MEKETA

Employees' Retirement System of Rhode Island

April 22, 2026

Asset-Liability Study: Part 3
Baseline Model Output

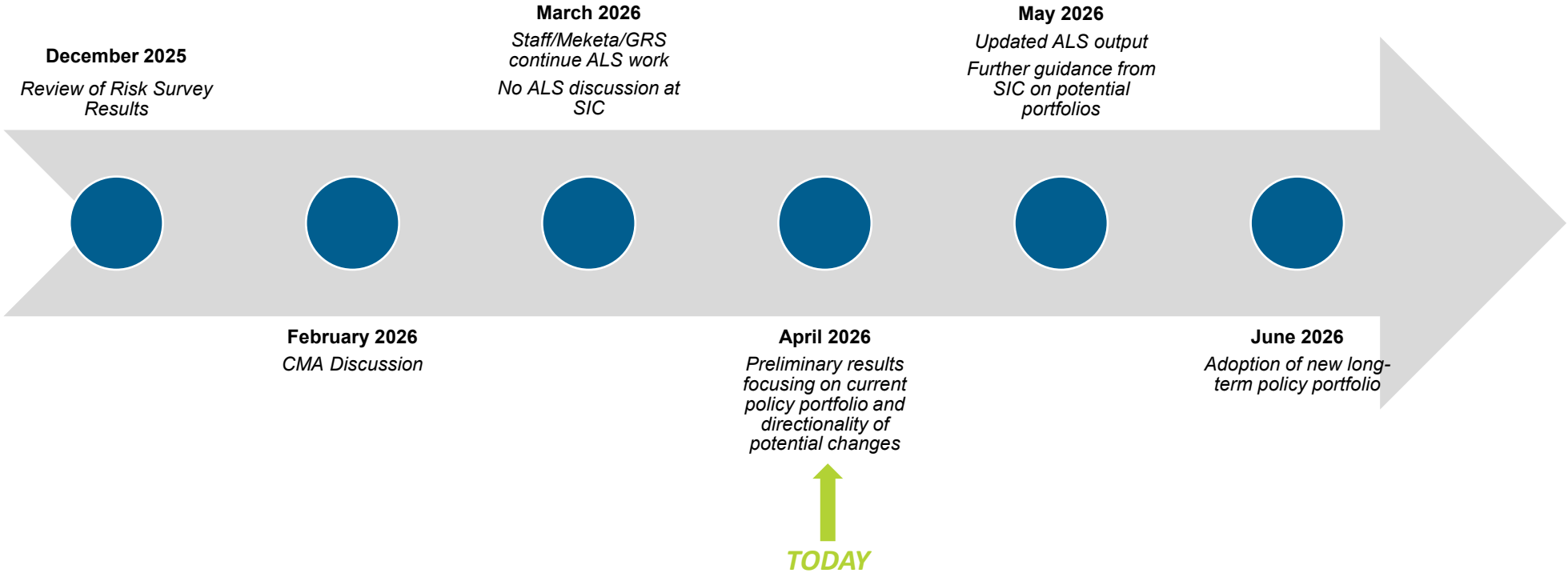
Table of Contents

Introduction

Goals of Today

1. Review Asset-Liability Study (“ALS”) timeline.
2. Present baseline asset-liability modeling results, focused on current policy portfolio.
3. Discuss preliminary asset-only output, examining potential directional changes.
4. Receive feedback/guidance for modeling constraints and output metrics.

Asset-Liability Study Timeline



→ Meketa and Staff expect to conclude the Asset-Liability Study in June 2026.

Risk Survey Review

→ The results of the survey serve as a foundation for the asset-liability modeling process. They help frame the inputs (e.g., classes and constraints) and output goals (e.g., key metrics and characteristics) of the process.

→ Main areas of focus:

1. Continue making funding progress with the goal of outperforming the actuarial rate.
2. Examine probabilities of experiencing downside scenarios (for investment returns and funded status) and their corresponding impacts (e.g., liquidity, contributions, etc.).
3. Pursue a portfolio of similar risk level (compared to current policy) but also explore portfolios with more risk.
4. Upon completion of the A/L study, discuss the potential for an Opportunistic class and required implementation parameters/processes.

→ **The baseline asset-liability output in this presentation is oriented around #2 above, seeking to preview the major metrics and considerations for the SIC.**

Modeling Approach

A/L Process

3 key high-level steps to the A/L process:

1.

Develop an understanding of **how the financial condition of ERSRI might vary** based on outcomes of the investment portfolio.

2.

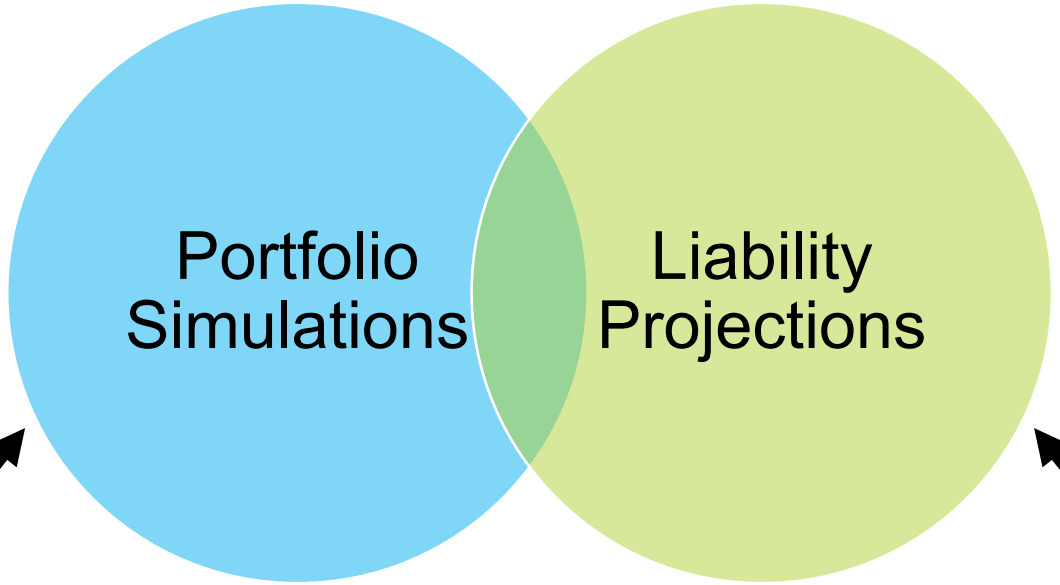
Set a consensus definition and view of the risk(s) ERSRI should bear.

3.

Once a view/tolerance for risk has been established, **select an appropriate long-term investment strategy** (i.e., a policy portfolio / strategic allocation).

Approach to Asset-Liability Studies

→ Asset-liability studies are the intersection of asset and liability projections.



Meketa's CMAs and simulation methodology

Assumptions for global capital markets and ERSRI characteristics/plan provisions drive the output.

Meketa's in-house actuarial team utilizes GRS actuary data/input

Approach to Asset-Liability Studies

→ The actuarial value of assets (AVA) and actuarial accrued liability (AAL) change from one year to the next in a formulaic fashion.

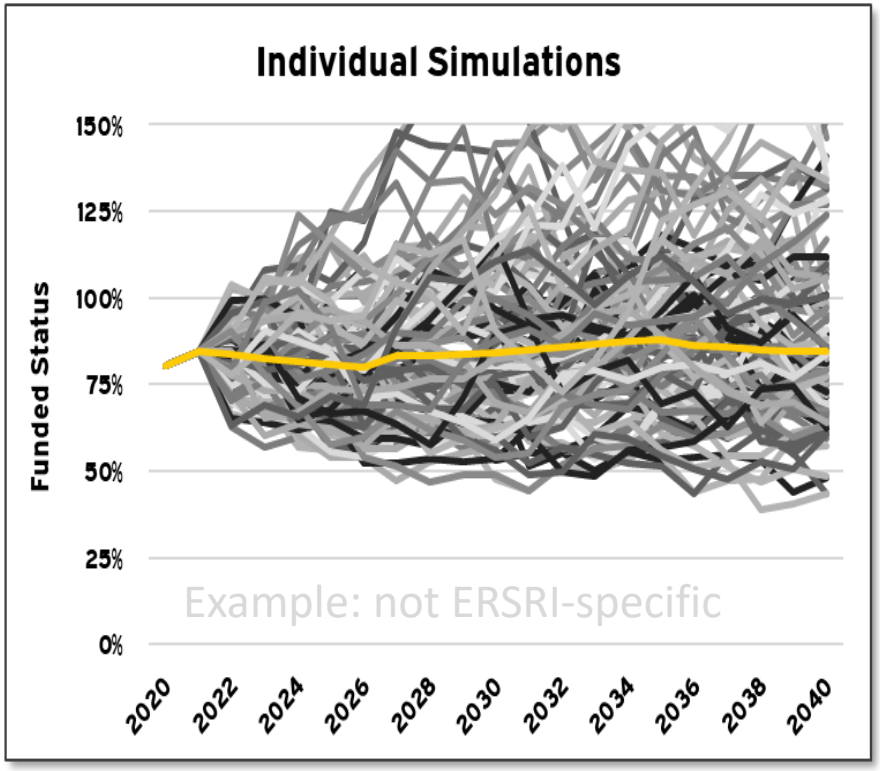
- Note: actuarial losses/gains are important considerations that are generally related to experience vs. assumptions.

