

# Investment Section

Report on Investment Activity and Policies .....	2
Annualized Total Returns (%) Net of Fees .....	8
Portfolio Summary Statistics Asset Allocation Basis as of June 30, 2023 .....	9
Comparison of Actual Portfolio Distribution to Asset Allocation Plan as of June 30, 2023 .....	10
Graph – Comparison of Actual Portfolio Distribution to Asset Allocation Plan as of June 30, 2023 .....	10
Graph – Portfolio Capital Distribution 10 Year Trend .....	11
10 Largest Holdings Schedules .....	11
Equity .....	12
Fixed Income .....	12
Postemployment Healthcare Investments .....	13
Defined Contribution Investments .....	13
Comparison of Investment Activity Income Fiscal Years Ended June 30, 2023 and 2022 .....	14
Summary Schedule of Broker Commissions .....	14
Professional Consultants .....	15



## Report on Investment Activity and Policies For Fiscal Year July 1, 2022 through June 30, 2023

### Authority and Fiduciary Standard

The Board has the responsibility to invest the System's funds in accordance with guidelines and limitations set forth in the Retirement Code and other applicable state law and Board Policy. Pursuant to the Board's enabling legislation, the members of the Board, employees of the Board, and their agents are fiduciaries to the System's members and beneficiaries and must invest and manage the fund for exclusive benefit of the System's members and beneficiaries (24 Pa. C. S. §8521(e)). As such, they must act consistent with the duty of prudence as well as the duty of loyalty.

In performance of their duties, the trustees shall exercise "that degree of judgment, skill and care under the circumstances then prevailing which persons of prudence, discretion and intelligence who are familiar with such matters exercise in the management of their own affairs not in regard to speculation, but in regard to the permanent disposition of the fund, considering the probable income to be derived therefrom as well as the probable safety of their capital." (24 Pa. C.S. §8521(a)).

The System shall, at all times, be managed in accordance with all applicable state and federal laws, rules, and regulations, as well as the Investment Policy Statement and other applicable policies of the Board.

### Policies and Objectives and Investment Philosophy

The Board is responsible for the formulation of investment policies for the System. Professional Staff is responsible for the implementation of those investment policies. The overall investment objectives of the System are as follows:

- to generate returns to support the System's actuarial soundness so it may provide its members with benefits as required by law;
- to earn a long-term total return, net of fees, and investment and administrative expenses, that equals or exceeds the actuarial assumed rate approved by the Board (currently 7.00%);
- to earn a long-term total return, net of fees and investment expenses, that equals or exceeds the Policy Index approved by the Board; and
- to prudently manage investment risks that are related to the achievement of investment goals.

The PSERS Board of Trustees believes the System's assets should be managed in accordance with the System's unique liability stream, funding sources, cash flows, and portfolio size, focusing on the prudent accumulation of wealth over the long term to meet the retirement benefit obligations established by the plan sponsor to its members. The Board's Investment Policy Statement states that the System's assets should be managed based on the following investment beliefs:

1. Uncertainty - The future is difficult to forecast with any accuracy or certainty, particularly changes in the economic and market environment.
2. Asset Allocation - The strategic asset allocation mix, more than implementation or any other factor or decision, largely determines the portfolio's overall risk and return.
3. Diversification - Diversification is the best approach to addressing future uncertainty and therefore meeting PSERS' long-term investment objectives.
4. Risk - For an underfunded plan or for a plan with negative external cash flow (benefits paid exceed contributions received), the path of compounding of investment returns – from month to month, quarter to quarter, and year to year – matters more than for a plan that is fully funded or has positive external cash flow; for the former type of plan, peak-to-trough declines transform unrealized losses into permanent ones. Drawdown risk should be mitigated, especially since the environment in which drawdowns occur is likely to take place when the plan sponsor's willingness and ability to make contributions to the plan may be less than in normal times. Liquidity should be managed to reasonably ensure that the fund can meet its obligations during periods of market dislocations.
5. Leverage - Leverage at the total fund level can be an effective tool to enhance diversification, since asset classes, over the long-term, have similar risk-adjusted returns, different correlations to each other, and different responses to changes in the economic and market environment. Leverage can be a vital tool to increase or decrease total fund risk in a diversified manner.
6. Rebalancing - Disciplined rebalancing enhances long-term returns as it is an inherently contrarian process. Rebalancing restores strategic asset allocation as the primary driver of return and risk.

7. Portfolio Size - Managing a large pool of assets provides investors unique access to investment opportunities not available to smaller institutional investors or individual investors. PSERS should use its size to its advantage to enhance its net-of fees return and diversification opportunities.
8. Private Investments - Allocations to Private Equity, Private Credit, Private Real Estate, Private Infrastructure, and other illiquid asset classes may be justified by the illiquidity risk premium available to investors. Allocations to these asset classes may also be justified by the diversification benefit they provide, through exposure to sectors, businesses, and mode of corporate governance not obtainable through public markets.
9. Active Management - Passive investing, rather than active management, is the default choice to be used for any asset class that is highly efficient or where skilled active managers are less likely to be identified. Certain asset classes continue to exhibit information inefficiency, where skilled active management and well-resourced investors such as PSERS can potentially persistently outperform peers and the benchmark for that asset class. There will be short-term periods when a skilled active manager may underperform peers and the benchmark; that is to be expected and accepted; therefore, a long-term perspective will be employed.
10. Internal Management - PSERS has developed skilled internal investment managers; as such, internal investment management is preferred over external investment management in cases where internal management most likely can match or exceed the long-term, net of fees, risk-adjusted returns provided by external managers, provided the internal investment and operational resources are available to do so.
11. Investment Fees - Investment management fees for external management are one of the few aspects of investment management that are certain and over which the investor has control. Investment management and performance fees should be managed to (i) maximize long-term, net of fees, risk-adjusted returns, (ii) split the value added fairly between the investment manager and PSERS, and (iii) align the interests of the investment manager with PSERS.

Assets are managed in accordance with allocation plan and investment policies by internal investment office professionals and external investment management firms acting as agents for the system.

