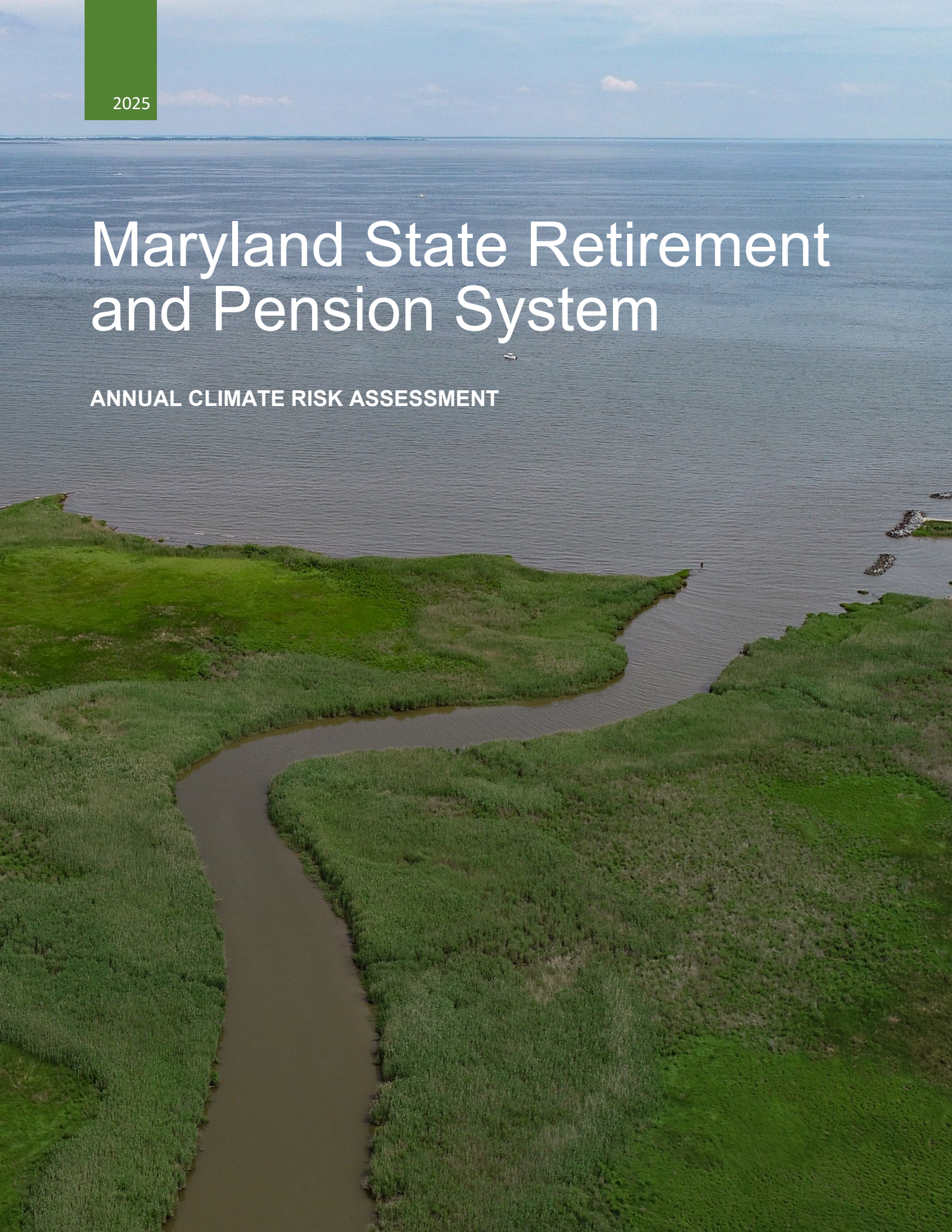


2025

Maryland State Retirement and Pension System

ANNUAL CLIMATE RISK ASSESSMENT



Contents

Introduction 2

Climate Risk Assessment..... 3

 A review of the total investment portfolio to determine the level of climate risk across industry sectors and assets classes that prioritize high-impact sectors responsible for greenhouse gas emissions 3

 Identifying investment opportunities in emerging technologies in renewable energy and transitioning, reducing, and eliminating carbon-emitting technology 5

 Process for regular reassessment of the potential systemic risks of the impact of climate change on System assets..... 6

 Utilization of the best data and practices available in current science, investment strategies, and climate risk analyses..... 12

 Environmentally-sustainable investment opportunities to support a low-carbon economy..... 13

 Develop transition assessments related to high impact sectors 13

 Evaluate whether managers are taking steps to transition to a more sustainable business model aligned with a low-carbon economy 13

 Identify, analyze, define and prioritize asset class specific metrics to evaluate transition readiness and resiliency for companies in high impact sectors 14

 Direct engagement with managers, brokers, and other entities 14

 Proxy voting..... 15

 A periodic review and assessment of the effectiveness of procedures used for direct engagement and proxy voting 16

 To the extent practicable, the establishment of an advisory panel of experts in the analysis of climate change risk to provide the most current science and data available 16

 Identify recent studies or actions by other U.S. state public pension plans, financial institutions, or risk experts, including those related to disclosure, risk assessment, investment principles, or other related issues or activities..... 16

 Recommend best practices and consider whether these best practices can be incorporated into the investment policy manual..... 18

 Examine the potential magnitude of the long-term risks and opportunities of multiple scenarios and related regulatory developments across industry sectors, asset classes, and the total portfolio of the several systems 18

Conclusion 22

On the Cover:

Franklin Point State Park
Photo courtesy of the Maryland Department of Natural Resources (DNR)
Photographer: Stephen Badgere



Mourning Doves Photo courtesy of the Maryland DNR. Photographer: Jane Staley

Introduction

In accordance with the State Personnel and Pensions Article § 21-116.1 enacted into law by chapters 24 and 25 of the acts of 2022, *State Retirement and Pension Systems – Investment Climate Risk – Fiduciary Duties*, the Board of Trustees is submitting an assessment of risk for the several Systems. This report is also responsive to the State Personnel and Pensions Article § 21-116(e), *The Maryland Pension Risk Mitigation Act*.

Highlights of this year’s report include:

- Progress towards establishment of a Climate Advisory Panel with the development and adoption of its charter by the Board of Trustees;
- Emphasis on directly held securities where the System can drive outcomes via proxy voting, engagement, and advocacy;
- Enhanced climate scenario modeling including inputs from the Network of Central Banks and Supervisors for Greening the Financial System (“NGFS”)¹;
- Analysis of an extreme sea level rise scenario on the System’s largest individual property holdings in its private real estate portfolio; and,
- Representative investments in the energy transition theme in the System’s private infrastructure portfolio.

