



# Administrative Committee Meeting Agenda

Tuesday, October 22, 2024

2:00 P.M.

(or immediately following the Investment Committee Meeting)

- I. [Additional Independent Actuarial Assessment](#)  
(Intended Outcome – Accept Report)
- II. [Tier 5 and Actuarial Information](#)  
(Intended Outcome – Information Only)
- III. Other

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**Administrative  
Committee Members:**

Mr. Bill Benson, *Committee Chair*  
Mr. Chris Graham  
Dr. Jay Smith  
State Treasurer David McRae

Mr. Kelly Breland, *Board Chair*

# Public Employees' Retirement System of Mississippi

## 2024 Preliminary Independent Actuarial Assessment



October 22, 2024

Janet Cranna, FSA, FCA, EA, MAAA  
Patrick Nelson, FSA, CERA, EA, MAAA

# Topics for Discussion



Senate Bill 3231

2024 Independent Actuarial Assessment

Funding Policy Metrics

Projected Outlook

# Scope and Purpose

Senate Bill  
3231

- Rescind the PERS Board approved employer contribution rate increases of 5% phased in over 3 years
- Provide for 0.5% increases each year from July 1, 2024 through July 1, 2028, with ultimate rate of 19.90% beginning July 1, 2028
- PERS Board has authority to make recommendations regarding additional funding
  - Must be accompanied by two assessments from independent actuaries
  - Legislature has sole authority to implement recommendations

# 2024 Independent Actuarial Assessment

## Summary of Results

	June 30, 2023	June 30, 2024
<b>Liabilities</b>		
Present Value of Future Benefits [PVFB]	\$ 63,645	\$ 65,382
Actuarial Liability [AL]	\$ 58,148	\$ 59,638
<b>Assets</b>		
Market Value [MVA]	\$ 31,622	\$ 33,450
Actuarial Value [AVA]	\$ 32,606	\$ 33,536
<b>Unfunded Liabilities</b>		
UAL [AL - AVA]	\$ 25,542	\$ 26,102
Funded Ratio [AVA / AL]	56.1%	56.2%
UAL [AL - MVA]	\$ 26,526	\$ 26,188
Funded Ratio [MVA / AL]	54.4%	56.1%
<b>Contributions, as % of Payroll</b>		
	<b>FYE 2026</b>	<b>FYE 2027</b>
Net Employer Normal Cost	2.62%	2.98%
UAL Payment for FCR	19.78%	15.92%
Fixed Contribution Rate [FCR]	22.40%	18.90%
UAL Payment for ADC	22.55%	22.90%
Actuarially Determined Contribution [ADC]	25.17%	25.88%
Shortfall [ADC - FCR]	2.77%	6.98%

\$ in millions

# 2024 Independent Actuarial Assessment

## Data Summary

	June 30, 2023	June 30, 2024
<b>Participant Counts</b>		
Actives	145,985	145,836
Retired	97,395	99,750
Disabled	6,153	6,089
Survivors	12,342	12,482
Deferred Vested and Inactives	96,000	100,966
Total	357,875	365,123
<b>Summary Statistics</b>		
Annual Compensation	\$ 7,065	\$ 7,246
Annual Retirement Allowances	\$ 3,119	\$ 3,277

*\$ in millions*

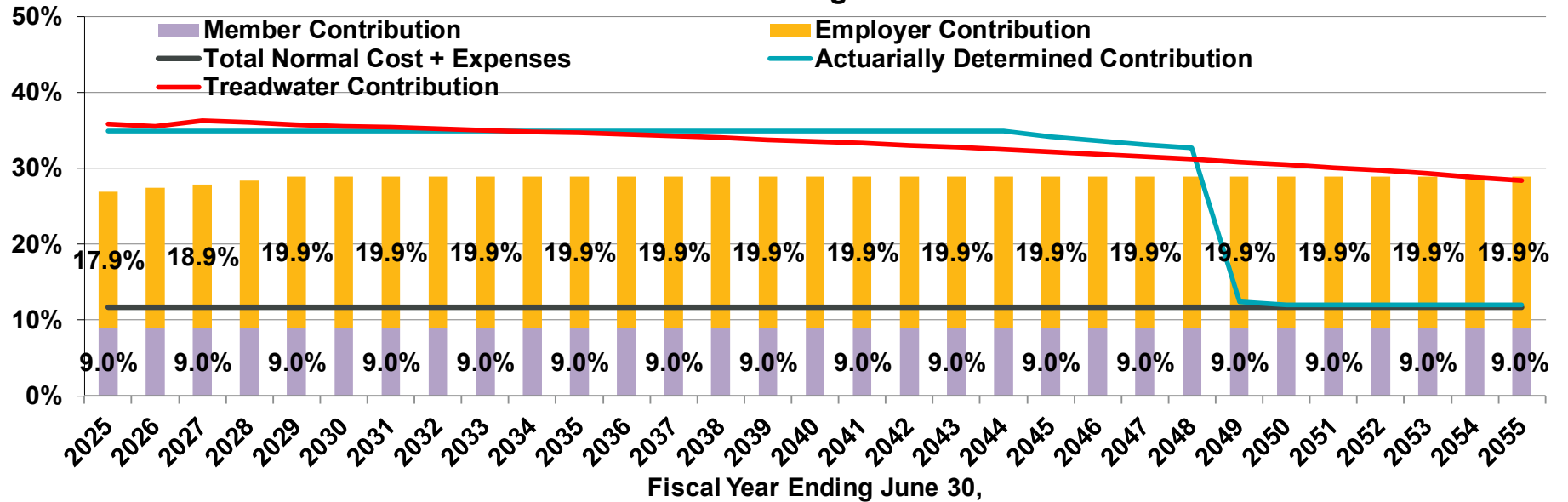
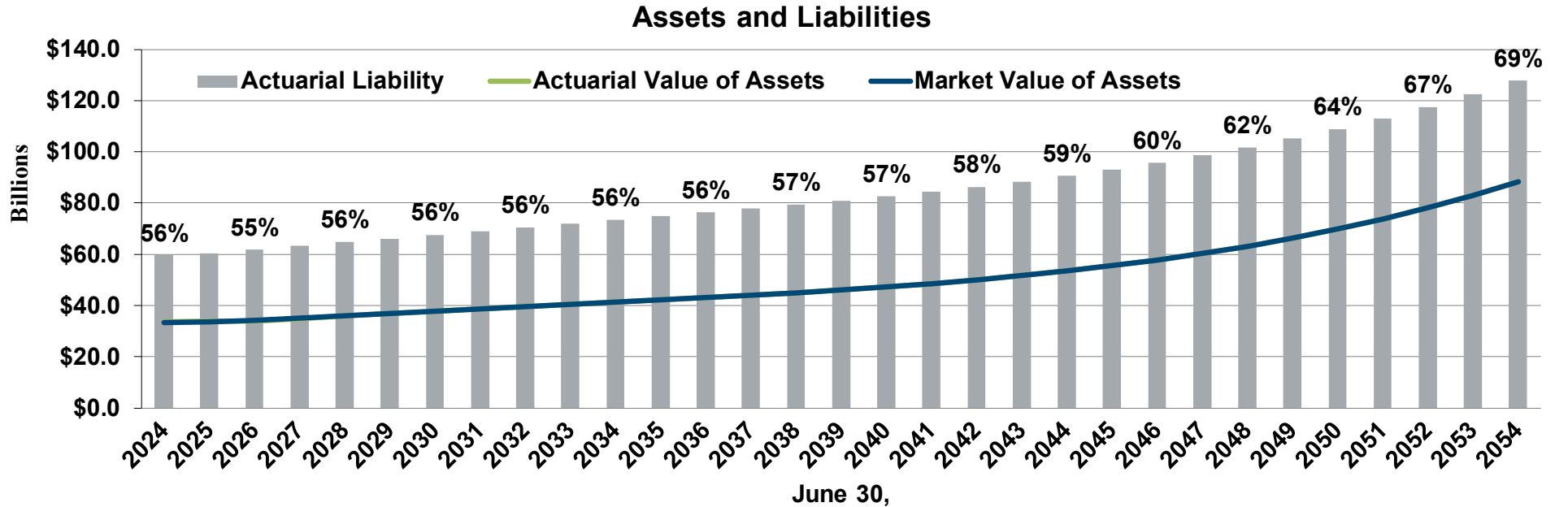
# 2024 Independent Actuarial Assessment

## Actuarial Assumptions

- Based on the same assumptions used in the June 30, 2023 actuarial valuation
- Assumptions were adopted by the Board based on the Actuarial Experience Investigation covering the four-year period ending June 30, 2022 prepared by CavMac
- We have reviewed the Actuarial Experience Investigation
  - Economic assumptions (including the 7.00% interest rate assumption) are reasonable and in compliance with *ASOP 27 Selection of Economic Assumptions for Measuring Pension Obligations*
  - Demographic assumptions are reasonable and in compliance with *ASOP 35 Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*

# Projected Outlook

Baseline projections using currently scheduled fixed contribution rates per SB 3231





# Projected Outlook

Baseline projections using currently scheduled fixed contribution rates per SB 3231

Baseline Projection Results <sup>1</sup> (7.00%)						
(\$ in Thousands)						
	2024	2029	2034	2044	2047	2054
Total Payroll	\$ 7,648,566	\$ 8,717,155	\$ 9,935,038	\$ 12,905,032	\$ 13,958,409	\$ 16,762,879
UAL	\$26,101,921	\$29,337,044	\$32,153,278	\$37,190,884	\$38,293,826	\$39,299,399
Normal Cost Rate	2.98%	2.98%	2.98%	2.98%	2.98%	2.98%
UAL Rate	14.92%	16.92%	16.92%	16.92%	16.92%	16.92%
FCR Rate <sup>2</sup>	17.90%	19.90%	19.90%	19.90%	19.90%	19.90%
Funded Ratio	56.23%	55.65%	56.17%	58.97%	61.17%	69.23%
Amortization Period	48.3 years	40.8 years	37.2 years	29.4 years	26.9 years	21.0 years
ADC	25.88%	28.77%	32.25%	42.81%	46.14%	27.55%
ADC / FCR Ratio	144.59%	144.58%	162.04%	215.11%	231.84%	138.44%
Cash Flow Percentage	-4.40%	-4.48%	-4.66%	-3.08%	-2.20%	-0.29%

<sup>1</sup> Projections assume constant active population with similar demographics to current population

<sup>2</sup> Based on current funding policy increasing to 19.90% as of July 1, 2028

# Board Metrics

## Signal Lights

	Definition	Status
Funded Ratio	Funded Ratio above 80% in 2047	Green
	Funded Ratio between 65% and 80% in 2047	Yellow
	Funded Ratio below 65% in 2047	Red
Net Cash Flow	Net Cash Flow Percentage above negative 5.25% (-5.25%) during the projection period	Green
	Net Cash Flow Percentage between negative 5.25% (-5.25%) and negative 7.00 (-7.00%) during the projection period	Yellow
	Net Cash Flow Percentage below negative 7.00% (-7.00%) during the projection period	Red
ADC : FCR Ratio	ADC ratio at or below 100% of fixed contribution rate	Green
	ADC ratio between 100% and 110% of fixed contribution rate	Yellow
	ADC ratio above 110% of fixed contribution rate	Red

# Board Metrics

Current scheduled fixed contribution rates per SB 3231

Payable as of:	FCR
July 1, 2024	17.90%
July 1, 2025	18.40%
July 1, 2026	18.90%
July 1, 2027	19.40%
July 1, 2028	19.90%

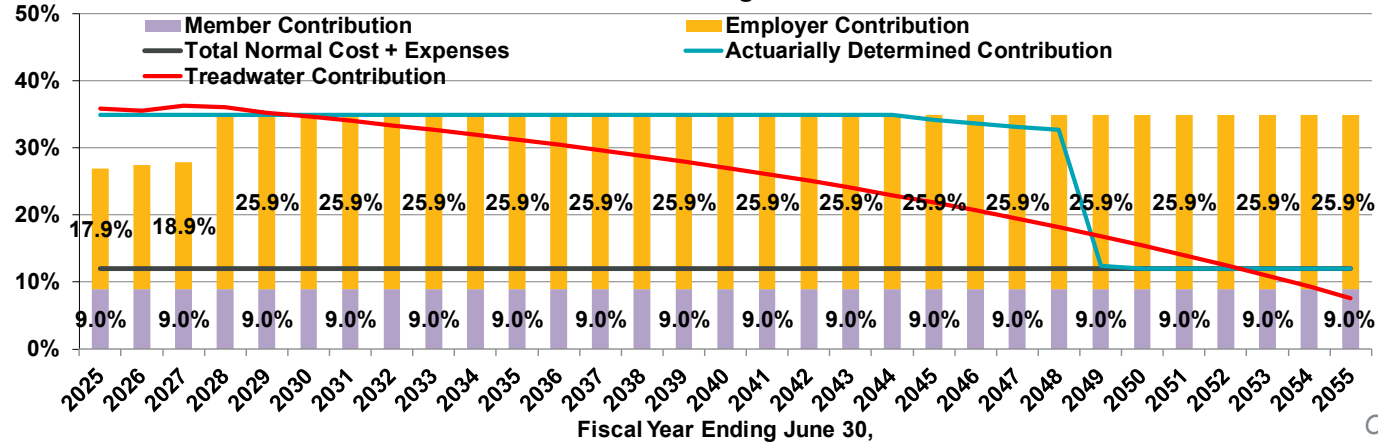
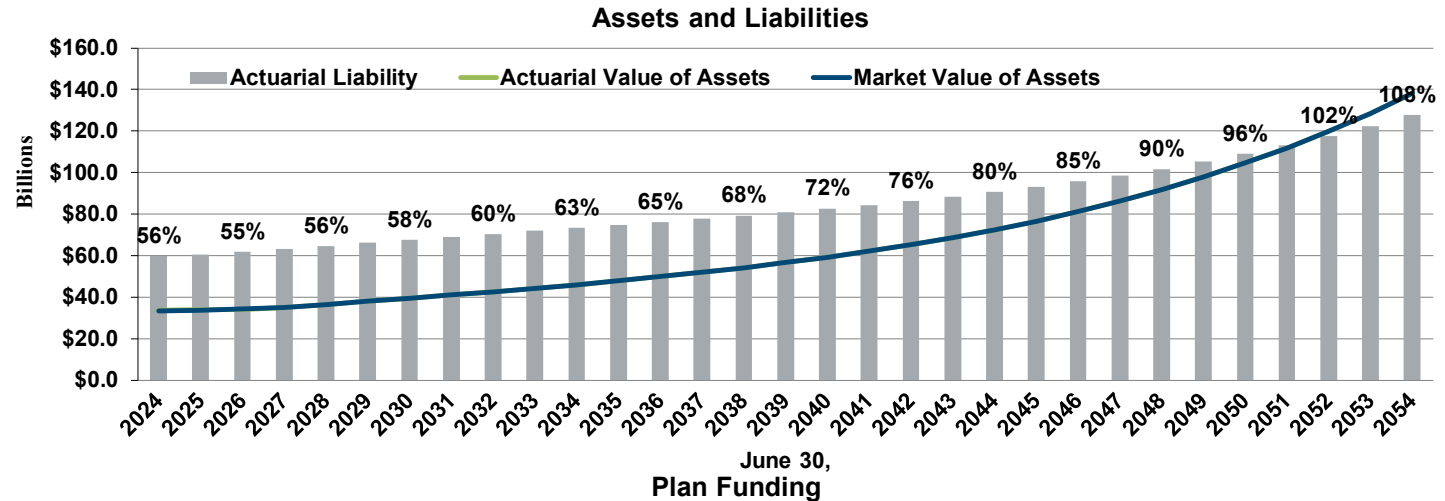
Definition	Value	Status
<b>Funded Ratio below 65% in 2047</b>	<b>61%</b>	<b>Red</b>
<b>Net Cash Flow Percentage above negative 5.25% (-5.25%) during the projection period</b>	<b>-4.40%</b>	<b>Green</b>
Actual net cash flow percentage for fiscal year ending June 30, 2024		
<b>ADC/FCR ratio above 110% of fixed contribution rate in 2024</b>	<b>133%</b>	<b>Red</b>
Based on scheduled fixed contribution rate of 19.40% payable beginning July 1, 2027		

# Board Metrics

Recommend FCR equal to the ADC rate of 25.88% beginning July 1, 2027 so all metrics are Green

Definition	Value	Status
Funded Ratio above 80% in 2047	87%	Green
Cash Flow as a Percentage of Assets for Projection Period	Above -5.25%	Green
ADC/FCR ratio at or below 100% of fixed contribution rate in 2024	100%	Green

Based on ultimate fixed contribution rate of 25.88% payable beginning July 1, 2027



The purpose of this presentation is to present the results of the 2024 Independent Actuarial Assessment of the Public Employees' Retirement System of Mississippi.

In preparing this presentation, we relied on information (some oral and some written) supplied by the System and current retained actuary (CavMac). This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23, Data Quality.

The results of this report rely on future System experience conforming to the underlying assumptions. To the extent that actual System experience deviates from the underlying assumptions, the results will vary accordingly. The actuarial assumptions were adopted by the Board based on the proposed demographic assumptions shown in the Actuarial Experience Investigation covering the four-year period ending June 30, 2022 prepared by CavMac.

Cheiron utilizes and relies upon ProVal, an actuarial valuation software leased from Winklevoss Technologies for the intended purpose of calculating liabilities and projected benefit payments. Projected expected results of future valuations in this presentation were developed using P-scan, our proprietary tool for the intended purpose of developing projections. As part of the review process for this presentation, we have performed a number of tests to verify that the results are reasonable and appropriate. We are not aware of any material inconsistencies, unreasonable output resulting from the aggregation of assumptions, material limitations or known weaknesses that would affect this presentation.

This presentation and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and 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 opinions 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 Public Employees' Retirement System of Mississippi 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 such other users.

