in a real asset allocation. We expect allocations to these investments will grow from both institutional and high net worth investors, particularly as the market for verified carbon assets matures in the next several years. Forestry is an important carbon-offset solution, accounting for 40% of the total registered carbon-offset ecosystem[10]. J.P. Morgan Asset Management expects to become an active participant in carbon markets as they continue to develop. We hope to help drive the transition to a low-carbon economy and grow the universe of sustainable investment solutions.

10 Source: Global Carbon Atlas (http://www.globalcarbonatlas.org/en/CO2-emissions); Russel 3000 (https://www.forbes.com/advisor/investing/russell-3000-index); https://www.nature.com/articles/s41558-020-00976-6; Carbon Registries (total of carbon offset registered on Climate Action Reserve, American Carbon Registry, Carbon Plan, GoldStandard, Verra, Clean Development Mechanism); ARB is not included since projects are also registered in American Carbon Registry, Climate ActionReserve, and Verra .Data as of 2019 - registered are credits issued (CAR, American Carbon Registry, Gold Standard, Verra, and ARB) and credits retired (Carbon Plan and Clean Development Mechanism)

Considering climate in our investment stewardship

Engaging with investee companies on climate change

As an active investment manager, we consider engagement with investee companies to encourage positive change an integral part of our investment process across asset classes. Investment stewardship specialists and investment teams engage with companies to discuss relevant and financially material ESG issues and encourage them to adopt robust ESG practices with a goal of driving better investment returns. Insights gained from our engagements are incorporated into our investment process, in an effort to enhance risk-adjusted returns over time. We engage companies across asset classes, portfolios and geographies. Nevertheless, there are differences between asset classes which inform our approach to engagement.

Climate risk is one of our firmwide investment stewardship priorities[11]. In 2021, we engaged with over 600 companies on topics related to climate risk, including supporting companies in target setting, asking for detail on decarbonization plans and improving climate change risk disclosures. Our engagements are led by the investment research analysts responsible for primary coverage of the company in equity and corporate bonds and are supported by members of Investment Stewardship team with sector experience and climate-related issues. Our approach to engagement on climate risk is to focus on sectors and companies where, in our view, climate risk poses the greatest material risk to our clients' investment.

Exhibit XVI. J.P. Morgan Asset Management 2021 Engagements with investee companies on climate risk

873	614	25	47
Engagements on climate risk	Companies engaged on climate risk	Sectors engaged on climate risk	Markets engaged on climate risk

Through our climate change engagement framework, we ask companies with whom we engage to align targets with the latest climate science, form robust strategies with intermediate milestones, and disclose consistently and transparently on progress.

11 https://am.jpmorgan.com/lu/en/asset-management/per/about-us/investment-stewardship/stewardship-priorities/

Our climate change engagement framework asks companies to:

Establish a climate transition strategy which is embedded into company strategy and ensure it is overseen at the highest levels of the organisation.

- Managing climate risks will require dedicated senior capacity which understands and can develop the appropriate strategic responses.

Implement action on climate which aligns with business model environmental materiality.

- Actions taken must address the main drivers of companies' current and future environmental impact, not incidental aspects.

Set a strategy, including targets and pathways, which is grounded in the science underlying the Paris agreement.

- Credible transition propositions must reference appropriate benchmarks and sector-specific decarbonisation trajectories to ensure they mitigate material risks.

Report transparently on the implementation of the low carbon transition strategy

- As long-term investors, we understand climate risk will continue to influence company strategies well beyond the tenures of companies' current management and boards. Thus, creating a framework to encourage and facilitate long term reporting is vital.

Proxy voting

We consider voting against directors, executive compensation or other management resolutions where we are not satisfied with the steps taken by the company on climate risk, the quality of the engagement discussion or its progress. Voting on climate change shareholder proposals is another important way of expressing our views where we think management could better manage climate risk. Climate resolutions are complex. We tend to support votes on governance and strategy transparency, climate risk disclosure and lobbying. We also recognise that some industries have characteristics that do not suit broad-brush, top-down action, which means we consider climate resolutions based on their individual merits. For more information see our paper Our approach to climate risk votes. For specific examples of our voting on climate-related issues in various regions globally, please refer to our recent report.