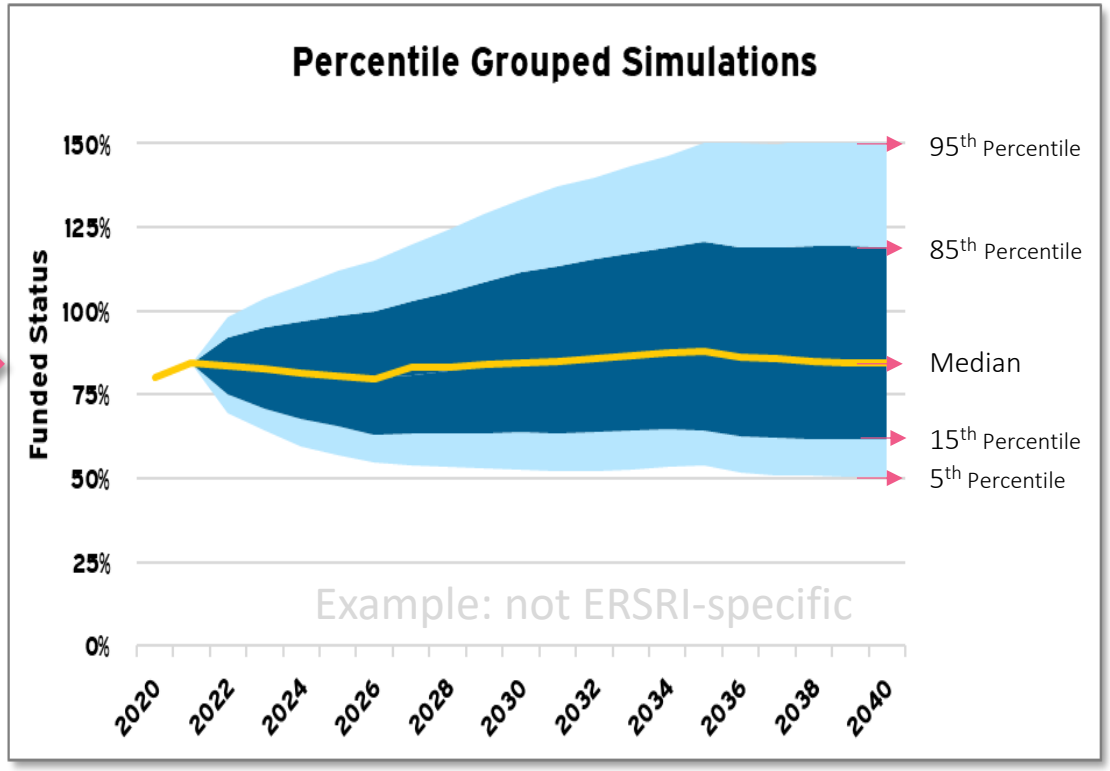
Asset-liability studies examine a wide range of modeled returns and corresponding impacts.

Example: Change in AVA and AAL	
AVA at Beginning of Year	**AAL at Beginning of Year**
+ Contributions	+ Service cost (benefits accrued during year)
+ Actual return (accounting for any smoothing)	+ Interest cost
- Benefits paid	+/- Actuarial losses/gains during the year
- Expenses	- Benefits paid
= AVA at End of Year	**= AAL at End of year**

Example Asset-Liability Output

- → Individual simulations that explore major asset-liability metrics (e.g., funded ratio) are combined into corridors of percentiles.
- → Discussions shift to focus on probabilities/groupings rather than point estimates.





Baseline Asset-Liability Results

Asset-Liability Modeling – Key Parameters

→ The current model is focused on the largest sleeve of the Rhode Island system, the ERS (State Employees and Teachers).

- *Asset Rebalancing*: annual
- *Liabilities and Normal Cost*: The liabilities, normal cost and expected benefit payments used in this study were provided by GRS as of June 30, 2025. Only the State Employees and Teachers are accounted for in this study.
- *Plan Provisions and Additional Assumptions*: Additional details regarding provisions and assumptions are documented in the June 30, 2025 actuarial valuation report issued by GRS.

→ Additional plans (e.g., MERS) are not explicitly included.

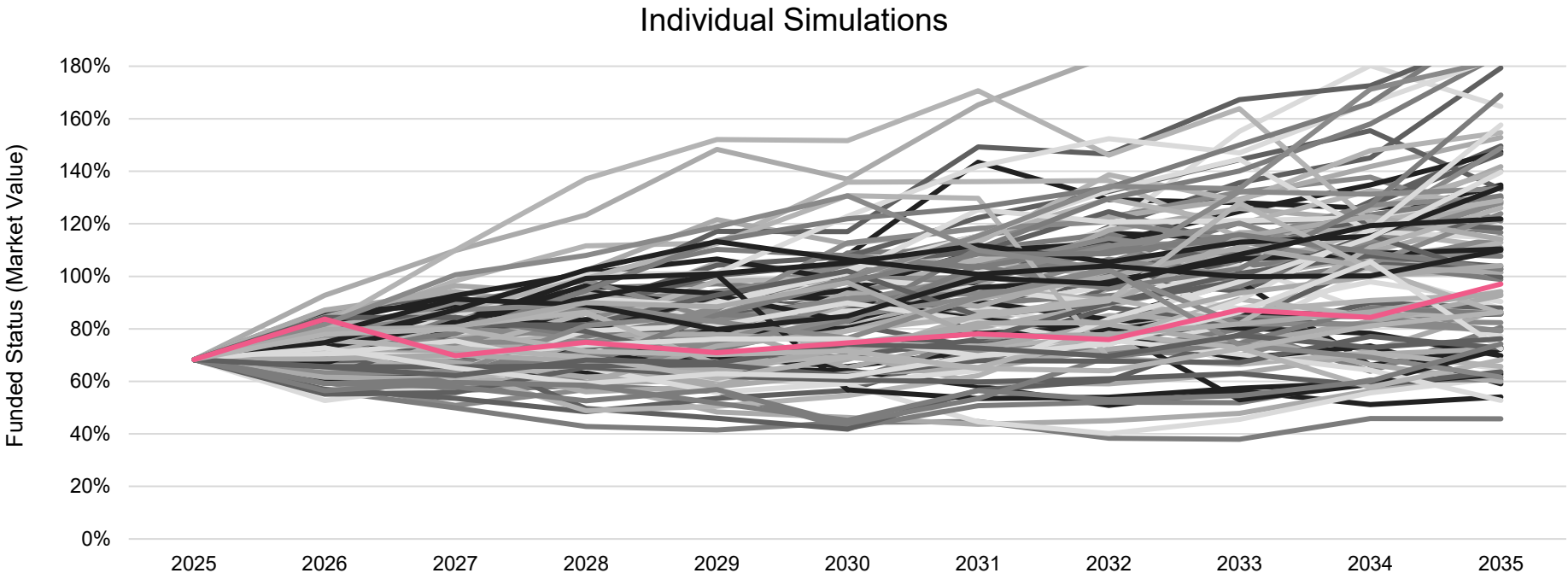
- This is a potential area of discussion for Meketa/Staff/SIC.

→ Upon completion of the asset-liability study, an asset allocation review for OPEB will be conducted.

How does Meketa optimize the asset allocation?