Janet Cranna, FSA, FCA, EA, MAAA  
Principal Consulting Actuary

Patrick Nelson, FSA, CERA, EA, MAAA  
Consulting Actuary



Classic Values, Innovative Advice

**Contact us if you have  
any questions**

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# **Public Employees' Retirement System of Mississippi**

## **Report on the June 30, 2024 Independent Actuarial Assessment**

**Produced by Cheiron**

**October 2024**

**DRAFT**

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## *Letter Of Transmittal*

October 21, 2024

Mr. Ray Higgins  
Executive Director  
Public Employees' Retirement System of Mississippi  
429 Mississippi Street  
Jackson, Mississippi 39201-1005

Dear Ray:

At your request, we have conducted an independent actuarial assessment of the valuation of the Public Employees' Retirement System of Mississippi as of June 30, 2024, as required by Senate Bill 3231. This report is organized as follows:

- In Section I **Board Summary**, we describe the purpose of an independent actuarial assessment and summarize the key results found in this assessment.
- The **Main Body** of the report presents details on the System's:
  - Section II - Assets
  - Section III - Liabilities
  - Section IV - Contributions
- In the **Appendices**, we conclude our report with information describing the System's membership (Appendix A), actuarial assumptions and methods employed (Appendix B), pertinent plan provisions (Appendix C), funding provisions of governing law (Appendix D), and a glossary of terms (Appendix E).

The results of this report rely on future System experience conforming to the underlying assumptions. To the extent that actual System experience deviates from the underlying assumptions, the results will vary accordingly. The actuarial assumptions were adopted by the Board based on the proposed demographic assumptions shown in the Actuarial Experience Investigation covering the four-year period ending June 30, 2022 prepared by CavMac.

The purpose of this report is to present Cheiron's independent actuarial assessment of the Public Employees' Retirement System of Mississippi (the System). This report is for the use of the Board in complying with Senate Bill 3231.

In preparing our report, we relied on information supplied by the System staff and CavMac. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice No. 23, Data Quality.

The report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice as 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 report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This independent actuarial assessment was prepared exclusively for the System for the purpose described herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

Sincerely,  
Cheiron

Janet Cranna, FSA, FCA, EA, MAAA  
Principal Consulting Actuary

Michael Moehle, FSA, FCA, EA, MAAA  
Public Pension Oversight

Patrick Nelson, FSA, CERA, EA, MAAA  
Consulting Actuary

**PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI  
JUNE 30, 2024 INDEPENDENT ACTUARIAL ASSESSMENT REPORT**

**SECTION I – BOARD SUMMARY**

This June 30, 2024 independent actuarial assessment was completed for the System, as required by Senate Bill 3231. The primary purpose of the independent actuarial assessment and this report is to measure, describe and identify as of the valuation date:

- The assets and actuarial liabilities of the System
- The current and projected financial condition of the System, and
- The employers' Actuarially Determined Contribution

In the balance of this Board Summary we present the basis upon which this year's independent assessment was completed, and the key findings of this valuation including a summary of all key financial results and the projected financial outlook for the System. All results as of June 30, 2023 and prior are those of the current retained actuary, CavMac.

The results of this report are based on the same assumptions as were used in the June 30, 2023 actuarial valuation prepared by CavMac. The actuarial assumptions were adopted by the Board based on the proposed demographic assumptions shown in the Actuarial Experience Investigation covering the four-year period ending June 30, 2022 prepared by CavMac. We have reviewed the Actuarial Experience Investigation and find that the recommended economic assumptions (including the 7.00% interest rate assumption) and demographic assumptions are reasonable and in compliance with *Actuarial Standards of Practice No. 27, Selection of Economic Assumptions for Measuring Pension Obligations* and *Actuarial Standards of Practice No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*. Please see Appendix B for additional information.

### **Key Findings of this Independent Actuarial Assessment**

The key results of the June 30, 2024 independent actuarial assessment for the Public Employees' Retirement System of Mississippi are as follows:

- The total actuarially determined contribution for the System, including the employer and employee contributions, is 34.88% of pay for FYE June 30, 2027. The employer portion of the total actuarial cost is 25.88% of pay, while members contribute 9.00% of pay.
- The employer portion of the actuarially determined contribution for fiscal year ending June 30, 2027 of 25.88% of pay is higher than the scheduled employer Fixed Contribution Rate (FCR) to the System for that year, which is 18.90% of pay effective July 1, 2026, creating an expected shortfall of 6.98% of pay. The Fixed Contribution Rate as of July 1, 2024 is 17.90%; contributions are currently scheduled to increase by 0.5% per year through July 1, 2028 to an ultimate employer contribution rate of 19.90% of pay per Senate Bill 3231. If all assumptions are met and the contributions continue at their current scheduled rates, the funded status of the System is expected to slowly improve.

**PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI  
JUNE 30, 2024 INDEPENDENT ACTUARIAL ASSESSMENT REPORT**

**SECTION I – BOARD SUMMARY**

- The “Tread Water Rate” – or the rate of employer contributions expected to hold the unfunded accrued liability (UAL) at its current dollar amount, net of the member contributions and assuming all assumptions are met – is about 27% of pay for FYE 2025. Since the FRC is below the trend water level, the UAL will continue to grow, on a dollar basis, even if all actuarial assumptions are met.
- The Unfunded Actuarial Liability (UAL), which is the excess of the Plan’s Actuarial Liability over its Actuarial Value of Assets, increased from \$25.5 billion on June 30, 2023 to \$26.1 billion on June 30, 2024. The System’s funded ratio, which is the Actuarial Value of Assets over the Actuarial Liability, increased slightly from 56.1% as of June 30, 2023 to 56.2% as of June 30, 2024. On a Market Value of Assets basis, the funded ratio increased from 54.4% as of June 30, 2023 to 56.1% as of June 30, 2024.

**PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI  
JUNE 30, 2024 INDEPENDENT ACTUARIAL ASSESSMENT REPORT**

**SECTION I – BOARD SUMMARY**

Table I-1 summarizes all the key results of the independent actuarial assessment with respect to the System's membership, assets, liabilities, and contributions. The results are presented and compared for both the current and prior years.

<b>Table I-1 Summary of Results</b>		
	<b>June 30, 2023</b>	<b>June 30, 2024</b>
<b>Participant Counts</b>		
Actives	145,985	145,836
Retired	97,395	99,750
Disabled	6,153	6,089
Survivors	12,342	12,482
Deferred Vested and Inactives	96,000	100,966
<b>Total</b>	<b>357,875</b>	<b>365,123</b>
Annual Compensation	\$ 7,065,419,204	\$ 7,245,823,968
Annual Retirement Allowances	\$ 3,118,511,891	\$ 3,276,558,966
Discount Rate	7.00%	7.00%
<b>Assets and Liabilities</b>		
Actuarial Liability [AL]	\$ 58,148,281,981	\$ 59,637,540,589
Actuarial Value of Assets [AVA]	32,605,990,000	33,535,619,000
Unfunded Actuarial Liability [UAL]	\$ 25,542,291,981	\$ 26,101,921,589
Funded Percentage [AVA / AL]	56.1%	56.2%
Market Value of Assets [MVA]	\$ 31,621,983,000	\$ 33,449,843,000
Funded Percentage [MVA / AL]	54.4%	56.1%
<b>Actuarial Contributions</b>		
	<b>FYE 2026</b>	<b>FYE 2027</b>
Net Employer Normal Cost Rate	2.62%	2.98%
UAL Payment Rate for FCR	19.78%	15.92%
Fixed Rate Contribution [FCR]	22.40% <sup>1</sup>	18.90% <sup>2</sup>
UAL Payment Rate for ADC	22.55%	22.90%
Actuarially Determined Contribution <sup>3</sup> [ADC]	25.17%	25.88%
Shortfall [ADC - FCR]	2.77%	6.98%

<sup>1</sup> Policy as of June 30, 2023 is a phased-in fixed contribution rate with employer contributions of 17.40% of pay through June 30, 2024. Beginning July 1, 2024, the employer fixed contribution rate increased to 19.40% of pay. It is scheduled to increase to 21.40% of pay beginning July 1, 2025 and then increase to 22.40% of pay beginning July 1, 2026.

<sup>2</sup> Senate Bill 3231 sets fixed contribution rate to 17.90% as of July 1, 2024, increasing 0.5% each July 1 through 2028 to an ultimate rate of 19.90%

<sup>3</sup> ADC determined as of June 30, 2023 is for fiscal year ending June 30, 2026, and ADC determined as of June 30, 2024 is for fiscal year ending June 30, 2027

**SECTION I – BOARD SUMMARY**

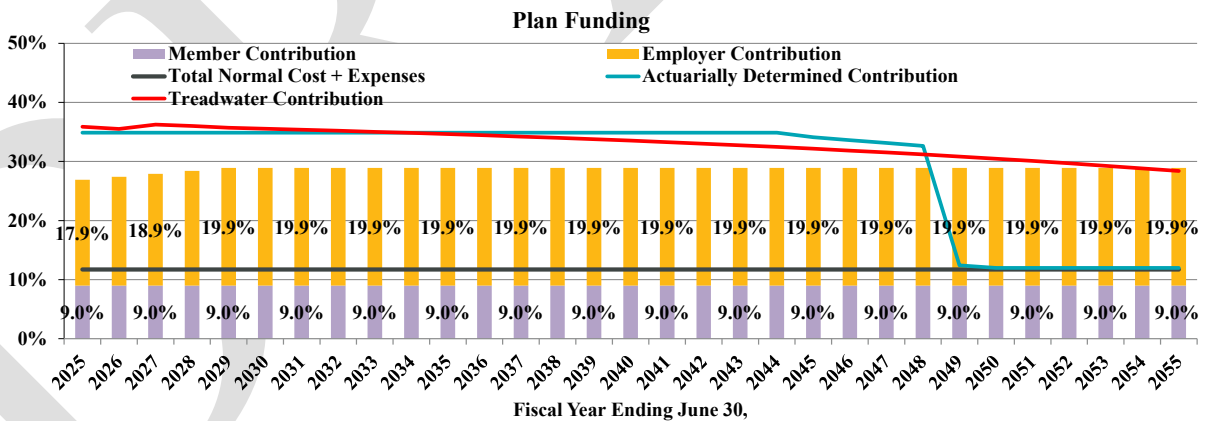
**Future Expected Financial Trends**

The analysis of projected financial trends is perhaps the most important component of the independent actuarial assessment. The charts presented in this section show the expected progress of the System’s funded status over the next 30 years, measured in terms of the expected contributions and funded ratio, assuming that the System is ongoing.

The baseline projections assume all assumptions are realized, including the 7.00% investment return assumption and total payroll growth of 2.65% per year. While the assumptions individually are reasonable for this valuation, they are also considered reasonable in the aggregate and appropriate. The projections and values shown below are estimates of the implications of future funding and funded status of the System over time. The future outcomes become increasingly uncertain over time, therefore the general trends, and not the absolute values should be considered when reviewing these projections. It is important to note that the experience will not conform exactly to the assumptions every year.

**Baseline returns of 7.0%**

The first chart shows the total projected employer contributions (gold bars) and the member contributions (gray bars) based on the Fixed Contribution Rates (FCR) shown in SB3231. The FCR as of July 1, 2024 is 17.90% and is scheduled to increase 0.5% each July 1 through 2028 to an ultimate rate of 19.90% per Senate Bill 3231. The actuarially determined contributions (employer and member rates) are shown by the blue line and assume that the System contributes the actuarially determined contribution each year. The tread water rates (normal cost plus interest on the unfunded actuarial liability) are shown by the red line. The total normal cost, including administrative expenses, is represented by the black line. The years shown in the charts are fiscal years ending June 30.

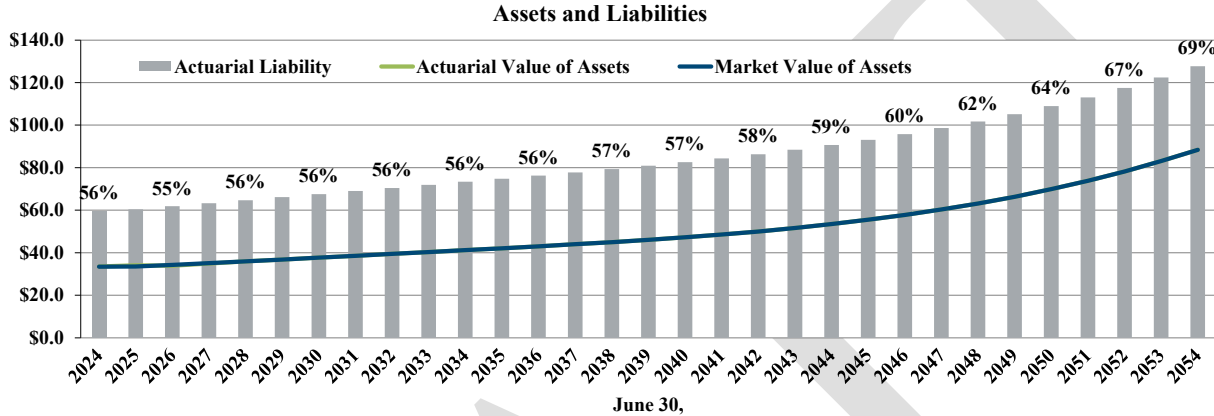


The chart above shows that the total actuarially determined contribution (employer and employee rates) remains relatively level at approximately 35% of pay before the large decrease as the initial unfunded liability is fully amortized.

**PUBLIC EMPLOYEES’ RETIREMENT SYSTEM OF MISSISSIPPI  
JUNE 30, 2024 INDEPENDENT ACTUARIAL ASSESSMENT REPORT**

**SECTION I – BOARD SUMMARY**

This next chart compares the market value of assets (blue line) and the actuarial, or smoothed value of assets (green line), to the System’s actuarial liabilities (gray bars). In addition, above the bars, we show the System’s funded ratio (ratio of actuarial value of assets to actuarial liabilities) based on the employer contributing the FCR. The projections assume that the FCR, as shown in the previous chart, are made each year. The years shown in the chart signify the valuation date as of June 30.



If the System earns the assumed investment rate of 7.0% each and every year, the funded ratio will increase slowly from 56% to 69% at the end of the 30-year projection period. The projections assume a constant active population with similar demographics to the current population.

Key metrics from another projection are shown below. In this projection, the actuarially determined contribution (ADC) assumes that the employer contributes based on the FCR.

	2024	2029	2034	2044	2047	2054
Total Payroll	\$ 7,648,566	\$ 8,717,155	\$ 9,935,038	\$ 12,905,032	\$ 13,958,409	\$ 16,762,879
UAL	\$ 26,101,921	\$ 29,337,044	\$ 32,153,278	\$ 37,190,884	\$ 38,293,826	\$ 39,299,399
Normal Cost Rate	2.98%	2.98%	2.98%	2.98%	2.98%	2.98%
UAL Rate	14.92%	16.92%	16.92%	16.92%	16.92%	16.92%
FCR Rate	17.90%	19.90%	19.90%	19.90%	19.90%	19.90%
Funded Ratio	56.23%	55.65%	56.17%	58.97%	61.17%	69.23%
Amortization Period	48.3 years	40.8 years	37.2 years	29.4 years	26.9 years	21.0 years
ADC	25.88%	28.77%	32.25%	42.81%	46.14%	27.55%
ADC / FCR Ratio	144.59%	144.58%	162.04%	215.11%	231.84%	138.44%
Cash Flow Percentage <sup>1</sup>	-4.40%	-4.48%	-4.66%	-3.08%	-2.20%	-0.29%

<sup>1</sup> Based on current funding policy increasing to 19.90% as of July 1, 2028

**Board’s Funding Goals and Objectives**

Based on the System’s funding policy, “The objective in requiring employer and member contributions to PERS is to accumulate sufficient assets during a member’s employment to fully finance the benefits the member will receive in retirement.”

**PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI  
JUNE 30, 2024 INDEPENDENT ACTUARIAL ASSESSMENT REPORT**

**SECTION I – BOARD SUMMARY**

To track the progress in achieving the funding goals and objectives of the Board (shown in Appendix D) and to assist the Board in making a determination whether an increase or decrease in the employer contribution rate for PERS should be considered, certain metrics are measured annually in conjunction with information provided in the actuarial valuation. Each metric is calculated and assigned a “Signal Light” as described in Appendix D.

Table I-3 summarizes these metrics. The metrics are based on the phase-in of the employer’s FCR to 19.90% of pay as of July 1, 2028.

Table I-3		
Metric	2024 Baseline Projection	2024 Status
Funded Ratio in 2047	61%	<b>Red</b>
Cash Flow as Percentage of Assets in 2024	-4.4%	<b>Green</b>
ADC / FCR Ratio in 2024 <sup>1</sup>	133%	<b>Red</b>
ADC / FCR Ratio in 2025 <sup>2</sup>	130%	<b>Red</b>

<sup>1</sup> Ratio based on scheduled FCR of 19.40% payable as of July 1, 2026

<sup>2</sup> Ratio based on scheduled FCR of 19.90% payable as of July 1, 2027

As shown in Table I-4 above, two of the three metrics are in the “Red Status” for 2024. We determined that an FCR of 25.88% of pay would be needed effective July 1, 2027 to get all three metrics into the “Green Status”. Table I-3 shows the metrics assuming the FCR is increased to 25.88% beginning July 1, 2027.

