

Asset Liability Management: Further Discussion

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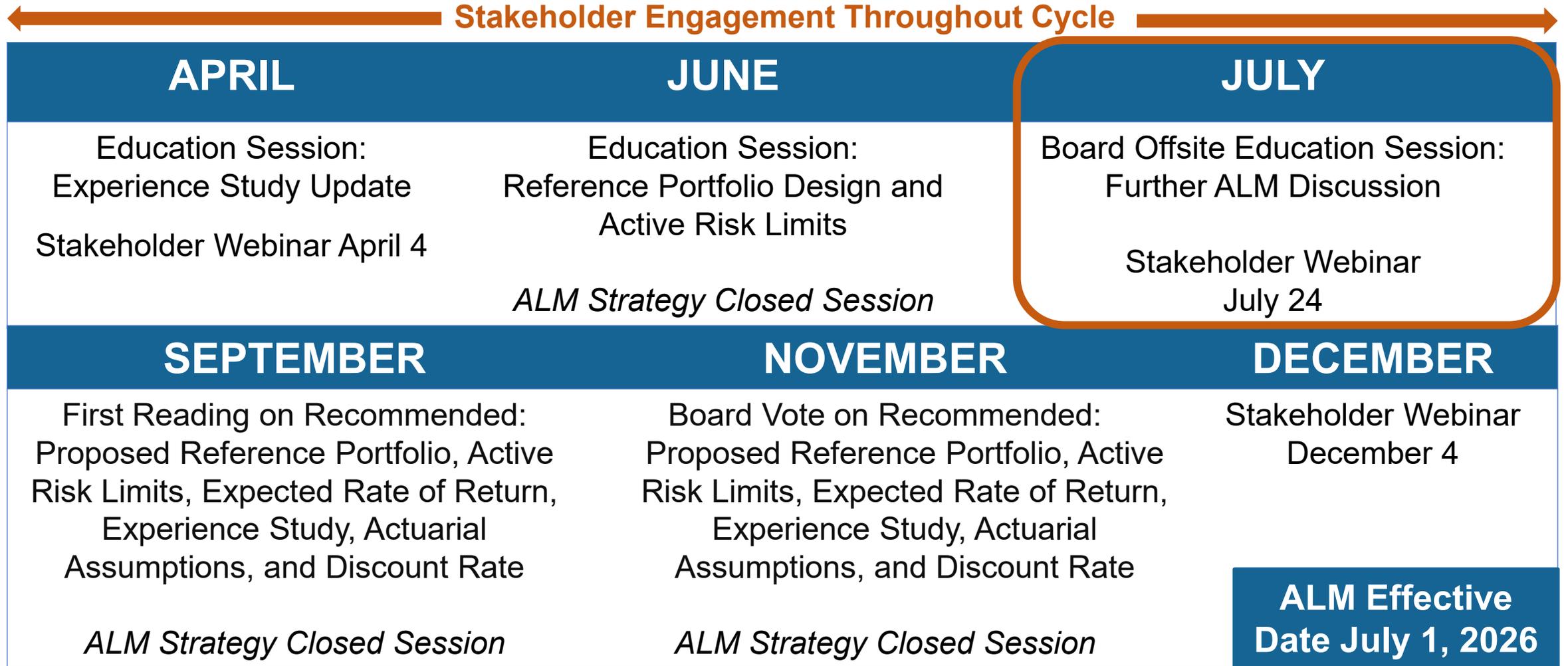
Today's Presentation

How Performance Reporting Will Change Under TPA

Sample TPA Trust Level Review Report Template

Appendix

2025 Asset Liability Management (ALM) Timeline



Investment Reporting

Current Reports

Board Reports

- 1 Annual Fiscal Year End Trust Level Review (TLR)
- 3 Quarterly TLRs
- 7 Annual Program Reviews (APR)
- 1 Annual Board Consultant TLR Report
- Ad Hoc Investment Strategy Reports

Standards Based Reports*

- Annual Comprehensive Financial Report (ACFR)*
- Annual Investment Performance (AIR) Report*
- Annual Global Investment Performance Standards (GIPS) Report*

Changes Under TPA

- No Change to Frequency of Quarterly & Annual TLR
- APRs Integrated into the Annual TLR for One Complete Discussion of All Total Fund Strategies
- New In-Depth Program Strategy Reviews
- Benchmarks and Risk Metrics Will Change to Align With TPA
- Simpler and Streamlined Reports with Dashboards

Trust Level Review Reporting Changes*

Current Trust Level Review

- I. PERF Summary
 - I. High level metrics & highlights
 - II. Performance Tables
 - I. 20, 10, 5, 1, FYTD, 1-Qtr
 - II. Total PERF, by asset class and segment, benchmark, excess, cumulative value added
 - III. Affiliate Funds
 - III. Markets and Economy
 - I. Macroeconomic drivers & outlook
 - IV. PERF Allocation
 - I. Allocation vs weights vs interim targets vs policy bands
 - V. PERF Risk Detail
 - I. Volatility and Risk Decomposition
- Appendices: PERF Benchmarks & Definitions

TPA Trust Level Review

- I. CIO Overview*
 - II. Total Fund Risk* & Performance* Dashboards
 - III. Performance Table
 - I. 20, 10, 5, 1, FYTD, ending value & weight*
 - II. Total PERF, by Program, funding mix* & universe benchmark*
 - IV. Economic & Market Conditions, Return Expectations*
 - V. Portfolio Risk Drivers*
 - I. Total risk and active risk drivers*
 - II. Liquidity risk*
 - VI. Sustainable Investing
 - VII. Operational Updates
- Appendices

Sample TPA Trust Level Review Template

CIO Overview*

Key Market Impacts to PERF

Macroeconomic Outlook

- The near-term macroeconomic outlook softening but evidence of a sudden stop or rapid deterioration is not clear in the data to date
- The long-run outlook points to weakening US fundamentals relative to starting position (high) and vis-a-vis selected countries.

Market Commentary

- US long-dated bond yields continue to rise, driven by term premia and expected inflation components. Long-dated bonds are around long-run fair value.
- Equity risk premia continues to compress (overvalued US equity markets) as forward earnings expectations moderate by less than yields move higher

Portfolio Strategy and Positioning

- Strategy continues to be characterized by a measured but steady increase in active risk taking across public and private strategies
- Portfolio is positioned with ample dry powder to support this growth while retaining significant reserve to take advantage of potential opportunities

TPA Reporting Template Example

*Denotes changes from current reporting

PERF Portfolio as of May 31, 2025	
\$542.1 bn Assets Under Management	
Asset Class	PERF Weight
Public Equities	39.1%
Income	30.7%
Private Equity**	17.9%
Real Estate**	9.5%
Infrastructure**	3.7%
Private Debt**	3.8%
Opportunistic/Other**	0.5%
Financing & Liquidity	-5.2%

Total Fund Dashboard*

As of March 31, 2025

TPA Reporting Template Example

*Denotes changes from current reporting

Governance

On Target

Policy Exceptions

Current: 0
FYTD: 0

Data as of 3/31/25 | Updated Quarterly

On Target

Portfolio Equity Equivalent Risk

Operating Range: 65-75%

Current: 70%

Data as of 3/31/25 | Updated Quarterly/

On Target

Active Risk

Operating Range: 250-350 bps

Current: 230 bps

Data as of 3/31/25 | Updated Quarterly

Liquidity

On Target

Surplus Accessible Liquidity

Current: \$35.6 bn
% Change Since Last Qtr: (18%)

Data as of 3/31/25 | Updated Quarterly

On Target

Total Fund Leverage

Current Limit 20%

Current: 8%

Data as of 3/31/25 | Updated Quarterly

Market Risk

On Target

Volatility

Current: 11.5%

Data as of 3/31/25 | Updated Quarterly

On Target

Sustainability

\$100 bn by 2030

Current Allocation: \$50.1 bn
Performance To Date: n/a**

Data as of 6/30/24 | Updated Annually

Expected Returns

20-Yr Return **On Target**

Total Portfolio: 6.8%

Reference Portfolio:
Median: 6.2%
Range: 4.4% - 7.5%

Value Add: 60 bps [40-80 bps]