1 – Plot the Baseline	Plot the primary expectation and risk measure for the asset allocation in the Investment Policy Statement
2 – Create Constraints	Asset classes are constrained to a minimum and maximum allocation to prevent impractical allocation recommendations
3 – Compare Alternatives	Alternative asset allocations will be optimized according to the SIC's preferred risk measures.
4 – Produce Samples	Meketa will provide samples of asset allocations that reflect the feedback received from the SIC with regards to growth expectations and tolerance for volatility.
5 – Analyze Additional Risks	Repeat the process for additional risk measures that are important to the SIC's decision making

Funded Status Simulations

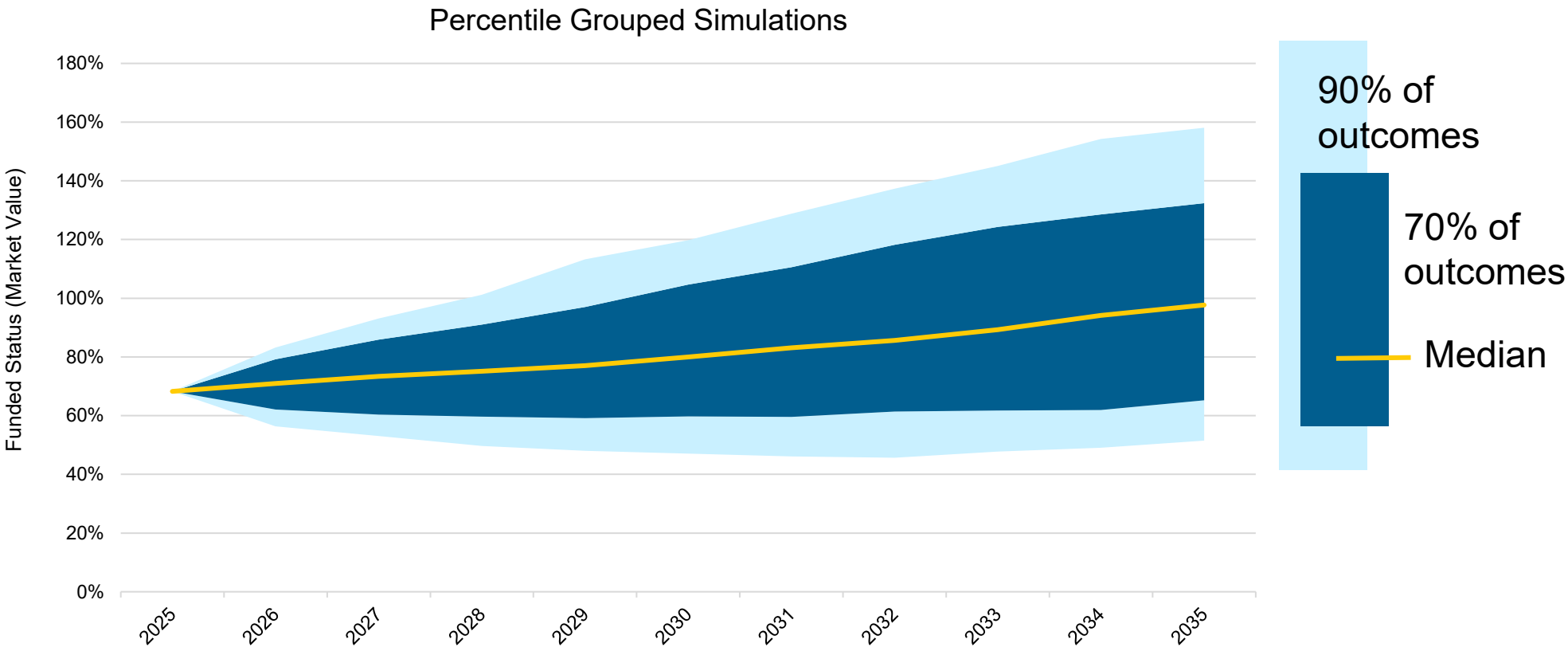


→ Funded Status (assets divided by liabilities) is simulated in a variety of market environments.

→ Analysis reflects the current:

- Asset allocation
- Projected benefit payments
- Funding policy (statutory)
- Plan provisions
- Actuarial assumptions
- Meketa 2026 Capital Market Assumptions

Funded Status Simulations



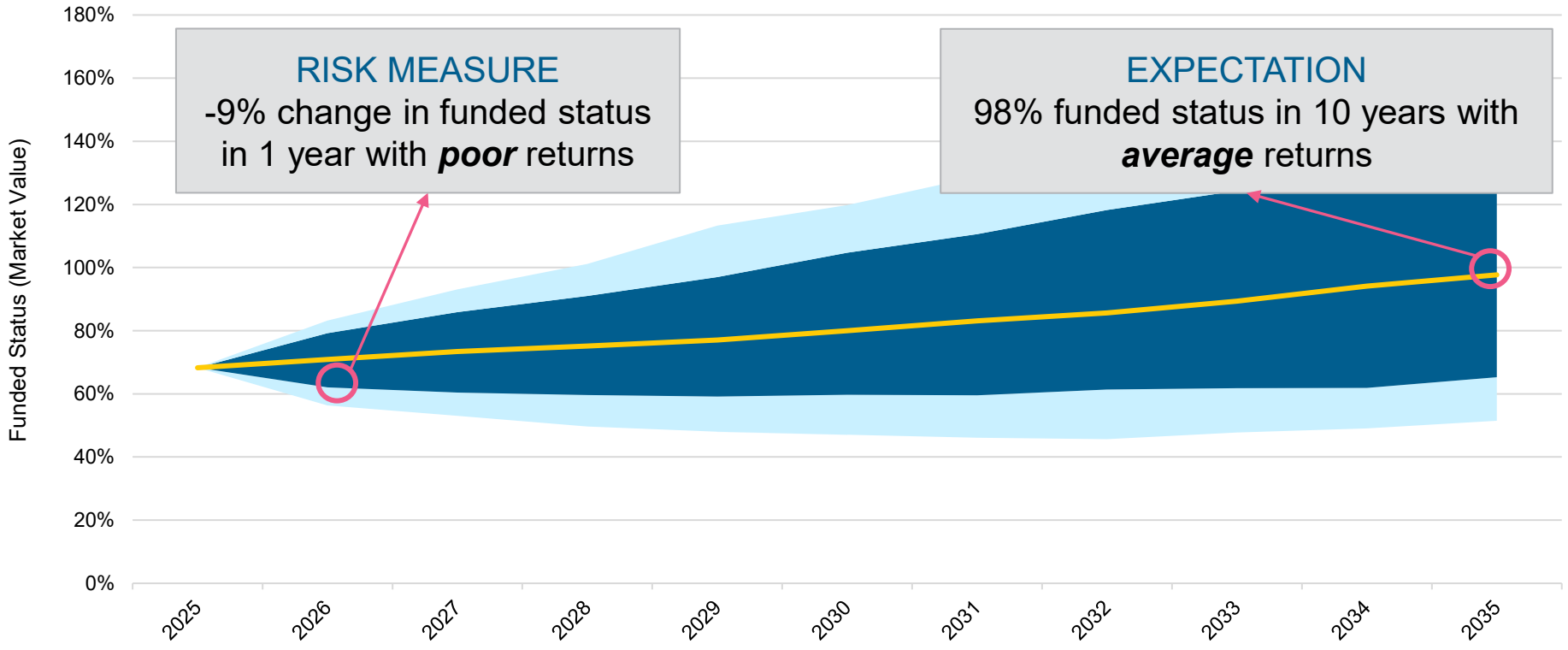
→ Simulations are summarized into percentiles, providing a quantitative analysis of enterprise risk, given the current asset allocation.

→ As an example, the median (50th Percentile) Funded Status in 2035 is 98% => there is a 50% probability the Funded Status will be greater than 98% and 50% probability it will be less than 98%.

Expectation/Risk Measure Framework - Tradeoffs

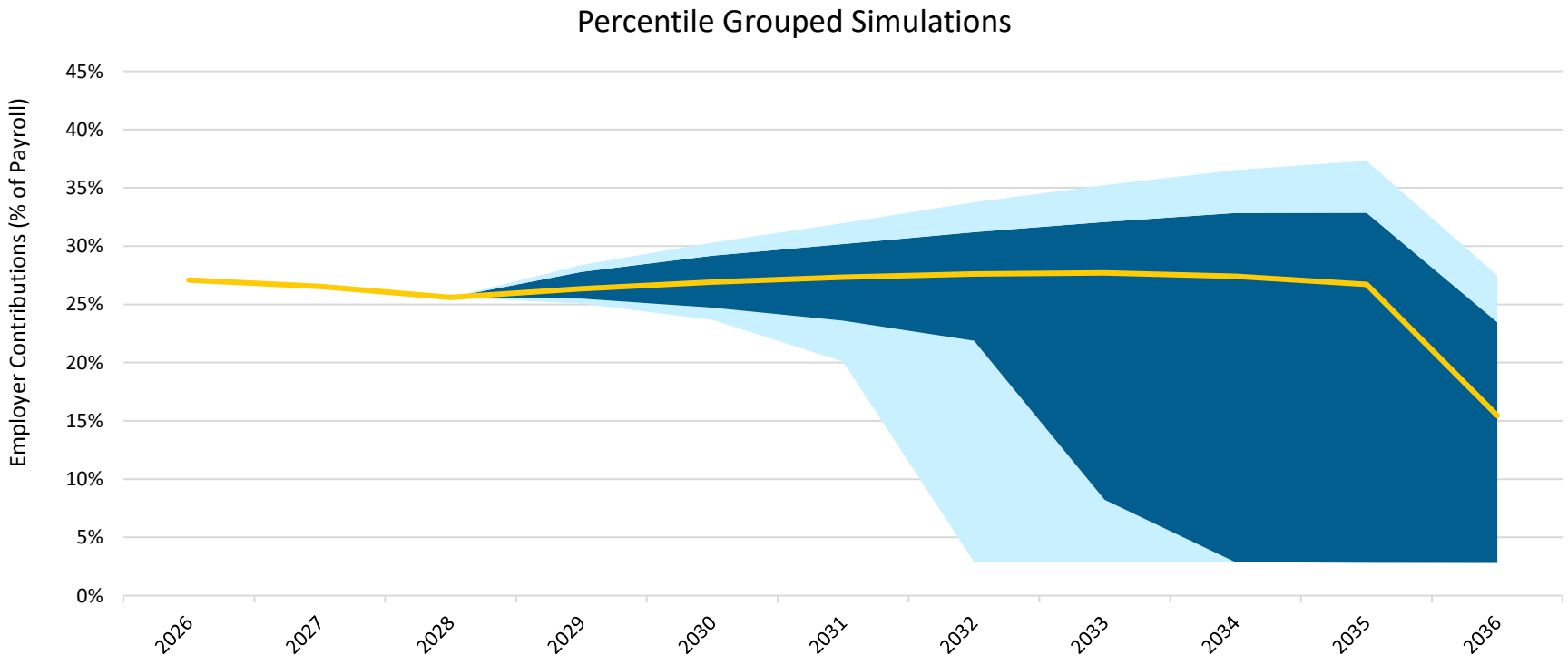
→ Key observations are determined during objective setting discussion and analyzed in a "Expectation/Risk Measure" framework.