¹ <https://www.ngfs.net/en>



Muddy Creek Falls Photo courtesy of the Maryland Office of Tourism

Climate Risk Assessment

A review of the total investment portfolio to determine the level of climate risk across industry sectors and assets classes that prioritize high-impact sectors responsible for greenhouse gas emissions

The System has exposure to high-impact sectors – defined as those segments of the economy where emissions intensity is relatively high – across its portfolio of investments. Figure 1 shows the System’s directly held public equity and corporate fixed income exposure to high-impact sectors as of June 30, 2024. The underlying securities are held in separate accounts overseen by internal and external portfolio managers – including passive and active mandates – held at the System’s custodial bank. While the System also has exposure to high-impact sectors through commingled funds that invest in public and private markets as well, the directly held securities afford the greatest potential for engagement.

Directly held investments in high-impact sectors have fallen over the last year. The financials sector is the only category that saw an increase in dollar exposure.

Sector	Exposure as of 6/30/2024 (\$ million)	Exposure as of 6/30/2023 (\$ million)	Change (\$ million)
Energy	\$1,959.5	\$1,973.6	-\$14.1
Utilities	\$1,119.2	\$1,255.9	-\$136.7
Industrials	\$2,358.6	\$2,540.9	-\$182.3
Food, Beverage, and Tobacco	\$468.1	\$588.9	-\$120.8
Real Estate	\$521.6	\$598.9	-\$77.3
Financials	\$2,561.6	\$2,263.9	+\$297.7
Total	\$8,988.6	\$9,222.1	-\$233.5

Figure 1

In addition to dollar exposure, the System measures the carbon footprint of the portfolio using emissions intensity data from Refinitiv covering Scope 1&2 emissions. As described in prior versions of this report, carbon footprint data has several shortcomings due to self-reporting, inconsistent regulatory application across jurisdictions, limited coverage, and backward-looking perspective. Nonetheless, emissions intensity measurement serves as a useful starting point for analysis, and Investment Division staff will continue to search for better ways to measure the carbon footprint of its portfolio including incorporating Scope 3 emissions.

Figure 2 shows emissions intensity has fallen in four of the six high-impact sectors over the last year. The lower carbon footprint of these holdings can result from several factors including asset allocation, manager selection, and security selection. In addition, the underlying companies may be instituting changes at the business level to improve their emissions profile.

Sector	Emissions Intensity as of 6/30/2024 (Scope 1&2 CO2 equiv. to Revenue \$ million)	Emissions Intensity as of 6/30/2023 (Scope 1&2 CO2 equiv. to Revenue \$ million)	Change (Scope 1&2 CO2 equiv. to Revenue \$ million)
Energy	701.1	691.9	+9.2
Utilities	953.9	1,029.3	-75.4
Industrials	146.2	206.1	-59.9
Food, Beverage, and Tobacco	58.0	62.2	-4.2
Real Estate	77.4	66.6	+10.8
Financials	4.7	5.6	-0.9

Figure 2

Identifying investment opportunities in emerging technologies in renewable energy and transitioning, reducing, and eliminating carbon-emitting technology

As described in last year’s report, the System is building out its allocation to private infrastructure investments. The strategic policy allocation to this asset class is 4% which translates to approximately \$2.7 billion based on total System assets of June 30, 2024. The private infrastructure portfolio is currently valued at \$566 million, or approximately 0.8% of total fund assets.

Energy transition has been a major theme in the early stages of portfolio construction. Figure 3 highlights several investments in companies that are well-positioned for a lower carbon economy. The System expects portfolio exposures to this theme to grow as additional investments are made and existing investments mature.

Company	Sector	Description	Exposure (\$ million)
Company A	Digital Infrastructure	Premium developer, owner, and operator of colocation data center in North America, offering premium digital infrastructure services with industry leading ESG credentials. The company has operated its facilities with net zero scope 2 emissions since 2016 and continues to pursue opportunities to support development of renewable energy to offset its customers’ power consumption within its facilities.	\$11.8
Company B	Energy	Leading provider of mobile modular power, temperature control, and energy services across a global customer base.	\$9.9
Company C	Diversified Utilities	Recognized as a key player in the energy transition by replacing higher carbon content fossil fuels with low-carbon fuels, being the first utility in Spain to exit coal in 2020, and by growing its existing 6.5 GW footprint of renewables assets.	\$8.4
Company D	Energy Transition	Pure-play provider of alternative, low-carbon fuels for the transportation sector with over 600 operated fueling stations across the U.S. and Canada and has taken a leading role in further efforts to decarbonize trucking and fleet transportation through the shift in fuel procurement towards renewable natural gas specifically.	\$6.9

Company	Sector	Description	Exposure (\$ million)
Company E	District Energy	Fully integrated district energy business that provides sustainable cooling and heating solutions to a diverse portfolio of over 320 customers in Canada. The company is one of the largest commercial operators of community-based thermal energy systems in North America and seeks to deploy leading-edge energy solutions at scale.	\$2.9
Company F	Water	Water sustainability platform focused on building a portfolio of water infrastructure assets across the western U.S.	\$2.7
Company G	Renewable Power	Fully integrated developer and operator of renewable power assets spanning 17 States in the U.S. with ~6 GW of operating and under construction assets, and a ~12 GW development pipeline.	\$2.6
Company H	Energy Transition	Fund investment that targets a range of investment opportunities including, but not limited to, renewable power, energy storage, electricity transmission and distribution, low carbon fuels and carbon capture.	\$2.6
Company I	Renewable Energy	Dedicated renewables platform that develops, constructs and operates wind and solar farms and invests in the deployment of associated emerging technologies including battery storage and green hydrogen.	\$2.1
Company J	Hydrogen Energy	Vertically integrated hydrogen infrastructure platform providing hydrogen production, refueling, and project consulting services across Canada and the United States.	\$1.5

Figure 3

Process for regular reassessment of the potential systemic risks of the impact of climate change on System assets

Meketa Investment Group (“Meketa”), the System’s general investment consultant, has incorporated climate scenario analysis into the System’s strategic asset allocation modeling for several years. Last year, Meketa used scenario inputs from the Network of Central Banks and Supervisors for Greening the Financial System² (“NGFS”) to complement its internally developed scenarios. Figure 4 summarizes the NGFS scenarios.

² <https://www.ngfs.net/ngfs-scenarios-portal/>. This report uses NGFS phase three scenarios. The latest scenarios, phase five, were released in November 2024. Investment Division staff will work with its partners to incorporate the latest modeling from NGFS into prior versions of this report.

Scenario Group	Scenario Name	Temp Target	Description
Orderly	Net Zero 2050	1.4°C	Immediate and smooth implementation of climate policies, gradually becoming more stringent to limit warming to 1.5°C. Subdued physical and transition risk.
	Below 2°C	1.6°C	Gradual increase of more stringent climate policies leading to 67% chance of limiting warming to below 2°C. Subdued physical and transition risk.
Disorderly	Divergent Net Zero	1.4°C	Achieves net zero around 2050 with high cost driven by fractured policies across sectors. Minimal physical risk and high transition risk.
	Delayed Transition	1.6°C	Assumes annual emissions do not decrease until 2030 and then move to rapid decline strict policies. Minimal physical risk and high transition risk.
Hot House	Nationally Determined Contribution	2.6°C	All pledged climate and emissions targets by countries are achieved. Moderately high physical and low transition risk.
	Current Policies	3.0°C+	Currently implemented climate and emissions policies are preserved. High physical risk and low transition risk.

