CalPERS' Climate Report and Response to Senate Bill 964

November 2025

CalPERS

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Note: Due to rounding, some figures found in this report may not precisely add up to the associated totals.

Introduction

This report by the California Public Employees' Retirement System (CalPERS) responds to California Senate Bill (SB) 964 and references the International Financial Reporting Standards Foundation (IFRS) S2 Climate-related Disclosures issued by the International Sustainability Standards Board (ISSB).

Climate change poses a threat to the CalPERS portfolio and jeopardizes our mission to deliver retirement and health benefits to our 2.3 million members and beneficiaries. Addressing climate change effectively requires foresight, collaboration, and a steadfast commitment to evidence-based decision-making.

We manage a significant trust fund with more than $500 billion in assets, delivering approximately $32 billion in pension payments annually. Our ability to meet these long-term obligations hinges on strong investment returns. Over the past 20 years, around 55 cents of every pension dollar paid comes from investment earnings. With an estimated funded status of approximately 79% as of June 30, 2025, and a target investment return of 6.8%, managing climate-related risks and seizing climate transition opportunities is not just prudent, it is essential to our financial sustainability.

Climate change presents multifaceted risks to CalPERS' fund and assets. **Physical risks** – such as rising sea levels, extreme weather events, drought, and wildfires – pose increasing threats to infrastructure, supply chains, and property values globally. Simultaneously, the accelerating global shift toward a low-carbon economy creates significant **transition risks**.[1] Companies face pressure to adapt their strategies and operations, but those leading the transition can be rewarded. Furthermore, companies face growing **litigation risks** related to climate impacts and disclosures. These risks unfold against a complex backdrop of political shifts, evolving energy markets, and persistent economic pressures.

As long-term investors entrusted with an absolute fiduciary duty to our members, CalPERS cannot ignore the profound implications of climate change. The consequences of inaction would reverberate throughout the global economy, impacting workers, communities, and the very companies generating the returns funding member benefits. Governmental analyses report that climate change contributes to instability and acts as a threat multiplier, jeopardizing food, water, and economic security.

$32.8 bil

Total Pension Payments for FY 2023–24

79%

Funded Status as of June 30, 2025

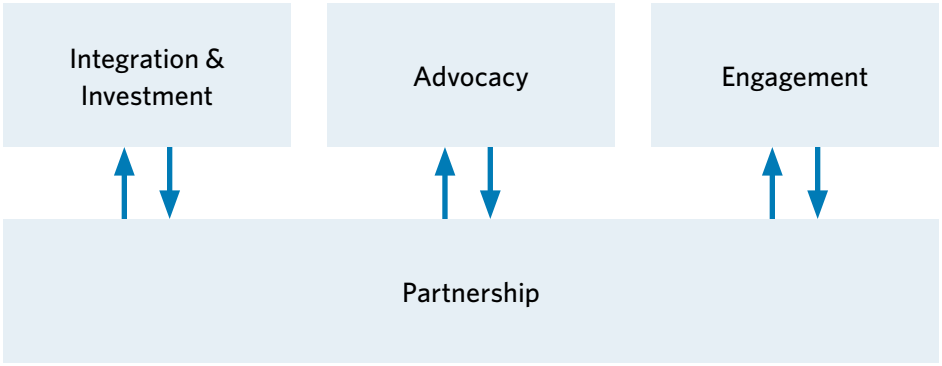
6.8%

Targeted Investment Return for FY 2024-25

However, this transition also unlocks immense investment opportunities. Capturing these opportunities is as critical as mitigating the risks.

CalPERS tackles this complex landscape through a strategic, four-pillar approach, as shown in Figure 1 below.

Figure 1: **Four-Pillar Approach**



Source: CalPERS

1. **Integration and investment:** We embed climate change risk and opportunity analysis into our investment decision-making processes across all asset classes, with a target of $100 billion invested in climate solutions by the end of 2030. By investing in mitigation, adaptation, and transition climate solutions, we aim to take advantage of the opportunities that will be presented from climate change and the transition to a lower-carbon economy. This approach should provide better financial outcomes for the pension system. This should also have a secondary effect of reducing the emissions intensity of our portfolio and further aligning it onto a net zero pathway by 2050.
2. **Engagement:** We work with portfolio companies to navigate the carbon transition and to enhance climate resilience.
3. **Advocacy:** We support policies and regulations that facilitate an orderly and just transition to a low-carbon economy.
4. **Partnership:** We collaborate with fellow investors and global initiatives, such as Climate Action 100+, to amplify our impact.

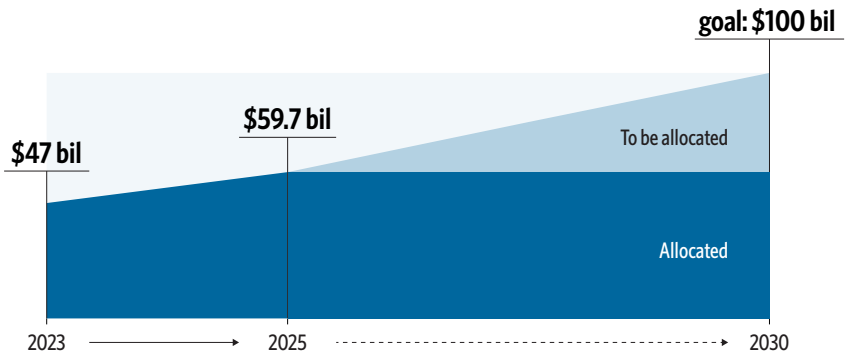
We recognize that climate data, methodologies, and reporting are rapidly evolving. This report reflects our findings based on the most current available information. CalPERS is a strong advocate for mandatory, standardized climate risk disclosure globally, supporting best-practice frameworks in the interim. CalPERS' ability to accurately assess climate risks and opportunities and allocate capital effectively will improve as corporate transparency improves. Successfully navigating the climate transition requires a concerted effort from the entire financial market, working in partnership with governments, businesses, and civil society to address this defining challenge of our time.

CalPERS' Climate-Related Accomplishments

In November 2023, CalPERS announced plans to more than double its climate solutions investments from a $47 billion baseline to $100 billion by the end of 2030. Climate investments were estimated at approximately $60 billion by the end of fiscal year 2025, spanning mitigation, adaptation, and transition categories as defined in the CalPERS climate solutions taxonomy.

In July 2024, CalPERS also announced a commitment of $5 billion in public equity investments to the FTSE Climate Transition Index, a customized index of companies with credible plans to participate in the energy transition and reduce their climate-related risks. We seek to deliver cap-weighted, index-like returns while significantly increasing exposure to climate solutions and decreasing the emissions intensity of the overall index.

Figure 2: **CalPERS' $100 Billion Climate Action Plan Progress**



$5 bil

FTSE Climate Transition Index allocation

447

Public company engagements conducted

Source: CalPERS

CalPERS advocates for climate-related policy to help generate outperformance and increase portfolio resilience. This includes advocating for climate-related risk disclosure from portfolio companies and for initiatives that mitigate climate-related risks to the human capital across our portfolio companies. For example, we have backed an Occupational Safety and Health Administration (OSHA) proposed rule to evaluate and promote heat injury and illness prevention in outdoor and indoor work settings.

CalPERS uses proxy voting and engagement on climate-related issues to foster alignment with our investment priorities. In 2024, staff conducted 447 public company engagements. Staff evaluated the top 350 carbon emitters in the CalPERS global public equity portfolio. These emitters account for more than 80% of total portfolio Scope 1 and Scope 2 emissions and more than 50% of Scope 3 emissions. As a result of the evaluation, CalPERS opposed 395 corporate board directors at 110 of the 350 companies.

Integration ensures consideration of relevant sustainability factors in the investment decision-making process across CalPERS' total fund. Our investment due diligence and external manager selection process assesses transition risks in the shift to a low-carbon economy and how they will be managed, and the physical risks associated with the effects of climate change.

The CalPERS sustainable investments team works across the total fund with each asset class to accomplish its objectives. Each year CalPERS' sustainable investments staff provides the CalPERS Board of Administration with a program review and updates on five core objectives as seen in Table 1.

Table 1: **CalPERS' Sustainable Investments Objectives**

	Objective	Key Performance Indicator	Target
1	Generate Outperformance	Sustainable investments performance relative to asset class benchmarks	Outperformance in each asset class
2	Increase Portfolio Resilience	Periodic total fund climate risk reporting	At least annually
		Proportion of investments with ESG analysis integrated in diligence process	100% of new investments
3	Pathway to Net Zero by 2050	Investments in climate solutions	$100B by 2030
		Monitor and report carbon footprint and emissions intensity by asset class	At least annually (subject to data availability)
4	Promote Diversity, Equity & Inclusion	Cumulative investments with diverse and/or emerging managers	Provide yearly update
		Completion of DEI external manager survey	Provide yearly update
		Percentage of diverse public corporate board directors	Provide yearly update
5	Improve Financial Markets Efficiency	Compliance with Responsible Contractor Program Policy	100% compliance for annual report
		Percentage of global public equity engaged annually	Engage 50% of global public equity AUM
		Proxy voting and corporate engagements update	Provide yearly update

Source: CalPERS

Governance

This section discusses management's approach to climate change and the board's oversight role.

The Role of the CalPERS Board of Administration

The California Constitution (Article XVI, Section 17) details the authority and fiduciary responsibility of the CalPERS Board of Administration. This includes discharging their duties for the exclusive purpose of providing benefits to members and their beneficiaries, minimizing employer contributions, and defraying reasonable expenses.

The board comprises 13 members who are elected, appointed, or hold office Ex Officio for four-year terms. The board delegates authority to six committees: Board Governance, Finance & Administration, Investment, Pension & Health Benefits, Performance, Compensation & Talent Management, and Risk & Audit. The board elects its president each year, who in turn appoints board members to committees which nominate their own chair and vice chair. Each committee operates under a formal delegation and policy which sets out their authority. These policies are publicly available online. The board's Investment Committee meets at least quarterly and oversees CalPERS' Governance and Sustainability Strategy in investments.

Board and committee meetings are held in open session to allow beneficiaries and stakeholders to attend and provide public comment. Closed session discussion is limited to personnel matters and market sensitive financial information.

The board and committee policies are reviewed and approved annually. This includes the Governance & Sustainability Principles, which since 2008 have guided CalPERS' engagement with companies on proxy voting, advocacy with policymakers, and recognition of best practice initiatives across our partnerships. The principles specifically address climate change in references to environmental management, carbon pricing, deforestation, political lobbying and compensation, board climate competence, and integrated corporate reporting.

The principles are in alignment with our Investment Beliefs, which figure prominently in the CalPERS Mission & Vision. First adopted by the board in 2013, the Investment Beliefs specifically address climate change in relation to risk and return.

The Role of Management

The board delegates management responsibility to the chief executive officer. CalPERS' approach on climate change is led by the CEO and the chief investment officer with support from the CalPERS Sustainable Investments Program. The program is led by a managing investment director who works with Investment Office senior team members.

Our work on climate change is coordinated across the total fund and the CalPERS enterprise. The Sustainable Investments Program, Corporate Governance, and staff in each asset class support our sustainability and climate solutions working group leads to implement CalPERS' public and private markets strategy.

To help generate better performance, we invest in the transition to a low-carbon economy and climate solutions. A secondary effect of these investments is their impact to the trajectory of global emissions. We can further impact the trajectory by:

- Putting companies on a pathway to net zero by 2050 through climate solutions investments
- Taking shareowner action to improve the largest emitting companies' net zero strategies
- Engaging the investment industry and government regulators to support the economy's transition to net zero

Strategy

Our sustainable investment objectives anchor CalPERS' approach to climate change.

We aim to:

- Generate outperformance through investments in climate solutions
- Increase portfolio resilience
- Improve the efficiency of financial markets with our advocacy, engagement, and partnership activities across our portfolio

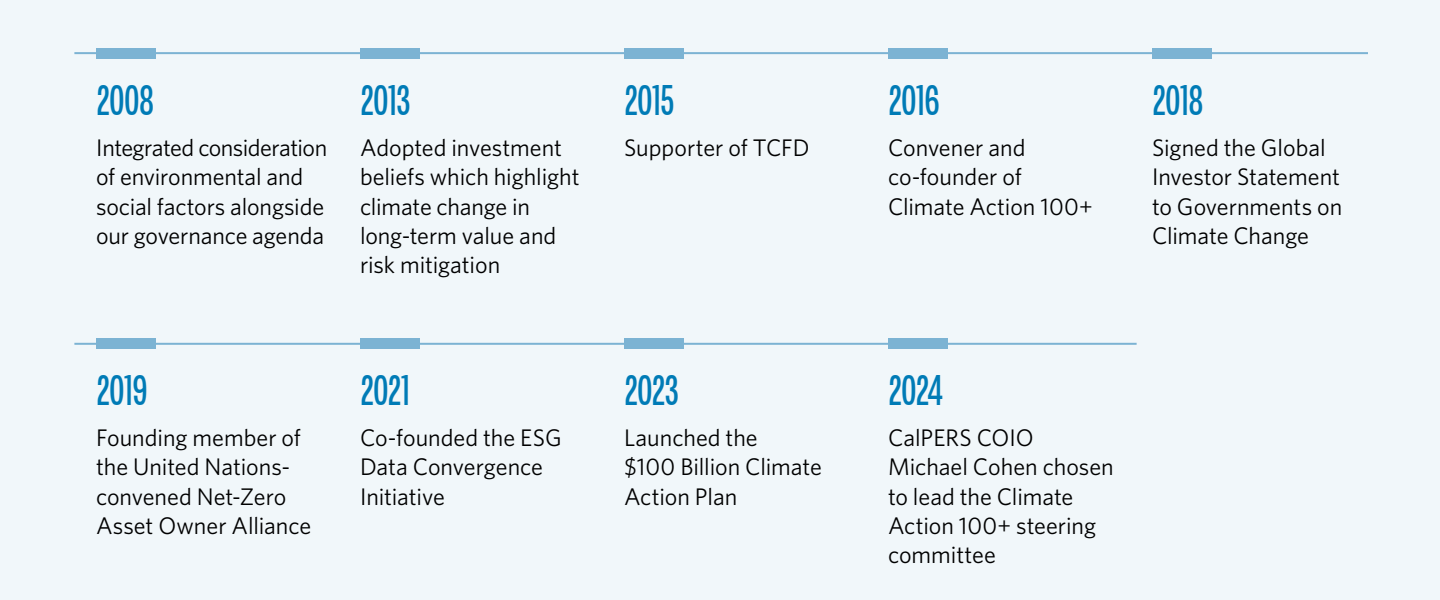
Table 2: **CalPERS' Sustainable Investing Approach**

Integration and Investment	Advocacy	Engagement	Partnership
Goal	**Goal**	**Goal**	**Goal**
Generate outperformance by: (1) investing $100 billion in climate solutions and (2) accelerating the integration of climate risk analysis to increase portfolio resilience	Provide education and advocate for governmental bodies to take ambitious, inclusive action to address climate change and catalyze a low-carbon transition that expands investment opportunities	Ensure portfolio companies consider climate risks and pursue opportunities that create value over the long-term	Partner with aligned investors and organizations to share experiences, pool resources, and amplify our views throughout the financial markets
Tools & Levers	**Tools & Levers**	**Tools & Levers**	**Tools & Levers**
• Investments: allocation and security selection • Manager selection and expectations • Investment due diligence and processes • Sustainable research	• Engage corporate management and boards of directors • Proxy voting • Exempt solicitations • Shareowner proposals	• Engage corporate management and boards of directors • Proxy voting • Exempt solicitations • Shareowner proposals	• Coalitions • Working groups • CA 100+, Ceres, UN NZ AOA, PRI, ICGN, UN GISD, EDCI, ISSB IAG, NCREIF, PREA, GIIA, ILPA, and more

Source: CalPERS

Over the years, CalPERS has demonstrated its commitment to climate action, as shown in Figure 3.