- **Expectation** – Outcome where all the underlying assumptions prove to be accurate over the long-term (Example: 50th percentile over a 10-year time horizon).
- **Risk Measure –** Outcome with a lower probability (Ex: 85th percentile) and detrimental impact, especially when that outcome occurs in the short-term (Ex: 1-year time horizon).



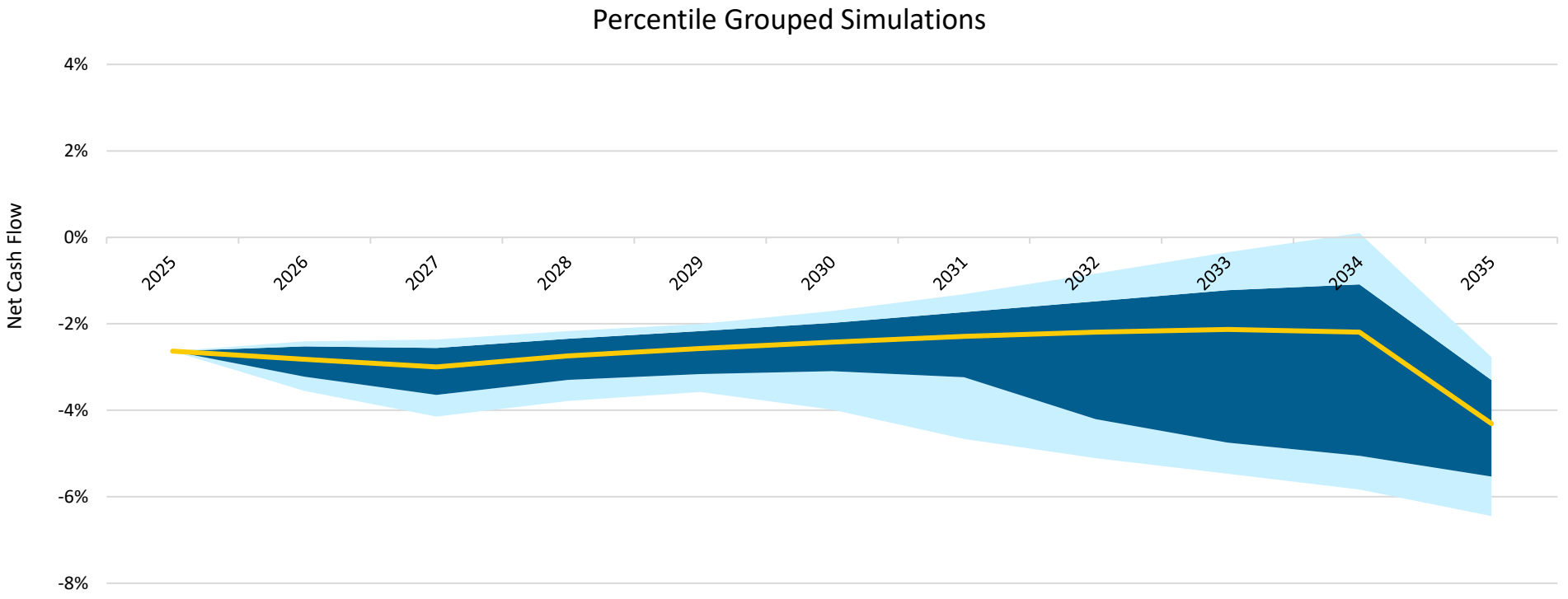
Contribution Levels

- Contribution levels for upcoming few years are known due to the System's method for recognizing gains/losses.
- Employer contributions as a percent of payroll anticipated to experience a drop-off in 2036 once historical losses are fully amortized.

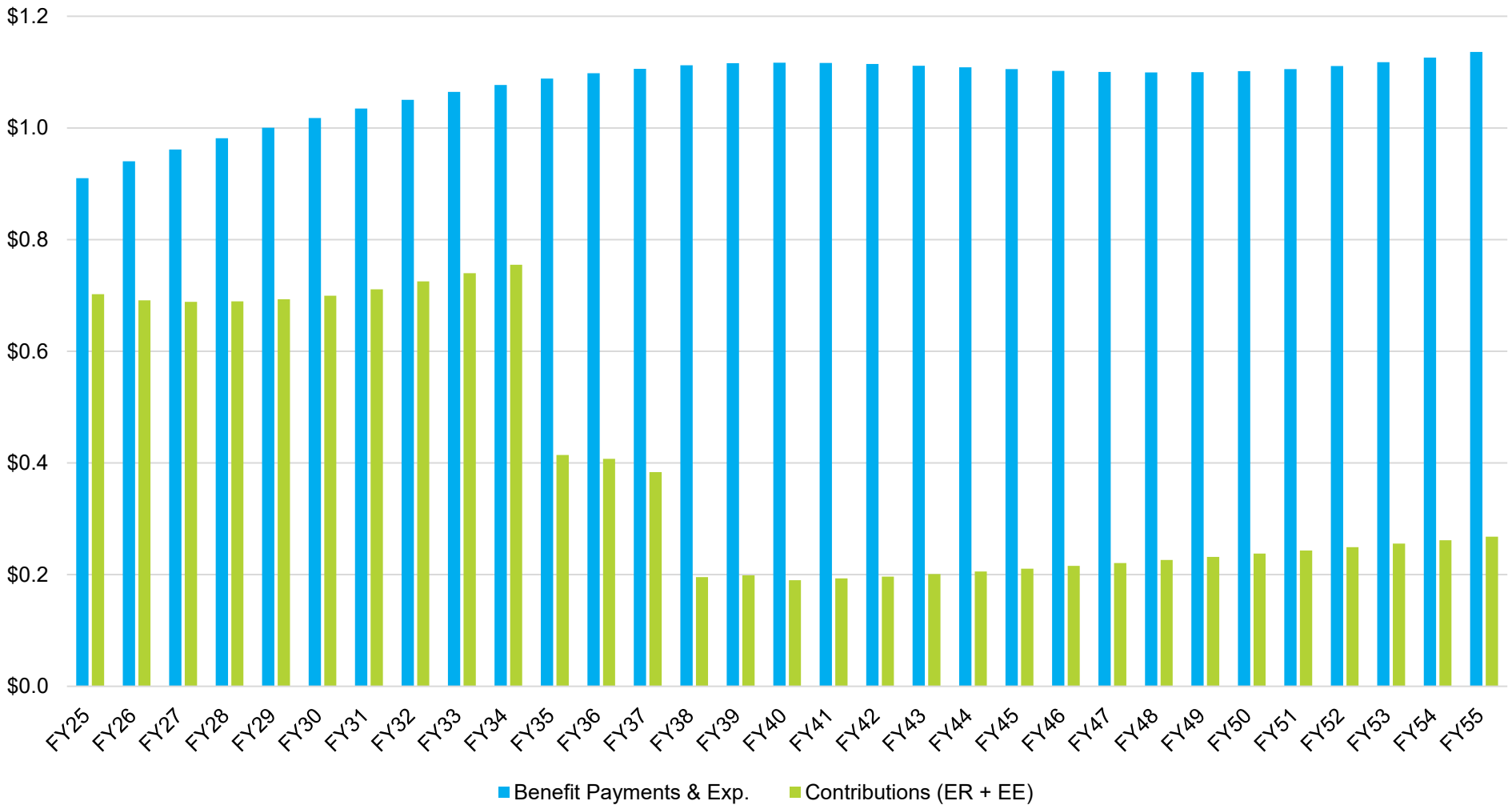


Net Cash Flows

- Net cash flow is defined as contributions less benefit payments and expenses, expressed as a percentage of market value of assets. This metric reflects the share of assets expected to be liquidated each year to meet cash needs.
- Net cash flow is anticipated to be between **-2% to -4% over the next 5-6 years**, after which outcomes widen depending on future market experience.