### Roles and Responsibilities

The Board, via its Investment Committee, provides direction and oversight of investment activities. The Investment Committee generally conducts six meetings per year and may meet more frequently as needed. Investment Office professionals, as well as external consultants, external investment managers, Investment Accounting professionals and Internal Audit professionals assist the Board in achieving investment objectives and monitoring compliance with investment policies.

As of June 30, 2023, the Board's consultants include the following: Verus Advisory, Inc., serves as the general investment consultant, assisting the Board and Professional Staff in formalizing investment objectives, establishing an asset allocation, conducting investment manager due diligence, calculating and reviewing performance, and commenting on compliance with investment policies; Aon Investment Consulting, Inc. provided performance reporting through June 30, 2023, facilitating an orderly transition of performance and other related services to Verus. Aksia, LLC, serves as private markets consultant; and Constellation Advisers LLC, provides investment compliance services.

Investment Office professionals implement investment decisions within the guidelines established in the Investment Policy Statement, Objectives and Guidelines regarding asset allocation, manager selection, security selection, and other objectives directed by the Board.

The Board employs both external investment management firms and internal investment managers to manage the investment portfolio of the System. At fiscal year-end, \$10.0 billion in assets were managed by external public markets managers, \$35.8 billion in assets were managed by internal investment managers, and the remaining \$25.2 billion in pension assets were managed by numerous private equity, private credit, private infrastructure, private real estate investment managers, and absolute return managers.

### Asset Allocation

The Board reviews the long-term asset allocation targets of the System on a periodic basis. The Board consults with its actuary, consultants, Investment Office professionals, and other sources of information it deems appropriate in formulating the asset allocation. The level of risk assumed by the System is largely a result of the asset allocation. The Board, in determining its long-term asset allocation, takes the following factors into consideration:

## Investment Section

---

- The System’s investment time horizon;
- The demographics of the plan participants and beneficiaries;
- The cash flow requirements of the System;
- The actuarial assumptions approved by the Board;
- The funded status of the System;
- The Board’s willingness and ability to take risk; and
- The employers’ (Commonwealth and school districts) financial strength.

In approving the asset allocation for the System, the Board considers capital market expectations for expected return, volatility, and asset class correlations for each asset class, as prepared by its general investment consultant.

PSERS asset allocation targets as of June 30, 2023, are as follows:

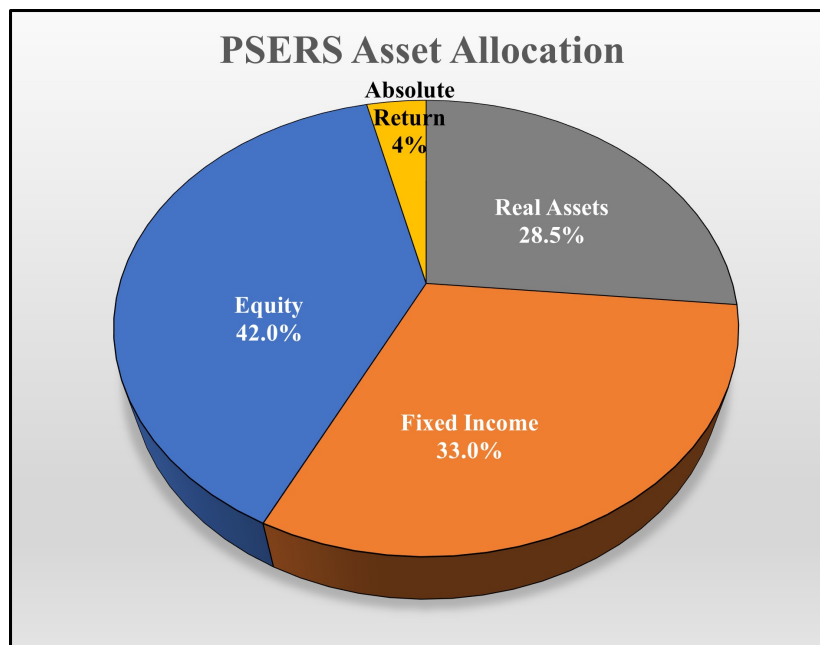
The equity target allocation was 42%, comprised of 30% public equity and 12% private equity. Public equity consisted of an equal split between U.S. equity (15%) and non-U.S. equity (15%). Within U.S. equity, the allocation was diversified across small, mid, and large capitalization equity. Within non-U.S. equity, exposure included international developed markets and emerging markets. Non-U.S. developed markets equity exposure was partially currency-hedged back to the U.S. dollar.

The fixed income target allocation was 33%, comprised of 10% investment grade exposure, 6% public credit-related exposure, 6% private credit-related exposure, and 11% Inflation-protected exposure. Investment grade exposure consisted of U.S. core fixed income (2%) and U.S. long-term treasury bonds (8%). Public credit-related exposure consisted of high yield bonds (4%) and emerging markets debt (2%). The real assets target allocation was 28.5%, comprised of 16.5% public real assets including real estate (4%), infrastructure (5%), commodities (2.5%) and gold (5%). Private real asset exposure of 12% was broken out between private real estate (7%) and private infrastructure (5%).

The System had a target allocation of 4% to absolute return. Any allocation to the absolute return program was with the purpose to generate positive, absolute returns with low volatility and low correlation to the public financial markets and serve to diversify the System’s total portfolio risk.

Leverage was utilized in the asset allocation as a means of gaining exposure to a portion of the above fixed income and real assets asset classes. Leverage was deployed through use of derivative instruments (typically total return swaps) that allow the System to gain market exposure. Total leverage was targeted at (10.5%). (Market convention was to show this with a negative sign.)

