State of Montana

CHEIRON
Classic Values, Innovative Advice

Stress Testing

Public Employees' Retirement System
Teachers' Retirement System
2023 Actuarial Valuations

October 24, 2024

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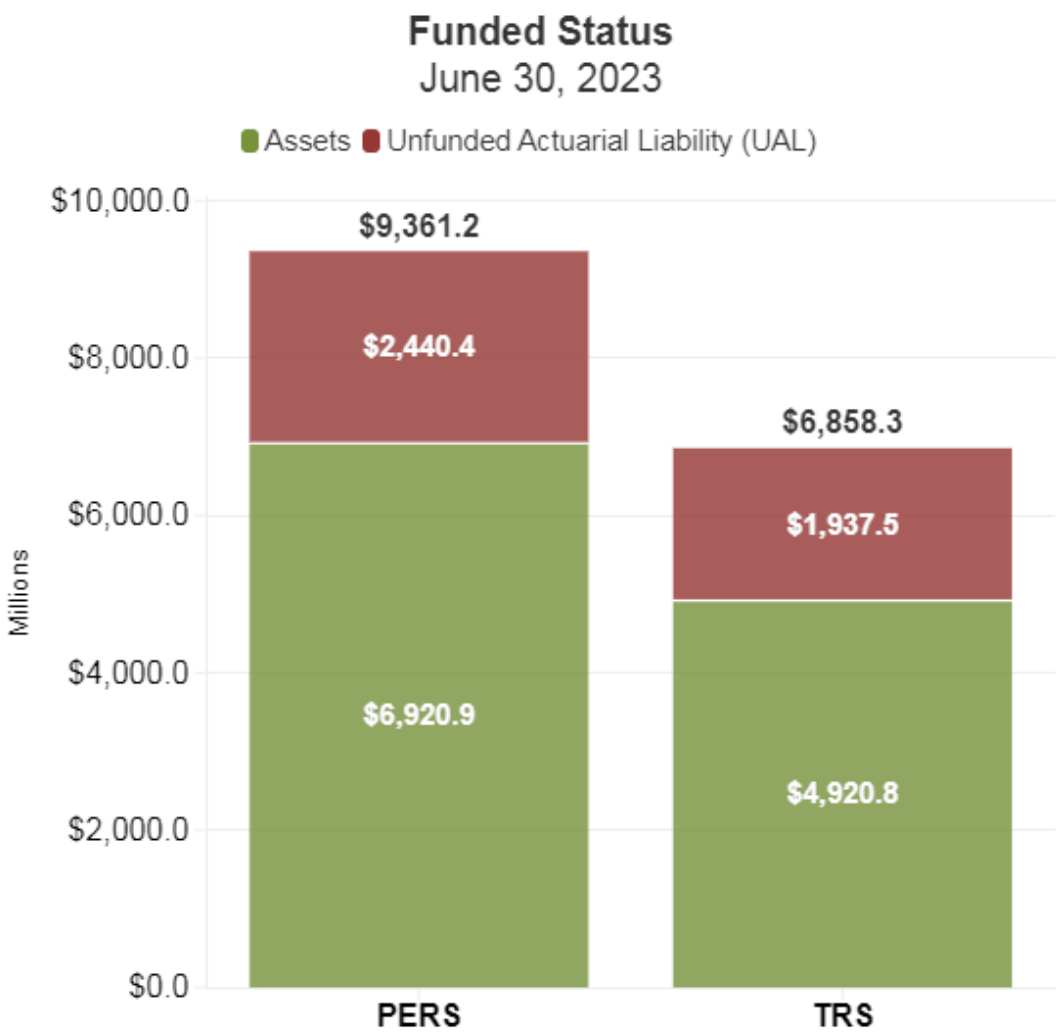
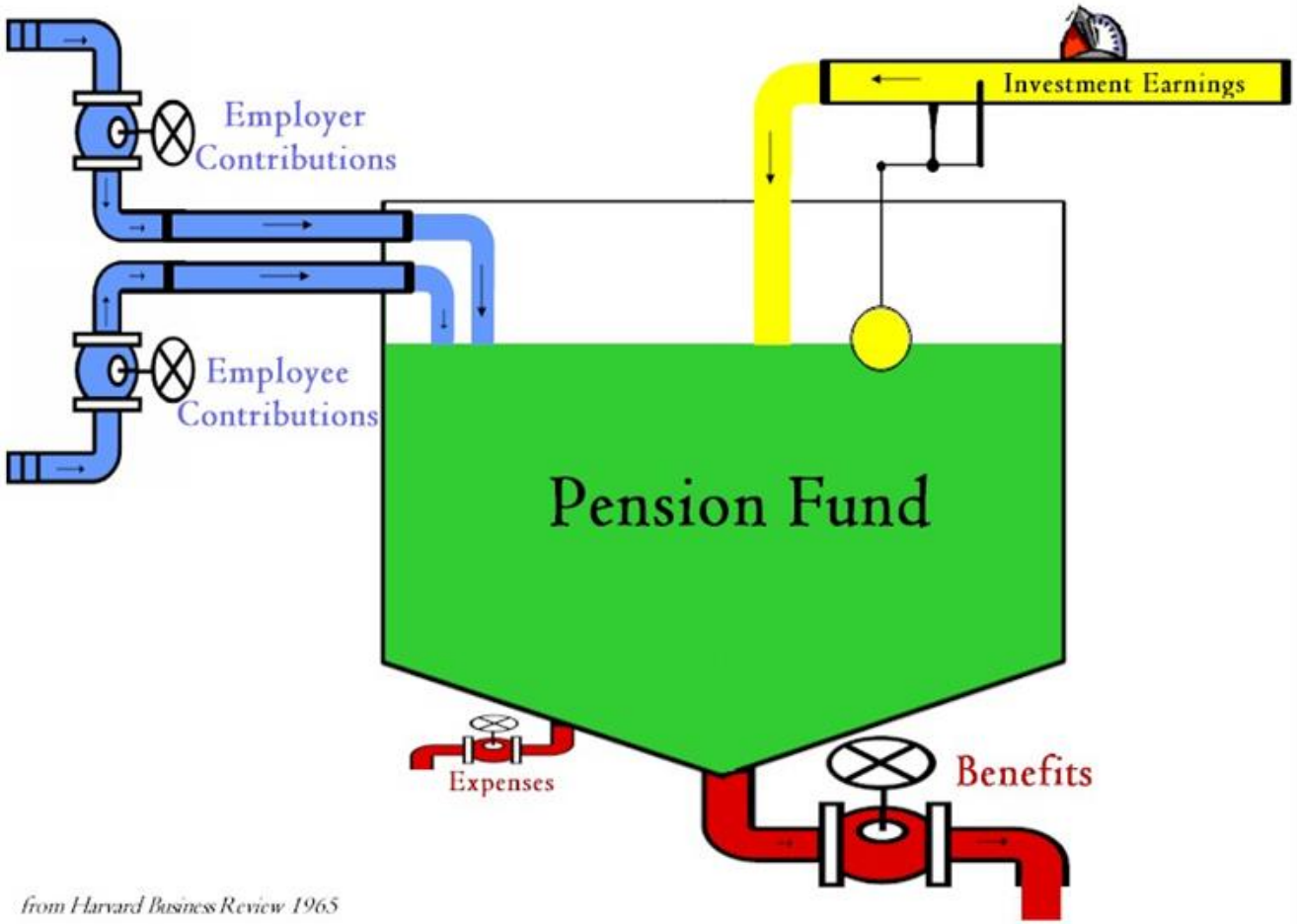
Introduction

- PERS and TRS represent significant obligations for the State of Montana
- Legislature controls
  - Benefits
  - Contributions required of
    - Members
    - Employers
    - State
- Managing the system necessitates understanding
  - Past and future trends
  - Risks



Fundamental Law of Pension Funding



Contributions + Investments

=

Expenses + Benefits

Key Metrics

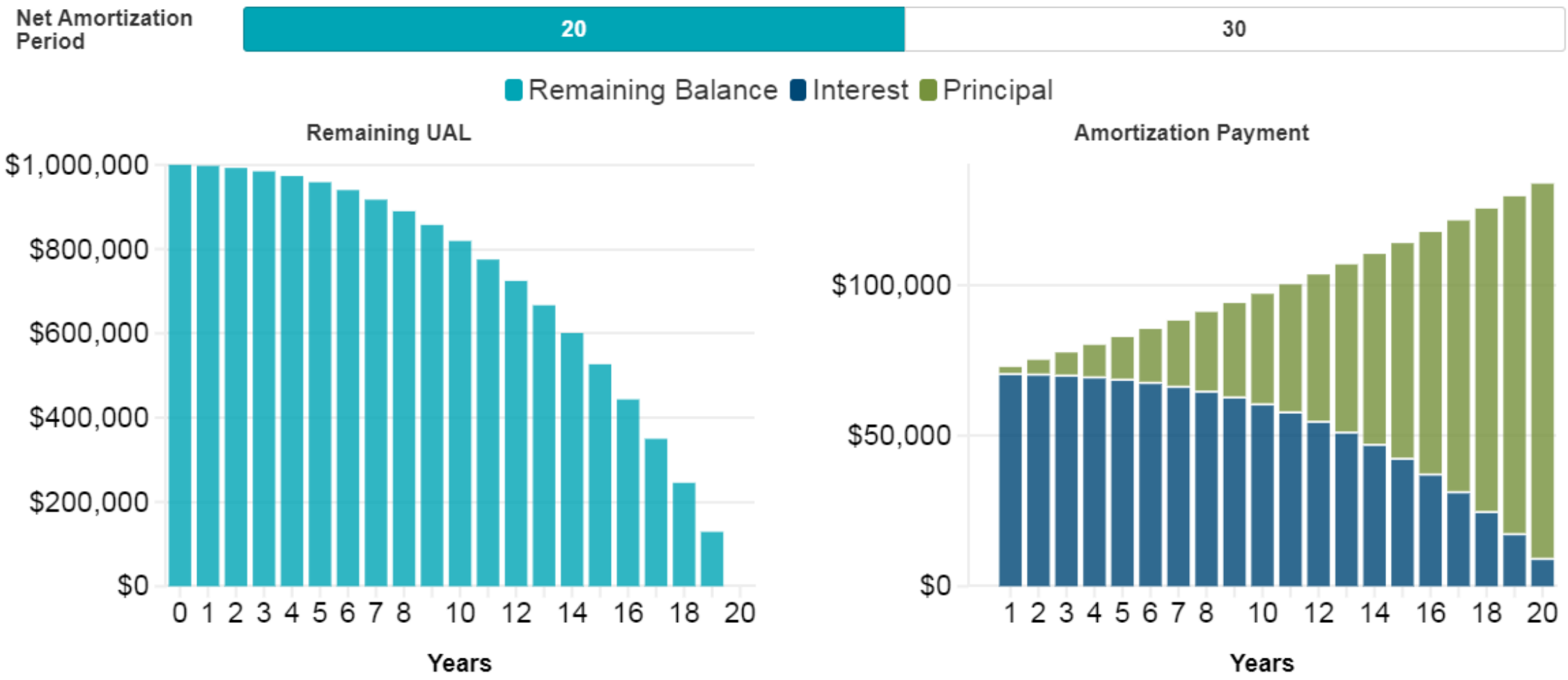
Funded Status

- Funded Ratio = Assets ÷ Actuarial Liability
  - Actuarial Liability is a funding target
  - 100% means the plan is on schedule
  - Less than 100% means the plan is behind schedule relative to that target
- Unfunded Actuarial Liability (UAL) = Actuarial Liability – Assets
  - The dollar amount by which the plan is behind schedule
- Interest on the UAL
  - The amount the UAL is expected to grow due to the current shortfall of assets (assuming no contributions to pay for UAL)