Cash Flows – Annual Dollar Amounts ($B)



Net Cash Flow – % of Market Value of Assets

Additional Metrics – Current Policy Portfolio

Metric	Related Risk Survey Results	Current Policy Portfolio
Probability of falling below 55% funded ratio	"Minimum funded ratio willing to accept in market crisis scenario" ≈ 55%	17.3% probability of falling below 55% in next five years.
Funded Status Volatility ***Defined as difference between median market value funded status in one year and one standard deviation funded status in one year***	Related SIC Objectives: - Maintain consistent progress towards improving funded status	8.9%
Probability of a 2% absolute increase in employer contribution rate	Related SIC Objectives: - Continue making progress on funded status - Net-cash flows are an important consideration - Limit need for plan sponsor contribution increases (lower SIC priority)	64.7% probability of a 2% absolute rise in employer contribution rate over 2026-2035.
Probability of >30% employer contribution rate	Related SIC Objectives: - Limit need for plan sponsor contribution increases (lower SIC priority)	42.9% probability of employer contribution rising above 30% from 2026-2035.
Contribution Rate Volatility ***Defined as the difference between median contribution rate in 2035 and one standard deviation contribution rate in 2035***	Related SIC Objectives: - Limit need for plan sponsor contribution increases (lower SIC priority)	6.1%

Preliminary Asset-Only Optimizations

Asset-only Optimizations

→ ERSRI exhibits several characteristics that are common among mature public pension systems:

- Low/moderate funded status (mid-60s)
- Modest negative net cash flow

→ With the above parameters, a portfolio that optimizes the tradeoff between expected return and expected max drawdown will likely result in the best integrated asset-liability metrics.

→ Asset-only optimizations are a quicker, exploratory exercise to preview where optimal portfolios may end up.

→ Meketa's simulation model utilizes non-normal distributions for asset classes:

- Skewness and kurtosis for asset classes are based on history.
  - Growth risk (and similar) asset classes have negative skew and positive kurtosis (i.e., fat tails)
  - Historical positive skew for fixed income assets (due to 40-year period of declining interest rates) is neutralized.
  - Certain diversifying strategies (e.g., systematic trend following, long volatility) exhibit positive skew.

→ The goal of the simulation-based optimization ("SBO") is to reflect economic reality as close as possible.

→ **Preliminary constraints on the following page seek to provide a range of flexibility/options for most classes, while also limiting private markets changes to achievable levels.**

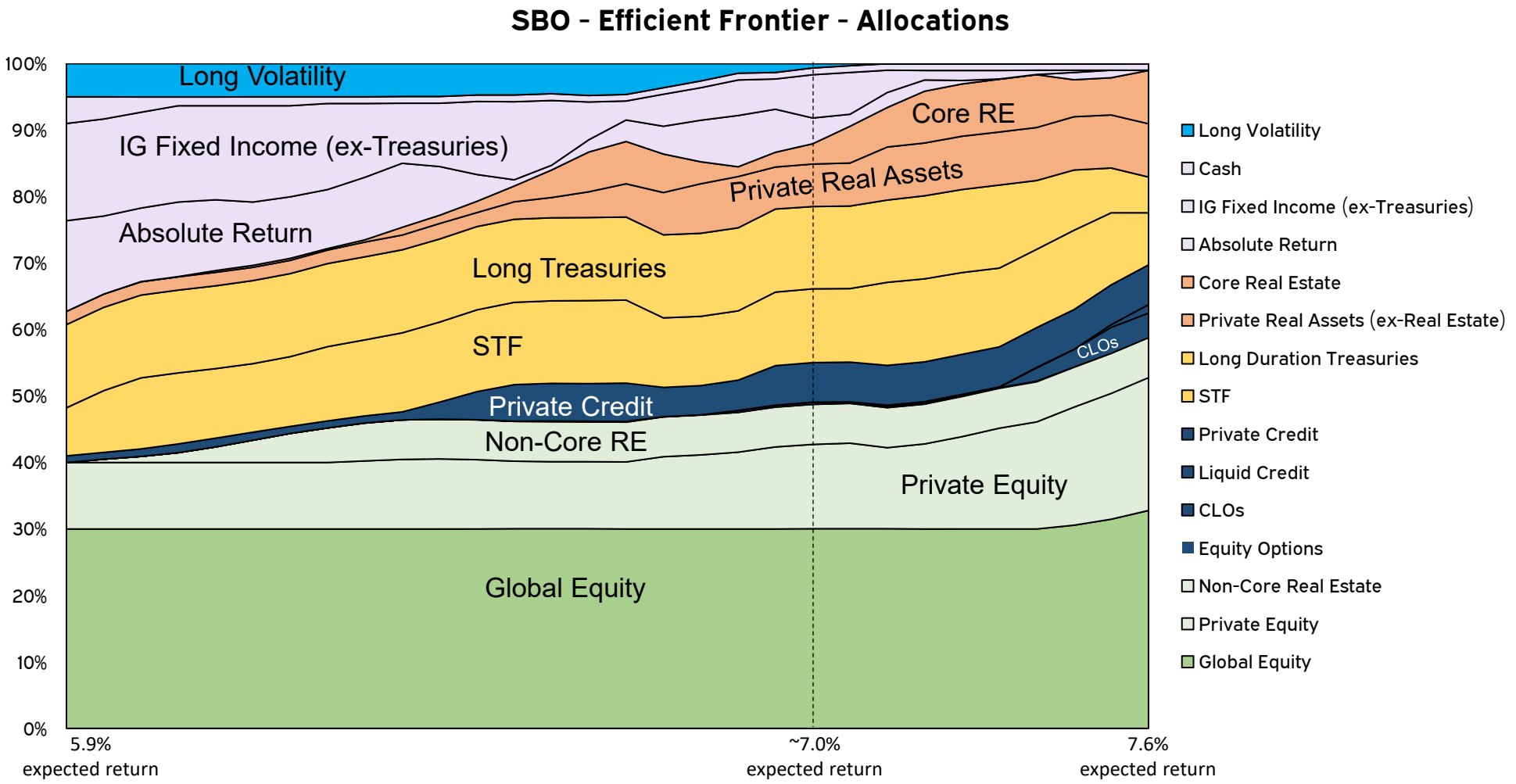
Preliminary Constraints (mins and maxes)

Strategic Classes	Components	Asset Class	Min (%)	Max (%)	*Policy (%)*	*2/28 Actual (%)**
Growth	Public Growth	Global Equity	30.0	60.0	*40.0*	*38.8*
	Private Growth	Private Equity	10.0	20.0	*12.5*	*15.0*
		Non-Core Real Estate	0.0	6.0	*2.5*	*2.4*
Income	Income	Equity Options	0.0	5.0	*2.0*	*1.8*
		CLOs	0.0	6.0	*2.0*	*1.6*
		Liquid Credit	0.0	15.0	*5.0*	*4.5*
		Private Credit	1.0	6.0	*3.0*	*3.0*
Stability	Crisis Protection Class	Systematic Trend Following	0.0	12.5	*5.0*	*4.9*
		Long Duration Treasuries	0.0	12.5	*5.0*	*4.8*
		Long Volatility	0.0	5.0	---	---
	Inflation Protection	Private Real Assets (ex-Real Estate)	2.0	8.0	*4.0*	*4.1*
		Core Real Estate	0.0	8.0	*4.0*	*2.9*
	Volatility Protection	Absolute Return	0.0	15.0	*6.5*	*6.3*
		IG Fixed Income (ex-Treasuries)	0.0	15.0	*6.5*	*6.3*
		Strategic Cash	1.0	4.0	*2.0*	*1.9*

*Other assets = ~1.8%

Efficient Frontier - Allocations

→ The graphic below depicts how "optimal" allocations change in the simulation as risk/return increase.