Figure 3: **CalPERS' Climate Action Milestones**



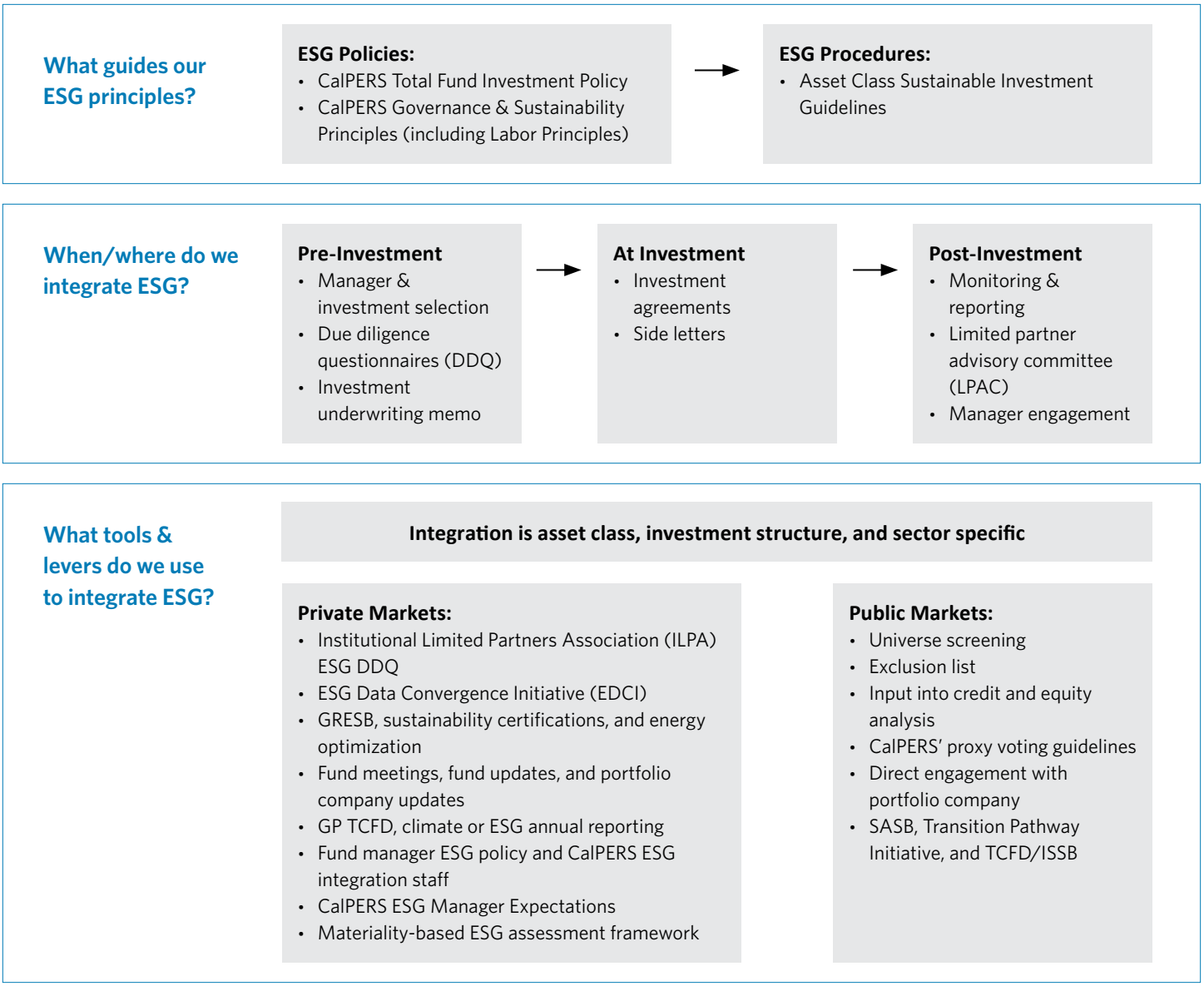
Source: CalPERS

Integration

Integration ensures consideration of relevant sustainability factors in the investment decision-making process across CalPERS' total fund. This includes assessing and managing transition risks in the shift to a low-carbon economy, and physical risks associated with the effects of climate change. Our investment policy and procedures call for environmental, social, and governance (ESG) sources of financially material risks and opportunities to be considered in our investment analyses. We do this to improve our portfolio's long-term performance.

At CalPERS, the Sustainable Investments Program collaborates with the asset class programs to integrate relevant ESG considerations into decision-making processes across all material investments. We research, analyze, and share the latest ESG insights and policy developments from academia and industry with the asset class programs to ensure key ESG considerations inform our investment decisions. Figure 4 highlights CalPERS' ESG integration approach at each investment management phase. It explains what guides our ESG integration and identifies the tools and levers that we use to integrate ESG.

Figure 4: CalPERS' ESG Integration



Source: CalPERS

Asset Class Considerations

CalPERS primarily invests across five asset classes – global public equity, global fixed income, real assets, private debt, and private equity – through a combination of internal, external, active, and index-driven management strategies.

Risk management is paramount at CalPERS. It is both centralized, supporting a total fund-level aggregated view of risk, and decentralized, capturing asset class- and investment strategy-specific risk attributes. CalPERS strives to integrate considerations of climate risk and opportunities at all levels of portfolio monitoring and management, and across all strategies, internal or external, active or index-like.

Fundamental Analysis

Fixed income assets are largely managed within the CalPERS Investment Office using internal fundamental analysis of securities. Real assets, private debt, and private equity rely more on fundamental analysis conducted by external managers. In these asset classes, CalPERS can retain some level of discretion regarding the security or asset selection; a level of discretion that will vary depending on strategies and investment vehicles (co-investments, separate accounts, or joint vehicles). Where possible, we use data and tools to understand our exposures to the low-carbon transition and/or physical risks expected during the time horizon of the investment and assess if identified risks are priced in.[2] This helps our staff and external managers make informed investment decisions.

Index Orientation

CalPERS' exposure to its global public equity assets is largely driven by internally managed index-driven strategies. In this case, levers for managing climate risk are benchmark selection and engagement with index-constituting companies.

Integrating climate risks and opportunities into our internally generated capital market assumptions for the strategic public equity benchmarks is an active and promising research workstream. It is also a critical input for our asset allocation process. In approaching this benchmark research, we acknowledge:

- The complexity in measuring transition and physical risks and opportunities (and the evolving nature of the data and tools available to measure climate risk)
- The uncertainty around horizons at which climate risks are likely to be expressed
- The dynamic aspect of corporate and governmental commitments and actions

Real Assets Integration

CalPERS makes use of a range of asset class-specific reporting frameworks such as the Global Real Estate Sustainability Benchmark (GRESB). We use tools to help evaluate how our real estate assets may be financially impacted by weather variables related to climate such as temperature changes (extreme heat and extreme cold), tropical cyclones, and flooding (coastal and fluvial).

Our real estate managers' sustainability efforts are key to preserving and creating value in our holdings. This is important given growing corporate tenant interest in reducing their carbon footprint to meet investor expectations and employee demand for sustainable workplaces.

Real assets staff employs an ESG consideration matrix tool during due diligence to ensure that ESG factors are systematically considered. This is done in cases where they have discretion regarding new asset investments. In addition, where possible, the ESG factor analyses are quantified and incorporated within the financial models for value and risk assessment. Most real estate investments use separate account investment vehicles while infrastructure investments use a mix of commingled funds, co-investments, and separate accounts. CalPERS' strong governance has enabled us to effectively integrate ESG considerations into decision-making.

Real Estate Energy Optimization Initiative

CalPERS established the Real Estate Energy Optimization Initiative, a program focused on energy use in CalPERS-owned buildings.

Formalized in July 2019, the initiative is designed to enable the systematic identification, implementation, and tracking of economically attractive energy-related opportunities in the CalPERS real estate portfolio. The initiative seeks to reduce carbon intensity, helping mitigate the systemic risk of climate change to the real estate portfolio, and more broadly to the CalPERS total fund. It captures energy cost savings and improves the attractiveness of our real estate to tenants, which increases returns and the long-term value of our investments. Additionally, the initiative aims to transition the CalPERS portfolio toward carbon neutrality, where accretive to performance. The initiative applies to domestic separate account partnerships and select external managers. We encourage our real estate managers not currently participating in the program to explore energy optimization opportunities that add value across their assets.

Since the initiative's launch, real estate managers have identified over 500 energy efficiency opportunities, including EV charging stations, onsite solar, and HVAC optimization projects.

Private Equity Integration

CalPERS' private equity portfolio is largely managed through commingled funds. As such, our approach to understanding the private equity portfolio's climate change risks involves analysis based on sectoral and portfolio company-specific information. An analysis of information provided by our general partners led us to conclude that the private equity industry lacks standardized and performance-based ESG data belonging to private companies. This is despite the proliferation of ESG frameworks and ratings providers. Staff determined that existing frameworks faced the following challenges:

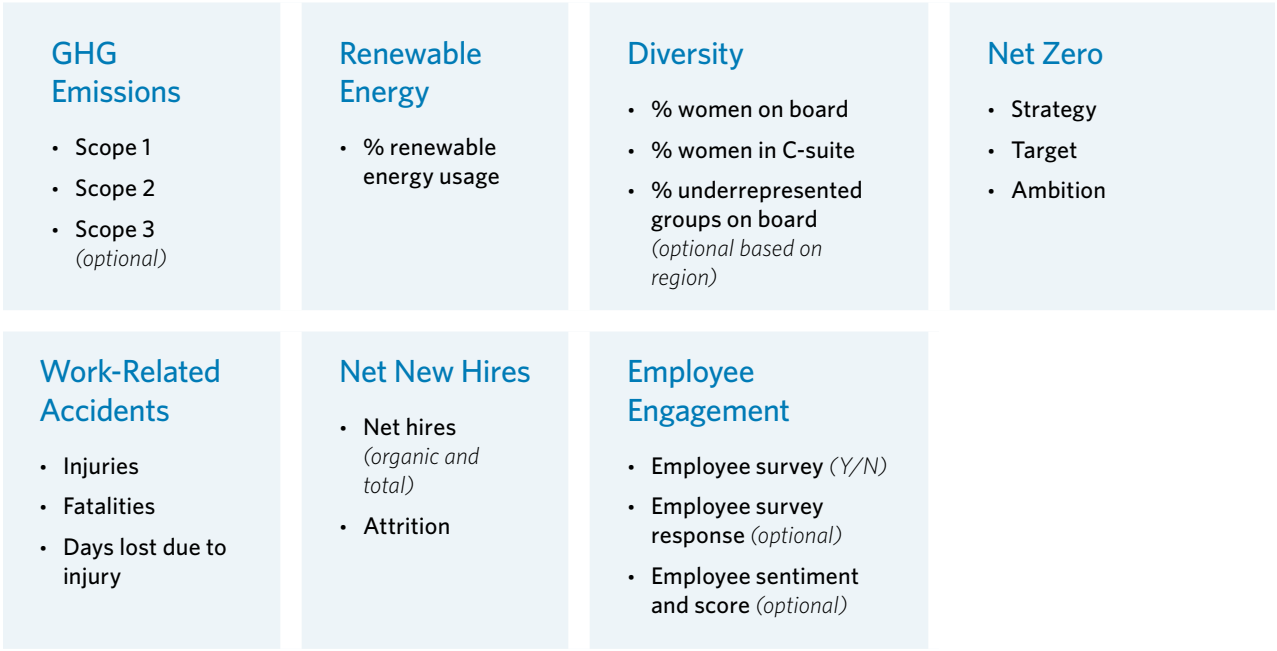
- A lack of critical mass prevents comparisons across metrics and burdens companies and general partners with a dizzying number of customized ESG template requests.
- There are different use cases/stakeholders supporting each framework.
- There is a tension between materiality by industry/company versus the broader industry.
- There are low disclosure rates and the quality of the performance data that does exist is poor.
- Privately held companies with limited resources find it impractical to implement complex frameworks; for instance, there are more than 100 booklets providing definitions.

ESG Data Convergence Initiative

To address these challenges, CalPERS' private equity staff partnered with the Carlyle Group in 2021 to develop the ESG Data Convergence Initiative. The initiative streamlines the private investment industry's historically fragmented approach to collecting and reporting ESG data to create a critical mass of meaningful, performance based, comparable ESG data from private companies. This allows private equity general partners and portfolio companies to benchmark their current position and make progress toward ESG improvements while enabling greater transparency and more comparable portfolio information for limited partners.

The private equity industry's response to the ESG Data Convergence Initiative has been extremely positive. As of 2025, there are more than 500 general partners (private equity external managers such as Carlyle) and limited partners (asset owners and others such as CalPERS) that have signed on to the initiative. The initiative's participating firms, representing about 8,900 portfolio companies, have agreed to report on a core set of ESG metrics across seven categories that are drawn from existing frameworks. The categories include greenhouse gas emissions, renewable energy, diversity, work-related accidents, net new hires, net zero, and employee engagement.

Figure 5: **CalPERS' ESG Data Convergence Initiative Metrics**



Source: CalPERS and EDCI

The greenhouse gas emissions, renewable energy, and net zero metrics will play an important role in the CalPERS sustainable investments ESG strategy. The metrics will serve as an important decarbonization tool due to the private equity industry's influential role in the economy. Prior to this initiative, many private equity companies were not tracking their emissions, renewable energy use, or progress to net zero. The initiative's work will push the industry to do a better job in tracking its progress in these areas and ultimately increase renewable energy use and cut emissions.

CalPERS' Goals

We want to promote data that is:

- Quantifiable
- Comparable across companies, managers, and industries
- Longitudinal (trackable over time)
- Easy and transparent to report on

Furthermore, the data must serve as a common foundation between investors at various points of their sustainable investment journeys and bring small and big players together.

This data will bring greater clarity to the sustainability performance of companies, which will allow the industry to make better investment decisions and, most importantly, create value during the hold period. This approach will ease the reporting burden on portfolio companies and general partners, who currently receive multiple ESG requests.

Investment

$100 Billion Climate Action Plan

The $100 Billion Climate Action Plan directs investments to mitigation, adaptation, and transition climate solutions across asset classes. To implement the plan, CalPERS' sustainable investments staff assist the asset classes to identify, assess, underwrite, and manage suitable investment opportunities and relationships.[3]

Table 3: **$100 Billion Climate Action Plan: Asset Class Breakdown of Climate Solutions Investments at the End of FY 2025**

Public Equity	$23.4 Bil
Real Estate	$19.9 Bil
Infrastructure	$7.2 Bil
Public Fixed Income	$6.2 Bil
Private Equity	$2.8 Bil
Private Debt	$0.2 Bil
Total Climate Solutions	**$59.7 Bil**

Source: CalPERS

CalPERS' Climate Solutions Taxonomy

CalPERS considers investments as eligible for a full or partial climate solutions classification if their underlying activities or purposes fall into one of three categories:

1. **Mitigation:** directly reduce or enable the reduction of GHG emissions at scale
2. **Adaptation:** enhance climate resilience by preventing or reducing harm to humans, assets, and natural systems caused by acute and chronic effects of climate change
3. **Transition:** operate in hard-to-abate sectors with a credible decarbonization plan, consistent with the latest state of climate science and technological capabilities[4]

Examples of Potential CalPERS' Climate Solutions Investments

CalPERS invests in a variety of climate solutions. Examples of such investments are shown in Figure 6 below.

Figure 6: **Climate Solutions Examples**

Mitigation

Renewable energy: Solar, wind, hydro, and other renewable sources to replace fossil fuels

Waste management: Reducing, recycling, and reusing, as well as capturing methane from landfills

Adaptation

Water management: Systems to manage droughts, floods, and ensure water supply

Agricultural adaptation: Techniques like drought-resistant crops

Disaster risk reduction: Early warning systems and community preparedness

Transition

Climate-friendly operations: Alternative materials in cement production and energy efficiency and carbon capture for cement plants

Renewable energy sources: Transitioning to wind, solar, and hydroelectric power, and retrofitting fossil fuel power plants and exploring advanced nuclear power

Source: CalPERS

Global Public Equity Climate Transition Index

The $5 billion FTSE Climate Transition Index is a scalable alternative to capitalization-weighting. The index evaluates the risks and opportunities of the global energy transition. Only a fraction of this investment is counted as a climate solution under CalPERS' methodology.