Participation in climate-related industry associations

J.P. Morgan Asset Management aims to be at the forefront of regulatory and industry developments and contribute to shaping global industry standards in sustainable investing. We also seek to define consistent reporting standards for investee companies on climate and other sustainability-related disclosures. We support regulatory developments which encourage the healthy growth of ESG implementation, market transparency and investor protection. To this end, we engage with industry associations to stay abreast of policy developments and offer feedback, where appropriate, to ongoing developments.

Our Global Head of Sustainable Investing was part of the Institutional Investors Group on Climate Change (IIGCC)'s series of working groups which provided key inputs to the development of the draft Net Zero Investment Framework and its Implementation Guide.

More recently, we have been actively involved in discussing the Climate Change and ESG-related agenda at Insurance Asset Management Association of China (IAMAC) where one of the senior members of our management team is the Chairman and our APAC Lead Sustainable Investing Strategist is a member of the ESG committee.

In Europe, our Global Head of Investment Stewardship co-chairs the IIGCC Net Zero Stewardship working group. This working group is focused on establishing best practices and tools for asset managers and owners to implement a net-zero stewardship program and net-zero aligned proxy voting. Through this work, we are contributing to the development of a toolkit for conducting net-zero stewardship. We also supported collaborative engagement with proxy advisors to develop proxy advice solutions and research to enable investors to implement robust net-zero-aligned proxy voting to help manage the systemic risks that climate change presents to our clients' investments.

While most of our engagement is conducted alone, we believe that collaborating with and advocating alongside other investors and stakeholders that share common values can help reinforce and, where needed, escalate our engagement efforts[12]. In 2020 we joined the Climate Action 100+ (CA100+) initiative, an investor-led effort aimed at reducing greenhouse gas emissions. J.P. Morgan Asset Management and other signatories have engaged with issuers to assist them in reducing their carbon footprint and working towards net-zero emissions. In 2021 we became co-lead in the engagement with Korea Electric Power Corp (KEPCO). Further, we are actively engaged with assisting POSCO, SK Innovation, ENEOS Holdings, Saudi Aramco and Toray Industries in their drive to reduce emissions and achieve net zero. We have also joined the AIGCC in 2021 to support its mission to create awareness about the risks and opportunities associated with climate change and net-zero investing.

That same year the AIGCC rolled out its first collaborative engagement program, where we participated in the engagement of Tenaga Nasional and CLP Group, the largest power companies listed in Malaysia and Hong Kong, respectively.

In November 2021, J.P. Morgan Asset Management became a signatory of the Net Zero Asset Managers initiative and UN-convened Glasgow Financial Alliance for Net Zero (GFANZ). In October 2021, our parent company JPMorgan Chase & Co. announced its support for the goals Net-Zero Banking Alliance (NZBA), a global network of banks working to align their lending and investment portfolios with the goal of reaching net zero emissions by 2050.

As part of these initiatives, we have committed to support investing aligned with the goal of achieving net-zero GHG emissions by 2050 or sooner.

As part of the Net Zero Asset Managers commitments, we will partner with our clients on their transition to net zero, set targets for assets that we determine can be managed within net zero pathways, and accelerate our corporate engagement, stewardship and policy advocacy on climate change.

12 While adhering to all applicable rules and regulations, such as antitrust and competition laws, we recognize and embrace the concept that collaboration is necessary to meet certain industry-wide goals as the size and scope of the goals make them difficult to meet without collaboration. J.P. Morgan Asset Management may collaborate with other investors in collective engagement exercises with companies where appropriate. We are selective when deciding which collaborative initiatives we will participate or support, focusing on topics and groups where we believe our collective approach will enhance the effectiveness of engagement.

