Addressing Climate Change Risk

CalPERS' First Response to Senate Bill 964

December 2019

CalPERS

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CalPERS’ Public Report, Senate Bill 964

Introduction

This first report on climate-related financial risk is provided by the California Public Employees’ Retirement System (CalPERS) in response to Senate Bill (SB) 964. It provides an overview of our work on climate change, as part of our relentless focus on risk and return.

We have a fiduciary duty to our 2 million members who rely on their CalPERS “pension buck” to pay benefits in retirement, disability, and illness. For every dollar paid out, 58 cents come from investment returns. With a funding ratio of about 71 percent and a target rate of return of 7 percent we need to be fully committed to address both risks and opportunities. Climate change brings both.

SB 964 requires the CalPERS Board of Administration (Board) to publicly report by January 1, 2020, and every three years thereafter, until January 31, 2035. The report should explain the “climate-related financial risk of its public market portfolio, including the alignment of the fund with the Paris Agreement and California climate policy goals, and the exposure of the fund to long-term risks.”

Our investment strategy on climate change is based on the scientific evidence, which shows how greenhouse gas (GHG) emissions contribute to global warming, and where this in turn is having a profound impact on the world’s environment. The physical impact brings risks to our members’ assets, with floods, storms, drought, and wildfires. The dramatic changes to the global energy economy also pose transition risk as companies are challenged to adopt new strategies, without leaving their investors with stranded assets, or, in extreme cases, bankruptcy. On top of this companies are increasingly vulnerable to litigation, bringing new risk for investors facing law suits and settlement costs.

Climate change also brings opportunity, as the global economy begins to shift away from the energy sources that create GHG emissions. We are finding ways to explore these opportunities through engaging companies that are shifting their strategy into new lines of business in the public markets, and through new strategies in the private markets where we are finding investment opportunities that can meet our risk and return goals.

This report explains our investment strategy on climate change: to make sure our portfolio is resilient to climate risk; to find the investment opportunities that the energy transition brings; and to bring down emissions that contribute to global warming. It also explains how we work in partnership with others, from international bodies like the United Nations to fellow asset owners around the world.

We have three channels in our sustainable investment strategy: engagement, to ensure that the companies we invest in bring down their GHG emissions; advocacy, to support the policy and regulation that will foster the energy transition, such as via the Paris Agreement; and integration, where we bring consideration of climate change risk and opportunity into our investment decision-making.

Furthermore, SB 964 states that it does not require action unless the Board determines in good faith that this is consistent with its fiduciary responsibilities. For us, as a long-term global investor we consider that addressing climate change risk in our portfolio is not only consistent with our fiduciary duty but is vitally important in fulfilling our fiduciary duty to exercise prudence and care in managing our members' assets.

Acknowledging this is the first report under SB 964, we welcome the legislature's feedback. We are aware there is more work to be done on the data and methodology used for assessment of climate risk for investors. For that reason, we will continue to advocate for mandatory climate risk reporting and support best practice frameworks as an interim measure. As reporting by companies improves, so too will the ability of investors to assess both the risks and opportunities of climate change.

Background

As a long-term investor in the global economy, we have long understood the scale and multi-faceted nature of climate change posing both risk and opportunity to the portfolio. In 2012 we commissioned an independent review of published academic research to assess the evidence on the environmental, social, and governance (ESG) dimensions of corporate and investment strategy. The Sustainable Investment Research Initiative (SIRI)[1] reviewed close to 1,000 published research papers, refreshed with a further 800 papers in 2016, highlighting themes that were relevant to long-term value creation and investment risk.

The SIRI findings contributed to the development of CalPERS' Investment Beliefs[2], which were adopted by the Board in 2013. These beliefs articulate our view that long-term value creation requires effective management of three forms of capital: financial, physical, and human (Investment Belief 4). As well as our view that risk, such as climate change, is multi-faceted and not fully captured through measures such as volatility or tracking error (Investment Belief 9).

In 2015, the Board revised and approved the CalPERS Governance and Sustainability Principles (Principles), which guide our advocacy, engagement, and integration work across the portfolio. Over the years, the Principles have been strengthened to reflect our view that companies should identify, manage, and disclose material environmental risks and opportunities relevant to their short and long-term success[3].

[1] Sustainable Investment Research Initiative
[2] CalPERS' Investment Beliefs
[3] Governance and Sustainability Principles

In 2016, building upon research evidence produced from SIRI, we developed a five-year CalPERS Total Fund Governance and Sustainability Strategic Plan (Plan)[4]. This sets out six priorities which include both climate change and improving corporate reporting. The focus of the climate change priority was to bring down emissions in our portfolio, through engaging the companies responsible for the bulk of GHGs which contribute to global warming.

As approved by the Board, the Plan sets out the three channels through which we pursue our priorities, all of which are supported through partnerships to enable us to share resources, gain insight, and pool influence with fellow long-term investors.

1. **Advocacy** ensures our goals are clearly articulated to regulators and policymakers. We participated in the finance sector meetings in 2015 during the Paris Agreement negotiations and issued our public support for the goal of keeping global warming to "well below 2 degrees." That support has been reaffirmed by CalPERS' CEO in responding to the Governor's Executive Order on climate change, and through our participation at COP 25 in Madrid this year. We continue to advocate for policy measures on climate change to support the energy transition, such as carbon pricing and removal of fossil fuel subsidies. We work closely through partnerships with industry leaders such as Ceres, the United Nations Global Investors for Sustainable Development, and the Vatican Dialogue on the Energy Transition and Care for Our Common Home. Likewise, we use our positions on the advisory boards of regulators such as the SEC, CFTC, and International Financial Reporting Standards Council to advocate for mandatory corporate reporting which captures climate change risk and opportunity. We also support best practices frameworks such as the Taskforce on Climate Related Financial Disclosure (TCFD) and the Sustainability Accounting Standards Board (SASB).
2. **Engagement** uses our position as a provider of financial capital to companies and managers, to foster alignment with the strategic priorities. We have engaged extensively with companies to both bring down emissions which are causing climate change, and to protect the natural carbon sinks which help to absorb those emissions, through our work on deforestation. Examples here include our leadership role in the founding of Climate Action 100+, which is now the world's largest shareowner engagement project with signatories with assets under management totaling $35 trillion. We also use our proxy voting influence to support climate risk reporting, and alignment of corporate lobbying and compensation to ensure a just transition among the world's systemically important carbon emitters.
3. **Integration** ensures consideration of relevant sustainability factors in the investment decision-making process across the total fund. This includes assessing the physical risks to long-lived assets in increasingly vulnerable regions and exposure of carbon intense assets to risks in the transition to a low-carbon economy. This work leverages asset class tools and partnerships such as the Global Real Estate Sustainability Benchmark (GRESB), for both Real Estate and Infrastructure. We have set a goal of having 100 percent of our investment policy and procedures integrating sustainability factors which