CalPERS' Green Bond Investment: A Climate Solution Example

The green bonds issued by Public Service Electric & Gas (PSE&G), New Jersey's largest provider of electricity and natural gas, are an example of a CalPERS climate solution investment.

PSE&G will use the proceeds for one or more of the following project categories:

1. Renewable energy: investments in wind and solar energy production, energy storage, and associated transmission and distribution projects
2. Energy efficiency and advanced metering infrastructure: investments in smart electric meters and digital technologies intended to promote improved customer energy efficiency
3. Climate change adaptation: investments in electric transmission and distribution infrastructure designed to make the grid more resilient to climate change-related weather impacts

Real Assets Climate Solutions Investments

Through a strategic partnership with a global investment firm, CalPERS purchased a minority interest in a global owner and developer of solar power, wind power, and energy storage assets. The capital will help the business expand and build out its development pipeline.

Private Equity Climate Solutions Investments

CalPERS' climate investments also include a private equity investment commitment to TPG Rise Climate. The fund focuses on scaling climate solutions globally and seeks to invest in opportunities across its core themes including energy transition, green mobility, sustainable fuels and molecules, and carbon solutions.

Another example of climate solutions funded by CalPERS over the past few years includes an investment in Octopus Energy, a fast-growing renewable energy company based in the United Kingdom. The company uses an advanced operating system to power 6 million homes in the U.K. and 60 million homes globally.

Advocacy

As part of our risk management related to climate change, we advocate for policies that drive the transition to a thriving low-carbon global economy. This will help increase investment opportunities and help generate better performance. CalPERS backs state, federal, and international policy supporting:

- Greater corporate disclosure on climate-related financial risks
- Regulations that price carbon emissions

Mandatory Corporate Reporting

CalPERS believes the voluntary recommendations of the ISSB Standards should be mandated in corporate reporting. However, there have been positive and negative developments over the last few years in this area.

U.S. Federal

CalPERS has met with the chair and staff of the Securities and Exchange Commission (SEC) in recent years to advocate for the development of mandatory and high-quality climate risk reporting standards.

In 2022, the SEC issued proposed rules for the enhancement and standardization of climate-related disclosures for investors. In June 2022, CalPERS issued a comment letter on the proposed rules and supported the SEC for taking steps that CalPERS, and many investors, have called for. In 2024, the SEC, building on past requirements, adopted final rules mandating material climate risk disclosures by public companies and in public offerings. The rules would have provided investors with consistent, comparable, and decision-useful information. The rules would also have provided companies with clear reporting requirements. CalPERS applauded the SEC for taking these steps.

In March 2025, the SEC, under a new administration, changed its view on the climate disclosure rules. Certain states and private parties had challenged the rules with litigation. The SEC voted to end its defense of the rules and sent a letter to the court stating that it would withdraw its defense of the rules. The letter also stated that the commission's counsel was no longer authorized to advance the arguments in the brief it had filed. Though CalPERS and other institutional investors signed on to an amicus brief in support of the climate disclosure rules, the SEC's recent actions leave the rules in an untenable situation.

California State

In the fall of 2023, SB 253 and SB 261 were signed into law and provided additional climate disclosure requirements for thousands of companies doing business in California.

SB 253 (Climate Corporate Data Accountability Act): The law requires large companies (with over $1 billion in annual revenue) doing business in California to publicly disclose their direct and indirect greenhouse gas emissions (Scopes 1, 2, and 3) annually. They must start reporting in 2026.

SB 261 (Climate-Related Financial Risk Act): This law requires large companies (with over $500 million annual revenue) doing business in California to report every two years on their climate-related financial risks and the strategies they are using to mitigate those risks. These companies must begin reporting in 2026.

CalPERS engaged policymakers and stakeholders on these bills and advocated for the California Air Resources Board (CARB) to obtain the funding needed to carry out the bills' requirements. More recently CARB solicited public comments to help it implement these bills. CalPERS staff filed a comment letter and, before that, met stakeholders, corporate representatives, and policymakers to share our views and gather insights from organizations required to report under these laws.

Carbon Pricing

Carbon emission pricing facilitates the transition to a low-carbon economy through market mechanisms. This is an investor-aligned approach. We support carbon pricing at a meaningful level to efficiently drive the transition. In September 2019, the board adopted language in our Governance & Sustainability Principles to guide our advocacy efforts regarding carbon pricing policy:

"Policymakers should establish stable and clear carbon pricing policy that appropriately prices the externalized cost to the economy and society from greenhouse gas emissions. Specifically, carbon pricing should be set at a level, and with the regulatory certainty, that incentivizes the business practices, consumer behavior, and related investment decisions needed to drive the transition to a thriving, low-carbon global economy. Effective carbon pricing policies should decrease emissions and therefore the physical risk to investors' portfolios from climate change.

Additionally, policies should be designed to avoid exacerbating economic inequality and its associated geopolitical risks, and policies should be designed to provide incentives for carbon sequestration, including through natural methods, such as ecosystem protection and restoration."

Calls for Action

CalPERS has supported several initiatives urging world leaders to transition their countries to low-carbon economies.

Ahead of COP29, CalPERS joined more than 600 investors calling on national governments to end fossil fuel subsidies, phase out coal, and mandate climate risk disclosure. This initiative was through the Investor Agenda, which urges world governments to implement the Paris Agreement and strengthen commitments through their nationally determined contributions (NDCs). The Paris Agreement's overarching goal is to limit the increase in the global average temperature to well below 2 degrees Celsius above preindustrial levels and pursue efforts to limit the increase to 1.5 degrees Celsius above preindustrial levels.

In March 2024, CalPERS also submitted a comment letter to the U.S. Environmental Protection Agency (EPA) on the Waste Emissions Charge for Petroleum and Natural Gas Systems proposed rule. The charge is called for in the Inflation Reduction Act's Methane Emissions Reduction Program. The rule aimed to impose and collect an excess methane waste emissions charge on covered oil and gas facilities. Such a charge is crucial for holding companies accountable for excess emissions, encouraging reductions, and standardizing best practices, thereby mitigating climate-related risks for investors. Though we supported the EPA's proposal and final rule announced in November 2024, a joint Congressional resolution disapproved the 2024 Final Waste Emissions Charge Rule on March 14, 2025. This regulation no longer has any force of law and facilities will not be required to submit their waste emissions charge filings by September 2, 2025.

In January 2025, CalPERS submitted a comment letter commending OSHA for advancing its Heat Injury and Illness Prevention in Outdoor and Indoor Work Settings proposed rule. CalPERS supported this proposed rule as climate change can increase heat stress and unstable working conditions. Corporate failure to address these risks will not only have direct human impacts, but negatively impact the sustainability of their operations and overall economic growth, thereby adversely affecting our investment returns. The final OSHA rule is expected to be released later in 2025.

Ensuring a dynamic, safe, healthy, and productive workforce is critical to the short- and long-term viability of our investments. A clear federal standard that helps businesses manage heat-related risks aligns with the CalPERS Labor Principles, which detail our expectations on labor matters for portfolio companies. As described here, one of the principles is to "support and improve the well-being of employees as part of human capital management strategy that includes providing a safe and healthy workplace."

In early 2025, CARB solicited feedback to help inform its work implementing California's SB 253 (Wiener, Statutes of 2023) and SB 261 (Stern, Statutes of 2023), both as amended by SB 219 (Wiener, Statutes of 2024).

The implementation of these statutes will provide institutional investors, consumers, and policymakers with a consistent source of valuable emissions and climate-related financial risk reporting data. It will also allow investors to address climate risks through asset allocation, voting, or engagement. In our feedback, we urged CARB to prioritize harmonization and interoperability with the ISSB Standards. This will help ensure consistent, comparable, reliable, and decision-useful information for companies and investors navigating diverse reporting requirements, while minimizing redundant efforts.

CalPERS is aligned with the goals of state climate efforts, including the Renewable Portfolio Standards Program, the Clean Energy and Pollution Reduction Act, the Global Warming Solutions Act, and California's climate-disclosure acts. CalPERS calls for action and advocacy work to help decrease emissions and meet California's climate goals. Additional research and CalPERS' initiatives related to California's climate goals are highlighted later in this report.

Thermal Coal Companies Act

In 2015, CalPERS identified the companies in our public asset portfolio that potentially met the definition of a "thermal coal company," as specified in California's Public Divestiture of Thermal Coal Companies Act. Following the October 19, 2015, Investment Committee meeting, CalPERS prohibited new or additional investments in the identified companies and began engagement activities. In May 2017, the Investment Committee evaluated the outcome of these engagements as the law required. The committee also evaluated the investment performance and risk considerations of the identified companies, and the implications for the portfolio. All applicable holdings were divested in advance of the July 1, 2017, deadline specified by the law.

California's Climate Policy Goals

California is a leader in developing climate policy goals that are effective in mitigating the risk of climate change. As the largest defined benefit public pension system in the United States, CalPERS advocates for climate-related policies and engages portfolio companies to advance those policies. We take these actions to serve our-long term financial interests, in keeping with our fiduciary duty to our members.

California is a pioneer in climate policy solutions. These solutions have influenced other states to adopt a number of climate-related policies and regulations. California instituted America's first tailpipe emissions standards for cars and was the first state to adopt a cap-and-trade program. It also adopted one of the first renewable electricity standards in the country. California's climate policies have helped drive the transition to a low-carbon economy and have served as a catalyst for wealth and job creation.

Three goals of those climate policies include:

- Reducing greenhouse gas emissions
- Increasing renewable energy procurement
- Increasing zero-emission transportation

Next, we explain how CalPERS is advancing these goals.

Reducing Greenhouse Gas Emissions

State law requires California to cut its greenhouse gas emissions to 1990 levels by 2020 and to 40% below 1990 levels by 2030. CARB is charged with developing policies, including the state's cap-and-trade program, to achieve these goals.

California's cap-and-trade program covers GHG sources responsible for approximately 85% of the state's emissions.[5] This amounts to around 450 entities across the electricity generation, large industrial, and fuel supply industries.[6] A number of these entities are being engaged by CalPERS and other investors through Climate Action 100+.

In 2016, California's greenhouse gas emissions dropped 2.7% to about 430 million metric tons, according to CARB.[7] That's just below the 431 million metric tons produced in 1990 and puts California four years ahead of its 2020 goal to reduce its overall greenhouse gas emissions to 1990 levels. The state's next hurdle will be to reduce its GHG emissions to 40% below the 1990 level by 2030.

Through its leadership and participation in a number of initiatives, CalPERS is committed to cutting greenhouse gas emissions. The Engagement and Proxy Voting section of this report highlights our role in co-founding Climate Action 100+ and the progress that companies have made to decarbonize. Furthermore, the Climate Action 100+ 2024 progress update, released earlier this year, states that nearly 80% of the initiative's 168 focus companies have established net zero commitments. This is up from 51% of companies in the first benchmark conducted in 2021.

We discuss CalPERS' support for a price on carbon and policies that avoid exacerbating economic inequality and its associated geopolitical risks in the Advocacy section of this report. We also highlight the increasing number of markets that have a price on carbon in the Risk Management section.

Increasing Renewable Energy Procurement

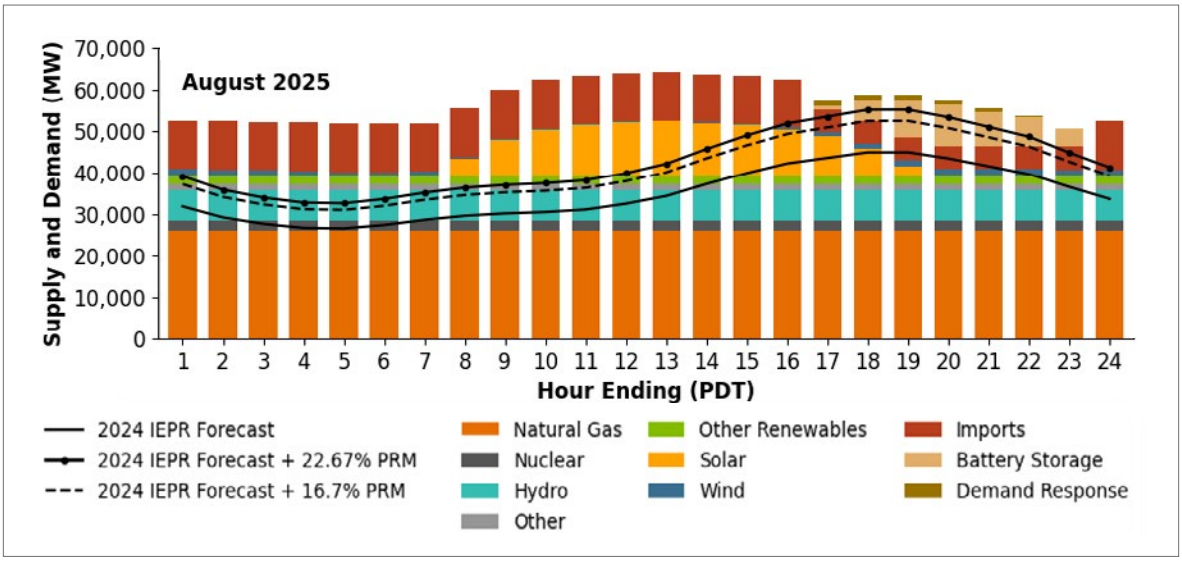
California law requires the state to:

- Procure 60% of all electricity from renewable sources by 2030 and 100% from carbon-free sources by 2045
- Double the energy efficiency of existing buildings
- Allow greater electric utility investment in electric vehicle charging infrastructure[8]

In 2024, California hit a milestone of 100 days with 100% carbon-free, renewable electricity for at least a part of each day.[9] Though this was temporary for each day, it was nonetheless an accomplishment that demonstrates the progress being made toward achieving California's renewable and carbon-free energy goals.

This progress should be applauded, but procuring more electricity from renewables will cause challenges. Figure 7 depicts the California Independent System Operator projections of the state's August 2025 electricity supply, by asset type, and the demand based on the 2024 Integrated Energy Policy Report. The figure shows the imbalance between peak demand and renewable energy production. Total demand is about the same at 5:00 p.m. and at 8:00 p.m., but solar generation begins to drop in the later hours and demand net of wind and solar increases. Plotting this data provides a visualization which is known as the "duck curve," due to the resemblance of a duck's profile and demonstrates the significant gap that wind and solar leave during certain parts of the day.[10]

Figure 7: All Resource Adequacy Eligible Portfolio Multi-Hour Stack for Peak Days in August 2025 for California



Source: California Independent System Operator

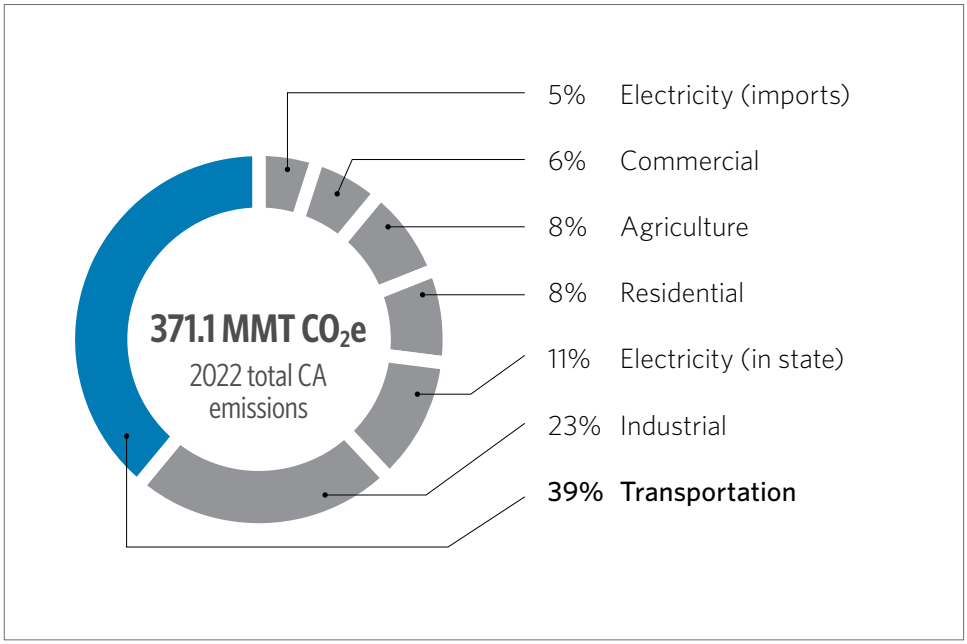
To combat the issues that are visible through the duck curve, continued build out of renewable and battery capacity is needed, combined with access to imported energy. All energy generation assets, including renewables, and transmission lines that carry electricity, have faced development hurdles. Policy focused on permitting reform to ease the construction and interconnection of assets to the electricity grid is also needed to improve grid resiliency and to bring down the cost of electricity for consumers.