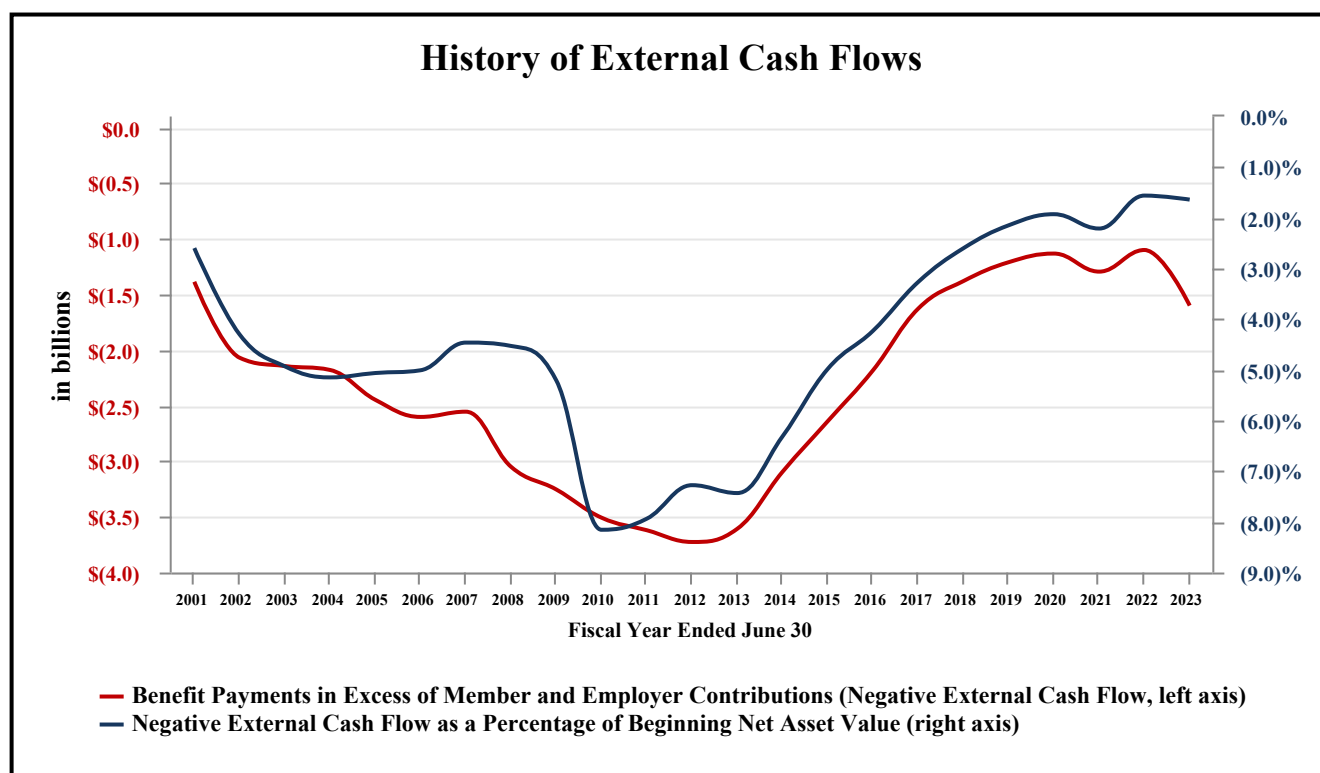
Finally, the System had a 3% allocation to cash, consisting of short-duration, liquid, high quality securities.



Over the fiscal year, the System also participated in a securities lending program administered by Deutsche Bank AG. This program is designed to provide incremental income to the System by lending publicly traded securities in the System's portfolio held by the System's custodial bank, The Bank of New York Mellon, to securities dealers in exchange for cash collateral, which can be reinvested to generate income.

### Liquidity and Cash Flow

The System's asset allocation and risk profile are, in part, driven by its liquidity needs. Over the past 20 fiscal years, the System has paid out \$55.5 billion more in benefits than it has received in member and employer contributions (i.e., the System has experienced negative external cash flow). The average negative external cash flow was approximately \$2.2 billion per year during this period. This annual funding deficiency represents the amount of investment return needed each year to make up the shortfall (For example, if in a given year the System earned 3% on its investments and had a 3% external cash flow shortfall, then the net assets of the System will be unchanged for that year). The negative annual external cash flow has improved significantly since fiscal year 2012 due to the implementation of Act 120 in 2010 (see chart below). Act 120 provided for increased employer contributions to the actuarially determined contribution levels. The annual cash flow shortfall, while much improved, will continue over the next few years and necessitates a larger liquidity position and lower risk profile than a retirement system that has smaller liquidity requirements.



### The Economy and Investment Markets During The Past Fiscal Year

A primary element of PSERS' investment philosophy is diversification among various asset classes as an effective method to realize its goals while addressing uncertainty across capital markets from shifting macroeconomic and geopolitical environments. Over the past year, several such shifts emerged, with three themes (rising interest rates, tighter credit markets, and geopolitical uncertainty) having particular significance.

*Rising Interest Rates* – This fiscal year witnessed a significant shift higher of 350 basis points in the over-night interest rates from 1.50%-1.75% to 5.00%-5.25%. This represents a continuation of rate hikes from last fiscal year as the Federal Reserve seeks to address concerns over higher inflation rates resulting from the fiscal responses to COVID-19 and supply-chain challenges. While inflation concern has subsided somewhat from its highs (core inflation peaked at 6.6% in September 2022, compared to 4.8% as of June 30, 2023), it remains elevated in the face of strong labor markets and buoyant economic activity, making the future of monetary policy direction uncertain. However, the resulting higher rates on cash have implications across



## Investment Section

the entire PSERS portfolio, most notably on the return for holding cash, the cost for employing leverage, and risk-return value proposition for all other asset classes relative to cash.

*Tighter Credit Markets* – Partially because of the higher interest rates described above, Silicon Valley Bank collapsed and was taken over in March 2023. This was followed by takeovers of Signature Bank that same weekend and then First Republic in May. The initial market turbulence and concerns about contagion of cash withdrawals in other regional banks was quickly quelled through decisive government action. However, these events highlighted and exacerbated a shift towards tighter credit markets, particularly for Commercial Real Estate (CRE), as regional banks demonstrated a reduced appetite for this long-term debt given the short-term, and potentially uncertain nature of deposits relied on to fund such debt. Lending for office and retail related inventory has been most acutely impacted as employers have proven reluctant to require employees to return to the office following the shift to online working that occurred in response to COVID-19. Fewer employees coming into the traditional office centers has also translated into less foot traffic for traditional retail located in these centers. The implications of tighter credit markets, together with higher interest rates, lower occupancies and less foot traffic presents risk to the equity holders, particularly where the degree of leverage underlying such properties is high and the related maturities are relatively near. However, this disruption among bank lenders, presents opportunity for lenders with longer term capital to be more discerning within sectors of real estate with better outlooks, such as multifamily and industrial use properties.

