

Maryland State Retirement and Pension System



MARYLAND
STATE RETIREMENT
and PENSION SYSTEM

Maryland Pension Risk Mitigation Act

Risk Assessment

January 2023

Introduction

In accordance with the State Personnel and Pensions Article § 21-116(e) (MSAR #11752), The Maryland Pension Risk Mitigation Act, the Board of Trustees is submitting an assessment of risk for the several Systems. This report also addresses 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 overarching risk to the System is a failure to meet pension obligations in full and on time. There are many potential causes for such a failure. This report will focus on risks associated with the investment program.

The Board of Trustees is charged with the responsibility of managing the assets of the Maryland State Retirement and Pension System. Investment policies are designed to support the fulfillment of the Board's mission to optimize risk-adjusted returns to ensure that sufficient assets are available to pay benefits to members and beneficiaries when due.

In pursuing this mission, the most powerful tool at the Board's disposal is its long-term strategic asset allocation policy. The strategic asset allocation policy establishes a mix of investment types (stocks, bonds, real estate, etc.) that collectively are modeled to produce the required return with the least risk over the horizon of the pension liabilities. The Board works with its independent investment consultant and staff to establish this long-term policy. Beyond this top-down approach, the Investment Division also contributes to the System's risk management process in its implementation of the strategic asset allocation.

A mix of techniques are utilized at both levels of the investment process. The Board of Trustees and the Investment Division regularly engage with other market participants, including public pension plan peers, financial institutions, and academia, to ensure the System's investment policies and procedures represent leading practices.

Collectively, the Board's strategic allocation and the implementation of that allocation by staff could lead to heightened risk of a funding shortfall if:

1. The collection of assets in the strategic asset allocation fail to achieve the expected returns
2. The collection of assets in the strategic asset allocation achieves the average return over long periods of time, but experience extreme negative returns in the near term, reducing the value of System assets
3. The implementation of the strategic asset allocation by Investment Division staff markedly underperforms the benchmark returns
4. The implementation of the strategic asset allocation does not maintain sufficient liquidity to make benefit payments

The System continues to make progress on its risk management practices including how it addresses climate risk. In addition to dedicating additional personnel and technological resources to risk management, the Board's strategic asset allocation work continues to evolve. From an opportunity standpoint, the System's portfolio is invested in companies that could benefit from the transition to a

lower carbon economy. Consistent with the proxy voting policies and procedures detailed in the Investment Policy Manual, the System also addresses climate risk through its engagement and advocacy efforts. Recent highlights include:

1. *Human Capital.* The Investment Division added an Associate to the risk team in the summer of 2022. In addition, the newly-created Senior Governance Officer position was filled during the year.¹ As an active member of the Investment Division, the Senior Governance Officer supports the overall investment program by acting as Secretary to the Board of Trustees' Governance Committee and chairing the Environment, Social, and Governance Committee and the Diversity, Equity, and Inclusion Committee, among other responsibilities.
2. *Systems Infrastructure.* Staff migrated to BlackRock's Aladdin Risk system and completed the software implementation project in the beginning of 2022. Among other benefits, Aladdin offers a suite of headline ESG analytics, including carbon emissions data, from several third-party vendors. Last year's report introduced these analytics on a single United States public equity portfolio, while this year's report evaluates the carbon footprint of the overall public equity portfolio which spans global markets and constitutes approximately one-third of the total System portfolio. The Investments Division is actively evaluating additional ESG and climate measurement tools, including company-level transition readiness scores, to complement the headline analytics currently accessible via Aladdin Risk. Staff believes this effort is consistent with the following State Personnel and Pensions Article § 21-116.1:
 - (b)(4) – Requiring utilization of best data and practices available in current science, investment strategies, and climate risk analysis
 - (d)(2) – Requiring development of a transition assessment relating to investments in high-impact sectors.
3. *Strategic Asset Allocation.* Meketa Investment Group ("Meketa") led the strategic asset allocation review in the summer of 2021. Climate analysis was a key input of the process for the first time. The Board adopted a policy mix that shared characteristics with the "climate sensitive" option and held up well in climate scenario analysis. Staff will work with Meketa to revisit similar policy options in future strategic reviews, typically conducted every three to five years. In addition, Staff integrates ESG factors throughout the investment process and will continue to enhance these efforts through policy integration in addition to active ownership and engagement, as described in the System's Environmental, Social and Governance ("ESG") Risk Committee Reports². Staff believes these established practices align with the State Personnel and Pensions Article § 21-116.1(b)(3) which requires a process for regular reassessment of the potential systemic risks of the impact of climate change on the assets of the several systems.
4. *Active Management and Sustainable Investments.* As part of its investment strategy, the System utilizes active management in public and private markets. Based on Staff's discussion with the Systems investment managers, during initial due diligence as well as in ongoing monitoring, ESG

¹ <https://www.pionline.com/esg/maryland-state-retirement-appoints-dominique-cherry-navigate-esg-matters>

² <https://sra.maryland.gov/esg-risk-committee-reports>

and climate physical and transition risk considerations are largely being incorporated into decision-making and security selection.

Successful active management strategies are expected to benefit from trends, including the climate transition, that produce winners and losers. In public markets, Staff generally expects its active managers to overweight securities issued by companies better positioned to navigate the climate transition as compared to their respective benchmark indices. Large, listed companies themselves are also making strategic investments in transition opportunities, such as Microsoft's debt investment into direct air capture firm Climeworks AG³.

With respect to private markets, Staff maintains a similar expectation that the System's portfolio will include companies seeking to capitalize on the transition to a lower carbon economy. For example, Staff believes the largest future winners could be relatively small investments today in the System's venture capital portfolio. Representative portfolio themes include solar, commercial fusion energy research, and plant-based foods.

The Investments Division has recently begun to systematically track investments, and is actively evaluating opportunities in the transition in response to the following sections of State Personnel and Pensions Article § 21-116.1:

- (b)(2) – requiring an assessment to identify investment opportunities in (i) emerging technologies in renewable energy and (ii) transitioning, reducing, and eliminating carbon-emitting technology
- (d)(1) – requiring the Chief Investment Officer to identify environmentally sustainable investment opportunities to support a low-carbon economy

For example, in the period beginning July 1, 2022, through January 1, 2022, the team conducted approximately 560 meetings with both current and prospective managers. Of those meetings, approximately 23% were tied to climate risk either directly through a dedicated strategy, or indirectly by way of successful implementation of the manager's investment process leading to potential changes in the underlying portfolio companies they own – all in an effort to minimize exposure to various risk factors.

Additionally, the recent creation of a Theme Team within in the Investments Division is part of an effort to establish a more deliberate process for identifying risks and value driving opportunities related to ESG and Climate.

5. *Engagement and Advocacy.* The ESG Risk Committee issued its third biennial report in February 2022⁴. This report describes the System's policies and procedures with respect to responsible investing, along with recent highlights pertaining to engagement and advocacy. It is being submitted in full as an attachment to this year's risk assessment. Staff believes the proxy voting and engagement activities described in the ESG Risk Committee report already align with the following State Personnel and Pensions Article § 21-116.1

³ <https://www.wsj.com/articles/climate-startup-removes-carbon-from-open-air-in-industry-first-11673492767>

⁴ <https://sra.maryland.gov/esg-risk-committee-reports>

- (e)(1) – Requiring the policies of the Board of Trustees to address and mitigate climate risk in the investment of system assets through direct engagement with managers, brokers, or other entities
- (e)(2) – Requiring the policies of the Board of Trustees to address and mitigate climate risk in the investment of system assets through Proxy Voting

As noted above The Chief Investment Officer and Staff regularly engage with other market participants, including public pension plan peers, financial institutions, data providers, and academia, to ensure the System’s investment policies and procedures represent leading practices, and to understand the latest developments in climate risk analytics. The Chief Investment Officer, Board of Trustees, and Staff has been actively engaging and will continue to work with groups (e.g., Part of an informal group of asset owners housed under the Sustainable Finance Institute, Inevitable Policy Response, Massachusetts Institute of Technology, University of Maryland, Climate Action 100, Council of Institutional Investors, et al) to evaluate the practical implications of establishing “an advisory panel of experts in the analysis of climate change risk to provide the most current science and data available,” as stipulated in the State Personnel and Pensions Article § 21-116.1(e)(4). Future submissions of this report will provide progress updates.

Assessment of the System’s Investment Risk

Strategic Asset Allocation

Periodically, the System conducts an asset allocation review that evaluates long-term expected returns for the System as well as a variety of different measures of risk. Meketa Investment Group (“Meketa”), the Board’s general consultant, led the most recent strategic asset allocation review in September 2021 which explicitly addressed climate risk. The following analyses utilize Meketa’s 2022 midyear capital markets assumptions to compare four asset allocation portfolios:

1. The System’s portfolio exposures as of 9/30/2022 (“Current Portfolio”)
2. The System’s strategic policy benchmark, adopted in September 2021, effective 7/1/2022 (“Strategic Policy”)
3. A mix of 60% S&P 500 Index, 40% Bloomberg US Aggregate Bond Index (“60/40 Portfolio”)
4. Meketa’s estimation of the public pension plan large peer universe (“Large Public Peers”)

Strategic Asset Allocation Portfolio Summary

Asset Class	Current Portfolio (%)	Strategic Policy (%)	60/40 Portfolio (%)	Large Public Peers (%)
Public Equity	27.7	34.0	60.0	45.6
Private Equity	21.9	16.0	0.0	11.1
Rate Sensitive	19.8	21.0	40.0	18.0
Credit	7.9	8.0	0.0	7.9
Real Estate	11.8	10.0	0.0	9.4
Natural Resources & Infra	5.1	5.0	0.0	2.6
Absolute Return	4.7	4.0	0.0	4.4
Cash	-1.5	0.0	0.0	0.5
Expected Return	8.59	8.34	6.70	8.19
Standard Deviation	13.6	13.0	10.9	13.5
Sharpe Ratio	0.45	0.45	0.39	0.42

Source: Meketa Investment Group

The asset allocation review analyzes numerous measures of risk including statistical and scenario-based approaches. These approaches help evaluate the risk that a period of underperformance could severely impact the existing pool of assets. These approaches include:

- **Historical Scenarios Analysis:** Assessing how the System would have performed in different historical scenarios with its current asset allocation. There are many different types of events that could result in sub-par returns for the System. In particular, extreme shocks such as the Global Financial Crisis and the Stagflation of the 1970s would have the most severe impact.