Risk Management

Risk Management

We identify and assess climate-related risks in our client accounts by leveraging our proprietary qualitative and quantitative ESG research and assessments. Once identified, climate-related risks are managed through our risk governance structure and incorporated into J.P. Morgan Asset Management risk-management processes.

Leveraging ESG research to identify climate-related risks

To identify climate-related risks in our investments on behalf of clients, we are continuing to develop portfolio and risk management tools and research focused on assessing companies' climate-risk exposure and resilience. Our central technology platform provides a hub for our fundamental research analysts to assess companies, share insights and provide updates on engagement efforts. It also houses quantitative data that may serve as an additional input into qualitative assessments.

Qualitative ESG assessments

Qualitative assessment of financially material ESG factors, including climate risk, varies by investment group and strategy. For example, the Equity and Global Fixed income Currency & Commodities have developed a detailed 40-question ESG checklist that sets a baseline fundamental assessment for over 3,000 companies globally. The assessment informs discussions between portfolio managers and fundamental analysts, and our engagements with the companies we cover.

Along with questions on social and governance considerations, the ESG checklist asks questions specifically addressing environmental considerations, including how companies are taking climate and climate-related risks into consideration in managing their businesses.

Exhibit XVII. ESG checklist sample questions

Does the company lack a credible/ measurable strategy or plan to reduce greenhouse gas emissions?	Does the company have issues with toxic emissions, waste management, non-recyclable waste or other environmental damage?	Is the company poised to benefit as a result of their actions related to environmental considerations?

Quantitative ESG assessments

The rapid improvement in the size and quality of ESG-related data has enabled us to conduct in-depth quantitative assessments on the extent to which companies face and manage financially material ESG risk. In these analyses, we use granular data including a company's management of natural resources and environmental impacts leveraging company disclosures, third-party estimates of environmental impact and data science signals. As a result, we obtain a number of important climate-related metrics which help us both identify as well as manage the associated risks. As such, climate related risks are considered alongside other ESG related risks, and the relative significance is determined using industry-level materiality assessments.

Our ESG data not only supports an investment team's quantitative analysis, but also helps to inform qualitative assessments of individual companies. This capability aims to enhance our understanding of what ESG information is available for research and investment decision-making and provides a consistent view around the material ESG factors of each sector in order to manage the associated risks and opportunities.

Exhibit XVIII. Select climate metrics used in quantitative assessments

GHG Emissions

- Scope 1 and Scope 2 GHG emissions intensity
- Assessment of carbon reduction target by Science-Based Targets Initiative
- Does the company have a climate change policy

Business Model Resilience:

- Products relating to climate change opportunities

Energy Management

- Controversies around energy use and GHG emissions

Product Design and Lifecycle

- Scope 3 sales intensity
- Controversies around carbon impact of products
- Assessment of a carmaker's sales-weighted fleet average CO^2 emissions

Enhancements to climate-related data and analysis

We are currently working towards enhancing our processes for identifying, assessing and managing climate-related risks by developing a dedicated climate analytics platform. This platform will provide insights on relevant climate-related metrics, starting with a core set of emissions-based metrics that are more extensive that the metrics currently used in the quantitative ESG assessment. We expect to include metrics such as total current emissions and emissions intensity, as discussed in the Metrics and Targets chapter. As part of this process, we have recently onboarded Trucost as our primary emissions data source, which has coverage for over 14,000 publicly listed companies and combines reported data with an effective emissions estimation model. Over time, we will add additional data and capabilities that will cover the full range of climate related risks and opportunities identified in Exhibit X in the Strategy section and incorporate scenario analysis tools into this platform. We envisage that insights from the climate analytics tool will be combined with ESG quantitative analysis and our qualitative assessment tool, to help portfolio managers to understand the holistic nature of climate-related risks and opportunities.