Contributions

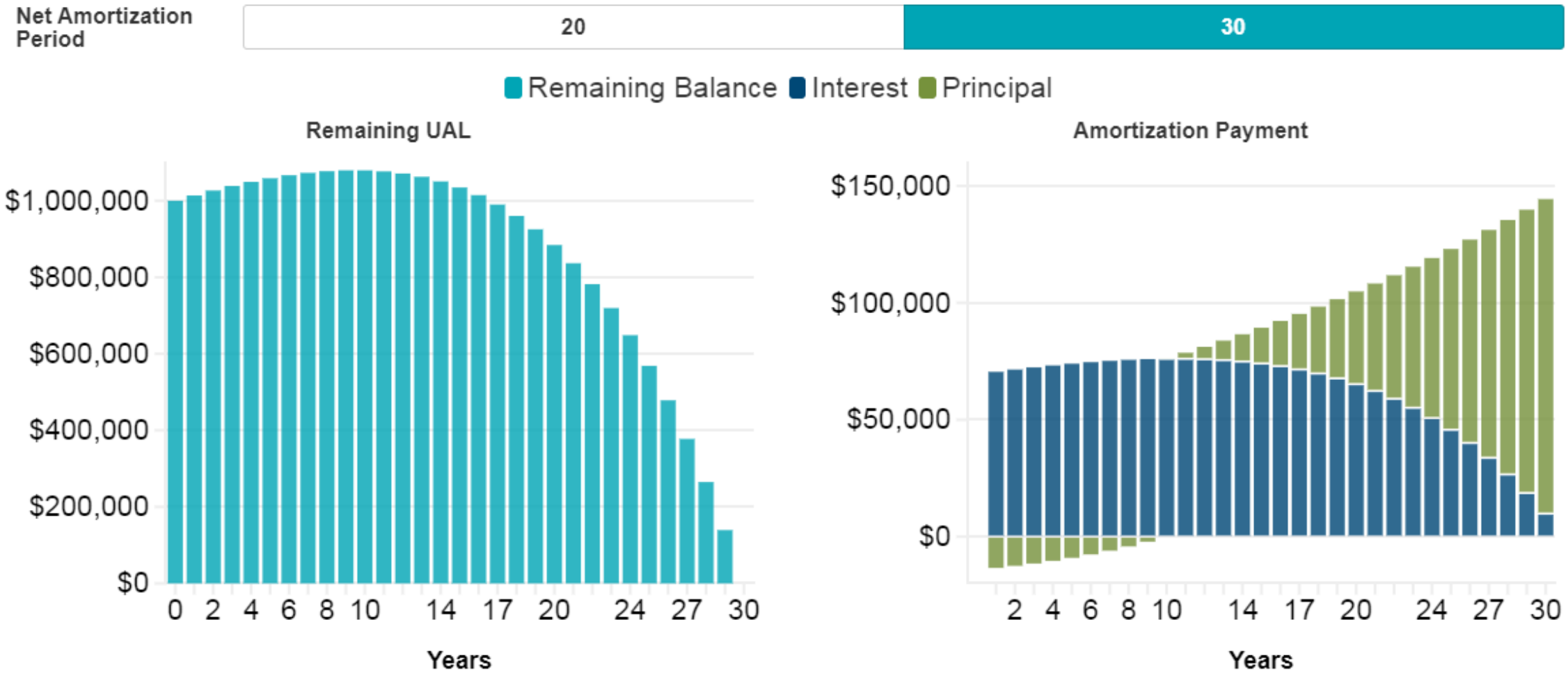
- Normal Cost Rate
  - The expected cost of benefits attributed to the current year of service
- UAL Rate
  - Any contribution rate above the Normal Cost Rate
  - These contributions first pay the Interest on the UAL and then pay down the principal of the UAL
- Net Amortization Period
  - The length of time to pay off the UAL if the current UAL rate continues in the future
- Tread Water Benchmark
  - The contribution amount needed to pay the normal cost and the interest on the UAL
  - Would maintain a constant dollar amount of UAL

Amortization Periods and Interest on the UAL



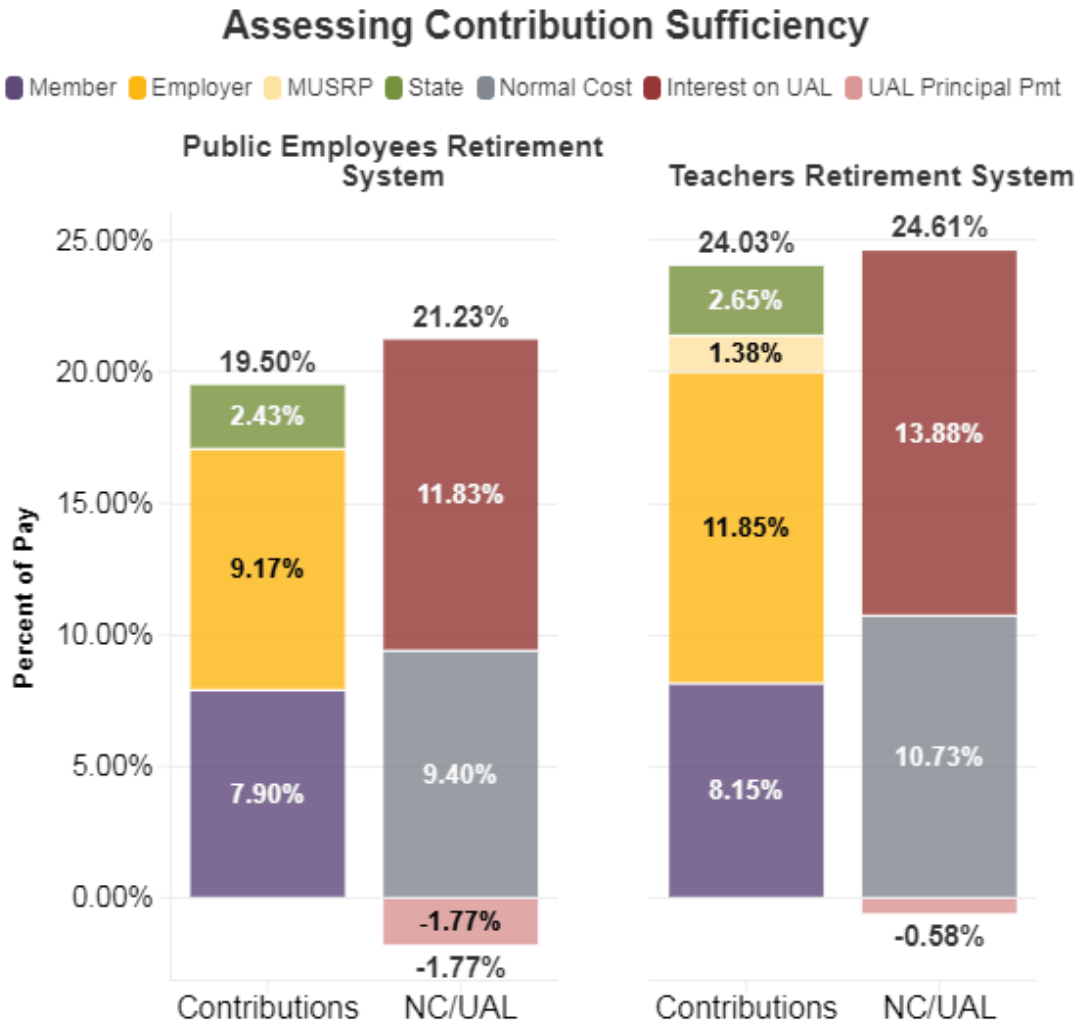
7.30% Discount Rate, 3.25% Payroll Growth

Amortization Periods and Interest on the UAL



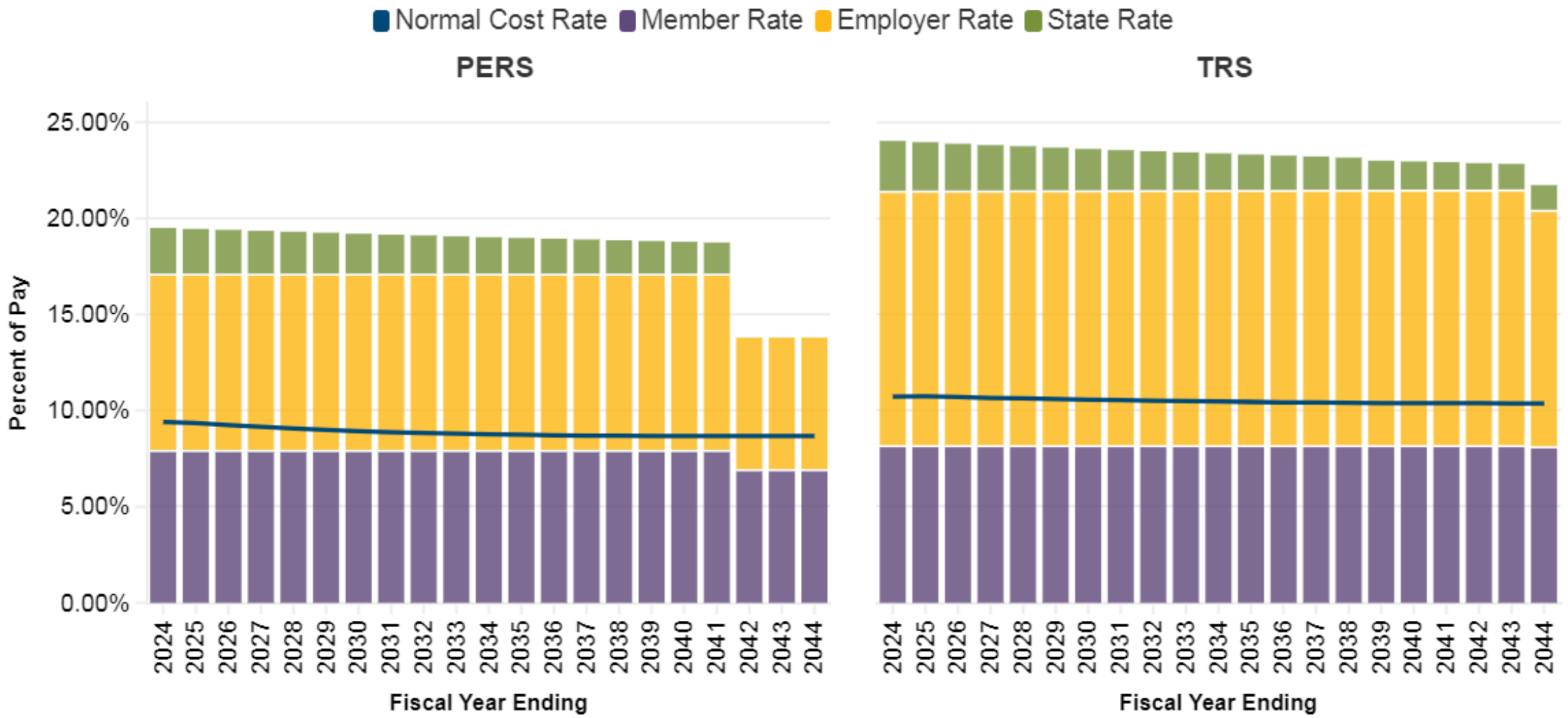
7.30% Discount Rate, 3.25% Payroll Growth

Contribution Rates vs. Tread Water



- Current contribution rates are slightly less than Tread Water
- Net Amortization Periods are less than 30
  - PERS = 28 years
  - TRS = 24 years
- These calculations do not account for some future expected changes
  - Net amortization period uses a smoothed Actuarial Value of Assets
  - Normal cost rates are expected to decline as new Tiers of benefit become more prevalent
  - Some components of the contribution are not expected to grow with payroll, and some adjust as funding improves

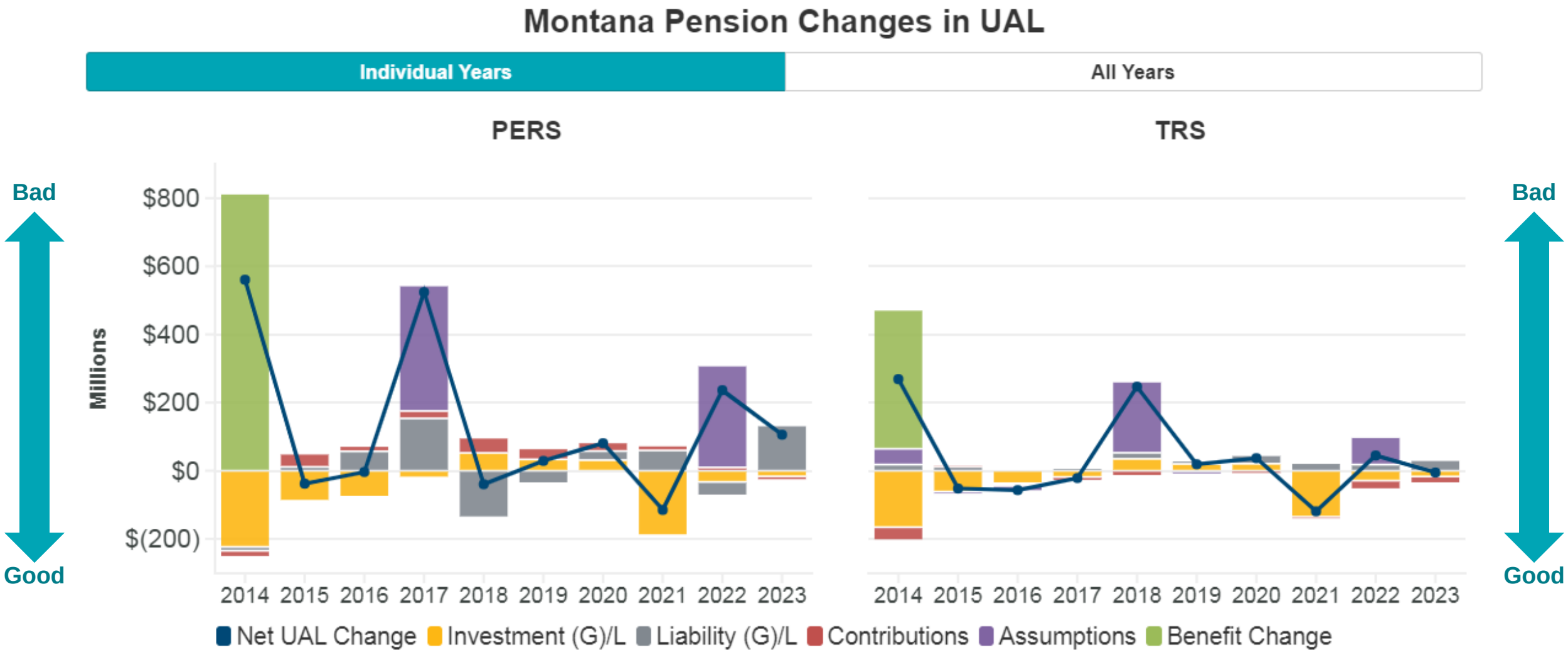
Projected Contribution and Normal Cost Rates