Figure 4

Meketa’s approach to NGFS modeling is like its traditional approach but differs in one respect. Instead of generating ways the world could look, Meketa assumes certain variables will look like the NGFS forecasts and generates simulations based on these assumptions. The variables held constant include global GDP; coal, oil, and gas prices and consumptions; total energy consumption; non-carbon energy consumption; flood costs; and tropical storm costs. In analyzing the results of this modeling, it is important to note the following:

- Tipping points are not incorporated into the assumption set due to uncertainty around timing³.
- The modeling produces estimates of financial returns, not economic growth (i.e., damage functions are typically cited as % of GDP); asset returns are linked to economic growth but are not perfectly correlated.
- The time horizon of 20 years, typical of Meketa’s strategic asset allocation work, is much shorter than many climate models which go to 2100 or beyond.

The results of Meketa’s climate scenario modeling are shown in Figure 5; the gray dotted line represents the System’s actuarial target of 6.8% for context. The analysis utilizes Meketa’s capital markets assumptions as of December 31, 2023. The current policies and delayed transition scenarios indicate higher expected returns than the baseline analysis while the divergent net zero scenario has the largest potential negative impact.

³ For a summary on climate tipping points, please see: <https://www.nytimes.com/interactive/2024/08/11/climate/earth-warming-climate-tipping-points.html>

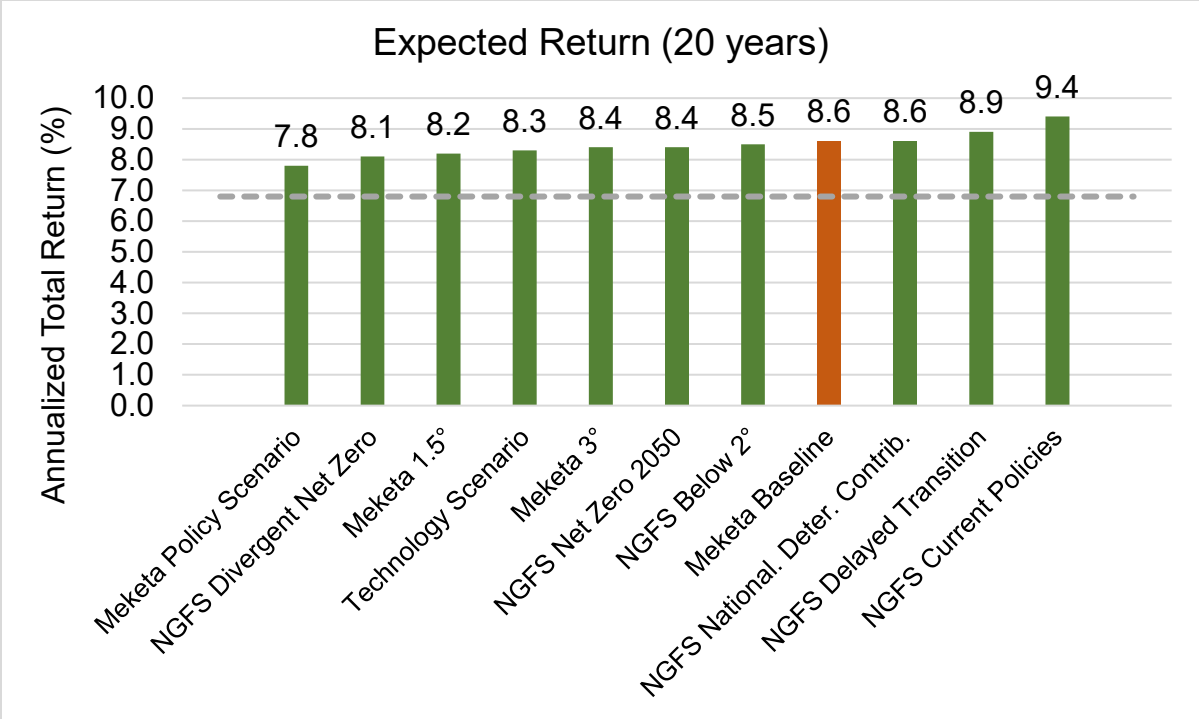


Figure 5

In addition to working with Meketa, staff is collaborating with a large global asset manager to evaluate the System’s policy mix using NGFS scenarios. Staff is not advocating for one approach over the other but rather highlighting the sensitivity inherent in the modeling and downstream interpretation of the results. There are several key distinctions in the two methodologies:

1. Proprietary capital markets assumptions. While similar in form and substance, each firm has its own methodology for developing risk, return, and correlation expectations across asset classes.
2. Varying time horizons. To complement Meketa’s 20-year perspective, staff asked the external asset manager to produce 10- and 30-year scenarios. As indicated previously, the longest of these modeled time horizons is significantly shorter than much of the scientific research based on scenarios looking to 2100 or beyond.
3. Manipulation of NGFS scenario inputs. The asset manager adjusts the NGFS scenario inputs while Meketa uses the standard NGFS inputs. The external manager partners with a leading market data and climate risk analytics vendor to enhance physical risk impacts using more realistic damage functions. In addition, the third-party firm uses its proprietary bottom-up decarbonization cost abatement curves.

Figure 6 shows the results of the third-party analysis compared to Meketa’s output. The System’s current asset allocation policy performs the best in the divergent net zero scenario over a 10- and 30-year timeframe. The current policies scenario produces the lowest expected return for the System’s asset allocation policy over the longer time horizon. Figure 7 summarizes the key economic linkages from the analysis.