Equilibrium Return **On Target**

Total Portfolio: 7.6%

Reference Portfolio:
Median: 7.0%
Range: 6.0% - 7.5%

Value Add: 60 bps [40-80 bps]

Data as of 3/31/25 | Updated Quarterly

Demonstrative Example

Realized Returns

At Risk

20-Yr Return

Annual Discount Rate: 7.4%

Total Portfolio: 6.5%

On Target

5-Yr Return

Annual Discount Rate: 6.9%

Total Portfolio: 8.7%

At Risk

FYTD Return

Annual Discount Rate: 6.8%

Total Portfolio: 5.6%

Reference Portfolio: 4.3%

Value Add: 128 bps

Data as of 3/31/25 | Updated Quarterly

Historic SAA Reporting Format

Prospective TPA Reporting Format

Performance Table

TPA Reporting Template Example

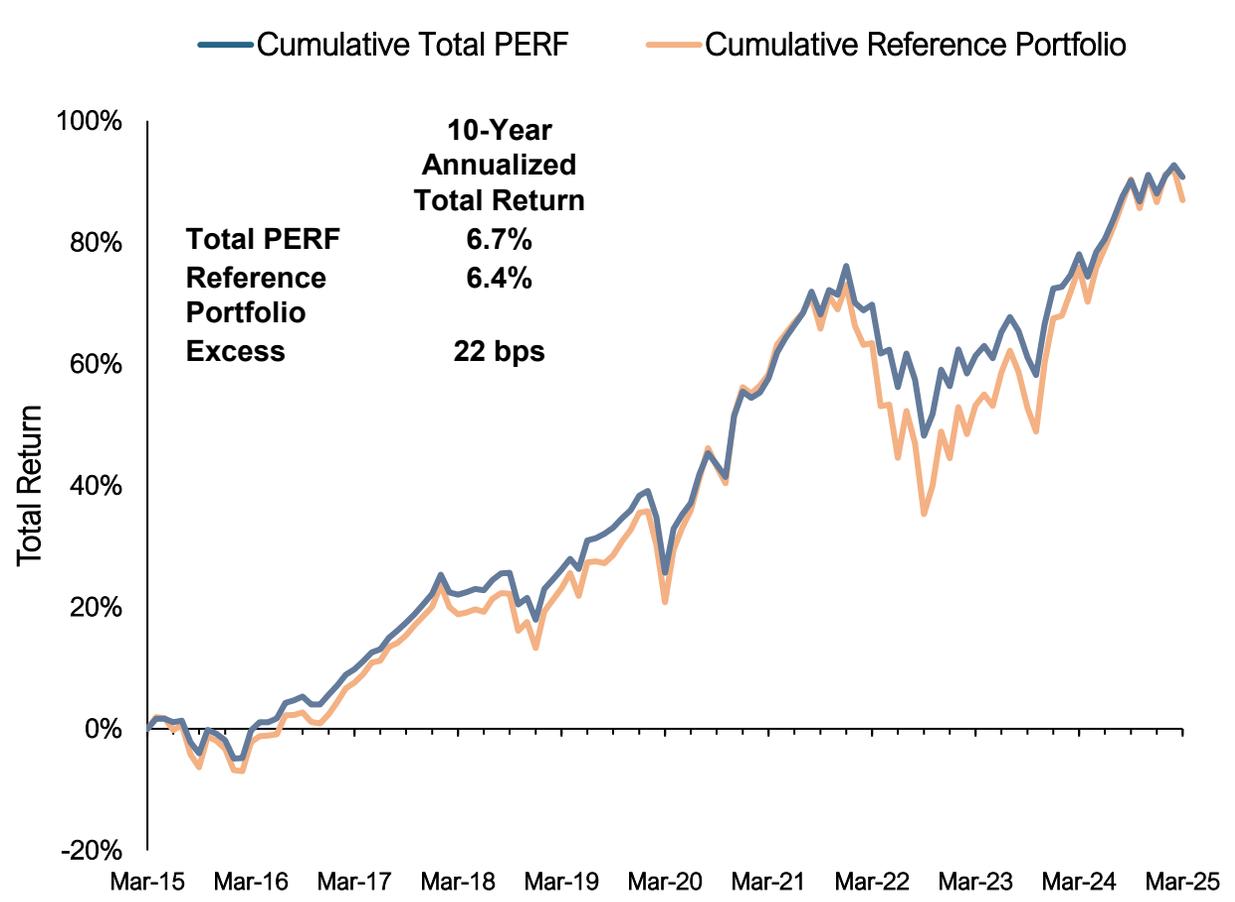
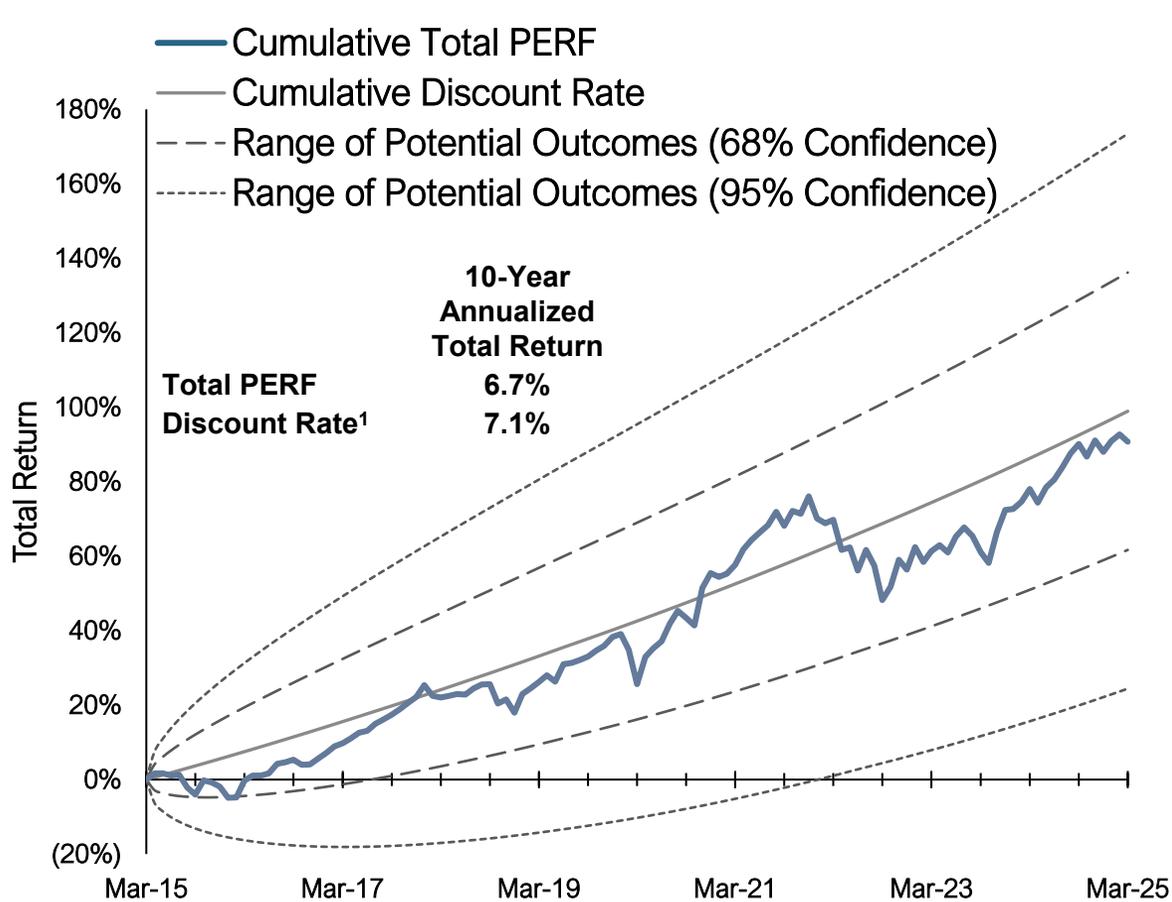
*Denotes changes from current reporting