[4] Total Fund Governance Sustainability Strategic Plan Update

are relevant to risk and return, including climate change across the total fund portfolio, by 2021 as part of our strategic plan on sustainable investment. Furthermore, carbon foot printing has been estimated for three out of our four asset classes (global equity, global fixed income, and real assets), representing 90 percent of the fund's investments by value.

We are mindful that much of this work is hampered by the lack of data and corporate reporting. Despite the importance and urgency of mitigating climate change risk, and the opportunity for value creation in the transition to a low-carbon economy, there is no consistent, comparable, and verified reporting required by the United States and international standard setters. We have consistently advocated for this to be introduced while supporting voluntary measures such as the reporting framework developed by the TCFD.

With a lack of high-quality data, much of the measurement on current emissions involves estimation. This is not satisfactory but underlines the important role of regulators in ensuring that investors have timely, high-quality reporting. Currently, less than half of the companies in our public market portfolios report under voluntary platforms such as the CDP (formerly known as the Carbon Disclosure Project), a longstanding best practice measure, or more recent frameworks such as TCFD. Hence, in this report we have taken two lines of sight into the portfolio but caution that the assessments are based upon incomplete data. It should also be noted that projections on future emissions' trajectories, and related temperature rise scenarios involve modeling, various assumptions about policy, technology and consumer demand, and significant estimation.

We will continue to pursue the sustainable investment goals of our Plan, which make climate change one of our priorities alongside the call for improved data and corporate reporting. The partnerships enable us to share insights, pool resources, and bring broader influence to bear in the financial markets. Our work as the originator of the Climate Action 100+ initiative, which is now the world's largest shareowner engagement alliance, demonstrates the potential of that partnership.

Our approach to climate change risk and opportunity reflects the three pillars of our Plan and approach to sustainable investment: advocacy, to ensure the needed policy framework; engagement, to bring company and manager strategy in line with the Paris Agreement goals; and integration, to ensure relevant climate-related factors are considered across the investment decision-making for the total fund. Finally, all three of these pillars are supported through our partnerships, with expert bodies and fellow investors.

Analysis of Exposure to Climate-Related Risk

CalPERS’ analysis considers exposure to both short- and long-term risks of climate change. The TCFD provides a useful framework to categorize climate change-related risks as Transition and Physical impacts[5].

- **Transition risks** are shifts in the market, policies, and technologies (due to movement toward a lower-carbon economy) that can affect the financial success of existing business models and industries. Our portfolio companies' success depends on the degree to which they can successfully navigate the transition.
- **Physical risks** such as wildfires, extreme weather, sea-level rise, and drought can affect fixed assets, like real estate, 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.

Due to the episodic nature of litigation, and the current lack of an identified source to allow assessment, we have not in this first report included a comprehensive assessment. We would expect future litigation risk to consist of third-party and class action claims against public companies as well as direct action(s) by shareholders 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. Given the likely magnitude of future climate-related litigation, we face real risk to the value of our public market portfolio.

Transition Risk Drivers[6]

1. **Policy and Legal:** Policy is a crucial driver of the pace at which the economy decarbonizes and thus the depth of physical risk to our portfolio. The United Nations Framework Convention on Climate Change (UNFCCC) estimates the collective impact of national climate policies currently track to a 3.2°C rise in the global average temperature. This is substantially higher than the Paris Agreement goal of keeping global warming to well below 2°C .
2. **Market:** Supply, demand, and cost-competitiveness of products and services linked to the low-carbon economy will play a part. Analysis indicates that corporate planning may currently be tracking to a 3.6°C rise in global average temperature,[7] reflecting a significant gap in both business and consumer demand for low-carbon products and services.
3. **Technology:** Technological improvements and innovations will play a critical role in supporting the transition to a lower-carbon, energy efficient economy. Current installations in the transportation,

[5] Financial Stability Board. “Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) (June 2017)”
[6] To inform our view of transition risks, CalPERS considered a range of expert sources including the US Energy Information Agency, the International Energy Agency, Bloomberg New Energy Finance, Carbon Tracker Initiative, Grantham Institute for Climate Change, Transition Pathway Initiative, and Wood Mackenzie.
[7] “Institutional Investors - Schroders.” Climate Progress Dashboard.

energy and carbon capture industry track to a wide range of possible outcomes in temperature rise from 2.9°C to 5°C.

Physical Risk Drivers

Scientists have developed models to forecast the frequency, intensity, and location of expected physical impacts from climate change over time. There is a range of severity for impact linked to and driven by the pace of transition. We considered two types of physical risks from climate change: acute and chronic impact.

