From:	Donna Albert
To:	Office State Actuary, WA
Subject:	Fwd: Email/comment to the Select Committee on Pension Policy
Date:	Tuesday, September 23, 2025 11:45:10 AM
Attachments:	SCPP comments re Oregon Climate Risk Report sep2025.pdf Executive_Summary_of_Divest_Oregon_2025_Climate_Risk_Review_-_May_2025-8291fde5.pdf

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Attached is my written comment to the Select Committee on Pension Policy. Although I submitted it before the recent SCPP meeting, it was probably too late to be included in their information packet.

Please consider this my written comment for the October SCPP meeting. Will this be posted with meeting materials on the SCPP meetings webpage? Thank you. - Donna Albert, PERS2 retired

Sent from my iPhone

Begin forwarded message:

> **From:** Donna Albert <donna.albert@gmail.com>
> **Date:** September 15, 2025 at 7:07:56 AM PDT
> **To:** "Office State Actuary, WA" <State.Actuary@leg.wa.gov>
> **Subject: Email/comment to the Select Committee on Pension Policy**
>
> Please see my comment to the Select Committee on Pension Policy, in the attached pdf, which includes a link to the full Divest Oregon Climate Risk Review.
>
> A pdf of the Executive Summary is attached to this email.
>
> Thank you. -- Donna Albert, PERS2 (retired)

To the Select Committee on Pension Policy:

I recommend you read the Executive Summary of the Divest Oregon 2025 Climate Risk Review. Findings regarding systemic economic risk are applicable to public pension funds in general. **Here are some excerpts:**

"Three-fourths of surveyed climate economists believe climate change will likely cause long-term harm to global economic growth…In 2015, and again in 2021, the Institute for Policy Integrity at New York University School of Law surveyed 738 economists who have published climate-related research in the field's highest-ranked academic journals. The questions sought their views on how climate change was likely to affect the global economy…The economists 'expressed striking levels of concern about climate impacts; estimated major climate-related GDP losses and a reduction in long-term economic growth; and predicted that climate impacts will exacerbate economic inequality both between countries and within most countries'…The economists surveyed…widely agreed that aggressive targets to reach net-zero emissions by mid-century were likely to be cost-benefit justified…In total, 76% of survey respondents think it is likely or very likely that climate change will negatively affect global economic growth rates. Maybe more notable is the dearth of respondents who find this prospect unlikely (3%) or extremely unlikely (2%)."
—from pages 27-28 of Divest Oregon 2025 Climate Risk Review (reference: Gauging Economic Consensus on Climate Change, NYU Institute for Policy Integrity, pages I-ii, 2021.)

"2024 Bilal & Kanzig estimate: 12% GDP reduction for 1°C warming, 50% GDP reduction by 2100–the impact of a permanent war and living in the Great Depression forever"
— from page 42 of the Divest Oregon 2025 Climate Risk Review (reference: Bilal & Kanzig, The Macroeconomic Impact of Climate Change: Global vs. Local Temperature pp. 2-3, 2024).

“Gunther Thallinger, board member of insurance giant Allianz SE, warns:

> Once we reach 3°C of warming, the situation locks in. Atmospheric energy at this level will persist for 100+ years due to carbon cycle inertia and the absence of scalable industrial carbon removal technologies. There is no known pathway to return to pre-2°C conditions.
>
> At that point, risk cannot be transferred (no insurance), risk cannot be absorbed (no public capacity), and risk cannot be adapted to (physical limits exceeded). That means no more mortgages, no new real estate development, no long-term investment, no financial stability. The financial sector as we know it ceases to function. . . .
>
> The idea that market economies can continue to function without insurance, finance, and asset protection is a fantasy. . . . There is only one path forward: prevent any further increase in atmospheric energy levels. That means keeping emissions out of the atmosphere. That means burning less carbon or capturing it at the point of combustion. These are the only two levers. Everything else isdelay or distraction.
>
> The good news: we already have the technologies to switch from fossil
> combustion to zero-emission energy. Solar, wind, battery storage, green
> hydrogen, electrification, grid modernization, demand-side efficiency —these are mature and scalable solutions.The only thing missing is speed and scale. And the understanding that this is not about saving the planet. This is about saving the conditions under which markets, finance, and civilization itself can continue to operate.”

— from pages 100-101 of the Divest Oregon 2025 Climate Risk Review (reference: Thallinger, Climate, Risk, Insurance: The Future of Capitalism, 2025).

"…all long-term intergenerational pension funds with global economic exposures, have an overriding interest in the long-term health of capital markets as a whole, because their own returns are largely tied to overall market movements."
— from page 108 of the Divest Oregon 2025 Climate Risk Review (reference: IEEFA, Universal Ownership: A Call for Practical Implementation, page 4, 2024).

"Long-term investors 'cannot stock-pick their way out of systemic risks, since a fully diversified portfolio will own the effects…' Because a diversified owner's returns 'overwhelmingly rely on the health of the market as a whole,' 'universal owners like globally invested intergenerational pension funds are "better off working to reduce systemic risks at their source as opposed to attempting to stock-pick away from them."
— from page 108 of the Divest Oregon 2025 Climate Risk Review (reference: Quigley, Universal Ownership in Practice: A Practical Investment Framework for Asset Owners, page 3, 2020.)

"This analysis provides a compelling logic for net zero becoming part of fiduciary duty, as if we do not mitigate climate change, it will be exceptionally challenging to provide financial returns."
— Lenton, The Emperor's New Climate Scenarios, page 26, 2023.

"[A]n increasing body of evidence suggests that global warming of 3C or above, consistent with the current policies trajectory, is likely to be more damaging not just to the economy but also to portfolio values, even over time horizons of current beneficiaries," than is an "orderly attempt to limit warming in line with the Paris goal of 2C or below. This seems to us to be a…straightforward position for fiduciaries to adopt."
— from page 116 of the Divest Oregon 2025 Climate Risk Review (reference: Gosling, Universal Ownership and Climate Change, page 64, 2024).

“Actuarial approaches take uncertainty into account, asking not just ‘What is likely?’ But ‘What is possible?’”
— Institute and Faculty of Actuaries, Planetary Solvency - finding our balance with nature, page 15, 2025.

“A prudent approach would be to take the highest estimate of economic loss and reduce it when evidence becomes available that it is over-stated, rather than the other way around.”
— Institute and Faculty of Actuaries, Planetary Solvency - finding our balance with nature, page 12, 2025.

“A 2024 working paper from UC-Berkeley’s Institute for Research on Labor and Employment surveyed the literature and found that fossil fuel divestment does not compromise returns or add significant transaction costs.”
— from page 133 of the Divest Oregon 2025 Climate Risk Review (reference: Brown et al, Does Divestment Fulfill Fiduciary Duty?, page 1, 2024)

“A summary of the report highlights key findings:
- Fossil fuel stocks are exposed to significant regulatory, technological, and market risks;
- Divestment actions taken by hundreds of funds worldwide have passed the prudence tests required of fiduciaries;
- Most funds adopted broad divestment strategies across the coal, oil and gas sectors; and
- All divestment options have proven to be financially sound.”

— from page 133 of the Divest Oregon 2025 Climate Risk Review (reference: Brown et al., Does Divestment Fulfill Fiduciary Duty? pp. 9-10, 2024).

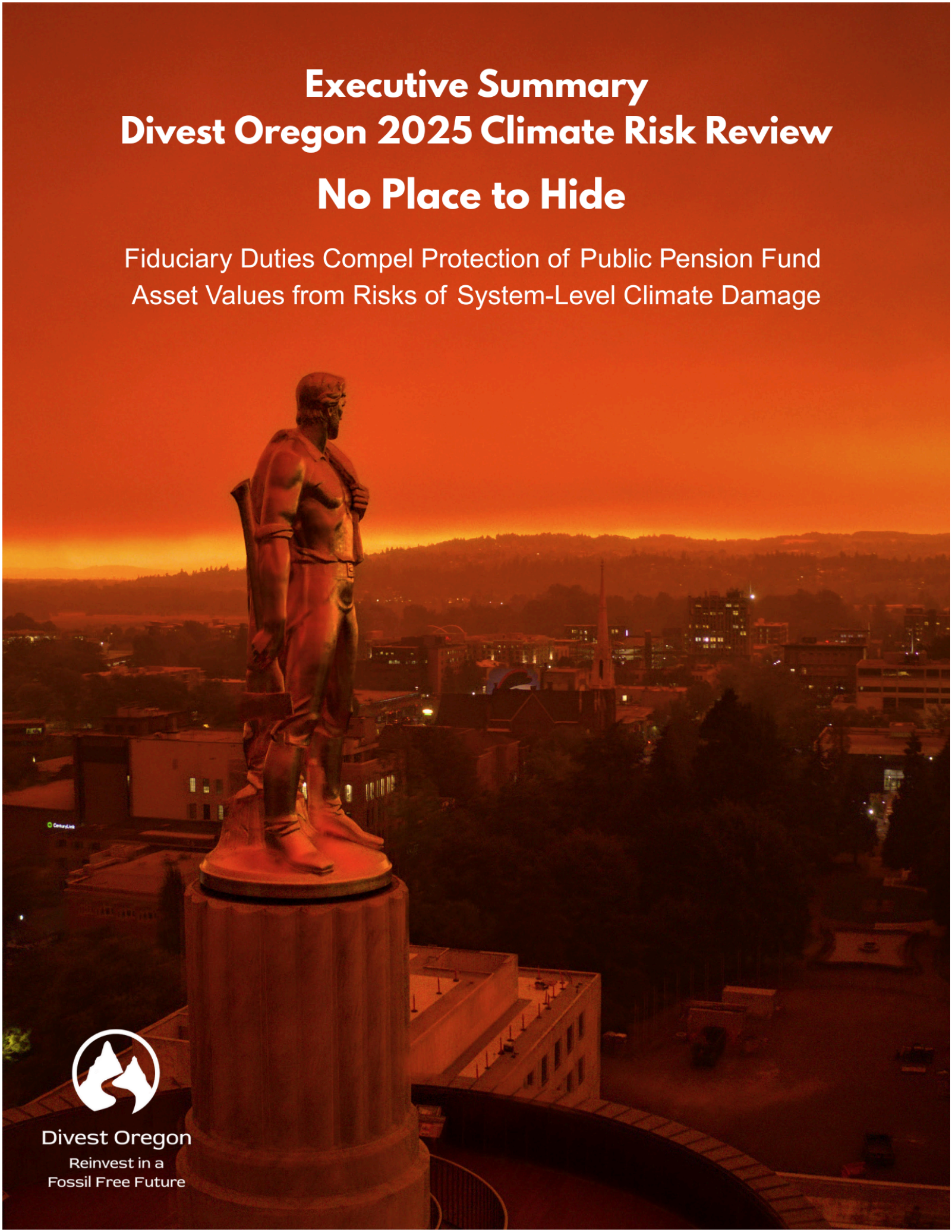
“Fossil fuels have insignificant value as portfolio diversifiers…A 2017 study compared risk-adjusted returns of portfolios with and without fossil fuels from 1927-2015. It found ‘there is no significant differential between the variance nor the Sharpe ratio of fossil free portfolios and the unconstrained market portfolio. Hence there does not seem to be a significant reduction in diversification opportunities following a divestment strategy.’
— from page 133-134 of the Divest Oregon 2025 Climate Risk Review (reference: Trinks et al., Divesting Fossil Fuels: The Implications for Investment Portfolios, pp. 13-14, 2017).