Optimized Portfolios Near ~7%

Strategic Classes	Components	Asset Class	Example Allocation (%)	*Policy (%)*	*2/28 Actual (%)**
Growth	Public Growth	Global Equity	30.0	*40.0*	*38.8*
	Private Growth	Private Equity	12.0	*12.5*	*15.0*
		Non-Core Real Estate	6.0	*2.5*	*2.4*
Income	Income	Equity Options	0.0	*2.0*	*1.8*
		CLOs	0.0	*2.0*	*1.6*
		Liquid Credit	0.0	*5.0*	*4.5*
		Private Credit	4.5	*3.0*	*3.0*
Stability	Crisis Protection Class	Systematic Trend Following	10.5	*5.0*	*4.9*
		Long Duration Treasuries	12.5	*5.0*	*4.8*
		Long Volatility	1.5	---	---
	Inflation Protection	Private Real Assets (ex-Real Estate)	7.5	*4.0*	*4.1*
		Core Real Estate	1.5	*4.0*	*2.9*
	Volatility Protection	Absolute Return	7.5	*6.5*	*6.3*
		IG Fixed Income (ex-Treasuries)	5.5	*6.5*	*6.3*
		Strategic Cash	1.0	*2.0*	*1.9*

*Other assets = 1.8%

General Takeaways from Asset-Only Optimizations

→ Near the actuarial rate, the asset-only optimization seeks to:

- Reduce *Global Equity* to ~30% (model minimum)
- Maintain *Private Equity* at similar allocation level
- Increase *Non-Core Real Estate* and *Private Real Assets (ex-Real Estate)*
- Materially reduce "Income" class and focus on *Private Credit*
- Increase *Systematic Trend Following* and *Long Duration*
  - *Long Volatility* (new strategy) is introduced at a small allocation
- Reduce *Core Real Estate*
- Maintain *Absolute Return* and *Investment Grade Fixed Income (ex-Treasuries)* at similar allocations.

→ Additional Notes:

- *CLOs*, *Liquid Credit*, *Core Real Estate*, and *Absolute Return* have various degrees of interchangeability.
  - Absolute Return has an expected return of 4.5% but a high degree of diversification benefit, whereas the other three classes have 5.4-5.8% expected returns and lower degrees of diversification benefits.
  - This gives the SIC flexibility in final allocations with these classes for "near optimal" portfolio selection.

Conclusion/Next Steps

Conclusion/Next Steps

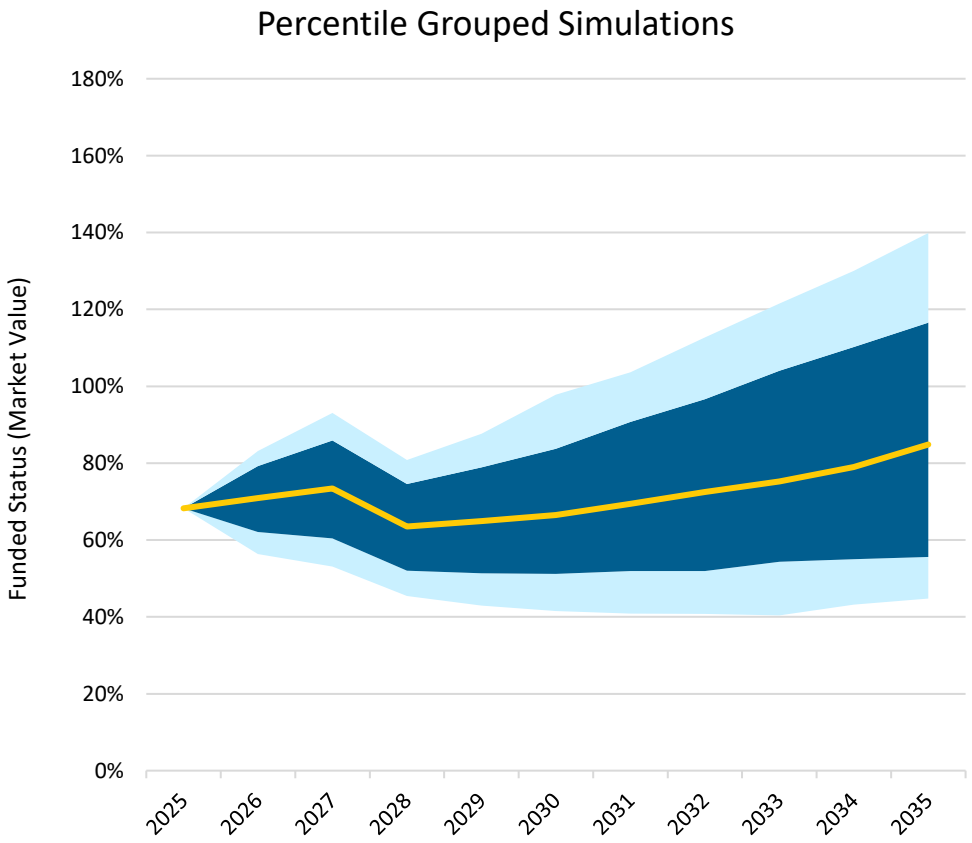
- Baseline asset-liability modeling results form the starting point for making asset allocation decisions.
- A multitude of lenses/metrics have been provided, which are expected to inform the decision-making process as the asset-liability study progresses.
- Preliminary, directional changes from the asset-only optimizations provide indication of asset allocation changes that may improve ERSRI asset-liability metrics.

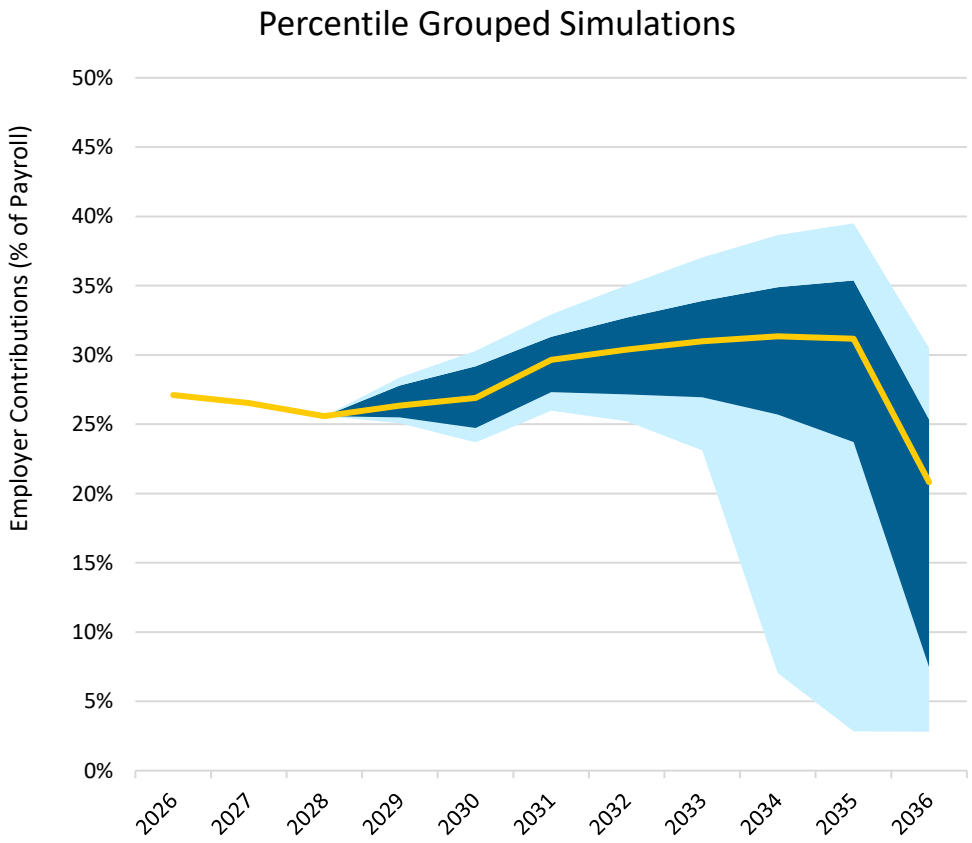
- **Based on direction/guidance from the SIC, Meketa and Staff will return in May with refined portfolio allocation options and further asset-liability metrics for discussion.**

Appendix

Deterministic Loss – Year 3

→ The graphics below detail *Funded Status* and *Employer Contributions* should the portfolio experience a guaranteed loss of -10% in year 3.