1. **Acute:** Acute physical impacts involve discrete events where frequency or severity may increase due to changing climate conditions. These include wildfires, hurricanes, heatwaves, and flooding. The amount of global temperature rise will affect the severity of future events and related financial impacts. Even a 0.5° difference in temperature increase, for example from 1.5° to 2°, could entail potentially catastrophic changes, as evidenced in the UN IPCC's research[8]. Occurrences of acute events are already generating financial impacts and are expected to increase in frequency and magnitude.
    A. **In the United States:** In 2018, the U.S. experienced 14 separate disaster events with an estimated cost of more than $1 billion.[9] According to the National Centers for Environmental Information, the years from 2016-2018 were historic periods because the U.S. faced double the long-term annual average number of disasters each with an estimated cost of more than $1 billion.[10]
    B. **Globally:** Between 1998 and 2017, the direct economic losses from climate-related disasters rose by 151 percent. Floods were the most prevalent natural disaster accounting for 43.4 percent of occurrences and storms were the second most frequent at 28.2 percent. The direct economic losses associated with these disasters was $2.25 trillion.[11]
2. **Chronic:** Chronic physical impacts involve long-term shifts in climate patterns. These unfold and recur over time. Such chronic risks include extreme heat, drought, and sea-level rise.
    A. Nearly 400 all-time high temperatures were recorded in the northern hemisphere from May through August 2019. High temperatures pose challenges for human health, worker productivity, and infrastructure designed for less extreme heat. In South East Asia, research conducted on India indicates that extreme heat impacts worker productivity and absenteeism. This is estimated to decrease economic output by approximately three percent for every degree Celsius increase above the average temperature. [12]
    B. The IPCC comments in relation to the United States "[C]ontinued warming that is projected to occur without substantial and sustained reductions in global greenhouse gas emissions (GHG) is

[8] Intergovernmental Panel on Climate Change. "Special Report Summary for Policymakers. Global Warming of 1.5°C"
[9] Climate.gov
[10] Fourth National Climate Assessment. (2018)
[11] UN Office for Disaster Risk Reduction
[12] Energy Policy Institute and the University of Chicago

expected to cause substantial net damage to the U.S. economy throughout this century, especially in the absence of increased adaptation efforts. With the increase of emissions at historic rates, annual losses in some economic sectors are projected to reach hundreds of billions of dollars by the end of the century—more than the current gross domestic product (GDP) of many U.S. states."[13]

C. The impact of different degrees of warming on sea level rise has also been estimated by the IPCC as follows: "By 2100, global mean sea level rise is projected to be around 0.1 meter lower with global warming of 1.5°C compared to 2°C (*medium confidence*). Sea level will continue to rise well beyond 2100 (*high confidence*), and the magnitude and rate of this rise depend on future emission pathways. A slower rate of sea level rise enables greater opportunities for adaptation in the human and ecological systems of small islands, low-lying coastal areas and deltas (*medium confidence*)."

Analysis of Climate-Related Financial Risk to CalPERS' Public Market Portfolio

At the sector level, CalPERS' staff analyzed climate-related financial risk to our public market portfolio from both physical risks from climate change and risks stemming from the transition to the low-carbon economy. We first carried out a carbon footprint for our Global Equity portfolio in 2015 as part of our commitment to the Principles for Responsible Investment's (PRI) Montréal Pledge. Since then, we have completed a carbon footprint for our Global Fixed Income portfolio corporate holdings.

It is important to note that the companies within our portfolio are dynamic. Risks assessed today may be mitigated by sound strategy and concerted attention over time. The belief that companies can adapt and mitigate their risk exposures to the various facets of climate change is the reason for our engagement work.

Risk Analysis Summary Findings

CalPERS identified the percentages of aggregate public market investments in the sectors noted by the TCFD as most exposed to climate risks and opportunities. These sectors include those highlighted as examples in SB 964. Set forth below is a summary of public market exposures and anticipated climate-related financial risks in these sectors. Unless otherwise noted, all public market holdings information is as of December 31, 2018.

[13] Intergovernmental Panel on Climate Change. "Special Report Summary for Policymakers. Global Warming of 1.5°C"

Public Market Exposures

TCFD Sector	Combined Weight in Portfolios[14]	Transition Risks	Physical Risks
Energy[15] (Includes Energy and Utilities Holdings)	8%	Policy, regulatory, market, and technology changes may result or are already resulting in the loss of value or "stranded assets" particularly in long-lived and carbon-intense energy holdings in our portfolio. In some cases[16], short-term decreases in value will coincide with companies adjusting their long-term business models to align with the goals of the Paris Agreement. In other cases, value may be impaired and bankruptcies may result from collapse of demand for carbon-intense energy, policy changes, including carbon pricing, alongside failure of companies to adequately manage such risks.	Energy equipment and infrastructure may be vulnerable to increased instances of drought, hurricanes, wildfires, and extreme temperatures. For assets located in regions that experience such physical climate impacts, there may be increased costs and disruption of business operations

[14] Considers CalPERS' Global Equity and Investment-grade Corporate Fixed Income portfolios

[15] The Global Industry Classification Scheme includes the following industries in each Sector below:

- Energy: Energy Equipment and Services, Oil, Gas and Consumable Fuels
- Utilities: Electric Utilities, Gas Utilities, Multi-Utilities, Water Utilities, Independent Power and Renewable Electricity Producers.

[16] Repsol press release on impairment of value related to ambitious low-carbon transition plan

TCFD Sector	Combined Weight in Portfolios	Transition Risks	Physical Risks
Transportation	3%	Consumer preference and policy requirements for electrification, decarbonization, and shared mobility may result in the loss of value for fossil fuel-dependent transportation	Fixed infrastructure and equipment for rail and air transportation are vulnerable to temperature extremes, flooding, and hurricanes. For assets located in regions that experience such physical climate impacts, there may be disruption to critical processes and services resulting in increased costs and lost revenue
Materials and Buildings	6%	Buildings and materials with higher operating or embedded emissions should fare worse in a market environment where carbon emissions are priced or regulated for the built environment	Buildings, with their fixed locations, can be vulnerable to drought, hurricanes, wildfires, extreme temperatures, and chronic sea level rise. For assets located in regions experiencing such physical climate impacts, they may have increased costs for adaptation and operations, and may lose desirability by tenants, decreasing their value
Agriculture, Food and Forestry	3%	Policy, market, and technology developments may increase consumer demand for more sustainable food products and disrupt incumbent farming practices and food production methods	Agriculture faces vulnerability to an overall rise in temperature alongside more frequent and severe weather events and related declines in ecosystem services from pollinators. For companies and assets located in regions experiencing such physical climate impacts, crop and animal product yields may decline, operating costs may be more volatile, and ability to grow incumbent crops may be compromised with the changing physical conditions
Total	20%		

Carbon Footprint Findings

To better understand the carbon emissions of public market portfolios, CalPERS has utilized two research providers, Institutional Shareholder Services, Inc. (ISS) Climate Impact Assessment and MSCI Inc. (MSCI)

Carbon Portfolio Analytics Report, with slightly different methodologies. The carbon emissions findings for both our Global Equity and Global Fixed Income portfolios are summarized in the tables below.