*Geopolitical Uncertainty* – While Russia’s invasion of Ukraine most directly impacted capital markets in the prior fiscal year, the resulting geopolitical uncertainty has influenced how investors frame investment choices across geographic regions. The long-standing theme of globalization based on the economics of comparative advantages, has more recently given way to more pragmatic discussions regarding supply chain resiliency or nearshoring/onshoring of activities that had previously been offshored. This further complicates the assessment of relative value across regional classifications, which were already clouded given difference in sector composition, financial reporting transparency, and basic investor rights across jurisdictions. Accordingly, some investors (including PSERS) have revisited and revised long standing strategic over/underweights to certain geographical regions (e.g., Public U.S. relative to Emerging Market equity allocations). We believe this trend will influence the flow of capital across regional classifications and likely impact relative market valuations over the next several years.

The table below summarizes the relative public market benchmark performance for the fiscal year grouped by three of PSERS’ major asset classes.

Indices	FY 22-23
<b>Public Equity</b>	
S&P 500	19.6%
S&P 400	17.6%
S&P 600	9.8%
Nasdaq-100 Index	31.9%
MSCI ACWI x-US IMI Net	12.5%
MSCI Emerging Market IMI	3.2%
<b>Public Fixed Income</b>	
Bloomberg US Aggregate	(0.9%)
Bloomberg US Long Treasury	(6.8%)
PSERS Blended Emerging Markets Bond	7.4%
Bloomberg US Corporate High Yield	9.1%
Bloomberg US TIPS	(1.3%)
Bloomberg World Ex-US ILB Hedged	(6.2%)
<b>Public Real Assets</b>	
FTSE Developed Core 50/50	(1.3%)
Bloomberg Commodity Total Return	(9.6%)
Bloomberg Gold Total Return	6.2%
FTSE EPRA/NAREIT Developed	(4.6%)

## Investment Results

For the one-year period ended June 30, 2023, the System generated a total net of fee return of 3.54%. This return exceeded the total fund Policy Index return of 3.21% by 0.33%. Annualized total net-of-fee returns for the three-, five- and ten-year periods ended June 30, 2023 were 9.66%, 7.30% and 7.46%, respectively. The three-, five- and ten-year returns exceeded the total fund

Policy Index returns by 1.78%, 0.50%, and 0.38%, respectively. Performance is calculated using a time-weighted return methodology.

Asset classes that were significant positive contributors to PSERS performance this past fiscal year included:

- Public Global Equity: 14.6%
- Public Credit-Related Fixed Income: 10.2%
- Private Credit: 8.6%

Asset classes that were significant detractors from PSERS performance this past fiscal year included:

- Public Investment Grade Fixed Income: -5.9%
- Public Inflation Protected Fixed Income : -2.6%

### Current priorities

The Investment Office priorities are in alignment with the PSERS agency-wide strategic plan framework, which were adopted at the August 11<sup>th</sup>, 2023, Board meeting. The three specific initiatives for the Investment Office for the 2023/2024 fiscal year are the continued preparation for the Soc 1, Type 2 review, IBOR/ABOR alignment, and Global Investment Performance Standards (GIPS) compliance. Additionally, we continue to focus on moving towards PSERS revised asset allocation targets, which were also ratified at the August 11<sup>th</sup>, 2023 Board meeting for implementation by October 1<sup>st</sup>, 2023.

**Prepared by PSERS Investment Office:  
Ben Cotton, Chief Investment Officer**

<b>Annualized Time-Weighted Returns (%) Net of Fees (1)</b>				
<b>Periods Ended June 30, 2023</b>				
	<b>1 Year</b>	<b>3 Years</b>	<b>5 Years</b>	<b>10 Years</b>
<b>PSERS Total Portfolio</b>	3.54	9.66	7.30	7.46
Total Fund Policy Index	3.21	7.88	6.80	7.08
Median Public Defined Benefit Plan (DBP) Fund Universe (Aon Investment Consulting Database)	7.64	8.28	6.25	6.94
<b>PSERS U.S. Equity Portfolios</b>	18.32	15.34	11.30	12.40
U.S. Equity Policy Index	18.19	14.89	11.28	12.31
<b>PSERS Non-U.S. Equity Portfolios</b>	11.81	7.29	5.27	7.53
Non-U.S. Equity Policy Index	11.65	7.08	4.10	6.58
<b>PSERS Fixed Income Portfolios (4)</b>	0.53	0.25	3.10	4.60
Fixed Income Policy Index	1.64	(1.49)	2.41	2.87
<b>PSERS Commodity Portfolios (4)</b>	1.04	8.15	5.10	1.44
Commodity Policy Index	1.01	7.83	4.10	(0.06)
<b>PSERS Absolute Return Portfolios</b>	1.67	7.63	4.91	4.55
Absolute Return Policy Index	4.67	7.13	5.83	5.43
<b>PSERS Infrastructure (4)</b>	2.41	10.68	1.94	N/A
Blended Infrastructure Index	-0.91	7.96	2.31	5.87
<b>PSERS Real Estate (hedged) (2) (4)</b>	(1.93)	12.60	9.52	10.85
Blended Real Estate Index (2)	(2.31)	9.62	6.59	8.89
<b>Private Equity (hedged) (3)</b>	1.11	24.90	15.73	12.86
Burgiss Private Equity (3)	(2.90)	21.49	14.84	13.81

1. For more specific details on policy indices, refer to PSERS Investment Policy Statement at [www.pasers.pa.gov](http://www.pasers.pa.gov).
2. Returns reported on a one-quarter lag, except for publicly traded real estate security investments.
3. Returns reported on a one-quarter lag.
4. Returns are presented on an unleveraged basis for comparability purposes to the Policy Index.