“A 2020 peer-reviewed study, examining data from 7,000 companies over 40 years, compared a minimum-risk portfolio construction with and without fossil fuels; a market-capitalization weighted portfolio with and without fossil fuels; and portfolios equally weighted by industry with and without fossil fuels. The results showed risk-return differences were marginal and statistically insignificant. ‘Therefore,’ they wrote, ‘we can conclude that divestment from fossil fuels does not limit the diversification opportunities in terms of financial return and risk.’”
- from page 134 of the Divest Oregon 2025 Climate Risk Review (reference: Plantinga & Scholtens, The financial impact of fossil fuel divestment, pp. 5-6, 2020).

Executive Summary
Divest Oregon 2025 Climate Risk Review

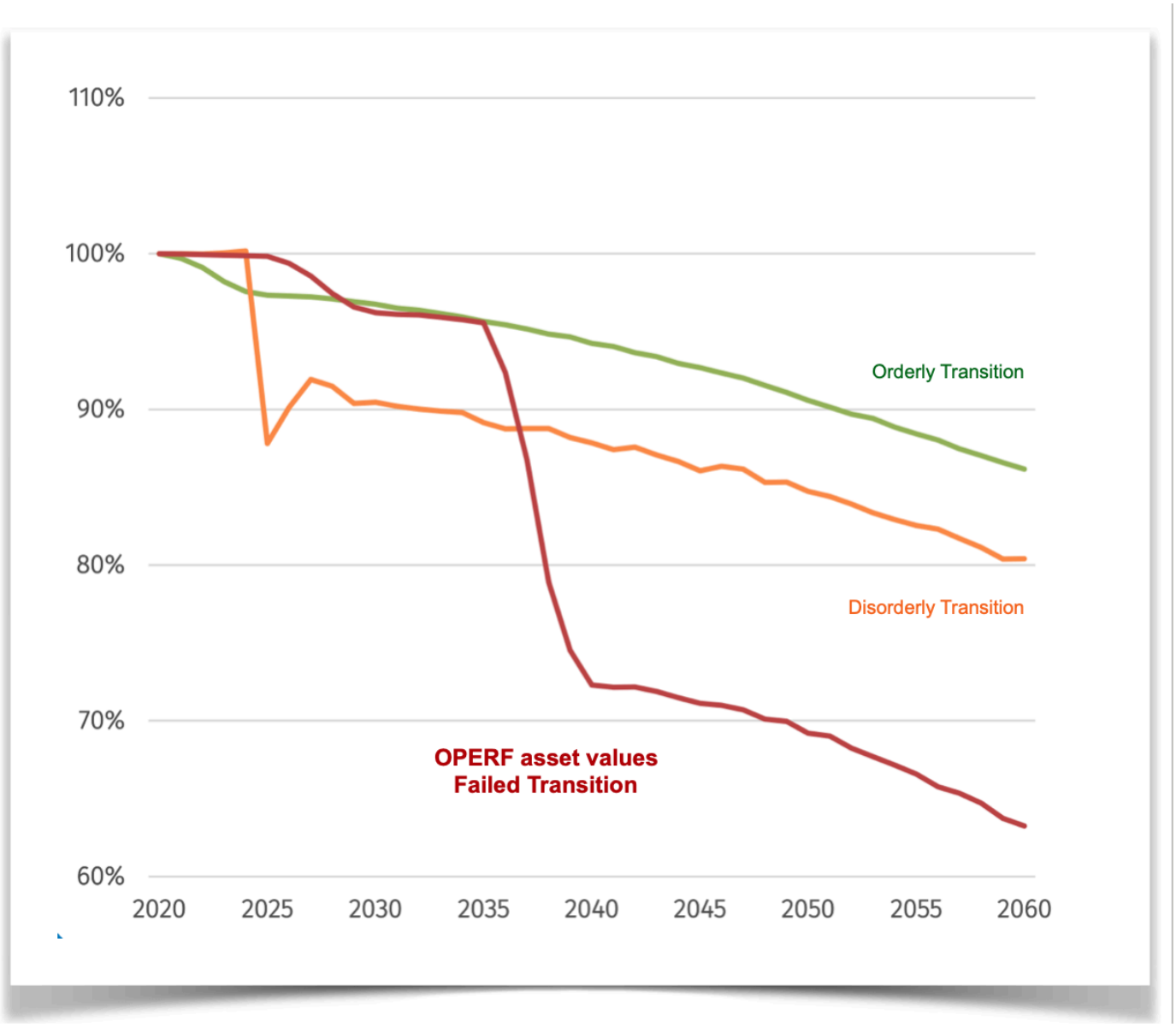
No Place to Hide

Fiduciary Duties Compel Protection of Public Pension Fund Asset Values from Risks of System-Level Climate Damage



Divest Oregon
Reinvest in a
Fossil Free Future

A Failed Clean-Energy Transition Risks Severe Damage to Pension Asset Values



Frontispiece (above): Oregon Public Employee Retirement Fund (OPERF) estimated portfolio losses due to climate change (from Ortec Finance report produced for Oregon Treasury – see details below and in the 2025 Climate Risk Review

Cover: The Oregon Pioneer atop the Oregon State Capitol in 2020 wildfire season (photograph by Michael Mann)

Executive Summary of the Divest Oregon 2025 Climate Risk Review

Divest Oregon
Reinvest in a Fossil Free Future

No Place to Hide

Fiduciary Duties Compel Protection of Public Pension Fund Asset Values from Risks of System-Level Climate Damage

May 2025

See the full report at 2025 Climate Risk Review

Editor and Contributing Author: Rick Pope

Advance Reviewers of this *2025 Climate Risk Review*: Their statements can be found in Appendix B.

CLAIR BROWN, *Professor of Economics emerita and Director of the Center for Work, Technology and Society at the University of California, Berkeley*

DAN COHN, *Energy Finance Analyst, Institute for Energy Economics and Financial Analysis (IEEFA)*

AMY GRAY, *Associate Director of Climate Finance, Stand.earth*

JILLIAN GREGG, *Founding CEO, Terrestrial Ecosystems Research Associates (TERA), Corvallis, Oregon; co-author, 2023 and 2024 State of the Climate Reports (BioScience)*

BRAD LANDER, *Comptroller, City of New York*

RICCARDO REBONATO, *Professor of Finance, EDHEC Business School; Scientific Director, EDHEC Risk Climate Institute; author, "How to Think About Climate Change"*

CHARLES SLIDDERS, *Manager & Senior Attorney, Climate Financial Strategies,* and **CONOR MACDONALD**, *Staff Attorney, Climate Financial Strategies at Center for International Environmental Law (CIEL)*

CLARA VONDRICH, *Senior Policy Counsel for Climate, Public Citizen*

Table of Contents

(hyperlinked)

Introduction

Fiduciary standards by their nature must evolve to reflect new knowledge and conditions. Reducing climate investment risk requires much more than moving into energy transition and climate adaptation. Global warming on today's path raises substantial, even existential, risks to pension values from systemic damage to the economy and to investment values. With climate change upon us and more coming, public pension fiduciaries need a comprehensive and organized examination of system-level climate risks to portfolio asset values, and how to respond to them. This allows fiduciaries to better understand the nature of their duties to maintain the viability of their pension system as equally for beneficiaries in their 20s through 50s as they have for today's retirees.

This *Executive Summary* is a highly distilled version of Divest Oregon's 2025 Climate Risk Review. Both documents show how managing long-term intergenerational pension funds to protect portfolio asset values from substantial climate risk is a well supported financial decision.

The Climate Risk Review is an in-depth analysis of system-level impacts of climate change on long-term portfolio management. It synthesizes more than 200 climate, economic and investment research findings and policies by academics, professionals, government, and the law. Key areas that the 2025 Climate Risk Review addresses are:

- Scientific expectations of climate damage under the current business-as-usual 3°C+ path
- Basics of climate, economic, and investment damage modeling
- Economists' expectations of damage to GDP and to investment values from maintaining a business-as-usual path, with a range that plausibly includes 20%-40% systemically depressed asset values – and more with tipping points
- The devastating impact on the economy, pensions, and beneficiaries of highly depressed asset values
- The ineffectiveness of diversification to protect against system-level risks from climate change – there is no place to hide
- The solid cost effectiveness for GDP and investment values of abating climate change
- Pension trustees' fiduciary duties to protect future pensions and the asset values

that support them from climate risk
- The unique legal responsibility public pensions have to shift sentiment for climate action
- Portfolio-beneficial investment and engagement strategies

Those interested in exploring more are encouraged to begin with the 2025 Climate Risk Review Table of Contents.