Historical Negative Scenario Analysis – Cumulative Return

Scenario	Current Portfolio (%)	Strategic Policy (%)	60/40 Portfolio (%)	Large Public Peers (%)
COVID-19 Market Shock (Feb 2020-Mar 2020)	-13.5	-13.8	-21.4	-17.8
Taper Tantrum (May - Aug 2013)	-0.9	-1.2	0.4	-0.2
Global Financial Crisis (Oct 2007 - Mar 2009)	-22.6	-22.2	-24.1	-28.9
Popping of the TMT Bubble (Apr 2000 - Sep 2002)	-8.2	-8.5	-14.8	-15.1
LTCM (Jul - Aug 1998)	-6.0	-6.8	-8.5	-8.5
Asian Financial Crisis (Aug 97 - Jan 98)	4.7	2.8	4.1	2.6
Rate spike (1994 Calendar Year)	3.1	1.7	-0.4	2.8
Early 1990s Recession (Jun - Oct 1990)	-2.8	-3.9	-7.3	-5.6
Crash of 1987 (Sep - Nov 1987)	-6.9	-8.2	-16.9	-11.8
Strong dollar (Jan 1981 - Sep 1982)	5.1	4.9	10.6	3.6
Volcker Recession (Jan - Mar 1980)	-4.0	-4.2	-5.9	-4.3
Stagflation (Jan 1973 - Sep 1974)	-17.9	-19.0	-22.4	-21.5

Source: Meketa Investment Group

- **Stress Testing:** Estimating the possible risk of various changes in market conditions (e.g., interest rates, credit risk, currency fluctuations) by varying degrees. The largest market risk factors are equity market declines and widening credit spreads.

Stress Testing: Impact of Market Movements – Expected Return under Stressed Conditions

Scenario	Current Portfolio (%)	Strategic Policy (%)	60/40 Portfolio (%)	Large Public Peers (%)
10-year Treasury Bond rates rise 100 bps	3.3	3.1	2.6	4.3
10-year Treasury Bond rates rise 200 bps	-1.6	-2.0	-2.8	-0.7
10-year Treasury Bond rates rise 300 bps	-4.9	-5.0	-3.1	-3.2
Baa Spreads widen by 50 bps, High Yield by 200 bps	1.0	1.1	0.9	0.5
Baa Spreads widen by 300 bps, High Yield by 1000 bps	-19.2	-19.1	-19.4	-22.2
Trade Weighted Dollar gains 10%	-3.1	-3.5	-0.8	-3.6
Trade Weighted Dollar gains 20%	-1.3	-1.2	2.7	-1.3
U.S. Equities decline 10%	-5.7	-5.5	-5.4	-6.1
U.S. Equities decline 25%	-16.4	-16.0	-15.6	-17.8
U.S. Equities decline 40%	-23.7	-23.8	-25.8	-27.7
Inflation slightly higher than expected	-0.5	-0.5	-0.9	-0.6
Inflation meaningfully higher than expected	-4.4	-4.7	-7.8	-6.1
Low Growth and Low Inflation	-5.7	-5.9	-6.6	-6.8
Low Growth and High Inflation	-8.8	-9.4	-10.0	-10.9
Brief, moderate inflation spike	-3.5	-3.6	-1.8	-2.9
Extended, moderate inflation spike	-5.9	-6.1	-4.5	-5.6
Brief, extreme inflation spike	-7.5	-7.6	-6.1	-7.3
Extended, extreme inflation spike	-9.8	-9.9	-8.8	-9.9

Source: Meketa Investment Group

- Value at Risk (VaR) and CVaR: Statistical measures of potential large drawdowns in the market value of investments. VaR is a measure of the risks to the System in the majority of potential outcomes, generally 67% to 99% of the time. The System’s conditional value at risk (CVaR), evaluates the range of outcomes assuming the market is already outside the reasonably expected range. This is often described as a tail risk or black swan event. The System’s one-month CVaR, as reflected in the below table, indicates the policy allocation could lose 9.7% of market value in a single month. This potential loss of 9.7% is an average of the worst 1% of cases, so it is possible for an extreme outlier event to produce a greater loss.

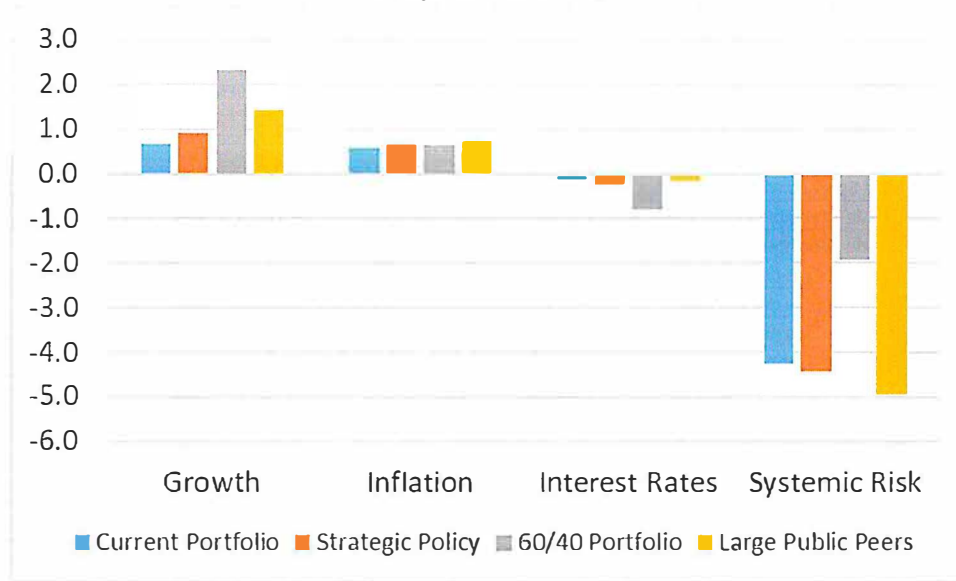
Conditional Value at Risk

Time	Current Portfolio (%)	Strategic Policy (%)	60/40 Portfolio (%)	Large Public Peers (%)
1 month	-9.7	-9.3	-7.8	-9.6
3 months	-15.8	-15.1	-12.8	-15.7
6 months	-21.0	-20.0	-17.0	-20.9

Source: Meketa Investment Group

- Economic Regime Management (ERM) Factor Sensitivity: A measure of the System’s exposure to several economic risk factors (e.g., interest rate, growth, inflation). The largest risk exposure to the System is Systemic Risk, which was the main driver of the global financial crisis during the 2008-2009 period. Because most of the volatility of returns is a result of equity price risk, the System is also sensitive to changes in growth rates. Interest rate and inflation surprises have smaller impacts on the System.

ERM: Portfolio Sensitivity Comparison
Portfolio Return (%)



Source: Meketa Investment Group

- **Tracking Error Attribution:** Estimates the expected variation in performance versus peers over time. While not a direct risk to the System, it is important for Trustees to evaluate the asset allocation relative to the peer average. Tracking error is a metric that can be used to measure the variability of the System’s returns versus the peer average. With the current asset allocation, the System can expect long-term variability of the difference between the System’s return and the peer average return (tracking error) to average 2.29% per annum due to differences in asset allocation.

The vast majority of tracking error stems from the System’s allocations to equities and rate sensitive fixed income differing from peers. Supplemental information in the report discusses the process of determining asset class expected returns and risk, as well as a comparison to peers’ expected return forecasts. While the System’s allocations differ from peers, the Current Portfolio is expected outperform this representative peer portfolio by 40 bps annually at a similar level of volatility for better a risk-adjusted expected outcome.

*Sources of Tracking Error
Current System Portfolio versus Strategic Policy, 60/40, and Peers*

Asset Group	Strategic Policy (bps)	60/40 Portfolio (bps)	Large Public Peers (bps)
Rate Sensitive	1	29	48
Global Credit	3	25	1
Growth/Equity	80	433	136
Global Real Assets	21	66	32
Other	1	5	13
Total	107	558	229

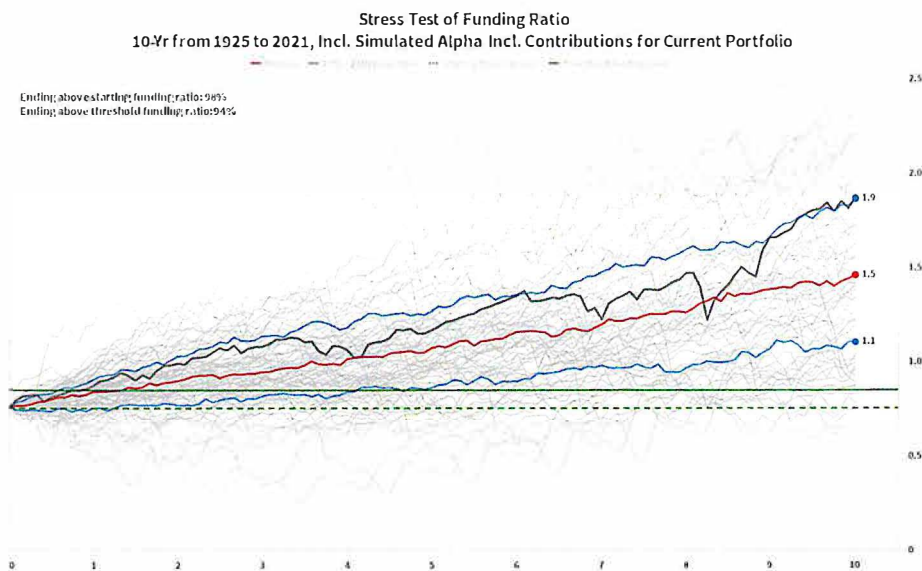
Source: Meketa Investment Group

Funded Status Stress Testing

Evaluating changes to the System's funded ratio based on both historical scenarios and stress tests, as well as varying the sequence of investment returns over time, an equity market downturn has the most serious negative impact on funded status. Additionally, because the System currently pays more in benefits than it receives in contributions from the employees and employers, the sequence of returns is important. That is, the System could earn its actuarial rate of return, on average, over the next twenty years but still find itself well short of its anticipated funded status. For example, if the System has weak returns in years 1-10 offset by stronger returns in the future, the System's ending funded status would be projected to be lower than if it produced its assumed rate of return in each year.