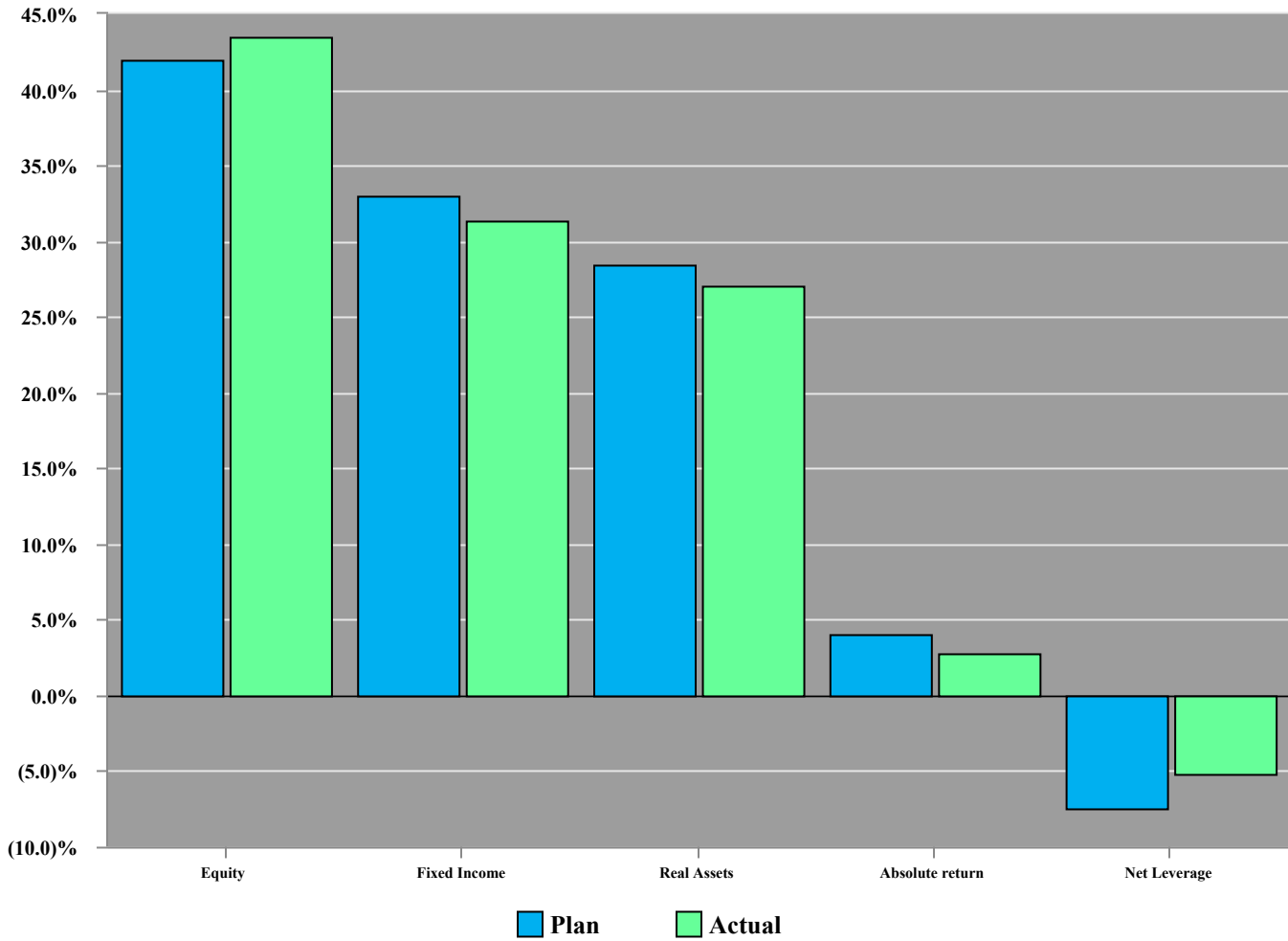


**Portfolio Summary Statistics**  
**Asset Allocation Basis**  
**As of June 30, 2023**  
(Dollar Amounts in Thousands)

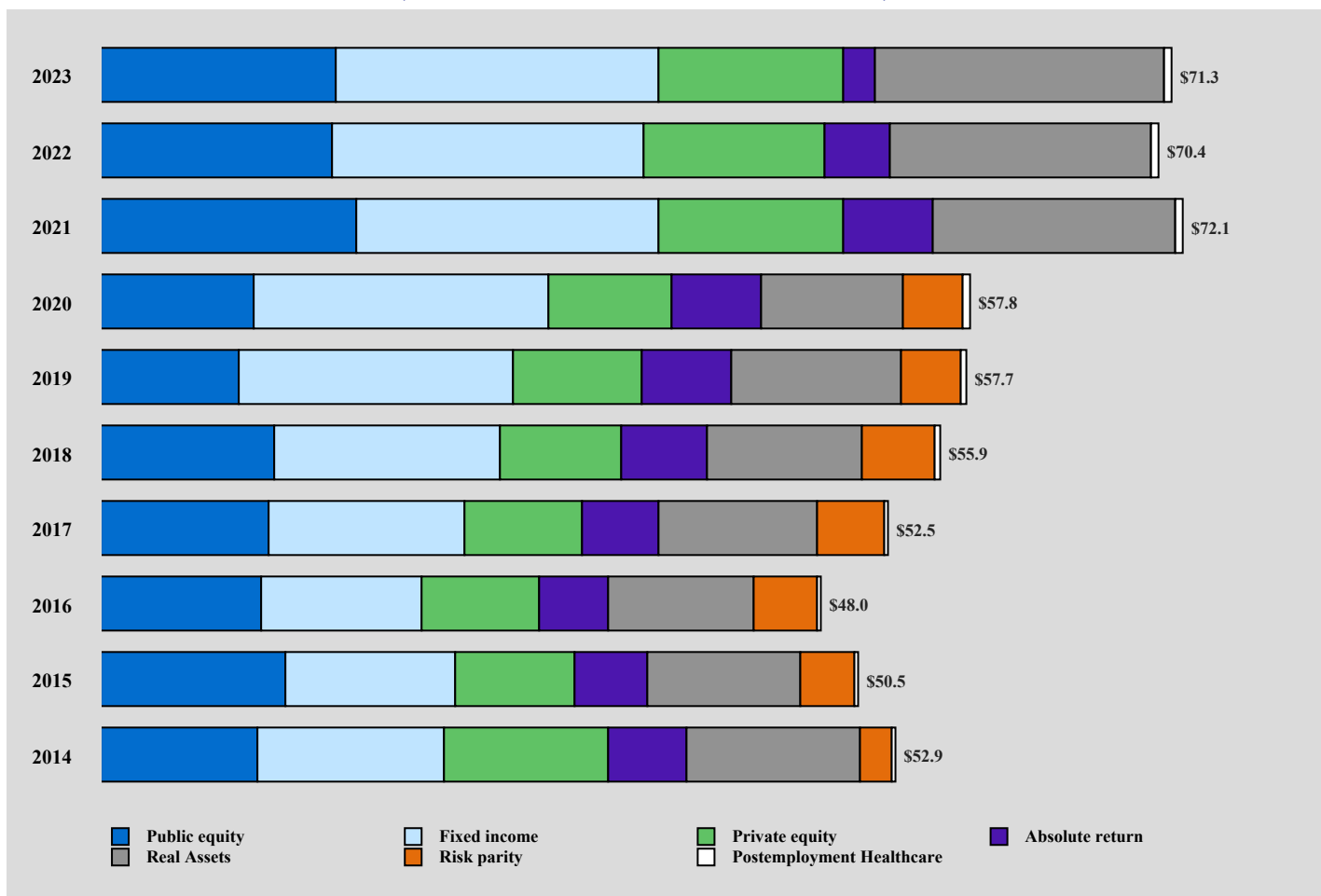
Pension investments	Fair Value	% Fair Value
<b>Public Equity:</b>		
<b>U.S. Equity</b>		
Large Cap	\$ 7,151,952	10.1
Mid and Small Cap	2,306,711	3.2
<b>Non-U.S. Equity</b>		
Large and Mid Cap	6,936,759	9.8
Small Cap	555,653	0.8
Emerging Markets	1,891,163	2.7
<b>Private Equity</b>	12,789,319	18.0
<b>Total Equity</b>	<b>31,631,557</b>	<b>44.6</b>
<b>Public Fixed Income:</b>		
<b>Investment Grade Fixed Income</b>		
U.S. Core	1,112,824	1.6
U.S. Long Treasuries	5,494,605	7.7
<b>Credit-Related Fixed Income</b>		
Emerging Markets	905,312	1.3
U.S. High Yield	2,085,216	2.9
<b>Inflation Protected Fixed Income</b>		
U.S. Inflation Protected	6,853,851	9.7
Non-U.S. Inflation Protected	634,176	0.9
<b>Private Fixed Income</b>	5,175,199	7.3
<b>Total Fixed Income</b>	<b>22,261,183</b>	<b>31.4</b>
<b>Public Real Assets:</b>		
<b>Public Infrastructure</b>	4,959,517	7.0
<b>Public Commodities</b>		
Broad Commodities	1,584,052	2.2
Gold	3,360,570	4.7
<b>Public Real Estate</b>	1,427,052	2.0
<b>Private Real Assets:</b>		
Private Infrastructure	1,682,315	2.4
Private Real Estate	5,755,416	8.1
<b>Total Real Asset</b>	<b>18,768,922</b>	<b>26.4</b>
<b>Absolute Return</b>	<b>2,050,902</b>	<b>2.8</b>
<b>Leverage:</b>		
Leverage	(6,337,337)	(8.9)
Cash and Cash Equivalents	2,626,636	3.7
<b>Total Net Leverage</b>	<b>(3,710,701)</b>	<b>(5.2)</b>
<b>Total Pension investments</b>	<b>71,001,863</b>	<b>100.0</b>
<b>Postemployment Healthcare investments</b>	<b>529,247</b>	<b>100.0</b>
<b>Defined Contribution plan investments</b>	<b>202,766</b>	<b>100.0</b>

### Comparison of Actual Portfolio Distribution to Asset Allocation Plan - Pension Investments \* As of June 30, 2023

Asset Category	Plan	Actual