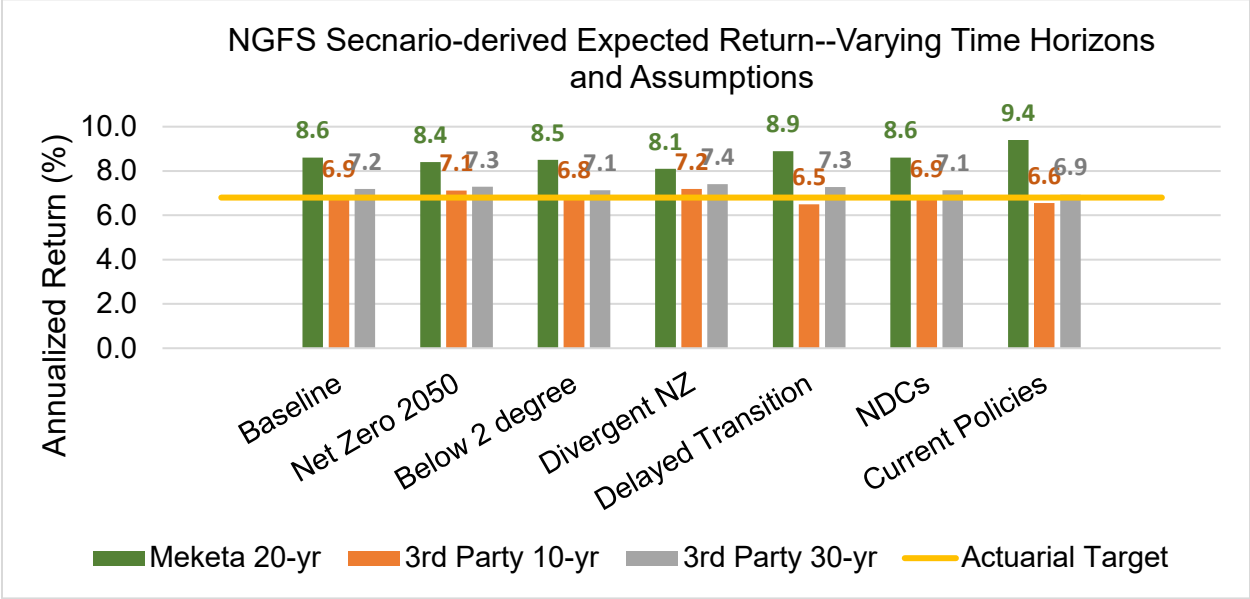


Figure 6

	Mid-term (10-year) Observations	Long-term (Years 11-30) Observations
Current Policies Scenario	Physical risk impact on GDP growth is limited while green capex and carbon tax policy is delayed. Most asset classes deliver high returns due to declining inflation and central bank policy rates coming off today’s relatively high levels.	Asset returns are lower amid lower GDP growth as chronic physical damage takes its toll. Restrictive monetary policy is required to combat higher inflation as compared to more aggressive decarbonization scenarios.
More Aggressive Decarbonization Scenarios	Green capex and carbon tax policies lead to higher energy prices and inflation, forcing central banks to respond with tighter monetary policy resulting in lower returns on stocks and bonds.	Inflation falls in part due to lower electricity prices resulting in monetary policy normalization which provides a tailwind for asset returns. Lower physical risks support equity prices amid less damage to GDP.

Figure 7

Using data from the National Oceanic and Atmospheric Administration⁴ (“NOAA”), Figure 8 displays the System’s 50 largest individual property holdings on a map of the United States under an extreme scenario where sea levels rise by eight feet. These 50 holdings represent an aggregate value of \$1.03 billion, or approximately 1.5% of the System’s total assets, and are held in core open-end private fund structures. Eleven of the 50 properties are in impacted areas according to the NOAA sea level rise data, representing approximately 0.3% of the System’s total assets.

8ft Sea Level Rise Scenario



Figure 8

As part of its regular ongoing due diligence process, Investment Division staff discusses physical risk with the System’s private real estate managers. In addition to transitional and physical risks, described in more detail below, other due diligence topics related to climate change have included insurance, migration trends, valuation considerations, and lending practices.

Transitional risk includes local regulatory changes focused on monitoring and curbing greenhouse gas emissions. Some municipalities are starting to implement building performance standards to require building owners to disclose usage or meet performance targets for greenhouse gas emissions or energy usage. To achieve these goals, owners may be forced to spend money on capital improvements. Owners who fail to disclose the required data or do not meet mandatory standards could face fines. As a result of these regulatory changes, it is expected that buildings will improve their carbon emissions over time.

⁴ <https://coast.noaa.gov/slr/>

Physical risks include looking at a building’s potential exposure to floods, heat stress, hurricanes and typhoons, sea level rise, water stress, and wildfires. Some of these risks will develop over long periods of time (e.g., droughts) while some will happen rapidly (e.g., hurricanes). In all cases, the System’s managers are using climate risk software for acquisitions and for assessing climate risk relating to their existing portfolios. This type of software has been in the market for less than ten years and typically focuses on the building’s location. If a building is flagged to have a certain risk associated with climate change, it is reviewed by the asset management team to determine if there have been any historical issues and if there has been any work completed to mitigate potential risks. If a potential risk is too great and cannot be mitigated, that asset would be considered a potential sale candidate.

Insurance on the Rise – Climate Risk and Real Estate Investment Decisions⁵

In October 2024, the Urban Land Institute (“ULI”) and Heitman, one of the System’s private real estate managers published a report regarding rising insurance costs for commercial real estate (“CRE”) due to reinsurance capital scarcity, persistent inflation, regulatory restrictions, and more frequent claims from severe weather events. Market participants must strategically manage physical climate risk and consider creative coverage solutions to ensure portfolio properties are insurable and profitable. This report is the fifth in series produced by ULI and Heitman that examines climate risk and real estate.

⁵ <https://urbanland.uli.org/uli-and-heitman-research-strategies-for-rising-property-insurance-costs>



Calvert Cliffs State Park Photo courtesy of the Maryland Office of Tourism

Utilization of the best data and practices available in current science, investment strategies, and climate risk analyses

The preceding sections of this report demonstrate how climate risk is integrated in the System’s investment practices and analytical tools. Through the System’s risk software, staff has access to ESG analytics from several vendors. Figure 9 includes a sampling of these analytics.

Sustainalytics	Refinitiv	ISS	Clarity AI
<ul style="list-style-type: none"> Controversy categories Overall product involvement Carbon – Total Emissions ESG Risk Category, Score, Percentile 	<ul style="list-style-type: none"> ESG Score Controversies Score Resource Use, Emissions, and Environmental Innovation scores Workforce, Human Rights, Community, Product Responsibility scores Management, Shareholder, CSR scores Total CO2-equivalent Emissions to Revenue 	<ul style="list-style-type: none"> ESG Rating Decile Rank ESG Rating Overall GQS Overall Score SDG Impact Rating 	<ul style="list-style-type: none"> ESG Risk Score ESG Impact UN Sustainable Development Goals SFDR EU Taxonomy

Figure 9

Staff is early in its engagement with these datasets and recognizes there are challenges in their application including security universe coverage, widespread use of proxies, and lack of consistency across vendors and throughout time. Notwithstanding these challenges, staff is committed to the continued integration of these tools into its suite of analytics and will evaluate additional products and services as the System's needs evolve and opportunities become available.

Environmentally-sustainable investment opportunities to support a low-carbon economy

As part of the October 2024 annual Board education agenda, the Managing Partner of Climate Adaptive Infrastructure presented a report to the Board relating to investment opportunities in the private infrastructure space. While infrastructure has many attractive investment characteristics, it is also vulnerable to the “triple threat risk” of climate change – namely, physical, policy, and political risk. Large scale projects designed to mitigate climate risk include low-carbon electricity generation, storage, and transmission; sustainable water and wastewater management; and low-carbon transport and related urban infrastructure. Tailwinds to green investments include the passage of the IRA and CHIPS Act in the United States and the dramatic decline in energy prices from solar and wind over the last decade.