The Investment Division utilizes a risk budgeting tool provided by one of the System's investment managers, Bridgewater Associates, to perform an asset-liability management analysis of the strategic policy. The chart below presents a stress test of the System's funding ratio using 10-year time horizons, re-sampled every two years, since 1925. According to this analysis, using historical asset class returns and historical cash yields, there is a 94% chance of ending the prospective 10-year period at 85% funded. As reported in the fiscal year 2022 Annual Comprehensive Financial Report, the System is on track to achieve a funding ratio of 80% by 2026, 85% by 2030, and 100% by 2039.⁵ To be clear, this analysis is not a forecast and is subject to the inherent limitations associated with hypothetical performance analysis. Rather, the analysis is a helpful starting point to evaluate potential future outcomes in concert with the work performed by the System's actuary⁶.

Historical Stress Test of Funding Ratio over 10-year Periods (1925-Present)



Source: Maryland State Retirement Agency, Bridgewater Associates

⁵ https://sra.maryland.gov/sites/main/files/file-attachments/1_cafr-2022_intro_1-14-r6.pdf?1674497712

⁶ <https://sra.maryland.gov/actuarial-valuation-reports>

The below table expresses the ending funding ratios in terms of annualized total returns based on historical asset class performance and historical cash yields. This information is not intended to serve as a forecast but as a basis for understanding the relationship between total returns and funding status over a 10-year timeframe.

<u>Scenario Outcome</u>	<u>Ending Funding Ratio</u>	<u>Annualized Total Return (Historical Cash)</u>
Median	1.5	9.6%
20 th Percentile	1.1	7.4%
80 th Percentile	1.9	12.6%

Source: Maryland State Retirement Agency, Bridgewater Associates

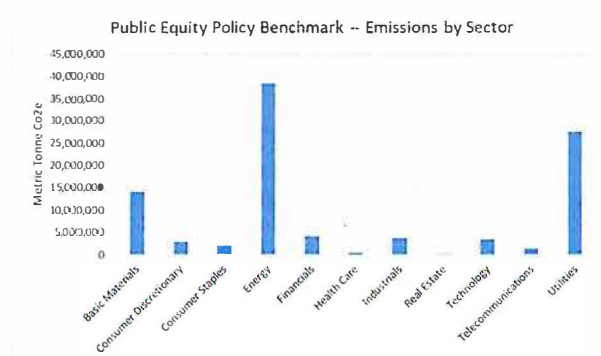
Climate Risk Analysis

Much like the broader industry, the System’s ability to measure and model the effects of climate change evolves constantly. This section focuses on the carbon footprint of the public equity portfolio as compared to its benchmark. While this analysis provides a rough approximation of portfolio and benchmark emissions, there are important caveats.

First, the portfolio utilizes different holdings structures in implementing its investment strategy. Most securities are held directly at the System’s custody bank; however, certain investments are made via fund entities. In these instances, the Investment Division often receives security-level reporting on a lagged basis and utilizes summary exposure reporting at times which brings some degree of proxying into the analysis.

In addition to parsing multiple holdings structures, the state of reporting of emissions data also poses challenges.⁷ This section utilizes Scope 1 (direct emissions from controlled and owned sources) and Scope 2 (indirect emissions from purchased electricity) from Sustainalytics, a leading vendor in the marketplace. Even though this section does not address Scope 3 (all other indirect emissions), some ambiguity remains in the analytics. Emissions are self-reported in some jurisdictions requiring vendors to use estimation models to expand the coverage universe. Fortunately, the marketplace continues to improve amid the demand for such information.

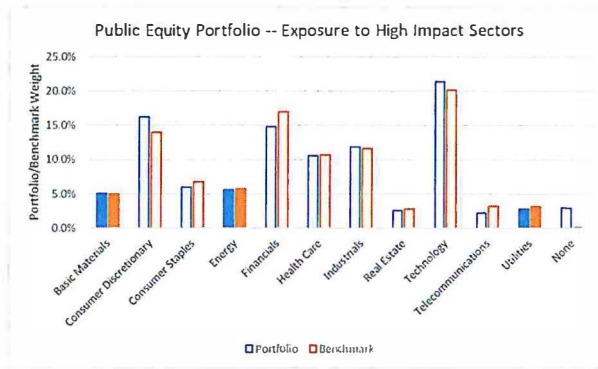
Companies operating in energy, utilities, and basic materials have the largest Scope 1 and Scope 2 emissions profiles due to their nature of their activities, as shown in the chart below.



Source: Maryland State Retirement Agency, BlackRock Solutions, Sustainalytics

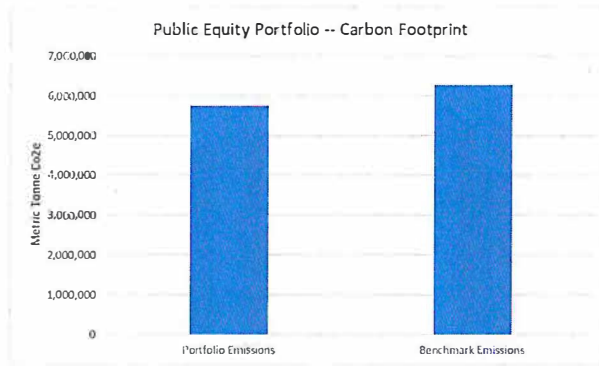
The following chart shows the public equity portfolio exposure to each sector as compared to its benchmark. The high impact sectors are highlighted to show that, on balance, the portfolio has relatively less exposure to these companies.

⁷ <https://mitsloan.mit.edu/centers-initiatives/mit-sloan-sustainability-initiative/carbon-confusion>

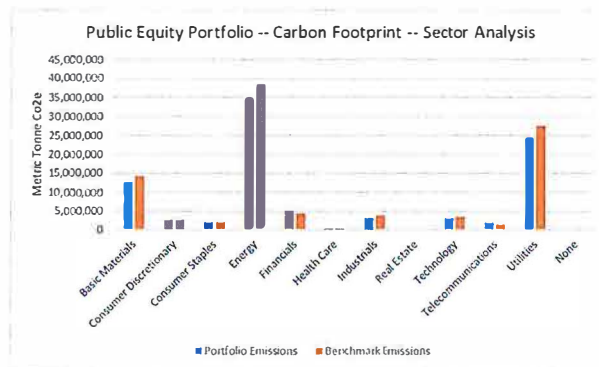


Source: Maryland State Retirement Agency, BlackRock Solutions, Sustainalytics

As shown in the next two charts, the public equity portfolio has a lower carbon footprint than its benchmark. This outcome is the result of different facets of the investment decision-making process. For example, Staff may allocate capital to a manager whose strategy tends to invest in companies outside high impact sectors. Security selection decisions made at the manager level also play a role. While the portfolio has a small overweight of 0.1% to basic materials, as seen above, the portfolio has a lower emissions profile than the benchmark in this sector. The cumulative effect of active management decisions result in a more efficient portfolio in terms of carbon emissions.



Source: Maryland State Retirement Agency, BlackRock Solutions, Sustainalytics



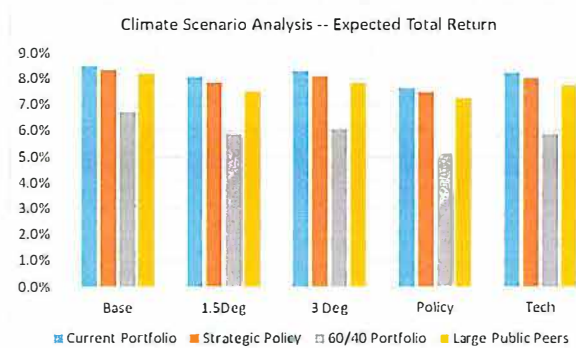
Source: Maryland State Retirement Agency, BlackRock Solutions, Sustainalytics

Going forward, the Investment Division will expand its use of these analytics to other asset classes beyond public equity. Staff expects to benefit from having access to multiple vendors’ analytics in a single platform for risk analysis as it continues to evaluate how the portfolio and its benchmark are positioned for the energy transition.

Meketa Investment Group – Climate Change Analysis

The Investment Division has been working with Meketa on climate change modeling for the last several years. As described in prior Risk Assessments, Meketa’s model runs 185 million simulations to generate a range of possible impacts of climate change on the System’s portfolio over a ten-year horizon. The analysis estimates financial impacts across 35 risk factors in 44 asset classes that interact both directly and indirectly. In prior analyses, Meketa has examined the impact of a 2°C increase in global average temperature and a commensurate level of carbon dioxide emissions over the subsequent ten years.