Key Sources of Risk

- Investment returns
  - Current assumption = 7.30%
  - Significant volatility
- Sufficiency of Contributions
  - Rates fixed in statute
  - Payroll is assumed to increase by 3.25% per year
- Assumptions
  - Potential reduction in discount rate/expected returns
  - Potential reduction in assumed payroll growth
  - Other assumptions (e.g., mortality)

Historical Changes in UAL by Source



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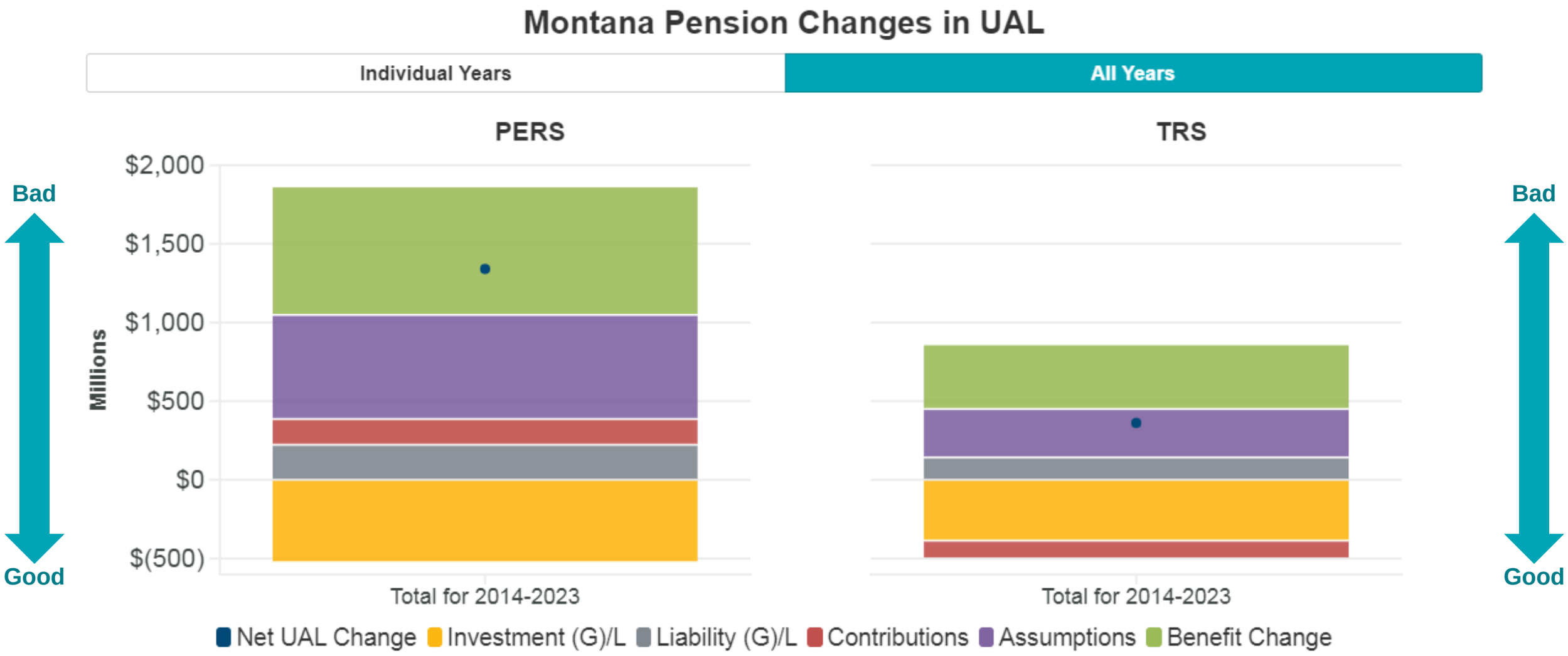


Stress Testing Investment Returns

- Investment returns are the largest and most immediate source of risk
- Deterministic scenarios
  - Illustrates dynamics of investment gains and losses on plan projections
  - Doesn’t illustrate the likelihood of any specific scenario
  - Doesn’t cover the full range of possible outcomes
- Stochastic projections
  - Illustrates the likelihood of different levels of outcome
  - Illustrates the range of possible outcomes
  - Sensitive to underlying assumptions

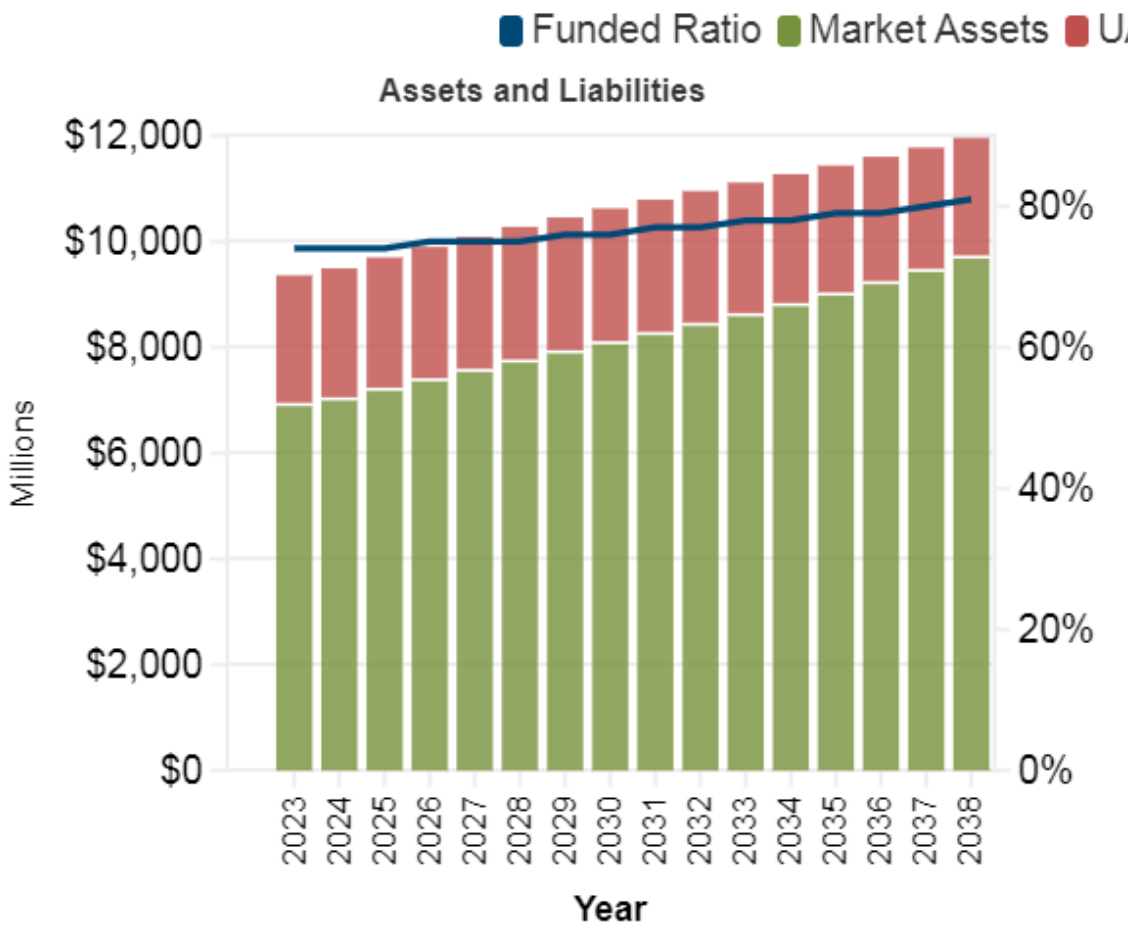
Stress Testing Investment Return Scenarios

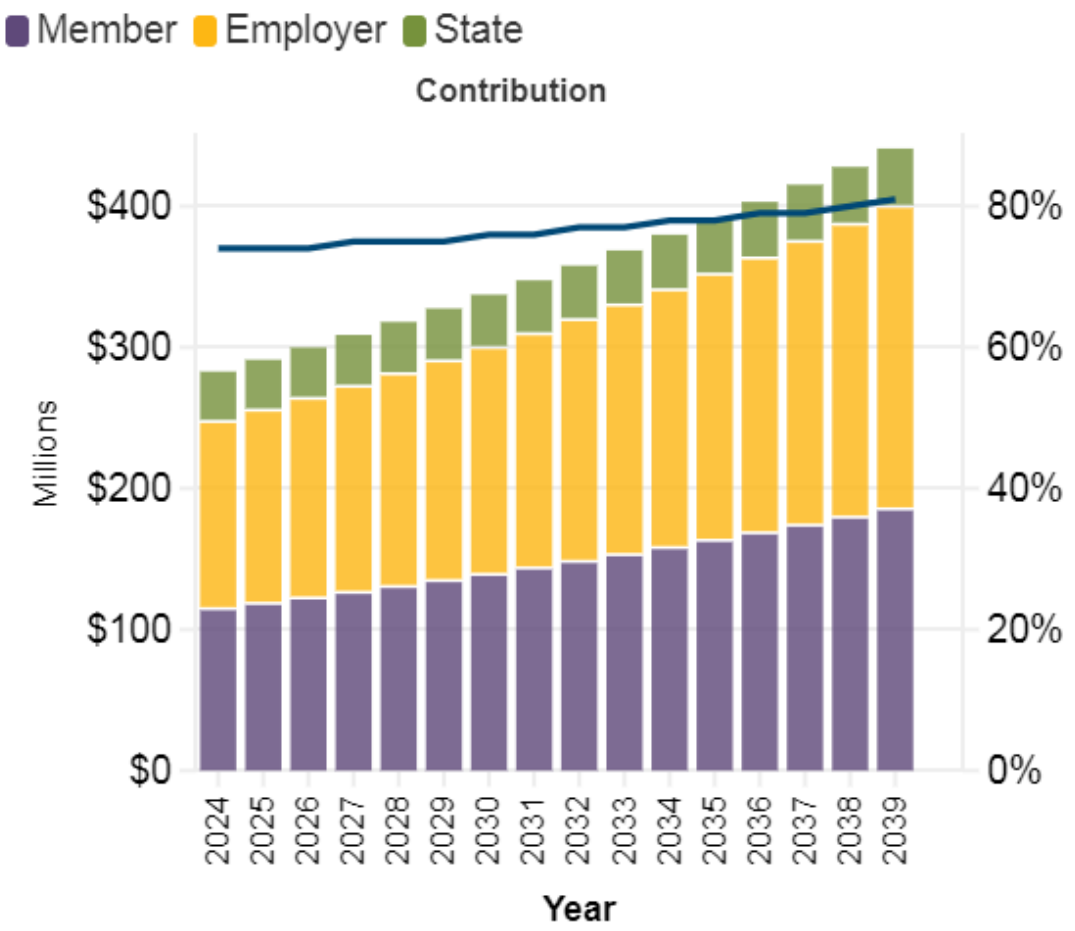
- Hypothetical scenarios are for illustrative purposes only
  - These scenarios are not intended to be realistic projections
  - All scenarios assume no changes to statutes during the projection period
- The scenarios are solely to illustrate the sensitivity to investment returns of:
  - Contributions,
  - Funded ratios, and
  - UAL/Surplus
- The scenarios were derived from the distribution of expected returns over five years
  - Median return = 7.30%
  - Standard deviation = 12.4%
  - Moderate scenarios represent the 25th and 75th percentiles of the distribution
  - Significant scenarios represent the 5th and 95th percentiles of the distribution

Theoretical Scenarios				
	5-Year Moderate		5-Year Significant	
FYE	Neg	Pos	Neg	Pos
2024	3.75%	11.00%	-1.50%	16.50%
2025	3.75%	11.00%	-1.50%	16.50%
2026	3.75%	11.00%	-1.50%	16.50%
2027	3.75%	11.00%	-1.50%	16.50%
2028	3.75%	11.00%	-1.50%	16.50%
2029+	7.30%	7.30%	7.30%	7.30%

Stress Testing Scenarios – PERS

Scenario: **Baseline** | Moderate Neg | Moderate Pos | Significant Neg | Significant Pos