Table A: Global Equity Carbon Footprint, as of December 31, 2018

Provider	**Scope 1 and 2 Carbon Emissions**[17] (tons CO_2 equivalent)	**Carbon Emissions** (tons CO_2 $MM invested)	**Carbon Intensity** (tons CO_2 -e/ $MM sales)	**Weighted Average Carbon Intensity** (position weighted carbon intensity)	**Scope 3 Carbon Emissions**[18] (tons CO_2 equivalent)	**Emissions Total**
ISS[19]	23,452,073	165	223	267	67,913,992	91,366,065
MSCI[20]	23,962,817	174	240	212	58,678,205	82,641,022

In addition to considering Scope 1 and 2 emissions, we recognize the importance of assessing Scope 3 emissions as understanding the total emissions of our portfolio companies is critical to assessing transition risks to our portfolio. In the absence of consistent standards and mandatory corporate reporting data providers have developed models to estimate emissions.

For the Scope 3 emissions attributed to our equity ownership, we evaluated ISS and MSCI Climate Change Metrics data. For MSCI, we utilized the higher of a company's reported Scope 3 emissions or MSCI's estimated emissions for that company.

With a large public equity portfolio of more than 10,000 companies, we note considering Scope 3 emissions can pose for us the challenge of double counting across business-to-business supply and demand chains.

Table B: Global Fixed Income Carbon Footprint, as of December 31, 2018

Provider	**Weighted Average Carbon Intensity** (position weighted tons CO_2 -e/ $MM sales)
ISS	367
MSCI	379

[17] Scope 1 are direct greenhouse gas emissions from sources owned by a company. Scope 2 are emissions from purchased electricity consumed by the company

[18] Scope 3 are indirect emissions resulting from the organization's operations, such as upstream and downstream activities, and supply chain activities

[19] Analysis was provided to CalPERS by Institutional Shareholder Services, Inc.

[20] Analysis was provided to CalPERS by MSCI, Inc.

For our Global Fixed Income (investment grade corporate) portfolio, we exclusively utilized the Weighted Average Carbon Intensity (WACI) measure as other carbon metrics rely on the equity ownership share.

Analysis of Alignment with the Paris Agreement and California Policy Goals

To promote alignment with the Paris Agreement's goal of limiting the global average temperature increase to well-below 2°C above pre-industrial levels, CalPERS plays a leading role in multiple global initiatives focused on investment risk and opportunity around climate change.

- We are the convener and a founding member of Climate Action 100+[21], a five-year global engagement initiative supported by 370 signatories with over $35 trillion in assets under management. The initiative focuses on the 100 largest GHG sources in our portfolio, or systemically important carbon emitting companies responsible for the bulk of emissions. In addition, the group focuses on companies with significant opportunity to drive the transition to a low-carbon economy.
- In September 2019, we became the first U.S. investor to join the UN-Convened Net-Zero Asset Owner Alliance[22], launched by the United Nations and PRI, committing to transition our investment portfolio to net-zero GHG emissions by 2050 through advocacy and engagement efforts. This initiative aims to limit the global temperature rise to 1.5°C considering the best available scientific knowledge, including the findings of the IPCC, and regularly reporting on progress, including establishing intermediate targets every five years in line with Paris Agreement Article 4.9.
- We consistently advocate that climate change presents a systemic risk to investors. For example, we presented this view, adding our support for carbon pricing and removal of fossil fuel subsidies, at the annual United Nations-coordinated climate negotiations[23] held in 2015 and in 2019. We also annually join the Global Investor Statement on Climate Change, which this year was supported by a record 631 investors representing $37 trillion.
- We advocate for financial markets to align with the Paris target through our role on the advisory boards and special projects at regulatory bodies, such as membership of the CFTC's Climate-Related Market Risk Subcommittee, the SEC's Investor Advisory Committee, and the International Financial Reporting Standards Advisory Council.
- In addition, our work on climate change is aligned with California policy. Specifically, in 2015, we identified approximately two dozen companies in our public asset investment universe as potentially meeting the definition of a "thermal coal company" as specified in the Public Divestiture of Thermal Coal Companies Act (Act). Following the October 19, 2015, Investment Committee meeting, we prohibited new or additional investments in the identified companies and began engagement activities. In May 2017, the Board's Investment Committee evaluated the outcome of engagement activities undertaken per the requirements of the Act, as well as the investment performance and risk

[21] Climate Action 100+
[22] UN-Convened Net-Zero Asset Owner Alliance
[23] Conference of the Parties to the Kyoto Protocol or COP. COP 21 was held in Paris in 2015 and COP 25 in Madrid in 2019.

considerations of the identified companies, and implications for the portfolio. The Committee considered the following, consistent with their fiduciary duty:

- Three companies had indicated plans to adapt their business models in consideration of clean energy generation (such as through a reduction of thermal coal mining revenues), and were exempt from the divestment requirement of the Act
- Fourteen companies failed to indicate applicable business plan adaptations, or failed to respond to our engagement efforts and were subject to divestment per the requirements of the Act
- Although we had no holdings to divest, an additional eight companies were identified as subject to the Act

All applicable holdings were divested in advance of the July 1, 2017, deadline specified by the Act. [24]

The underlying principles of Greenhouse Gas Emission Reduction (California Global Warming Solutions Act) and Renewable Energy Procurement (California Renewables Portfolio Standard Program and the Clean Energy and Pollution Reduction Act) are aligned with our investment strategy as follows:

- We have invested significantly in climate solutions in our private asset portfolios.
  - Of our Real Assets portfolio's power and energy infrastructure investment[25]:
    - 50 percent is invested in renewable energy power plants and carbon-agnostic[26] transmission assets
    - 39 percent is specifically invested in renewable energy power plants, including an investment in the 550-megawatt Desert Sunlight solar power asset in California
  - $12.1 Billion dollars or approximately 18 percent of our combined private assets (real assets and private equity) is invested in Climate Solutions, Renewable Energy and Sustainably Certified Buildings[27].
- Our real estate portfolio has an innovative Energy Optimization Program[28]. This program helps us systematically identify economically attractive opportunities that reduce our real estate assets' carbon footprint while helping to meet our target risk adjusted returns.