Managing climate risks through integration across organizational structures

We have multiple lines of defense to manage risks in client portfolios, including climate-related risks. These lines work together but with distinct responsibilities to provide oversight over business activities, including climate-related risks, as outlined in the section below. This enables a sound control framework by minimizing gaps in risk and control coverage, creating separation of duties and an oversight framework.

Investment teams and business management are the first line of defense

Investment teams and business management are responsible for developing and maintaining effective internal controls and are the primary risk owners, or the first line of defense. Portfolio managers have primary responsibility for the risk oversight of client investments. They operate within guidelines and risk parameters and make active investment decisions to generate excess returns for the portfolio. As part of the first line, portfolio managers also coordinate with embedded risk teams dedicated to helping execute risk and performance oversight of the portfolio including review and challenge of the investment process.

Within the first line of defense, material climate-related risks are considered as part of ESG integration and managed day-to-day within portfolios that are determined to be ESG integrated under our governance process. Investment teams are responsible for considering climate as a core topic in our investment analysis, alongside all other material financial risks. These risks are also considered in Investment Oversight Committees organized by asset class across the firm globally.

The investment team's responsibility to integrate these considerations is further outlined in our Sustainability Risks Policy, which provides context on the process for identifying and assessing sustainability risks in investment decision-making.

Monitoring of ESG Integration

J.P. Morgan Asset Management's first line of defense also includes monitoring to assess how investment teams are incorporating material sustainability risks within their strategies. For example, Investment Director teams (or equivalents) across certain asset classes oversee performance and risk oversight of portfolio management. They do this to maintain discipline around investment objectives and process in the context of client objectives or fund guidelines, performance, risk position and ESG profile. The Investment Director teams monitor the relative ESG exposures of the relevant strategy, looking at overarching trends and reviewing outliers.

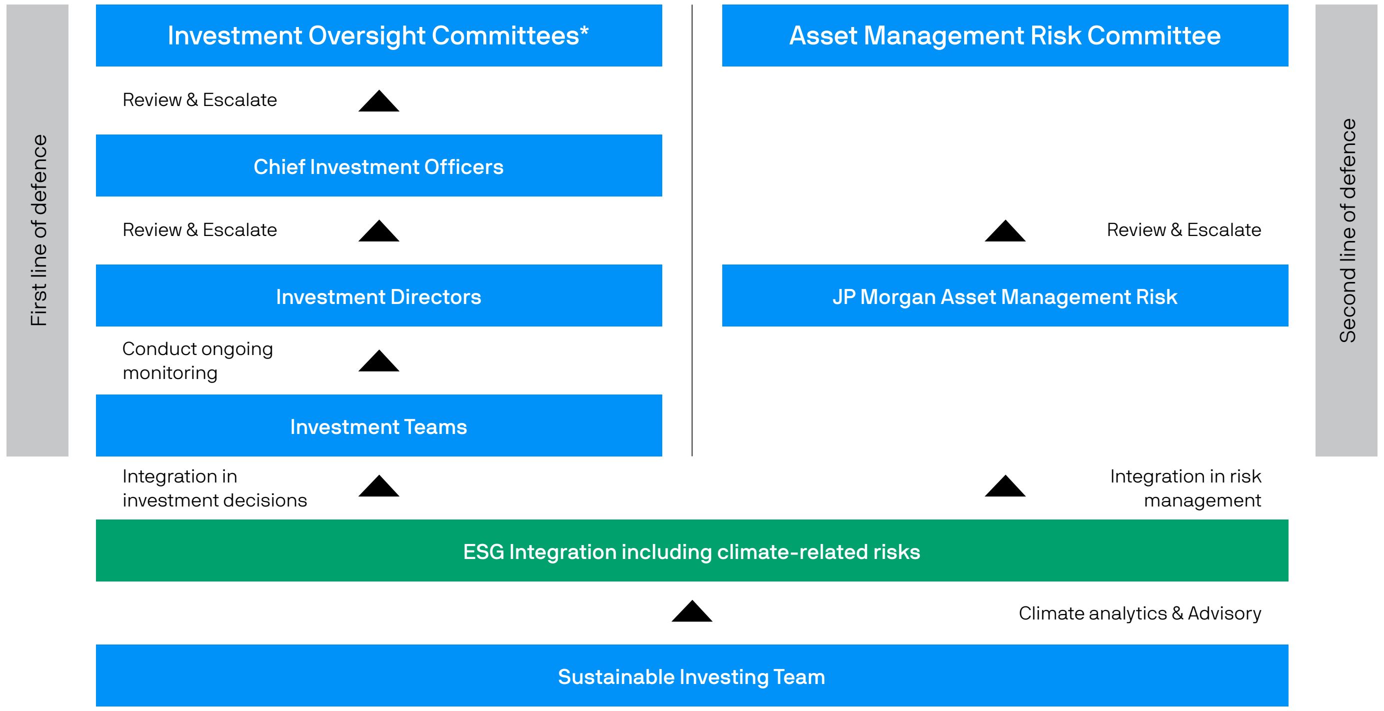
These teams oversee the level of integration from both a qualitative and quantitative angle. The qualitative angle would be captured through regular review meetings, typically once a quarter, with the portfolio managers, while quantitative factors would include measurable metrics on ESG items or exposure across the relevant portfolios. On a regular basis, the Investment Director teams for Equities, Fixed Income and Multi-Asset Solutions, and the equivalent teams in Global Liquidity and Alternatives, conduct formal review meetings with each investment team. Portfolios are reviewed in the context of objectives, performance, risk positioning and ESG profiles, and ESG exposures are documented. The Investment Directors report directly to their respective CIOs.