CalPERS seeks to invest in climate solutions that are consistent with our return objectives. For example, CalPERS' infrastructure portfolio has billions of dollars invested in renewable power and utilities.[11]

Increasing Zero-Emission Transportation

In 2020, California Governor Gavin Newsom issued an executive order decreeing that all new cars and passenger trucks sold in the state will be required to be zero-emission by 2035.[12] CalPERS will monitor this development as well as Congress' actions to overturn a waiver that allowed California to set air pollution standards for cars stricter than national regulations.

Figure 8: **California Air Resources Board, GHG Inventory Graphs**[13]



Source: California Air Resources Board

As shown in the CARB graphic (Figure 8) above, transportation is the largest contributor to greenhouse gas emissions in California, representing 39% of total emissions. Policies that shift consumers to electric vehicles or plug-in hybrid electric vehicles can significantly reduce greenhouse gas emissions in the transportation sector.

CalPERS has advocated for the nationwide and global transition to electric and zero-emission vehicles. We have engaged multiple major automobile manufacturers to better understand their strategies to build out electric and zero-emission vehicles.

As shown in the Risk Management section, electric vehicles are one of few critical energy technologies and sectors that are on a potentially successful pathway to net zero by 2050. Edmunds reported that 7.9% of new vehicles sold in the U.S. in February 2025 were electric cars.[14] This clears the 5% threshold, or tipping point, of new cars sales that can signal that electric vehicles have gone mainstream. However, their sales growth rate in the U.S. has decreased. This may pose challenges for climate goals and the ability of car manufacturers to transition to electric and zero-emission vehicles.

Table 4: California's Zero-Emission Vehicle Market[15]

Light-duty ZEV						Total Light-duty	
Cumulative Sales Sales through 2024			**Annual Sales** YTD Sales in 2024			**Annual Sales** Sales in 2024	
2,213,296			443,374			Q4 Sales 431,392	YDT Sales 1,752,030
BEV 1,655,001	PHEV 540,123	FCEV 18,172	BEV 378,910	PHEV 63,864	FCEV 600	Q4 ZEV Share 25.1%	YTD ZEV Share 25.3%

Source: California Energy Commission

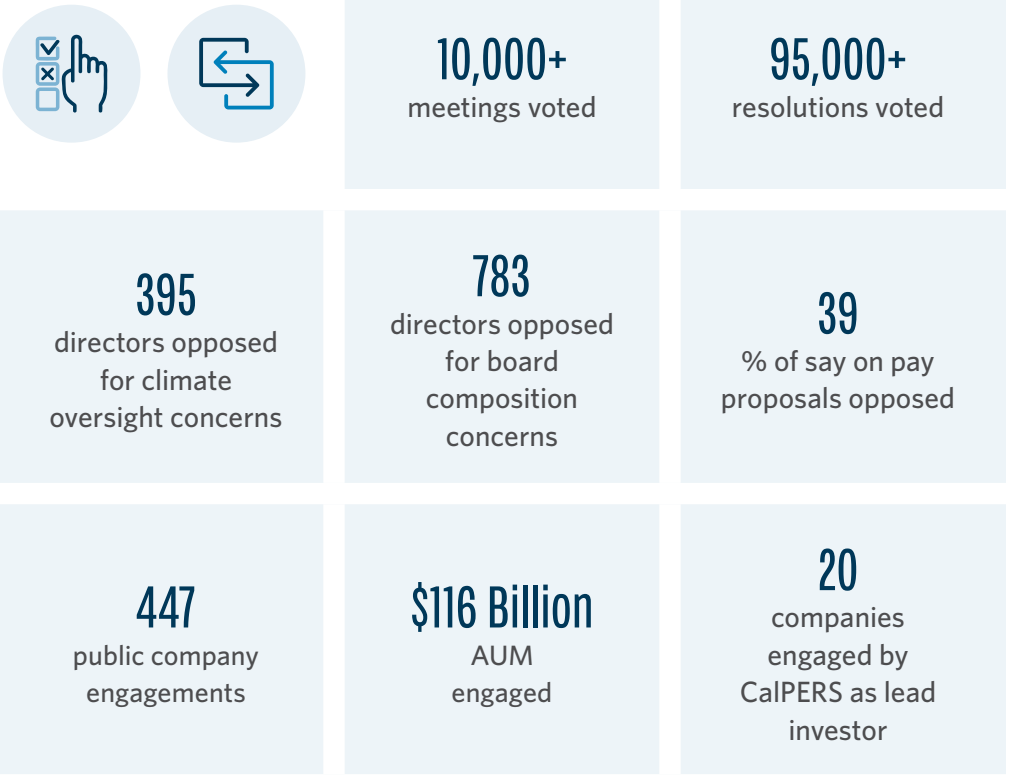
California has continued to demonstrate its climate leadership through the adoption of zero-emission vehicles. Table 4 shows that 25.3% of all new cars sold in the California vehicle market in 2024 were zero-emission. This includes battery electric vehicles which are solely powered by an electric battery, plug-in hybrid electric vehicles, and fuel cell electric vehicles.

Engagement and Proxy Voting

CalPERS, as a provider of financial capital, engages with companies and managers to foster alignment on our climate change strategic priorities. We have engaged extensively with the largest emitters of greenhouse gases identified as "systemically important carbon emitters." These engagements are intended to drive business action to cut emissions causing climate change, which can adversely impact our investment portfolio.

Examples of our engagements and proxy voting efforts are provided in the following pages. One notable example of our engagement strategy is the leadership role we took in founding Climate Action 100+, which is now the world's largest shareowner engagement project with more than 600 investor signatories. Furthermore, we cast proxy votes on climate risk reporting, corporate lobbying, and executive compensation matters. Figure 9 provides a summary of CalPERS' 2024 stewardship proxy voting and engagement activities.

Figure 9: **CalPERS' Stewardship Summary of the 2024 Proxy Voting Season and Corporate Engagements**

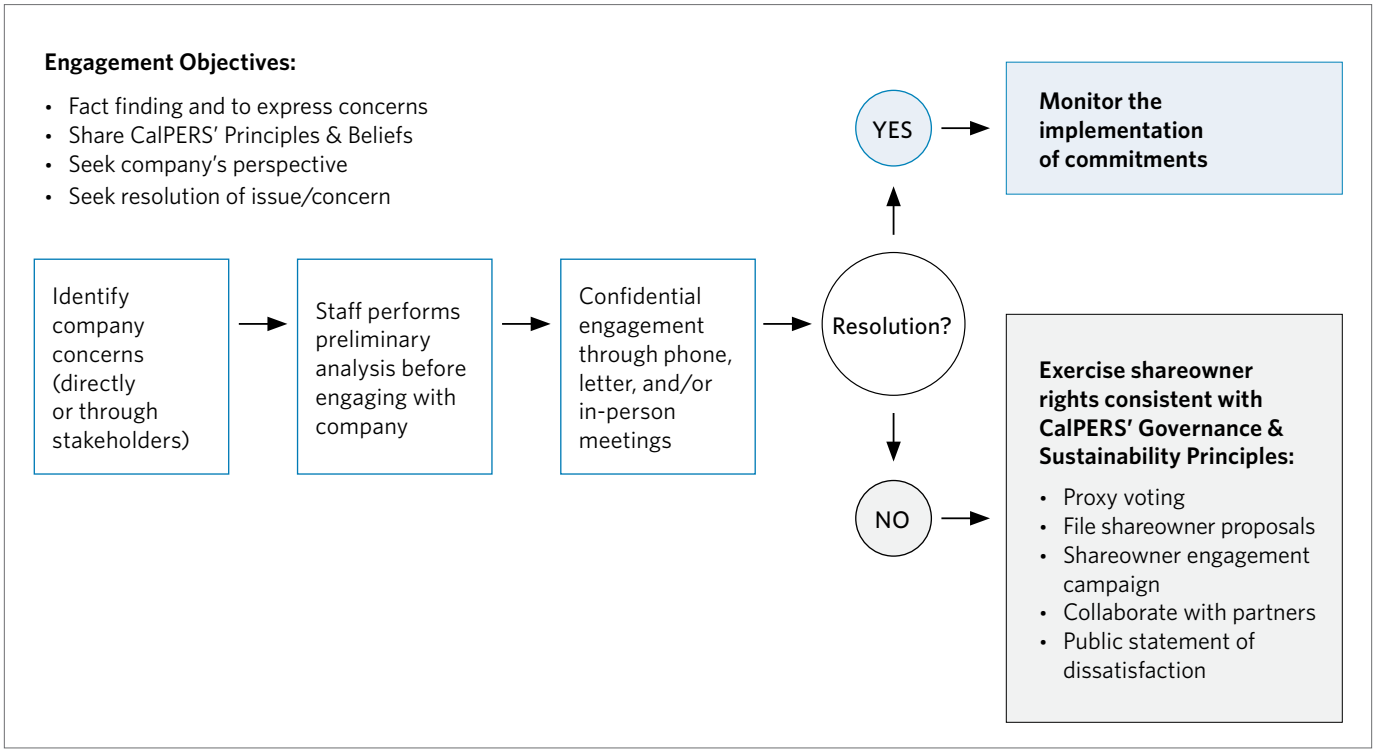


Source: CalPERS

Corporate Engagement and Proxy Voting Process

An effective strategic tool that we use is company engagement. CalPERS exercises its ownership rights to hold boards accountable for their oversight of management strategy. The underlying objective is to ensure these companies are managed to create long-term, sustainable value for shareowners, consistent with CalPERS' fiduciary duty. The process is set out in Figure 10.

Figure 10: **Corporate Engagement Flowchart**

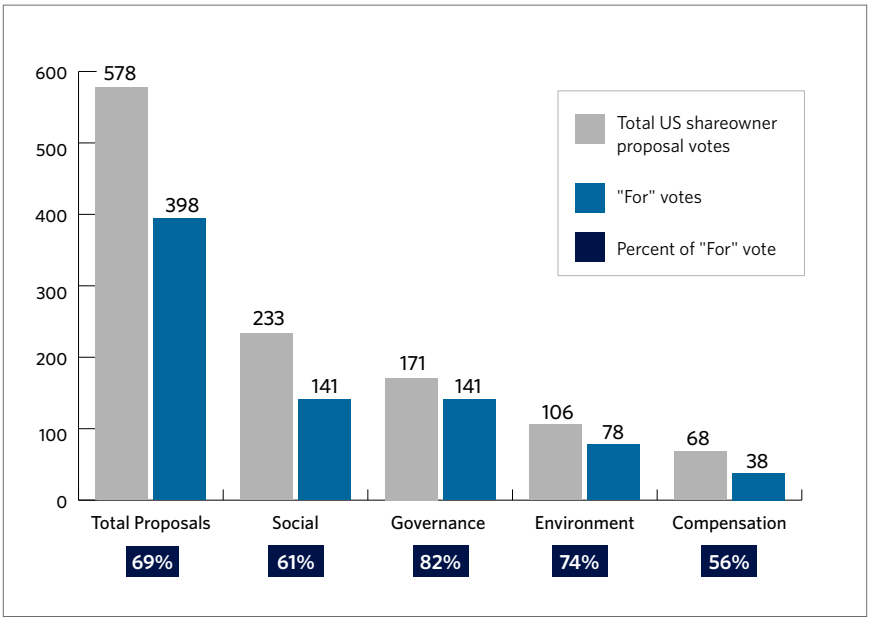


Source: CalPERS

Proxy Voting

CalPERS casts proxy votes at more than 10,000 companies' annual general meetings, exercising our shareowner rights to reflect the results of corporate engagement in line with our Governance & Sustainability Principles. We post our votes in advance on our website, and provide additional information for high-profile votes and company-specific shareowner campaigns. As shown in Figure 11 below, during the 2024 proxy season, we voted on 578 U.S. shareowner proposals including 106 proposals related to environmental topics. Using the Governance & Sustainability Principles as a guide, we reviewed each of the proposals and assessed whether they could add value to the investment if implemented.

Figure 11: **CalPERS' Proxy Votes on Environmental, Climate, and Sustainability Shareowner Proposals During 2024 Proxy Season**



Source: CalPERS

In 2024, our corporate governance team, which engages with companies and votes proxies for global public equity, supported 78 of the 106 proposals (74%) related to environmental topics. Within those environmental topics, CalPERS supported all 34 proposals related to reporting and reducing greenhouse gas emissions and all 19 proposals calling for enhanced environmental reporting measures.

In 2024, as part of our climate risk oversight efforts, staff evaluated the top 350 carbon emitters in the CalPERS global public equity portfolio based on a set of climate-related criteria. These emitters account for more than 80% of total portfolio Scope 1 and Scope 2 emissions and more than 50% of Scope 3 emissions. As a result of the evaluation, CalPERS opposed 395 corporate board directors at 110 of the 350 companies.

In 2025, as part of our climate risk oversight efforts, CalPERS reviewed its company selection criteria and added new climate-related standards to its proxy vote evaluation process. As a result of the revised evaluation process, CalPERS will oppose directors at companies not aligned with our climate criteria and will engage with their leadership teams.

CalPERS' Pathway to Climate Action 100+

The origins of Climate Action 100+ lie in CalPERS' commitment to mapping its carbon footprint. In 2014, CalPERS committed to the PRI Montreal Pledge and was the first U.S. signatory to measure and publicly disclose the carbon footprint of its public equity portfolio. After analyzing more than 10,000 companies within the portfolio, approximately 80 were found to be responsible for 50% of the portfolio's Scope 1 and Scope 2 GHG emissions. The emissions trajectory of these systemically important carbon emitters is critical to whether the global economy will meet the goals of the Paris Agreement.

CalPERS recognized other global investors were likely to have similar holdings in their portfolios and convened a series of meetings hosted by the French mission to the United Nations. The result was a new partnership between regional and global investor networks (North America, Europe, Australasia, and Asia) to found and launch Climate Action 100+. Climate Action 100+ engages companies operating in the following sectors based on their GHG output: oil and gas, utilities, transportation, metals and mining, construction materials, industrials, chemicals, food and beverage, and forestry. Climate Action 100+ identified these companies using data on their Scope 1 and Scope 2 emissions. Climate Action 100+ also assesses a company's Scope 3 emissions to determine if it should be engaged. More companies were added to the initiative's engagement efforts reflecting their importance at the regional level or importance in addressing climate change. These companies were placed on the Plus List (hence the plus sign in Climate Action 100+) at the One Planet Summit in December 2018.[16]

The initiative has received substantial praise. For example, its efforts to hold global warming to 1.5 degrees Celsius were recognized by the United Nations.

CalPERS plays an important role in Climate Action 100+. CalPERS served as the inaugural chair, recently concluded an additional term as chair, and currently serves (as of this writing) on the committee setting the initiative's strategy. CalPERS also participates on the Climate Action 100+ Asia Advisory Group, which provides strategic insight into Asian markets.

Furthermore, our corporate governance team has a leading role engaging 20 major corporate emitters. This is the largest number of emitters engaged by a single asset owner in the initiative. The responsibilities of the lead investor include meeting virtually and in person with a company's leadership, including senior management and board members. The lead investor engages with companies on the following matters:

- **Governance:** Companies should implement a strong governance framework which clearly articulates the board's accountability and oversight of climate change risk.
- **Greenhouse gas emissions:** Companies should take action to reduce greenhouse gas emissions across the value chain, consistent with the Paris Agreement. Notably, this implies the need to move toward net zero emissions by 2050 or sooner.