[24] Public Divestiture of Thermal Coal Companies Act Report to Legislature

[25] As of December 31, 2018

[26] Transmission assets carry electrons, regardless of whether they originate from fossil fuel or renewable energy power sources. Therefore, CalPERS considers them carbon "agnostic."

[27] As of December 31, 2018. The majority of this value is invested in sustainably-certified buildings.

[28] Energy Optimization Initiative

CalPERS' Sustainable Investment Strategy: Climate Risk

Engagement

Climate Action 100+: In 2015 CalPERS committed to the PRI Montréal Pledge, as the first U.S. signatory to measure and publicly disclose the carbon footprint of our global equity investment portfolio. After analyzing the 10,000+ companies within the portfolio, approximately 80 companies were found to be responsible for 50 percent of the portfolio's scope 1 and 2 GHG emissions. The emission trajectory of these systemically important carbon emitters is critical to whether the global economy will meet the goals of the Paris Agreement to keep global warming to well-below 2°C.

We 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 (PRI, Ceres, and their counterparts in Europe, Australasia, and Asia) to found and launch Climate Action 100+. Companies in the Oil and Gas and Utilities sector as referenced in SB 964 represent 44 percent of the companies engaged by Climate Action 100+. Other sectors in the initiative include transportation, metals and mining, construction materials, industrials, chemicals, and food, beverages, and forestry. These companies were identified through estimates of emissions by scopes 1, 2, and 3.

We play a leading role on the Climate Action 100+ Steering Committee which sets the strategy for the initiative and served as the inaugural chair. We also serve as the chair of the Climate Action 100+ Asia Advisory Group which draws together expertise for that region. Our Corporate Governance program assumed the lead for 22 of the companies identified for engagement which is the largest number engaged by a single asset owner in the initiative. The responsibilities of the lead investor include meeting in person with the company's leadership, including senior management and board members to communicate and engage on the Climate Action 100+ goals listed below.

- **Governance:** Implement a strong governance framework that clearly articulates the board's accountability for oversight of climate change risk and opportunities. This includes ensuring that corporate lobbying and executive compensation are aligned with the Paris Agreement to ensure a just transition.
- **Targets:** Act to reduce GHG emissions across their value chain, consistent with the Paris Agreement's goal of limiting global average temperature increase to well-below 2°C above pre-industrial levels. This includes scope 1, 2 and 3 emissions to ensure complete tracking of climate impact through emissions.
- **Transparency:** Provide enhanced corporate disclosure in line with the TCFD and, when applicable, sector-specific Global Investor Coalition on Climate Change Investor Expectations on Climate Change to enable investors to assess the robustness of companies' business plans against a range of climate scenarios, including well-below 2°C, and improve investment decision-making.[29]

[29] Global Investor Coalition

As a lead investor, we have completed multiple engagement discussions with management, and in some cases directly with board members, in addition to delivering presentations at company annual meetings, filing shareowner proposals, exercising our proxy votes, and carrying out solicitations to support progress.

Results of these engagements are detailed in the Climate Action 100+ 2019 Progress Report.[30] This inaugural report was launched in September 2019. Key highlights of the outcomes of the initiative's collective engagements include items listed below. Oil and gas companies, energy companies, and utilities, as referenced in SB 964, are denoted with asterisk. The early results show the significant impact of engagement by the Climate Action 100+ signatories.

- Royal Dutch Shell*, commonly known as Shell, issued a joint statement with Climate Action 100+ committing to set carbon reduction targets. Shell set specific targets for reducing carbon emissions every three to five years, with the goal of shrinking its net carbon footprint by about half by 2050. Shell also agreed to introduce a new compensation plan for its 1,500 most senior executives to ensure bonus targets included emissions reductions, plus a review of their membership of trade associations to ensure lobbying is aligned with the Paris Agreement. In a first for the oil industry, Shell agreed to include its emissions across its supply and demand chains (Scopes 1, 2 and 3).
- BP* supported a shareholder resolution requiring company disclosure on how its business strategy will become aligned with the Paris Agreement. BP also agreed to include its top 14,000 executives in a compensation plan aligned to the goals of emissions reductions.
- AES Corporation*, an electric utilities company, performed climate scenario analysis and announced a commitment to reducing carbon intensity of its power generation by 70 percent by 2030.
- Occidental Petroleum Corporation*, HeidelbergCement, Duke Energy*, Nestle, Daimler, Volkswagen, Thyssenkrupp, ArcelorMittal, BHP Billiton*, and Centrica*, and Moeller Maersk, have made "net-zero" emissions commitments for 2050.
- Glencore, the world's largest private mining exporter, has set a cap on coal production and Rio Tinto Zinc, the world's largest mining company, has plans to exit coal completely.
- Chevron* published a new climate risk report with a 2-degree analysis in 2018 and recently set reduction goals for GHG production intensity (scopes 1 & 2).
- Devon Energy*, an independent oil and natural gas exploration and production company, published its first climate change assessment report in 2018 and set a target to reduce methane emissions for its U.S. oil and natural gas production operations.
- Dominion Energy*, an energy production company, published a new climate report in 2018 and committed to cut carbon emissions from its power stations by 55 percent between 2005 and 2030, and by at least 80 percent between 2005 and 2050.
- ExxonMobil* published a new climate risk report with a 2-degree scenario analysis in 2018 and set reduction goals for flaring and methane emissions.

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[30] Climate Action 100+

- First Energy*, a regulated utility company, set a goal to reduce CO_2 emissions by at least 90 percent below 2005 levels by 2045.
- Kinder Morgan* (energy infrastructure) and Marathon Petroleum* (petroleum refining) both published an enhanced climate report in 2019 that includes a 2-degree scenario analysis.
- PPL Corporation*, a regulated utility company, enhanced its climate risk disclosures and set a goal to cut CO_2 emissions by 70 percent from 2010 levels by 2050.
- Southern Company*, an energy infrastructure company, improved its climate risk disclosures and pledged to reach a 50 percent reduction in emissions by 2030 and low- to no-carbon operations by 2050.
- 70 percent of Climate Action 100+ companies have set long-term emissions reduction targets. However, only 9 percent of the companies have targets that are in line with the goals of the Paris Agreement, showing the need for greater ambition if the Paris Agreement goals are to be met.
- 40 percent of companies undertake and disclose climate scenario analysis and 30 percent of companies have formally supported the recommendations of the TCFD.
- 8 percent of companies have policies in place to ensure their lobbying activities are aligned with necessary action on climate change, again highlighting the need for further progress.