Any material findings from ongoing monitoring processes are escalated to the CIOs of the relevant asset class using the existing investment oversight/escalation process, as shown in the framework below. CIOs are then able to further escalate any issues, including material negative ESG exposures, into their respective Investment Oversight Committees.

Target Framework: Holistic Investment and Risk Management Framework

Approach: Integrate TCFD aligned Climate Risk Factors into existing investment oversight and escalation framework

Exhibit XIX. Overview of risk management processes



* Committees across asset classes include Fixed Income, Asset Management Solution, Equities and Global Liquidity

Risk and Compliance are the second line of defence

Risk and Compliance are the second line of defense for managing climate-related risk. Each area has its own set of responsibilities, but they work together to provide oversight of the business and set firmwide control policies.

The AM Risk function is responsible for providing independent oversight and effective challenge of the risk management process, including measuring, monitoring and managing risk thresholds to review investment, liquidity and counterparty risks.

The AM Risk team performs quarterly deep dives focused on potential risks across portfolios, and presents those findings to the AM Risk Committee. This includes ESG and Sustainable Investing analyses that are tailored to potential forward-looking risks as well as industry-wide topics of interest. The AM Risk Committee is co-chaired by the J.P. Morgan Asset Management CEO and AM Chief Risk Officer (CRO). Committee members from across the first line of defense have the ability to escalate items where deemed applicable by the AM Risk Committee Charter.

AM Risk also serves as a voting member of SIOC, discussed in more detail in the Governance section.

In 2022, AM Risk developed a framework to monitor material ESG factors and their consideration in the investment process of our active strategies. In its initial stage, this process is being designed with the objective to identify investment strategies with ESG factor scores that are materially different versus their benchmarks and understand the rationale for such differences.

This process aims to raise the transparency of specific exposures or strategies with ESG indicators that may be inconsistent with the strategy's investment objective or disclosures. This process is not expected to limit an exposure identified as an outlier or trigger changes in positions that would negatively impact portfolio returns. On a quarterly basis, results are reviewed with the AM CRO, AM Regional CROs, J.P. Morgan Asset Management Europe (JPMAME) Conducting Officer, and AM Risk Asset Class Leads to determine material outliers to escalate to the CIOs. This quarterly monitoring process is expected to evolve over time.