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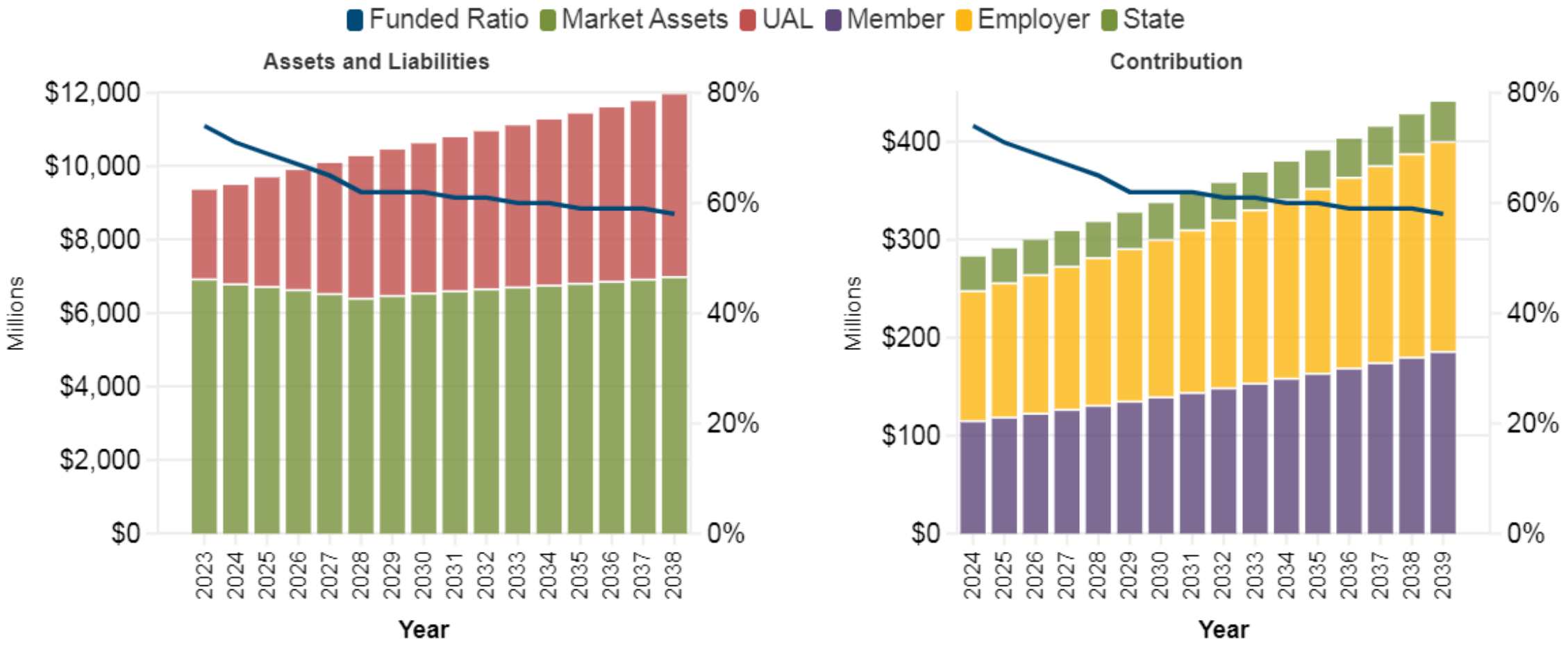

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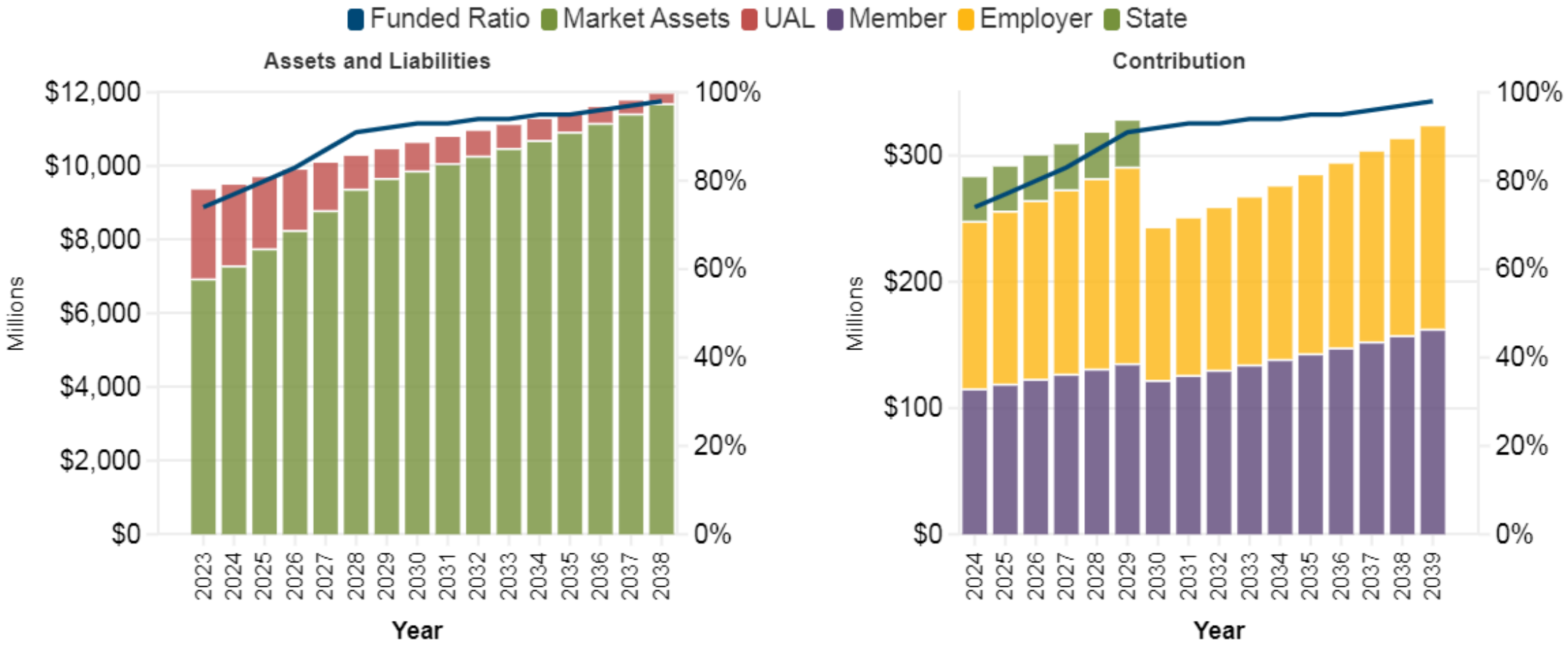

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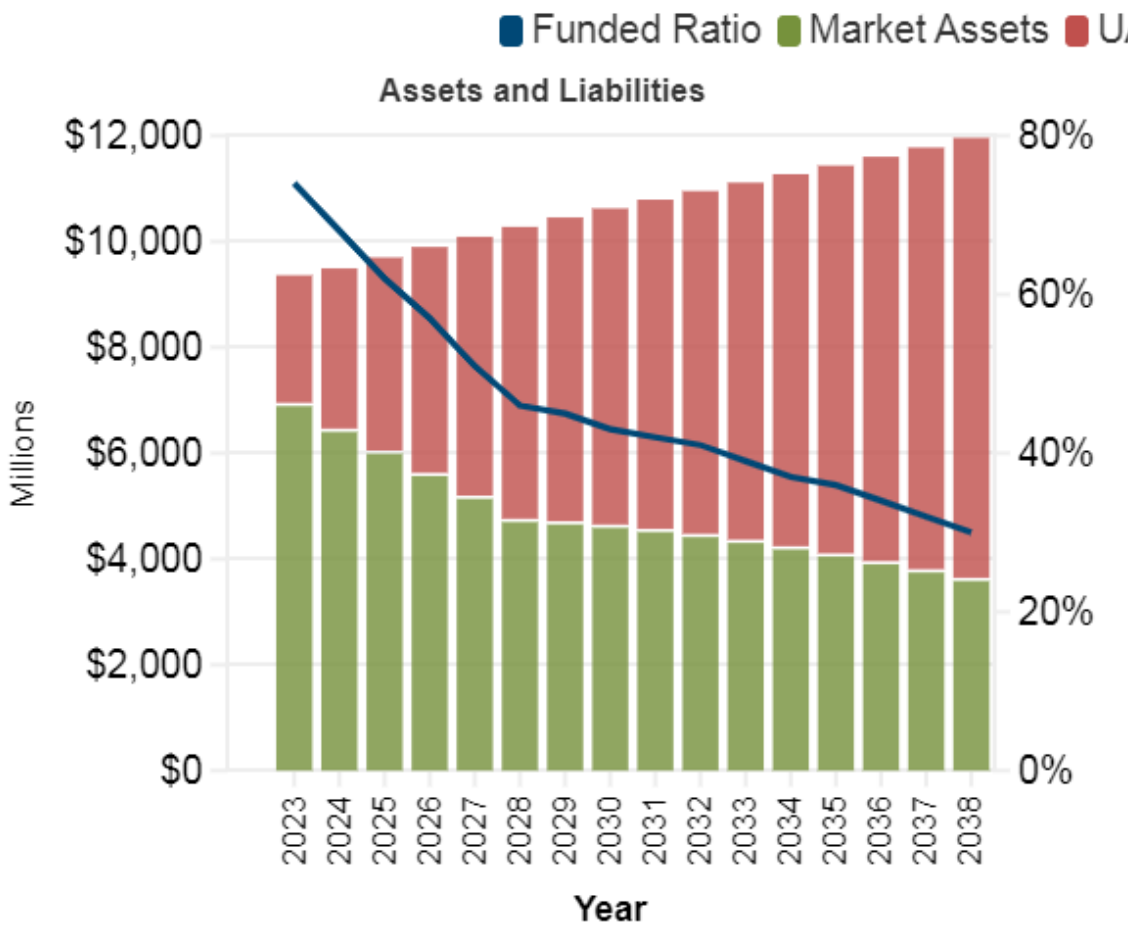