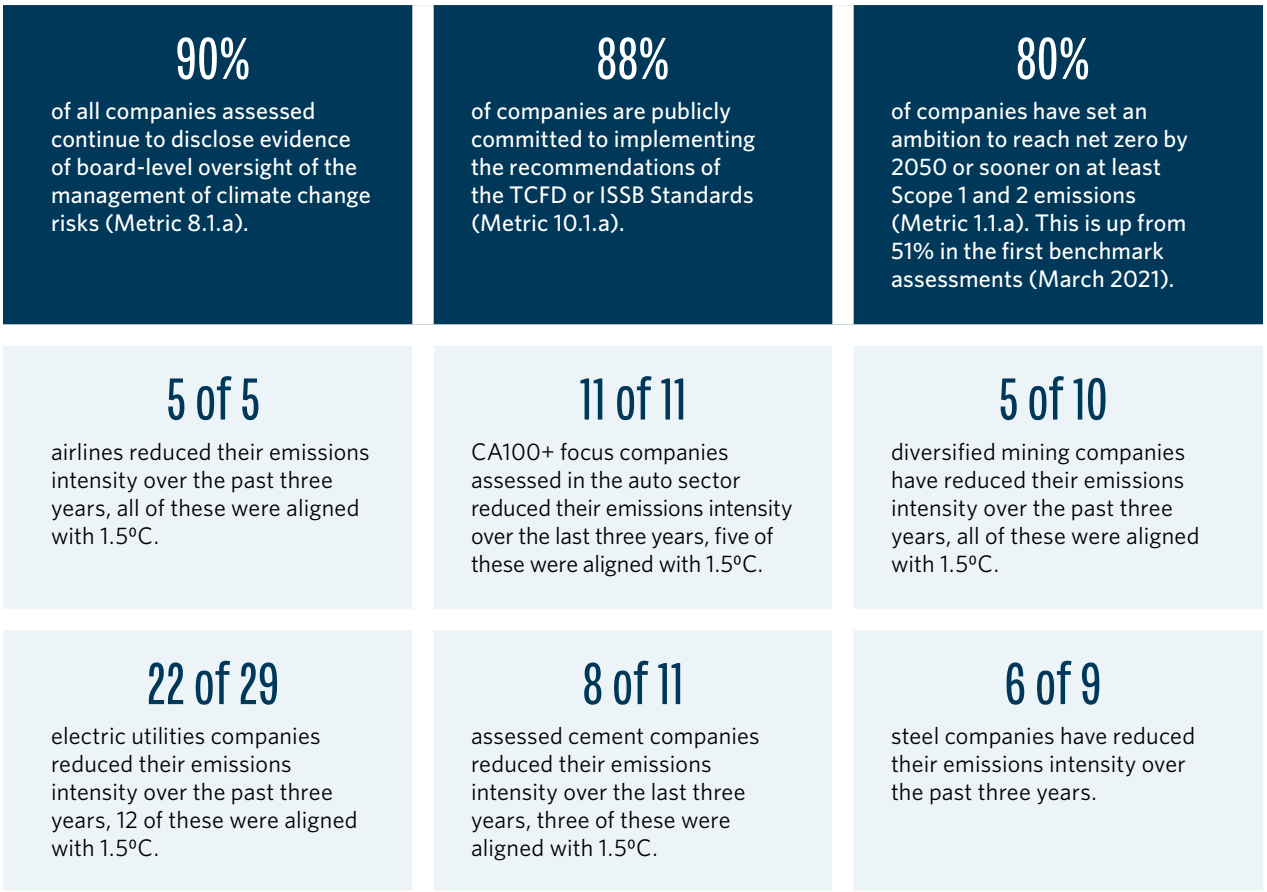
- **Corporate disclosure:** Companies should provide enhanced corporate disclosure in line with TCFD recommendations and, when applicable, sector-specific expectations. This enables investors to improve decision-making and assess the robustness of a company's strategy against a range of climate change scenarios.

Climate Action 100+'s latest progress update includes the following:

- A section on the initiative's impact and growth since its founding
- A cross-sector selection of case studies from 2024
- A proxy season review from 2024
- Information about the progress of its thematic and sectoral working groups
- Net Zero Company Benchmark assessment results

In Figure 12, we share a summary of the key findings that demonstrate the progress companies across multiple sectors are making. The initiative's latest progress update provides additional details through case studies on specific companies.

Figure 12: **Climate Action 100+ Progress Update**



Source: Climate Action 100+

Climate Action 100+ Net Zero Company Benchmark

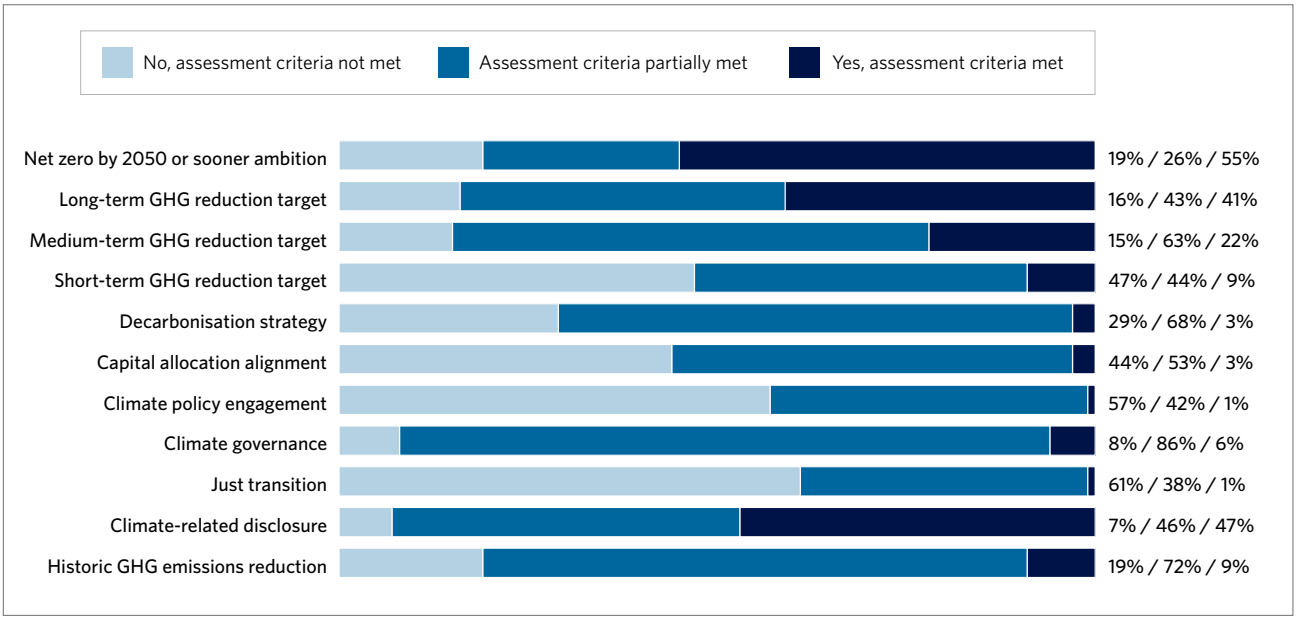
The Climate Action 100+ Net Zero Company Benchmark was launched in March 2021 ahead of the U.S. and European proxy seasons. The benchmark provides an objective way of measuring corporate progress against the initiative's three high-level goals: emissions reduction, governance, and disclosure.

The October 2024 Climate Action 100+ Net Zero Company Benchmark assessment made the following determinations:

- Eighty percent of focus companies have set a goal to reach net zero emissions by 2050 or sooner.
- Ninety percent of focus companies have some level of board oversight of climate change.
- Eighty-eight percent of focus companies have publicly committed to implement the recommendations of the TCFD or ISSB Standards.

Figure 13 showcases a summary of the 2024 Climate Action 100+ Net Zero Company Benchmark assessment results. Though progress should be recognized, most companies have not fully aligned their future capital expenditures with the goals of the Paris Agreement, despite the increase in net zero commitments. These companies will continue to be focus areas for CalPERS and the other 600 investors participating in Climate Action 100+ engagements.

Figure 13: **Summary of the 2024 Company Disclosure Assessment Results by Indicator**



Source: Climate Action 100+

Partnerships

Partnerships allow CalPERS to share insights and pool resources with investors whose objectives match ours. Here are three examples of partnerships and initiatives that CalPERS founded or co-founded:

Climate Action 100+

CalPERS convened and co-founded Climate Action 100+ to scale up engagements with the world's largest greenhouse gas emitters so that they will take appropriate action on climate change. This investor-led initiative is made up of more than 600 investors and is engaging 169 companies.

ESG Data Convergence Initiative

CalPERS co-founded the ESG Data Convergence Initiative in 2021. The initiative represents more than 500 general and limited partners and over 8,900 portfolio companies. It seeks to streamline the private investment industry's historically fragmented approach to collecting and reporting ESG data. Its goal is to create a critical mass of meaningful, performance-based, and comparable ESG data.

UN-convened Net-Zero Asset Owner Alliance

CalPERS was a founding member of the UN-convened Net-Zero Asset Owner Alliance, a group of 86 institutional investors with $9.2 trillion in assets under management. It is committed to accelerating decarbonization in line with limiting global warming to 1.5 degrees Celsius by 2050.

Our climate work is also conducted through memberships in organizations such as Ceres, Principles for Responsible Investment, Asia Investor Group on Climate Change, Institutional Investors Group on Climate Change, Global Infrastructure Investor Association, National Council of Real Estate Investment Fiduciaries, Pension Real Estate Association, Institutional Limited Partners Association, Transition Pathway Initiative (TPI), United Nations Global Investors for Sustainable Development, ISSB Investor Advisory Group, and the Council of Institutional Investors.

Risk Management

This section describes how CalPERS considers exposure to short- and long-term risks of climate change.

We highlight our analysis of transition and physical climate-related financial risks and CalPERS' alignment with the Paris Agreement based on the portfolio's implied temperature rise. Lastly, our assessment of important climate-related research is discussed.

Transition and Physical Climate-Related Financial Risks

We distinguish two main categories of climate-related risks:

1. Risks related to the **transition** to a lower-carbon economy
2. Risks related to the **physical impacts** of climate change

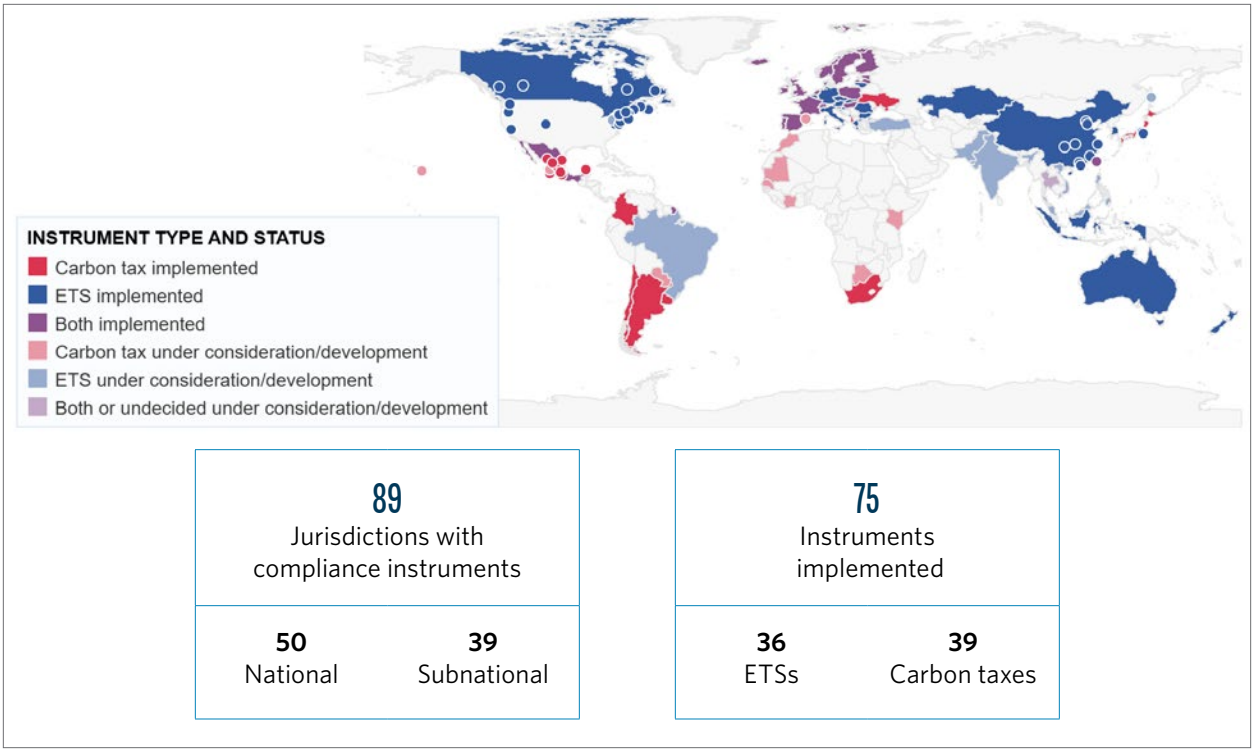
Transition Risks

Transition risks involve shifts in the market, policies, and technologies that can affect the financial success of existing business models and industries. Our portfolio companies' long-term performance depends to various degrees on how successfully they navigate the transition brought on by climate change. These include indirect risks, such as disruptions that threaten global policy momentum to address climate change. Transition risks include litigation such as third-party and class action claims against public companies as well as direct action(s) by shareowners against companies relating to damages directly or indirectly stemming from climate change. These claims, while difficult to quantify, have the potential to significantly impact share price, company goodwill, and valuation.

Transition Risk Deep Dive: The World Bank's Carbon Pricing Dashboard

The Carbon Pricing Dashboard is an online tool that provides up-to-date information on existing and emerging carbon pricing initiatives around the world. A price on carbon is a way to capture the external costs of greenhouse gas emissions and ties them to their sources through a price that is typically in the form of carbon dioxide emitted.[17] A common type of carbon price is a tax that sets a price on carbon explicitly. Another is an emissions trading system such as California's cap-and-trade program which places a cap on emissions and conducts an auction process for emission allowances.

Figure 14: **Compliance Carbon Pricing Instruments Around the World, 2024**



Source: The World Bank

The dashboard (Figure 14) builds on the data and analyses of the annual State and Trends of Carbon Pricing report series. In 2024, the 75 carbon pricing instruments implemented (as shown in the graphic) represent equivalent to 24% of global greenhouse gas emissions. Since 2022, this is an increase of about 1% of global greenhouse gas emissions being covered.

In recent years, there has been interest by some developed nations to create a carbon border adjustment mechanism. This mechanism is a policy where importers pay a fee based on the greenhouse gas emissions of imported goods to ensure they are comparable to domestic production. But at the same time, some governments are scaling back. For instance, earlier this year, the Canadian government scrapped the federal fuel charge and eliminated requirements for provinces and territories to have a consumer-facing carbon price. Additionally, the U.S. Congress and President Trump's executive orders threaten California's cap-and-trade model.

With these developments in mind, CalPERS will monitor the adoption of carbon pricing and advocate for carbon policies that avoid exacerbating economic inequality and its associated geopolitical risks.

Physical Risks

Physical risks such as wildfires, extreme weather, sea level rise, and drought can affect fixed assets, like real estate or infrastructure, and disrupt portfolio companies' supply chains and operations. Climate change's acute and chronic physical impacts can affect people's health, food security, migration, water supply, and other ecosystem services in ways that could bring heightened volatility to financial markets and harm economic growth.

Physical Risk Insight: Munich RE Insurance Catastrophic Loss Events in 2024

Munich RE highlights the natural catastrophes that occurred in 2024. In total, natural disasters caused losses of $320 billion. This was considerably higher than the inflation-adjusted averages of the past ten and 30 years. In terms of insured losses, it was the third most expensive year; in terms of total losses, 2024 ranks fifth on the cost scale since 1980, and many of the catastrophic loss events were identified as climate related.[18]

Transition and Physical Risk Sector Insights

Below are examples of how transition and physical risks can impact individual sectors.