Compliance, Conduct and Operational risk (CCOR) is responsible for the independent governance and oversight of the first line of defense, including the timely escalation of identified issues. The CCOR management framework establishes J.P. Morgan Asset Management's approach or methodology to govern, identify, measure, monitor, test, manage, and report on compliance, conduct, and operational risks.

Regulatory requirements related to climate change

J.P. Morgan Asset Management actively considers global and industry requirements related to climate change as the developments are directly related to the firm, our investee companies and the interest of our clients.

J.P. Morgan Asset Management has established a global regulatory and industry reform risk management framework (R&IR) to help ensure that business activities are conducted in a manner that complies with applicable regulatory and industry requirements and associated changes.

This framework is run by the Business Transformation (BT) Team and tracks applicable regulatory and industry developments, assesses their impact on our business (directly and indirectly) and implements changes where appropriate. Regulatory or industry developments that materially impact J.P. Morgan Asset Management's business will be assigned a business project manager and the status of in-scope requirements will be tracked through implementation by the J.P. Morgan Asset Management R&IR framework and communicated as appropriate to J.P. Morgan Asset Management governance committees.

The J.P. Morgan Asset Management R&IR framework, which is global in scope, has a three-year, forward-looking perspective and is designed to identify and mitigate the key risks associated with regulatory and industry reform: awareness, applicability, interpretation, implementation (solution design and delivery) and transfer into our operational organization. These risks are considered related but independent of each other. "Industry reform" relates to standards, codes, statements of best practice and other guidance or material developments which are relevant to our business. Recent example includes the APAC ESG Regulatory program that the BT Team has used to coordinate the interpretation and implementation around the disclosure requirements of climate-related risks by the Singapore MAS and HK SFC.

Metrics and Targets

Metrics and Targets

The climate analytics tools we are developing aims to provide a set of emissions-based and climate-related metrics at both a company and portfolio level to cater to different use cases in investment decision-making.

Carbon metrics

Beyond absolute scope 1, 2 and 3 [13] emissions, several other carbon metrics can be used to add insight and context to these figures. These metrics can be used for portfolio analytics and decision-making as they take into account the contribution of each company to the overall portfolio carbon footprint, and highlight companies that are performing better or worse relative to their peers in terms of emissions efficiency. A summary of core carbon metrics is shown in Exhibit XX. based on current best practices as outlined by the Partnership for Carbon Accounting Financials (PCAF Standard) and the TCFD. In 2021, we published a paper "Understanding Carbon Exposure Metrics" that outlines the evolution of carbon metric standards and current best practices. We will leverage these industry standards in our tools.

13 Scope 1: Direct emissions from company owned or controlled facilities, Scope 2: Indirect emissions from purchased electricity, heat and steam, Scope 3: Indirect emissions resulting from upstream and downstream activities of the company such as emissions from purchased products, product end use, business travel and investments. https://ghgprotocol.org/corporate-standard

Exhibit XX. Strengths, weaknesses and use cases for carbon exposure metrics

*** = metrics used by J.P. Morgan Asset Management for reporting**

Metric	Strengths	Weaknesses	Use cases
Total financed emissions* (tonnes CO_2e)	• Portfolio decomposition and attribution analysis • Ultimate tracker of emissions	• Cannot compare portfolios • Trends are sensitive to EVIC^ variations	• To set baselines and track emission evolution
Carbon footprint* (tonnes CO_2e/million invested (USD))	• Portfolio decomposition and attribution analysis • Portfolio comparisons • Intuitive link between ownership and responsibility.	• Size and carbon efficiency of companies not considered • Trend sensitive to EVIC^ variations	• To compare portfolios and perform company attribution based on ownership
Carbon intensity (revenues)* **(Weighted Average Carbon Intensity (WACI))** (tonnes CO_2e/million revenues (USD))	• Portfolio decomposition and attribution analysis • Size and carbon efficiency of companies taken into account	• Can be sensitive to short-term fluctuations in product pricing • Sensitive to outliers	• To evaluate exposure to carbon-intensive companies
Carbon intensity (physical) (tonnes CO_2e/unit production) Sector specific	• Fundamental link to physical production • Independent of pricing and market positioning • Size and carbon efficiency of companies taken into account	• Cannot perform portfolio decomposition and attribution analysis • Normalisation is sector-specific • Only suitable for homogeneous sectors	• To perform sector-specific deep-dive analyses