Table I-4		
Metric	2024 Baseline Projection	2024 Status
Funded Ratio in 2047	87%	<b>Green</b>
Cash Flow as Percentage of Assets for Projection Period	Above -5.25%	<b>Green</b>
ADC / FCR Ratio in 2024 <sup>1</sup>	100%	<b>Green</b>
ADC / FCR Ratio in 2025 <sup>1</sup>	100%	<b>Green</b>

<sup>1</sup> Ratio based on ultimate FCR of 25.88% payable as of July 2, 2027

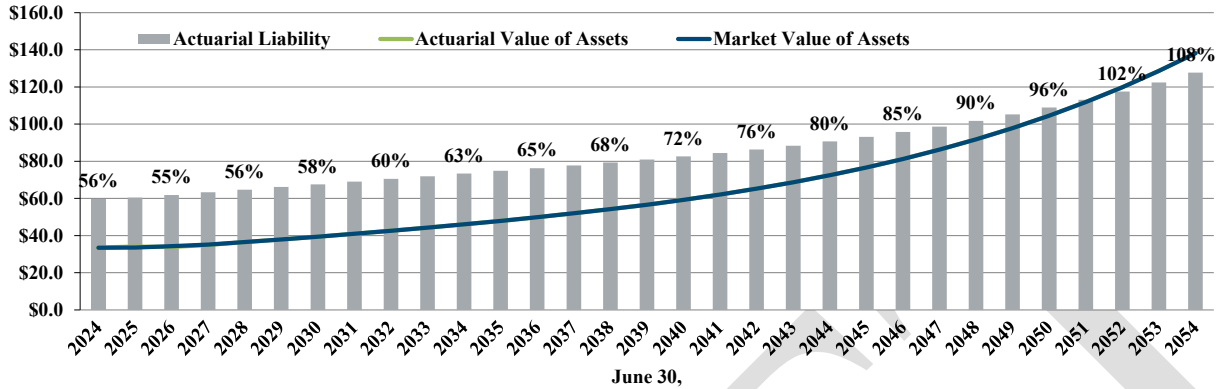
Assuming the FCR is increased to the actuarially determined contribution rate of 25.88% beginning July 1, 2027, the funded ratio is expected to reach 104% by the end of the projection period as shown in the graphs below. The Board should consider recommending a funding policy of contributing the actuarially determined contribution each year to improve the funded status of the System.



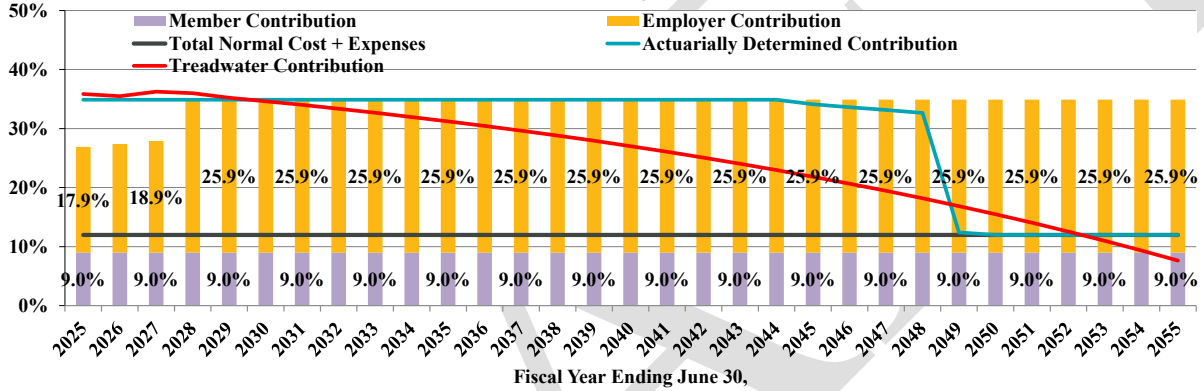
**PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI  
JUNE 30, 2024 INDEPENDENT ACTUARIAL ASSESSMENT REPORT**

**SECTION I – BOARD SUMMARY**

**Assets and Liabilities**



**Plan Funding**



## **SECTION II – ASSETS**

Pension plan assets play a key role in the financial operation of the System and in the decisions the Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact benefit levels, employer contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on the System assets including:

- Statement of the changes in market values from June 30, 2023 to June 30, 2024;
- Development of the Actuarial Value of Assets;
- An assessment of investment performance.

### **Disclosure**

There are two types of asset values disclosed in this independent actuarial assessment, the market value of assets (MVA) and the actuarial value of assets (AVA). The market value represents a “snap-shot” or “cash-out” value which provides the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace. As a result, market values are usually not as suitable for long-range planning as are the actuarial value of assets which reflect smoothing of annual investment returns.

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**SECTION II – ASSETS**

**Changes in Market Value**

Table II-1 shows the components of change between the market value of assets from June 30, 2023 and June 30, 2024.

<b>Table II-1 Change in Market Value of Assets</b>	
<b>Market Value as of June 30, 2023</b>	\$ 31,621,983,000
<b>Contributions</b>	
Employer	1,345,811,000
Member	682,937,000
Additional State Contribution	110,000,000
<i>Subtotal</i>	<u>\$ 2,138,748,000</u>
<b>Net Investment Income</b>	
Net Appreciation in Fair Value	\$ 2,601,301,000
Interest & Dividends	708,719,000
Managers' Fees & Trading Costs	(103,922,000)
Other Additions	314,000
<i>Subtotal</i>	<u>\$ 3,206,412,000</u>
<b>Securities Lending</b>	
Net Appreciation in Fair Value	\$ 5,498,000
Interest	124,689,000
Program Fees	(116,721,000)
<i>Subtotal</i>	<u>\$ 13,466,000</u>
<b>Deductions</b>	
Pension Benefits	\$ (3,394,102,000)
Refunds to Terminated Employees	(118,413,000)
Administrative Expense	(18,251,000)
<i>Subtotal</i>	<u>\$ (3,530,766,000)</u>
<b>Market Value as of June 30, 2024</b>	\$ 33,449,843,000

**PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI  
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**SECTION II – ASSETS**

**Actuarial Value of Assets**

The actuarial value of assets represents a “smoothed” value used to reduce or eliminate erratic results which could develop from short-term fluctuations in the market value of assets. For this System, the actuarial value of assets has been calculated by recognizing the full expected return each year plus (minus) 20% of the gain (loss) each for each of the past five years. Differences between the actual return on the market value of assets and the expected return on the market value of assets are recognized over five years.

**Table II-2  
Development of Actuarial Value of Assets**

(1) Market Value as of June 30, 2023	\$ 31,621,983,000
(2) Contributions	2,138,748,000
(3) Benefit Payments	(3,512,515,000)
(4) Administrative Expenses	(18,251,000)
(5) Expected Return at 7.0%	<u>2,164,818,000</u>
(6) Expected Value at June 30, 2024	\$ 32,394,783,000
(7) Market Value as of June 30, 2024	\$ 33,449,843,000
(8) Net Cash Flow [(2) + (3) + (4)]	\$ (1,392,018,000)
(9) Actual Return [(7) - (1) - (8)]	\$ 3,219,878,000
(10) Immediate Recognition [(1) x 7.0% + (8) x 7.0% / 2]	\$ 2,164,818,000
(11) Gain / (Loss) [(9) - (10)]	\$ 1,055,060,000
	<b>Total Gain/(Loss) % Recognized</b>
Investment gain / (loss) for 2024	\$ 1,055,060,000 20% \$ 211,012,000
Investment gain / (loss) for 2023	(37,380,000) 20% (7,476,000)
Investment gain / (loss) for 2022	(5,584,610,000) 20% (1,116,922,000)
Investment gain / (loss) for 2021	6,632,230,000 20% 1,326,446,000
Investment gain / (loss) for 2020	(1,281,155,000) 20% <u>(256,231,000)</u>
(12) Total Phase-In	\$ 156,829,000
(13) Actuarial Value as of June 30, 2023	\$ 32,605,990,000
(14) Actuarial Value as of June 30, 2024 [(8) + (10) + (12) + (13)]	\$ 33,535,619,000

**SECTION II – ASSETS**

**Investment Performance**

The market value of assets returned 10.41% during the fiscal year ending June 30, 2024, which is greater than the assumed 7.0% assumption for the period. A return of 7.28% was experienced on the actuarial value of assets, resulting in an actuarial gain for the year. Table II-2 shows a comparison of the assumed rate of return, and the actual rate of return on both the market value and actuarial value of assets.

<b>Table II-3 Historical Returns</b>			
<b>FYE</b>	<b>Assumed Return</b>	<b>Market Value</b>	<b>Actuarial Value</b>
2015	8.00%	3.46%	12.21%
2016	7.75%	0.89%	7.19%
2017	7.75%	14.96%	9.31%
2018	7.75%	9.59%	9.16%
2019	7.75%	6.64%	7.19%
2020	7.75%	3.11%	6.72%
2021	7.75%	32.17%	12.47%
2022	7.55%	-8.64%	8.49%
2023	7.55%	7.43%	6.85%
2024	7.00%	10.41%	7.28%
10-year average	7.66%	7.55%	8.67%

### SECTION III – LIABILITIES

In this section, we present detailed information on the System liabilities as of June 30, 2024.

Two types of liabilities are calculated and presented in this report. Each type is distinguished by the people ultimately using the figures and the purpose for which they are using them.

- **Present Value of All Future Benefits:** Used for measuring all future System obligations, represents the amount of money needed today to fully fund all benefits of the System both earned as of the valuation date and those expected to be earned in the future by current plan participants, under the current plan provisions.
- **Actuarial Liability:** Calculated as of the valuation date as the present value of benefits allocated to service prior to that date. The actuarial liability is determined using the Entry Age Normal method.

These liabilities are for funding purposes and are not appropriate for measuring the cost of settling plan liabilities by purchasing annuities or paying lump sums.

Table III-1, which follows, discloses each of these liabilities for our independent actuarial assessment. With respect to each disclosure, a subtraction of the appropriate value of plan assets yields, for each respective type, a **net surplus** or an **unfunded liability**.

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**SECTION III – LIABILITIES**

**Table III-1  
Summary of Liabilities**

	June 30, 2023	June 30, 2024
<b>Present Value of Future Benefits [PVFB]</b>		
Actives	\$25,647,175,043	\$25,544,106,384
Retired	32,179,084,583	33,697,981,643
Disabled	1,362,112,330	1,382,406,701
Survivors	2,193,624,378	2,245,286,962
Deferred Vested	1,705,195,138	1,914,179,360
Inactive	557,953,772	597,702,699
Total	<u>\$63,645,145,244</u>	<u>\$65,381,663,749</u>
Market Value of Assets	\$31,621,983,000	\$33,449,843,000
Unfunded PVFB	\$32,023,162,244	\$31,931,820,749
<b>Actuarial Liability [AL]</b>		
Actives	\$20,150,311,780	\$19,799,983,224
Retired	32,179,084,583	33,697,981,643
Survivors	2,193,624,378	2,245,286,962
Disabled	1,362,112,330	1,382,406,701
Deferred Vested	1,705,195,138	1,914,179,360
Inactive	557,953,772	597,702,699
Total	<u>\$58,148,281,981</u>	<u>\$59,637,540,589</u>
Actuarial Value of Assets	\$32,605,990,000	\$33,535,619,000
Unfunded Actuarial Liability [UAL]	\$25,542,291,981	\$26,101,921,589

## SECTION IV – CONTRIBUTIONS

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the System. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both stable and predictable.

For this System, the funding method employed is the **Entry Age Normal Actuarial Cost Method**. Under this funding method, a normal cost rate is determined as a level percentage of pay for each active member. The normal cost rate multiplied by payroll equals the total normal cost for each active member. The total anticipated member contributions for the year are then subtracted from the sum of the total normal cost to arrive at the employer normal cost. The normal cost contributions (employer and active member) will pay for projected benefits at retirement for each active member. An administrative expense rate of 0.26% of payroll is added to the normal cost.

The EAN actuarial liability is the difference between the plan's total present value of future benefits and the present value of future normal costs. The difference between the Entry Age Normal actuarial liability and the actuarial value of assets is the unfunded actuarial liability. The Funding Policy provides that the unfunded actuarial liability as of June 30, 2018 is amortized as a level percentage of payroll over a closed 30-year period. In each subsequent valuation, all benefit changes, assumption and method changes, and experiences gains and/or losses that have occurred since the previous valuation will be amortized as a level percentage of payroll over a closed 25-year period from the date it is established.

This amortization method is used for benchmark purposes only, since the employer contribution is based on a fixed percentage of payroll.



**PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI  
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**SECTION IV – CONTRIBUTIONS**

Table IV-1 below develops the employer contribution rates for the System for the fiscal years ending 2024 and 2025.

<b>Table IV-1 Actuarial Contribution Rates</b>		
<b>Fiscal Year Ending</b>	<b>June 30, 2026</b>	<b>June 30, 2027</b>
<b>Actuarially Determined Contribution Rate</b>		
Employer Normal Cost plus Admin Expenses	2.62%	2.98%
UAL Liability Rate	<u>22.55%</u>	<u>22.90%</u>
Total ADC	25.17%	25.88%
Fixed Contribution Rate (FCR)	22.40% <sup>1</sup>	19.40% <sup>2</sup>
Ratio of ADC to FCR	112.4%	133.4%
Funding Policy Metric Status	<b>Red</b>	<b>Red</b>
Anticipated UAL Payment Period under FCR <sup>3</sup>	32.2 years	48.3 years

<sup>1</sup> Policy as of June 30, 2023 is a phased-in fixed contribution rate with the employer contributions of 17.40% of pay through June 30, 2024. Beginning July 1, 2024, the employer fixed contribution rate increased to 19.40% of pay. It is scheduled to increase to 21.40% of pay beginning July 1, 2025 and then increase to 22.40% of pay beginning July 1, 2026.

<sup>2</sup> Senate Bill 3231 sets fixed contribution rate to 17.90% as of July 1, 2024, increasing 0.5% each July 1 through 2028 to an ultimate rate of 19.90%

<sup>3</sup> UAL payment period based on currently scheduled Fixed Contribution Rate beginning as of respective valuation dates.

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**SECTION IV – CONTRIBUTIONS**

Table IV-2 below presents the amortization schedule for the actuarially determined contribution rate.

<b>Table IV-2 Development of Amortization Payments as of June 30, 2024</b>				
<b>Date Established</b>	<b>Original UAL Balance</b>	<b>Remaining UAL Balance</b>	<b>Remaining Amortization Period</b>	<b>Amortization Payment</b>
June 30, 2018	\$16,940,459,000	\$17,879,678,003	24 years	\$1,192,199,186
June 30, 2019	784,879,000	791,330,529	20 years	59,005,073
June 30, 2020	524,319,000	528,689,216	21 years	38,220,130
June 30, 2021	506,599,000	509,805,348	22 years	35,808,180
June 30, 2022	561,966,000	564,968,457	23 years	38,630,170
June 30, 2023	5,309,730,000	5,323,697,515	24 years	354,978,867
June 30, 2024	503,752,521	503,752,521	25 years	32,808,648
<b>Total</b>		<u>\$26,101,921,589</u>		<u>\$1,751,650,255</u>
Estimated Payroll				\$7,648,565,596
UAL Amortization Contribution Rate				22.90%

**PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI  
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**APPENDIX A – MEMBERSHIP INFORMATION**

The June 30, 2024 census data was provided by Cav Mav and is summarized below. The June 30, 2023 data was based on CavMac's June 30, 2023 Actuarial Valuation Report.

Membership Data				
	June 30, 2023	June 30, 2024	June 30, 2023	June 30, 2024
<b>Active</b>				
Count	145,985	145,836		
Average Age	45.2	45.1		
Average Service	10.2	10.1		
Total Salary	\$7,065,419,204	\$7,648,565,596		
Average Salary	\$ 48,398	\$ 52,446		
<b>Retired</b>				
Count	97,395	99,750		
Average Age	71.7	71.8		
Total Benefits	\$2,740,183,618	\$2,884,704,412		
Average Benefit	\$ 28,135	\$ 28,919		
<b>Disabled</b>				
Count	6,153	6,089		
Average Age	65.3	65.7		
Total Benefits	\$ 131,430,485	\$ 144,332,066		
Average Benefit	\$ 21,360	\$ 23,704		
<b>Survivors</b>				
Count	12,342	12,482		
Average Age	69.0	69.2		
Total Benefits	\$ 246,897,788	\$ 255,561,969		
Average Benefit	\$ 20,005	\$ 20,474		
<b>Vested, Pending Retirement</b>				
Count			936	1,112
Total Benefits			\$ 30,338,787	\$ 37,340,723
Average Benefit			\$ 32,413	\$ 33,580
<b>Deferred Vested, Benefit Provided</b>				
Count			15,180	15,145
Total Benefits			\$ 135,081,505	\$ 132,960,352
Average Benefit			\$ 8,899	\$ 8,779
<b>Deferred Vested, Missing Benefit</b>				
Count			1,075	898
Total Refunds			\$ 46,557,950	\$ 40,944,362
Average Refund			\$ 43,310	\$ 45,595
<b>Inactive, Due Refund</b>				
Count			78,809	83,811
Total Refunds			\$ 384,795,705	\$ 408,891,524
Average Refund			\$ 4,883	\$ 4,879

## APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

### A. Actuarial Assumptions

The actuarial assumptions used in our independent actuarial assessment are the same as those described in the June 30, 2023 Actuarial Valuation Report prepared by Cavanaugh Macdonald Consulting. Those assumptions were based on the recommended assumptions shown in the Experience Investigation for the four-year period ending June 30, 2022 which was prepared by Cavanaugh Macdonald Consulting and approved by the Board.

We have reviewed the Experience Investigation and find that the recommended economic assumptions (including the 7.00% interest rate assumption) and demographic assumptions reasonable and in compliance with ASOP 27 *Selection of Economic Assumptions for Measuring Pension Obligations* and ASOP 35 *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*. However, we have the following recommendations for future experience investigations:

#### *Mortality*

- Consider whether the General Employees table provides a better fit than the Public Safety table. Consider whether the income-weighted tables provide a better fit than the headcount weighted tables.
- Provide a discussion on the level of credible data when adjusting the standard tables for PERS experience.
- Consider the most recent mortality improvement scale.

#### *Retirement Age for Terminated Vested Participants*

This assumption was not analyzed in the June 30, 2022 Experience Investigation. CavMac should analyze the retirement age for terminated vested participants in the next Experience Investigation.