Energy

The energy sector is in a critical stage of transformation. Notable shifts are emerging that offer alternatives to the traditional model of centralized power grids and forms of transportation that have historically run mostly on fossil fuels. Such shifts are driven by technological advances enabling more consumer choice and decentralization along with a growing demand for electricity, electrification, and desire for decarbonization. These shifts could have a profound effect on the energy sector and our investments in energy across the fund. Renewables and fossil fuel equipment will need to become weatherized and more resilient to tolerate and/or function at new temperature extremes.

Materials and Buildings

Cement, steel, and building management are significant sources of emissions for the industries in this category. Decarbonization may require advances that rely on emerging technologies to further reduce the role that high-intensity thermal processes currently play in driving refinement of iron ore.[19]

Insulation and thermal wraps/weather-resistive barriers work together as part of a complete building envelope system to improve energy efficiency. Advancements in building codes and construction best practices have also leaned into using more advanced materials. Insulation, typically made from fiberglass, mineral

wool, cellulose, or foam boards, provides the primary resistance to heat flow (high R-value).[20] Thermal wraps protect the insulation and structure from outside bulk water and allow the wall assembly to dry if moisture forms. Crucially, it also stops air leakage, which prevents convective heat loss/gain and ensures insulation can perform closer to its rated R-value (wind blowing through insulation degrades its performance). These materials help mitigate the physical risks of climate change.

Our approach to energy management in buildings is covered in our discussion of the Energy Optimization Program for our real estate portfolio in the Strategy section.

Agriculture, Food, and Forestry

The companies involved in the agriculture, food, and forestry sectors meet critical needs including the production, distribution, and security of food. These industries interact with, and in some cases imperil or support, biodiversity as well as natural ecosystems which serve as critical carbon sinks capturing significant amounts of CO2 emissions. The overall rise in temperature alongside more frequent and severe weather events create acute and chronic physical risks that can substantially impact these sectors.

Transportation

The transportation sector is beginning a global transformation driven by electrification, decarbonization, shared mobility, and autonomous driving. Much of the change in the coming decades will be in tandem with the low-carbon transition.

Battery range may continue to increase while the cost of batteries falls, which will expand the universe of potential buyers of electric vehicles. State, national, and international policies have driven the automotive market toward low-carbon options and improved fuel efficiency, but now multiple governments are acting to curtail these developments.

The use of autonomous driving ride-hailing services such as Alphabet's Waymo deserve particular attention. The utilization rate of these vehicles is very high, and it is poised to disrupt the traditional ride-hailing business. Uber's CEO said the Waymo robotaxis on its app in Austin, Texas are already busier than 99% of human drivers.[21]

Climate Value-at-Risk

Climate Value-at-Risk (Climate VaR) is an important framework CalPERS uses to assess the potential longer-term impact of climate risks on portfolio performance.[22] MSCI's Climate VaR framework estimates the impact of future climate-related costs (or benefits) on a corporate entity's enterprise value and the subcomponents of its capital structure. The framework discounts the financial impact, through 2100, associated with policy shifts supporting a lower-carbon economy and damages associated with the effects of climate change. The framework also assesses the

potential positive impact of incremental green revenues associated with the adoption of technologies supporting the economy's decarbonization. The total estimated impact is normalized by the assessed entity's enterprise value, and can be further decomposed into the impact on the entity's equity and debt securities. Importantly, impacts are estimated for different stylized climate scenarios.

The output of this framework is an estimate of a conditional downside or upside of a firm's enterprise value or a specific security's climate-unaware fair value (conditional on climate scenarios).

The expected market impact is attributed to **three possible drivers:**

1. **Policy:** captures the impact of climate policy (translated to an impact or carbon price shock)
2. **Technology opportunities:** captures potential revenues associated with technologies enabling or consistent with modeled global warming scenarios
3. **Physical risk:** captures an entity's expected damages resulting from projections of frequency, severity, and costs of climate events (acute and chronic) associated with its geographic operating exposure

We should note that policy and technology opportunities are two subcomponents of transition risk.

The Climate VaR framework uses **three scenarios** developed by the Network for Greening the Financial System (NGFS) to help CalPERS estimate climate change's impact on its public markets portfolio:

1. **1.5ºC disorderly scenario or "delayed scenario":** In this scenario, global annual emissions do not decrease until 2030, and forceful policies are then enacted to limit warming to below 2ºC.
2. **2.0ºC orderly scenario:** In this scenario, climate policies are introduced immediately and become gradually more stringent. Carbon dioxide removal is relatively low. Net zero CO2 emissions are achieved after 2070. Physical and transition risks are both relatively low.
3. **3.0ºC NDC or "current policies" scenario:** Under this scenario, current policies remain in place. Emissions grow until 2080 leading to about 3ºC of warming, causing severe physical risks, including irreversible changes like higher sea level rise.

Interpreting Results

The results from the Climate VaR analysis are summarized in Table 5 below. These results should be interpreted as directional signals and as orders of magnitudes, rather than absolute estimates of performance impact.

Acknowledging an elevated level of noise in Climate VaR estimates, the results translate a clear and significant exposure to climate risk. They also reveal that transition and physical risks have the potential to cause a material drag on returns. It is therefore imperative that we develop a deeper understanding of how different risks impact CalPERS' public market portfolios.

Table 5: **Climate Value-at-Risk for CalPERS' Public Market Portfolios**

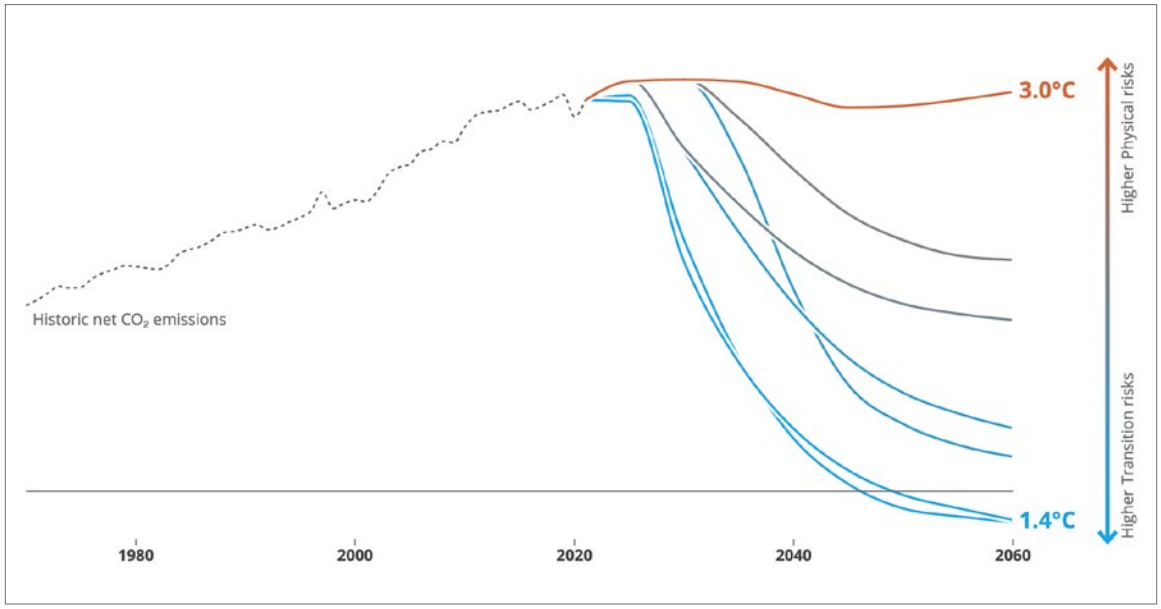
	CalPERS' Global Public Equity Portfolio:			CalPERS' Global Fixed Income Corporate Portfolio:		
Climate VaR Dimension	1.5°C NGFS Disorderly Scenario	2°C NGFS Orderly Scenario	3°C NGFS NDC Scenario	1.5°C NGFS Disorderly Scenario	2°C NGFS Orderly Scenario	3°C NGFS NDC Scenario
Policy (Scope 1, 2, 3)	-11.5%	-2.4%	-2.3%	-8.6%	-0.9%	-1.3%
Technology Opportunities	1.6%	0.2%	0.2%	0.0%	0.0%	0.0%
Physical Risks	-2.1%	-3.1%	-4.1%	-0.1%	-0.2%	-0.4%
Total	**-12.1%**	**-5.3%**	**-6.2%**	**-8.7%**	**-1.1%**	**-1.7%**

Source: MSCI

Key Findings

A first high-level observation is that Climate VaR estimates quantify the transition risk/physical risk trade off graphically captured in the chart below. Under scenarios consistent with a containment of global warming, financial assets are, on average, expected to be negatively impacted by the effects of policies. However, these assets are expected to incur more moderate losses from the effects of physical risks. Note the physical risks would abate over time because of the policy effects. Conversely, scenarios reflecting incremental policy inaction exposes the real economy to increasing physical risk.

Figure 15: **Transitional Risk/Physical Risk Trade Offs**



Source: NGFS

Using the results of the Climate VaR analysis as directional cues, we derive three key takeaways:

1. The disorderly adoption of decarbonizing policies would have a detrimental impact on both equities and corporate bonds, mitigated by green revenues. Under this scenario, climate policies would erase 11.5% of the equity portfolio value and 8.6% of the credit portfolio value, with the bulk of the impact expected to be realized within a 15-year horizon.
2. The financial impact of physical risk is a first-order impact for the equity portfolio under all scenarios. Investments in climate adaptation solutions that drive economic resilience to the physical effects of climate change can serve as a potential portfolio mitigant for this risk.
3. The expected impact of physical risk is sticky and pervasive across scenarios. This is because the physical effects of climate change over the coming decades are largely determined by past emissions and are largely insensitive to new policies enacted today, as stringent as they may be. The effect of emissions is a long-memory process.

Analysis of Alignment with the Paris Agreement

The Paris Agreement's key goals were set to avoid the perilous effects of climate change. We ran a data and analysis exercise to consider the warming potential in the portfolio, relative to the goal of limiting global warming to 1.5 degrees Celsius above preindustrial levels.

We conducted this assessment on our global public equity and global fixed income corporate portfolios using MSCI's Implied Temperature Rise (ITR) tool.[23] The tool provides a portfolio-level number, in degrees Celsius, demonstrating how aligned the companies in the portfolio are to global temperature goals. This is applied at the portfolio level by estimating the sum of "owned" projected GHG emissions against the sum of "owned" carbon budgets for the underlying fund holdings. The portfolio's total estimated carbon budget over/undershoot is then converted to a degree of temperature rise (in degrees Celsius) using science-based transient climate response to cumulative emissions.

CalPERS' Global Public Equity Portfolio

CalPERS' global public equity portfolio exhibits an implied temperature rise of 2.6 degrees Celsius. This is slightly lower than the 2.7 degrees Celsius for the MSCI ACWI IMI Index (All Country World Investable Market Index), which serves as a good representation of the broad equity market.

A review of commitments from individual companies within our portfolio reveals that 38.2% of them align with the goal of limiting the temperature increase to below 2 degrees Celsius (37% for the MSCI ACWI IMI Index), and 11.6% align with the goal of limiting the temperature increase to below 1.5 degrees Celsius.

These statistics denote the magnitude of the task ahead in aligning the real economy with a 2 degrees Celsius trajectory. Fiduciaries also face a conundrum, as they seek to build diversified portfolios while recognizing the financial risks associated with global warming.

Table 6: **Implied Temperature Rise Categories**

Implied Temperature Rise Categories		% of Companies in Category
1.5°C Aligned	<= 1.5°C	11.6%
2.0°C Aligned	> 1.5°C–2.0°C	26.6%
Misaligned	> 2.0°C–3.2°C	36.1%
Strongly Misaligned	> 3.2°C	25.7%

Source: MSCI

CalPERS' Global Fixed Income Corporate Portfolio

CalPERS' global fixed income corporate portfolio exhibits an aggregated implied temperature rise of 2.9 degrees Celsius and 2.6 degrees Celsius for the U.S. investment-grade component.

While implied temperature rises remain elevated, a review of commitments from individual companies in the portfolio provides a reason for relative optimism. For example, 48.6% of the companies within the investment-grade portfolio, which is internally and actively managed at CalPERS, align with the goal of limiting the temperature increase to below 2 degrees Celsius. However, only 25.1% of the companies in the portfolio align with the goal of limiting the temperature increase to below 1.5 degrees Celsius.

Summary

As CalPERS is a universal owner, these results are not surprising as we track the expected temperature increase taking the current state of global climate policy commitments into account. Current commitments made by countries through the NDCs and by companies setting targets help CalPERS understand the warming potential of our public market portfolios. This reinforces the importance of activities such as company engagements through initiatives like Climate Action 100+ and public policy advocacy. It also allows us to assess how much work is needed to help the world get on a path toward net zero emissions by 2050.

Climate-Related Research

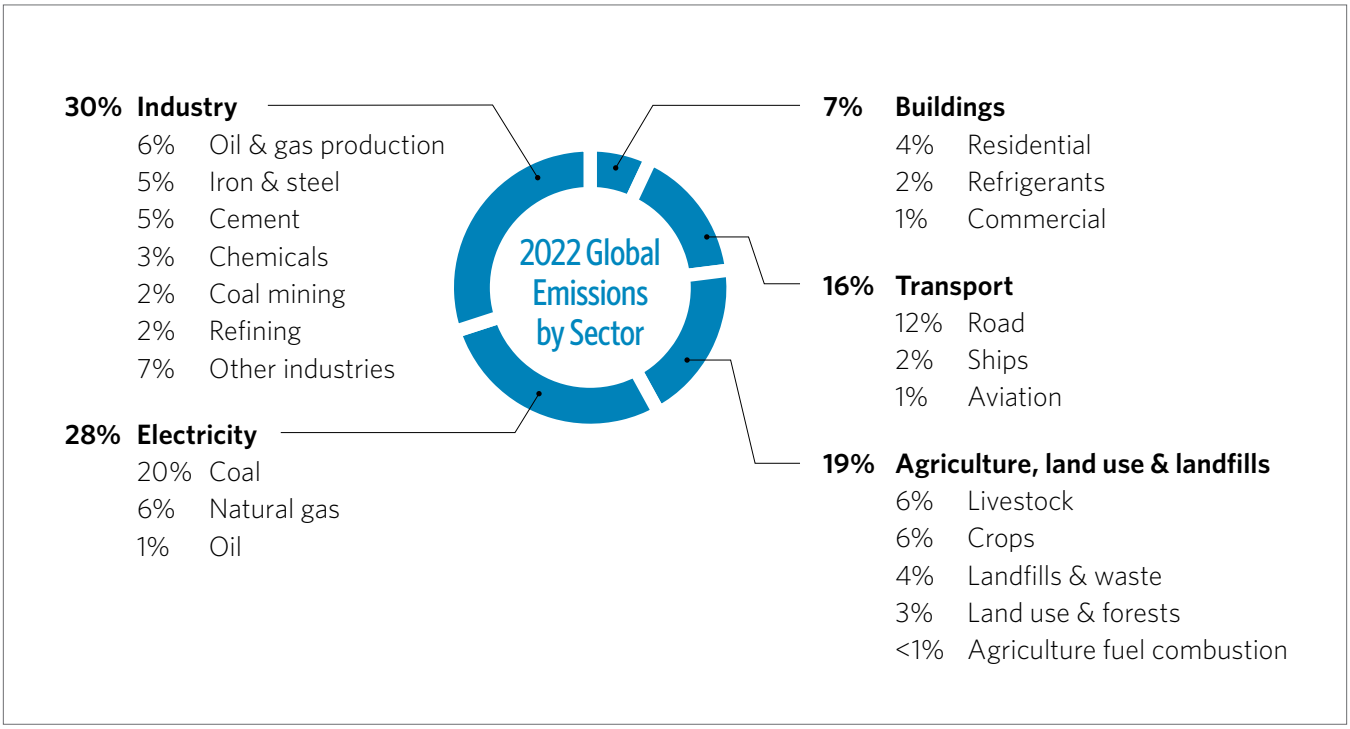
As a long-term investor in the global economy, we understand the scale and multifaceted nature of climate change, and the attendant risks and opportunities it poses for the portfolio. We also understand that the science and data to assess climate-related risks is quickly evolving. So too is the technology to combat and mitigate the impact of climate change. As part of our ongoing educational efforts, staff review the latest academic, industry, and governmental publications and research.