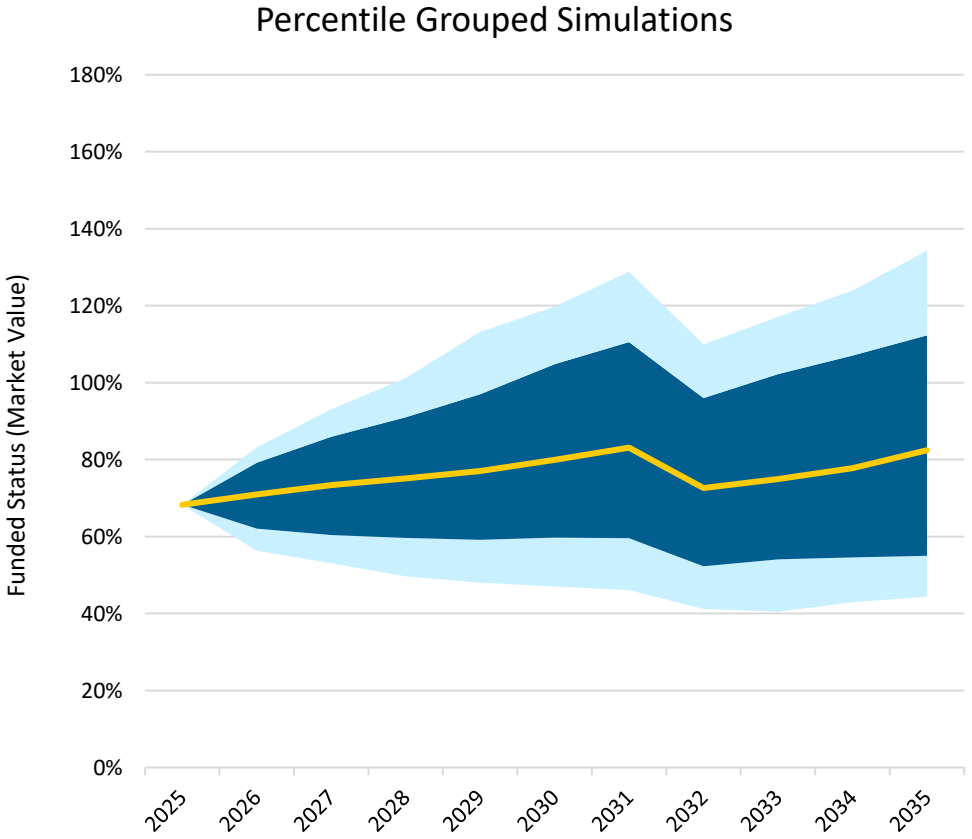


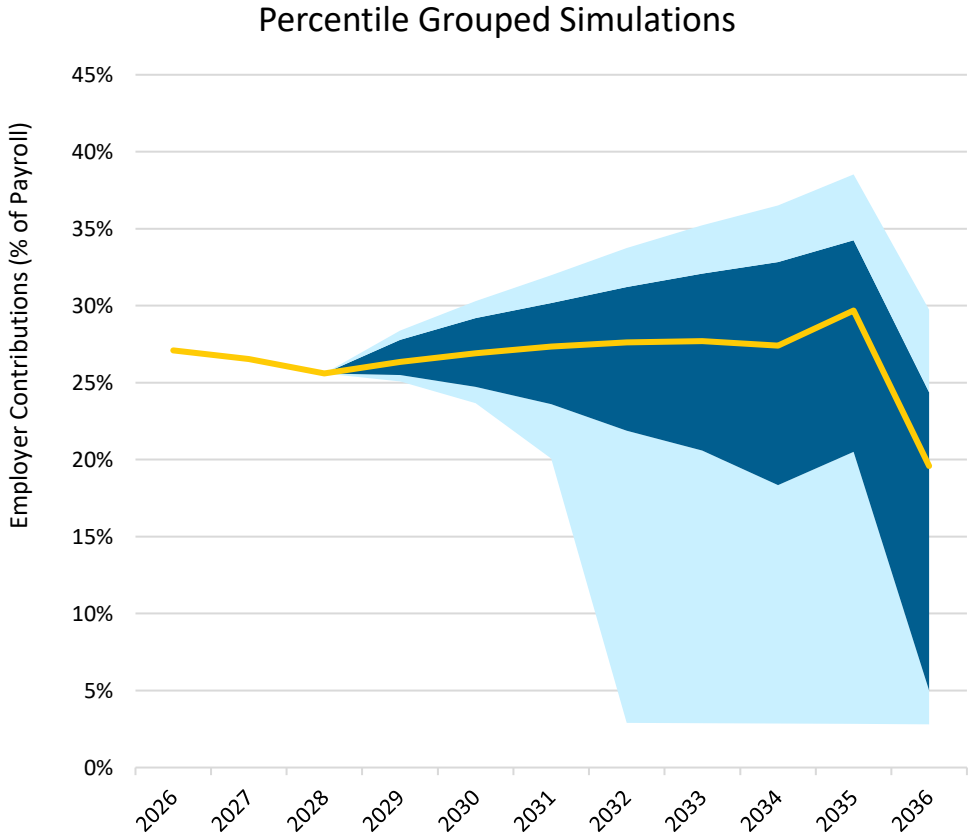


Deterministic Loss – Year 7

→ The graphics below detail *Funded Status* and *Employer Contributions* should the portfolio experience a guaranteed loss of -10% in year 7.

→ Whether in year 3 or year 7, a loss of ~2.5x fiscal years shifts the funding progress proportionally.





ERSRI Asset Class and Meketa's Modeling Approach

Strategic Classes	Components	Asset Class	Notes
Growth	Public Growth	Global Equity	Modeled as ACWI. Can be regional if desired.
	Private Growth	Private Equity	---
		Non-Core Real Estate	50% Value Add / 50% Opportunistic RE
Income	Income	Equity Options	---
		CLOs	---
		Liquid Credit	Modeled as High Yield Bonds
		Private Credit	---
Stability	Crisis Protection Class	Systematic Trend Following	---
		Long Duration Treasuries	---
	Inflation Protection	Private Real Assets (ex-Real Estate)	Modeled as 50% Core / 50% Non-Core Private Infrastructure
		Core Real Estate	---
	Volatility Protection	Absolute Return	Modeled as RMS Diversifiers
		Investment Grade Fixed Income (ex-Treasuries)	Modeled as 50% IG Corporate / 50% MBS
		Strategic Cash	---

--- indicates one-for-one match between asset class and Meketa's CMAs

ERSRI Asset Class and Respective Expected Returns

Strategic Classes	Components	Asset Class	2025 ER	2026 ER
Growth	Public Growth	Global Equity	6.7	6.3 ↓
	Private Growth	Private Equity	9.8	9.0 ↓
		Non-Core Real Estate	9.1	9.4 ↑
Income	Income	Equity Options	5.6	5.5 ↓
		CLOs	6.9	5.8 ↓
		Liquid Credit	6.3	5.4 ↓
		Private Credit	8.7	7.8 ↓
Stability	Crisis Protection Class	Systematic Trend Following	3.5	3.6 ↑
		Long Duration Treasuries	5.0	4.5 ↓
	Inflation Protection	Private Real Assets (ex-Real Estate)	7.2	7.5 ↑
		Core Real Estate	5.5	5.8 ↑
	Volatility Protection	Absolute Return	4.7	4.5 ↓
		Investment Grade Fixed Income (ex-Treasuries)	5.4	4.6 ↓
		Strategic Cash	2.8	2.8

ERSRI Asset Class and Respective Expected Volatilities

Strategic Classes	Components	Asset Class	2025 Volatility	2026 Volatility
Growth	Public Growth	Global Equity	17.0	17.0
	Private Growth	Private Equity	25.0	26.0 ⬆
		Non-Core Real Estate	22.4	22.4
Income	Income	Equity Options	13.0	13.0
		CLOs	13.0	13.0
		Liquid Credit	11.0	11.0
		Private Credit	15.0	15.0
Stability	Crisis Protection Class	Systematic Trend Following	18.0	18.0
		Long Duration Treasuries	12.0	12.0
	Inflation Protection	Private Real Assets (ex-Real Estate)	18.0	19.0 ⬆
		Core Real Estate	12.0	12.0
	Volatility Protection	Absolute Return	4.0	5.0 ⬆
		Investment Grade Fixed Income (ex-Treasuries)	5.2	5.2
		Strategic Cash	1.0	1.0

Approach to Modeling Long Volatility

→ Meketa has two options for modeling Long Volatility:

Mean-Variance	Simulation-based

• 0.5% expected return and 9.0% volatility
• -0.5 correlation to Global Equity
• **Pros**
  ○ Simple, easy to understand
• **Cons**
  ○ Assumes normal distribution
  ○ Cannot recognize non-linearity and convexity
	• Conditional payoff based on Global Equity simulated returns:
	  ○ Global Equity >0%: -4% return (negative carry)
	  ○ Global Equity < 0%: -0.25x of GE
	  ○ Global Equity < -10%: -0.5x of GE
	  ○ Global Equity < -20%: -1.0x of GE
	  ○ Global Equity < -30%: -1.15x of GE
	  ○ Global Equity < -40%: -1.2x of GE
	  ○ Global Equity < -50%: -1.25x of GE
	• **Pros**
	  ○ More accurately reflects actual payoff structure
	  ○ Calibrated based on a universe of actual performance histories with conservative adjustments
	• **Cons**
	  ○ No explicit expected return or volatility assumption (through simulation process, ER and Vol approximate mean-variance assumptions)

→ **The simulation-based approach is being used for the 2026 Asset-Liability Study**

2026 Peer Comparison Sample

→ The table below highlights 10-year expected returns from a sample of investment consultants & asset managers.

→ Data was sourced from publicly available documents/websites on 2/15/25.