### B. Actuarial Methods

The actuarial methods used in our independent actuarial assessment are the same as those described in the June 30, 2023 Actuarial Valuation Report prepared by Cavanaugh Macdonald Consulting.

#### 1. Actuarial Value of Assets

The actuarial value of assets is a five-year smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. This smoothing method complies with ASOP 44 *Selection and Use of Asset Valuation Methods for Pension Valuations*. Smoothing the market gains and losses over a reasonable period of time to determine the actuarial value of assets is a generally accepted approach, and we concur with its use.

## APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

### 2. Actuarial Cost Method

The funding method for the valuation of liabilities used for this independent actuarial assessment is the Entry Age Normal (EAN) method. Under this funding method, a normal cost rate is determined as a level percentage of pay for each active member. The normal cost rate multiplied by payroll equals the total normal cost for each active member. The normal cost contributions (employer and active member) will pay for projected benefits at retirement for each active member.

The actuarial liability is the difference between the present value of future benefits and the present value of future normal costs. The difference between this actuarial liability and the actuarial value of assets is the unfunded actuarial liability (UAL).

The portion of the actuarial liability in excess of System assets, the UAL, is amortized to develop an additional cost that is added to each year's employer normal cost. Under this funding method, actuarial gains and losses are directly reflected in the size of the unfunded actuarial liability. The amortization method is described below.

### 3. Amortization Method

The initial Unfunded Actuarial Liability as of June 30, 2018 is amortized over a closed 30 year amortization period as a level percent of payroll. Each subsequent experience gains or losses, assumption changes and plan changes are amortized over separate 25-year layers as a level percent of payroll.

This amortization method is used for benchmark purposes only, since the employer contribution is based on a fixed percentage of payroll.

### 4. Valuation Software

Cheiron utilizes ProVal, an actuarial valuation software program leased from Winklevoss Technologies (WinTech), to calculate liabilities, normal costs, and projected benefit payments. We have relied on WinTech as the developer of ProVal. We have reviewed ProVal as it relates to the System and have used ProVal in accordance with its original intended purpose. We have not identified any material inconsistencies in the output of ProVal that would affect the contents of this actuarial valuation report.

Projections in this valuation report were developed using P-Scan, our proprietary tool for developing projections. The projections shown in this report cover multiple scenarios and the variables are not necessarily correlated. We are not aware of any material inconsistencies, unreasonable output resulting from the aggregation of assumptions, material limitations, or known weaknesses that would affect the projections shown in this report.

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**APPENDIX C – SUMMARY OF PERTINENT PLAN PROVISIONS**

The plan provisions used in our independent actuarial assessment are the same as those described in the June 30, 2023 Actuarial Valuation Report from Cavanaugh Macdonald Consulting. It is our understanding that there have been no changes in plan provisions since the June 30, 2023 actuarial valuation.

We compared the summary of main benefit and contribution provisions shown in Schedule C of the June 30, 2023 Actuarial Valuation Report from Cavanaugh Macdonald Consulting to what is contained in the Mississippi Code, the member handbooks and other information provided by PERS. We found that the benefit and contribution provisions matched our source documents.

**APPENDIX D – FUNDING PROVISIONS OF GOVERNING LAW**

Pages in Appendix D are reprinted from CavMac's June 30, 2023 Actuarial Valuation Report

**FUNDING POLICY OF THE PERS BOARD OF TRUSTEES**

The purpose of the funding policy is to state the overall funding goals and objectives for the Public Employees' Retirement System of Mississippi (PERS), and to document both the metrics that will be used to measure progress toward achieving those goals, and the methods and assumptions employed to develop the metrics.

The employer contribution rate for PERS will be set based on the metrics, assumptions and methods outlined in Section II and III of this policy.

**I. Funding Goals and Objectives**

The objective in requiring employer and member contributions to PERS is to accumulate sufficient assets during a member's employment to fully finance the benefits the member will receive in retirement. In meeting this objective, PERS will strive to meet the following goals:

- Preservation of the defined benefit structure for providing lifetime benefits to the PERS membership,
- Contribution rate stability as a percentage of payroll (Fixed Contribution Rate – FCR),
- Maintain an increasing trend in the funded ratio over the projection period with an ultimate goal of being 100% funded,
- Require clear reporting and risk analysis of the metrics by the actuary as outlined in Section II of this policy using a "Signal Light" approach to assist the Board in determining whether increases or decreases are needed in the employer contribution rate, and
- Ensure benefit improvements are funded through increases in contribution requirements in accordance with Article 14, S 272A, of the Mississippi Constitution.

**II. Metrics**

To track progress in achieving the outlined funding goals and objectives and to assist the Board in making a determination whether an increase or decrease in the employer contribution rate for PERS should be considered, certain metrics will be measured annually in conjunction with information provided in the actuarial valuation and projection report. As part of the annual valuation and projection reports, each metric will be calculated and assigned a "Signal Light" with the following definitions:

Status	Definition
Green	Plan passes metric and PERS' funding goals, and objectives are achieved
Yellow	Plan passes metric but a warning is issued that negative experience may lead to failing status

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**APPENDIX D – FUNDING PROVISIONS OF GOVERNING LAW**

**Red Plan fails metric and PERS must consider contribution increases**

If any one of the metrics are in the Red Signal Light status in conjunction with the annual valuation report and the projection report, the actuary will determine and recommend to the Board an employer contribution rate increase to consider that is sufficient enough to get all three metrics back into the Green Signal Light status. The employer contribution rate increase would be effective for the July 1<sup>st</sup>, 18 months following the completion of the projection report (e.g., if the projection report in 2024 deems an increase to be considered, then it would be effective for July 1, 2026).

The following metrics will be measured:

- Funded Ratio** – Funded Ratio is defined as the actuarial value of assets divided by the actuarial accrued liability. One of the funding goals is to have an increasing funded ratio over the projection period with an ultimate goal of having a 100 percent funded ratio. The Board sets the Signal Light definition as follows:

Status	Definition
Green	Funded Ratio above 80% in 2047
Yellow	Funded Ratio between 65% and 80% in 2047
Red	Funded Ratio below 65% in 2047

- Cash flow as a percentage of assets** – Cash flow as a percentage of assets is defined as the difference between total contributions coming into the trust and the benefit payments made to retirees and beneficiaries going out of the trust as a percentage of beginning year market value of assets. Over the projection period, this percentage will fluctuate from year to year so for Signal Light testing, the net cash flow percentage over the entire projection period will be tested. The Board sets the Signal Light definition as follows:

Status	Definition
Green	Net Cash Flow Percentage above negative 5.25% (-5.25%) during the projection period
Yellow	Net Cash Flow Percentage between negative 5.25% (-5.25%) and negative 7.00% (-7.00%) during the projection period
Red	Net Cash Flow Percentage below negative 7.00% (-7.00%) during the projection period



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**APPENDIX D – FUNDING PROVISIONS OF GOVERNING LAW**

- **Actuarially Determined Contribution (ADC)** – ADC is defined as the contribution requirement determined by the actuary using a contribution allocation procedure based on the principal elements disclosed in Section III of this funding policy:
  1. Actuarial Cost Method
  2. Asset Smoothing Method
  3. Amortization Method

The calculation of the ADC will be determined during the actuarial valuation and not during the projection report. The ratio of the ADC to the fixed contribution rate (ADC/FCR) as set by this Funding Policy will be tested. The Board sets the Signal Light definition as follows:

Status	Definition
Green	ADC ratio at or below 100% of fixed contribution rate at valuation date
Yellow	ADC ratio between 100% and 110% of fixed contribution rate at valuation date
Red	ADC ratio above 110% of fixed contribution rate at valuation date

**III. Assumptions and Methods**

Each year, the actuary will perform an actuarial valuation and projection report for funding purposes. During the process, the actuary shall calculate all the metrics listed in Section II of this funding policy and PERS’ Signal Light status for each metric. The following three major components of a funding valuation will be used:

- **Actuarial Cost Method** – This component determines the attribution method upon which the cost/liability of the retirement benefits are allocated to a given period, defining the normal cost or annual accrual rate associated with projected benefits. The Entry Age Normal Cost Method (EAN) is to be used for determination of the normal cost rate and the actuarial accrued liability for purposes of calculating the Actuarial Determined Contribution (ADC).
- **Asset Valuation Method** – This component dictates the method by which the asset value, used in the determination of the Unfunded Actuarial Accrued Liability (UAAL) and Funded Ratio, is determined. The asset valuation method to be used shall be a five-year smoothed market value of assets. The difference between the actual market value investment returns and the expected market investment returns is recognized equally over a five-year period.

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**APPENDIX D – FUNDING PROVISIONS OF GOVERNING LAW**

- **Amortization Method** – This component prescribes, in terms of duration and pattern, the systematic manner in which the difference between the accrued liability and the actuarial value of assets is reduced. For purposes of calculating the ADC metric, the following amortization method assumptions are used:
  - I. Once established for any component of the UAAL, the amortization period for that component will be closed and will decrease by one year annually.
  - II. The amortization payment will be determined on a level percentage of pay basis.
  - III. The length of the amortization periods will be as follows:
    - a. Existing UAAL on June 30, 2018 – 30 years.
    - b. Annual future actuarial experience gains and losses, assumption changes or benefit enhancements or reductions – 25 years from the date of the valuation.
  - IV. If any future annual actuarial valuation indicates that PERS has a negative UAAL, the ADC shall be set equal to the Normal Cost.
- **Actuarial Assumptions** – The actuarial assumptions are used to develop the annual and projected actuarial metrics, as well as the ADC rates. The actuarial assumptions are derived and proposed by the actuary and adopted by the PERS' Board in conformity with the *Actuarial Standards of Practice*. The actuarial assumptions for this funding policy were developed using the experience for the four- year period ending June 30, 2022 (State of Mississippi Retirement Systems Experience Investigation for the Four-Year Period Ending June 30, 2022). The long-term investment return assumption adopted by the PERS' Board in conjunction with the experience investigation is 7.00 percent.

**IV. Governance Policy/Process**

Below is a list of specific actuarial and funding related studies, the frequency at which they should be commissioned by the Board and additional responsibilities related to each:

- **Actuarial Valuation (performed annually)** – The Board is responsible for the review of PERS' annual actuarial valuation report, which provides the annual funded ratio and the calculation of the ADC.
- **Projection Report (performed annually)** – The Board is responsible for the review of PERS' 30-year projection report, which will include the actuarial metrics and Signal Light status for each metric over a 30-year period.
- **Experience Analysis (performed every two years on a rolling four-year)** – The Board is responsible for ensuring that an experience analysis is performed as prescribed, review of the

**PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI  
JUNE 30, 2024 INDEPENDENT ACTUARIAL ASSESSMENT REPORT**

**APPENDIX D – FUNDING PROVISIONS OF GOVERNING LAW**

results of the study, and approving the actuarial assumptions and methodologies to be used for all actuarial purposes relating to the defined benefit pension plan.

- **Actuarial Audit (performed at least every five years)** – The Board is responsible for the review of an audit report performed by a new actuarial firm to provide a critique of the reasonableness of the actuarial methods and assumptions in use and the resulting actuarially computed liabilities and contribution rates.
- **Funding Policy Review (performed at least annually)** – The Board is responsible for the periodic review of this policy, but at least annually following the Projection Report and biennially following the Experience Analysis.

**V. Glossary of Funding Policy Terms**

- **Actuarial Accrued Liability (AAL):** The AAL is the value at a particular point in time of all past normal costs. This is the amount of assets the plan would have today if the current plan provisions, actuarial assumptions, and participant data had always been in effect, contributions equal to the normal cost had been made, and all actuarial assumptions had been met.
- **Actuarial Cost Method:** The actuarial cost method allocates a portion of the total cost (present value of benefits) to each year of service, both past service and future service.
- **Actuarial Determined Contribution (ADC):** The potential payment to the plan as determined by the actuary using a contribution allocation procedure that, if contributed consistently and combined with investment earnings, would be sufficient to pay promised benefits in full over the long term. The ADC may or may not be the amount actually paid by the plan sponsor or other contributing entity.
- **Asset Values:**
  - **Actuarial Value of Assets (AVA):** The AVA is the market value of assets less the deferred investment gains or losses not yet recognized by the asset smoothing method.
  - **Market Value of Assets (MVA):** The MVA is the fair value of assets of the plan as reported in the plan's audited financial statements.
- **Entry Age Normal Actuarial Cost Method (EAN):** The EAN actuarial cost method is a funding method that calculates the normal cost as a level percentage of pay or level dollar amount over the working lifetime of the plan's members.

**PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF MISSISSIPPI  
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**APPENDIX D – FUNDING PROVISIONS OF GOVERNING LAW**

- **Funded Ratio:** The funded ratio is the ratio of the plan assets to the plan's actuarial accrued liabilities.
  - **Actuarial Value Funded Ratio:** is the ratio of the AVA to the AAL.
- **Normal Cost:** The normal cost is the cost allocated under the actuarial cost method to each year of active member service.
- **Present Value of Benefits (PVB) or total cost:** The PVB is the value at a particular point in time of all projected future benefit payments for current plan members. The future benefit payments and the value of those payments are determined using actuarial assumptions regarding future events. Examples of these assumptions are estimates of retirement and termination patterns, salary increases, investment returns, etc.
- **Surplus:** A surplus refers to the positive difference, if any, between the AVA and the AAL.
- **Unfunded Actuarial Accrued Liability (UAAL):** The UAAL is the portion of the AAL that is not currently covered by the AVA. It is the positive difference between the AAL and the AVA.
- **Valuation Date:** The valuation date is the annual date upon which an actuarial valuation is performed; meaning that the trust assets and liabilities of the plan are valued as of that date. PERS' annual valuation date is June 30.

**APPENDIX E – GLOSSARY OF TERMS**

**1. Actuarial Assumptions**

Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, withdrawal, disability, and retirement; changes in compensation; inflation; rates of investment earnings, and asset appreciation or depreciation; and other relevant items.

**2. Actuarial Cost Method**

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an allocation of such value to each year of service, usually in the form of a Normal Cost and an Actuarial Liability.

**3. Actuarial Gain/(Loss)**

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

**4. Actuarial Liability**

The portion of the Actuarial Present Value of Projected Benefits which will not be paid by future Normal Costs. It represents the value of the past Normal Costs with interest to the valuation date.

**5. Actuarial Present Value (Present Value)**

The value as of a given date of a future amount or series of payments. The Actuarial Present Value discounts the payments to the given date at the assumed investment return and includes the probability of the payment being made. As a simple example: assume you owe \$100 to a friend one year from now. Also, assume there is a 1% probability of your friend dying over the next year, in which case you won't be obligated to pay him. If the assumed investment return is 10%, the actuarial present value is:

$$\frac{\text{Amount}}{\text{Probability of Payment}} \times \frac{1}{(1+\text{Investment Return})} = \text{Present Value}$$

$$\$100 \times \frac{1}{(1 - .01)} \times \frac{1}{(1+.1)} = \$90$$

**6. Actuarial Valuation/Actuarial Assessment**

The determination, as of a specified date, of the Normal Cost, Actuarial Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

## APPENDIX E – GLOSSARY OF TERMS

### 7. Actuarial Value of Assets

The value of cash, investments and other property belonging to a pension plan as used by the actuary for the purpose of an Actuarial Valuation. The purpose of an Actuarial Value of Assets is to smooth out fluctuations in market values. This way long-term costs are not distorted by short-term fluctuations in the market.

### 8. Actuarially Equivalent

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

### 9. Amortization Payment

The portion of the pension plan contribution which is designed to pay interest and principal on the Unfunded Actuarial Liability in order to pay for that liability in a given number of years.

### 10. Entry Age Normal Actuarial Cost Method

A method under which the Actuarial Present Value of the Projected Benefits of each individual included in an Actuarial Valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages.

### 11. Funded Percentage

The ratio of the Actuarial Value of Assets to the Actuarial Liabilities.

### 12. Investment Return Assumption

The assumed interest rate used for projecting dollar related values in the future.

### 13. Mortality Table

A set of percentages which estimate the probability of death at a particular point in time. Typically, the rates are annual and based on age and sex.

### 14. Normal Cost

That portion of the Actuarial Present Value of pension plan benefits and expenses, which is allocated to a valuation year by the Actuarial Cost Method.

**APPENDIX E – GLOSSARY OF TERMS**

**15. Projected Benefits**

Those pension plan benefit amounts which are expected to be paid in the future under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and increases in future compensation and service credits.

**16. Unfunded Actuarial Liability**

The excess of the Actuarial Liability over the Actuarial Value of Assets.