This year’s analysis includes four climate scenarios – 3°C temperature increase/minimal mitigation, 1.5°C temperature increase/heavy mitigation, policy/carbon tax, and technology/carbon intensity reduction – as shown above in the section on strategic asset allocation. The following chart applies the scenarios across the four portfolios shown above in the section addressing strategic asset allocation. The Current Portfolio and Strategic Policy are expected to outperform in all scenarios, though the expected returns are somewhat lower in each climate scenario with the policy/carbon tax instance showing the most degradation.



Source: Meketa Investment Group

The path of the energy transition that transpires will greatly influence the type and timing of risks to System assets. To help evaluate the current and potential future states of the energy transition the investment team is evaluating research produced by groups such as the Inevitable Policy Response (IPR). The IPR provides a quarterly assessment⁸ of the progress on the path to 1.5°C and the areas that are on, behind or ahead of pace. These and similar tools help the System evaluate the likelihood of stranded assets, the need for investment in mitigation and the remaining opportunity set for transition investments.

⁸ <https://www.unpri.org/inevitable-policy-response/the-inevitable-policy-response-2022-quarterly-forecast-trackers/9910.article>

Implementation Risk Management

Once the Board of Trustees establishes the System’s strategic asset allocation, the Chief Investment Officer, working with investment 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 1.60% versus the strategic policy index as of 9/30/2022, meaning that approximately 67% of the time, the realized return will be within a range of +/- 1.60% around the expected outperformance above the benchmark return. The vast majority – more than 85% – of total active risk can be attributed to security selection decisions, a function of the Investment Division’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 the Growth asset class, which includes public and private equity, constitutes the bulk of overall selection risk.

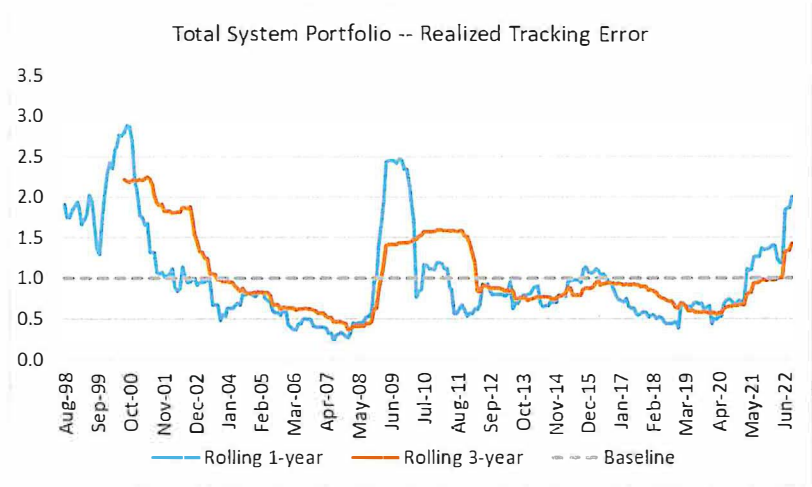
Total Active Risk (basis points)

Asset Class	Allocation risk (bps)	Selection risk (bps)	Style risk (bps)	Total active risk (bps)
Total System Portfolio	2	138	21	160
Public Equity	10	5	11	26
Private Equity	0	49	0	49
Rate Sensitive	3	-4	0	0
Credit	1	15	0	17
Real Estate	0	30	0	30
Nat Res & Infra	-7	33	-2	25
Commodities	-1	0	0	-1
Absolute Return	-4	9	13	18
Multi Asset	-2	0	-2	-3
Cash	0	0	0	0
Total Plan Overlays	1	1	-2	0

Source: Maryland State Retirement Agency

To contextualize this estimate of tracking error, the following chart displays historical realized tracking error since the late 1990s. There are two noticeable spikes, one around the bursting of the tech bubble and another around the great financial crisis, during the first half of the time series. Following each of the episodes of market tumult, an extended period subdued volatility took hold. The latest plots in the

time series reflect the current market environment characterized by the global pandemic and stubborn inflation environment.



Source: Maryland State Retirement Agency

Review of Recent Studies and Actions

Maryland State Retirement Agency staff conducted a review of recent studies and actions with respect to portfolio risks with the goal of identifying leading practices not currently employed that could be recommended for inclusion in the Investment Policy Manual.

- *Harvard Management Company.*⁹ In February 2022, Harvard Management Company (“HMC”) submitted its annual progress report towards its 2050 net-zero goal. The report addresses achieving carbon neutral operations; investing in climate transition; collaborative engagements; fossil fuel exposure; improving data access; and developing appropriate methodologies. The latter two topics are particularly relevant for any investor with significant exposure to private markets and hedge fund strategies that rely on derivatives and short selling. The report describes these issues as systemic challenges that require industry-wide solutions and the collaboration of asset owners, asset managers, data providers, and NGOs.
- *IPR 2022 Policy Gap Analysis.*¹⁰ The Inevitable Policy Response (“IPR”), as described on the Principles for Responsible Investment (“PRI”) website¹¹, “is a climate transition forecasting consortium commissioned by the PRI which aims to prepare institutional investors for the portfolio risks and opportunities associated with an acceleration of policy responses to climate change.” The gap analysis builds upon prior sector-by-sector research across the G20+ economies that covers global policy, technology, and land use developments. According to the report, the 1.8°C forecast policy scenario – where global emissions fall by 80% in 2050 to hold warming well below 2°C – is still in reach even though there is no apparent political pathway that would deliver the 1.5°C required policy scenario. (IPR presented to the Board of Trustees at its education day in October 2022.)
- *Maine Public Employees Retirement System.*¹² MainePERS adopted its ESG policy in 2015 and has been reporting how ESG factors influence their investment decisions since 2017. The latest report addresses risks and opportunities; public market investments: engagement and proxy voting; private market investments; real estate; ESG metrics; ESG policy; and engagement policy.
- *Minnesota State Board of Investment.*¹³ The Minnesota State Board of Investments (“SBI”) uses Meketa as its general investment consultant. Meketa’s Climate Change Investment Analysis project for the SBI seeks to provide data, analysis, and options for the SBI to further develop its investment strategy to address long-term climate investment risks and opportunities. Three phases of the project included a review of high-level global trends, results and analysis of a survey of 20 public pension plan climate leaders, and analysis of the SBI portfolio’s current exposures to climate risks and opportunities. (Maryland State Retirement Agency participated in the survey of climate leaders.)

⁹ <https://www.hmc.harvard.edu/wp-content/uploads/2022/02/2022-Climate-Report.pdf>

¹⁰ <https://www.unpri.org/download?ac=17459>

¹¹ <https://www.unpri.org/sustainability-issues/climate-change/inevitable-policy-response>

¹² <https://www.mainepers.org/investments/esg/>

¹³ <https://msbi.us/climate%20change>

- *New York State Common Retirement Fund*.¹⁴ In June 2019, the comptroller released a Climate Action Plan to address climate risks and opportunities across asset classes. The Common Retirement Fund (“CRF”) has committed \$20 billion (7.5% of assets as of June 30, 2022) to a formal Sustainable Investments and Climate Solutions program. So far, commitments have been made across asset classes including clean and green infrastructure funds as well as real estate funds certified in Leadership in Energy and Environmental Design. CRF also assesses how managers incorporate ESG factors into investment decisions and has set a 2040 target for reaching net zero emissions. CRF published its latest progress report in July 2022.

¹⁴ <https://www.osc.state.ny.us/common-retirement-fund/sustainable-investments-and-climate-solutions-program>

Recommendation of Best Practices for the Investment Policy Manual

The Board of Trustees regularly reviews and updates the Investment Policy Manual in consultation with the Investment Division. Several recent revisions have been made to enhance the policies and procedures with respect to risk management, as well as corporate governance and proxy voting. The risk management section provides the purpose, asset allocation, analytical measures, non-market risks, liquidity risk, counterparty risk, and leverage risk.

In addition, the corporate governance and proxy voting section addresses the following topics:

1. Board of Directors
2. Shareholder Rights and Defenses
3. Capital/Restructuring
4. Compensation
5. Social/Environmental Issues
 - a. Animal Rights
 - b. Consumer Issues
 - c. Climate Change and the Environment
 - d. Diversity
 - e. General Corporate Issues
 - f. International Issues, Labor Issues, and Human Rights
 - g. Sustainability
6. Routine/Miscellaneous

After reviewing the System's risk management processes in comparison with the leading practices of peers and new research from academic literature, it appears the System engages in leading practices concerning the evaluation and management of risks associated with the investment of System assets.

The most recent review of the System's practices by the United Nations-supported Principles for Responsible Investment (UN PRI) serves as evidence. As UN PRI advised, "On an individual basis, per the PRI Summary Scorecard Data, MSRPS has improved significantly across all assessed categories since 2017. Notably, in the strategy and governance module, Maryland has improved from a C to an A rating since 2017." UNPRI also noted that the System scores better than average in seven of ten categories when compared to a peer group of ten other state, county, and city retirement funds using 2020 PRI reporting.

The Investment Policy Manual is a living document that is revised regularly. Given the pace of change in matters pertaining to climate risk over the last few years, from actions of the System's peer plans to the Investment Division's organizational structure as well as the quality of analytics in the marketplace, the next review of the Investment Policy Manual will be an appropriate time to revise language and strengthen policies where necessary. Furthermore, the Board of Trustees and the Investment Division will monitor the divestment plans underway at state pension peers as it pertains to fiduciary duty and other implementation issues that may arise.



MSRPS Responsible Investing

3rd Biennial report by
The Environmental, Social and Governance Risk Committee
of the Maryland State Retirement and Pension System



February 15, 2022

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MSRPS Responsible Investing

The Maryland State Retirement and Pension System has long been active as a responsible investor in addressing Environmental, Social and Governance (ESG) risks. The System was an early signatory to the United Nations Principles of Responsible Investing (UNPRI) in 2008 and is a member of the Ceres Investor Network on Climate Risk and Sustainability, the Council of Institutional Investors, and the Institutional Limited Partners Association. The System is also a member of the Sustainability Accounting Standards Board (SASB) Alliance program, which promotes best practices in the disclosure and reporting of sustainability information. The System’s Board of Trustees has adopted extensive proxy voting policies addressing ESG risks, and engages with corporations, regulatory agencies, lawmakers, or associations to support the principles outlined in these policies. These policies, commitments, memberships, and actions underscore the importance of responsible investing to the System.