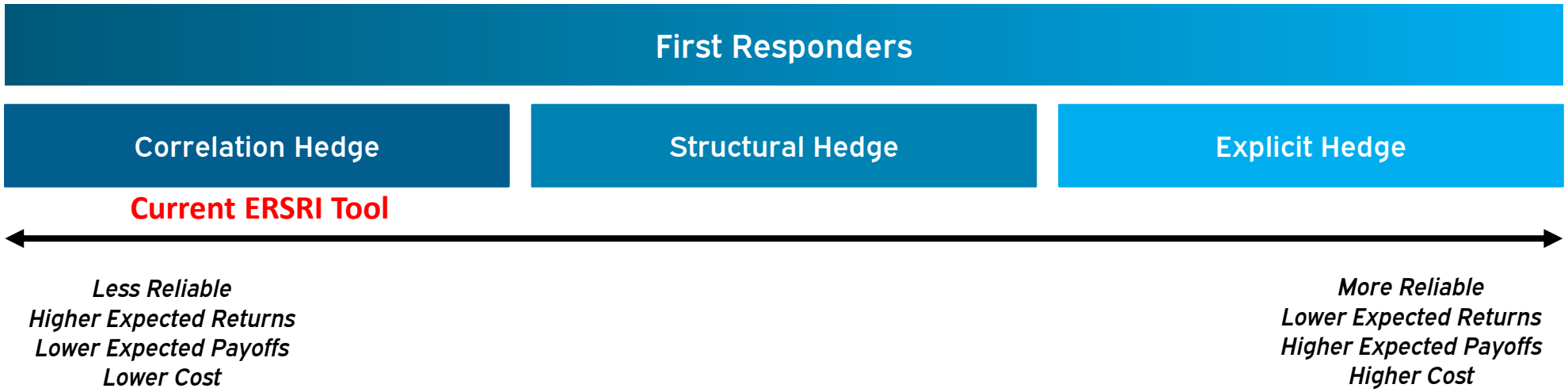
- Peer data are all 2026 CMAs but represented a mix of 11/30 and 12/31 end dates for inputs.

Asset Class	Meketa	Verus	Wilshire	Callan	Vanguard	BlackRock	Northern Trust	Average (ex Meketa)
US Equity	6.3%	5.5%	4.5%	7.4%	4.9%	5.2%	6.8%	5.7%
Developed Non-US Equity	6.2%	6.8%	5.5%	7.3%	5.9%	7.1%	6.8%	6.6%
Emerging Markets Equity	6.2%	6.7%	5.7%	7.5%	4.2%	5.9%	6.9%	6.1%
Investment Grade Bonds	4.2%	4.7%	4.9%	4.8%	4.6%	4.1%	5.0%	4.7%
High Yield Bonds	5.4%	5.7%	6.1%	5.9%	4.8%	5.7%	5.5%	5.6%
Private Equity	9.0%	9.0%	6.1%	8.5%	---	12.9%	10.2%	9.3%
Private Real Estate*	7.2%	8.5%	6.9%	---	---	---	7.9%	7.8%
Core Private Real Estate	5.8%	7.2%	6.0%	6.3%	---	5.8%	---	6.3%

*Private Real Estate represents the firm's stated, single line item assumption or an assumed blend of 50% Core / 25% Value Add / 25% Opportunistic.

The First Responders "Tool Kit"

- First responders are meant to be the first line of defense in an equity event.
- Strategies should produce meaningful gains in the initial stages of a market shock.
- There are three main types of hedging all of which can be found within the First Responders component of RMS:
  1. Correlation hedge: a bet that one asset will produce good returns when another produces bad returns.
  2. Structural hedge: an investment in a security that has a close inverse relationship with another.
  3. Explicit hedge: analogous to an insurance contract (e.g., an ongoing payment in exchange for a payoff if an event X occurs).
- Strategies vary primarily by certainty, payoff magnitude, expected return, and cost.



First Responders Strategy Summaries

Correlation Hedge

Strategies:
→ Long US Treasuries

Performance Drivers:
→ Investors often seek high quality assets when markets decline

Most Effective When...
→ Flight-to-safety

Least Effective When...
→ Rising rates

Implementation Example
→ Buying 20+ year US Treasuries

Strategy Benefits
→ Well known
→ Low cost
→ Historically reliable

Things to consider...
→ Relies on the behavior of others
→ Negative real yields
→ Changing correlations?

Structural Hedge

Strategies:
→ Long Volatility

Performance Drivers:
→ Volatility increases as equity price changes accelerate

Most Effective When...
→ Increasing volatility

Least Effective When...
→ Stable / low volatility

Implementation Example
→ Buying CBOE VIX options

Strategy Benefits:
→ High certainty
→ High event payoffs
→ Flexible implementation

Things to consider...
→ Low expected returns
→ Complexity
→ Ability to hold

Explicit Hedge

Strategies:
→ Tail risk hedging

Performance Drivers:
→ Continual insurance payment for a guaranteed payoff

Most Effective When...
→ Sharp drawdowns

Least Effective When...
→ Stable, bull markets

Implementation Example
→ Buying equity put options

Strategy Benefits:
→ Guaranteed payoff
→ Targets specific levels
→ Highest payoff

Things to consider...
→ Explicit ongoing cost
→ Most difficult to hold
→ Counterparty risk

Disclaimer

THIS REPORT (THE "REPORT") HAS BEEN PREPARED FOR THE SOLE BENEFIT OF THE INTENDED RECIPIENT (THE "RECIPIENT").

SIGNIFICANT EVENTS MAY OCCUR (OR HAVE OCCURRED) AFTER THE DATE OF THIS REPORT, AND IT IS NOT OUR FUNCTION OR RESPONSIBILITY TO UPDATE THIS REPORT. THE INFORMATION CONTAINED HEREIN, INCLUDING ANY OPINIONS OR RECOMMENDATIONS, REPRESENTS OUR GOOD FAITH VIEWS AS OF THE DATE OF THIS REPORT AND IS SUBJECT TO CHANGE AT ANY TIME. ALL INVESTMENTS INVOLVE RISK, AND THERE CAN BE NO GUARANTEE THAT THE STRATEGIES, TACTICS, AND METHODS DISCUSSED HERE WILL BE SUCCESSFUL.

THE INFORMATION USED TO PREPARE THIS REPORT MAY HAVE BEEN OBTAINED FROM INVESTMENT MANAGERS, CUSTODIANS, AND OTHER EXTERNAL SOURCES. SOME OF THIS REPORT MAY HAVE BEEN PRODUCED WITH THE ASSISTANCE OF ARTIFICIAL INTELLIGENCE ("AI") TECHNOLOGY. WHILE WE HAVE EXERCISED REASONABLE CARE IN PREPARING THIS REPORT, WE CANNOT GUARANTEE THE ACCURACY, ADEQUACY, VALIDITY, RELIABILITY, AVAILABILITY, OR COMPLETENESS OF ANY INFORMATION CONTAINED HEREIN, WHETHER OBTAINED EXTERNALLY OR PRODUCED BY THE AI.

THE RECIPIENT SHOULD BE AWARE THAT THIS REPORT MAY INCLUDE AI-GENERATED CONTENT THAT MAY NOT HAVE CONSIDERED ALL RISK FACTORS. THE RECIPIENT IS ADVISED TO CONSULT WITH THEIR MEKETA ADVISOR OR ANOTHER PROFESSIONAL ADVISOR BEFORE MAKING ANY FINANCIAL DECISIONS OR TAKING ANY ACTION BASED ON THE CONTENT OF THIS REPORT. WE BELIEVE THE INFORMATION TO BE FACTUAL AND UP TO DATE BUT DO NOT ASSUME ANY RESPONSIBILITY FOR ERRORS OR OMISSIONS IN THE CONTENT PRODUCED. UNDER NO CIRCUMSTANCES SHALL WE BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, CONSEQUENTIAL, OR INCIDENTAL DAMAGES OR ANY DAMAGES WHATSOEVER, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE, OR OTHER TORT, ARISING OUT OF OR IN CONNECTION WITH THE USE OF THIS CONTENT. IT IS IMPORTANT FOR THE RECIPIENT TO CRITICALLY EVALUATE THE INFORMATION PROVIDED.

CERTAIN INFORMATION CONTAINED IN THIS REPORT MAY CONSTITUTE "FORWARD-LOOKING STATEMENTS," WHICH CAN BE IDENTIFIED BY THE USE OF TERMINOLOGY SUCH AS "MAY," "WILL," "SHOULD," "EXPECT," "AIM," "ANTICIPATE," "TARGET," "PROJECT," "ESTIMATE," "INTEND," "CONTINUE," OR "BELIEVE," OR THE NEGATIVES THEREOF OR OTHER VARIATIONS THEREON OR COMPARABLE TERMINOLOGY. ANY FORWARD-LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS REPORT ARE BASED UPON CURRENT ASSUMPTIONS. CHANGES TO ANY ASSUMPTIONS MAY HAVE A MATERIAL IMPACT ON FORWARD-LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS. ACTUAL RESULTS MAY THEREFORE BE MATERIALLY DIFFERENT FROM ANY FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS REPORT.

PERFORMANCE DATA CONTAINED HEREIN REPRESENT PAST PERFORMANCE. PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.