Funding Mix is Proprietary Investment Strategy and Shared in Closed Session

	Ending Asset Value (\$ bn)	Ending Weight (%) *	20-Year Total Return (%)	20-Year Excess Return (bps)	10-Year Total Return (%)	10-Year Excess Return (bps)	5-Year Total Return (%)	5-Year Excess Return (bps)	1-Year Total Return (%)	1-Year Excess Return (bps)	Fiscal YTD Total Return (%)	Fiscal YTD Excess Return (bps)
Total PERF Reference Portfolio	527.3	100.0	6.5	tbd	6.7	22	8.7	(41)	7.1	84	5.6	128
Public Equity	205.3	38.9	7.7		8.8		14.7		8.3		6.0	
Funding Mix *			tbd	tbd	tbd	tbd	15.2	(48)	7.2	113	4.2	180
Universe Benchmark *			7.9	(12)	8.7	13	14.4	26	7.8	45	5.7	28
Income	167.8	31.8	4.5		2.2		(0.1)		4.9		4.8	
Funding Mix			tbd	tbd	tbd	tbd	0.8	(95)	5.1	(17)	4.4	45
Universe Benchmark			3.9	57	1.9	36	(0.5)	34	4.6	33	4.6	23
Private Equity	92.2	17.5	12.0		11.3		12.8		11.3		7.6	
Funding Mix			tbd	tbd	tbd	tbd	16.6	(383)	7.3	403	4.1	342
Universe Benchmark			13.3	(132)	13.8	(245)	13.7	(89)	5.9	543	4.6	297
Real Estate	50.4	9.6	3.2		4.9		1.6		(1.9)		0.0	
Funding Mix			tbd	tbd	tbd	tbd	7.0	(541)	5.9	(785)	4.4	(433)
Universe Benchmark			5.5	(230)	4.9	(2)	2.0	(39)	(2.3)	39	0.3	(27)
Infrastructure	19.7	3.7	-		9.3		6.5		9.7		6.9	
Funding Mix			-	-	tbd	tbd	7.0	(52)	5.9	375	4.3	255
Universe Benchmark			-	-	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd
Private Debt	19.4	3.7	-		-		-		13.5		7.8	
Funding Mix			-	-	-	-	-	-	6.2	725	4.0	382
Universe Benchmark			-	-	-	-	-	-	tbd	tbd	tbd	tbd
Opportunistic/Other	0.7	0.1	tbd		tbd		tbd		tbd		tbd	
Funding Mix			tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd
Universe Benchmark			tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd
Financing & Liquidity	(28.2)	(5.3)	tbd		tbd		tbd		tbd		tbd	
Funding Mix			tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd

Long-Term Performance

10-Year Performance vs Range of Outcomes

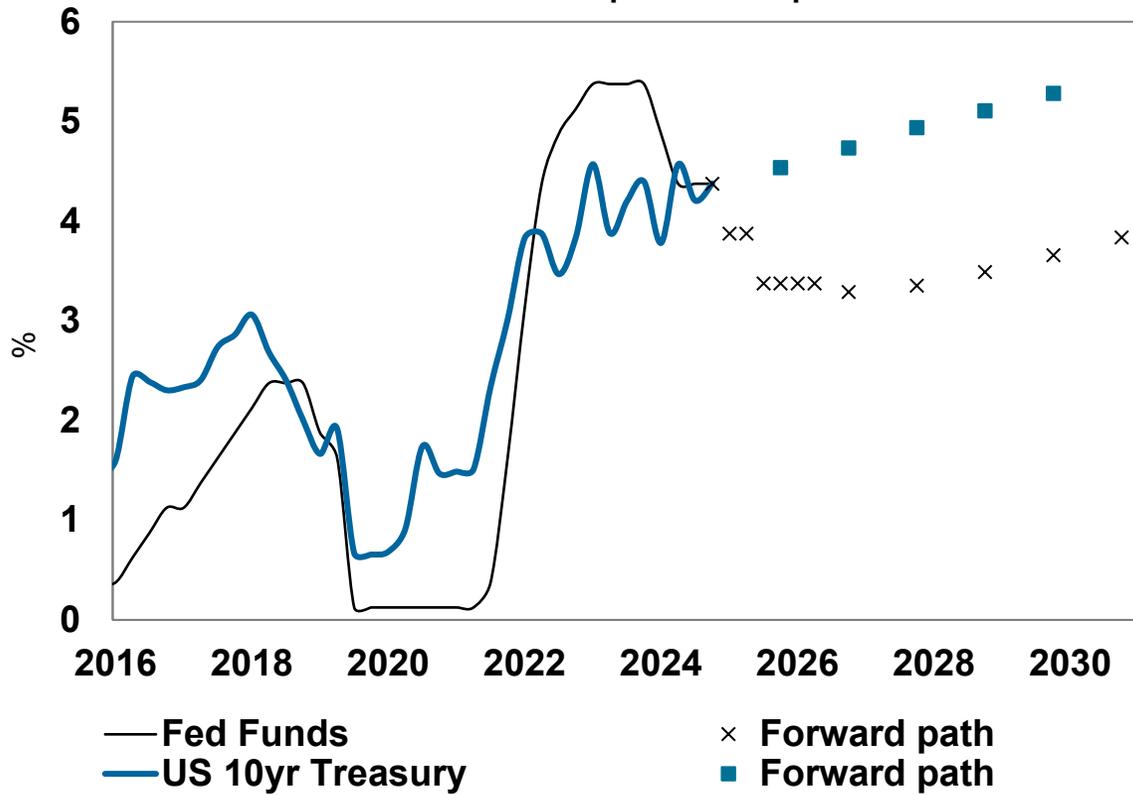


¹The discount rate return reflects changes in the discount rate over time. The Reference Portfolio used is hypothetical, and the information shown is for illustrative purposes only

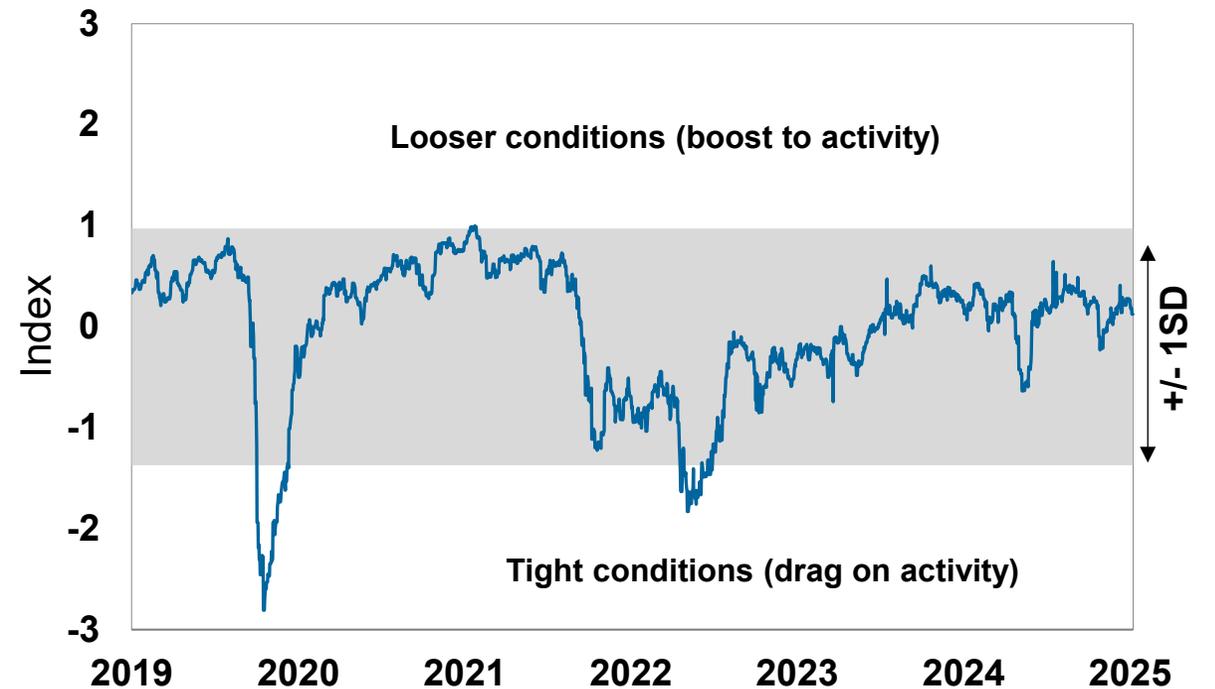
Economic & Market Conditions

Macroeconomic Indicators

Fed Funds rate and 10-year Treasury yield
Historical and market implied future path