Proxy Voting

By voting proxies at over 10,000 companies' annual general meetings, CalPERS uses its influence as a shareowner to foster transparency and accountability. Our proxy votes are published in advance on our website, with additional information for high profile votes and company-specific shareowner campaigns. [31] During the 2019 proxy season, we voted on 81 shareholder proposals related to environmental topics. We reviewed each of the proposals in consideration of our Principles and assessed whether the proposal could add value to the investment if implemented.

Typically, we support proposals that ask for improved environmental risk reporting, unless it is believed the company already adequately discloses these risks. In general, we do not support environmental proposals intended to substitute for management's operational judgments. We believe companies should manage environmental risk, but also that the board should oversee the design and implementation of risk management systems. However, we do not usually support proposals calling for specific board committees to be established, as this can lead to a fragmentation of responsibility. For a company where climate change is a strategic issue, this should remain a responsibility for the whole board. In 2019, in aggregate, we supported 44 of the 81 proposals (54 percent) and 33 of the 36 proposals (92 percent) that asked companies to report on risks linked to sustainability, the environment, or climate change. Highlights from our proxy voting work in recent years is set out below.

[31] CalPERS' Global Proxy Voting Decisions

Environmental Proposals - January 1, 2019 to September 24, 2019

	Votes FOR	Votes AGAINST	Total
Adoption of Comprehensive Recycling Strategies	4	0	4
Bioengineering / Nanotechnology Safety	2	0	2
Environmental or Sustainability Reports	34	3	37
Formation of Environmental/Social Committee of the Board	0	7	7
Miscellaneous Energy/Environmental Issues	4	17	21
Phase out of Nuclear Power	0	10	10
TOTAL	**44**	**37**	**81**
PERCENTAGE	**54%**	**46%**	

Below we provide our historical proxy voting activity on climate risk reporting.

2016 Proxy Season

- Co-filed climate risk proposals at three companies in support of the “Aiming for A” coalition – a campaign supported by a group of international investors seeking greater disclosure around climate change. Proposals were filed at three international mining companies - Glencore plc, Anglo American, and Rio Tinto. The resolutions were all supported by management and each passed with over 96 percent shareholder support.
- Ran proxy solicitations at nine U.S. companies seeking implementation of climate risk reporting. Vote results ranged from 20 percent to 42 percent shareholder support.

2016 CalPERS Proxy Solicitations Outcomes: Climate-Related Proposals				
Company Name	**Proposal Type**	**Annual Mtg Date**	**Result**	**Proxy Solicitation***
AES	Climate Risk - Scenario Analysis	4/21/2016	42% - Fail	Yes
Anadarko	Climate Risk - Scenario Analysis	5/10/2016	42% - Fail	Yes
Chevron	Climate Risk - Scenario Analysis	5/25/2016	41% - Fail	Yes
Devon	Climate Risk - Scenario Analysis	6/3/2016	36% - Fail	Yes
ExxonMobil	Climate Risk - Scenario Analysis	5/25/2016	38% - Fail	Yes
First Energy	Climate Risk - Scenario Analysis	5/17/2016	32% - Fail	Yes
Noble Energy	Climate Risk - Scenario Analysis	4/26/2016	25% - Fail	Yes
Occidental	Climate Risk - Scenario Analysis	4/29/2016	49% - Fail	Yes
Southern Company	Climate Risk - Scenario Analysis	5/25/2016	34% - Fail	Yes
Average			38%	

2017 Proxy Season

- 2017 was a watershed year for climate risk shareholder proposals in the U.S. – for the first time, an environmental related shareholder proposal achieved majority shareholder support.
- Co-filed climate risk proposals at three companies – Chevron, ExxonMobil and Occidental Petroleum.
- Two proposals passed (ExxonMobil with 62 percent support and Occidental with 67 percent support), while the Chevron proposal was withdrawn due to substantial implementation.
- In total, we ran proxy solicitations at 15 U.S. companies seeking implementation of climate risk reporting.
- Three of the 15 proposals passed – In additional to ExxonMobil and Occidental, a proposal at PPL Corporation passed with 57 percent support.

2017 CalPERS Proxy Solicitations Outcomes: Climate-Related Proposals				
Company Name	**Proposal Type**	**Annual Mtg Date**	**Result**	**Proxy Solicitation***
AES	Climate Risk - Scenario Analysis	4/20/2017	40% - Fail	Yes
Ameren	Climate Risk - Scenario Analysis	4/27/2017	46% - Fail	Yes
Chevron	Climate Risk - Scenario Analysis	5/31/2017	Withdrawn - Settlement	Yes
Devon	Climate Risk - Scenario Analysis	6/8/2017	41% - Fail	Yes
Dominion Energy	Climate Risk - Scenario Analysis	5/10/2017	48% - Fail	Yes
DTE	Climate Risk - Scenario Analysis	5/4/2017	45% - Fail	Yes
Duke	Climate Risk - Scenario Analysis	5/4/2017	45% - Fail	Yes
ExxonMobil	Climate Risk - Scenario Analysis	5/31/2017	62% - Pass	Yes
FirstEnergy	Climate Risk - Scenario Analysis	5/16/2017	42% - Fail	Yes
Hess	Climate Risk - Scenario Analysis	5/4/2017	30% - Fail	Yes
Kinder Morgan, Inc.	Climate Risk - Scenario Analysis	5/10/2017	38% - Fail	Yes
Marathon Petroleum	Climate Risk - Scenario Analysis	4/26/2017	40% - Fail	Yes
Noble Energy	Climate Risk - Scenario Analysis	4/25/2017	24% - Fail	Yes
Occidental Petroleum	Climate Risk - Scenario Analysis	5/12/2017	67% - Pass	Yes
PPL	Climate Risk - Scenario Analysis	5/17/2017	57% - Pass	Yes

Company Name	Proposal Type	Annual Mtg Date	Result	Proxy Solicitation*
Southern Company	Climate Risk - Scenario Analysis	5/24/2017	46% - Fail	Yes
Average			45%	

2018 Proxy Season

- Following the success of the 2017 proxy season, more companies began to respond favorably to shareholder requests to improve climate risk disclosure.
- As a result, few proposals went to vote, and we only ran solicitations at five companies – two of the proposals received majority support (Anadarko with 53 percent and Kinder Morgan with 59 percent).