Investment Division staff continues to enhance its practices with respect to the diligence of new investments, including the assessment of ESG risks and having explicit discussions of those risks as part of the review of investment opportunities. Along with ESG risk considerations, these discussions highlight the varied approaches that managers utilize, and the inconsistent practices applied to similar strategies and investments. As companies improve transparency, ESG-related data becomes more consistent, and best practices evolve, staff will evaluate additional enhancements to further improve the investment decision making process and meet plan objectives.

The System’s Chief Investment Officer formed the MSRPS ESG Risk Committee in the summer of 2017 to provide thought leadership, education and reporting around ESG issues (excluding diversity, which is the province of the System’s Diversity Committee). The Committee consists of the CIO, the Senior Compliance Officer, and five investment professionals responsible for the managing asset classes across the plan, including recently established internal mandates in fixed income and public equities. The Board of Trustees approved the CIO’s recommendation to create a Senior Governance Officer position, which will expand the Committee’s capabilities in 2022.

The charter of the Committee is shown above.

Charter *ESG Risk Committee*

The ESG Risk Committee of the Investment Division is formed to provide thought leadership, education and reporting around the ESG issues excluding diversity, which will be the province of the Diversity Committee.

The Committee will review academic research, perform de novo research, and evaluate the ESG practices of asset owners. These efforts will help formulate language for the operations manual and provide recommendations to the Board for inclusions in the Investment Policy Manual.

The Committee will work to bring the findings of its research to the Investment Division and Board through providing educational opportunities in terms of white papers and presentations by organizations outside the division.

The Committee will document the ESG activities of the Board and Investment Division including how our diligence and oversight practices address ESG risks.

Integrated in the Process

At the investment level, the System has a diverse asset allocation implemented through its internal portfolio management team, over 80 external managers, and over 120 general partners, all of which combined hold thousands of individual securities, loans, derivatives, and private market investments. This diverse asset allocation and implementation is the System’s first line of defense from a risk management perspective. No single investment presents the System with a significant amount of concentration risk. Aside from US government bonds, the largest investments represent less than 1% of System assets.

Until 2019, plan assets had been externally managed and consequently the System relied on its asset managers to address ESG risks, including climate change risks. Currently, investment staff evaluates the ESG risks inherent in the investments and strategies under consideration for inclusion in portfolios, as well as managers’ policies for addressing those risks, as part of the external manager due diligence and monitoring processes. ESG risk specific questions are included in the System’s due diligence questionnaires posted on the MSRPS website and staff has ensured that all of the System’s consultant’s due diligence questionnaires include ESG risk specific questions. The list of staff’s ESG related due diligence questions was expanded over the past couple of years in order to develop an internal view of best practices by asset class. These efforts encourage additional discussion and consideration of ESG risks during internal investment committee meetings and identify managers where staff can recommend improvements.

The matrix template below summarizes the ESG related information requested during manager due diligence for all of the System’s mandates and is included in staff’s investment recommendations to the CIO. Updates to this information is requested at a minimum annually for all public market mandates via the System’s Annual Compliance Questionnaire.

ESG Policy	UNPRI Signatory	ESG-integrated investment process	Internal or 3rd party ESG research	ESG in-office initiative/officer/committee	ESG risk monitoring	ESG risk report internally/externally	ESG risk meetings with investee companies	Local community & industry involvement on ESG risk

In 2019 the System started managing certain assets internally, and the percentage of assets managed internally will grow over time. As with external manager recommendations, staff incorporates ESG risk assessment into the investment decision making process for recommendations of internally managed mandates. These mandates were initially passive index strategies. As these mandates become more active, staff will further develop policies and processes to assess ESG risk factors at the individual security level for all internally managed assets.

For both externally and internally managed assets, staff has access to third party ESG research, ratings, and data to supplement its own and utilize in the investment decision making and monitoring processes, as well as in the development of best practices. Third party ESG resources for evaluating externally managed assets include consultant reports, UNPRI assessments, the SASB materiality heatmap, and ILPA research; for internally managed assets they also include Bloomberg, MSCI, Fitch, CreditSights and Wall Street research.

Also in 2019, the System began submitting an annual risk assessment to the Maryland State Legislature in accordance with the Maryland Pension Risk Mitigation Act (available on the MSRPS website). This

report includes an analysis of the System's portfolio risk due to climate change and an estimate of the System's public equity portfolio carbon footprint, both performed in collaboration by the System's Risk Management team and general consultant. Additionally, the System's Investment Policy Manual was updated with respect to Economically Targeted Investments and the consideration of ESG risk factors.

In 2020, the System worked with its investment consultant to provide training and research to the Board and develop a methodology to include climate risk in the asset allocation study as a specific risk, similar to inflation or systemic risk. This analysis was instrumental in the changes to asset allocation approved in September 2021 that improved the System's expected performance in climate risk scenarios.

In 2021, the Board of Trustees adopted a Responsible Contractor policy incorporating the System's Economically Targeted Investments (ETI) and ESG policies. Within the System's IPM, investment staff and external managers' responsibilities with respect to applicable private real estate and infrastructure investments are outlined.

Also in 2021, the Board of Trustees approved the CIO's recommendation to create a Senior Governance Officer position. This position will report directly to the CIO and lead the System's efforts in continuing to develop best practices with respect to integrating ESG risk factors throughout the investment decision making process, evaluating energy transition and impact related investments, and expanding upon current stewardship activities including engagement initiatives.

Today, most of the System's dollars are invested in individual investments through an ESG lens – exceptions are government bond portfolios, hedge funds with relatively short investment horizons, index funds and Terra Maria (emerging) managers. At the asset class level, the Board's general consultant stress tests potential asset mixes with performance in a climate change scenario. To date, thematic investing in the energy transition has occurred within portfolios through the System's traditional fund managers finding attractive transition investments. Annually, the System engages with managers on ESG incorporation into their investment analytics, process, and engagement practices to ensure our managers are taking ESG risks into consideration when selecting investments.

Committed to Responsible Investing and Continuous Improvement

MSRPS has long been one of the leaders among its peers regarding responsible investing and is one of ten US State Pension plans that are signatories to the UN Principles of Responsible Investing. The System became a signatory in 2008, committing to the UNPRI Six Principles of Responsible Investing.

PRINCIPLE #1 – *We will incorporate ESG issues into investment analysis and decision-making processes*

PRI Recommended Actions	MSRPS Practice
Address ESG issues in investment policy statements	The System's IPM includes ESG conscious proxy voting policies, and ESG risk management and ETI language
Support development of ESG-related tools, metrics, and analyses	The System is an active member of UN PRI, the SASB Alliance and Climate Action 100+, and supports improved disclosure and transparency initiatives
Assess the capabilities of internal investment managers to incorporate ESG issues	The same evaluation process is applied to internal managers as is applied to external managers
Assess the capabilities of external investment managers to incorporate ESG issues	Evaluation of manager practice and ESG risk factors is part of staff new manager due diligence and internal investment committee review; annual ESG related disclosures are required of existing managers
Ask investment service providers to integrate ESG factors into evolving research and analysis	This is required for general and specialty consultant's due diligence reports and for internal management's research providers
Encourage academic and other research on this theme	Investment staff participates in industry conferences and collaborates with peers on best practices
Advocate ESG training for investment professionals	ESG related presentations are given at the System's Board Education Session by various industry experts and staff participates in industry conferences

PRINCIPLE #2 – *We will be active owners and incorporate ESG issues into our ownership policies and practices.*

PRI Recommended Actions	MSRPS Practice
Develop and disclose an active ownership policy consistent with the Principles	The System's IPM includes ESG conscious proxy voting policies, ESG risk management and ETI language, and a corporate governance engagement policy; the Board has adopted a Responsible Contractor policy incorporating the System's ETI and ESG policies; the proxy voting record is published on the System's website
Exercise voting rights or monitor compliance with voting policy (if outsourced)	The System's IPM includes ESG conscious proxy voting policies and the voting record is published on the System's website; the votes are audited for compliance with the IPM
Develop an engagement capability (either directly or through outsourcing)	Both the System and its external managers engage with companies regarding ESG risk factors; internal managers are held to the same standard; the System is actively involved in PRI, CII, Ceres, ILPA and SASB initiatives
Participate in the development of policy, regulation, and standard setting (such as promoting and protecting shareholder rights)	The System accomplishes this through its proxy voting policies, engagement activities and active involvement in PRI and SASB initiatives
File shareholder resolutions consistent with long-term ESG considerations	This is primarily accomplished through the activities of external managers; capabilities are being developed internally
Engage with companies on ESG issues	This is primarily accomplished through the activities of external managers; capabilities are being developed internally
Participate in collaborative engagement initiatives	The System is actively involved in PRI, CII, Ceres, ILPA and SASB initiatives
Ask investment managers to undertake and report on ESG-related engagement	This is included in the due diligence process through questionnaires on the System's website, and certain asset classes through side letter negotiation; monitoring of these activities is accomplished through an annual compliance questionnaire

PRINCIPLE #3 – We will seek appropriate disclosure on ESG issues by the entities in which we invest

PRI Recommended Actions	MSRPS Practice
Ask for standardized reporting on ESG issues	The System seeks appropriate disclosure on ESG issues by the entities in which it invests through annual questionnaires submitted to managers, membership in SASB, ILPA and PRI, and participation in ad hoc letters sponsored by our ESG partners; for requests directly from companies, outside of the System's proxy voting policy, external managers have been relied upon to date; capabilities are being developed for internally managed assets
Ask for ESG issues to be integrated within annual financial reports	
Ask for information from companies regarding adoption of/adherence to relevant norms, standards, codes of conduct or international initiatives	
Support shareholder initiatives and resolutions promoting ESG disclosure	