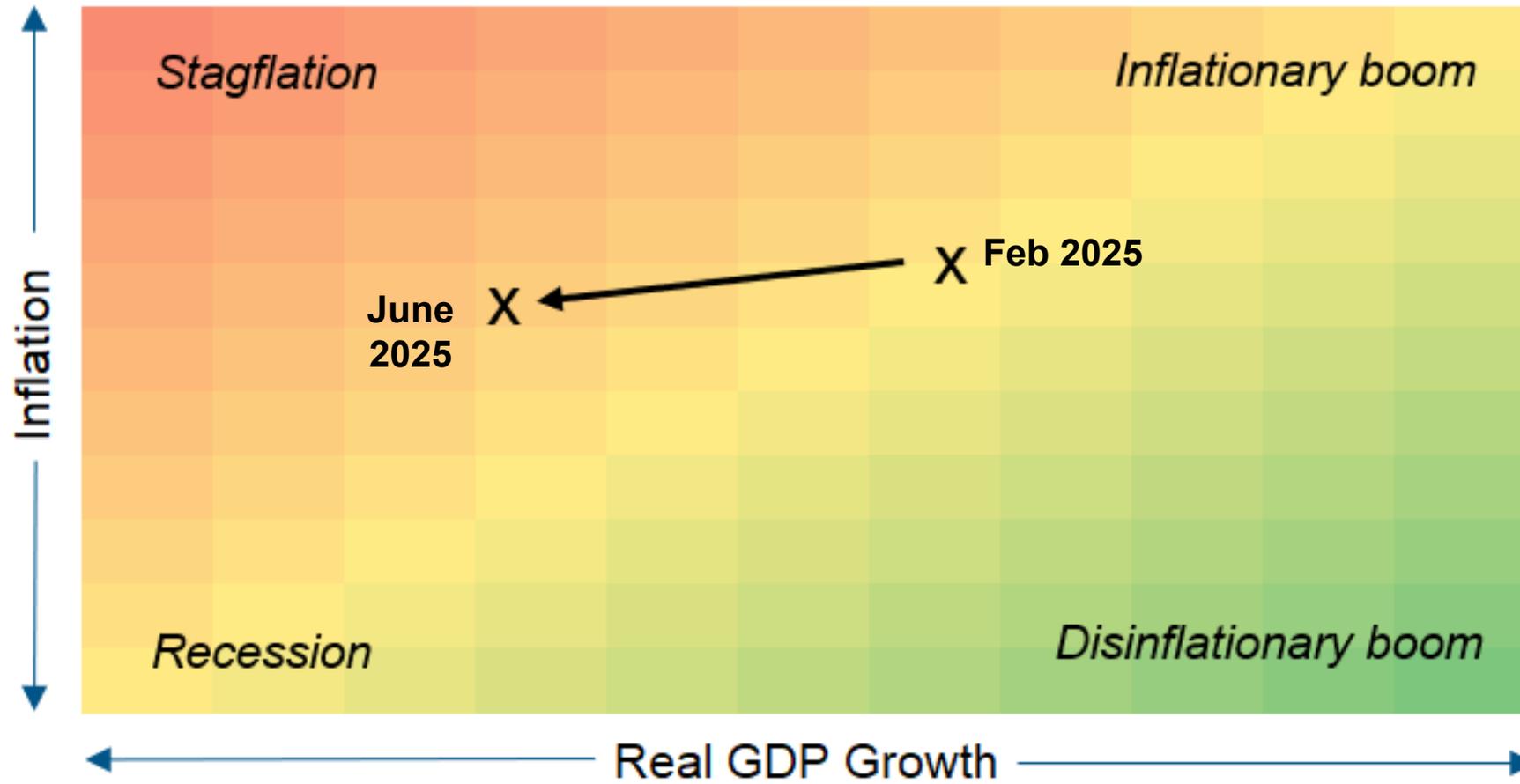


Global Financial Conditions Index (FCI)



Economic Conditions Scenarios

Slowing GDP Growth

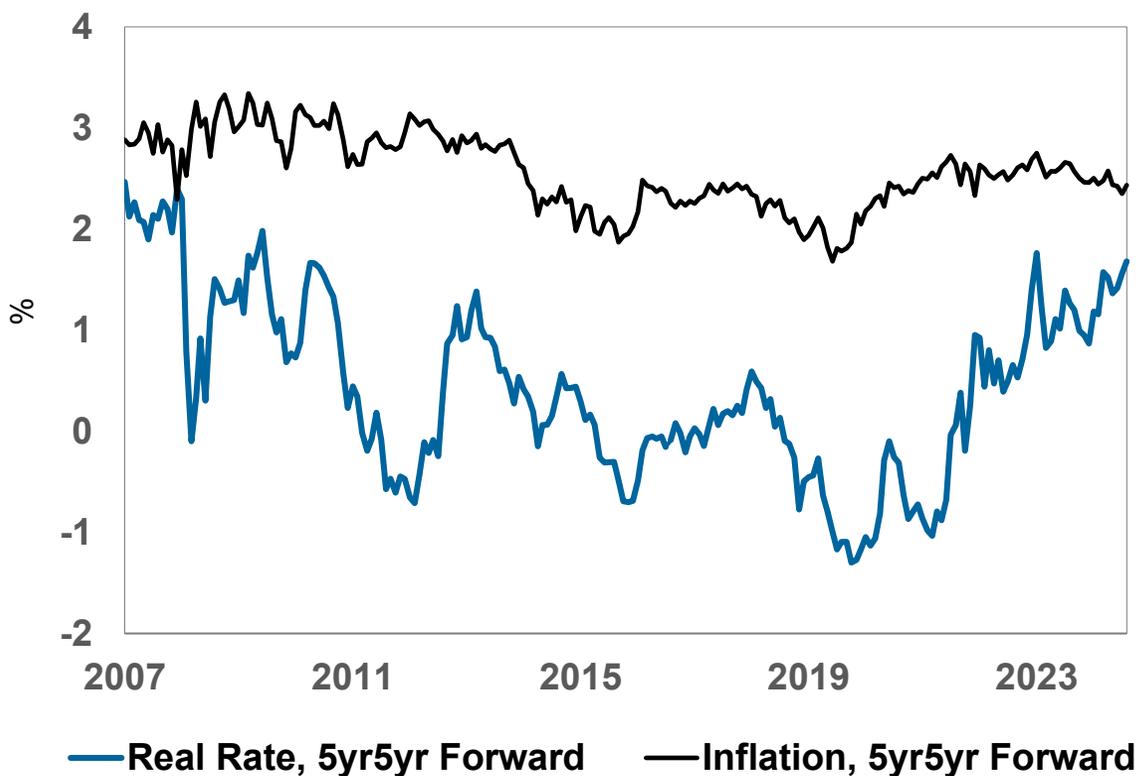


Footnote in Appendix, slide 23.