2018 CalPERS Proxy Solicitations Outcomes - Climate Related Proposals				
Company Name	**Proposal Type**	**Annual Mtg Date**	**Result**	**Proxy Solicitation***
Anadarko	Climate Risk - Scenario Analysis	5/15/2018	53% - Pass	Yes
Kinder Morgan	Climate Risk - Scenario Analysis	5/9/2018	59% - Pass	Yes
MGE Energy	Climate Risk - Scenario Analysis	5/15/2018	10% - Fail	Yes
Noble Energy	Climate Risk - Scenario Analysis	4/24/2018	46% - Fail	Yes
PNM Resources	Climate Risk - Scenario Analysis	5/22/2018	13% - Fail	Yes
Average			36%	

2019 Proxy Season

- We filed or co-filed climate risk proposals at four companies in 2019. Only one proposal (BP) went to the vote. This proposal was supported by management and approved with 99 percent shareholder support.
- Ran proxy solicitations at two companies in support of Climate Action 100+ engagements – both proposals were calling for improved lobbying disclosure and received less than majority support (Ford with 16 percent and General Motors with 29 percent support).

2019 CalPERS' Proxy Solicitations Outcomes - Climate Related Proposals				
Company Name	**Proposal Type**	**Annual Mtg Date**	**Result**	**Proxy Solicitation***
Ford	Climate Risk - Lobbying Disclosure	5/9/2019	16% - Fail	Yes
General Motors	Climate Risk - Lobbying Disclosure	6/4/2019	29% - Fail	Yes
Average			23%	

*CalPERS sends solicitation letters to shareholders (representing at least 50 percent or more of outstanding shares) at each company requesting support

Advocacy

CalPERS advocates for policies that can drive the transition to a thriving low-carbon global economy in which we can mitigate risks and achieve our target investment returns for the benefit of our members. For more than a decade, we have advocated for domestic and international policy in support of regulatory and policy measures, such as greater disclosure from companies on climate-related financial risks; reduced fossil fuel subsidies; pricing on carbon emissions; and deforestation. Examples of our advocacy work include:

- Support for the Global Investor Statement to Governments on Climate Change.
- Joining "We Are Still In" as an advocate to the G7 and G20 for implementation of the Paris Agreement and for strengthening country commitments with the goal of limiting the global temperature rise to 1.5° above preindustrial levels.
- We are a member of the U.S. Commodity Futures Trading Commission (CFTC)'s Climate-Related Market Risk Subcommittee. The CFTC's mission is to promote the integrity, resilience, and vibrancy of the U.S. derivatives markets through sound regulation. The subcommittee is a significant opportunity to link climate risk and financial policy as it represents the first time a U.S. market regulator has commissioned a public report on climate-related risks to financial markets. The 35-member subcommittee, chaired by Bob Litterman, will produce a report by June 2020.
- Leading the call for "wider reporting" to be included at the IFRS Advisory Council, where now, under the guidance of board member, Nick Anderson, incorporation of climate risk is under discussion.
- Supporting the holding of hearings at the SEC Investor Advisory Committee to cover sustainability reporting, by academics, investors, and market participants, to strengthen guidance on climate change reporting.
- Participation in the Vatican's Dialogue on the Energy Transition and Care for Our Common Home in both 2018 and 2019, which resulted in a statement supporting carbon pricing by oil and gas chief

executives and leading global investors. This will be followed by a roundtable at Notre Dame University in 2020 to develop implementation strategy for carbon pricing to support a just transition.

In September 2019, the Board adopted language in our Principles to guide advocacy efforts regarding carbon pricing:

"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."

We have also been advocates on the topic of deforestation. GHG emissions largely come from burning fossil fuels but also from land use change, such as deforestation. Forests provide numerous benefits, playing a key role in promoting well-functioning watersheds and protecting bio-diversity that communities, companies, and economies rely on. Importantly, forests are currently one of the best available ways to absorb and store carbon emissions, helping protect assets from the physical risks of climate change by reducing CO_2 levels in the atmosphere.

Companies not aware of risks associated with deforestation in their supply chains are vulnerable to reputational, regulatory, and other business risks, including concern with human rights.

In February 2019, in our response to an inquiry from eight U.S. senators on our approach to deforestation, we noted "CalPERS views forests as providing numerous benefits, including their key role as carbon sinks helping to mitigate climate change and in turn, protect the CalPERS' global investment portfolio."[32] It is for this reason, that over the past two years we have:

- Revised our Principles to strengthen our approach to Environmental Management Practices, specifically referencing deforestation in the Principles.
- Partnered with a large group of investors to make specific requests for improvements to the Principles and Criteria for the Production of Sustainable Palm Oil, pushing for stronger sustainability standards for the palm oil sector from the key sustainability certification body, the Roundtable on Responsible Palm Oil (RSPO).

[32] Approach to Managing Environmental, Social, and Governance Risks Related to Investments, February 21, 2019

- Joined investor working groups focused on deforestation in the soy, cattle and palm oil sectors. As members of these coalitions, we support efforts to reduce deforestation caused by portfolio companies, working with Ceres and PRI initiative on Cattle[33] and Soy[34] Supply Chains[35]
- Sent letters to over 60 companies regarding risks to their business models from climate change. In these letters, we highlighted expectations regarding the companies' policies and practices to address deforestation, natural resource degradation (such as water), GHG emissions, and respect for universal human rights.
- Signed onto a statement[36] along with 244 other investors, representing $17.2 trillion in assets under management, in response to wildfires in the Amazon, Indonesia, and other regions, urgently requesting companies to redouble their efforts and demonstrate a clear commitment to eliminating deforestation risks within their operations and supply chains.