Climate Change is a Risk Like No Other

Global warming to 3°C+, the path we are on, has never been seen in human history.[1] Nobel Laureate and Yale University climate economist Professor Nordhaus warned in 2018:

> "[G]lobal warming is a major threat to humans and the natural world. I have used the metaphor that climate change is like a vast casino. By this, I mean that economic growth is producing unintended but dangerous changes in the climate and earth systems. These changes will lead to unforeseeable consequences. We are rolling the climatic dice, the outcome will produce surprises, and some of them are likely to be perilous. The message is that we need not roll the climatic dice—that there is time to turn around and walk back out of the casino."[2]

Gunther Thallinger, board member of insurance giant Allianz SE, warned in 2025:

> Once we reach 3°C of warming, the situation locks in. Atmospheric energy at this level will persist for 100+ years due to carbon cycle inertia and the absence of scalable industrial carbon removal technologies. There is no known pathway to return to pre-2°C conditions.
>
> At that point, risk cannot be transferred (no insurance), risk cannot be absorbed (no public capacity), and risk cannot be adapted to (physical limits exceeded). That means no more mortgages, no new real estate development, no long-term investment, no financial stability. The financial sector as we know it ceases to function. . . .
>
> The idea that market economies can continue to function without insurance, finance, and asset protection is a fantasy. . . . There is only one path forward: prevent any further increase in atmospheric energy levels. That means keeping emissions out of the atmosphere. That means burning less carbon or capturing it at the point of combustion. These are the only two levers. Everything else is delay or distraction.
>
> The good news: we already have the technologies to switch from fossil

[1] Ripple et al., The 2023 state of the climate report: Entering uncharted territory (Bioscience 2023).
[2] Nordhaus, Climate Change: The Ultimate Challenge for Economics p. 1996 (2018).

> combustion to zero-emission energy. Solar, wind, battery storage, green hydrogen, electrification, grid modernization, demand-side efficiency—these are mature and scalable solutions.
>
> The only thing missing is speed and scale. And the understanding that **this is not about saving the planet**. **This is about saving the conditions under which markets, finance, and civilization itself can continue to operate**.[3]

IPCC 2023 Consensus Report describes climate change and coming impacts

The Intergovernmental Panel on Climate Change (IPCC) provides regular assessments of the global scientific consensus on climate change, its impacts and future risks, and options for adaptation and mitigation.[4] The IPCC issued its most recent assessment report in March 2023.[5] Among its findings and its confidence level of coming impacts is as follows:

Observed Warming and its Causes

> Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850-1900 in 2011-2020. (IPCC A.1, p. 4)

Observed Changes and Impacts

> In all regions increases in extreme heat events have resulted in human mortality and morbidity (very high confidence). The occurrence of climate-related food-borne and water-borne diseases (very high confidence) and the incidence of vector-borne diseases (high confidence) have increased. . . .
>
> Climate and weather extremes are increasingly driving displacement in Africa, Asia, North America (high confidence), and Central and South America (medium confidence). (IPCC A.2.5 p. 6)
>
> Economic damages from climate change have been detected in climate-exposed sectors, such as agriculture, forestry, fishery, energy, and tourism. Individual livelihoods have been affected through, for example, destruction of homes and infrastructure, and loss of property and income, human health and food security

[3] Thallinger, Climate, Risk, Insurance: The Future of Capitalism (2025).
[4] About — IPCC.
[5] IPCC, Climate Change 2023 Summary for Policymakers.

(high confidence). (IPCC A.2.6 p. 6)

Hot extremes have intensified in cities. Urban infrastructure, including transportation, water, sanitation and energy systems have been compromised by extreme and slow-onset events, with resulting economic losses, disruptions of services and negative impacts to well-being. (IPCC A.2.7 p. 6)

Current Mitigation Progress, Gaps and Challenges

Without a strengthening of policies, global warming of 3.2 [2.2 to 3.5]°C is projected by 2100 (medium confidence) (emphasis added). (IPCC A.4.4 p. 11)

Future Climate Change

Every increment of global warming will intensify multiple and concurrent hazards (high confidence). **Deep, rapid, and sustained reductions in greenhouse gas emissions would lead to a discernible slowdown in global warming within around two decades, and also to discernible changes in atmospheric composition within a few years** (high confidence) (emphasis added). (IPCC B.1 p. 12)

Climate Change Impacts and Climate-Related Risks

Risks and projected adverse impacts and related losses and damages from climate change escalate with every increment of global warming (very high confidence).

Climatic and non-climatic risks will increasingly interact, creating compound and cascading risks that are more complex and difficult to manage (high confidence). (IPCC B.2 p. 14) (emphasis added)

Likelihood and Risks of Unavoidable, Irreversible or Abrupt Changes

The likelihood of abrupt and/or irreversible changes increases with higher global warming levels. Similarly, the probability of low-likelihood outcomes associated with potentially very large adverse impacts increases with higher global warming levels (high confidence) (emphasis added). (IPCC B.3 p. 18)

Adaptation Options and their Limits in a Warmer World

> **Adaptation options that are feasible and effective today will become constrained and less effective with increasing global warming. With increasing global warming, losses and damages will increase and additional human and natural systems will reach adaptation limits**. (high confidence). (IPCC B.4 p. 19) (emphasis added)

Urgency of Near-Term Integrated Climate Action

> Climate change is a threat to human well-being and planetary health (very high confidence). There is a rapidly closing window of opportunity to secure a liveable and sustainable future for all (very high confidence).
>
> **The choices and actions implemented in this decade will have impacts now and for thousands of years** (high confidence). (IPCC C.1 p. 24) (emphasis added)

The Benefits of Near-Term Action

> **Deep, rapid and sustained mitigation and accelerated implementation of adaptation actions in this decade would reduce projected losses and damages for humans and ecosystems (very high confidence)**, and deliver many co-benefits, especially for air quality and health (high confidence).
>
> **Delayed mitigation and adaptation action would lock in high-emissions infrastructure, raise risks of stranded assets and cost-escalation, reduce feasibility, and increase losses and damages** (high confidence).
>
> Near-term actions involve high up-front investments and potentially disruptive changes that can be lessened by a range of enabling policies (high confidence). (IPCC C.2 p. 25) (emphasis added)

The world reached a milestone 1.5° C average increase in 2024

Under the 2016 Paris Agreement, the United States and almost 200 other nations agreed to limit global warming to an average of between 1.5° C and 2.0° C above pre-industrial times (2.7° F to 3.6° F). In 2024, the Earth experienced a 1.5° C average warming increase for 12 consecutive months. While many scientists believe more than one year of such an increase is necessary to meet the Paris threshold, the 2024 result

is widely considered to be a troubling signal.[6]

Scientists catalog troubling climate trends

In October 2023, climate scientist William J. Ripple and others, from Oregon State University and elsewhere, reported that we are entering "a situation no one has ever witnessed firsthand in the history of humanity." The authors presented "a diverse set of vital signs of the planet."[7] The authors found that 20 of 35 planetary vital signs were at record extremes.They included:

- Fossil fuel consumption up 1.5% and energy related emissions up 2.1% in 2023.
- Exceptional heat waves across the world leading to record high temperatures.
- A post-Covid rebound in carbon emissions.
- Mixed results on deforestation, with emerging climate feedback loops of insect damage, dieback and wildfires.
- CO2, methane and nitrous oxide at record levels in the atmosphere.
- Ocean acidity rising.
- Glacier thickness and Greenland ice sheet mass falling to record lows.
- Ocean heat content at record highs.
- A new concern that the main Atlantic Ocean current could pass a tipping point and start to collapse this century, which would significantly alter global precipitation and temperature patterns.
- Exceptional floods, heatwaves, storms and wildfires worldwide.
- Uncertainty over the combination of multiple amplifying climate feedback loops, such as melting permafrost, that could emit more greenhouse gases and cause more warming.
- Increasing undernourishment.

The authors warned of a world "where we will face unbearable heat, frequent extreme weather events, food and fresh water shortages, rising seas, more emerging diseases, and increased social unrest and geopolitical conflict." "**As we push past the Paris Agreement's 1.5°C goal", the authors said, "the significance of immediately curbing fossil fuel use and preventing every further 0.1°C increase in future global warming cannot be overstated"** (emphasis added).[8]

Some recent events describe this escalating severity:

[6] Los Angeles Times, In a troubling milestone, Earth surpasses 1.5 degrees C of warming for 12 consecutive months (2024).
[7] Ripple et al., State of the climate report BioScience | Oxford Academic (2023).
[8] Ripple et al., State of the climate report BioScience | Oxford Academic (2023).

- In September 2024, NASA scientists concluded that changes in large-scale atmospheric circulation were causing contractions of cloud cover in mid-latitude storm zones and the tropical rainy zone.[9]
- In September 2024, Hurricane Helene caused devastating unexpected floods in western North Carolina and $53 billion in damage.[10]
- In December 2024, German climate researchers concluded that decreasing cloud cover in northern mid latitudes and tropics was a driver of record global heat in 2023, and that our future could be hotter faster than expected.[11]
- In January 2025 massive firestorms incinerated more than 16,000 homes in Los Angeles.[12] Earlier, insurance companies had not renewed thousands of homeowner policies in the fire prone neighborhoods of Altadena and Pacific Palisades,[13] leading to more than 1,500 Go Fund Me pleas in Altadena alone.[14]

What would a 3-degree world be like?