PRINCIPLE #4 – We will promote acceptance and implementation of the Principles within the investment industry

PRI Recommended Actions	MSRPS Practice
Include Principles-related requirements in requests for proposals	The System promotes acceptance and implementation of the Principles by requiring investment staff and consultants to address the issues in due diligence and monitoring activities with managers, and through side letter negotiations in certain asset classes; monitoring of these activities is accomplished through regular interactions and an annual compliance questionnaire; the Board has adopted a Responsible Contractor policy incorporating the System's ETI and ESG policies
Align investment mandates, monitoring procedures, performance indicators and incentive structures accordingly	
Communicate ESG expectations to investment service providers	Investment staff accomplishes this through regular dialogue with consultants and engaging with external managers in areas of weakness
Revisit relationships with service providers that fail to meet ESG expectations	
Support the development of tools for benchmarking ESG integration	Investment staff and the System's consultant developed a methodology to include climate risk in the asset allocation study as a specific risk, similar to inflation or systemic risk; climate change analysis and carbon footprint measurement are part of the System's annual risk assessment
Support regulatory or policy developments that enable implementation of the Principles	The System accomplishes this through its engagement activities and active involvement in PRI and SASB initiatives including letter writing campaigns

PRINCIPLE #5 – *We will work together to enhance our effectiveness in implementing the Principles*

PRI Recommended Actions	MSRPS Practice
Support/participate in networks and information platforms to share tools, pool resources, and make use of investor reporting as a source of learning	Investment staff works with organizations such as SASB, UN PRI, Ceres, CII and ILPA, and with peer state pension plans and other investors directly
Collectively address relevant emerging issues	
Develop or support appropriate collaborative initiatives	

PRINCIPLE #6 - *We will each report on our activities and progress towards implementing the Principles*

PRI Recommended Actions	MSRPS Practice
Disclose how ESG issues are integrated within investment practices	The System accomplishes disclosure and reporting objectives through its updated IPM, annual Risk Assessment, biennial Responsible Investing report, proxy voting disclosure, and updated due diligence questionnaires, all of which are available on the MSRPS website: https://sra.maryland.gov/investment-policy-manual https://sra.maryland.gov/maryland-pension-risk-mitigation-act-risk-assessment https://sra.maryland.gov/esg-risk-committee-reports https://sra.maryland.gov/proxy-vote-record https://sra.maryland.gov/manager-opportunities
Disclose active ownership activities (voting, engagement, and/or policy dialogue)	
Disclose what is required from service providers in relation to the Principles	
Communicate with beneficiaries about ESG issues and the Principles	
Report on progress and/or achievements relating to the Principles using a comply-or-explain approach	
Seek to determine the impact of the Principles	
Make use of reporting to raise awareness among a broader group of stakeholders	

Since the formation of the ESG Committee, staff has worked on improving data capture and communication to external constituents. Staff's efforts have been successful, which can be seen in the ratings given to MSRPS by UN PRI following review of the System's responses to their annual survey in the table below. The "C" rating in 2020 under "Direct and Active Ownership" can be attributed to the System's prior completely outsourced model and will improve as more assets are managed internally.

PRI Assessment – Major Categories	PRI Assessment Year			
	2017	2018	2019	2020
Strategy and Governance	C	C	B	A
Indirect – Manager Selection Monitoring	D	C	C	B
Direct and Active Ownership	D	D	C	C

Note: Results of the PRI 2021 assessment will not be available to signatories until April 2022 due to technological and implementation issues during the 2021 reporting period.

Separately, MSRPS was selected as a finalist for the 2021 Responsible Asset Allocator Initiative (RAAI) Index. This evaluation of the world's largest asset owners on their responsible investing practices was conducted by New America, a public problem solving think tank. Among the 82 asset allocators in the US rated by the RAAI, MSRPS ranked 8th. Four asset allocators from the US scored as leaders (UC Regents, CalPERS, CalSTRS and NYSCRF) and four were rated finalists (Maryland SRPS, NYCRS, Colorado PERS and San Francisco SERS). Only 10% of US asset allocators were rated in the top quintile. (<https://www.newamerica.org/responsible-asset-allocator-initiative/>)

Diversity, Equity, and Inclusion (DE&I)

The Board of Trustees is committed to using minority business enterprises (MBE) to provide brokerage and investment management services to the System by removing barriers and publicizing searches consistent with the fiduciary duties of the Board. As part of this effort, investment staff implements the Terra Maria Developing Manager Program focused on emerging managers, which was formed in 2007. Many MBE and women-owned investment management firms are in the emerging state of their business, having less assets under management than more established managers.

The System's corporate governance and proxy voting policy regarding diversity is outlined in the IPM, and proxy votes are provided on the MSRPS website.

In 2017, the Chief Investment Officer established the System's **Diversity, Equity, and Inclusion Committee**. The DE&I Committee includes senior leaders from across investments, operations, and accounting departments, and acts on behalf of the Investment Division to manage and encourage the diversity, equity, and inclusion process. While this committee is separate from the ESG committee, its objectives, actions, and accomplishments fall under investment staff's responsible investing implementation. Similar to investment staff's ESG and climate change related due diligence process, DE&I related due diligence has been expanded in order to develop an internal view of best practices. These efforts encourage additional discussion and consideration of DE&I issues during internal investment committee meetings and identify managers where staff can recommend improvements.

DE&I Committee Responsibilities:

1. Assist the Chief Investment Officer (the "CIO") in the creation of DE&I objectives and key milestones.
2. Identify specific DE&I education content to be included in employee training and professional development practices.
3. Review policies and procedures and informal practices to identify DE&I barriers that impact recruitment, training, retention, advancement, leadership, and key assignments and provide recommendations for improvement.
4. Provide a forum for identifying and sharing programs and practices that improve diversity and inclusion.
5. Partner with human resource professionals to develop and coordinate the Investment Division's DE&I efforts.
6. Create opportunities for employees to provide insight and feedback to executive staff about organizational climate, equity, inclusion, diversity, and culture (i.e. climate assessments, anonymous satisfaction surveys, focus group sessions, etc.) in the workplace.
7. Create opportunities for employees to have meaningful engagement with leadership to promote cultural inclusivity.
8. Track internal hiring and promotion statistics by gender and race/ethnicity.
9. Track gender and race/ethnicity statistics within partner organizations (LPs: Fund Managers, GPs: Portfolio Company Board and/or Management Teams).

- 10.** Annually conduct a self-assessment of DE&I Committee effectiveness that describes accomplishments relative to developed objectives and responsibilities, challenges and barriers encountered during the period, and recommendations for solutions.

In 2021, MSRPS became a signatory to the ILPA Diversity in Action framework. The System is a member of ILPA's Diversity & Inclusion Advisory Council, the Private Equity Women's Investor Network (PEWIN), AIF's Women's Leadership Steering Committee and SEO's Alternative Investments Limited Partner Advisory Council

The DE&I Committee's efforts were recognized by the industry in 2021. MSRPS staff was named to Institutional Investor's Global List of Top 50 Women in Investment Management, Trusted Insight's list of Top Public Pension Investors Directors, and PEWIN's Member of the Year highlighting work in transforming the private equity industry with a focus on diversity, equity, and inclusion.

Milestones Achieved and the Path Forward

To improve reporting and transparency, the ESG Committee and investment staff have:

1. Documented and reported the percentage of managers that have an ESG policy and incorporate ESG principals in their investment process, and assessed differences between asset classes, geographies, and strategy types
2. Documented and reported the percentage of managers that have engagement initiatives with public companies
3. Documented and reported the percentage of managers that are UNPRI signatories
4. Analyzed and reported trends in proxy voting
5. Published the System's proxy voting experience on its website
6. Published the System's annual Risk Assessment on its website
7. Identified System investments that focus on ESG solutions

The ESG Committee and investment staff have also implemented the following practices:

1. Established a monthly ESG Committee meeting to review new research, potential opportunities and ESG risk factors across asset classes
2. Developed in collaboration with the System's general consultant a methodology to include climate risk in the asset allocation study as a specific risk, similar to inflation or systemic risk.
3. Continuously identify opportunities for staff to initiate engagement to improve the percentage of managers who incorporate ESG issues in their investment process
4. Maintain due diligence questionnaires on the MSRPS website that include ESG risk related questions, make them available to managers interested in opportunities with the System, and ensure the System's consultants have ESG risk sections in their due diligence questionnaires
5. Utilize a list of best practices when evaluating the effectiveness of manager ESG policies and to encourage policy improvements; track manager practices and create internal risk ratings or opinions as part of manager evaluation and monitoring and to encourage broader ESG risk discussions
6. Continue developing policies and processes to assess ESG risks for internally managed assets
7. Participate in the SASB Alliance, and other organizations, to promote better financial disclosure, improving the information value of metrics such as carbon footprint and sustainability scores
8. Create additional education opportunities for the Board of Trustees and investment staff

Areas of focus going forward:

1. Measure impact of investments with respect to UN Sustainable Development Goals
2. Review differences between TCFD (Task force on Climate-related Financial Disclosures) recommended disclosures and current practice

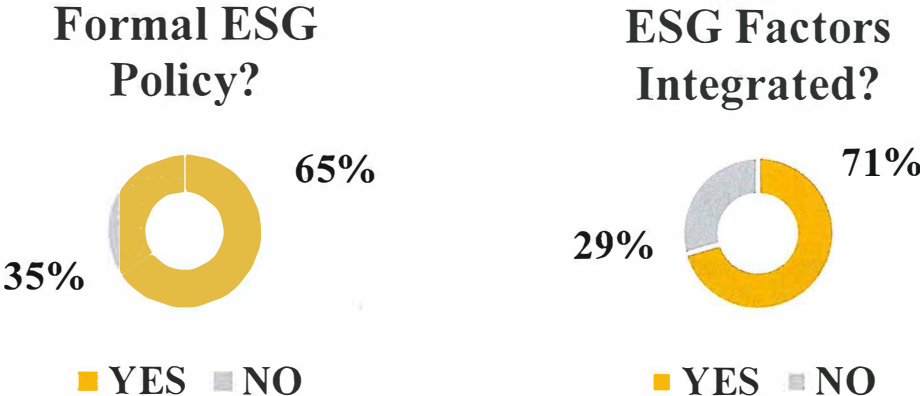
3. Continue to include and refine Responsible Investing considerations in the Asset Allocation process
4. Further incorporate the SASB Heat Map into the investment due diligence process
5. Regularly update the internal operations manual to reflect changes or additions to practice
6. Attend conferences and discuss ESG related issues with peers to continue developing responsible investing best practices

Until recently, the System has primarily relied on an outsourced model to engage directly with underlying companies and to engage in sponsoring proxy initiatives with respect to ESG related risks and issues. The long-term vision is to incorporate ESG elements in a comprehensive risk system on a real time basis. The System has made significant progress in this effort.