Equity	42.0%	44.6%
Fixed Income	33.0	31.4
Real Assets	28.5	26.4
Absolute return	4.0	2.8
Net Leverage	(7.5)	(5.2)
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>



### Portfolio Capital Distribution 10 Year Trend\* (Fair Value - Dollar Amounts in Billions)



\*Defined Contribution Plan and Tail Risk Mitigation are not included in the above chart.

**Equity**  
**10 Largest Holdings in Descending Order by Fair Value**  
**As of June 30, 2023**  
(Dollar Amounts and Shares in Thousands)

Description	No. of Shares	Fair Value
Apple Inc.	2,579	\$ 500,161
Microsoft Corporation	1,297	441,603
Nextera Energy, Inc.	2,906	215,620
Amazon.com, Inc.	1,557	202,946
Transurban Group	20,980	199,008
Aena S.M.E., S.A.	1,223	197,427
iShares MSCI ETF	3,881	191,294
NVIDIA CORPORATION	431	182,458
The Southern Company	2,017	141,671
American Tower REIT, Inc.	730	141,491
<b>Total of 10 Largest Holdings</b>		<b>\$ 2,413,679</b>

**Fixed Income**  
**10 Largest Holdings in Descending Order by Fair Value**  
**As of June 30, 2023**  
(Dollar Amounts and Shares in Thousands)

Description	No. of Shares	Fair Value
iShares J.P. Morgan USD Emerging Markets Bond ETF, December 31, 2049	6,219	\$ 538,188
iShares Core U.S. Aggregate Bond ETF	5,197	509,045
U.S.A. Treasury Note, 5.4177%, April, 30, 2025	250,000	250,173
U.S.A. Treasury Note, 5.4487%, January 31, 2025	240,000	240,384
U.S.A. TIPS 1.125%, January 15, 2033	178,271	171,003
U.S.A. Treasury Bond, 4.00%, November 15, 2052	149,000	153,144
U.S.A. TIPS 0.625%, January 15, 2026	156,991	149,751
U.S.A. TIPS 0.250%, January 15, 2025	153,277	146,950
U.S.A. Treasury Bond, 2.375%, May 15, 2051	195,900	145,701
U.S.A. TIPS 0.125%, January 15, 2031	163,199	145,128
<b>Total of 10 Largest Holdings</b>		<b>\$ 2,449,467</b>