Develop transition assessments related to high impact sectors

The System is evaluating the requirements associated with developing a transition readiness assessment framework. In practice, the framework would include company-specific analyses and engagement strategies carried out by climate and investment professionals with subject matter expertise. Within a given sector, key performance indicators would be identified to allow for cross company comparisons. After this initial assessment work, company-specific engagement plans would be formulated and carried out before ultimately deciding whether to hold or sell securities issued by the company in question. This type of analysis is labor-intensive and time-consuming. For example, a peer pension fund recently completed its first review of 26 integrated oil and gas companies in February 2024 after beginning the process two years prior⁶.

Evaluate whether managers are taking steps to transition to a more sustainable business model aligned with a low-carbon economy

Each year the Investment Division sends a compliance questionnaire to the System's external managers and consultants. This questionnaire was recently updated to include questions to help assess ESG and climate risk profiles of external managers and consultants. The recently added questions request detailed climate risk measurement, overall resiliency, and approach to physical, financial, and transition risk. These questions were designed to understand the internal policies and practices of these partners and to understand their approach relating to their investment companies.

⁶ <https://www.osc.ny.gov/files/reports/special-topics/pdf/progress-report-climate-action-plan-2024.pdf>

Identify, analyze, define and prioritize asset class specific metrics to evaluate transition readiness and resiliency for companies in high impact sectors

The preceding sections demonstrate many examples and descriptions of ways the System works with managers, data providers, index providers, and consultants to analyze climate risk. While much research lies ahead, the System's relationships and analytical tools provide a solid base. The System intends to expand upon this foundation going forward and maintains ongoing dialogue with various entities to consider potential upgrades to the available resources.

Direct engagement with managers, brokers, and other entities

The System has been formally tracking and reporting its meeting with climate-oriented investment managers since the third quarter of 2023. As shown in Figure 10, Investments Division staff meets with nearly 100 managers per quarter to discuss a strategy where climate risk is integrated into the investment process while meetings with dedicated climate strategy managers have averaged roughly 15 per quarter. These interactions include meetings with current and prospective managers. Highlights include:

- Current manager of a public equity mandate. Staff has held a series of meetings to enhance its understanding of ESG principles into the manager's investment process. The first meeting at the firm's headquarters gave staff the opportunity to meet with the representatives from the global credit and United States equity impact teams. Staff also met with the responsible investing director of research for the entire firm. In the most recent follow-up meeting, staff had a detailed discussion with the responsible investing director of research about the firm's proprietary research tool which covers securities issued by approximately 15,000 corporations and 200 sovereign entities. The platform, which combines external quantitative ESG datasets and internally created metrics and scoring, provides a common language for analysts and portfolio managers to evaluate ESG risks and opportunities.
- Prospective manager of responsible investing strategies. Staff has been in discussions with a prospective responsible investing manager since 2023. Initially, staff collaborated with the firm to measure ESG risk across the System's public equity portfolio using the firm's proprietary analytics which staff compared to its Aladdin-based analytics. Subsequent conversations revolved around the manager's research process to find companies that effectively manage financial material ESG risks, trends among state pension investment organizations, carbon offset markets, and practical challenges with commercially available ESG data sets and physical risk measurement tools.

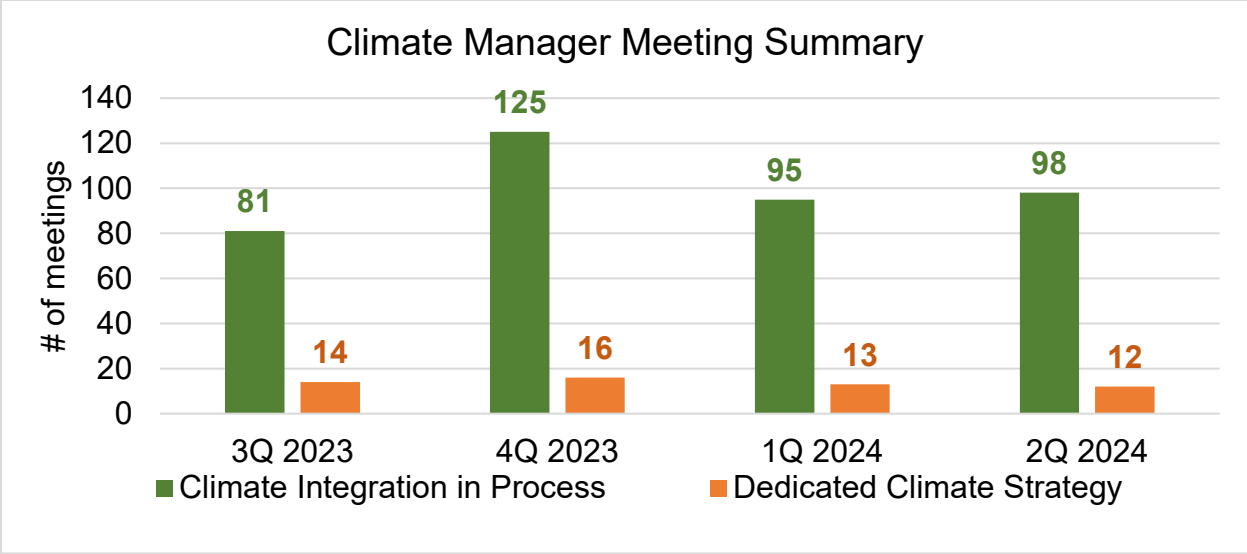


Figure 10

In July 2024, the System became a signatory to an advocacy letter from Ceres, related to U.S. methane regulations for the oil and gas industry. The letter encourages states to develop, implement, and enforce plans that meet or exceed the Environmental Protection Agency’s federal methane standard to substantially reduce methane emissions from the U.S. oil and gas sector. The letter was sent to governors and environmental agency leadership in August.

In August 2024, the System signed an advocacy letter by the Investor Agenda related to government action on climate policy. The Investor Agenda is an initiative founded by seven organizations including Ceres and Principles for Responsible Investment (“PRI”) to work with investors to advocate for public policy to accelerate the net-zero transition. The advocacy letter asks policymakers to enact legislation to support a net zero transition, implement transition strategies in high-emitting sectors, address nature, water and biodiversity challenges contributing to the climate crisis, mandate climate-related disclosures, and encourage investment in climate mitigation. The letter was distributed to national and international policymakers, heads of state, ministers of finance and environment ministers.

Proxy voting

In early 2024, Exxon Mobil filed a lawsuit against two shareholders, Arjuna Capital and Follow This, following their submission of a shareholder proposal calling on the company to further accelerate the pace of greenhouse gas emissions reductions⁷. While the shareholder proposal was withdrawn, the company’s lawsuit has moved forward. The company is asking the court to rule that the proposal is excludable under rule 14a to prevent the proponents from submitting a similar proposal in the future.