We next examine the types of companies contributing the most to global warming and the opportunities that exist to help decarbonize the economy.

Sector Analysis: Contributors to Emissions and Global Warming

We assess the sectors contributing the most to emissions and global warming, and to what degree they are aligned to a specific temperature rise. It is helpful to understand global GHG emissions by sector. The November 2024 Rhodium Group graphic below shows that the industry and electricity sectors accounted for 58% of 2022 net GHG emissions.

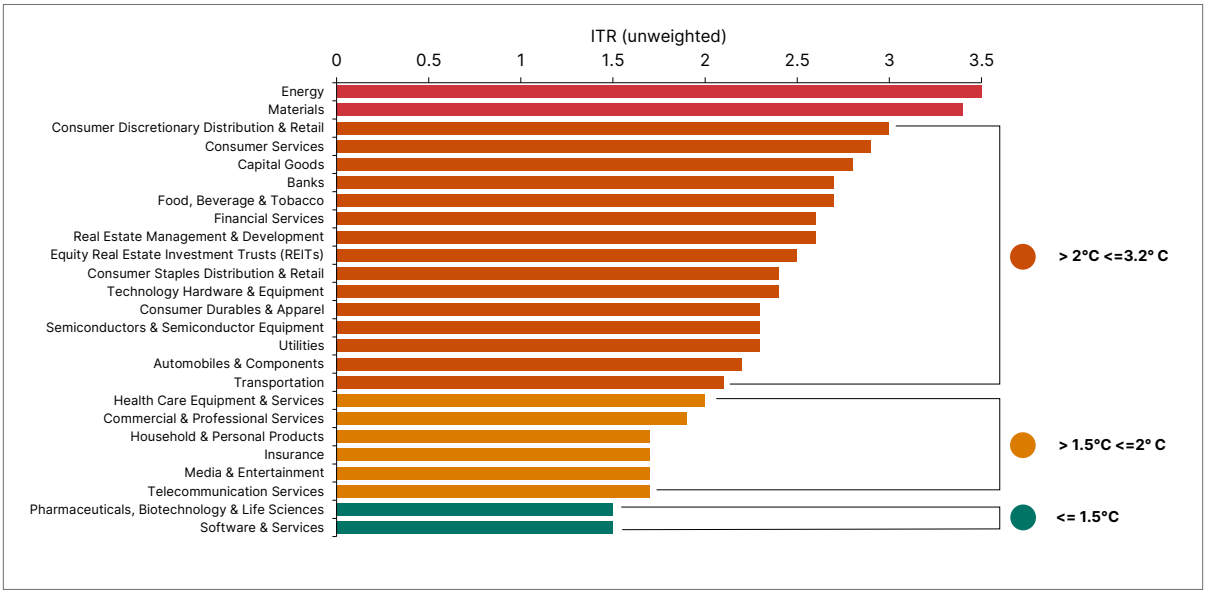
Figure 16: **Global Emissions by Sector — Share of 2022 net GHG emissions**[24]



Source: Rhodium Group

The MSCI net zero tracker graphics below shows the implied temperature rise in degrees Celsius for each sector.[25]

Figure 17: **Projected Temperature Alignment of the World's Listed Companies by Industry Group** *(Implied Temperature Rise in Degrees Celsius)*[26]



Source: MSCI ESG Research, data as of June 30, 2025. Not index weighted.

Opportunities

CalPERS' strategy seeks to identify climate solutions investments poised to benefit from the transition to a low-carbon economy. It is important to note these investments must be rooted in the fund's fiduciary responsibility to generate outperformance and exceed CalPERS' target rate of return. Within our large and diverse portfolio, investment strategies involve different time horizons, asset types, and geographies. Given this, our risk management process includes analysis of the progress that individual technologies are marking toward decarbonization and how that progress aligns with a net zero scenario.

The International Energy Agency: Tracking Clean Energy Progress

The International Energy Agency (IEA) works with countries around the world to shape energy policies for a secure and sustainable future. The IEA's Net Zero Emissions by 2050 Scenario (NZE) is a pathway for the global energy sector to achieve net zero CO2 emissions by 2050. The IEA's Tracking Clean Energy Progress reports assess the status of more than 50 components of the energy system that are critical energy technologies and sectors and provide recommendations on how they can get "on track" with the NZE.[27]

Table 7: **IEA Tracking Clean Energy Progress**

What's Tracking?	■ Not on track	■ More Efforts Needs	■ On track
Energy System Overview Decarbonizing the energy system will require a wide range of strategies. These should advance in a holistic manner, capitalizing on synergies among sectors.	■ Energy Efficiency	■ Bioenergy	
	■ Behavioral Changes	■ Hydrogen	
	■ Electrification	■ Digitalization	
	■ International Collaboration	■ Renewables	
	■ Carbon Capture, Utilization and Storage		
Cross-Cutting Technologies & Infrastructure Several key technologies and infrastructure will support alignment with the Net Zero Emissions by 2050 Scenario across multiple sectors.	■ Direct Air Capture	■ District Heating	
	■ Electrolyzers	■ Bioenergy with Carbon Capture and Storage	
	■ CO2 Transport and Storage	■ CO2 Capture and Utilization	
	■ Data Centers and Data Transmission Networks		

What's Tracking? *(cont'd)*	Not on track	More Efforts Needs	On track

Electricity Sector

Decarbonizing the power sector is fundamental to reducing emissions, especially in an increasingly electrified world.

On track: Solar PV	More Efforts Needs: Nuclear Electricity
More Efforts Needs: Wind Electricity	More Efforts Needs: Demand Response
More Efforts Needs: Grid-Scale Storage	More Efforts Needs: Smart Grids
Not on track: Coal-Fired Electricity	More Efforts Needs: Natural Gas-Fired Electricity
More Efforts Needs: Hydroelectricity	

Oil & Natural Gas Supply

A rapid step-change in policy and industry action is needed to cut flaring and methane emissions in the oil and gas sector.

Not on track: Methane Abatement	Not on track: Gas Flaring

Low-Emissions Fuel Supply

Biofuels and hydrogen production and distribution must be rolled out rapidly to meet the growing demand of a decarbonizing energy system.

Not on track: Biofuels

Transport

The transport sector must undergo a major transformation, vastly improve efficiency, and shift from oil to electricity and low-carbon fuels.

More Efforts Needs: Cars and Vans	Not on track: Aviation
Not on track: Trucks and Buses	Not on track: International Shipping
More Efforts Needs: Rail	On track: Electric Vehicles

Industry

Industry processes that can't be easily electrified must cut emissions through material efficiency and innovative technologies like hydrogen and carbon capture.

Not on track: Steel	Not on track: Aluminum
Not on track: Chemicals	Not on track: Pulp and Paper
Not on track: Cement	More Efforts Needs: Light Industry

Buildings

Unprecedented efficiency improvements are required in buildings, addressing growing demand from cooling, heating, and powered devices.

More Efforts Needs: Heating	On track: Lighting
More Efforts Needs: Space Cooling	Not on track: Building Envelopes
More Efforts Needs: Appliances and Equipment	More Efforts Needs: Heat Pumps

Source: IEA

As shown in the IEA Tracking Clean Energy Progress (Table 7), only three of the more than 50 critical energy components, technologies, and sectors are currently on track. Those three sectors, shown with green dots, are solar PV, electric vehicles, and lighting. Sectors in the "More Efforts Needed" category are marked with yellow dots. And those with red dots are designated as "Not on Track." We should note that the pace of progress needed to stay on track with a net zero pathway is significantly higher than what's currently being achieved across many of these critical energy technologies.

Metrics and Targets

This section discusses CalPERS' climate-related targets and assesses its carbon footprint.

Sustainable investments staff members provide the Board of Administration with annual program reviews and updates on our core objectives. Updates on the following subjects are provided:

1. $100 Billion Climate Action Plan
2. Carbon footprint and emissions intensity assessments
3. Climate risk assessments
4. Engagements with our portfolio companies to improve the largest emitting companies' net zero strategies.

The report on our carbon footprint is below.

Carbon Footprints

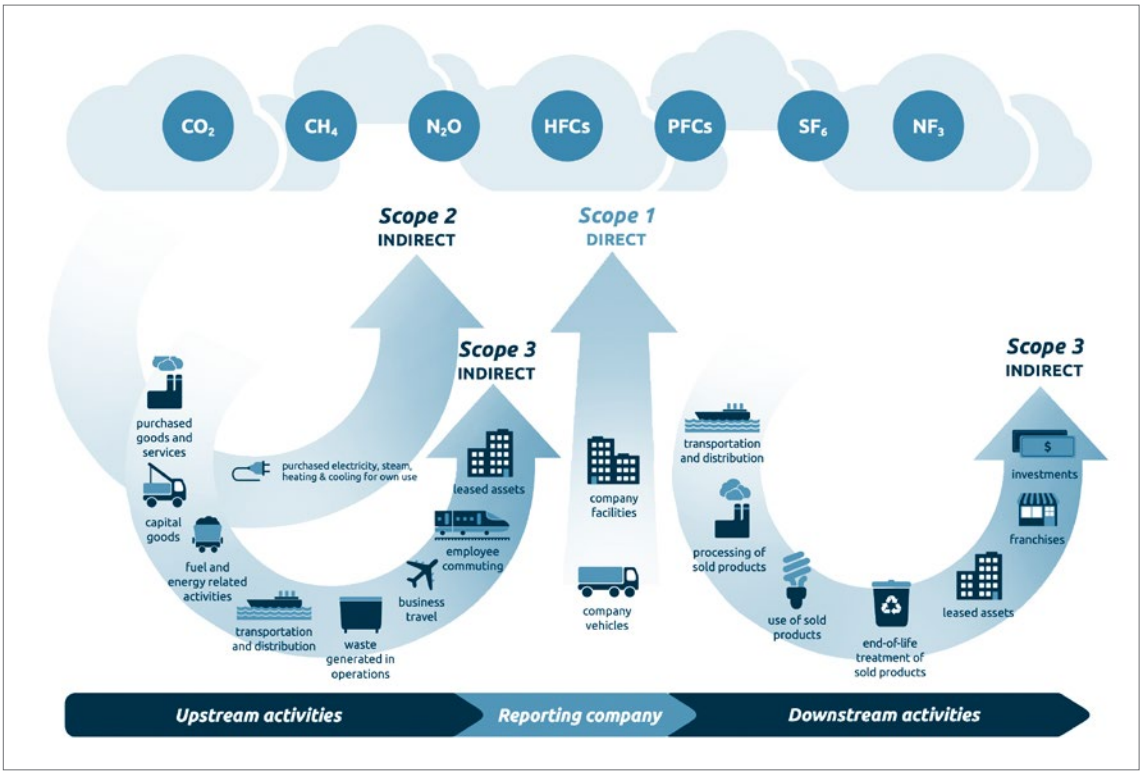
Effective carbon management begins with accurate measurement. To that end, we have provided a background on greenhouse gas emissions and reported our carbon footprint across multiple segments of the portfolio, highlighting the progress achieved to date. While CalPERS does not directly purchase carbon credits, it is likely that some of our portfolio companies utilize carbon credits as part of their emissions reduction strategies.

Defining Greenhouse Gas Emissions

The World Resources Institute (WRI) and the World Business Council for Sustainable Development created the Greenhouse Gas Protocol in 2001 to help organizations identify and reduce emissions.[28] Emissions were streamlined and classified as one of three categories, or scopes.

Companies that disclose their emissions report them based on these scopes. Emissions from sources within the company are referred to as direct emissions while emissions generated outside of the company are referred to as indirect emissions.

Figure 18: **Greenhouse Gas Protocol, Technical Guidance for Calculating Scope 3 Emissions, V. 1.0**[29]



Source: WRI

As shown in Figure 18, Scope 1 refers to direct emissions from an organization's facilities or the use of its vehicles. Scope 2 includes indirect emissions from purchased electricity, steam, and heating and cooling. Scope 3 includes indirect emissions from an organization's value chain, including emissions from both upstream and downstream activities.

CalPERS' Carbon Footprint

Public Markets Portfolio

CalPERS regularly conducts carbon footprint analyses of its publicly traded asset portfolios, with a focus on global public equity and U.S. credit portfolios, including investment-grade and high-yield markets. Together these assets represented $279.1 billion or close to 50% of the total fund's net asset value as of June 30, 2025.

Table 8: **CalPERS' Global Public Equity Portfolio Carbon Footprint**

Global Public Equity Portfolio	Total Financed Carbon Emissions (tons CO2e)	Financed Carbon Emissions (tons CO2e/$M invested)
Scope 1 and 2	8,963,671	41.7
Scope 3 – upstream	17,615,494	81.9
Scope 3 – downstream	38,351,643	178.3

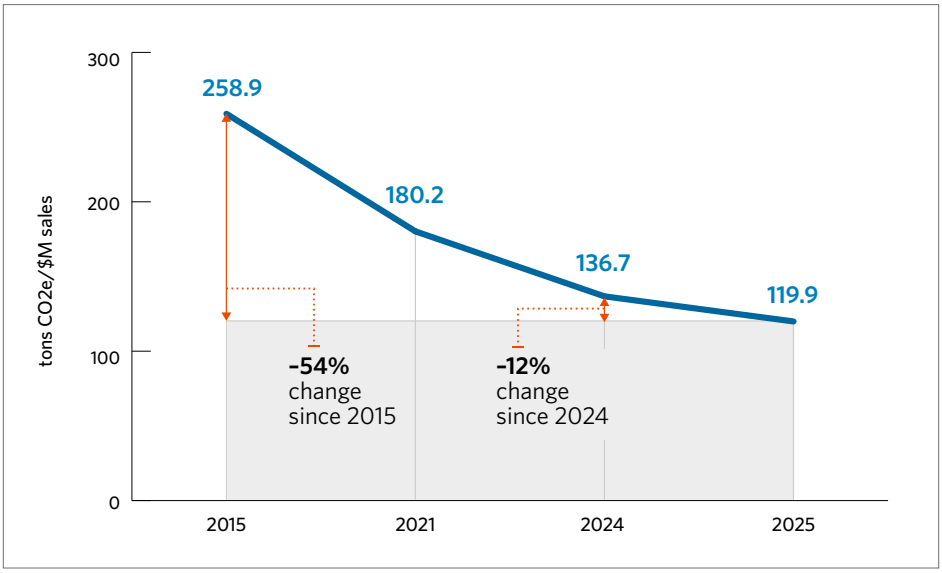
Sources: MSCI, CalPERS

CalPERS' global public equity portfolio carbon footprint metrics in Table 8 were derived with MSCI's climate risk reporting facility. The metrics above used an enterprise value including cash (EVIC) methodology, covering 99.8% of the portfolio's market value.

Relative to the broad MSCI ACWI IMI Equity Market Index, our portfolio exhibits lower financed carbon emissions, with 8%, 6%, and 21% advantages across Scope 1, Scope 2, and Scope 3 (upstream and downstream) emissions, respectively.

The weighted average carbon intensity (WACI) of the portfolio registered a decrease of 12% year-over-year. The metric stands 54% lower in comparison to 2015, when it was initially measured for the equity portfolio.

Figure 19: **Evolution of the CalPERS' Global Public Equity Portfolio's WACI (Scope 1 and 2)**



Source: MSCI, CalPERS

Although the carbon intensity of the U.S. corporate bond market remains significantly higher than that of the equity market, our U.S. credit portfolio's WACI has improved by 51% since 2017, when the metric was first measured. The portfolio's carbon footprint is provided in Table 9, using an EVIC methodology, covering 95.9% of the portfolio's market value.

Table 9: **CalPERS' Global Fixed Income Corporate Portfolio**

Global Fixed Income Corporate Portfolio	Total Financed Carbon Emissions (tons CO2e)	Financed Carbon Emissions (tons CO2e/$M invested)
Scope 1 and 2	7,367,705	121.6
Scope 3 – upstream	7,949,983	131.2
Scope 3 – downstream	21,025,832	347.1

Sources: MSCI, CalPERS

CalPERS' Real Estate Portfolio

CalPERS conducted a carbon footprint analysis of the real estate portfolio that generated a number of findings. The emissions represented by the carbon footprint cover approximately 89% of this portfolio's $45 billion in net asset value as of December 31, 2023. Conducting carbon footprints of private market investments can be much more resource intensive and have longer lag times than conducting footprint analyses on public market exposure. CalPERS' real assets staff utilized our partnerships with external managers and with the GRESB to conduct the carbon footprint.