In 2021, *The Economist* reported that 3°C global warming was "quite plausible and truly disastrous."[15] Its accompanying 16-minute video allows watchers to see what three degrees of global warming looks like.

Enormous Financial Risks from Unabated Climate Change Cannot be Diversified Away

Many human and natural systems are highly vulnerable to climate-sensitive physical systems.[16] With the physical climate deteriorating, an enormous risk arising for the Oregon Public Employee Retirement Fund (OPERF) is the systematic risk of a climate-damaged chronic bear market.[17] Another is the systemic risk of market collapse from interlinked complex systems overwhelmed by increasing climate physical

[9] Tselioudis et al., Contraction of the world's storm-cloud zones the primary contributor to the 21st century increase in the Earth's sunlight absorption (2024).
[10] NPR, North Carolina government calculates Hurricane Helene damages, needs at least $53B (2024).
[11] Goessling et al., Recent global temperature surge intensified by record-low planetary albedo (2024).
[12] CNN, Tracking the damage from the Los Angeles wildfire in maps (2024).
[13] Los Angeles Times, They lost their home insurance policies. Then came the L.A. fires (2025).
[14] The Grio, 5 ways to support Black families and communities in LA after wildfires (2025).
[15] The Economist, Three degrees of global warming is quite plausible and truly disastrous (2021).
[16] Nordhaus, Climate Change: The Ultimate Challenge for Economics p. 1999 (2018).
[17] Institute and Faculty of Actuaries & Ortec Finance, Climate scenario analysis for pension schemes pp. 7, 10 (2020).

damage.[18] Because these system-level risks are economy wide, **they cannot be diversified away**. OPERF cannot stock-pick out of a chronic climate bear market. It cannot stock-pick out of a climate-triggered systemic financial collapse.[19] While some investments would do better than others, all investment values would suffer.

According to the US government's 2023 Fifth National Climate Assessment:

> **"There is growing concern that climate change could pose a systemic risk to financial stability. Negative economic impacts on even a limited number of entities could, in principle, lead to cascading effects, causing wider failure in the financial system.** For example, declines in property values due to climate change could adversely affect mortgage markets and financial institutions' balance sheets, potentially leading to financial distress, especially if climate risks are imperfectly priced or if they are concentrated in government-sponsored enterprises. . . .
>
> **Climate change has the potential to undermine conditions that support overall societal stability, which may threaten economic stability, and vice versa**. Global warming has the potential to impede the ability of institutions and governmental organizations to function smoothly and to increase political turnover, and it is directly implicated in increasing rates of violence and unrest. Some extreme events have triggered widespread mortgage delinquency, insurer default, breakdown in support for leaders, and the migration of large populations domestically and internationally—which in turn impacts downstream markets" (emphases added).[20]

As with all system-level risks, the precise times and impacts of climate change are uncertain. "This uncertainty means that in managing climate risk we must err on the side of caution if we are to maintain the relative stability and proper functioning of our market economies."[21]

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[18] US Financial Stability Oversight Council, Annual Report p. 49 (2024); Choudhury, Climate Change as Systemic Risk p. 64 (Berkeley Business Law Journal 2021).
[19] Oxford University Press, *A Dictionary of Economics* (5th ed. 2017); Institute and Faculty of Actuaries & Ortec Finance, Climate scenario analysis for pension schemes pp. 7, 10 (2020); Steele, Confronting the 'Climate Lehman Moment': The Case for Macroprudential Climate Regulation p. 135 (2020).
[20] US Global Change Research Program, Fifth National Climate Assessment 19 Economics.pdf key message 19.3, pp. 19-18 to 19-19 (2023).
[21] US Commodity Futures Trading Commission, Managing Climate Risk in the U.S. Financial System p. xx (2020).

Unabated climate change is a known financial risk

According to the US government's 2023 Fifth National Climate Assessment:

> "While some economic impacts of climate change are already being felt, the impacts of future changes are projected to be more significant and apparent across more sectors of the economy. **With every additional degree of warming, the United States is expected to see increasingly adverse consequences.** For example, warming global temperatures by 2°F is projected to cause more than twice the economic harm induced by 1°F of warming" (emphasis added).[22]
>
> **Climate risks are projected to change asset values as markets and prices adjust to reflect economic conditions that result from climate change (*very likely, high confidence*)**.
>
> New costs and challenges will emerge in insurance systems and public budgets that were not originally designed to respond to climate change (*high confidence*).
>
> **Trade and economic growth are projected to be impacted by climate change directly and through policy responses to climate change (*likely, medium confidence*)**" (emphasis added).[23]
>
> "**Climate change is projected to reduce labor productivity and economic output across many sectors—including agriculture, finance, real estate, insurance, and services—and across many regions and states. Extreme weather events can reduce output for extended periods, altering GDP growth rates. In projections, these effects can compound over time, generating large cumulative losses.** Businesses will face increasing exposure to climate-related risks at local, national, and international levels. For example, more intense heat waves will reduce local productivity, greater wildfire smoke will lower demand for outdoor services, and more frequent extreme events around the world will disrupt international trade, supply chains, and foreign demand for American products" (emphasis added).[24]

[22] US Global Change Research Program, Fifth National Climate Assessment 19 Economics.pdf key message 19.1, p.19-6 (2023).
[23] US Global Change Research Program, Fifth National Climate Assessment 19 Economics.pdf key message 19.2, p. 19-13 (2023).
[24] US Global Change Research Program, Fifth National Climate Assessment 19 Economics.pdf key message 19.3, pp. 19-17 to 19-18 (2023).

An array of economists identify substantial financial risks from climate change

As knowledge and modeling sophistication has grown, a clear trend shows increasing risk of substantial damage to the economy and to investments from unabated 3+°C global warming.

GDP is at severe risk from climate change

Investment values depend on the GDP that supports them.[25]

- In 2021 the New York University School of Law surveyed 738 economists who published climate-related research in the field's highest-ranked academic journals. More than 75% thought it likely that climate change will have a long-term negative impact on the growth rate of the global economy. Only 5% thought it unlikely.[26]

- Economics Professors Burke[27] and Kotz,[28] in the prestigious journal *Nature,* separately estimated unabated global warming will reduce GDP or income reductions by 25-40% from a climate-change-free baseline.

- The Network for Greening the Financial System (NGFS), a consortium of 120 central banks, estimates a 15%+ GDP reduction by 2050[29] and a 30% reduction by 2100 from unabated climate change.[30] **The Oregon Investment Council's (OIC's) consultant Meketa endorses NGFS scenarios and risk assessments**.[31]

- In 2021, Oregon Treasury's consultant Ortec Finance estimated unabated climate change will reduce US GDP by 16% from baseline by 2060, by 63% by 2100.[32]

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[25] MSCI, Is There a Link Between GDP Growth and Equity Returns?, p. 7 (2010); World Bank Group, Gross capital formation (% of GDP) | Data (1960-2023).
[26] NYU Institute for Policy Integrity, Gauging Economic Consensus on Climate Change p. 15 (2021).
[27] Burke et al., Large potential reduction in economic damages under UN mitigation targets pp. 1, 4 (*Nature* 2018).
[28] Kotz et al., The economic commitment of climate change 553 and Figure 1; Extended Data Table 3 (*Nature* 2024).
[29] NGFS long-term scenarios for central banks and supervisors p. 26 (2024).
[30] Damage functions, NGFS scenarios, and the economic commitment of climate change p. 4 (2024).
[31] Meketa says the NGFS damage scenarios "provide well specified data, both in terms of outputs as well as documented linkages throughout." NGFS assessments of aspects of physical and transition risk, Meketa says, "provide high-level data suitable for reviewing portfolio risk exposures in a top-down manner." Meketa Investment Group, Climate Scenario Frameworks p. 3 (2023)
[32] Ortec Finance, OPERF Climate Risk Assessment pp. 3, 65 (2021).

- A 2024 GDP study by economist Professors Bilal and Kanzig, at Harvard and Northwestern universities, found unabated climate change implies precipitous declines in output, capital and consumption that exceed 50% by 2100. They found this damage comparable to fighting a war domestically and permanently.[33] Professor Bilal, in a later interview with Harvard Magazine, said the degree of spending loss from 3°C warming would be "comparable to living in the 1929 Great Depression, *forever*."[34]

OPERF investment values are at severe risk from climate change

Investment damage estimates are increasing over time, as seen in the timeline below, as the modeling of investment impacts has become more sophisticated. Three private consultants' estimates–by Mercer, MSCI and Meketa– were simplistic and flawed, producing implausibly tame damage estimates that do not pass a financial "sniff test."