Solicitations filed by different organizations urged shareholders to vote against the election of Exxon Mobil Chairman and CEO Darren Woods and Joseph Hooley, the lead independent director and chair of the Nominating and Governance Committee. These organizations asserted that, as individuals with the primary responsibility over the use company funds to litigate rather

⁷ <https://www.bloomberg.com/news/articles/2024-05-29/exxon-suit-threatens-to-silence-shareholders-calpers-ceo-says>

than pursue standard SEC non action letter procedures, they should not be re-elected to the Board.

On May 29, 2024, the System voted against the election of Woods and Hooley.

A periodic review and assessment of the effectiveness of procedures used for direct engagement and proxy voting

As part of its responsibilities as described in the Investment Policy Manual, staff provides regular reporting to the Corporate Governance and Securities Litigation Committee (“CGSLC”) on its engagement and advocacy activity and outcomes. As is necessary and appropriate, Investment Division staff shall perform a periodic assessment and review of the engagement procedures to evaluate their effectiveness and report the results to the CGSLC for its review and consideration of any proposed changes to this policy.

To the extent practicable, the establishment of an advisory panel of experts in the analysis of climate change risk to provide the most current science and data available

The charter for the Climate Advisory Panel (“Panel”) was approved by the Board of Trustees in December 2024. The Panel will be established as a committee of the Board Trustees in accordance with SPP Article §§ 21-108(b) and 21-116.1(e)(4). The objective of the Panel is to support the Board, its committees, and the Investment Division to climate change risk in the management of System assets and to assess transition investment opportunities by providing the most current science and data available. The Panel shall consist of at least three outside experts in the analysis of climate change risk who are appointed by the Board. The Panel will collaborate with the Board, Investment Committee, Corporate Governance and Securities Litigation Committee, Investment Division, consultants, and other committees as appropriate to develop recommendations and initiatives to achieve a long-term sustainable portfolio. The Board expects to appoint members to the Panel in the first half of 2025.

Identify recent studies or actions by other U.S. state public pension plans, financial institutions, or risk experts, including those related to disclosure, risk assessment, investment principles, or other related issues or activities

Carbon Tracker Initiative – Loading the DICE Against Pension Funds⁸

This report describes the disconnect between climate science projections and the preparations of pension funds and investors. Using academic research by climate economists which has been peer-reviewed but not cross-disciplined to include climate scientists, investment consultants have advised pension funds that global warming will have a minimal impact of portfolio returns. While economists suggest climate change will reduce future global GDP by less than 10%, scientists maintain global warming poses an existential threat to humanity and tipping points may have been already triggered.

However, the report also acknowledges the challenges related to specifying models consistent with the scientific literature. As the author notes, *“Nor is the timing implied by the relatively more realistic functions—the exponential and the logistic—an accurate guide to when significant*

⁸ <https://carbontracker.org/reports/loading-the-dice-against-pensions/>

economic damage could occur. Nor are we proposing that economists should in future use an exponential or logistic damage function, rather than a quadratic. Instead, the point of this section is to illustrate that the sanguine predictions made by economists about limited economic damages from global warming are the product of two false assumptions—that the numbers they have generated are relevant to global warming, and that damages from climate change can be modelled using a quadratic.”

New York City Employees Retirement System, Teachers Retirement System, and Board of Education Retirement System⁹

In July 2024, the New York State Supreme Court dismissed a lawsuit related to the three city pension plans' decision to sell billions of dollars in fossil fuel investments. The lawsuit had been brought by a conservative group, Americans for Fair Treatment, and three public sector employees in 2023. The judge ruled the plaintiffs lacked legal standing. As members of a defined benefit pension plan entitled to a fixed payment every month, they would not be harmed by the divestment decision.

New York State Common Retirement Fund

In its fourth annual Climate Action Plan Progress Report¹⁰, the New York State Common Retirement Fund notes completion of its first review of integrated oil and gas companies. The review determined eight companies are not transition-ready. As a result, the fund will divest from related corporate bonds and actively managed public equity holdings. The fund also announced a new goal of investing \$40 billion, or approximately 15% of the fund's total market value as of June 30, 2024, in its sustainable program by 2035; the program was envisioned to be \$20 billion when the Climate Action Plan was adopted in 2019.

Oregon Public Employees Retirement Fund

In February 2024, the Oregon State Treasury (“OST”) released a plan to achieve net zero carbon emissions in the state pension fund by 2050¹¹. The plan calls for reducing the portfolio's carbon emissions intensity by 60% by 2035 to meet its 2050 goal. Specific objectives include increasing climate positive investments in private markets, increased allocation to climate-aligned public equity holdings, excluding new fossil fuel investments in private markets, and increasing the share of portfolio emissions covered by credible net zero transition plans. In April 2024, Oregon Governor Tina Kotek signed a bill that directs OST to end new investments in thermal coal and phase out existing holdings in coal stocks¹².

⁹ <https://www.bloomberg.com/news/articles/2024-07-03/conservative-lawsuit-against-nyc-pensions-over-climate-dismissed>

¹⁰ <https://www.osc.ny.gov/files/reports/special-topics/pdf/progress-report-climate-action-plan-2024.pdf>

¹¹ <https://apps.oregon.gov/oregon-newsroom/OR/OST/Posts/Post/treasury-releases-plan-to-achieve-net-zero-carbon-emissions-in-state-pension-fund-by-2050-9904>

¹² <https://www.pionline.com/pension-funds/oregon-pension-fund-dump-coal-stocks-after-governor-signs-divestment-bill>

Recommend best practices and consider whether these best practices can be incorporated into the investment policy manual

In 2023, the Chief Investment Officer and the Senior Governance Manager worked closely with the Board of Trustees to achieve several milestones: addition and approval of policy language to incorporate all requirements of *State Retirement and Pension Systems – Investment Climate Risk – Fiduciary Duties* in February 2023; approval of a framework for sustainable investing in May 2023; and adoption of further policies and procedures related to sustainable investing in the Investment Policy Manual in September 2023.

Examine the potential magnitude of the long-term risks and opportunities of multiple scenarios and related regulatory developments across industry sectors, asset classes, and the total portfolio of the several systems

Strategic Asset Allocation¹³

The Board conducts a formal strategic asset allocation study every three to five years in collaboration with its general investment consultant and investment staff. The following exhibits incorporate various statistical and scenario-based approaches to understand how the System’s strategic policy benchmark might perform in the future. This analysis is based on Meketa’s 2024 capital markets assumptions which is the latest available information at the time of publication.

Figure 11 shows the strategic policy targets across asset classes as well as summary risk and return forecasts over the next 20 years.

Asset Class	Strategic Policy
Public Equity	34.0%
Private Equity	16.0%
Rate Sensitive	20.0%
Credit	9.0%
Real Estate	10.0%
Natural Resources & Infra	5.0%
Absolute Return	6.0%
Expected Return (20-year)	8.66%
Standard Deviation	12.6%
Sharpe Ratio	0.49

Figure 11

¹³ For more information related to the System’s strategic asset allocation framework, please refer to page 15 of the Investment Policy Manual: https://sra.maryland.gov/sites/main/files/file-attachments/investment_policy_manual_-_approved_by_board_oct_15_2024.pdf?1729887208

Figure 12 presents hypothetical outcomes under various market events that have occurred in the past such as the COVID outbreak and Global Financial Crisis of 2008.