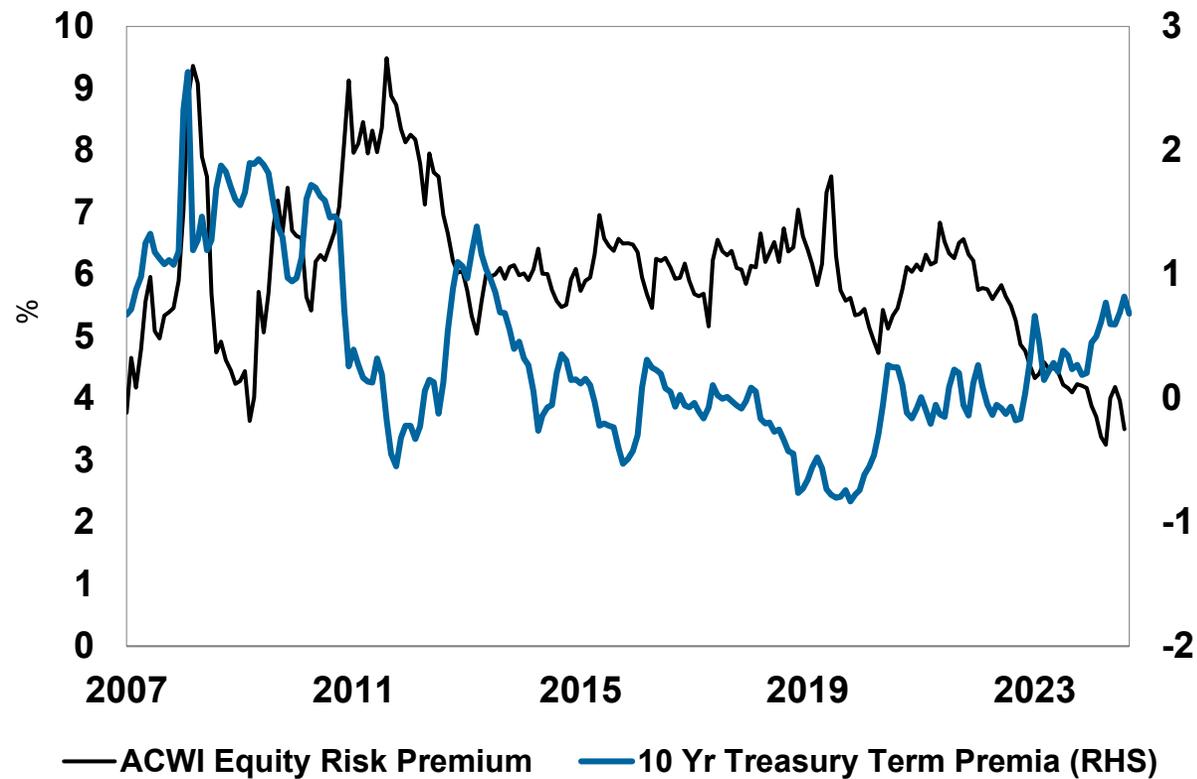
Market Conditions

Key Asset Pricing Indicators

Real rates and forward inflation expectations



Risk premia: Global equity and 10-year Treasury



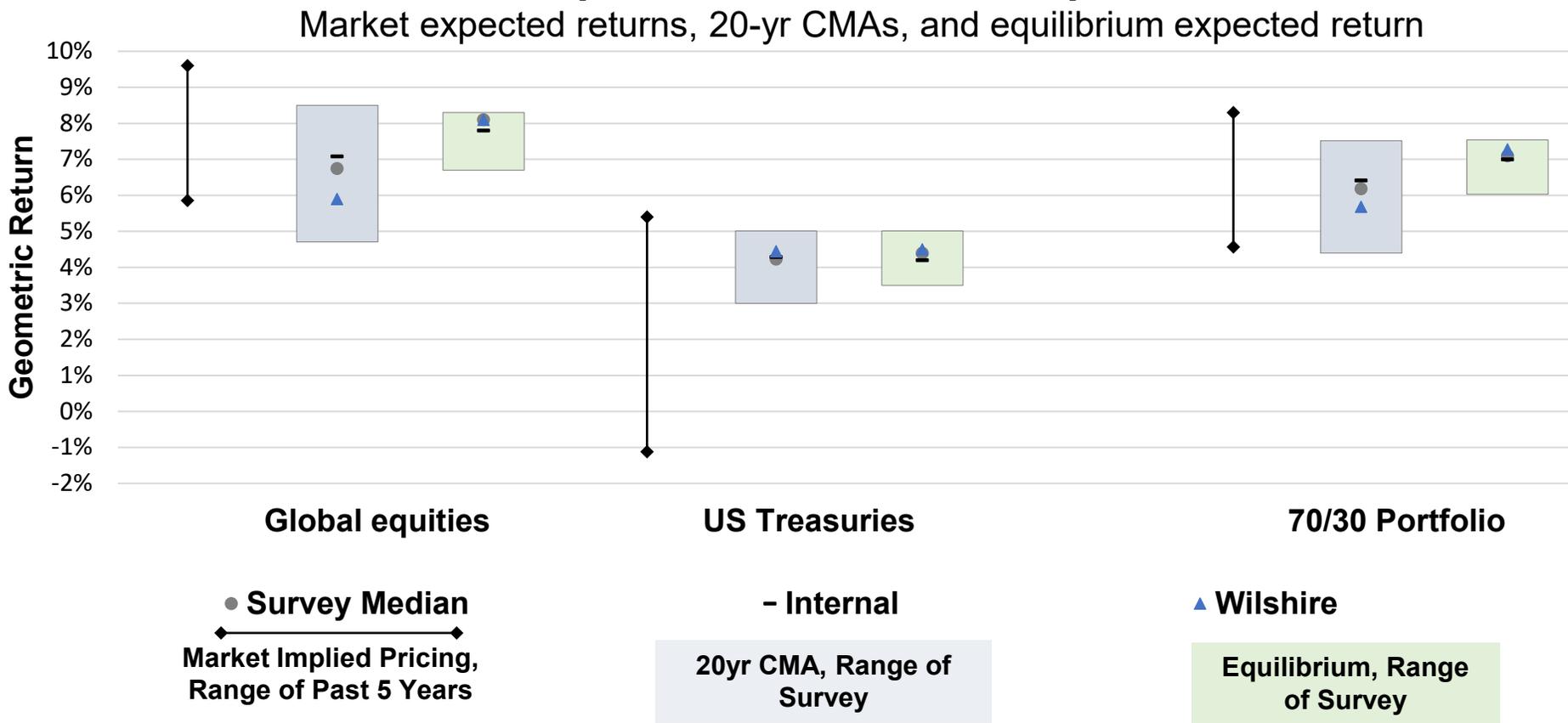
Ranges of Expected Returns*

TPA Reporting Template Example

*Denotes changes from current reporting

Very Long-Run Returns Anchor Risk Appetite, Shorter Term Expected Returns Can Vary

Expected Returns Assumptions



Varying Expected Return Methodologies in ALM

Three Approaches To Bridge Today With Tomorrow

Traditional ALM Capital Market Assumptions (CMAs)

- Quarterly survey of 15 providers, including asset managers and leading consultants
- Internal CMA model
- Results are a range of expected returns with the median historically shown to the Board