Research and Integration

Through CalPERS' integration efforts, we work to research, assess, and manage high-value sustainable investments risks and opportunities alongside traditional factors in the investment process. Integration is important because we understand that various sustainability issues can materially impact investments in our portfolio. Therefore, we develop, use, and continually refine tools and practices to help internal and external managers utilize sustainable investment considerations throughout the life cycle of their investments.

In 2016, each asset class developed a set of sustainable investment practice guidelines[37] that reflect their investment goals and our Investment Beliefs, Governance and Sustainability Principles, with reference to the United Nations-supported Principles for Responsible Investment. These guidelines are intended to evolve and adapt with industry best practices, as data and tools improve.

Integration of sustainability into investment is a complicated endeavor. For instance, on climate change to understand how the world is physically changing and may continue to change involves complex analyses. Many forecasts are influenced by assumptions of how quickly or slowly the world shifts to a low-carbon economy. Industry tools for applying science-based models to understanding investment portfolios, and individual investments, are still in early stages.

A collaborative research project illustrates the potential for innovation. Since September 2018, we have worked with the Woods Hole Research Center and Wellington Management to develop tools to enable the review of physical risk scenarios for our investments based on sound climate science, through the Physical Risks of Climate Change project (P-ROCC). Through the analysis of different emissions scenarios, we seek to understand how acute and chronic risks can have different implications for our portfolio. Potential

[33] Investor Expectations on Deforestation in Cattle Supply Chains
[34] Investor Expectations on Deforestation in Soybean Supply Chains
[35] UNPRI Sustainable Land Use
[36] Investor statement on deforestation and forest fires in the Amazon
[37] Sustainable Investment Practice Guidelines

impacts across regions, industries, and subsequently within asset classes are being reviewed to develop investment insights.

Partnerships

Partnerships are critical to our strategy as they allow us to share experience, pool resources, and magnify our influence. Notable partnerships include:

- Ceres
- Climate Action 100+
- Global Real Estate Sustainability Benchmark and also for Infrastructure
- Principles for Responsible Investment (PRI)
- UN Global Investors for Sustainable Development
- UN-Convened Net-Zero Asset Owner Alliance
- Vatican Dialogue on the Energy Transition and Care for Our Common Home

Future Actions

CalPERS will continue to focus on climate change as a priority in its strategic plan for sustainable investment. Highlights of our plans include the following:

- Continue integrating climate-related research on risks and opportunities, along with other investment factors, when making investment decisions to complete an Enterprise Strategic Plan goal of ensuring 100 percent of investment policies and practices include relevant sustainability considerations.
- Advocate for acceleration of low-carbon transition through market-aligned policy solutions through the U.S. Commodity Futures Trading Commission Climate-related Market Risk Subcommittee.
- Work toward improved climate-risk financial disclosures, including reporting in line with the TCFD through our role at the SEC's Investor Advisory Committee, the International Financial Reporting Standards Advisory Council, and Financial Accounting Standards Advisory Committee.
- Piloting an improved framework for reporting of physical risks, we will utilize the P-ROCC framework developed and launched with Wellington Asset Management in 2019 to improve corporate disclosure.[38]
- Engage the systemically important carbon emitters through Climate Action 100+ to drive business action in line with the Paris Agreement goal of limiting global warming to well-below 2°C.
- Collaborate with the United Nations through the Secretary General's Global Investors for Sustainable Development and with global peers through the UN-Convened Net-Zero Asset Owners Alliance, plus asset class specific platforms such as GRESB.
- Participate in the Vatican Dialogue on the Energy Transition and Care for Our Common Home to focus on carbon pricing to finance a just transition.

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[38] P-ROCC Framework

- Exercise proxy votes to support shareowner proposals where engagement activities are insufficient and file proposals with proxy solicitations to support voting outcomes.
- Publish our first carbon footprint of our Real Assets portfolio completed in 2019.
- Publish our first TCFD-aligned Asset Owner climate risk report in 2020.

Conclusion

Climate change is a complex and unprecedented topic for investors. The entire history of the financial markets has occurred in a time of relative climate stability. In conducting climate change analysis on our portfolio, we observed the breadth and depth of risks across the Total Fund, and opportunities in the transition to a low-carbon economy. The markets have not previously had to confront such urgent challenge and demands for adaptation that climate change brings.

Much of the climate story has yet to be written. New breakthrough technologies may expedite the transition to a low-carbon economy and/or sequester carbon emissions at a scale commensurate with the problem. Or policymakers may yet establish a clear and stable carbon-pricing regime that gets the global economy on track for a thriving low-carbon future. However, it is also possible that collectively our global society does not reign in emissions by policy, technology, or major shifts in consumer demand, and we enter a dangerous time of climate extremes, volatility, ecosystem collapse, vast migration, and resource scarcity.

With our long-term investment horizon and multiple generations relying on us for pension security, establishing a thriving low-carbon global economy in which we can invest is vitally important to our ability to protect our members' assets and earn risk adjusted returns. Climate change is a systemic risk which needs to be managed and mitigated. For an intergenerational, universal owner like us, there is nowhere to hide.

With our funding status and liability challenges, we are aware that our path in pushing for the low-carbon future will need to be different from some of our peers unburdened by our specific challenges and return targets. Even with our constraints, we continue to lead on climate change. We are proud to have co-founded Climate Action 100+, to have released a detailed and comprehensive document on our Real Estate Energy Optimization Program, to have joined the Net-Zero Asset Alliance, and to have released the P-ROCC framework so companies and investors can understand their vulnerability to physical risk if we do not transition to a low-carbon economy. We will continue our work engaging and advocating for the low-carbon transition. We will continue to seek out attractive investment opportunities in the low-carbon economy and continue working to protect our portfolio from the physical risks we are facing. In all of this work our partnership with fellow investors, policymakers, companies, and civil society will be critical. Tackling the climate crisis is urgent work, and it will take all sides pulling together if we are to meet the goals of the Paris Agreement.

Addressing Climate Change Risk

CalPERS' First Response to Senate Bill 964

December 2019

CalPERS