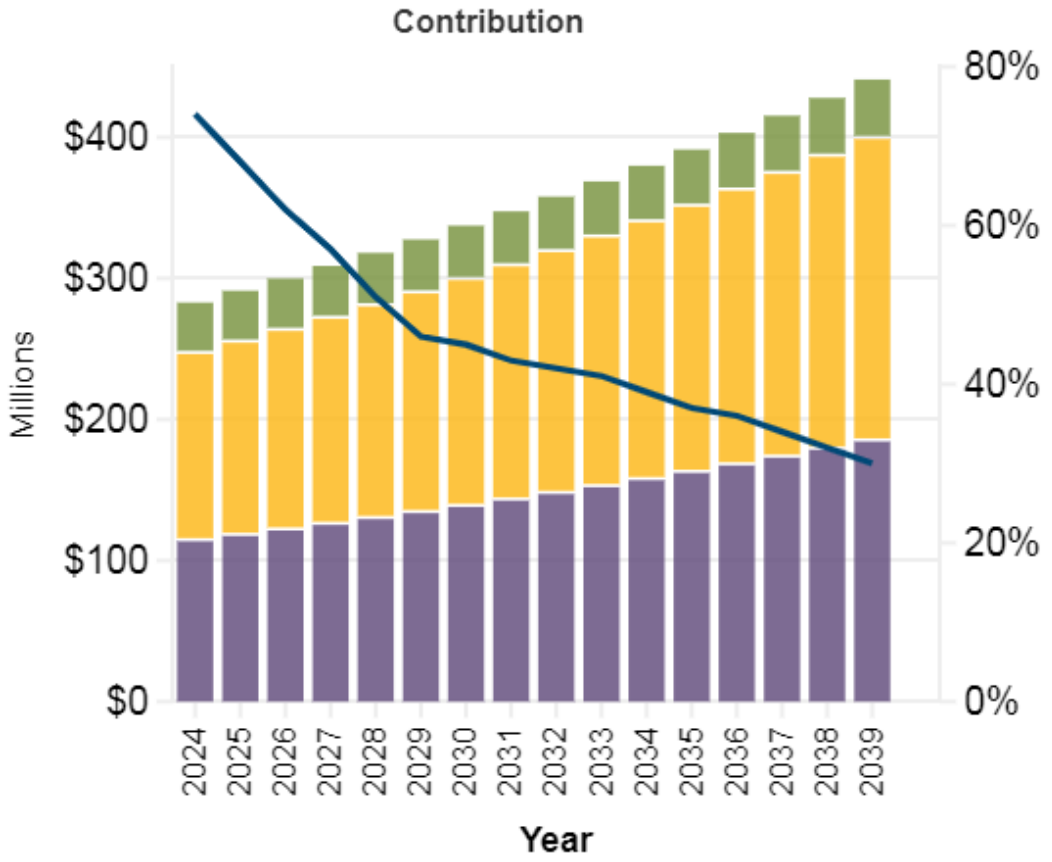

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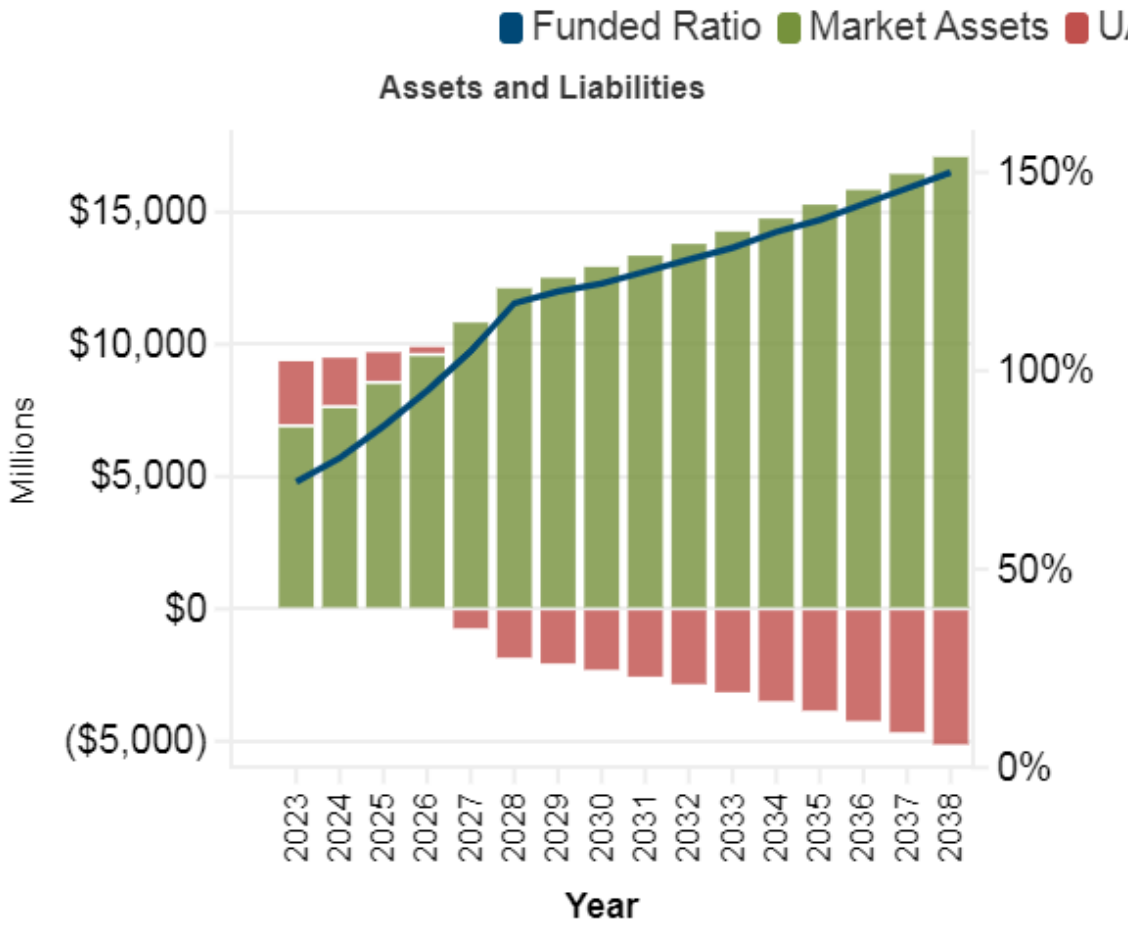
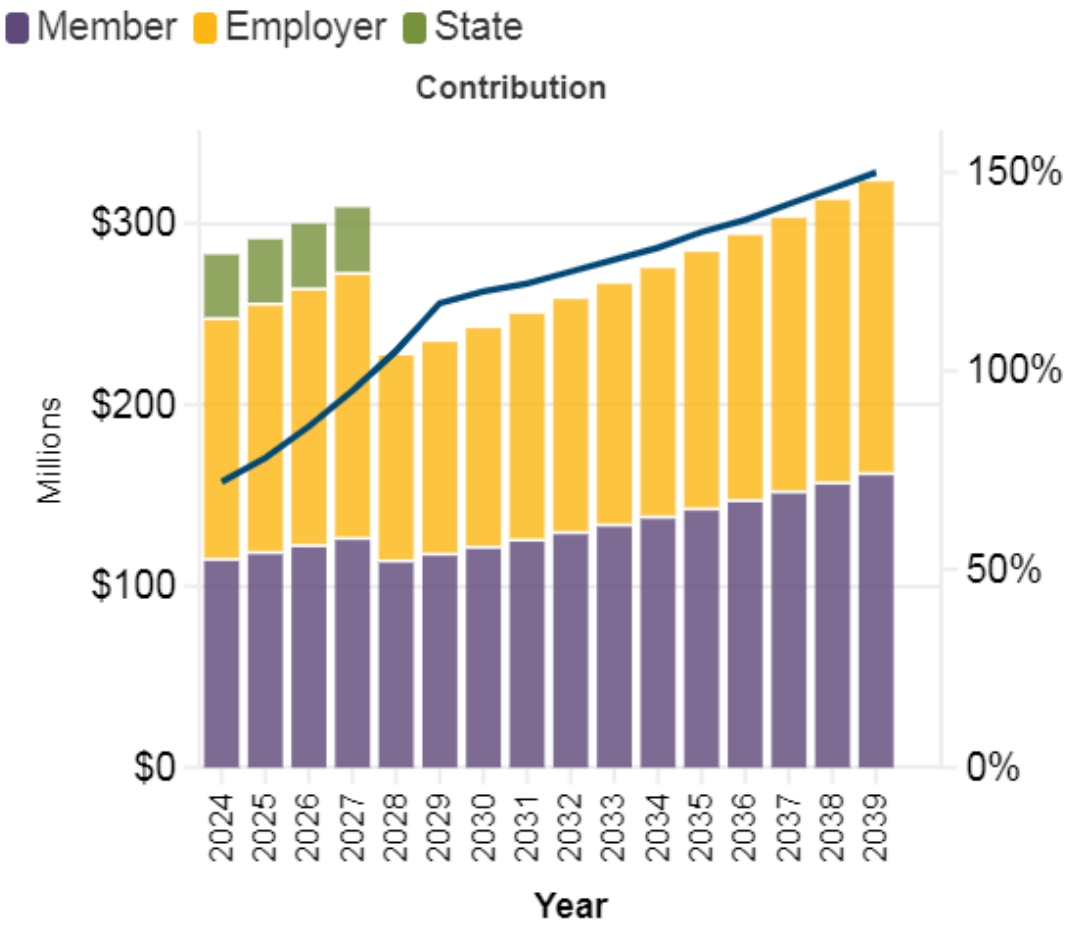
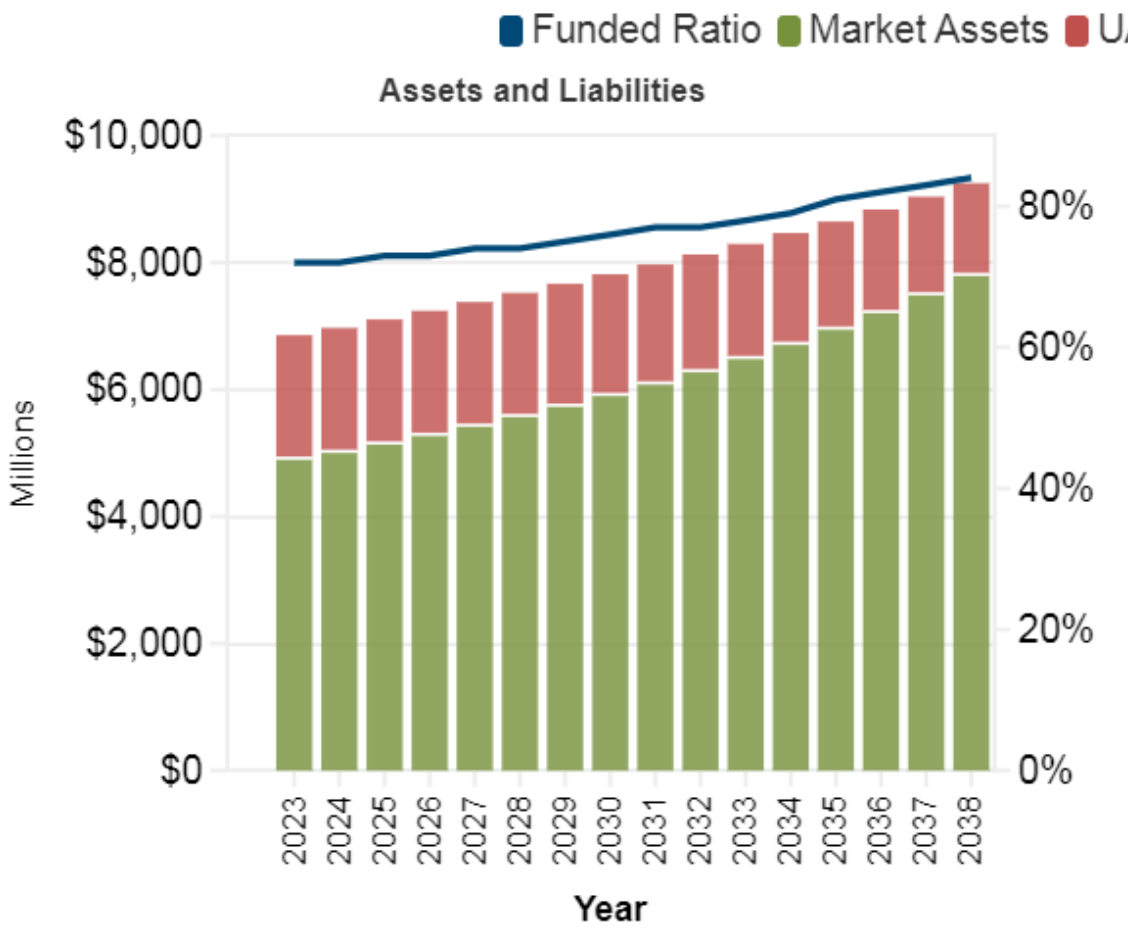
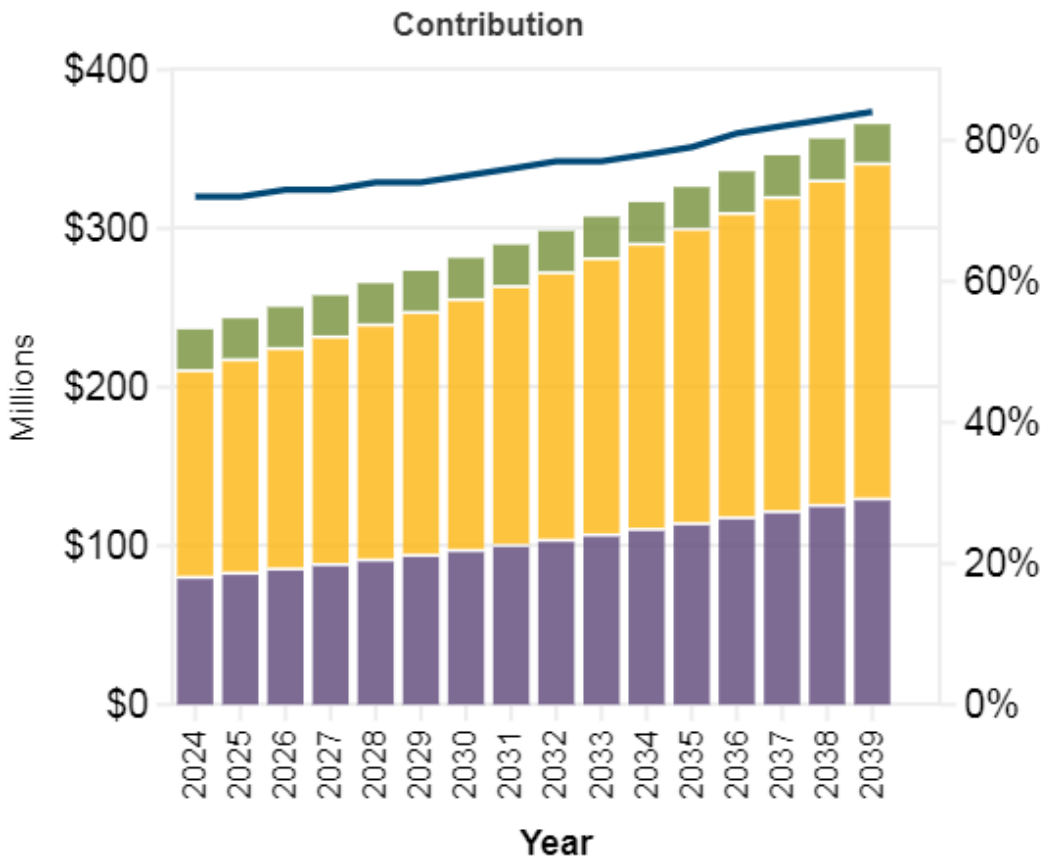




Stress Testing Scenarios – TRS

Scenario: **Baseline** | Moderate Neg | Moderate Pos | Significant Neg | Significant Pos