Equilibrium Expected Return*

- The long-run steady-state returns, or beyond the business cycle

Market Aware Expected Return*

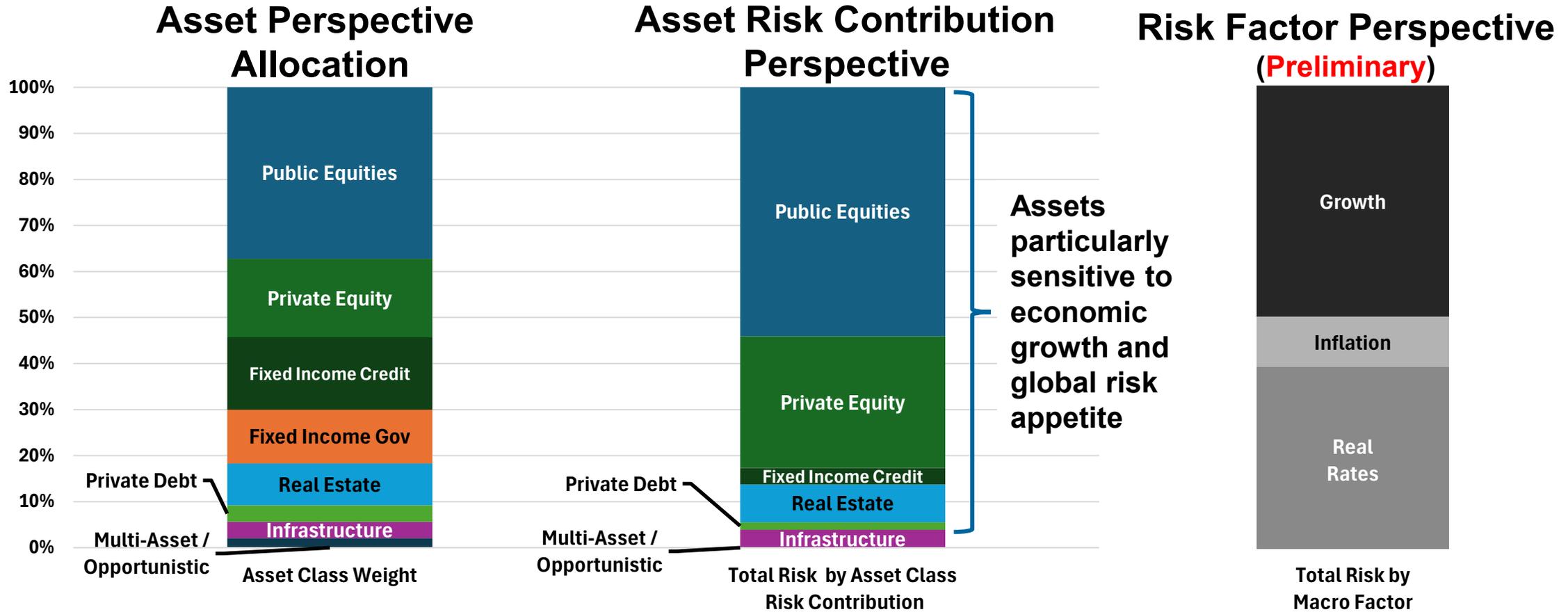
- Cumulatively built from the Real Cash Rate, Inflation, Equity Risk Premium, & Term Premium

Drivers of Total Portfolio Risk*

TPA Reporting Template Example

*Denotes changes from current reporting

Different Lenses on Portfolio Exposure



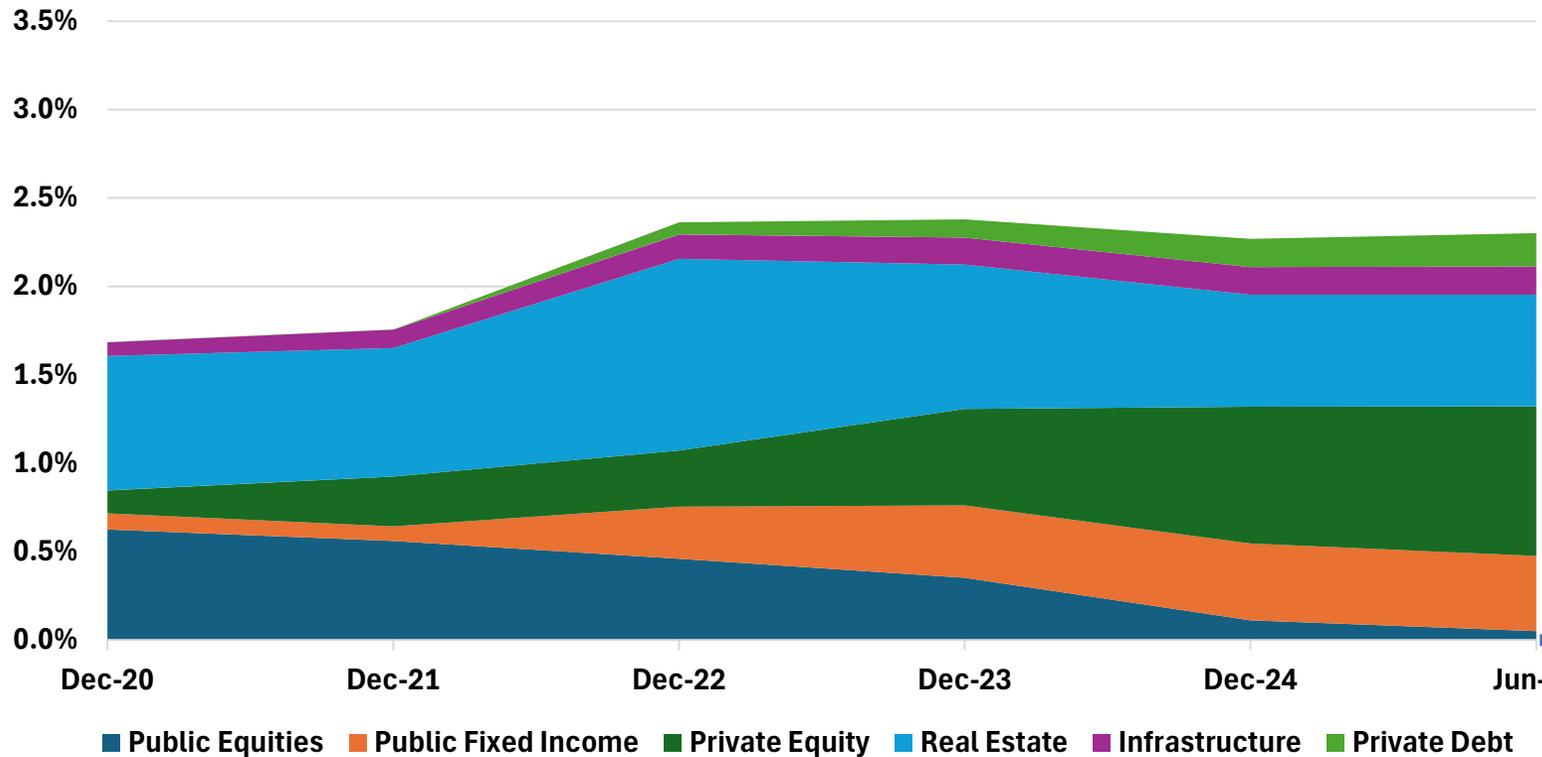
Drivers of Active Risk*

TPA Reporting Template Example

*Denotes changes from current reporting

Active Risk is Diversified

Active Risk - Contribution by Program



Total Active Risk is expected to grow under TPA with continued emphasis on diversifying sources of value add