^ EVIC: Enterprise Value Including Cash. Based on the recommendation of the EU Technical Expert Group, EVIC has been recommended by PCAF as the apportioning metric of choice, and the TCFD has also recommended its use for listed equities, corporate bonds and business loans in its latest guidance on carbon metrics

Currently we use the carbon footprint and weighted average carbon intensity data from MSCI to measure the carbon exposure of investment portfolios in Global Equities and Fixed Income, primarily in regions where this is a regulatory requirement, but also for interested clients. In the climate analytics tools we are building, we plan to leverage the complementary nature of the insights that the different metrics outlined in Exhibit XX can provide.

Climate-related metrics

We plan to complement the carbon exposure metrics with a selection of additional climate metrics to provide a comprehensive analysis of climate-related risks and opportunities at the company and portfolio levels, taking into account both physical and transition issues[14]. Climate metrics can be split into two categories: those that consider a company's impact on climate change and those that consider the impact of a low-carbon transition or physical climate change on a company. Carbon exposure metrics all fall into the first category along with portfolio alignment metrics (such as implied temperature rise metrics), while scenario analysis metrics that consider the valuation impact on companies under different climate pathways fall into the second.

Climate-related metrics often require more detailed or nuanced data inputs than carbon exposure metrics and rely on complex modeling or methodologies. However, the key strength of these metrics is that they can provide insights and understanding beyond those that can be gained through carbon metrics alone.

While carbon exposure metrics can show which portfolios or companies have high emissions or emissions intensities, additional climate metrics could show how this risk may reduce in the future as a result of transition plans that are already underway to reduce these emissions. Similarly, a company with low emissions may not be identified by carbon exposure metrics as having high climate related risks, but scenario analysis metrics may show a potential loss in future revenue if it operates in a sector where there are expected shifts in consumer preferences. Climate metrics are therefore not only useful for reporting and analytics, but also for engagement, as they can provide a more quantitative analysis of a company's risks and opportunities.

As we develop our climate analytics capabilities, we will evaluate which climate related metrics are most appropriate and useful, taking into account data availability and quality. We expect to use the carbon exposure metrics outlined in Exhibit XX and additional climate-related metrics to assess risks and opportunities in our investment strategies and products, as well as to inform our work related to Net Zero Asset Managers initiative commitments.

14 The TCFD recommendations suggests using a number of cross-industry climate related metrics to provide a more holistic picture of an organization's climate related risks and opportunities. https://assets.bbhub.io/company/sites/60/2021/07/2021-Metrics_Targets_Guidance-1.pdf

In this inaugural TCFD report, J.P. Morgan Asset Management is reporting carbon exposure metrics for our assets under management for the first time. We acknowledge that the scope, methodologies and data sources may change in the future, as industry standards evolve and we enhance our climate metric capabilities.

Exhibit XXI. The carbon exposure metrics for our assets under management for 2021[15] are:

Total financed emissions:	Carbon Footprint:	WACI:
126	134	200
$MtCO_2e$	tCO_2e/$million invested	tCO_2e/$million revenue

Bridging emissions data gaps

The majority of companies do not currently report their Scope 1 and Scope 2 emissions data, and so we have followed a hierarchy approach to fill the gaps for non-reporting companies, following the approach recommended by PCAF.