**Postemployment Healthcare Investments**  
**Holdings in Descending Order by Fair Value**  
**As of June 30, 2023**  
(Dollar Amounts in Thousands)

Description	Maturity Date	Interest Rate (%)	Par Value	Fair Value
Wilmington US Government MM	N/A	Various	\$ 284,745	\$ 284,745
PSERS Short-Term Investment Fund	Various	Various	205,059	205,059
<b>Total Holdings*</b>				<b><u>\$ 489,804</u></b>

\*Excludes Cash on Deposit

**Defined Contribution Plan Investments**  
**10 Largest Holdings in Descending Order by Fair Value**  
**As of June 30, 2023**  
(Dollar Amounts and Shares in Thousands)

Description	No. of Shares	Fair Value
T Rowe Price Target Date 2060	4,057	\$ 61,548
T Rowe Price Target Date 2065	2,275	28,322
T Rowe Price Target Date 2055	1,772	25,516
T Rowe Price Target Date 2050	1,347	19,402
T Rowe Price Target Date 2045	1,117	16,076
T Rowe Price Target Date 2040	919	13,025
T Rowe Price Target Date 2035	780	10,812
T Rowe Price Target Date 2030	566	7,636
Vanguard® Treasury Money Market	5,347	5,347
PSERS Short-Term Investment Fund	N/A	4,844
<b>Total of 10 Largest Holdings</b>		<b><u>\$ 192,528</u></b>

Information on the complete holdings of the System can be downloaded from the PSERS website at [www.psers.pa.gov](http://www.psers.pa.gov).

**Comparison of Investment Activity Income**  
**Fiscal Years Ended June 30, 2023 and 2022**  
(Dollar Amounts in Thousands)

Investment Activity	2023	2022
Net appreciation (depreciation) in fair value of investments	\$ 1,336,804	\$ (1,781,150)
Short-term	276,739	23,385
Fixed income	663,883	556,068
Equity	445,086	416,326
Collective trust funds	981	477
Real estate	188,922	455,027
Alternative investments	300,455	547,142
<b>Total investment activity income</b>	<b>\$ 3,212,870</b>	<b>\$ 217,275</b>

Brokers' fees on equity investment transactions for the fiscal year ended June 30, 2023, were \$2.6 million. The System has commission recapture contracts with several brokers. These contracts generally stipulate that the brokers rebate a percentage of commissions earned on investment transactions directly to the System. During the fiscal year ended June 30, 2023, the System earned \$16,000 from a commissions recapture program. A list of the individual brokers receiving fees in excess of \$100,000 during the fiscal year, as well as all other brokers (receiving fees less than \$100,000) is as follows:

**Schedule of Broker Commissions**  
**Fiscal Year Ended June 30, 2023**

Brokerage Firm	Commissions Paid	Shares	Average Commission Per Share
Instinet LLC	\$ 433,278	156,100,826	\$ 0.003
Fimat USA Inc.	252,375	101,355	2.490
Liquidnet, Inc	179,540	22,300,844	0.008
Macquarie Bank Ltd.	135,121	92,549,200	0.001
All other brokers (less than \$100,000)	1,569,604	592,564,530	0.003
<b>Total</b>	<b>\$ 2,569,918</b>	<b>863,616,755</b>	<b>\$ 2.505</b>



**Professional Consultants**  
**Roster of Investment Managers, Advisors, and Consultants**  
**As of June 30, 2023**

**Absolute Return Managers**

- ◆ Aeolus Capital Management, Ltd.
- ◆ Bridgewater Associates, LP
- ◆ Capula Investment Management, LLP
- ◆ Carlyle Aviation Management Limited
- ◆ Falko Regional Aircraft Limited
- ◆ Garda Capital Partners, LP
- ◆ HS Group Ltd.
- ◆ Independence Reinsurance Partners GP, LLC
- ◆ Nephila Capital, Ltd.
- ◆ Oceanwood Capital Management, Ltd.
- ◆ One William Street Capital Management, LP
- ◆ Venor Capital Management, LP

**Non-U.S. Public Equity Managers**

- ◆ Acadian Asset Management, LLC
- ◆ Baillie Gifford Overseas, Ltd.
- ◆ BlackRock Institutional Trust Company, N.A.
- ◆ Cederberg Capital
- ◆ Effissimo Capital Management Pte. Ltd.
- ◆ Marathon Asset Management Limited
- ◆ Oberweis Asset Management, Inc.
- ◆ Steadview Capital Partners, LP
- ◆ The Children's Investment Fund, LP
- ◆ Wasatch Advisors, Inc.

**Tail Risk Mitigation Manager**

- ◆ Capstone

**Fixed Income Managers**

**U.S. High Yield Fixed Income Managers**

- ◆ Bain Capital Credit, LP
- ◆ BlackRock Institutional Trust Company, N.A.
- ◆ Caspian Capital, LP

**Private Credit Managers**

- ◆ Apollo Global Management, LLC
- ◆ Ares SSG Capital Management Limited
- ◆ Avenue Capital Group
- ◆ Bain Capital Credit, LP
- ◆ Cerberus Business Finance, LLC
- ◆ Clearlake Capital Group, LP
- ◆ Galton Capital Group, LLC
- ◆ Hayfin Capital Management, LLP
- ◆ Intermediate Capital Group PLC
- ◆ LaSalle Mortgage Real Estate Investors
- ◆ LBC Credit Management, LP
- ◆ Newmarket Global Management, LP
- ◆ Pacific Investment Management Company, LLC
- ◆ Park Square Capital, LLC
- ◆ Sixth Street Partners, LLC
- ◆ Summit Partners
- ◆ TCI Fund Management Limited
- ◆ The Carlyle Group
- ◆ Vårde Partners, Inc.
- ◆ Whitehorse Liquidity Partners, Inc.