Liquidity Risk*

Sufficient Available Investment Liquidity

Current Liquidity is More Than Required For a Stress Scenario

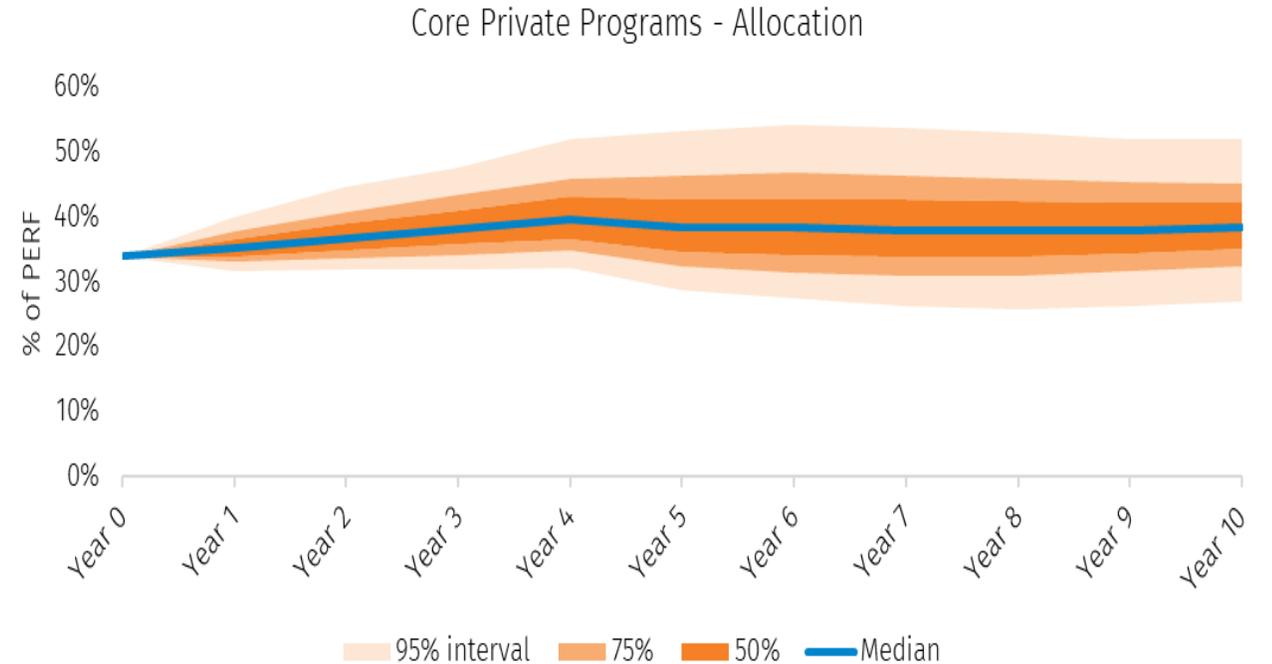
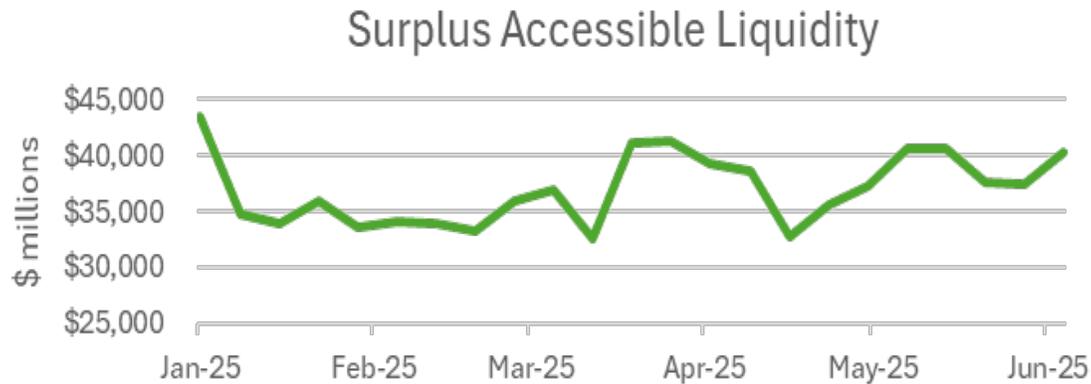
TPA Reporting Template Example

*Denotes changes from current reporting

Short horizon metric: Surplus Accessible Liquidity

Long horizon metric: Illiquid Assets Weight Forecast

Measures the amount of cash/cash equivalents on hand plus additional financing available to CalPERS above an established minimum

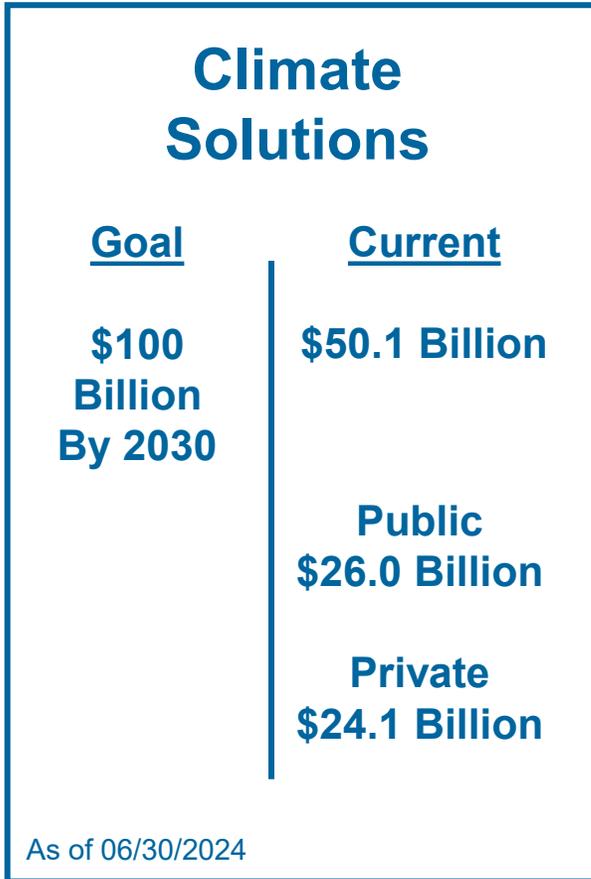


Sustainable Investing*

Climate Action Progress – Refreshed Annually

TPA Reporting Template Example

*Denotes changes from current reporting



		Climate Solutions	Ref Portfolio
Sectoral Composition	Real Estate	37%	1%
	Technology	19%	17%
	Industrials	12%	8%
	Energy ³	9%	3%
	Consumer Discr.	5%	8%
	Other	22%	TBD
		Climate Solutions	Ref Portfolio
Performance	1-Yr	TBD	TBD
	3-Yr	TBD	TBD
Valuation	P/B	TBD	TBD
	P/E	TBD	TBD
	Div Yield	TBD	TBD

Sustainable Investing*

TPA Reporting Template Example

*Denotes changes from current reporting

Emerging and Diverse Managers – FY 2023-24 (Refreshed Annually)