# WORKING Together for You



## Public Employees' Retirement System of Mississippi Actuarial Education Session





Ed Koebel  
EA, MAAA, FCA  
Chief Executive Officer



Ben Mobley  
ASA, MAAA, FCA  
Consulting Actuary



Darby Carraway  
Consultant

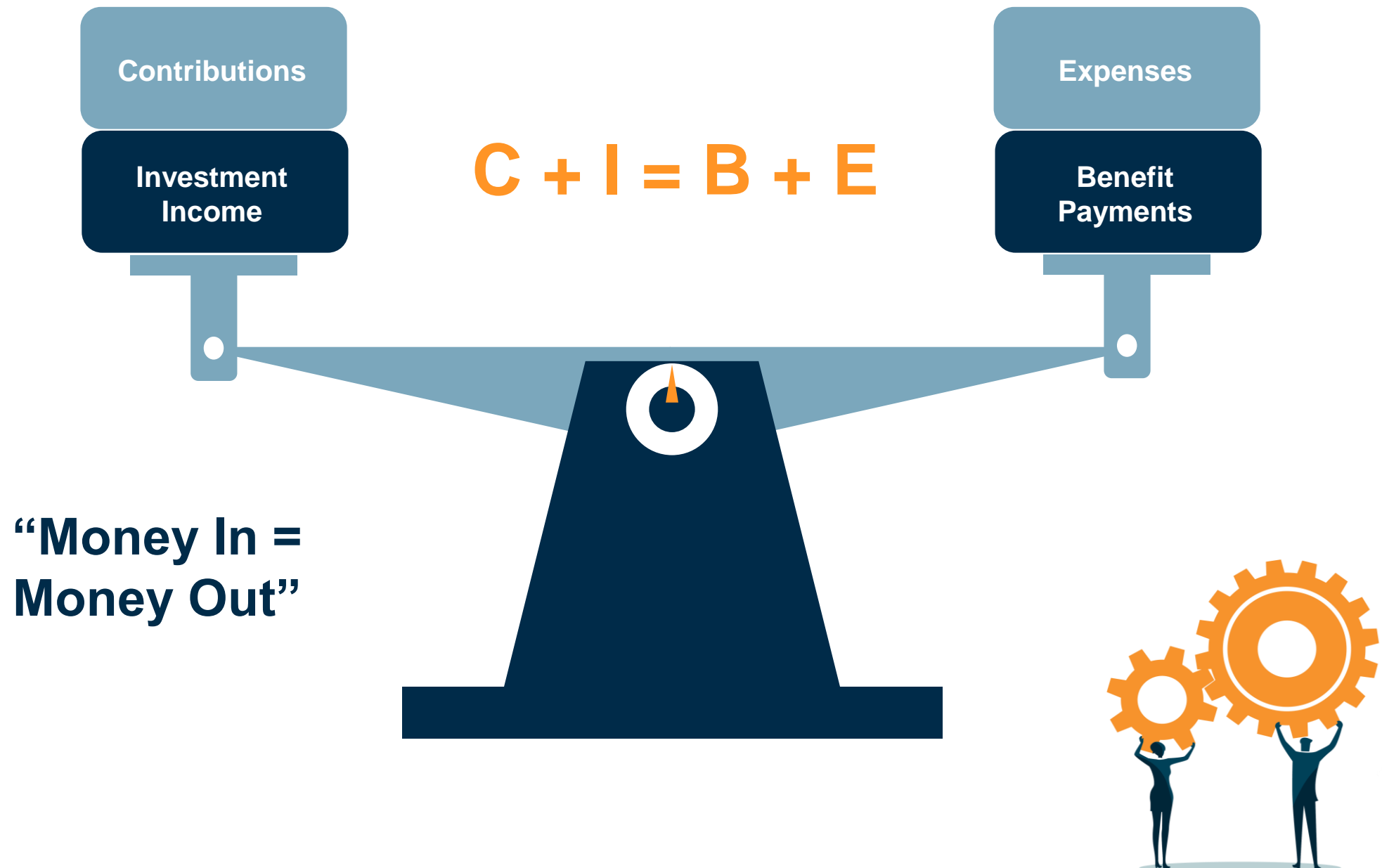


# Actuarial 101



- Two primary pension plan structures:
  - Defined Contribution (DC)
    - Annual contribution amount placed in a member's account
  - Defined Benefit (DB)
    - Monthly benefit amount payable at retirement
- “Hybrid Plans”
  - Characteristics of both DB and DC Plans
  - Example: DB with enhanced refund features or separate DC account





- Review the strategy to systematically fund the promised benefits of the system
  - $C + I = B + E$
- Measure assets and liabilities (future benefit payments)
- Determine actuarial contributions needed based on actuarial assumptions and methods (2024 valuation results are used to set the FY 2027 contribution)
- Analyze experience (actual vs. expected) in last year
- Report on trends



- The present value of an amount of money payable in the future is the amount of money that, if we had it invested today, would accumulate to the amount that will be payable
  - Requires an assumption of expected investment rate of return



- Example 1: You owe \$1,000 to a financial institution payable one year from now. You estimate that you can invest money for a 7% return. What is the present value of the debt?

$$\frac{\$1,000}{1.07} = \$934.58$$

- Observation: What if you're mistaken about the 7%?



- The actuarial present value of an amount of money payable in the future which is contingent on a future event. This amount would accumulate to be the amount that is **EXPECTED** to be payable.
  - Requires an assumption of expected rate of return
  - Requires a probability that future event will occur





- Example 2: You owe \$1,000 to 100 people one year from now. Each person is 70 years old. You expect the same return (7%) and chance each person will be alive in one year (98%). What is the present value of the debt?

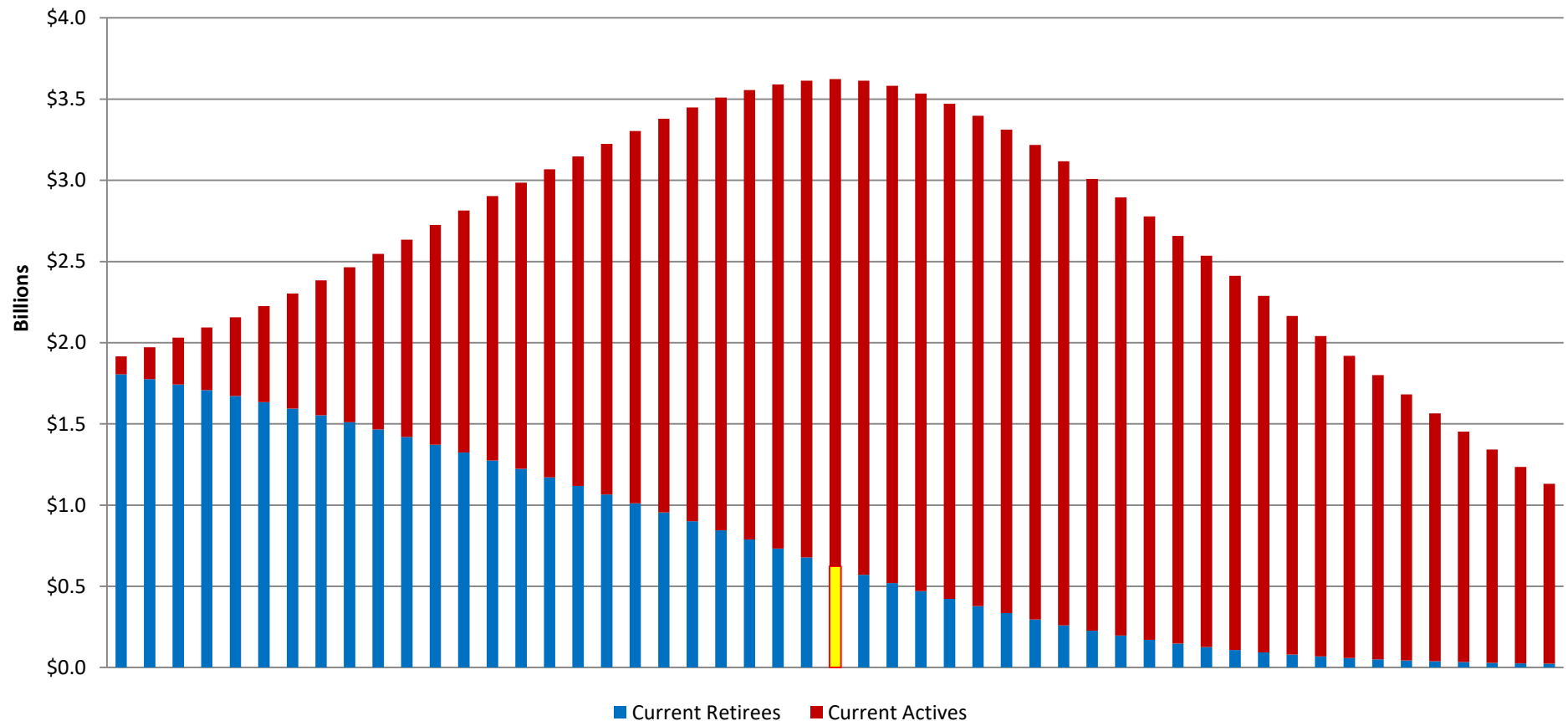
$$100 \times \frac{\$1,000}{1.07} \times 98\% = \$91,589$$

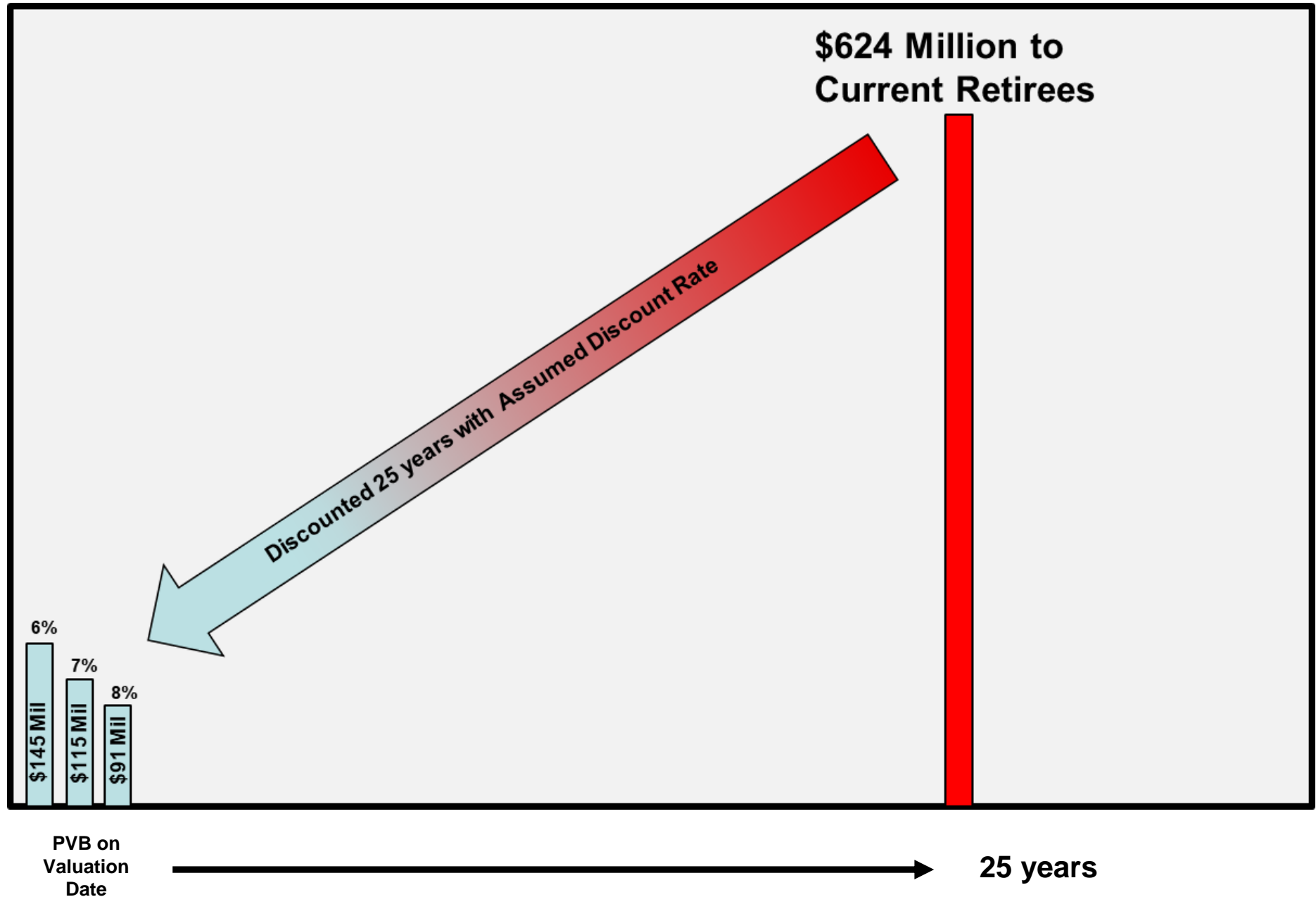
- Observation: Under what circumstances will you have exactly enough money to pay the debt?

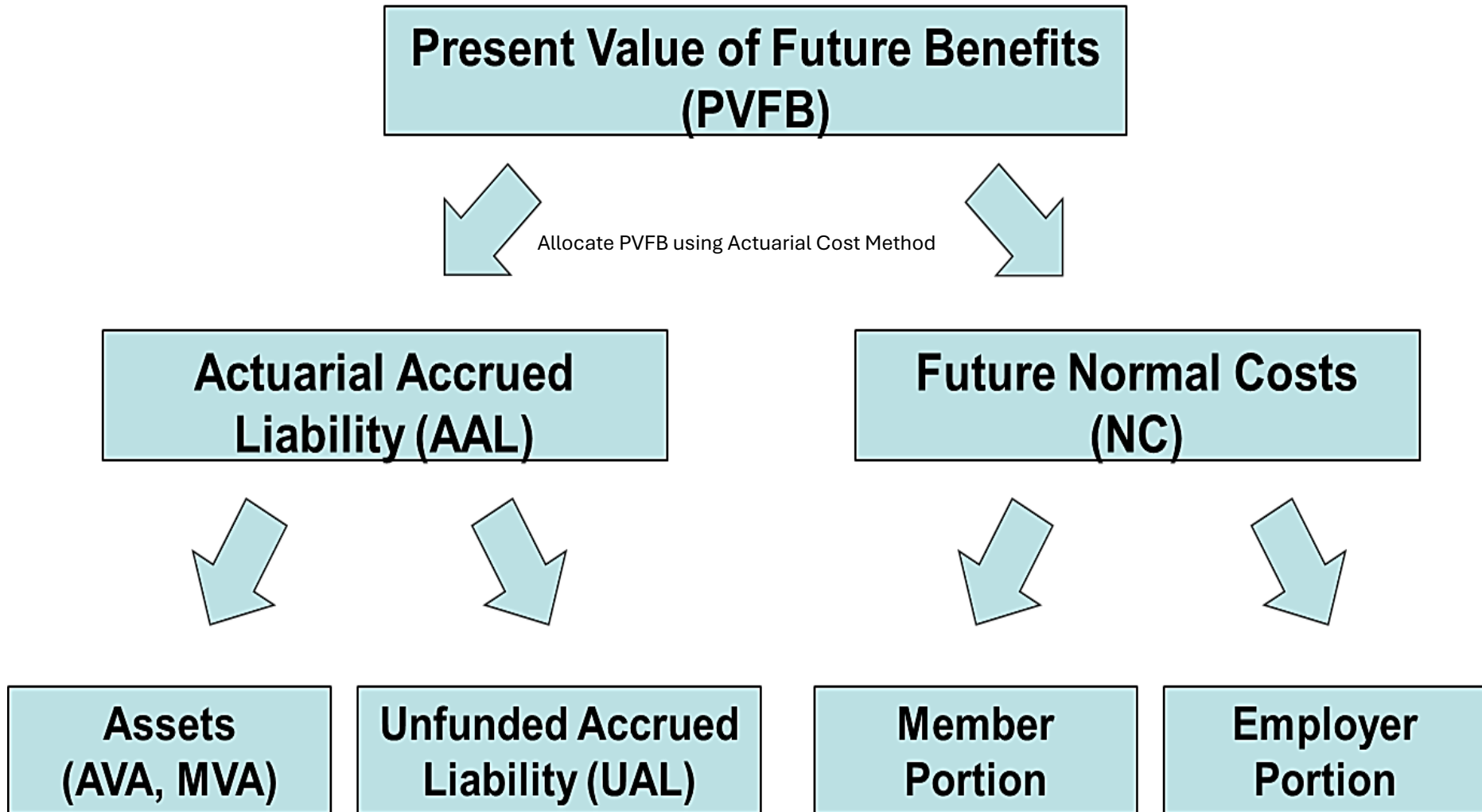


- Each Annual Expected Benefit Payment Discounted to the Valuation date and Summed is the Actuarial Total Present Value of Benefits

### Expected Total Benefit Payments of Current Members in Next 50 Years







- “Unfunded Liabilities” are a natural part of retirement system funding, allows spreading the funding of unexpected liability changes
  - Shortfall between assets and liabilities that is paid back like a mortgage payment of a house
- Contributions (referred to as Actuarially Determined Contributions) consist of two elements:

<b>Contribution For</b>	<b>Description</b>
Normal Cost (Expense Loaded)	Value of this year’s expected benefit accruals
Unfunded Actuarial Accrued Liability (UAAL)	Amount based on amortization method

- Providing benefits at plan inception or granting benefit increases for service already rendered
- Actual experience which is less favorable than assumed  
Examples follow:
  - Higher salary increases
  - Earlier retirement date(s)
  - Lower death rates
  - Lower rates of investment earnings
- Changes in methods or assumptions used in calculating the accrued liability



## Effect on Liabilities and Contributions

<u>Assumption</u>	<u>Action</u>	<u>Usual Effect</u>
Interest Rate	Increase	Decrease
Inflation Rate*	Increase	Increase
Retirement Rate	Retire younger	Increase
Turnover Rate	More withdrawals	Decrease

\*leaving interest rate unchanged



- Amortization of UAL has become a major component of actuarial contribution rate in recent years
- Amortization policy decisions
  - Payment is level dollar or level percent of pay
  - Amortization period open or closed
  - Length of amortization period
  - One base or multiple bases