Stress Testing Scenarios – TRS

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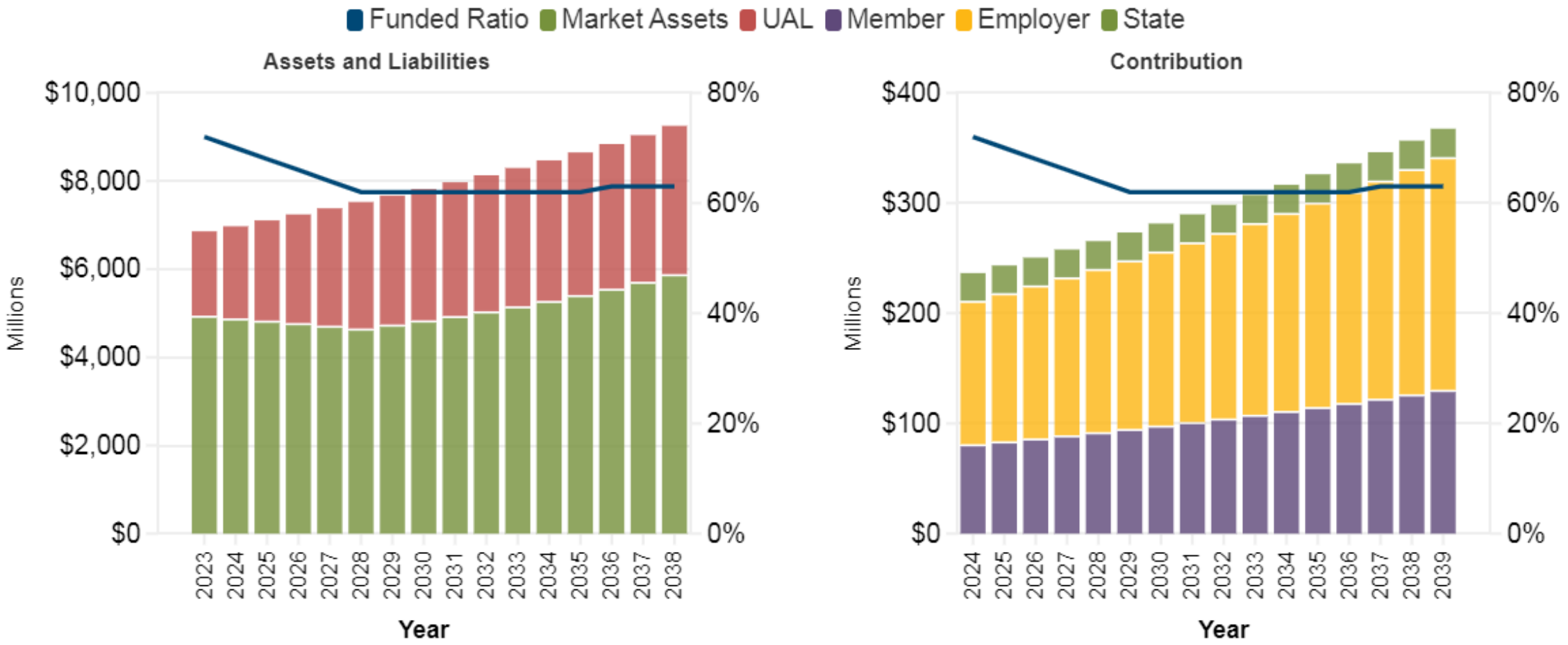

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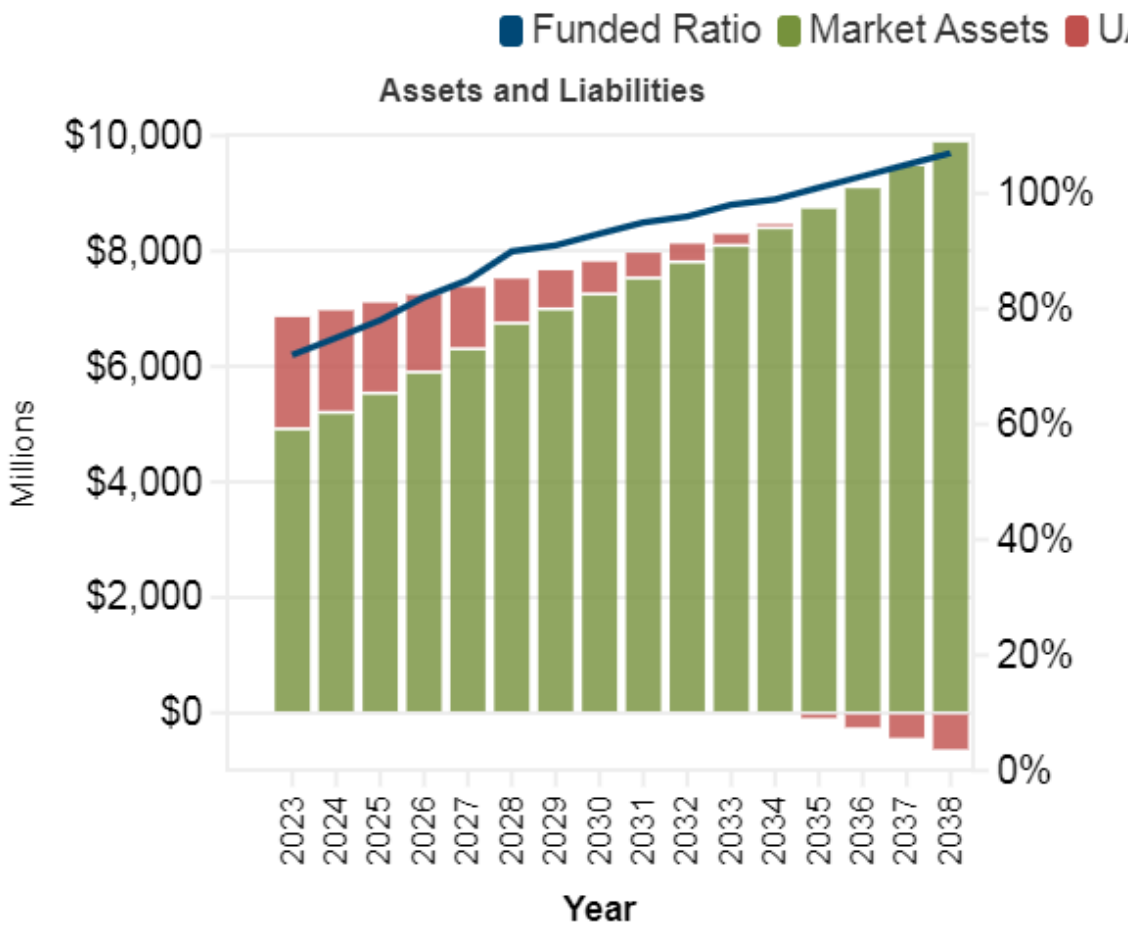

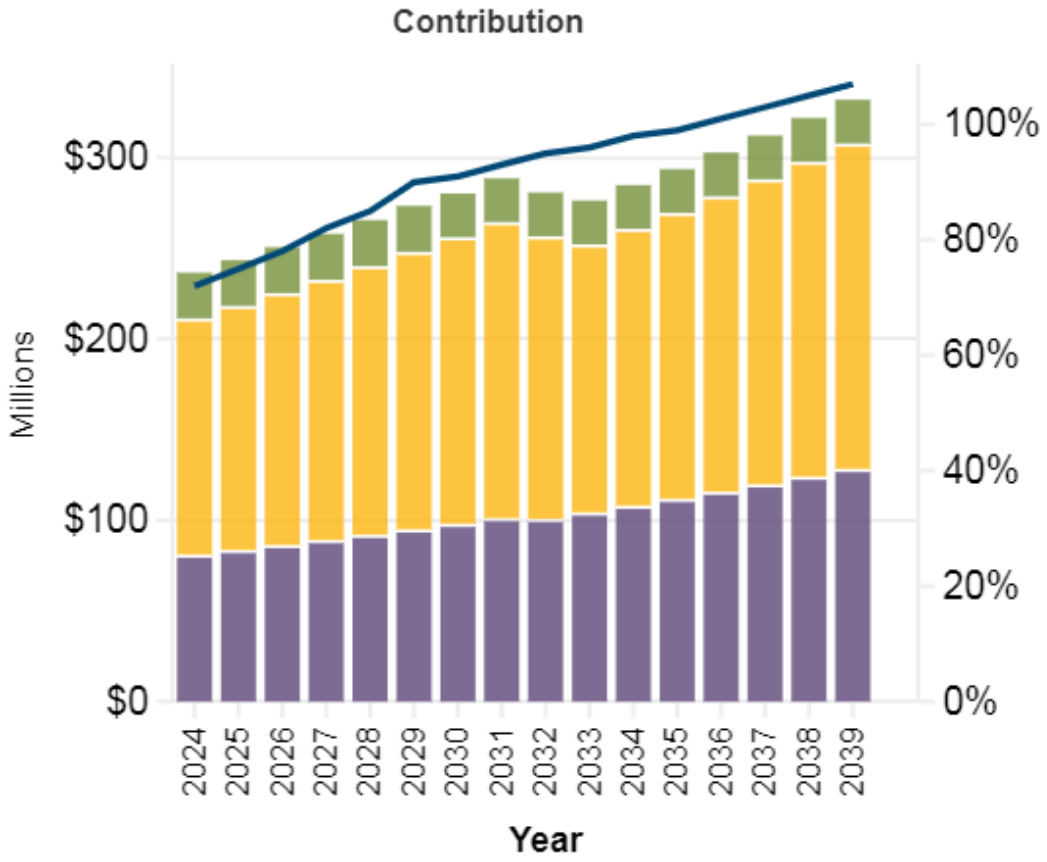

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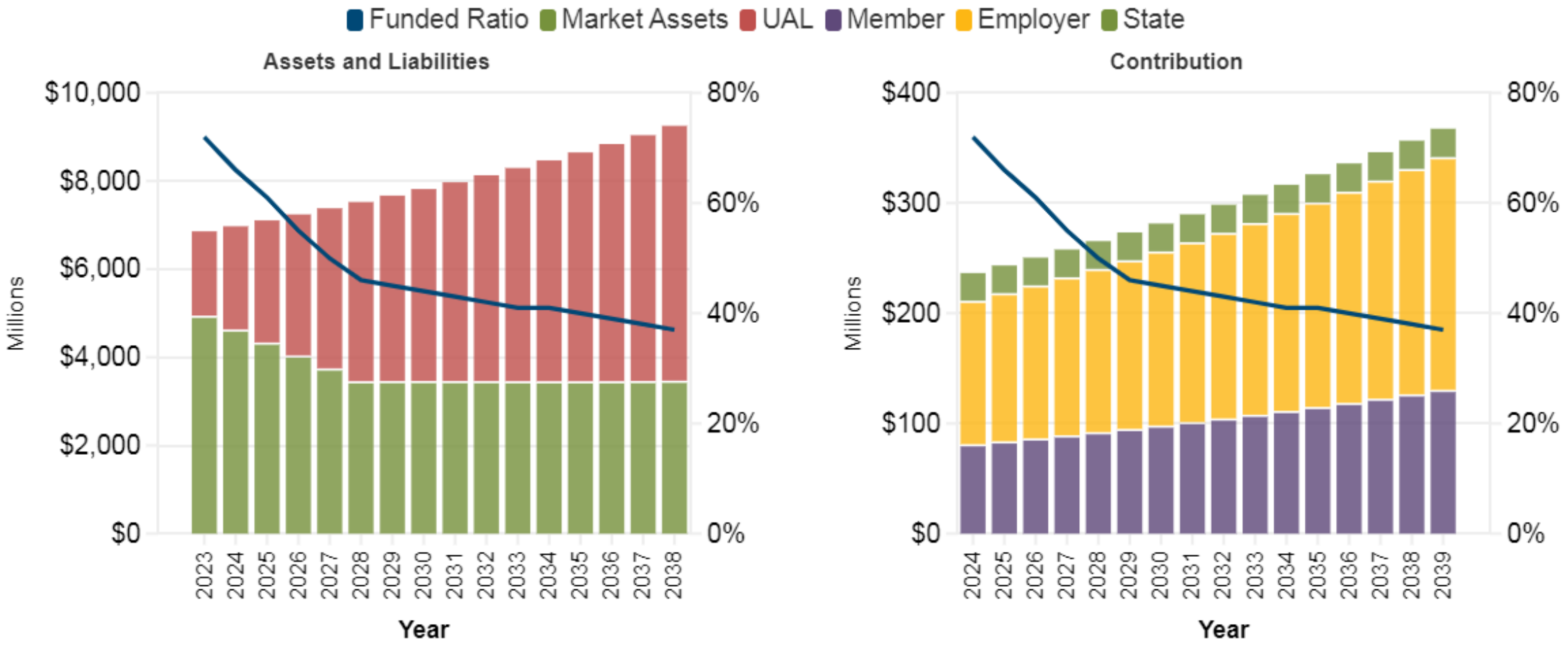