- 2016: A **London School of Economics** study estimated a 1.8%-17% investment value reduction by 2100 from unabated climate change.[35] The study used a now 15-year old climate model, and a Value at Risk approach based on past experience that cannot be assumed applicable to novel conditions and impacts created by climate change.[36]

- 2019 - 2021: Pension consultant **Mercer** estimated annualized investment value reductions from climate change of 0.12% to the year 2100.[37] Mercer's model did not study most of the physical damage that climate change would likely produce. Instead it concentrated primarily on coastal flood damage.[38] Mercer's estimates provoked rounds of criticism about trivialization of climate damage to the portfolio.[39]

- 2019: **MSCI** acquired a company to give it a presence in climate-change portfolio analytics.[40] In an internally inconsistent 2021 report for Norges Bank Investment Management (NBIM), after NBIM estimated an 18% GDP loss by 2050, MSCI estimated only a 4% portfolio loss in value by 2080. MSCI estimated that returns

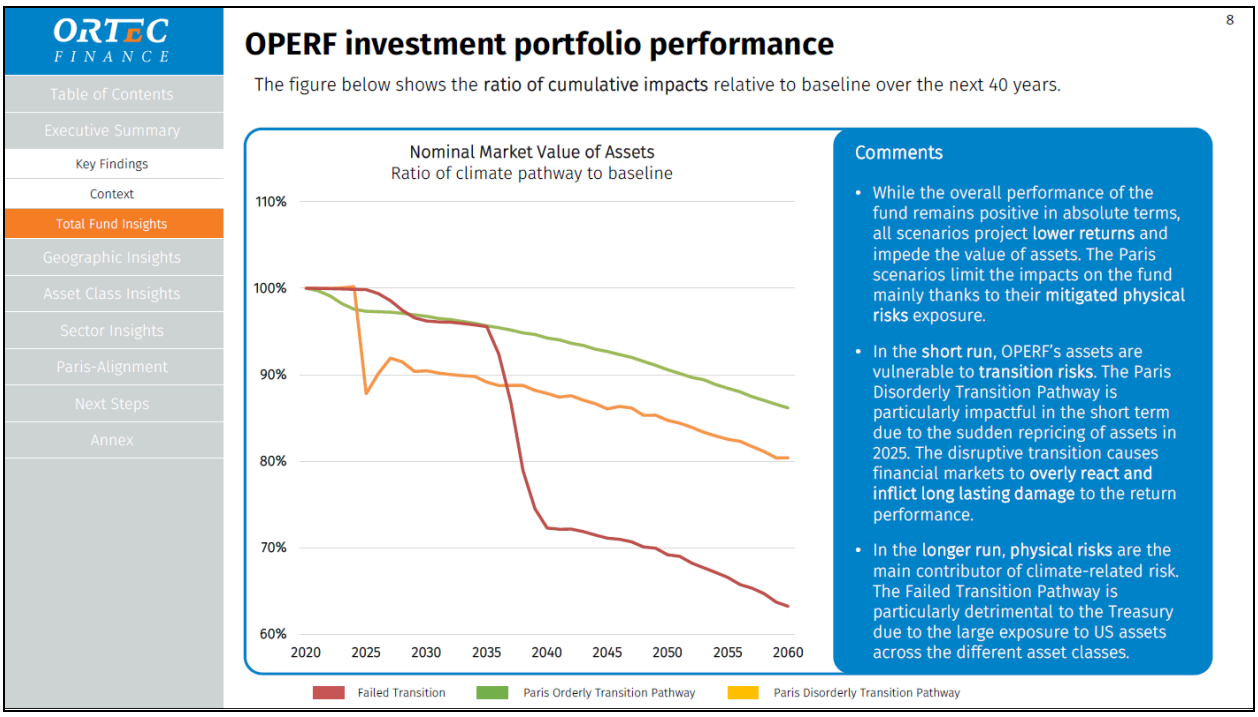
[33] Bilal & Kanzig, The Macroeconomic Impact of Climate Change: Global vs. Local Temperature pp. 4-5 (2024).
[34] Harvard Magazine, What is the Economic Impact of Climate Change on Global GDP? (2024).
[35] Dietz et al., Climate value at risk of global financial assets (2016).
[36] Rebonato, Why We Need Climate Scenario Probabilities and How to Get Them, Pensions & Investments Institutional Money Management Supplement p. 8 (March 2025).
[37] Mercer, Investing in a Time of Change pp. 21, 39 (2019). The projections were presented as annual impacts per year on returns per year for the stated period.
[38] Mercer, Investing in a Time of Change p. 79 (2019).
[39] Keen, Loading the DICE against pension funds pp. 56-57 (2023).
[40] MSCI, Scenario Analysis (2022); MSCI, MSCI completes acquisition of Carbon Delta (2019).

would not suffer from a huge GDP loss even though years earlier MSCI concluded that investments over time will not return more than GDP growth.[41] MSCI also made its small portfolio-loss estimate 60 years into an assumed path to a 5ºC global warming increase by 2100.[42] This scenario-assumed emissions pathway, RCP 8.5, is dire enough to cause one climate scientist to summarize it as "God help us."[43]

- 2021: **Ortec Finance**, using a well documented climate-specific model,[44] **conducted a climate risk assessment for OPERF** that the Oregon Treasury commissioned. Divest Oregon obtained the risk assessment after a lengthy public records process. The red line in the chart below is Ortec's estimate of the declining value of OPERF assets in a "failed transition"[45] – a business as usual scenario much like the one we are in right now. The estimated decline is from a baseline of values OPERF would have received in the absence of climate change. **OPERF's estimated asset value decline** from the effects of climate change **reaches -28% by the year 2040 and -37% by the year 2060.** That is within the working or retired lives of more than 200,000 PERS members now in their 20s, 30s, 40s and 50s.[46]

- 2022: **Ortec's partner Cambridge Econometrics** announced a collaboration between it, Ortec and Mercer.[47] **Mercer** consequently updated its model "to bring it closer to damages of the order that the rapidly evolving science might suggest."[48] Mercer's "latest Failed Transition scenario" included "a **25% reduction in GDP by 2062** compared to a scenario with no climate impacts

[41] Is There a Link Between GDP Growth and Equity Returns? | May 2010 | MSCI, p. 7.
[42] NBIM, Climate Change as a Financial RIsk to the Fund pp. 14, 15 & Table 1 (2021).
[43] "God help us if 8.5 turns out to be the right scenario," according to Rob Jackson, a Stanford Earth scientist. ""That's an inconceivable increase for global temperatures—especially when we think about them being global *average* temperatures. Temperatures will be even higher in the northern latitudes, and higher over land than over the ocean." Meyer, Are We Living Through Climate Change's Worst-Case Scenario? (2019).
[44] GIC & Ortec, The Role of Climate Change Scenarios in Investment Portfolios pp. 7-9 (2021); GIC & Ortec, Integrating Climate Scenario Analysis into Investment Management p.23 (2023).
[45] Ortec Finance, OPERF Climate Risk Assessment p. 8 (2021).
[46] PERS actuary Milliman reports 18,212 PERS members now in their 20s, 49,930 members now in their 30s, 71,983 members now in their 40s, and 72,977 PERS members now in their 50s. While the bulk of members retire in their 60s, more than 6,000 active and inactive members continue working into their 70s. Milliman, Oregon PERS Actuarial Valuation pp. 87, 93, 94 (2024); Social Security Administration, Actuarial Life Table (2021).
[47] Cambridge Econometrics, Mercer collaborates with Ortec Finance and Cambridge Econometrics on climate crisis portfolio modelling (2022).
[48] Keen, Loading the DICE against pension funds p. 48 (2023).



Oregon Treasury consultant Ortec Finance's estimate of unabated climate change's precipitous financial impacts on OPERF portfolio from 2035-2060 (red line).

(emphasis added)."[49]

- 2022 - 2024: The OIC's investment consultant **Meketa** implausibly told its clients Minnesota, Los Angeles County and Maryland pension funds that 3ºC global warming is better than or almost as good as no climate change for their funds' investment values.[50] Meketa acknowledged that "As a financial model, our results show observable monetary impacts from transition risks better than from physical climate risks."[51] Meketa's emphasis on transition costs and slighting physical damage costs is "strange," as all Integrated Assessment Models concur physical damages will be the greater of the two.[52]

- 2023: **Ortec** revised its damage model to reflect new considerations and data.[53] It also updated the effects of physical climate risks on inflation. The revisions

[49] Mercer, A tipping point for climate scenarios.
[50] Meketa, SBI Climate Change Investment Analysis Phase 3 p.38 & Figure 29 (2022); LACERA Board of Investment meeting materials p. 192 (11/8/2023); Maryland State Retirement and Pension System, Fiduciary Duties & the Maryland Pension Risk Mitigation Act p. 16 Figure 13 (2024).
[51] Meketa, SBI Climate Change Investment Analysis Phase 3 p.31 (2022).
[52] Rebonato et al., How does climate risk affect equity valuations? p. 46 (2024).
[53] GIC & Ortec, Integrating Climate Scenario Analysis into Investment Management (2023).

caused Ortec to estimate a 37% reduction from baseline in standard portfolio value over 40 years in a Failed Transition. Ortec increased this loss from the 30% reduction in its 2021 60/40 equity/bonds standard portfolio.[54]

- 2024: **Ortec** published a summary climate risk assessment for the top 30 US pension funds. The summary included publicly available data from Maryland and Minnesota – for which OPERF consultant Meketa had issued no substantial climate warnings – as well as publicly available data from OPERF.[55] The Ortec summary risk assessment found that "portfolios of the Top 30 U.S. pension funds could, on average, experience nearly **50% lower investment returns by 2040**, with further declines continuing without recovery until at least 2050."[56]

- 2024-2025: **EDHEC-Risk Climate Impact Institute** published a ground-breaking research paper that incorporated the latest features in a climate and econometric Integrated Assessment Model. The paper carefully examined an array of potential conditions of the economy, and keyed its discount rate for damages to the probable effects of climate change on investment values in each of those potential economic states. Professor Rebonato et al. estimated a **20% to 40% baseline reduction in asset values from unabated 3+°C climate change.** The EDHEC team estimated a **40% to 60% reduction should climate tipping points occur**.[57]

  The EDHEC authors made a point of using conservative assumptions. They summarized their methodological contributions as follows:

  "This work innovatively combines asset pricing techniques with an upgraded integrated climate economics model. It benefits from three distinctive methodological innovations:

  - *Full Probabilistic Treatment:* We rigorously address the uncertainty inherent in both the physical and economic dimensions of the problem.
  - *State-Dependent* [prevailing economic conditions-dependent] *Discounting*: We incorporate this crucial but often overlooked aspect of valuation, highlighting its importance.
  - *Integrated Analysis of Transition Costs and Physical Damages:* Our

[54] GIC & Ortec, The Role of Climate Change Scenarios in Investment Portfolios p. 16 (2021).
[55] Ortec Finance, Climate risk assessment - Top 30 US pension funds pp. 4, 8, 21 (2024).
[56] Ortec Finance, Climate risk assessment - Top 30 US pension funds p. 13 (2024).
[57] Rebonato et al., How does climate risk affect equity valuations? pp. 6, 32 & Table 1, 39 & Table 5 (EDHEC 2024). The research paper is now peer reviewed. Rebonato et al., The Impact of Physical Climate Risk on the Valuation of Global Equity Assets (Environmental and Resource Economics 2025).

coherent framework contrasts with traditional approaches that analyse these impacts separately and often inconsistently.