Public Investments – External Managers

Annual Compliance Questionnaire – Active Public Market Managers
 Beginning in 2016, as part of public manager and hedge fund Annual Compliance Questionnaires, staff added a request for a copy of managers’ ESG policies and details regarding how managers integrate ESG risk factors into investment decision making processes. The charts below summarize the results for 2021.

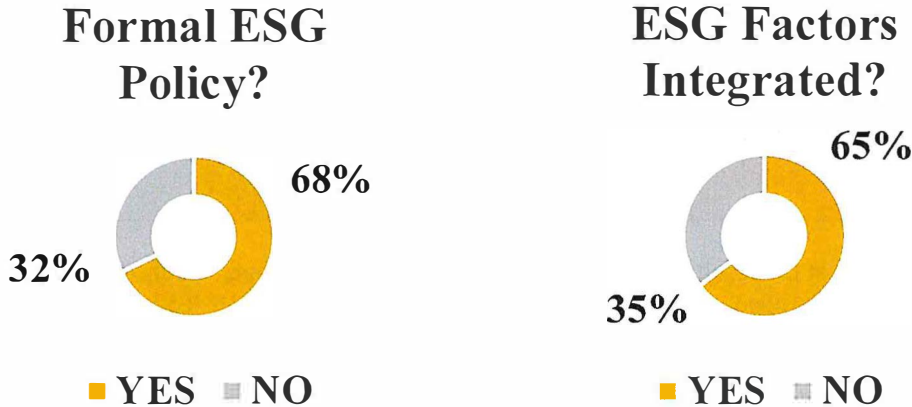
Active Mandates - Public Market Managers as of 12/31/2021



The percentage of active mandates where managers have a formal ESG policy increased from 45% in 2017 to 65% in 2021. The percentage where ESG factors are integrated into the investment decision making process increased from 45% to 71%. These percentages have historically been impacted by the System’s Terra Maria* managers, which may not have had sufficient depth of resources, and the System’s hedge funds, a high percentage of which would generally have shorter investment horizons. As can be seen in the following charts, in both cases, these managers are increasingly incorporating ESG risk factors in their investment decision making processes and adopting formal ESG policies.

*Terra Maria is the System’s emerging manager program

Public Market Mandates – Terra Maria as of 12/31/2021

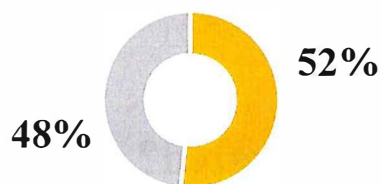


The percentages of the System’s Terra Maria mandates with formal ESG policies and where ESG risk factors are integrated in the process have increased over the past two years. Between 2019 and 2021,

mandates with a formal ESG policy increased from 47% to 68%, and those where ESG risk factors are integrated in the investment process increased from 59% to 65%.

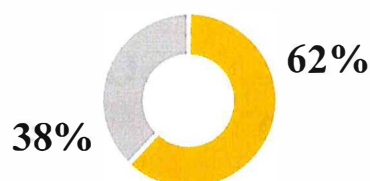
Public Market Mandates - Hedge Funds as of 12/31/2021

Formal ESG Policy?



■ YES ■ NO

ESG Factors Integrated?



■ YES ■ NO

The percentages of the System’s hedge fund mandates with formal ESG policies and where ESG risk factors are integrated in the process have increased over the past few years and are now over 50% for each, from 38% and 46% respectively in 2019. **One of the System’s largest hedge fund managers by assets under custody, Bridgewater, is a UNPRI signatory, incorporates ESG risk factors in their investment decision making process, and began publishing an extensive “Sustainable Investing” annual report in 2021.**

Results by % of System Assets

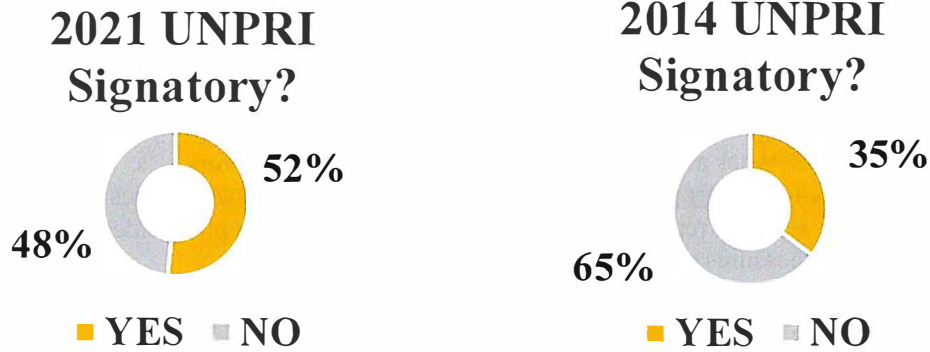
Affirmative Responses as % of AUM as of Calendar Year End	2021		2016	
	ESG Policy?	Integrated?	ESG Policy?	Integrated?
Total Active Public Markets	69%	76%	60%	53%
Total x-Hedge Funds	74%	80%	71%	65%
Developed Market Equities	56%	75%	61%	56%
Emerging Market Equities	65%	65%	68%	39%
Developed Market Fixed Income	100%	100%	87%	94%
Emerging Market Fixed Income	100%	100%	65%	65%
Hedge Funds	49%	56%	18%	11%

Another way of looking at the results is shown in the table above, which compares the System’s assets under active public market mandates as of 12/31/2021 compared to 12/31/2016. Today, over two thirds of the System’s actively managed public investments are with managers who maintain formal ESG policies and who integrate ESG risk factors into their investment decision making processes. With respect to integrating ESG risk factors into investment processes, significant improvement can be seen across asset classes over the past five years.

UNPRI Signatories – Active Managers

The System has been a UNPRI signatory since 2008. Staff encourages public market managers, general partners, and consultants to become signatories. UNPRI is a leading independent proponent of responsible investment. As shown in the charts below, the percentage of the System’s public market mandates where the investment managers are UNPRI Signatories has increased significantly from 2014 to 2021.

All Active Public Market Managers



The table below shows the percentage of the System’s actively managed public investments managed by UN PRI signatories. The percentage increased from 2014 to 2021 across active management broadly, and across most asset classes except for hedge funds. This is likely attributable to the shorter term investment horizons of many hedge fund strategies.

Results by % of System Assets Under Management

Asset Class	% AUM with UNPRI Signatories	
	2021	2015
Total Active Management	62%	45%
Total x-Hedge Funds	69%	58%
Developed Market Equities	54%	60%
Emerging Market Equities	65%	68%
Developed Market Fixed Income	94%	44%
Emerging Market Fixed Income	100%	100%
Hedge Funds	30%	0%

Note on Terra Maria Managers – in 2019, 47% of the System’s investments under the Terra Maria program were overseen by managers that had explicit ESG policies, 29% by managers who were UNPRI signatories, and 61% by managers who integrate ESG risk factors into their investment decision making processes. In 2021, these percentages increased to 68%, 48% and 67% respectively. The most significant data point is that almost 70% of the System’s assets in the Terra Maria program are managed by managers who integrate ESG risk factors into their investment processes. A lower percentage of UN PRI signatories in the program is expected due to the resources necessary for membership and commitments.

Note on Passive Managers – the System has two passive external managers with multiple mandates totaling over \$2.5 billion. One of the managers is a UN PRI Signatory. Both have formal ESG policies and strategies where ESG risk factors are integrated into the investment process. The System votes all proxies for active and passive account holdings held directly.

Proxy Voting

The System utilizes Institutional Shareholder Services (ISS), a proxy advisor firm, to obtain research and analytics about the companies it invests in and proxy proposals, provide advice on crafting proxy policies, recommend how to vote proxies based on best practices for corporate governance and the latest research, and process the System’s vote based on proxy voting policy included in the IPM (updated November 2021). ISS provides research on over 45,000 meetings and 12.2 million proxies a year.

In 2020, the System cast votes at almost 8,000 meetings on over 86,000 proposals. The System’s proxy voting policies generally support proxies that promote disclosure of relevant metrics such as environmental practices, risks, reports, liabilities, and Net Zero goals and plans unless the company already has sufficient measures or commitments in place.

Proxy voting results for the past three years were 65.6% against, 34.4% in favor of climate related proposals. For comparison, State Street Global Advisors has a record of supporting approximately 33% of climate related goal proposals and 50% of climate related report proposals.

Engagement, through our partners, often results in agreements between the shareholders and the company to enact practices and goals that are acceptable and allows the System to vote against shareholder proposals as it is no longer necessary to force the company to take action through a proxy vote.