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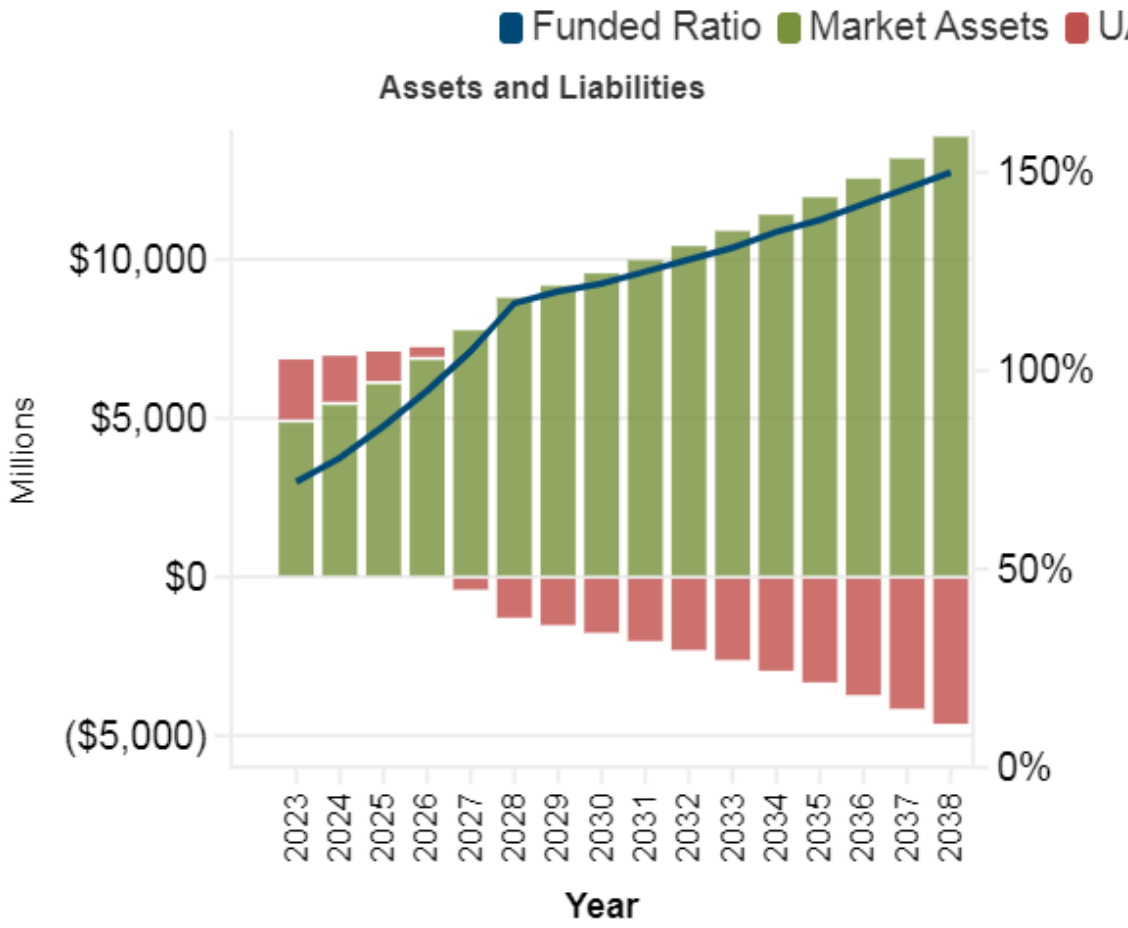
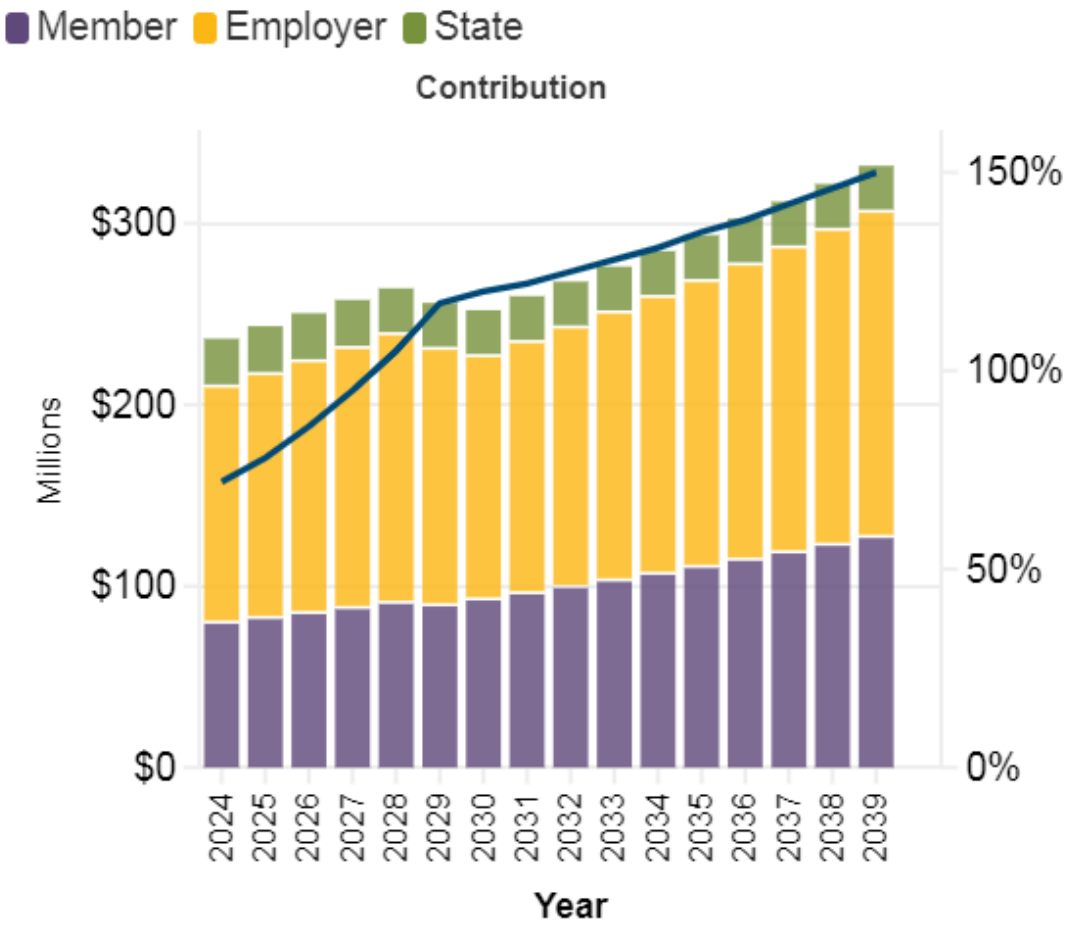
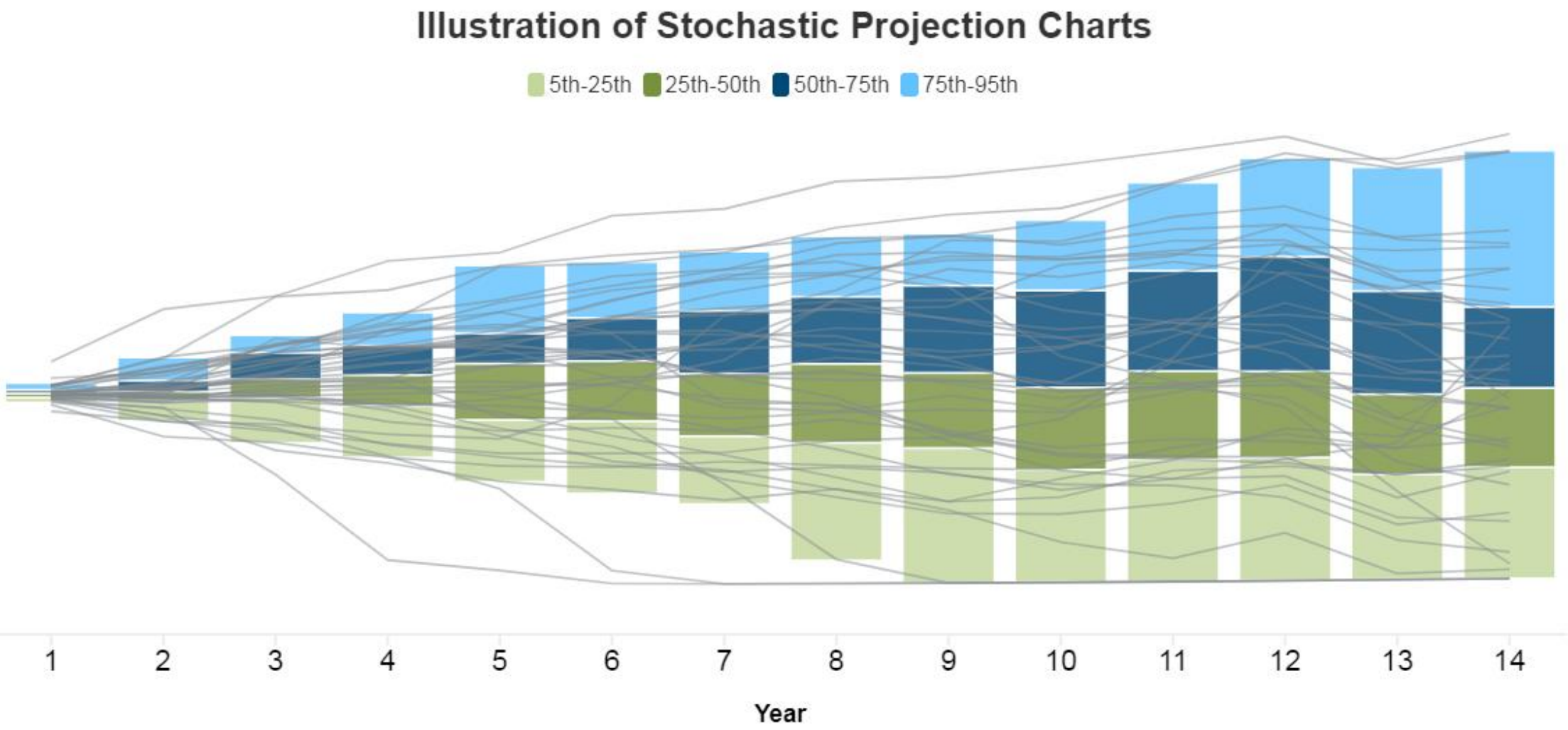