The probabilistic treatment is essential because the damages obtained with average climate outcomes are not the same as the average of damages across different climate scenarios. State-dependent discounting is critical, as we demonstrate that the highest climate damages are correlated with economic activity levels, which, in turn, influence prevailing interest rates. A joint treatment of transition costs and physical damages is necessary because these two factors are intimately and inversely related, requiring consistent estimation."[58]

The 2008-09 Global Financial Crisis and Great Recession provide a small foretaste of what can be expected from a 20-40% decline in asset values

After the 2008 financial crisis, real GDP fell 4.3 percent, home values fell 30%, and the S&P 500 index fell 57%. The US Federal Reserve characterized the recovery from the Great Recession as "slow and grudging."[59] It took 6 years, until 2013, for the value of OPERF to recover to its pre-recession level.[60] As a result OPERF's value from 2007 to 2022 had only a 2.26% compounded annual growth rate.

OPERF was actuarially overfunded in 4 of 8 years before the Great Recession, and was only 4%-8% underfunded in the other 4 years. OPERF became 20% actuarially underfunded in 2008. OPERF has not been fully funded since, and remained 23% underfunded as of December 31, 2023.[61]

Unabated climate change risks far more permanent financial damage to OPERF than occurred in the Great Recession

Under estimates of 20%-40% depressed investment values, plausible financial impacts would include:

- Increased employer contributions. Public employers would face increasingly significant risks of having to pay more for retirement contributions – on top of projections that workers will be living longer.
- Tax increases or service cuts. Taxpayers would face increasingly significant risks of service cuts or tax increases to pay for climate-caused shortfalls, even while public budgets will be stressed from responding to increasing climate-caused

[58] Rebonato et al., How does climate risk affect equity valuations? pp. 6 (EDHEC 2024).
[59] US Federal Reserve, The Great Recession | Federal Reserve History (2013).
[60] Oregon PERS, PERS by the Numbers p. 25 (2024).
[61] Oregon PERS, PERS by the Numbers p. 26 (2024).

destruction and health impacts.

- Benefit cuts or termination of PERS. Public employees would face increasingly significant risks of having to delay their retirements, and even then live with less. In a severe case, public pressures could mount to cut PERS benefits, or even pay vested beneficiaries their funded share and eliminate PERS altogether.[62]

Abating climate change produces financial benefits far outweighing costs

Economists overwhelmingly agree that acting to keep climate change well below the 3°C path we are on will cost far less, and affect asset values far less, than likely long-term economic damage from 3°+C global warming**.** They include:

- ➔ The US Financial Stability Oversight Council[63]
- ➔ The multi-national Network for Greening the Financial System[64]
- ➔ The overwhelming majority of 738 NYU climate-economist survey respondents[65]
- ➔ The Bank of England[66]
- ➔ Professor Burke and colleagues at Stanford University and the National Bureau of Economic Research[67]
- ➔ Professor Dietz at the London School of Economics[68]
- ➔ Professor Kotz and colleagues at Potsdam University[69]
- ➔ Professor Rebonato and colleagues at EDHEC[70]
- ➔ Oregon Treasury consultant Ortec Finance[71]
- ➔ Professors Bilal and Kanzig at Harvard and Northwestern universities – who found global warming was so destructive of GDP that it is cost-effective for the US to decarbonize for its own benefit, regardless of what the rest of the world does.[72]

[62] ORS 238.600(2) – System established.
[63] US Financial Stability Oversight Council, Report on Climate-Related Financial Risk p. 19 (2021).
[64] NGFS long-term scenarios for central banks and supervisors pp. 28, 31 (2024).
[65] NYU Institute for Policy Integrity, Gauging Economic Consensus on Climate Change pp. i-iii (2021).
[66] Bank of England Prudential Regulation Authority, SS3/19: Enhancing banks' and insurers' approaches to managing the financial risks from climate change p. 3 (2019).
[67] Burke et al., Large potential reduction in economic damages under UN mitigation targets p. 4 (2018).
[68] Dietz et al., Climate value at risk of global financial assets p. 4 (2016).
[69] Kotz et al., The economic commitment of climate change | Nature 553 and Figure 1; Extended Data Table 3 (2024).
[70] Rebonato et al., How does climate risk affect equity valuations? P.12, 38 (2024).
[71] Ortec Finance, OPERF Climate Risk Assessment p. 8 (2021).
[72] Bilal & Kanzig, The Macroeconomic Impact of Climate Change: Global vs. Local Temperature* p. 44 (2024).

Protecting Oregon's Public Pension Fund

Trustees protect pension funds from system-level climate risk as a financial duty – not as a social or political goal. Many investment factors that short-term thinkers criticize as non-financial are in fact financial when understood in the context of a long-term globally invested pension fund.[73] At the level of market-wide economic health that is necessary for sustained returns, stewardship principles of universal ownership demand a financial decision.[74]

Oregon Investment Council investment policies require long-term stewardship, which requires serious attention to the risks of long-term climate damage to OPERF assets

The OIC investment policy states that OPERF's "[l]ong-term horizon requires the OIC to consider the impact of its actions on future generations of members and the State."[75] As part of this, "understanding how . . . environmental factors impact investments is an important step towards building a more sustainable portfolio."[76] OIC legal advice states the obvious: "Risk and return factors may include economic effects of climate change. . . ."[77]

OIC risk-management policy anticipates the need for OPERF to address the risks of system-level climate-change damage to its portfolio. OIC policy recognizes that "Risk evolves over time, dictated by changing macroeconomic environments,"[78] and that risk needs evaluation "in terms of both short-term asset price volatility and long-term plan viability."[79] The policy specifies the most critical investment risk of concern as the

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[73] UK Financial Markets Law Committee, Pension Fund Trustees and Fiduciary Duties: Decision-making in the context of Sustainability and the subject of Climate Change p. 5 (2024).

[74] Gosling, Universal Owners and Climate Change p. 10 (2024). Merriam-Webster defines "stewardship as "the careful and responsible management of something entrusted to one's care." Stewardship Definition & Meaning - Merriam-Webster.

[75] Investment Policy Statement for OPERF adopted April 17, 2024 p. 8 (III.3A).

[76] OIC INV 1201 Statement of Investment and Management Beliefs 8, p. 4 approved 09/2020; Investment Policy Statement Template for OPERF, OIC Public Book 12/6/23 pp. 149, 159, adopted 5-0, OIC Minutes 12/6/2023 p. 3. OIC later "Consolidated the section while capturing the main message" as part of "refinements" to the statement of beliefs. OIC Public Book 4/17/2024 pp. 59, 60.

[77] Oregon DOJ, Oregon Investment Council p. 10 (2023); 29 CFR §2550a-1(b)(4).

[78] Investment Policy Statement for OPERF adopted April 17, 2024 p. 10 (IV).

[79] Investment Policy Statement for OPERF adopted April 17, 2024 p. 10.

precise risk unabated climate change poses – **"**a permanent impairment to the Fund's value that could reduce its ability to meet and sustain benefit payments**."**[80]

Despite stating such beliefs, while the Treasurer has proposed a rudimentary Net Zero plan for OPERF,[81] the OIC has so far done nothing to address system-level climate risks to OPERF asset values. Perhaps that is because, as one major pension consultant has experienced:

> "Many trustees have a short-term perspective on the relevance of climate risks to their members' benefits and act accordingly. Specifically, they make decisions based on the risks they consider to be relevant" only during "the period over which they are directly responsible for holding the assets. In some cases this is less than three years and in many cases is less than ten years."[82]
>
> "We find that educating trustees on the severity of the likely impacts of a 3°C rise can trigger a paradigm shift that fundamentally alters the way they think about climate change. This shift is needed across the industry in order to achieve the necessary scale of action."[83]

The legislature has directed OPERF fiduciaries to prioritize stability and viability of the PERS system

OPERF trustees' fiduciary duties are well defined by Oregon statutes and by general state trust law consistent with those statutes.[84] As one would expect for a pension fund intended to be long term and intergenerational, these statutes make it abundantly clear that duties to protect the value of OPERF assets, and with it the security of future retirements, are more important than simply maximizing returns.

The often-emphasized duty to make OPERF's investments "as productive as possible," while obviously of great importance, is not the first fiduciary priority. Instead, the legislature expressly prioritized protecting the value of OPERF assets, and protecting the security of pensions for today's young public employees on a footing equal with today's retirees. It did so by declaring the duty to make investments as productive as

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[80] Investment Policy Statement for OPERF adopted April 17, 2024 p. 10 (IV).
[81] https://www.divestoregon.org/NetZeroPlanComparison
[82] LPC, Fiduciary duty and climate change, Written evidence to UK Parliament Work and Pensions Committee p.2 (2024). LCP is a UK firm of 1,000 financial, actuarial, and business consultants and staff specializing in pension advice to trustees and employers. *Id*. p. 1.
[83] LPC, Fiduciary duty and climate change, Written evidence to UK Parliament Work and Pensions Committee p.4 (2024).
[84] White v. PERB, 351 Or 426, 433-34, 268 P3d 600, 606-07 (2011).

possible “subject to” a statutory standard of judgment and care.[85] That standard contains key duties that are legislatively declared preconditions to maximizing OPERF returns.[86]

Fiduciaries must prudently manage OPERF for climate risk under prevailing climate circumstances, and in light of OPERF’s purposes to fund a stable, viable public pension system.