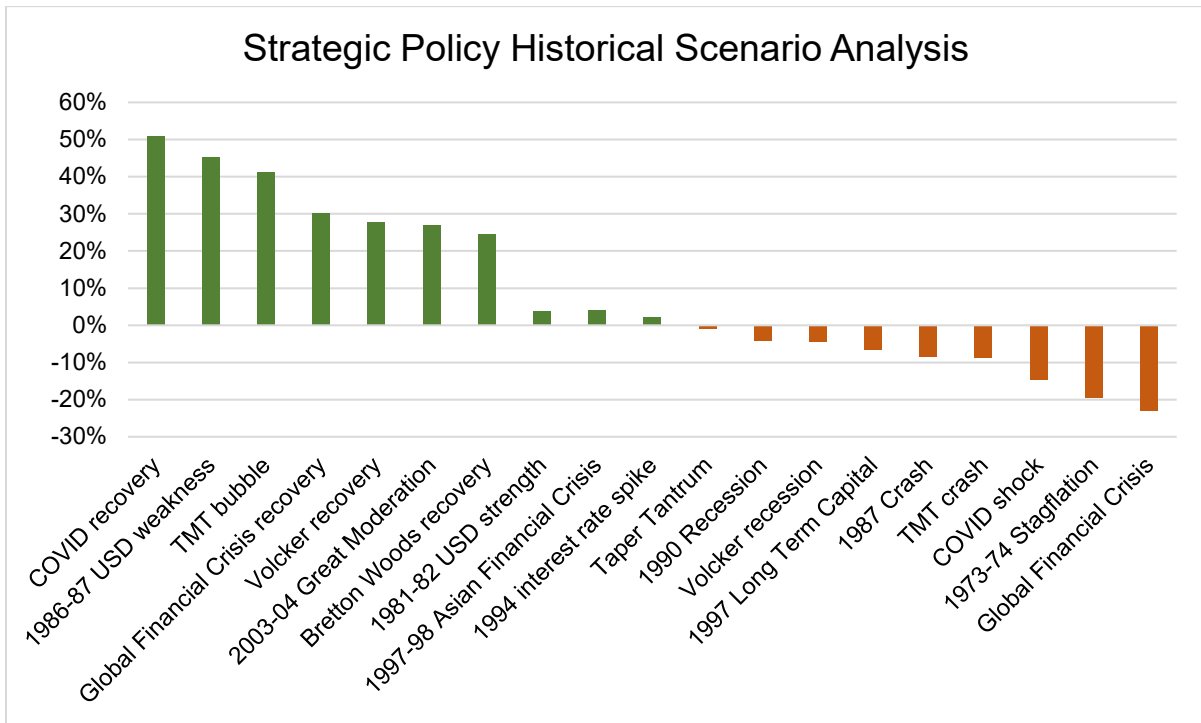


Figure 12

Figure 13 displays return outcomes under various stress tests based on correlated shocks derived from changes in factors such as interest rates, stock prices, and foreign exchange.

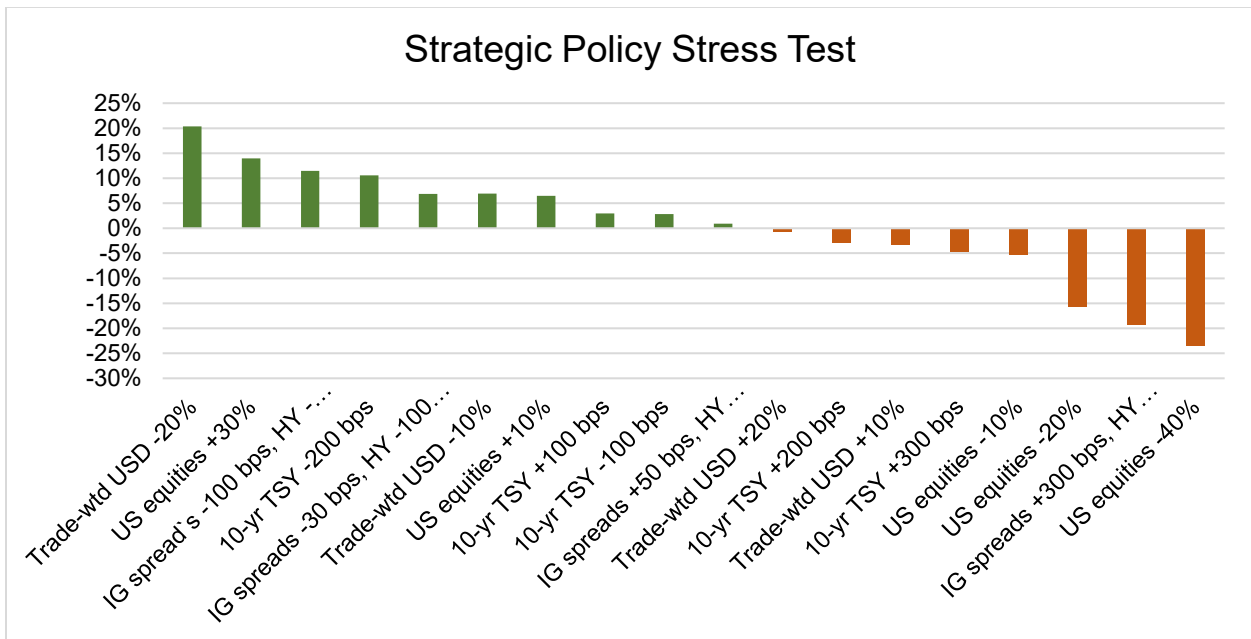


Figure 13

Figure 14 shows the probability of the System’s assets achieving its 6.8% actuarial target¹⁴ over several time horizons. As of June 30, 2024, the System’s funded ratio was 73.4%, slightly lower than the 75.3% reported in the prior year¹⁵. The System continues to remain on track to be 80% funded by 2026; 85% funded by 2030; and 100% funded by 2039.