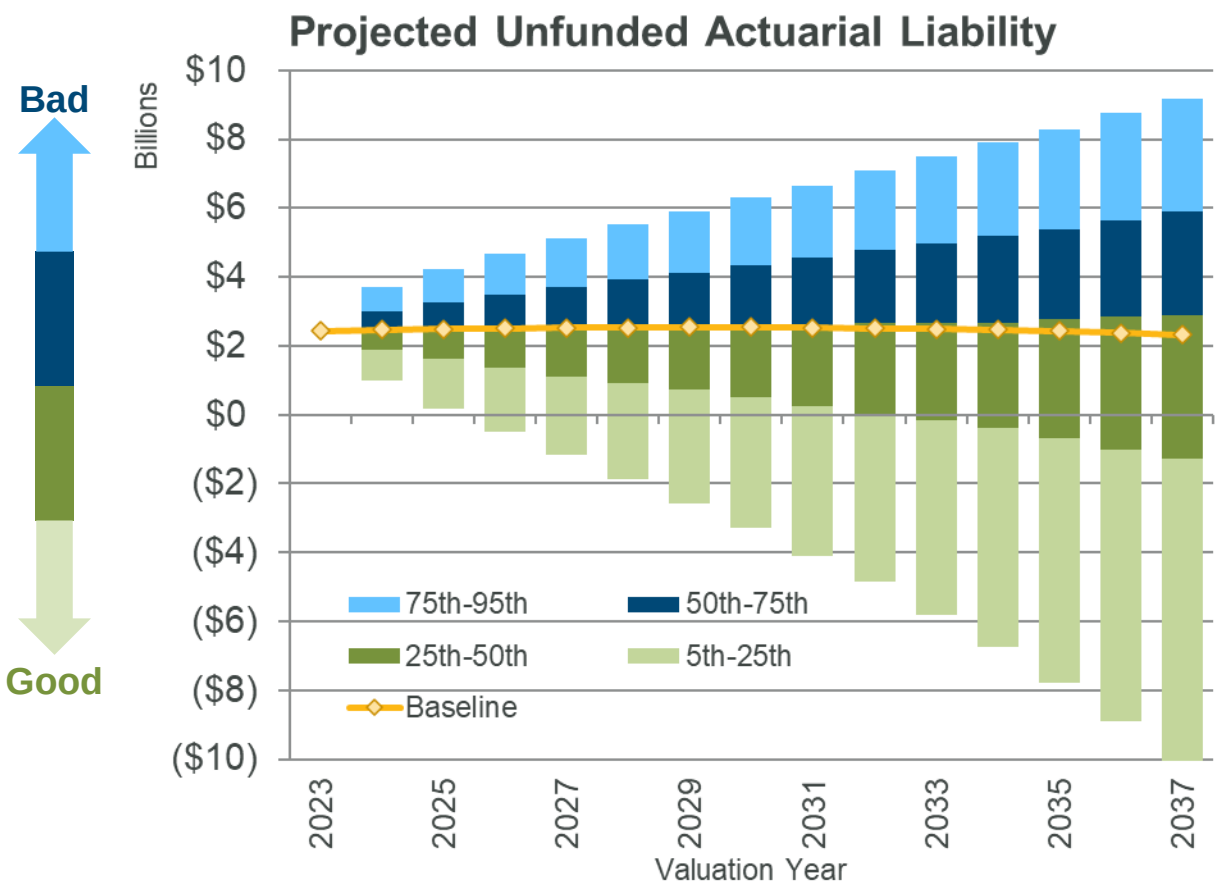


Stochastic Projections

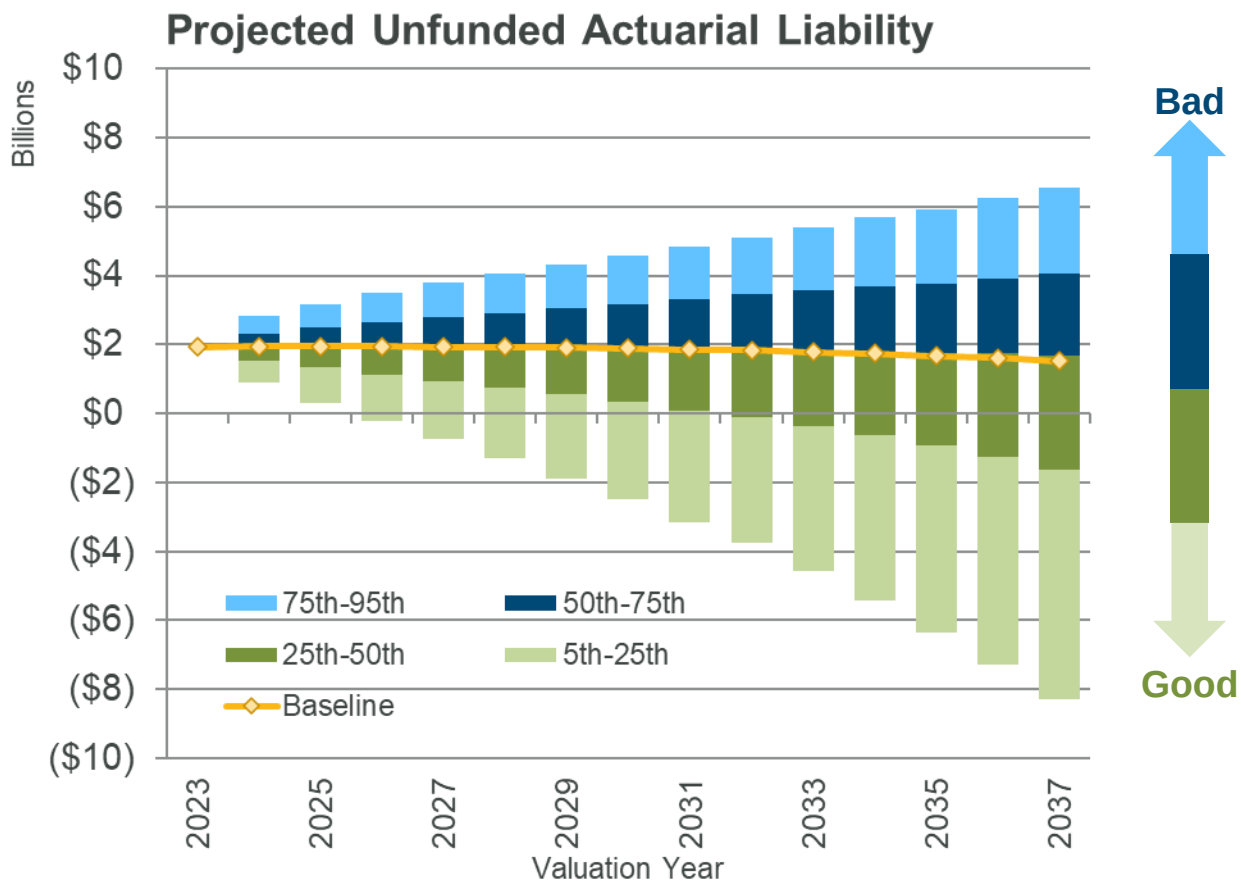


Stochastic Projection of UAL

Public Employees' Retirement System

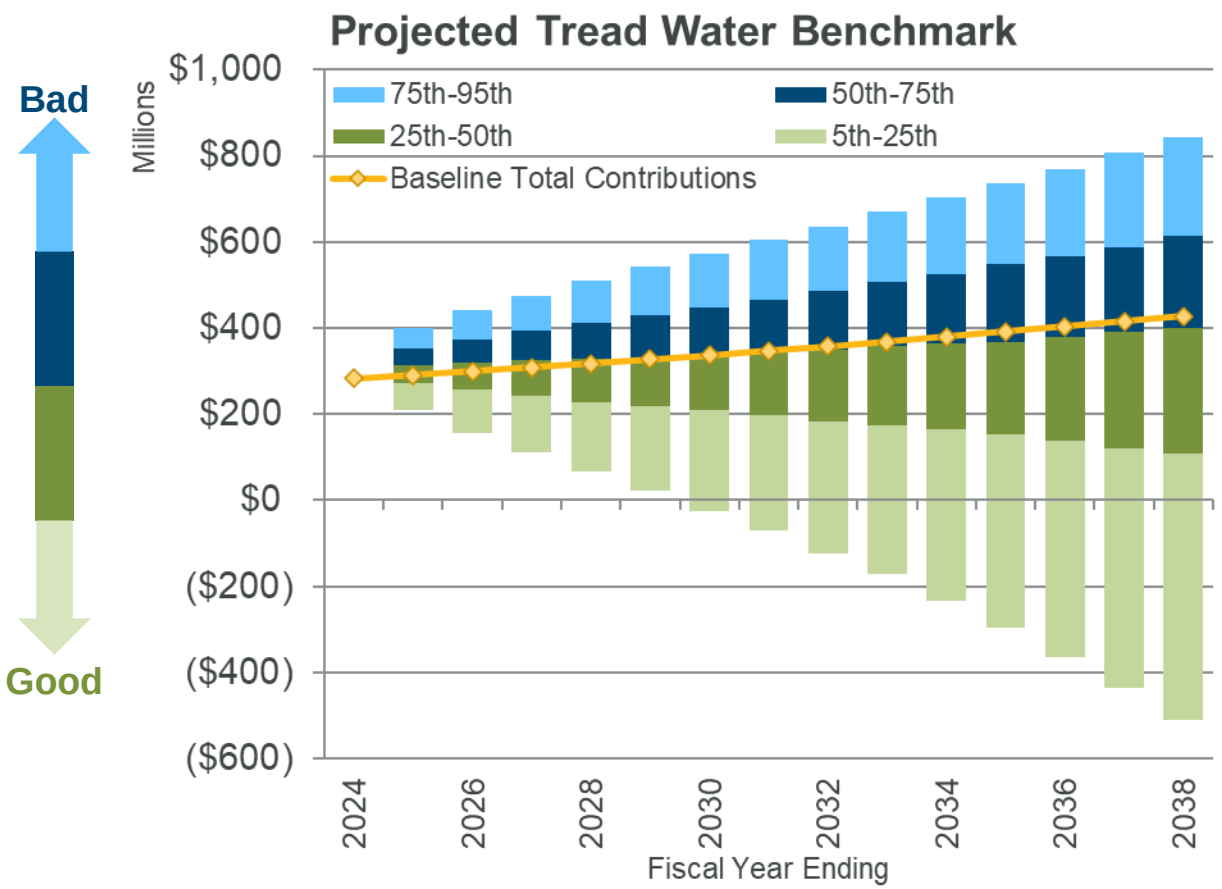


Teachers' Retirement System



Stochastic Projection of Tread Water

Public Employees' Retirement System



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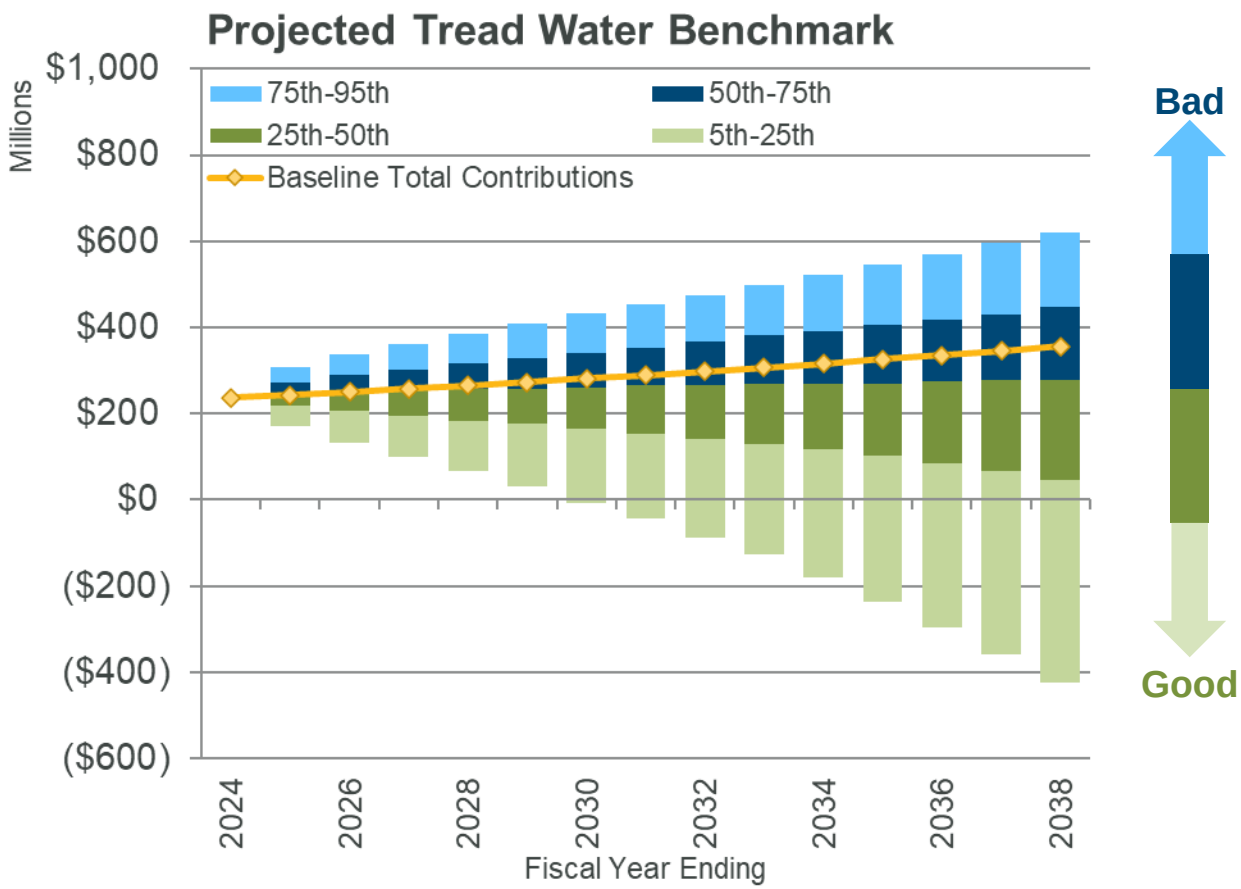

Observations

- Baseline projections show gradually improving funding
  - PERS UAL is expected to increase for a few years before it starts declining
- Automatic contribution reductions if funding improves, but no automatic contribution increases if funding deteriorates
- Even moderate investment scenarios would likely require legislative action
  - Enhancements to automatic adjustment mechanisms could limit scenarios requiring legislative action and provide the Legislature more time to act when needed
- Investment return volatility combined with fixed contribution rates represents the largest and most immediate risk, but other risks should also be monitored
  - Payroll growth
  - Assumption changes – especially discount rate

Questions

Appendix – Certification

The purpose of this presentation is to provide the Montana Legislature with stress-testing projections of the Montana Public Employees' Retirement System (MT PERS) and the Montana Teachers' Retirement System (MT TRS). This presentation is for the use of the Montana Legislature.

In preparing our presentation, we relied on information supplied by MT PERS and MT TRS. This information includes detailed results from the June 30, 2023 actuarial valuations by benefit tier. A summary of the data, assumptions, methods, and plan provisions used to prepare the valuation results can be found in the MT PERS and MT TRS June 30, 2023 Actuarial Valuation Reports.

Future actuarial measurements may differ significantly from the current measurements due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions, changes in economic or demographic assumptions, and changes in plan provisions or applicable law.

This presentation and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this presentation. This presentation does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This presentation was prepared exclusively for the Montana Legislature for the purpose described herein. Other users of this presentation are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

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Consulting Actuary

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Appendix – Modeling

- Deterministic projections in this presentation were developed using P-scan, a proprietary tool used to illustrate the impact of changes in assumptions, methods, plan provisions, or actual experience (particularly investment experience) on the future financial status of the Plan. P-scan uses standard roll-forward techniques that implicitly assume a stable active population.

- Stochastic projections in this presentation were developed using R-scan, our proprietary tool for assessing the probability of different outcomes based on the range of potential investment returns. We assumed a geometric return of 7.3%, a standard deviation of 12.4%, and a lognormal distribution.

- In addition to the assumptions described in the valuation reports, the projections assume:

  – MUS-RP payroll grows 3.25% each year

  – The State appropriation for MT PERS ceases when employer supplemental contributions cease