Total Emerging Managers NAV **\$6.0 bn**

Investments to Emerging Managers **\$2.0 bn**

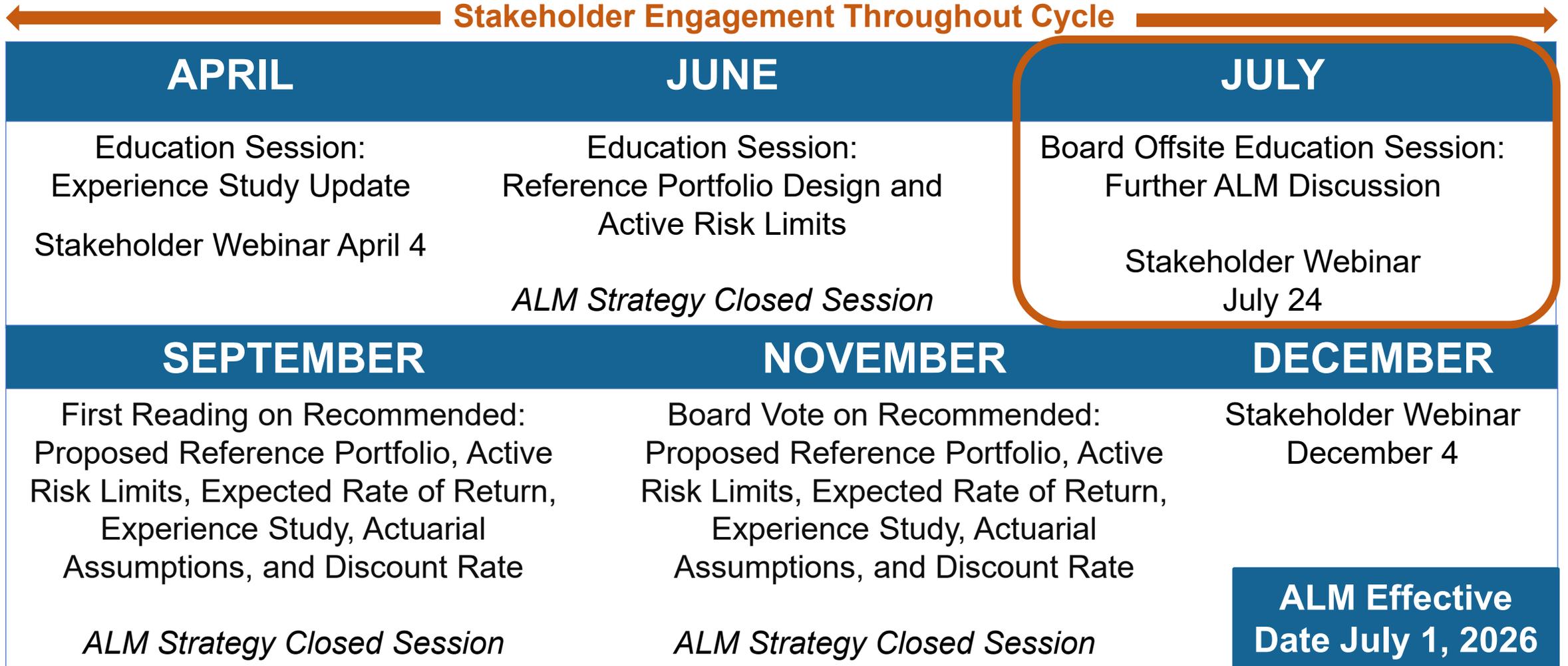
Total Diverse Manager NAV **\$16.8 bn**

Investments to Diverse Managers **\$6.3 bn**

2023 Lenox Park DEI Survey

- 91% Response Rate
- 78% Detailed Responses
- 41% of Workforce are Women
- 35% of Workforce are People of Color
- 33% Met CalPERS' Definition for Diverse Owned

2025 Asset Liability Management (ALM) Timeline



Appendix

Presentation Footnotes

- **Slide 8 –Total Fund Dashboard:**
 - For historical performance, the Reference Portfolio reflects the historical SAA risk profile.
 - For expected performance, a 70/30 simple mix has been used as a placeholder for illustration purposes.
 - Expected Tail Risk (95%) represents the average loss in the worst 5% of simulated portfolio outcomes in rolling 3-year periods.
 - **Performance reporting of climate investments not yet available but impending.
- **Slide 12, Economic Conditions Scenarios** - Sources: Haver Analytics, Bloomberg Financial L.P., PIMCO, NBER, CalPERS calculations. Portfolio returns are based on MSCI ACWI and US Treasury Aggregate Index; assumes correlations shift in different macro scenarios.
- **Slide 14: Ranges of Expected Returns** - Sources: MSCI; Bloomberg Financial L.P., Shiller, McQuarrie (2024), Ibbotson and Chen (2023), Dimson, Marsh, Staunton (2009), CMA providers. Variables are: overnight indexed swap, forward cash, on the run Treasury note, and zero-coupon inflation swap contracts. CalPERS calculations. History from 1980. CMA as of Q1 2025. Italicized is not directly estimated. The sum of return components do not always add to the expected return due to the different estimation and survey approaches used.
- **Slide 18: Liquidity Risk** - Based on a stochastic model with existing commitment plans, long term cash flow pacing assumptions and portfolio as of Dec 2024
- **Slide 19: Sustainable Investing** – (1) Top 5 sectors contributing to PERF’s climate solution exposure, (2) Using 70% All Country World / 30% Treasuries for illustrative purposes, (3) Includes renewable energy generation infrastructure, (4) For Public Equities component of climate solution exposure
- **Slide 26: Treasury & Equity | Internal Expected Returns** - Note: “High” and “Low” represent the most optimistic and pessimistic forecasts, respectively, from the Consensus Economics survey panel. “Consensus” reflects the average (mean) forecast. The range illustrates the level of expert uncertainty across economic scenarios.
- **Slide 27: Link Between Valuations and Long-term Equity Value** - CAPE (Cyclically Adjusted Price-to-Earnings Ratio): A valuation metric that averages inflation-adjusted earnings over the past 10 years to smooth out short-term fluctuations and provide a long-term perspective on equity market valuations. Data Source: Bloomberg: Long Term Price to Earnings plotted against Future 10-year Equity returns (1998-2025).

Defining the Dashboard Metrics

On Target

Meets target or is within acceptable range

At Risk

Approaching limit or misses target over a short, interim period shorter than one year

Off Target

Misses target or is not within acceptable range for one year or longer

Policy Exceptions: Exceptions to investment policies.

Reference Portfolio Risk: Expected volatility of the Reference Portfolio.

Equity Equivalent Exposure (EEE): EEE represents the return sensitivity of a portfolio to the equity market. A EEE of 1 implies that the equity market sensitive portion of a portfolio moves exactly in synch with the equity market; $EEE > 1$ implies such portion of the portfolio's co-movement with the equity market is magnified, while $EEE < 1$ implies the co-movement is diminished.

Active Risk: Standard deviation of active returns (e.g. differences between portfolio and benchmark returns). Higher active risk implies more divergence of portfolio from benchmark price movements.

Surplus Accessible Liquidity: \$ amount of cumulative cash, cash equivalents and incremental financing available above pre-established minimum.

10-Yr Illiquid Forecast Range: The forecasted allocation range of illiquid assets from the long-term stochastic model.

Total Fund Leverage: Metric that measures usage of leverage on the Total Fund in alignment with methodology outlined in PERF Policy.

Volatility: Standard deviation of returns. Higher volatility implies more dramatic price movement.

Expected Tail Risk (95%): Expected Tail Risk (95%) represents the average loss in the worst 5% of simulated portfolio outcomes in rolling 3-year periods.

Glossary of Terms

Capital Market Assumptions: A set of long-term estimates for risk, return, and correlations across various asset classes. CMAs serve as foundational inputs for strategic asset allocation, portfolio optimization, and financial modeling.

Equilibrium Expected Returns: A long-term projection of asset returns assuming stable macroeconomic conditions and balanced capital markets. It reflects what investors would earn if markets were in steady-state, free of business cycle effects and valuation mis-alignment.

Market Aware Expected Return: A quantitative estimate of future asset returns derived from current, observable traded financial market prices.

Term Premium: The excess yield that investors require for holding a longer-term bond over a series of shorter-term bonds. It compensates for interest rate risk, inflation uncertainty, and other macroeconomic factors.

Equity Risk Premium: The additional return expected from investing in equities over a risk-free asset (typically government bonds). ERP compensates investors for taking on the higher volatility and downside risk associated with equities.

Real Cash Rate: The inflation-adjusted return on short-term risk-free instruments, such as Treasury bills or overnight indexed swaps. It represents the true purchasing power return and serves as a baseline for evaluating real returns across asset classes.

Yield: The income return on an investment, expressed as a percentage of its current price. For bonds, yield includes interest payments relative to market value and may refer to current yield or yield to maturity (YTM). In equities, yield often refers to dividend yield.

Roll Down: The price appreciation that occurs when a bond naturally moves down the yield curve as it approaches maturity, assuming a normal (upward-sloping) curve. Roll down is a source of total return in fixed income portfolios.

Glossary of Terms

Earnings Growth: The projected increase in a company's earnings over time, typically expressed on a per-share basis.

Valuation Change: The portion of return attributable to changes in the market's pricing of an asset, rather than its income or growth fundamentals. For equities, valuation change is often reflected in shifts in the price-to-earnings (P/E).

CAPE Ratio (Cyclically Adjusted Price-to-Earnings Ratio): A valuation metric that divides the current price of an equity index by the average inflation-adjusted earnings over the past 10 years. Developed by Robert Shiller, the CAPE ratio is used to assess long-term equity valuation and potential mean reversion. High CAPE levels often signal lower future expected returns, while low CAPE may suggest undervaluation.

Confidence Range: An estimated range of potential investment returns that reflects the uncertainty inherent in projections. It illustrates the expected variability in outcomes based on available data, model inputs, and underlying assumptions.

Funding Mix: A carve out from the reference portfolio that represents the risk equivalent proxy for a strategy in equity and treasury risk exposure

Universe Benchmark: A benchmark assigned to asset class or strategy that shares similar investment style or strategy characteristics, allowing for peer comparison and analysis of relative performance