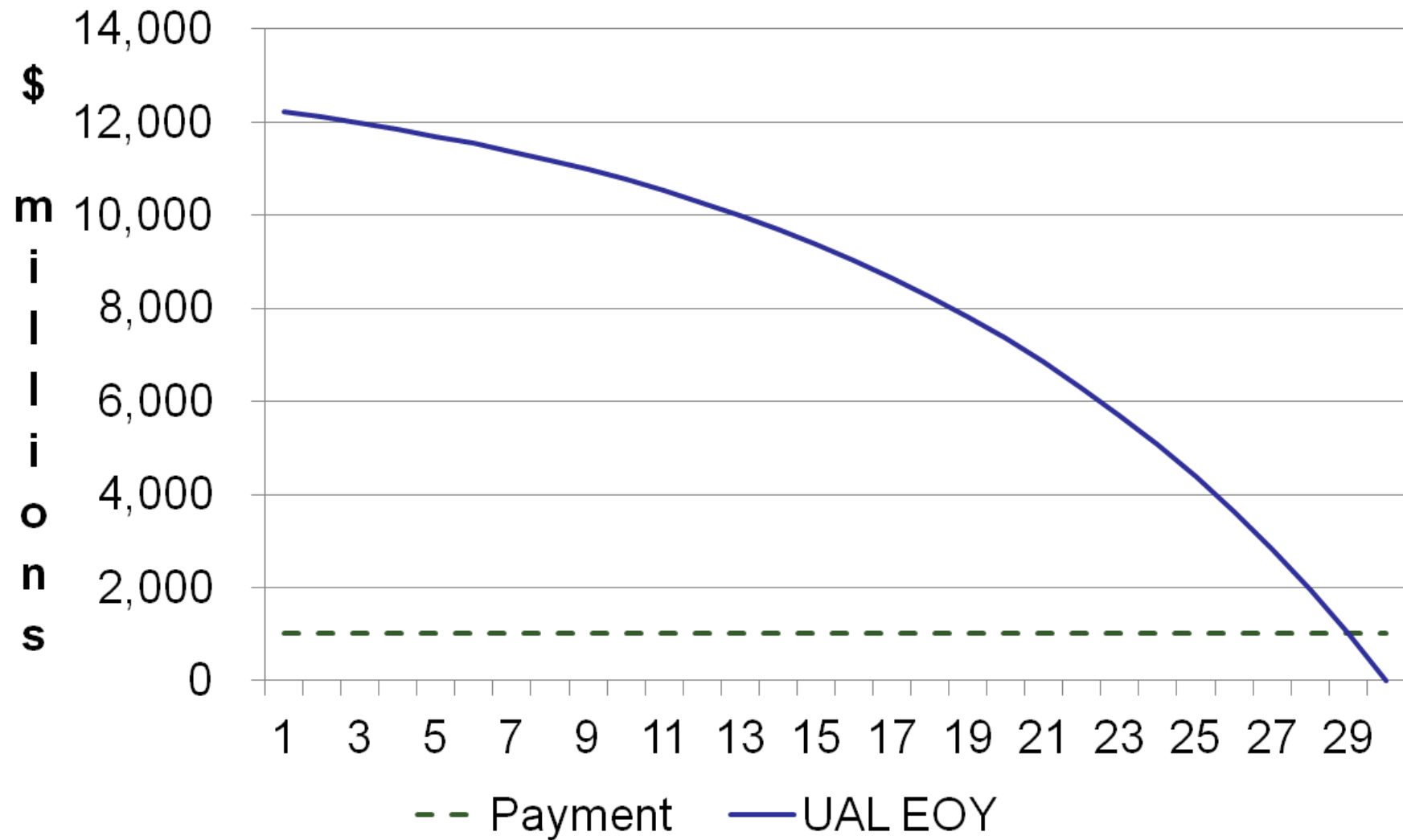




- Same as paying a home mortgage on a fixed interest rate.
- Payments remain constant in dollar amount over the amortization period, but decline as a percent of a, presumably, growing payroll.
- UAL declines in nominal (total dollar) value every year.



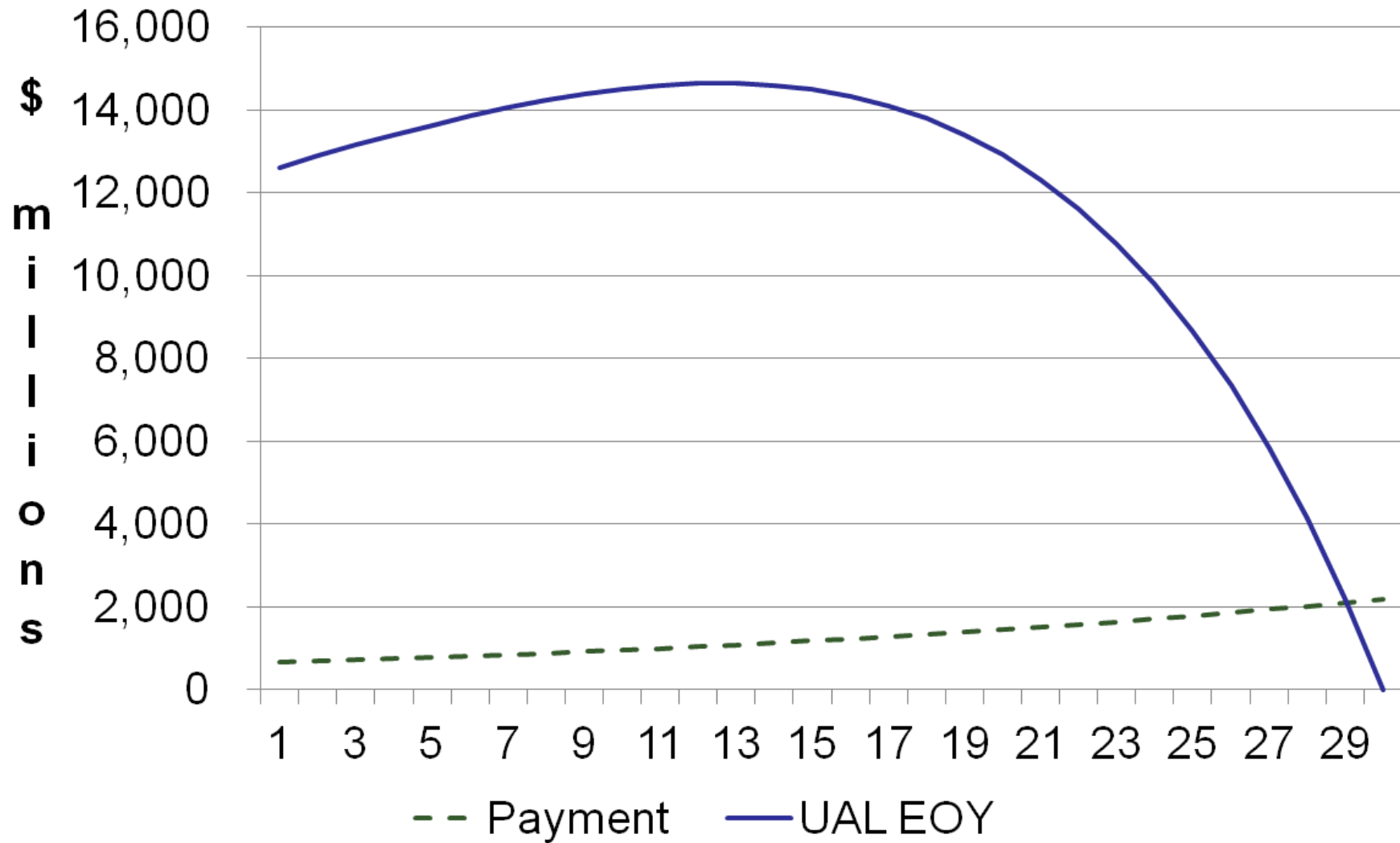
# Level \$ Amortization



- Developed to help better achieve the goal of level contributions as a percent of payroll.
- Requires an assumption regarding annual total payroll growth.
- Typically, the growth in the active membership is not reflected in the payroll growth assumption. However expected declines in membership (e.g., closed plans) should be reflected.
- This results in the use of the wage inflation assumption for ongoing plans.



# Level % Amortization



- Depending on the amortization period, can result in negative amortization (contributions less than interest accruing on the UAL) for a number of years.
- Amortization period needs to be 18 to 21 years to avoid the negative amortization.



- Closed period means a one year drop in the amortization period each year until you reach zero.
- Open period means the amortization period fluctuates up or down or stays the same from year to year.
- Open period with level % amortization can result in never paying off the UAL, although it does decline as a percent of payroll.



- One base methodology
  - Each year, gains and losses are included in the legacy UAL and amortized over the remaining amortization period
- Separate Bases methodology—Layered UAAL
  - Each year, new closed bases are established
  - Separate bases can be set up for gains/losses, plan amendments, and assumption changes
  - Different amortization periods for different kinds of bases:
    - Legacy UAL over 30 years
    - Each new Gain/Loss over 25 years
  - Similar to setting up mortgage of house for legacy and then each year take a home equity line and pay that off over a different period

- Bought a new house in 2022
  - Mortgage is \$16.8 Billion
  - Closed 30-year period
  - Level % of Payroll amortization method
  - Payment in 2022 is \$1,014 Million



Base	UAL	Period	Payment	ADC Rate
2022 Legacy	\$16,802	30 years	\$1,014	17.40%



- In 2023, you make an addition to the house and finance it over 25 years
  - Addition cost \$131 Million
  - Closed 25-year period
  - Level % of Payroll amortization method
  - Payment in 2023 is \$9 Million



Base	Remaining UAL	Remaining Period	Payment	ADC Rate
2022 Legacy	\$17,057	29 years	\$1,047	
2023 Loss	\$131	25 years	\$9	
Total	\$17,188	28.96 years	\$1,056	17.48%

- In 2024, you win \$92 Million in the lottery
  - Gain of \$92 Million
  - Closed 25-year period
  - Level % of Payroll amortization method
  - Credit in 2024 is \$6 Million



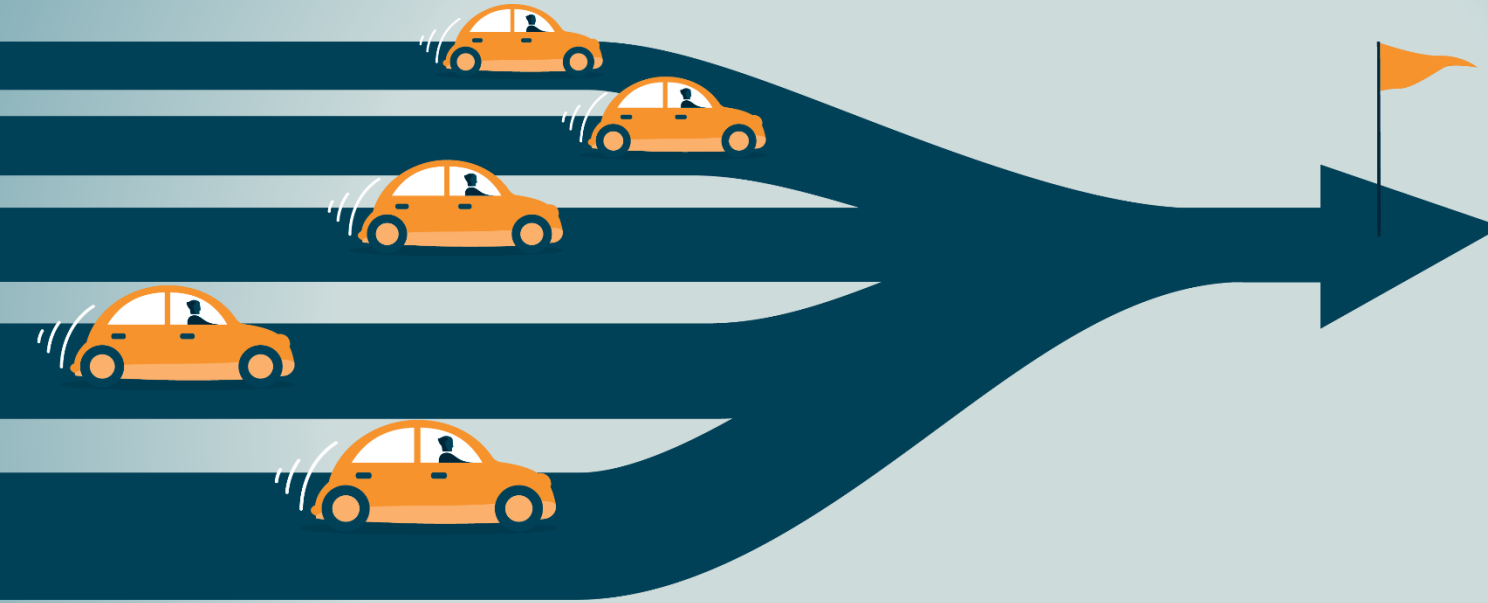
Base	Remaining UAL	Remaining Period	Payment	ADC Rate
2022 Legacy	\$17,297	28 years	\$1,081	
2023 Loss	\$132	24 years	\$9	
2024 Gain	\$(92)	25 years	\$(6)	
Total	\$17,337	27.98 years	\$1,084	17.33%



**THANK  
YOU**

# STRATEGIC

## Solutions for Financial Wellness

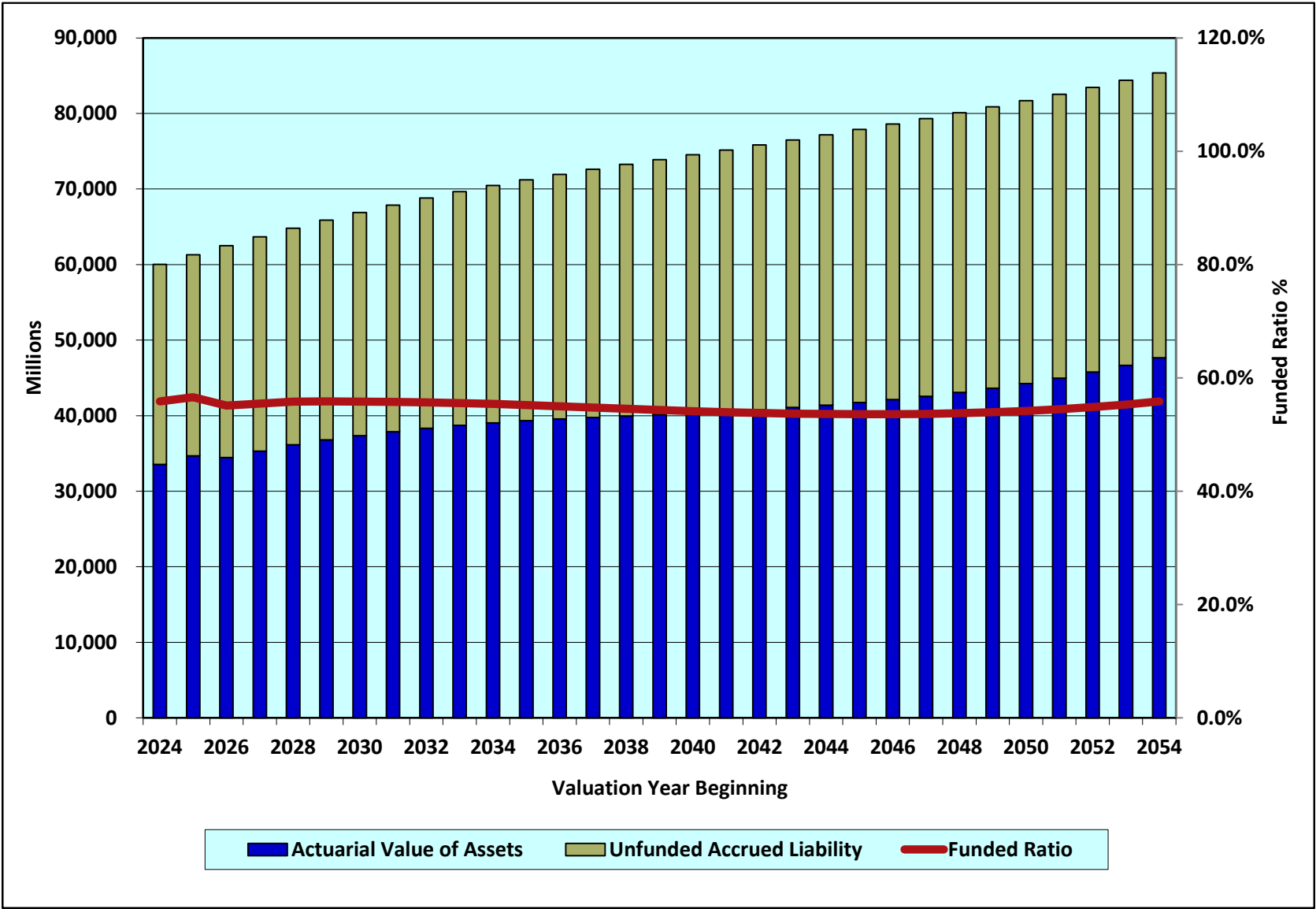


### Mississippi PERS Tier 5 Analysis

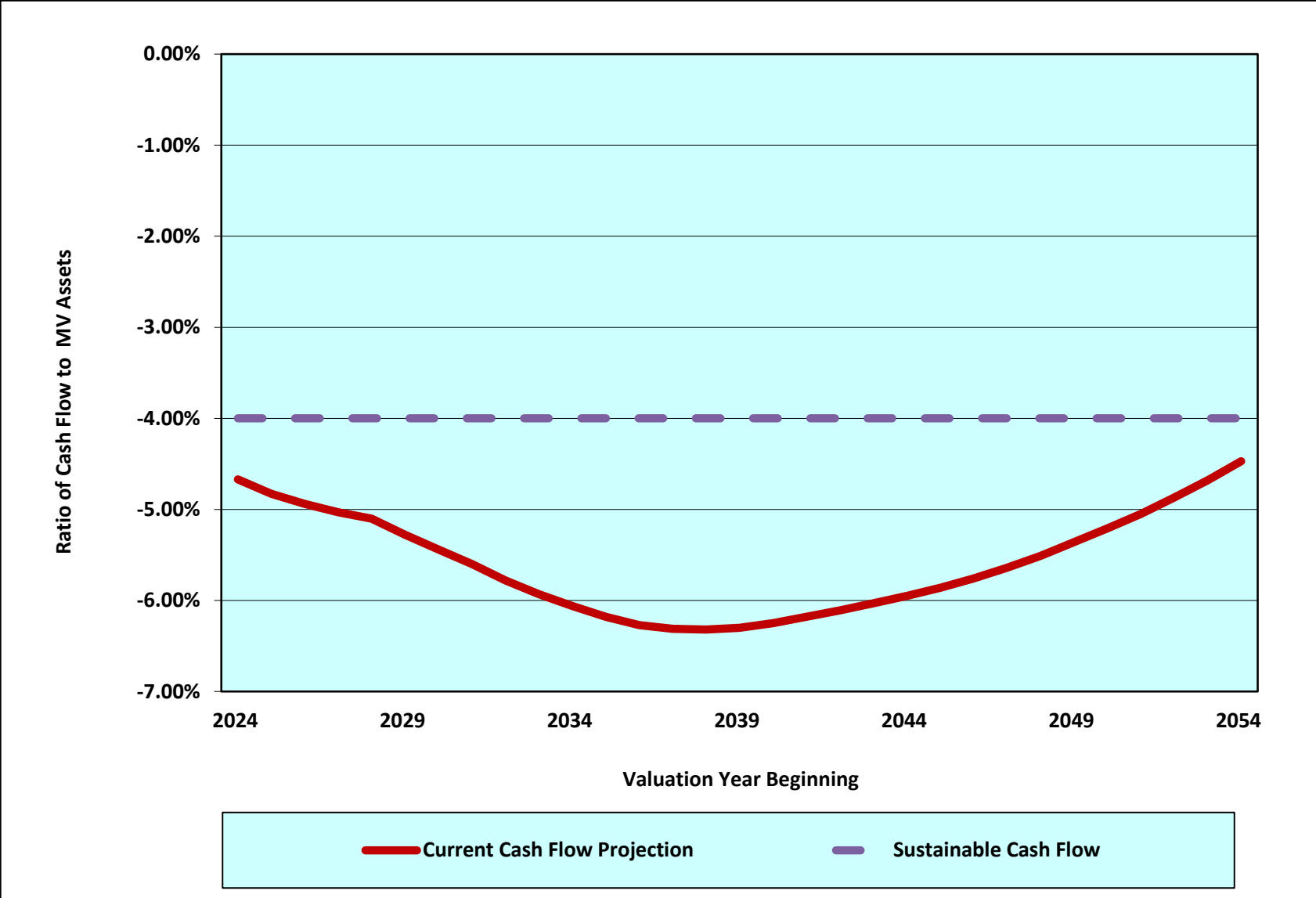
- **Projections based on all assumptions and methods used in the 2024 valuation, except as otherwise noted**
- **Active membership remains at approximately 146,000 employees**
- **Assumes 7.00% investment return in all future years**
- **Assumes Statutory Contribution Rate is phased-in to 19.90% of payroll as set by Legislature, except as otherwise noted**