The first provision in the statutory standard of judgment and care requires the OIC and Oregon Treasury to manage OPERF “as a prudent investor would do, under circumstances then prevailing and in light of the purposes, terms . . . and laws governing” OPERF.[87]

On the climate front, the circumstances now prevailing are much more than an eventual, perhaps belated, transition to clean energy. Climate-change abatement has so far been ineffective to halt investment-damaging global warming. A clean-energy transition may come too slowly to avoid severe climate and investment damage. Without significant interventions a plausible, even likely, result of the business-as-usual path we are on is substantial system-level damage to overall market values and thus to the overall investment values of OPERF.

The purpose of OPERF is to fund the PERS system,[88] which must be administered “to create and maintain long-term stability and viability in the system.”[89] The Oregon Supreme Court holds this requirement consists of “combined duties to safeguard PERF for past, present and future PERS members and the system as a whole. . . .”[90]

As required by trust law, necessary safeguarding requires the protection of OPERF’s assets.[91] There is no safeguarding exemption for damage caused to OPERF assets by unabated climate change. It would be the height of imprudence for trustees who are charged with protecting beneficiaries’ future to throw up their hands and simply hope for the climate-change best.

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[85] ORS 293.721 – General objective of investments.
[86] ORS 293.726 – Standard of judgment and care in investments
[87] ORS 293.726(1) – Standard of judgment and care in investments.
[88] ORS 238.660 – Fund generally
[89] ORS 238.601 – Legislative findings and intent; White v. PERB, 351 Or 426, 440-41, 268 P3d 600, 610 (2011).
[90] White v. PERB, 351 Or 426, 438, 268 P3d 600, 609 (2011).
[91] White v. PERB, 351 Or 426, 437, 268 P3d 600, 608 (2011), 46 Opinion Or. Atty. Gen. 506, 509 (1993) (citing general trust law); ORS 130.690 – UTC 809. Control and protection of trust property .

Prudent management for long-term climate risk requires a prudently designed and competently implemented strategy to protect the stability and viability of OPERF

The statutory standard of judgment and care requires the OIC and Oregon Treasury to address climate impacts by exercising "reasonable care, skill and caution" in prudently managing OPERF's portfolio "as a part of an overall investment strategy, which should incorporate risk and return objectives reasonably suitable" to OPERF.[92]

A careful overall investment strategy must recognize that OPERF is a long-term, intergenerational, globally invested pension fund whose "returns are largely tied to overall market movements."[93] The overall strategy must recognize that unabated greenhouse gas emissions are causing increasing climate damage, in turn causing increasing system-level risks to the economy and damage to the overall investment market risk (at times termed "beta") on which the vast bulk of OPERF returns depends.

A cautious strategy must recognize that while some investments will do better than others, long-term investors "cannot stock-pick their way out of systemic risks, since a fully diversified portfolio will own the effects" that produced the risks. Because a diversified owner's returns "overwhelmingly rely on the health of the market as a whole," "universal" owners like globally invested intergenerational pension funds are "better off working to reduce systemic risks at their source as opposed to attempting to stock-pick away from them."[94]

A skillful strategy must recognize that investors have power to impact market systems both positively and negatively.[95] It recognizes that climate change's "self-inflicted destruction of shareholder wealth strongly brings the case for universal owners to immediately implement more explicit beta-protectionist policies as part of fiduciary duty."[96]

Much as they might like to, the OIC and Oregon Treasury cannot abdicate responsibility for impacts of climate change on OPERF to ineffectual climate policy makers. At the end of the day it is OPERF trustees, not politically stalemated policy makers, who have the legal duty to preserve and protect PERS pension fund values as best they can. Within that context, their fiduciary duty is to find all the pressure points they can to reduce greenhouse gas emissions, and to apply all the pressure they can to do so.

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[92] ORS 293.726(1)-(2) – Standard of judgment and care in investments.
[93] IEEFA, Universal Ownership: A Call for Practical Implementation p. 4 (2024).
[94] Quigley, Universal Ownership in Practice: A Practical Investment Framework for Asset Owners p. 3 (2020).
[95] Principles for Responsible Investment, A Legal Framework for Impact-Summary Report p. 9 (2024).
[96] IEEFA, Universal Ownership: A Call for Practical Implementation p. 4 (2024).

Fossil fuels have insignificant value as portfolio diversifiers while being a drag on OPERF returns

The statutory standard of judgment and care requires OIC and Oregon Treasury to "Diversify the investments" of OPERF "unless, under the circumstances, it is not prudent to do so."[97]

Fossil fuel investments have no material value as diversifiers, are poor long-term performers with a declining future, and are affirmatively harming the rest of OPERF's investments.

While fossil fuels were 29% of the market in 1980, they have shrunk to 3% today.[98] The field of potential non-fossil-fuel diversifiers has thus grown from 71% of the market in 1980 to 97% of the market today.

A 2017 study compared risk-adjusted returns of portfolios with and without fossil fuels from 1927-2015. It found "there is no significant differential between the variance nor the Sharpe ratio of fossil free portfolios and the unconstrained market portfolio. Hence there does not seem to be a significant reduction in diversification opportunities following a divestment strategy."[99]

A 2020 peer-reviewed study examined data from 7,000 companies over 40 years. It compared a minimum-risk portfolio construction with and without fossil fuels; a market-capitalization weighted portfolio with and without fossil fuels; and portfolios equally weighted by industry with and without fossil fuels. The results showed risk-return differences were marginal and statistically insignificant. "Therefore," they wrote, "we can conclude that divestment from fossil fuels does not limit the diversification opportunities in terms of financial return and risk."[100]

Fossil fuel investments are also a poor value for long-term investors. While the S&P 500 returned 25% in 2025, fossil fuels returned less than 6%. Over 10 years, fossil fuels had the lowest returns and highest volatility of all sectors in the S&P 500.[101] They also bring with them the risk of stranded assets should climate-change abatement begin to occur

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[97] ORS 293.726(3) – Standard of judgment and care in investments.
[98] Another Bad Year — and Decade — for Fossil Fuel Stocks p.3 (IEEFA 2025).
[99] Trinks et al., Divesting Fossil Fuels: The Implications for Investment Portfolios pp. 13-14 (2017). "Variance" is a standard statistical measurement of risk over time that returns will vary from their mean. The Sharpe ratio ratio divides a portfolio's returns above a benchmark by a measure of its volatility. Both are commonly used to assess risk-adjusted performance.
[100] Plantinga & Scholtens, The financial impact of fossil fuel divestment pp. 5-6 (2020).
[101] Another Bad Year — and Decade — for Fossil Fuel Stocks pp. 1-2 (IEEFA 2025).

at the level required to protect OPERF's other assets.[102]

The Oregon Treasurer asked Ortec Finance to estimate the impact of divestment on OPERF's portfolio. Ortec in 2022 found that replacing OPERF's fossil fuel investments with Paris-aligned investments would bring a $1 billion benefit to OPERF if there were an orderly or disorderly energy transition – or conversely, a $1 billion loss from retaining them. Ortec further found that in a failed energy transition, whether fossil fuels were divested or retained would have a negligible impact on OPERF returns.[103]

Fossil fuels are not just poorly performing. The studies cited in this executive summary show that the emissions they cause today and in the future inflict harm on all the rest of OPERF's investments. Continued investment in fossil fuels inflicts harm on OPERF for another reason – it destroys OPERF's credibility in fulfilling a key fiduciary duty to work with others to pressure for market-protective reduction of greenhouse gas emissions.

Fiduciaries in a time of unabated climate change must protect the pensions of young PERS members equally with those of current retirees

The statutory standard of judgment and care requires the OIC and Oregon Treasury to "Conform to the fundamental fiduciary duties of loyalty and impartiality."[104] "The 'duty of impartiality' emanates from the duty of loyalty and requires a fiduciary to deal fairly and objectively with all beneficiaries."[105]

The duties of loyalty and impartiality require OPERF trustees to protect future retirements of younger PERS members equally with those of today. Trustees cannot favor investing for those in or near retirement in a manner that jeopardizes future OPERF values needed to sustain future retirements for today's young teachers, firefighters, police officers, and public servants of all kinds.

The Oregon Supreme Court holds that "a trustee's obligations are not met simply by maximizing current allocations to beneficiaries – and certainly not to one group of beneficiaries." Instead, "A trustee has a duty of impartiality and, 'with respect to the various beneficiaries of the trust,' must administer the trust 'impartially and with due

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[102] Carbon Tracker publicized the risk of stranded assets after calculating that most known fossil fuel reserves cannot be burned if global warming is to be limited to 2°C-3°C. Wasted capital and Stranded Assets - Carbon Tracker Initiative (2013).
[103] Divest Oregon, Treasury's own study shows fossil-fuel divestment would make > $1 billion for OPERF pp. 7-14 (2022); Ortec Finance, Climate Risk Scenario Modelling p. 6 (2022).
[104] ORS 293.726(4)(a) – Standard of judgment and care in investments); White v. PERB, 351 Or 426, 437-38, 268 P3d 600, 608 (2011).
[105] OIC Training Meeting Public Book p. 34 (12/1/2021).

regard for the diverse beneficial interests created by the terms of the trust.'"[106]

New investments in fossil fuel infrastructure may pay benefits to Baby Boomers over the next 10-12 years. They do so by inequitably allocating known substantial pension risk to Generation X, Millennials, Generation Z and upcoming even younger PERS beneficiaries. Such investments lock in decades of climate-damaging greenhouse gas emissions, jeopardizing the future value of OPERF's entire portfolio and the retirements of PERS members in their 20s through 50s.

The duty of impartiality does not allow OPERF to fund current retirements with investments that have a known substantial risk of damaging the retirements of PERS younger members. The duty of OPERF fiduciaries is to invest elsewhere and act along with other fiduciaries to make it harder, not easier, to raise capital for portfolio-damaging fossil-fuel investments.