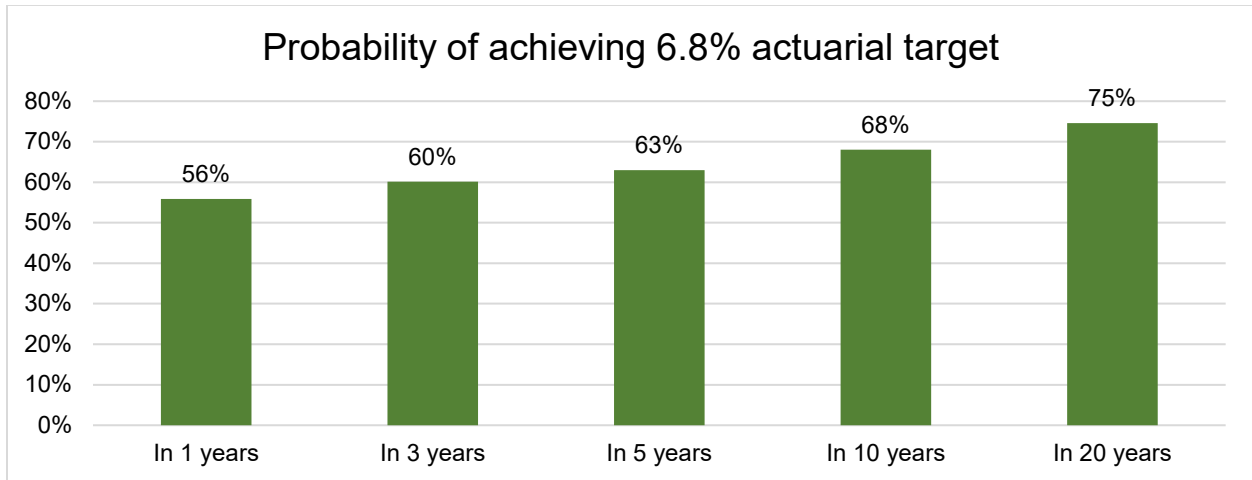


Figure 14

Once the Board establishes the System’s strategic asset allocation, the Chief Investment Officer, working with staff, specialty consultants and asset managers, is responsible for implementation. To capture the different types of risks associated with the implementation process, the Investment Division estimates tracking error, which measures the variability in the difference between realized and benchmark returns, broken down according to three distinct phases of the investment process as follows:

1. Allocation risk – the risk that results from an over- or under-weight position in a particular asset class
2. Style risk – the risk that results from assigning a benchmark to a manager that is different from a particular asset class benchmark
3. Selection risk – the risk that results from a manager building a portfolio of securities that is different from the constitution of the assigned benchmark

The System’s portfolio produces an estimated tracking error, or “total active risk,” of 1.21% relative to strategic policy benchmark as of June 30, 2024, as shown in Figure 15. This means approximately 67% of the time, the realized excess return will be within a range of +/- 1.21% around its expected mean. Most of the total active risk can be attributed to security selection decisions, a function of staff’s belief that markets exhibit varying degrees of efficiency across asset classes and geographies, providing opportunities for skilled investors to add value. Selection risk within asset classes where private markets investments play a prominent role constitutes the bulk of overall selection risk.

¹⁴ For further information, please see the Actuarial Valuation Reports at <https://sra.maryland.gov/actuarial-valuation-reports>.

¹⁵ Please refer to the Annual Financial Reports for more information at <https://sra.maryland.gov/annual-financial-reports>.

Asset Class	Allocation risk (bps)	Selection risk (bps)	Style risk (bps)	Total active risk (bps)
Public Equity	-16	9	2	-4
Private Equity	0	47	0	47
Nominal FI	6	-5	0	2
Inflation FI	2	0	0	2
US Credit	0	18	6	24
Non-US Credit	0	-1	0	-2
Real Estate	0	28	0	28
NR & Infra	3	20	1	23
Commodities	-1	0	0	-1
Absolute Return	3	8	1	12
Multi Asset	-1	0	-2	-3
Cash	0	0	0	0
Total Plan Overlays	-4	1	-2	-5
TOTAL SYSTEM PORTFOLIO	-10	124	7	121

Figure 15

To contextualize estimated tracking error, Figure 16 displays historical realized tracking error since the late 1990s using monthly returns calculated by the System’s custodian bank that serves as the performance book of record. There are two noticeable spikes, one around the bursting of the tech bubble and another associated with the great financial crisis, during the first half of the time series. Following each of the episodes of market tumult, an extended period of subdued volatility took hold. The latest plots in the time series reflect the current market environment characterized by the global pandemic and subsequent high inflation environment.

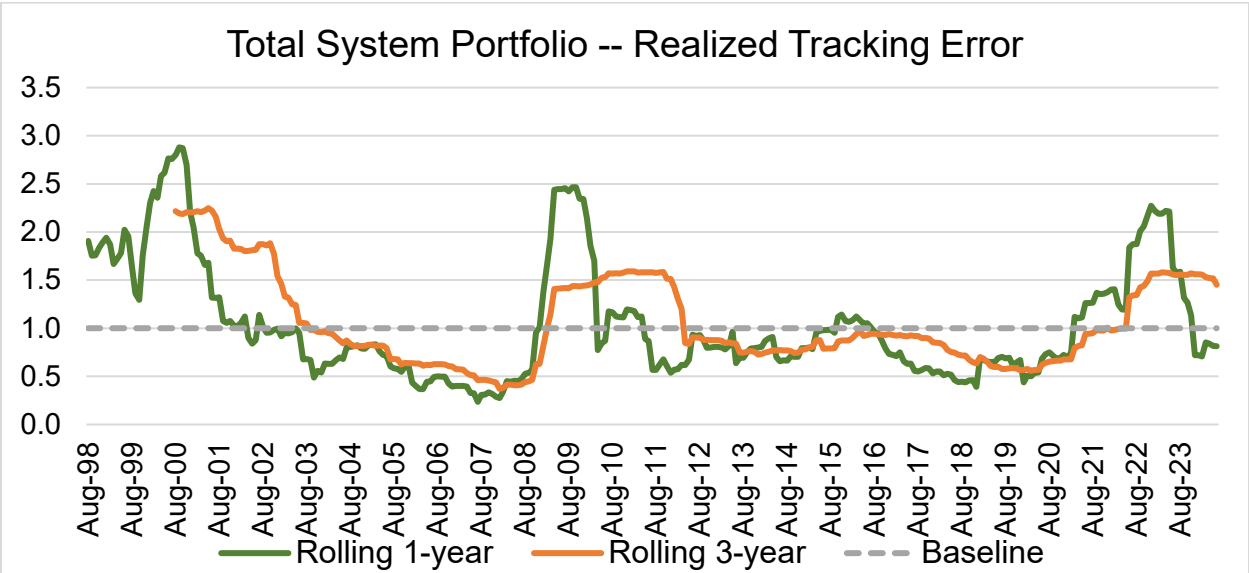


Figure 16



Squirrel Photo courtesy of the Maryland Department of Natural Resources (DNR). Photographer: Ian Todd

Conclusion

Staff has made significant progress in enhancing the System's risk management function over the last year in its utilization of new data analytics, establishing appropriate governance policies, and risk reporting. Going forward, staff will continue the education process relating to the integration of additional quantitative tools and apply these systems to the risk management and reporting function. While there is no industry standardization around climate risk management and challenges persist relating to the use of assumptions and accuracy of models, staff is confident that the System's Annual Climate Risk Assessment will continue to expand and provide more meaningful and insightful analysis.