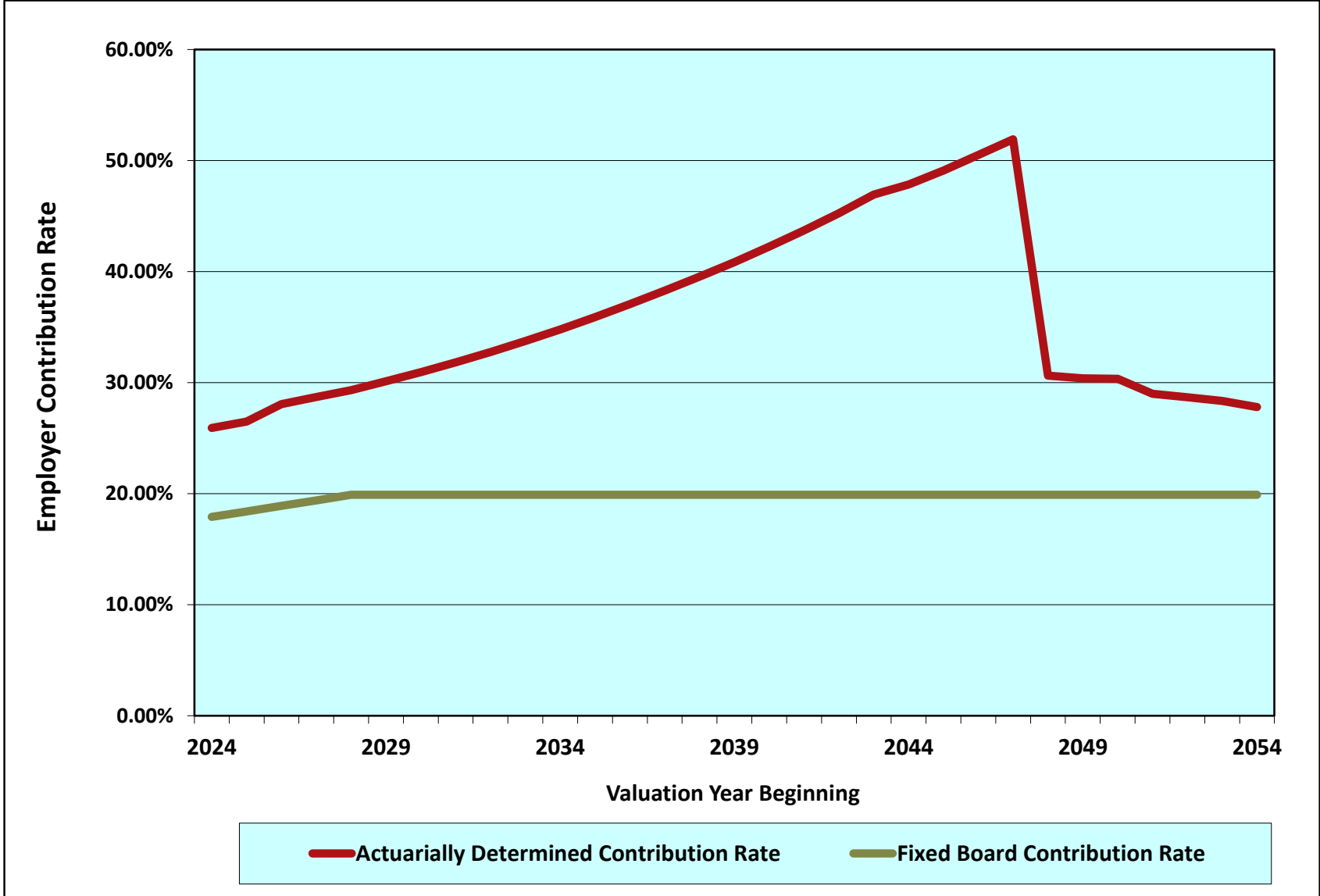
# 30-Year Projection of Funded Ratio Based on June 30, 2024 Valuation Results - PERS



# 30-Year Projection of Negative Cash Flow Based on June 30, 2024 Valuation Results - PERS



# 30-Year Projection of ADC and FCR Based on June 30, 2024 Valuation Results - PERS





## Long-Term

- New Tier 5 as a Pure DB Benefit with or without guaranteed COLAs
- New Tier 5 as a Pure DB Benefit with a reduced multiplier and guaranteed COLA
- New Tier 5 as a Hybrid Benefit with no guaranteed COLAs
  - Part DB – 1% Multiplier and Potential Match to DC



- Although a new tier is only impacting new hires and benefits to members will not be very different until many years in the future...
- A new tier of benefits aids in the sustainability of the pension plan for the next generation of employees
- It helps control cash flow issues if problems should arise in the future
- And it may provide relief of the pressure of potentially increasing the Employer contribution rate in the future
- But it will take awhile...the unfunded liability still needs to be paid off



## 1. Pure Defined Benefit (DB) Plan with Lower COLAs

Similar DB benefit structure based on average salary and years of service and the following differences:

- Cost-of-Living Adjustment (COLA)
  - None guaranteed, or
  - 1% guaranteed
- 4-year Vesting
- Retirement Eligibility: Same as Tier 4
- Average compensation: Same as Tier 4
- Member contribution rate lowered from 9.00% to 7.00% of payroll



## 2. Pure Defined Benefit (DB) Plan with Lower Formula

Reduced DB benefit structure based on average salary and years of service and the following differences:

- Multiplier equal to 1.5%
- Cost-of-Living Adjustment (COLA) guaranteed at 2%
- 4-year Vesting
- Retirement Eligibility: Same as Tier 4
- Average compensation: Same as Tier 4
- Member contribution rate lowered from 9.00% to 7.00% of payroll

Multiplier in line with other Social Security states with guaranteed COLA comparable to Inflation targets

## 3. Hybrid Plan

Reduced DB portion and Portable DC portion:

- Benefit Multiplier of only 1.00% for all years
- Extended retirement eligibility (62/30 or 65/8)
- Final average earnings over 8 years
- No COLAs and no PLSO
- Member contribution rate kept at 9% of payroll but split:
  - 5% to DB plan
  - 4% to DC portion
- Member automatically enrolled with an option to voluntarily save more
- A potential match up to a certain limit (still to be determined)
- Vesting is 25% each year for any potential employer contributions for the first 4 years

- What is the impact of member's benefits for each of these Tier 5 Alternative Designs
  - Pay at Retirement = \$60,000
  - Service at Retirement = 30 years

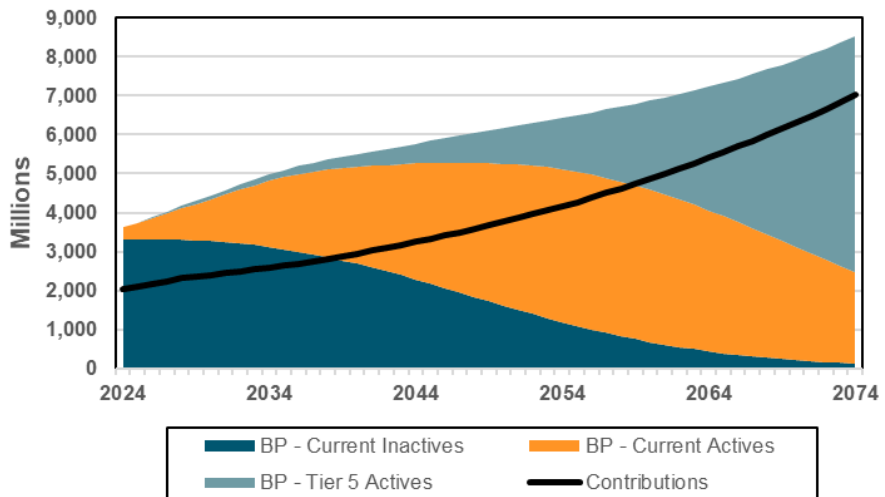
Tier 5 Design	Estimated Final Average Earnings	Annual Benefit at Retirement	Annual Benefit after 10 years	Replacement Ratio at Retirement**
Current Tier 4	\$57,700	\$34,600	\$46,500	87.7%
Tier 5 Board Approved with No COLA	\$57,700	\$34,600	\$34,600	87.7%
Tier 5 Board Approved with 1% COLA	\$57,700	\$34,600	\$38,110	87.7%
Tier 5 Reduced DB Multiplier with 2% COLA	\$57,700	\$25,965	\$31,650	73.3%
Tier 5 Hybrid DB with No COLA*	\$54,850	\$28,200	\$28,200	77.0%

\* Includes \$156,600 in DC account assuming 4% employee contribution, 2% employer match and 5% interest annuitized over employee life expectancy (estimated at \$12,000 per year at retirement)

\*\* Social Security Replacement Ratio estimated at 30% of final pay (or \$18,000 per year)

# Projection of Benefit Payments

**Current Plan with COLA - 50 Years Projection of Cash Flow**



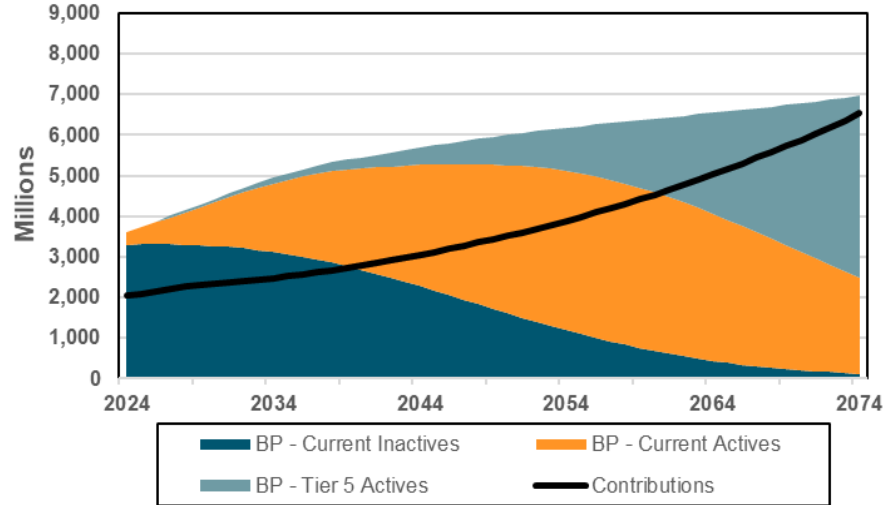
**Current Plan**  
Guaranteed COLAs  
continue to increase BPs



**PERS Board Tier 5**  
A Pure DB Tier 5 without  
Guaranteed COLAs does limit  
the increase in BPs after 2054



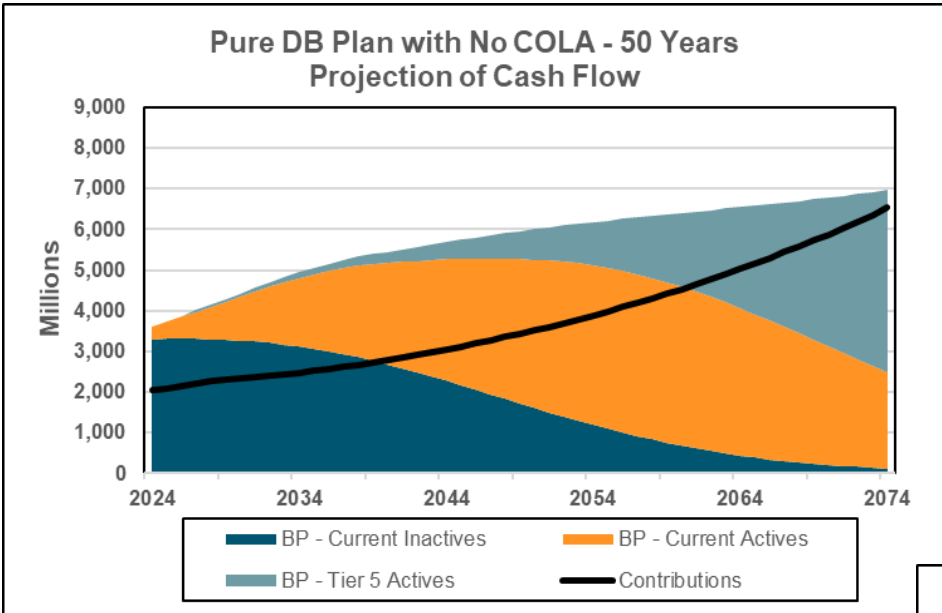
**Pure DB Plan with No COLA - 50 Years Projection of Cash Flow**



**Aids in Sustainability &  
Helps Control Cash Flow  
Issues in Future**

# Projection of Benefit Payments

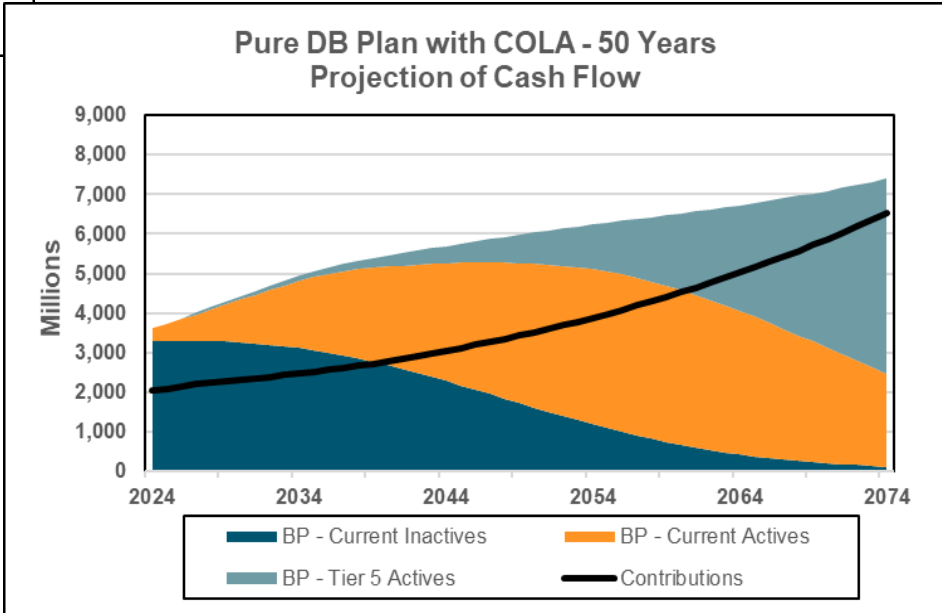
**NO COLA vs. 1% COLA**



**PERS Board Tier 5**  
A Pure DB Tier 5 without Guaranteed COLAs does limit the increase in BPs after 2054



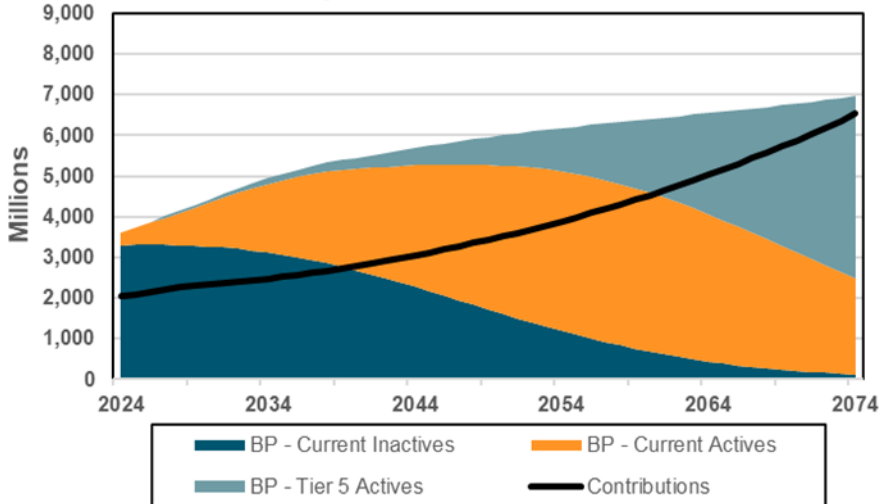
**Alternative Tier 5**  
A Pure DB Tier 5 with Guaranteed 1% COLA results in increase in BPs beyond 30 Years