As a group, US public pension funds have fiduciary duties to protect nearly $11 trillion in assets[107] from climate-change value depression on behalf of nearly 36 million state and local beneficiaries.[108] Their latent financial and political power is substantial, as is the latent potential power of a membership fully informed about the risks of unabated climate change to their investments and retirements.

In the current ineffectual political climate, OPERF and other public pension funds have a unique, valuable and financially required role to play.

The Path Forward

Strategies are available to trustees fulfilling their fiduciary duty to address known substantial system-level climate risks to OPERF investment values. The strategies are described in detail in the *2025 Climate Risk Review*, and the citations here are to the comprehensive review. They fall into two main categories – portfolio-beneficial climate investment policies, and portfolio-beneficial climate engagement policies.

Portfolio-beneficial Investment strategies include:

- Establishing a Net Zero plan;[109]

[106] White v. PERB, 351 Or 426, 438, 268 P3d 600, 608-09 (2011).
[107] Statista, AUM of public pension funds worldwide by country (2024).
[108] US Census, Annual Survey of Public Pensions: State & Local Tables column B line 21 (2023).
[109] 2025 Climate Risk Review p. 125.

- Accelerating clean-energy investments;[110]
- Recognizing the limited role of carbon capture;[111]
- Divesting portfolio-dragging fossil fuels and reinvesting those proceeds and more into market-competitive climate solutions;[112]
- Avoiding and discouraging debt and equity investments in entities causing outsized portfolio-damaging climate change;[113]
- Calling for and investing in fossil phaseout passive bond indices;[114]
- Creating an internal strategic climate-impact investment program;[115]
- Subjecting major OPERF investments to a systemically adjusted fair value analysis, which would provide empirically based guidance for engagement priorities and consequences.[116]

Portfolio-beneficial engagement strategies include:

- Understanding the types and purposes of engagement;[117]
- Acting alongside other public pension funds and Net Zero investors.[118] This is essential.
- Urging OPERF investment managers to provide fossil phaseout products and requiring them to invest according to OIC climate policy;[119]
- Advocating and pressuring for reduction in greenhouse gas emissions from companies in which OPERF invests;[120]
- Field building to influence the adoption of climate-sustainable policies and practices;[121]
- Advocating with and pressuring banks and insurance companies, who provide most lending to portfolio-damaging fossil fuel projects, to restrict and end funding for fossil fuel companies;[122]
- Advocating and pressuring government policymakers for effective climate policies to speed energy transitions before too much OPERF wealth is destroyed;[123]
- Educating beneficiaries about the impact of climate risk on their retirements and what is needed to protect investments made on their behalf.[124]

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[110] 2025 Climate Risk Review pp. 125-28.
[111] 2025 Climate Risk Review pp. 128-30.
[112] 2025 Climate Risk Review pp. 130-36.
[113] 2025 Climate Risk Review pp. 136-44.
[114] 2025 Climate Risk Review pp. 144-46.
[115] 2025 Climate Risk Review pp. 146-47.
[116] 2025 Climate Risk Review pp. 147-54.
[117] 2025 Climate Risk Review pp. 155-56.
[118] 2025 Climate Risk Review pp. 156-59.
[119] 2025 Climate Risk Review pp. 159-60.
[120] 2025 Climate Risk Review pp. 160-62.
[121] 2025 Climate Risk Review pp. 163-65.
[122] 2025 Climate Risk Review pp. 165-70.
[123] 2025 Climate Risk Review pp. 170-76.
[124] 2025 Climate Risk Review pp. 176-77.

Conclusion

OPERF Requires Trustees to Lead and Protect in a Challenging Time

The fossil fuel industry has brought prosperity and undreamed of new standards of living to much of the world. But its ever-increasing creation of risks to the climate that sustains our economy and investment values requires that we reduce greenhouse gas emissions – the more, the sooner, and the smoother the better. OPERF and other public pension funds are uniquely positioned to encourage a meaningful energy transition sooner than later.

Sound analysis shows that pension funds take these actions solely in the financial interests of their beneficiaries. OPERF needs committed leadership that focuses on protecting OPERF from significant risks of substantially depressed asset valuations from climate change. OPERF leadership and staff need to understand that business-as-usual will fail to protect 140,000-200,000 PERS beneficiaries in their 20s, 30s and 40s – and may well fail to protect many more in their 50s, 60s and older. They are all counting on PERS to provide them a long and fully funded retirement. Laying low until political storms blow over is not an option for them – or for OPERF's fiduciaries.

The times are challenging. The system-level climate risks to OPERF's investment values are real, substantial and there is no place to hide from them. Investment business-as-usual is an imprudent bet against inexorable forces of nature. As required by their fiduciary duties of care, prudence, asset protection and impartiality, OPERF's trustees cannot fail to invest and engage to reduce those risks at their source – greenhouse gas emissions fueling accelerating climate change

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Appendix B: Advance Review Statements

> "The Divest Oregon Coalition has released an excellent, rigorous and comprehensive report that reviews the material climate financial risk for public pension funds. These funds by law must financially protect their beneficiaries today and into the future. The *2025 Climate Risk Review* synthesizes over 200 climate, economic and investment research findings by academics, professionals and government to show that managing long-term intergenerational pension funds to protect portfolio asset values from sources of substantial climate risk is a financial decision that is part of fiduciary duty.
>
> The public, as well as pension fund trustees, will benefit from reading and referring to this report in order to understand and implement the paradigm shift required to protect public pension fund asset values from system-level climate risk."

CLAIR BROWN, *Professor of Economics emerita and Director of the Center for Work, Technology and Society at the University of California, Berkeley*

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> "Fiduciaries have an obligation to address risks to their portfolio — and as Divest Oregon has made clear, climate change more than meets that standard. With fires, floods, and storms intensifying across the globe, asset allocators have never faced a more urgent need to understand and navigate the complex interplay between climate events, market transitions, and portfolio management. This report provides a valuable summary of the latest literature on the financial implications of a warming world, and policymakers would do well to consider its conclusions carefully."

DAN COHN, *Energy Finance Analyst, Institute for Energy Economics and Financial Analysis (IEEFA)*

> “The findings of this Climate Risk Review make clear that fossil fuel investment as usual is not only environmentally catastrophic—it’s financially imprudent, even reckless. Oregon’s public pension fund faces a foreseeable and preventable collapse in value if we fail to act. We cannot diversify our way out of systemic climate risk. It’s time for fiduciaries to lead with clarity and courage, protecting retirement savings by investing in a climate-safe future.”

AMY GRAY, *Associate Director of Climate Finance, Stand.earth*

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> "As a climate scientist, I know that urgent action is needed to combat the Climate Emergency. In 2024, the Earth already passed the goal of staying below +1.5°C above pre industrial temperatures. Earth is nearing climate tipping points beyond which reduction in fossil fuels will no longer make a difference. Potentially trillions of people will someday exist - their fate depends on the decisions we make today. We have an enormous opportunity to make such a huge difference for life on planet Earth. That is what moves me.
>
> In this document, Divest Oregon has laid out the physical science alongside the economic consequences of not divesting from fossil fuels and not abating climate change. Divest Oregon shows what should financially move public pension funds: 'Economists overwhelmingly agree that acting now to keep climate change well below the 3°C path we are on will cost far less, and affect asset values far less, than the long-term damage from 3°C global warming.’"

JILLIAN GREGG, *Founding CEO, Terrestrial Ecosystems Research Associates (TERA), Corvallis, Oregon; co-author, 2023 and 2024 State of the Climate Reports (BioScience)*

"*No Place to Hide: A Climate Risk Review* by Divest Oregon is a powerful review of the system-level risks that climate change poses to the global economy, and therefore to the investment returns of long-term intergenerational pension funds. This report makes clear that pension fund fiduciaries need to act in the near term to promote a just clean energy transition if we are going to reduce economic damage from climate change. This release is a timely and valuable resource which provides practical recommendations and a comprehensive and actionable framework as asset owners, fellow fiduciaries of pension funds and other universal, long-term investors are seeking to align their portfolios with long-term sustainability goals while navigating an ever-evolving regulatory landscape."

BRAD LANDER, *Comptroller, City of New York*

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"The major point is strong, valid and well presented—abating climate change produces economic and investment benefits far outweighing costs. The stewards of pension fund assets should exercise all the pressure they can to avoid the severest climate outcomes."

RICCARDO REBONATO, *Professor of Finance, EDHEC Business School; Scientific Director, EDHEC Risk Climate Institute; author, "How to Think About Climate Change"*

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"As the fossil-fueled climate crisis escalates, this timely report reminds public pension fund managers that their duties to both current and future retirees — beneficiaries young and old alike — require them to insulate retirement funds from systemic climate risk. Protecting intergenerational equity within the fund and preserving long-term value means not investing in the fossil fuels which are driving climate change, or in other assets that only put the plan, and those counting on it now and in the future, at greater climate risk."

CHARLES SLIDDERS, *Manager & Senior Attorney, Climate Financial Strategies,* and **CONOR MACDONALD**, *Staff Attorney, Climate Financial Strategies at Center for International Environmental Law (CIEL)*

> “Divest Oregon has done essential homework for public pension fund trustees the world over. By chronicling the systemic risks of climate change to retiree benefits, the *2025 Climate Risk Review* gives pension managers a playbook for navigating their fiduciary duties in a heating world. The insurance crises in hurricane-prone Florida and wildfire-prone California are just a taste of what’s coming from unabated climate change—rates, deductibles and coverage exclusions increasing, insurance companies leaving, state programs of last resort struggling, and homeowners going without insurance. Public pension fund trustees who keep investing to promote climate change are risking a 20%-40% devaluation of their younger and middle-aged workers' nest eggs. But it doesn’t have to be this way, and this report is a lighthouse on a new course.”

CLARA VONDRICH, *Senior Policy Counsel for Climate, Public Citizen*