**Emerging Markets Debt Manager**

- ◆ Franklin Templeton Investments

**Non-U.S. Inflation-Linked Securities Manager**

- ◆ Bridgewater Associates, LP

**LIBOR-Plus Short-Term Investment Pool Manager**

- ◆ Radcliffe Capital Management

**Real Assets**

**Commodity Managers**

- ◆ Denham Capital Management, LP
- ◆ Gresham Investment Management, LLC
- ◆ NGP Energy Capital Management

**Professional Consultants (Continued)**

**Farmland Advisor**

- ◆ Prudential Agricultural Group

**Private Infrastructure Managers**

- ◆ Blackstone Group
- ◆ Brookfield Asset Management, Inc.
- ◆ CIM Group, LLC
- ◆ GCM Grosvenor
- ◆ I Squared Capital
- ◆ Newmarket Global Management, LP

**Publicly Traded Real Estate Securities Manager**

- ◆ Security Capital Research & Management, Inc

**Real Estate Advisors**

- ◆ Bell Partners, Inc.
- ◆ GF Management, Inc.
- ◆ L&B Realty Advisors
- ◆ O'Connor Real Estate Advisors, LLC.
- ◆ Property Management, Inc.
- ◆ Stockbridge Capital Partners

**Private Real Estate Fund Managers**

- ◆ Almanac Realty Investors, LLC
- ◆ Angelo, Gordon & Co., LP
- ◆ Ares Management, LLC
- ◆ Avenue Capital Group
- ◆ Bell Partners, Inc.
- ◆ BlackRock Real Estate
- ◆ Blackstone Group
- ◆ Brookfield Asset Management, Inc.
- ◆ Cabot Properties, Inc.
- ◆ C-III Capital Partners, LLC
- ◆ DRA Advisors, LLC
- ◆ Exeter Property Group
- ◆ Fortress Investment Group
- ◆ GF Management, Inc.
- ◆ LaSalle Mortgage Real Estate Investors
- ◆ LEM Capital Partners, LP

- ◆ O'Connor Capital Partners
- ◆ LEM Capital Partners, LP
- ◆ O'Connor Capital Partners
- ◆ Paramount Group, Inc.
- ◆ PGIM Real Estate
- ◆ RCG Longview Management, LLC
- ◆ Silverpeak Real Estate Partners
- ◆ Stockbridge Capital Partners
- ◆ The Carlyle Group
- ◆ UBS Realty Investors, LLC

**Currency Hedging Manager**

- ◆ Insight Investment International Limited

**Private Equity Fund Managers**

- ◆ Actis, LLP
- ◆ Adams Capital Management, Inc.
- ◆ Aisling Capital, LLC
- ◆ APAX Partners, LLP
- ◆ Apogem Capital, LLC
- ◆ Apollo Global Management, LLC
- ◆ Ares Management Corporation
- ◆ Arrowhead Mezzanine
- ◆ Avenue Capital Group
- ◆ Bain Capital Investors, LLC
- ◆ Baring Private Equity Asia Limited
- ◆ Black Diamond Capital Management, LLC
- ◆ Blackstone Group
- ◆ Blue Point Capital Partners LLC
- ◆ Bridgepoint Capital, LTD
- ◆ Bryn Mawr Trust
- ◆ Capital Group
- ◆ Cerberus Capital Management, LLC
- ◆ Cinven
- ◆ Clearlake Capital Group, LP
- ◆ Coller Investment Management, LTD
- ◆ Crestview Advisors LLC
- ◆ Cross-Atlantic Capital Partners
- ◆ CVC Capital Partners Group
- ◆ Denham Capital
- ◆ Equistone Partners Europe Limited
- ◆ First Reserve Corporation

**Professional Consultants (Continued)**

- ◆ Gold Hill Venture Lending 03, LLC
- ◆ Greenoaks Capital
- ◆ Hahn & Co.
- ◆ HgCapital
- ◆ Huntsman Gay Global Capital LLC
- ◆ Incline Management Corp
- ◆ Insight Venture Management, LLC
- ◆ IPC Advisors
- ◆ K4 Capital Advisors
- ◆ L Catterton Management Company, LLC
- ◆ Lindsay Goldberg & Bessermer
- ◆ LLR Partners
- ◆ Milestone Partners
- ◆ Morgan Stanley
- ◆ New Mountain Investments
- ◆ NGP Energy Capital Management
- ◆ Oak HC/FT Management Company, LLC
- ◆ Oaktree Capital Management, LP
- ◆ Odyssey Investment Partners, LLC
- ◆ Orchid Asia
- ◆ PAI Europe
- ◆ Palladium Equity Partners
- ◆ Partners Group Mgt VI, LTD
- ◆ Platium Equity Advisors, LLC
- ◆ Polaris Capital Group, LTD
- ◆ Portfolio Advisors, LLC
- ◆ Sante Ventures
- ◆ SCP Private Equity Partners
- ◆ Searchlight Capital Partners, LP
- ◆ StarVest Associates
- ◆ StepStone Group
- ◆ Sterling Partners
- ◆ Summit Partners
- ◆ Tenaya Capital
- ◆ The Energy & Minerals Group
- ◆ Trilantic Capital Management, LLC
- ◆ Tulco Management, LLC
- ◆ Valar Ventures LLC
- ◆ Venor Capital Management, LP
- ◆ Versa Capital Management, LLC
- ◆ Webster Capital Management, LLC

**Custodian Bank**

- ◆ The Bank of New York Mellon Corporation

**Securities Lending Agent**

- ◆ Deutsche Bank AG

**Investment Accounting Application Service Provider**

- ◆ STP Investment Services, LLC

**Proxy Voting Agent**

- ◆ Glass, Lewis & Co., LLC

**Board Investment Consultant**

- ◆ Verus Advisory, Inc.

**General Investment Consultant**

- ◆ Aon Investments USA Inc.

**Absolute Return, Private Equity, Private Real Estate, Private Credit, and Private Infrastructure Investment Consultant**

- ◆ Aksia, LLC

**Risk Management System**

- ◆ BlackRock Solutions

**Defined Contribution Investment Consultant**

- ◆ CAPTRUST Financial Advisors

**General Pension Consultant**

- ◆ Ernst & Young US LLP