Table 10: **CalPERS' Real Estate Carbon Footprint** *(in Metric Tons of CO2e)*

Scope 1	44,239
Scope 2	205,246
Subtotal Scope 1 and 2	249,485
Scope 3	808,315
Total Reported GHG Emissions	**1,057,800**

Source: CalPERS

The majority of the reported GHG emissions for the portfolio are concentrated in Scope 3 emissions. Data availability, collection, processes, and methodologies continue to evolve as an emphasis is placed on this effort in the industry.

Sectoral Decarbonization Pathways

TPI's sectoral decarbonization pathways, which are based on IEA climate scenarios, are widely used by investors and investor networks, including Climate Action 100+, to assess whether companies are aligned with the goals of the Paris Agreement. This analysis informs investors, including CalPERS, and underpins our engagement with companies across the range of high-impact sectors.

TPI carbon intensity targets (to be aligned with a 1.5 degrees Celsius pathway for 2030) for each sector are shown in the TPI online tool. This includes the sectoral carbon performance measure for each high-emitting sector.

We'll continue to assess sectoral decarbonization pathways, target intensity, and absolute real world emission reductions. Furthermore, we will continue to engage companies operating across a range of sectors to help bring them into alignment with the goals of the Paris Agreement so they may thrive in a lower-carbon economy.

Conclusion

Climate change poses an urgent and complex challenge for investors. In conducting a climate change analysis across our portfolio, we measured and monitored the breadth and depth of risks across the total fund, and opportunities in the transition to a low-carbon economy.

Climate change is a systemic risk which must be managed and mitigated through global cooperation between the public and private sectors in partnership with civil society. As a long-term investor with multiple generations relying on us for pension security, the shift to a sustainable low-carbon global economy presents ripe investment opportunities to earn our target rate of return.

CalPERS' public equity portfolio roughly tracks the potential implied temperature rise of the global economy to produce warming at 2.7 degrees Celsius, which would cause deleterious environmental impacts.[30] Our strategy of advocacy, engagement, integration and investment, and partnerships is showing promise. We must stay the course, maintain our focus, and continue efforts with our partners to navigate the transition.

The climate change transition brings opportunity if successfully traversed. Breakthrough technologies like scalable and financially competitive long-duration energy storage may expedite the transition to a low-carbon economy. Or policymakers may establish a clear and stable global carbon-pricing regime that gets the world on track for a thriving low-carbon future.

Climate risk poses systemic risk with global impacts for society. It is still possible that collectively our global ambition will falter and we will not rein in emissions through the combined and dynamic impact of government policy, technology breakthroughs, and major shifts in consumer demand. If so, we could enter a dangerous time of climate extremes, volatility, ecosystem collapse, vast migration, and resource scarcity.

CalPERS will lead on climate change resilience, seek opportunities to meet our investment return objective, and fulfill our obligations to beneficiaries. We are proud to have co-founded Climate Action 100+, the ESG Data Convergence Initiative, and to have committed to other partnerships supporting transition and climate change mitigation efforts.

Tackling the climate crisis is urgent work, and it will take all sides pulling together to achieve a just transition and to limit global warming. In all our work, our partnerships with fellow investors, policymakers, the business sector, and civil society will continue to be of vital importance. We will innovate in how we assess and manage climate risk and opportunities. We will build climate resilience into our portfolio and work tirelessly to achieve our goal of investing $100 billion to climate solutions by the end of 2030.

We believe that our sustainable investments approach will deliver better returns for our members in the years to come.

IFRS S2 Climate-Related Disclosures

In 2022, the ISSB published Exposure Draft IFRS S2 Climate-related Disclosures, integrating and building on the recommendations of the TCFD and incorporating industry-based disclosure requirements developed by SASB Standards.

In June 2023, the ISSB issued IFRS S2 Climate-related Disclosures after considering the feedback on the exposure draft. The requirements in IFRS S2 are consistent with the four core recommendations and recommended disclosures published by the TCFD.

CalPERS has been an active supporter of the ISSB's work from the outset. Although the ISSB recommendations are largely designed for corporate reporting, asset owners can benefit from using the same ISSB IFRS S2 four-part disclosure framework about an entity's climate-related risks and opportunities as shown below:

- **Governance:** detailing CalPERS' governance processes, controls, and procedures the entity uses to monitor, manage, and oversee climate-related risks and opportunities
- **Strategy:** explaining CalPERS' investment strategy for managing climate-related risks and opportunities
- **Risk management:** setting out CalPERS' investment approach to identify, assess, prioritize, and monitor climate-related risks and opportunities
- **Metrics and targets:** disclosing the performance in relation to CalPERS' climate-related risks and opportunities, including progress toward climate-related targets it has set, or is required to meet by law or regulation

Glossary

A limited number of climate-related terms can be found below. For a more comprehensive climate-related glossary, we refer the reader to the IPCC.

Limiting warming to 1.5 degrees Celsius (achieving net zero CO2e emissions by 2050): This requires decreasing energy demand, decarbonizing electrical systems, electrification of end-use energy, reducing agricultural emissions, and multiple forms of carbon storage.

2 degrees Celsius scenario: This is the global community's accepted limitation of temperature growth to avoid significant and potentially catastrophic changes to the planet.

Carbon capture technologies: Carbon capture and storage is the process of capturing waste carbon dioxide usually from large point sources, such as cement factories or biomass power plants, transporting it to a storage site, and depositing it where it will not enter the atmosphere, normally an underground geological formation.

Carbon footprint: This is the amount of carbon dioxide and other carbon compounds emitted due to the consumption of fossil fuels by a particular person, group, etc.

Carbon intensity: This is the total reported or estimated metric tons of C02e emissions divided by the company's sales revenue, in millions of dollars. This metric allows for comparison between companies.

Carbon risk premium: This refers to the adjustment to the expected risk profile of an investment based on its vulnerability or resilience to political, technology, and regulatory risks associated with the climate transition.

Climate solutions investment: CalPERS considers investments as eligible for a full or partial "climate solutions" classification if their underlying activities or purposes fall into one of three categories:

- **Mitigation:** directly reduce or enable the reduction of GHG emissions at scale
- **Adaptation:** enhance climate resilience by preventing or reducing harm to humans, assets, and natural systems caused by acute and chronic effects of climate change
- **Transition:** operate in hard-to-abate sectors with a credible decarbonization plan, consistent with the latest state of climate science and technological capabilities[31]

CFTC: Commodity Futures Trading Commission

Climate Action 100+: This is the world's largest shareowner engagement project with more than 600 signatories.

Climate Value-at-Risk (CVaR): This is a modeling process developed by MSCI that provides a quantitative, forward-looking analysis regarding risks and opportunities for investments related to climate change.

Deforestation: This refers to the permanent removal of trees to make room for something besides forest. This can include clearing the land for agriculture or grazing, or using the timber for fuel, construction, or manufacturing.

EVIC (enterprise value including cash): EVIC is an alternate measure to enterprise value (EV) to estimate the value of a company by adding back cash and cash equivalents to EV.

EVIC: Market capitalization at fiscal year-end date + preferred stock + minority interest + total debt

Financed carbon emissions (tons CO2e/$M invested): This measures the greenhouse gas emissions that are linked to an investor's holdings. It shows how much carbon pollution is being "financed" through each $1 million invested in the investor's portfolio (in debt or equity). Emissions are attributed to the investor proportionally to her ownership share of the invested companies' enterprise value (EVIC).

Financed carbon intensity (tons CO2e/$M sales): This refers to allocated emissions per allocated sales. This measures the carbon efficiency of a portfolio, defined as the ratio of carbon emissions for which an investor is responsible to the sales for which an investor has a claim by their equity ownership. Emissions and sales are apportioned based on equity ownership (% market capitalization).

GHG per unit of value added (GEVA) approach: This is an intensity measure of GHG emissions per unit of value added by the company.

Global carbon budget: This is the estimated amount of carbon dioxide the world can emit while still having a likely chance of limiting global temperature rise to 1.5 degrees Celsius above preindustrial levels.

Greenhouse gas emission scopes levels:

- **Scope 1 emissions:** These are direct emissions from owned or controlled sources
- **Scope 2 emissions:** These are indirect emissions from the generation of purchased energy.
- **Scope 3 emissions:** These are all indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions

Global Real Estate Sustainability Benchmark (GRESB): This provides globally recognized ESG benchmarks and assessments for real estate and infrastructure investments.

Intergovernmental Panel on Climate Change (IPCC): This is the United Nations body for assessing the science related to climate change.

International Accounting Standards Board (IASB): They develop IFRS Accounting Standards, which guide how companies prepare their financial statements.

International Financial Reporting Standards (IFRS): These are the globally recognized financial reporting standards that have been incorporated into law in 132 jurisdictions around the world, including the EU, the U.K. and many countries across America and Asia. These are developed by IASB and ISSB.

International Sustainability Standards Board (ISSB): This is an independent body, part of the IFRS Foundation that develops IFRS Sustainability Disclosure Standards, which builds upon and incorporates existing frameworks such as TCFD and SASB standards.

Investable universe: This is also known as "market portfolio," and includes all tradeable assets.

Litigation risks: They include but are not limited to third-party and class action claims against public companies as well as direct action(s) by shareowners against companies relating to damages directly or indirectly stemming from climate change.

Montreal Pledge: The pledge was launched in Montreal in 2014. It is a commitment by more than 120 investors to measure and publicly disclose the carbon footprint of their investment portfolios on an annual basis.

Net asset value (NAV): This refers to the value of an entity's assets minus the value of its liabilities.

Net zero carbon emissions: This refers to the removal from the atmosphere of all man-made greenhouse gas emissions through reduction measures, thus reducing the Earth's net climate balance to zero.

Paris Agreement: This agreement was signed in December 2015. It is an agreement within the United Nations Framework Convention on Climate Change dealing with greenhouse gas emissions mitigation, adaptation, and finance. The Paris Agreement includes the goal of limiting average global temperature rise to well below 2 degrees Celsius and pursuing efforts to limit it to 1.5 degrees Celsius above preindustrial levels.

Physical risks: These refer to risks such as wildfires, extreme weather, sea level rise, and drought that can affect fixed assets, like real estate, and disrupt portfolio companies' supply chains and operations.

Reforestation: This is the process of restocking existing forests and woodlands that have been depleted, usually through deforestation.

Representative concentration pathways (RCPs): These are four independent pathways (RCP 2.6, RCP 4.5, RCP 6, and RCP 8.5) developed by four individual modeling groups that are meant to be inputs for climate models developed by the IPCC.

Sustainability Accounting Standards Board (SASB): It develops industry-specific standards that guide companies on financially material sustainability disclosures. It is now a part of the IFRS Foundation.

SB 964: This bill was signed into law in 2018 and requires the boards of CalPERS and CalSTRS to publicly report on the analysis of the material climate-related financial risks of their public market portfolios by January 1, 2020, and every three years thereafter.

SEC: Securities and Exchange Commission

Sectoral decarbonization approach (SDA): This is a science-based model to help companies understand how their current emissions are contributing to temperature rise. The model also provides information to help companies determine the emissions cuts they must undertake to align them with 2 degrees Celsius, 4 degrees Celsius, or 6 degrees Celsius temperature rise scenarios.

Task Force on Climate-Related Financial Disclosures (TCFD): It developed voluntary recommendations for companies to disclose climate-related financial risks and opportunities. Having fulfilled its remit, the TCFD officially disbanded in October 2023, with its work now integrated into IFRS Sustainability Disclosure Standards, particularly IFRS S2 issued by ISSB.

Total financed carbon emissions (tons CO2e): This refers to the allocated emissions to all financiers (EVIC). It measures the total carbon emissions for which an investor is responsible by their equity ownership. Emissions are apportioned based on equity ownership (% market capitalization).

Transition Pathway Initiative (TPI): This is a global, investor-led initiative that assesses how companies are aligning with the transition to a low-carbon economy and provides data on their management quality and carbon performance for investor decision-making and engagement.

Transition risks: These are shifts in the market, policies, and technologies (due to the movement toward a lower-carbon economy) that can affect the financial success of existing business models and industries.

Value chain: Refers to the full range of activities performed to create a product or service and deliver it to market.

Weighted average carbon intensity (WACI): This metric has two steps for calculation. First the total reported or estimated metric tons of C02e emissions for each company is divided by the company's sales revenue, in millions of dollars (carbon intensity). This output is then multiplied by the company's weight in the investor's portfolio. It measures a portfolio's exposure to carbon-intensive companies, defined as the portfolio weighted average of companies' carbon intensity (emissions/sales).

Endnotes

1 *Unlocking the Inclusive Growth Story of the 21st Century_ Accelerating Climate Action in Urgent Times, 2018.*

2 *Exposure dollar amounts and net asset values are as of December 31, 2021. Sustainable investments assessment methodology is referenced in this report's glossary.*

3 *Sustainable investments assessment methodology is referenced in the glossary.*

4 *The Science Based Transition Initiative (SBTi) and the Transition Pathway Initiative (TPI) are two initiatives recognized as industry references for their science-based evaluation of decarbonization commitments.*

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14 *Edmunds, What is the Percentage of Electric Cars in the U.S.?, March 31, 2025.*

15 *California Energy Commission (2024). New ZEV Sales in California. Data last updated December 31, 2024.*

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17 *The World Bank, Carbon Pricing Dashboard.*

18 *Munich RE, The 2024 natural disaster in figures.*

19 *McKinsey & Company, Decarbonization Challenge For Steel, June 3, 2020.*

20 *R-value provides a measurement of the effectiveness of insulation. The higher the R-value, the better the material resists heat flow (i.e., the better it insulates).*

21 *Uber CEO says the Waymo robotaxis on its app in Austin are busier than 99% of human drivers, May 7, 2025.*

[22] *This disclosure was developed using information from MSCI ESG Research LLC or its affiliates or information providers. Although the California Public Employees' Retirement System's information providers, including without limitation, MSCI ESG Research LLC and its affiliates (the "ESG Parties"), obtain Information (the "Information") from sources they consider reliable, none of the ESG Parties warrants or guarantees the originality, accuracy and/or completeness, of any data herein and expressly disclaim all express or implied warranties, including those of merchantability and fitness for a particular purpose. The Information may only be used for your internal use, may not be reproduced or re-disseminated in any form and may not be used as a basis for, or a component of, any financial instruments or products or indices. Further, none of the Information can in and of itself be used to determine which securities to buy or sell or when to buy or sell them. None of the ESG Parties shall have any liability for any errors or omissions in connection with any data herein, or any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of the possibility of such damages.*

[23] *MSCI, Implied Temperature Rise.*

[24] *Rhodium Group, Global Greenhouse Gas Emissions: 1990-2022 and Preliminary 2023 Estimates, November 26, 2024.*

[25] *MSCI ESG Research, MSCI Net Zero Tracker; MSCI, The MSCI Net-Zero Tracker, July 2025, p. 39.*

[26] *Transition Finance Tracker from the MSCI Sustainability Institute.*

[27] *IEA, Tracking Clean Energy Progress.*

[28] *Persefoni, What Are Scope 1, 2, 3 Emissions? August 9, 2024.*

[29] *World Resources Institute (WRI) Greenhouse Gas Protocol, Technical Guidance for Calculating Scope 3 Emissions, V.1.0.*

[30] *Used MSCI transition Finance Tracker from the MSCI Sustainability Institute and its MSCI ACWI IMI Index as a proxy for the global economy. Represented by All Country World Investable Market Index (ACWI IMI), which includes large-, mid-, and small-cap traded listed companies across 23 developed markets and 24 emerging market countries. With 8,406 constituents, the index covers approximately 99% of the global equity investment opportunity set, as of March 31, 2025.*

[31] *SBTi and TPI are two initiatives recognized as industry references for their science-based evaluation of decarbonization commitments.*

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