British Petroleum (BP) example: Through the engagement process with the System’s partner Climate Action 100+, BP signed a binding agreement to develop its climate strategy in line with the goals of the Paris agreement, along with greater disclosure of metrics and targets. This agreement allowed the System to vote against the related shareholder proposal in 2021.

The System’s proxy voting policy includes evaluating Directors on their effectiveness with respect to ESG/Climate matters.

Exxon example: The System voted in favor of replacing certain board members due to their lack of consideration of energy transition issues and operational performance. As a result of the System’s and other shareholder votes, three new members were appointed to Exxon’s Board of Directors.

Engagement

The System’s Board of Trustees may engage with corporations, regulatory agencies, lawmakers, or associations to support the corporate governance principles outlined in the proxy voting guidelines. Engagement may include advocacy letters, direct contact with stakeholders and shareholder resolutions.

The System’s engagement activities are generally conducted through its partners including:

- SASB (Sustainable Accounting Standards Board): Affiliate member promoting consistent reporting standards on sustainability and an industry risk framework
- CERES: Member supporting education, advocacy, and engagement
- Climate Action 100+: Signatory, engage with large carbon companies (BP example)
- PRI (Principles for Responsible Investment): Signatory since 2008, supports incorporation of ESG factors into investment and ownership decisions

Examples of the System's engagement activities over the past few years are listed below.

- 2020/2021 – Signatory to PRI, CII and CERES letters to SEC opposing proposed changes to the proxy voting process and Rule 14a-8
- 2020 – As You Sow – supported Workplace Equity Disclosure Statement which called for increased corporate transparency regarding workplace equity data
- 2019 – Signatory to Principles for Responsible Civilian Firearms Industry
- 2018 – Signatory to Global Investor Statement to Governments on Climate Change
- 2018 – Signatory to letter to the SEC asking the SEC to maintain the requirements of Rule 14-a-8 and not increase the requirements for shareholders to submit a proposal on proxy ballot

Examples of engagement efforts made through the System's external managers:

PIMCO is the System's largest active fixed income manager by assets held in custody. PIMCO is a UNPRI signatory and a founding member of SASB.

Over 80% of PIMCO's firmwide holdings of corporate issuers were engaged on ESG topics by their global team of over 75 credit analysts in 2020. Below is one example taken from PIMCO's 2021 ESG Investing Report.





PEMEX – STATE-OWNED PETROLEUM COMPANY

Topic: Climate strategy and target setting

- *Background:* The oil industry continues to face persistent stakeholder pressure on ESG, while progress from state-owned companies has traditionally been limited. Being absent from the equity market, Pemex's material role in the debt market offers PIMCO an opportunity to engage with the issuer. While our engagement aims to steer for ESG improvement, the issuer (Pemex is Mexico's state-owned oil company) is lagging behind peers on various topics.
- *Engagement:* PIMCO continued our engagement with Pemex on increasing the share of health and safety certification in operations and responses to oil spills and controversies. We deepened our discussion on climate in terms of setting targets on methane reduction, Scope 3 emission disclosure, enhancing scenario analysis, etc., and shared our views and references for areas of improvements across these topics. In addition, PIMCO is also part of the CA100+ investor group to collectively engage Pemex on climate change.
- *Progress to date:* Pemex acknowledged the growing importance of climate change consideration in their business and has responsively engaged in multiple exchanges with PIMCO on ESG. They plan to align climate change disclosure closer to industry standards and are reviewing options to increase health and safety certifications over time. We will continue to monitor the issuer's progress and carry out constructive dialogue on their improvement toward best practices.

T. ROWE PRICE is the System's largest active public equity manager by assets held in custody and is based in Maryland. T. Rowe is a UNPRI signatory (since 2010) and joined the SASB Alliance in 2021.

During 2020, T. Rowe engaged directly with companies on 1,002 separate occasions, sometimes more than once with the same company, on ESG related topics including those listed below.

<p>ENVIRONMENT</p>  <ol style="list-style-type: none"> 1. Disclosure of environmental data 2. Greenhouse gas emissions 3. Product sustainability 4. Environmental management 5. Water and waste management 	<p>ETHICS</p>  <ol style="list-style-type: none"> 1. Compliance programs 2. Regulatory changes 3. Bribery and corruption 4. Lobbying activities 5. Facial recognition technology
<p>SOCIAL</p>  <ol style="list-style-type: none"> 1. Disclosure of social data 2. Diversity, equity and inclusion 3. Employee safety and treatment 4. Society and community relations 5. Product safety and sustainability 	<p>GOVERNANCE</p>  <ol style="list-style-type: none"> 1. Executive compensation 2. Board diversity 3. Shareholder proposals 4. Board composition 5. ESG accountability

Responsible Contracting

As mentioned earlier in this report, in 2021, the Board of Trustees adopted a Responsible Contractor policy incorporating the System's Economically Targeted Investments (ETI) and ESG policies.

The Board of Trustees expects the System's real estate and infrastructure managers to utilize responsible contractors whenever possible. In the Board's view, utilizing responsible contractors improves the long-term growth of the real estate and infrastructure investments in the MSRPS portfolio and enhances the Board's fiduciary responsibility to prudently invest the System's assets for the benefit of the System's participants.

Within the System's IPM, investment staff and external managers' responsibilities with respect to applicable private real estate and infrastructure investments are outlined.

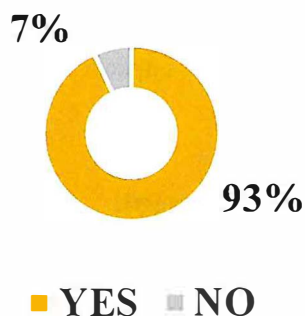
Private Investments – General Partnerships

Private Equity, Real Assets and Credit

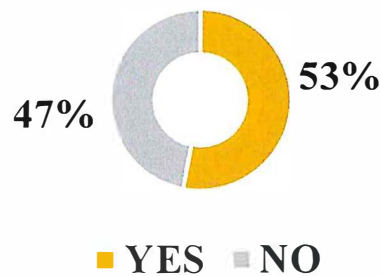
Investment staff and the System’s private market consultants include the assessment of ESG risks in the diligence of new investments and have explicit discussions of these risks with managers as part of the review of investment opportunities. For example, Staff requires potential energy managers to complete an ESG due diligence questionnaire, which questions the managers’ ESG-related policies and procedures. In the System’s side letter, energy managers are asked to include ESG guidelines that they use to evaluate new deals and in the monitoring of investments. Also in the side letter is a requirement that managers provide staff with an annual ESG report.

In the charts below, the one on the left shows the percentage of the System’s private equity, energy and credit active commitments to managers having formal ESG policies as of 12/31/2021. The chart on the right shows the percentage of these commitments with managers who are UNPRI Signatories.

Formal ESG Policy?



UNPRI Signatory?



The vast majority of the System’s commitments are to private market funds managed by firms with formal ESG policies. Over half of the commitments are with UNPRI signatories. As with certain public markets managers, the relatively lower percentage of signatories could be attributable to the resources necessary to maintain membership and commitments. Many of the System’s private market managers continue to improve reporting and transparency on ESG risk related issues.

Below are two examples of how this is working through the System’s private market managers.

1 Vista Equity Partners’ funds are one of the System’s largest private equity active commitments and the firm is a minority owned business. Vista became a UNPRI signatory in 2020 and in 2021 was one of the first US-based private equity firms to join the Net Zero Asset Managers Initiative. The following is taken from the 2021 Vista Equity Partners ESG and DEI Report:

PORTFOLIO-WIDE ESG ASSESSMENT RESULTS

January 2021¹⁵



91%
of respondents had DE&I personnel or a committee.



79%
had C-level+ sponsorship for an ESG function.



69%
were in process of setting or had set ESG goals.

When companies enter the Vista private equity and permanent capital portfolio, they are asked to complete Vista’s Annual ESG Assessment, which identifies current and potential ESG risks as well as opportunities for further impact as part of the value creation planning process. This is the first major milestone of our ESG engagement after investment and helps develop an effective, ongoing plan for execution and amplification of our portfolio companies’ positive impact.

We conducted our first-ever portfolio-wide ESG Assessment in January 2021 with a 100% response rate from our majority-owned private equity companies.

The results of this assessment reiterate that ESG is a key business consideration for Vista companies and illustrate the strong interest in ESG from their customers.

Vista’s assessment goes beyond ESG risk mitigation and process improvements. With accelerated digitization, we believe technology and enterprise software will continue to be critical drivers of ESG value, and we are committed to boosting the positive impact of our investments during our ownership.

Private Equity Portfolio Engagement:

Company Accountability and Best Practices

As a fiduciary, it is our responsibility to support our companies’ operations by providing sustainable solutions and frameworks that will exist even after our partnership ends. This includes helping our private equity and permanent capital portfolio companies establish and advance DE&I processes and programs.

Board diversity stewardship and executive leadership team engagement are among the main focuses of this pillar. Vista has introduced a DE&I Board Reporting template which enables portfolio management teams to present the progress of their DE&I initiatives to their Board of Directors each quarter.

Our global technology ecosystem provides our portfolio companies a unique peer network to learn, connect and share. CEO sharing sessions offer executives the chance to learn from others with similar experiences and have been critical to DE&I engagement at the executive level.

Throughout 2020 and 2021, session topics have included Diversity, Equity & Inclusion; Diversifying the Leadership Bench in a Post-Pandemic World; and Your Role in Supporting the AAPI Community.

DE&I topics were also among the best practice sharing sessions featured during our 2020 and 2021 CXO and CEO summits, forums where we bring together senior portfolio company operators to exchange ideas and share knowledge.

LEAD THE VISTA ECOSYSTEM ON THE TOPIC OF BOARD DIVERSITY

Signed agreements to amplify our commitment to diversifying corporate boards, including:

Portfolio Company Leadership²²

CEOS

12%
Women

14%
People of Color

C-SUITE

25%
Women

16%
People of Color