Where companies do not report emissions, we use the Trucost emissions estimate model. Overall, Trucost provides Scope 1 and Scope 2 emissions data for over 14,000 companies, which covers around 96% of our AUM in listed equity and 82% of AUM in corporate bonds.

15 We use the metrics described in Exhibit XXI which are calculated following the equations outlined in our paper "Understanding Carbon Exposure Metrics". The 2021 data is based on our holdings as of 31st December 2021 across publicly listed equity and corporate bonds. Other asset classes are currently out of scope due to data limitations and methodological challenges. Included in the calculation are Scope 1 and Scope 2 emissions and revenue based emissions intensities from the 2022 Trucost dataset as of April 2022. 93% of AUM have 2020 emissions data and 1% have 2021 emissions data (overall 96% listed equity and 82% corporate bonds), the remaining 8% are gap-filled. Revenue data for gap filling is taken from the date matching the emissions reporting date. EVIC data for attribution and gap filling is taken from the closest available datapoint to the holdings date.

To fill additional gaps in coverage, we have devised a policy that adopts a consistent approach across sectors. We assume that industry or sub-industry emissions intensity can be used as a representative emissions factor for the companies with missing data, which increases coverage to ~100%. For cases where emissions information is not available from Trucost, but where we have company revenue data, a company's carbon metrics will be derived from the average carbon intensity (tons CO_2e/million USD in revenues) for the industry or sub-industry in which it operates. For companies with missing emissions and revenue data, the industry or sub-industry average carbon footprint is used instead. The sub-industry is used when the distribution of emissions intensities within the sub industry is significantly different from the parent industry, and the calculation is handled separately for Scope 1 and Scope 2 emissions.

Our approach results in a higher proportion of our AUM being included in our carbon exposure metrics compared to using only reported or Trucost estimated emissions, but results in values with varying data quality. However, we consider this method to strike a sensible balance between the need to provide a straightforward and transparent approach while providing granular enough inputs to differentiate companies across sectors.

Aligning our assets under management with net zero

As discussed in the Strategy section, in November 2021, J.P. Morgan Asset Management signed up to Net Zero Asset Managers initiative. The overall goal of this initiative is to support investing aligned with the goal of net-zero greenhouse gas emissions by 2050 or sooner, in line with global efforts to limit warming to 1.5°C.

The initiative outlines 10 commitments to implement, one of which is to release an interim 2030 target this year that sets out the proportion of our AUM that we will manage in line with net zero.

We are currently developing our approach to meeting this commitment. This includes developing a detailed understanding of our current carbon emissions baseline, where the data and methodologies are available, and its variation across asset classes and the strategies within them. We will publish the interim target and accompanying approach in time for COP27.

Pursuing operational sustainability

In addition to climate impacts from companies held as investments in our client portfolios, as an international company, with offices and employees across the world, we can have a direct impact through our operations. JPMorgan Chase & Co. manages our operations centrally and publishes annual firmwide ESG reports. To drive the firm's progress on operational sustainability, JPMorgan Chase & Co. has set a number of firmwide Operational Commitments. Reducing the environmental impact of physical operations is an important part of becoming a more sustainable organization. In 2020, JPMorgan Chase & Co. committed to achieve carbon neutrality across its operations annually, was met for the second year in a row, as reported in JPMorgan Chase & Co.'s latest ESG Report published in April 2022. And, to continue building on this commitment, in 2021, JPMorgan Chase & Co. set a new target to reduce its Scope 1 and Scope 2 (location-based) emissions by 40% by 2030 versus a 2017 baseline.

It is important to remember that the MSCI ESG metrics provided in this report may not fully reflect future economic reality. At J.P. Morgan Asset Management, our ESG specialists collaborate closely with our research analysts to understand when that may be the case, and where appropriate we engage with companies to improve disclosure and enhance policies. Where we think climate risk may be material, we review fossil fuel exposure, disclosed reduction targets going forward and other relevant information.

DISCLAIMERS