# Projection of Benefit Payments

Pure DB Plan with No COLA - 50 Years  
Projection of Cash Flow



**Reduced Multiplier Plan but with Higher COLAs**

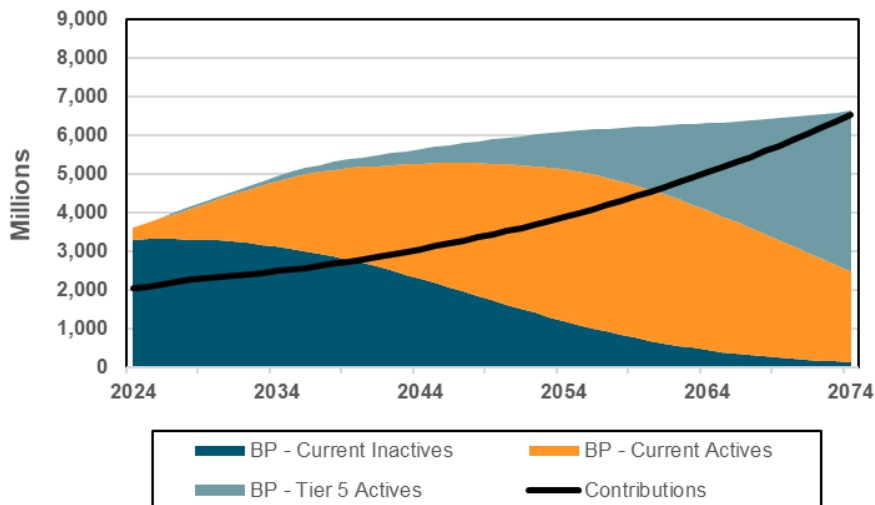
**PERS Board Tier 5**  
A Pure DB Tier 5 without Guaranteed COLAs does limit the increase in BPs after 2054



**Reduced Tier 5 with 2% COLAs**  
BPs level off considerably after 2054 but still provide inflation protection

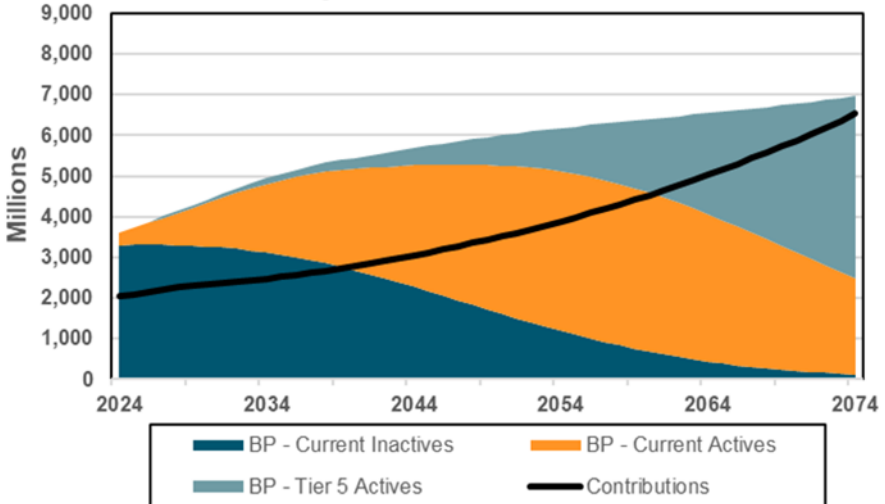


Reduced DB Plan with COLA - 50 Years  
Projection of Cash Flow



# Projection of Benefit Payments

**Pure DB Plan with No COLA - 50 Years  
Projection of Cash Flow**



**Hybrid Option**

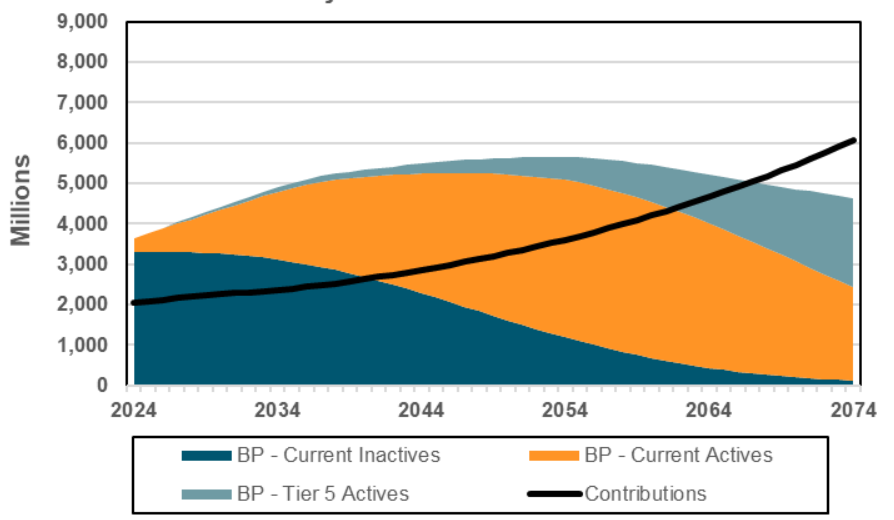
**PERS Board Tier 5  
A Pure DB Tier 5 without  
Guaranteed COLAs does limit  
the increase in BPs after 2054**



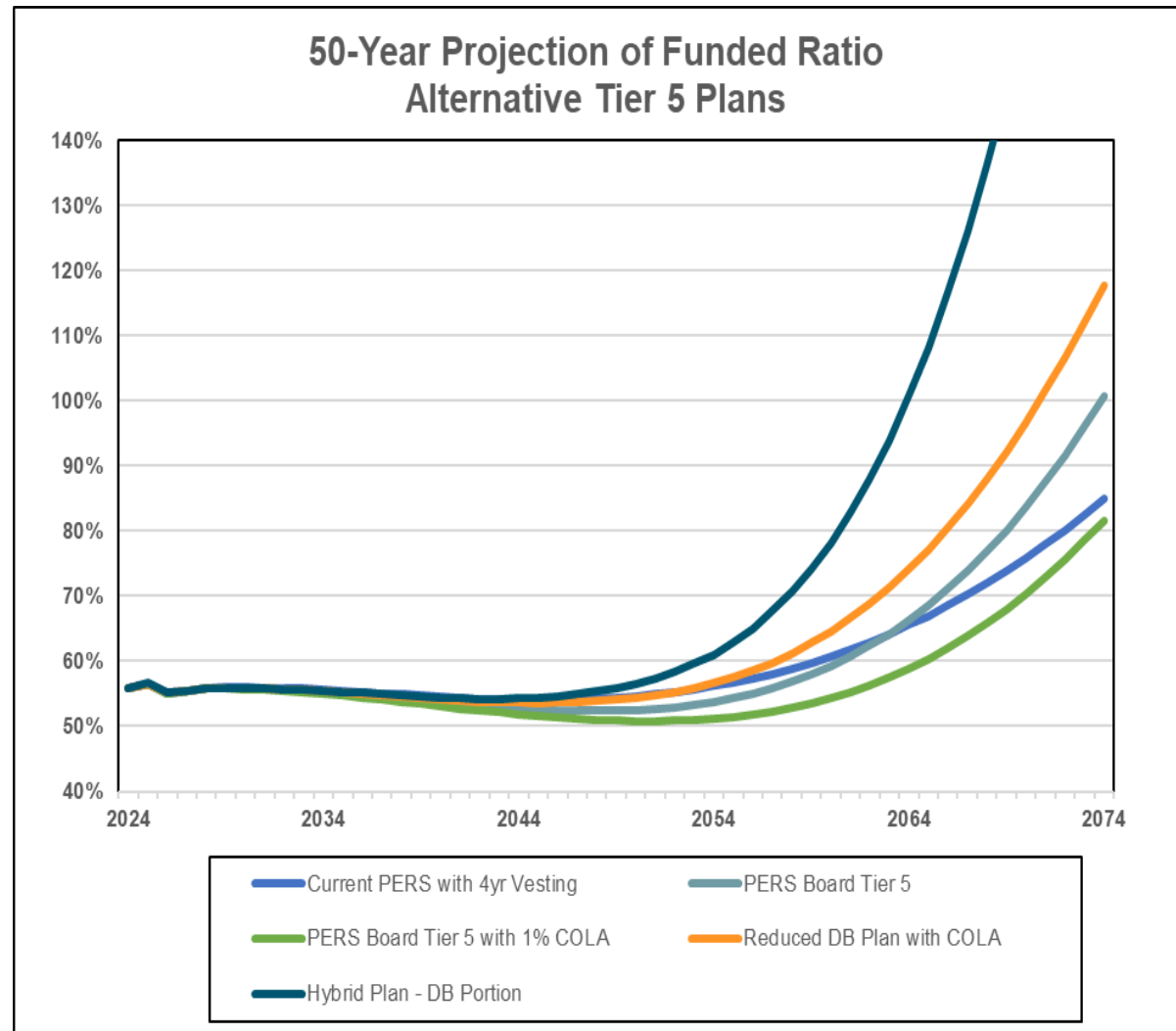
**Hybrid Tier 5  
BPs are much lower as  
expected but projection only  
shows DB portion of benefit**



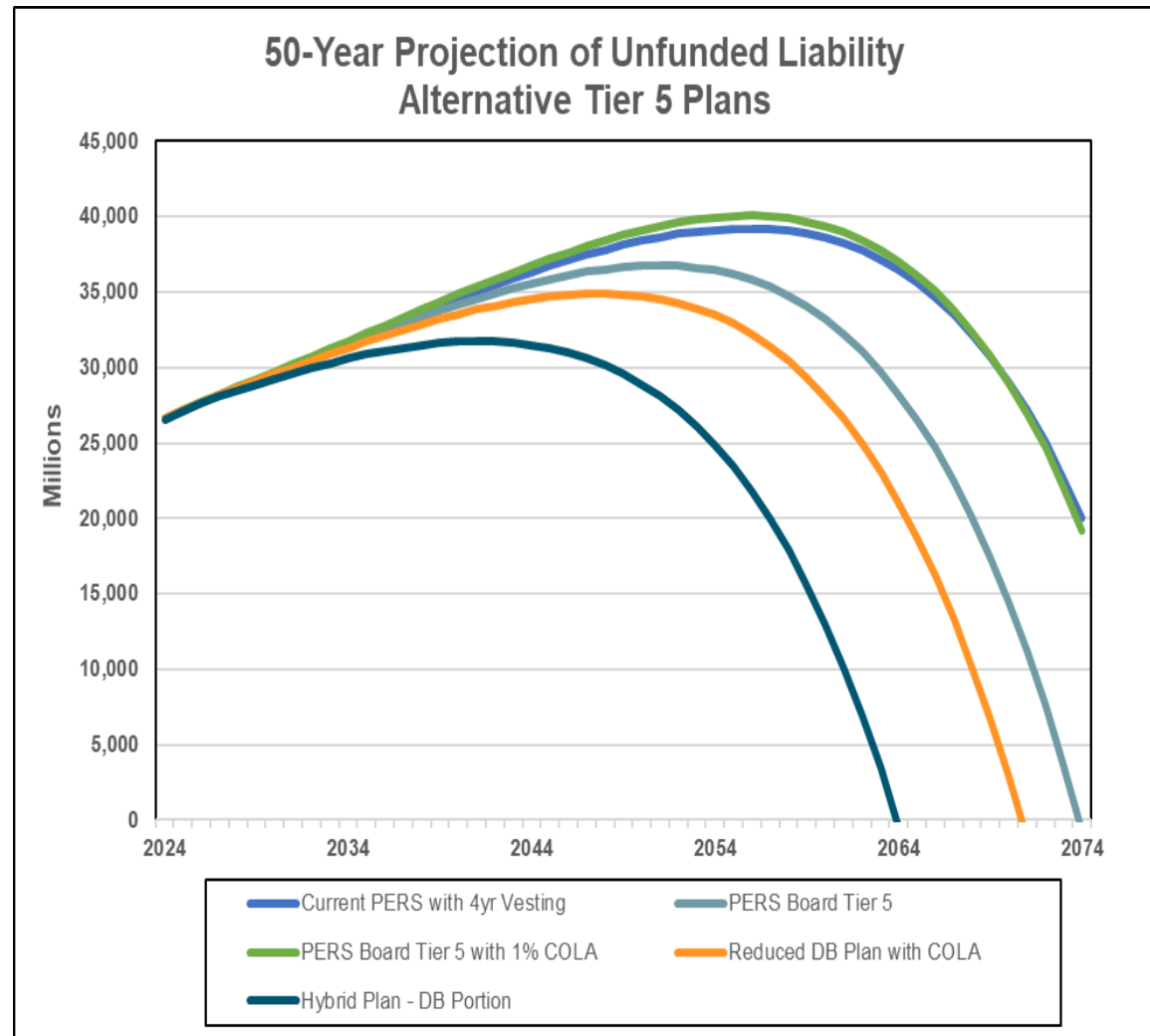
**Hybrid Plan - 50 Years  
Projection of Cash Flow**



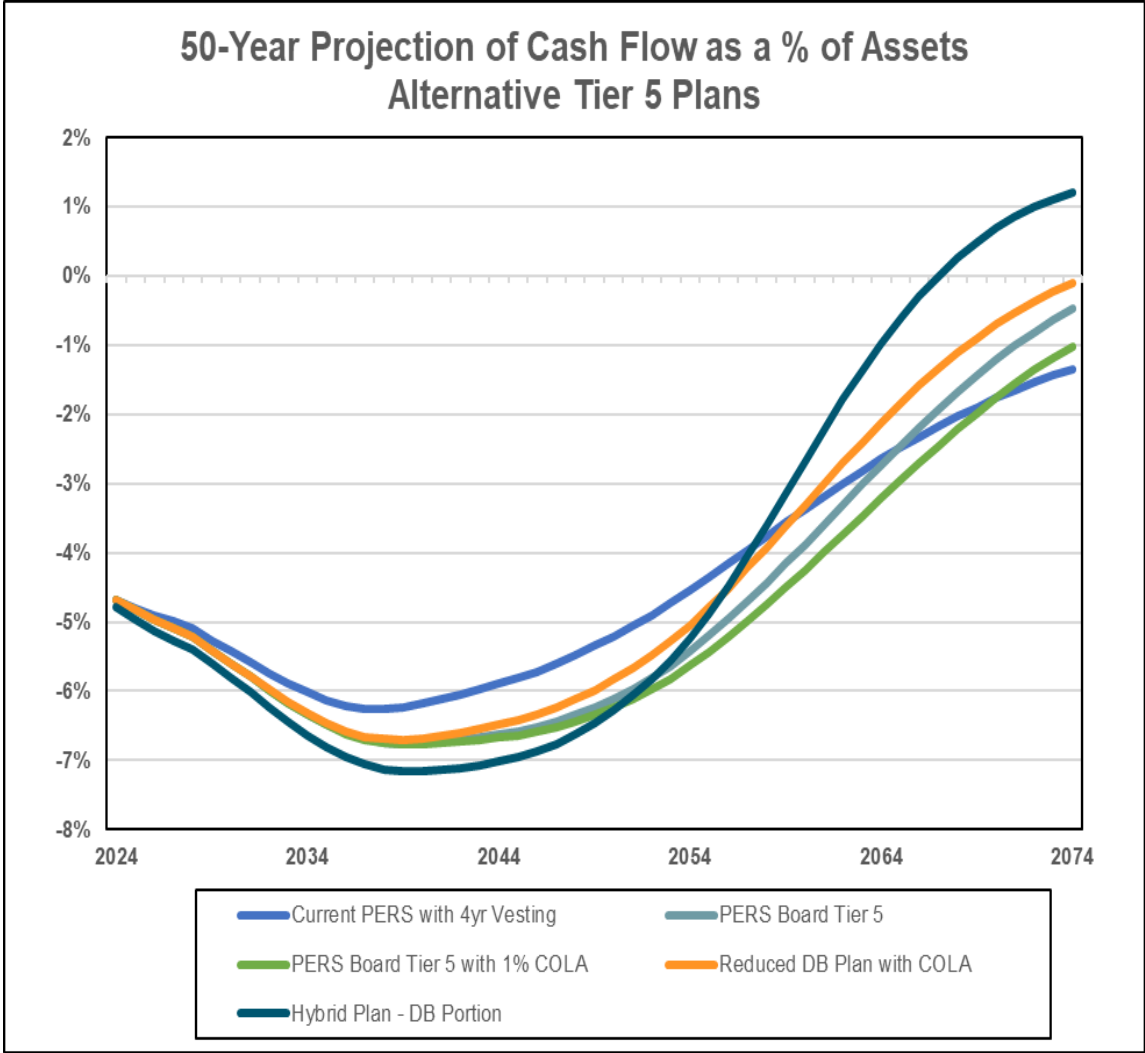
- As can be seen in the graph, without additional funding, current plan and all Tier 5 plans will take many years to show improvement in the funded ratio
- Current Tier 4 Plan with 4-year vesting (Blue line) will take nearly 50 years (2072) to reach 80% funded
- Most alternative Tier 5 designs would reach 80% funded in about 3 to 11 years earlier than Current Tier 4 Plan with 4-year vesting



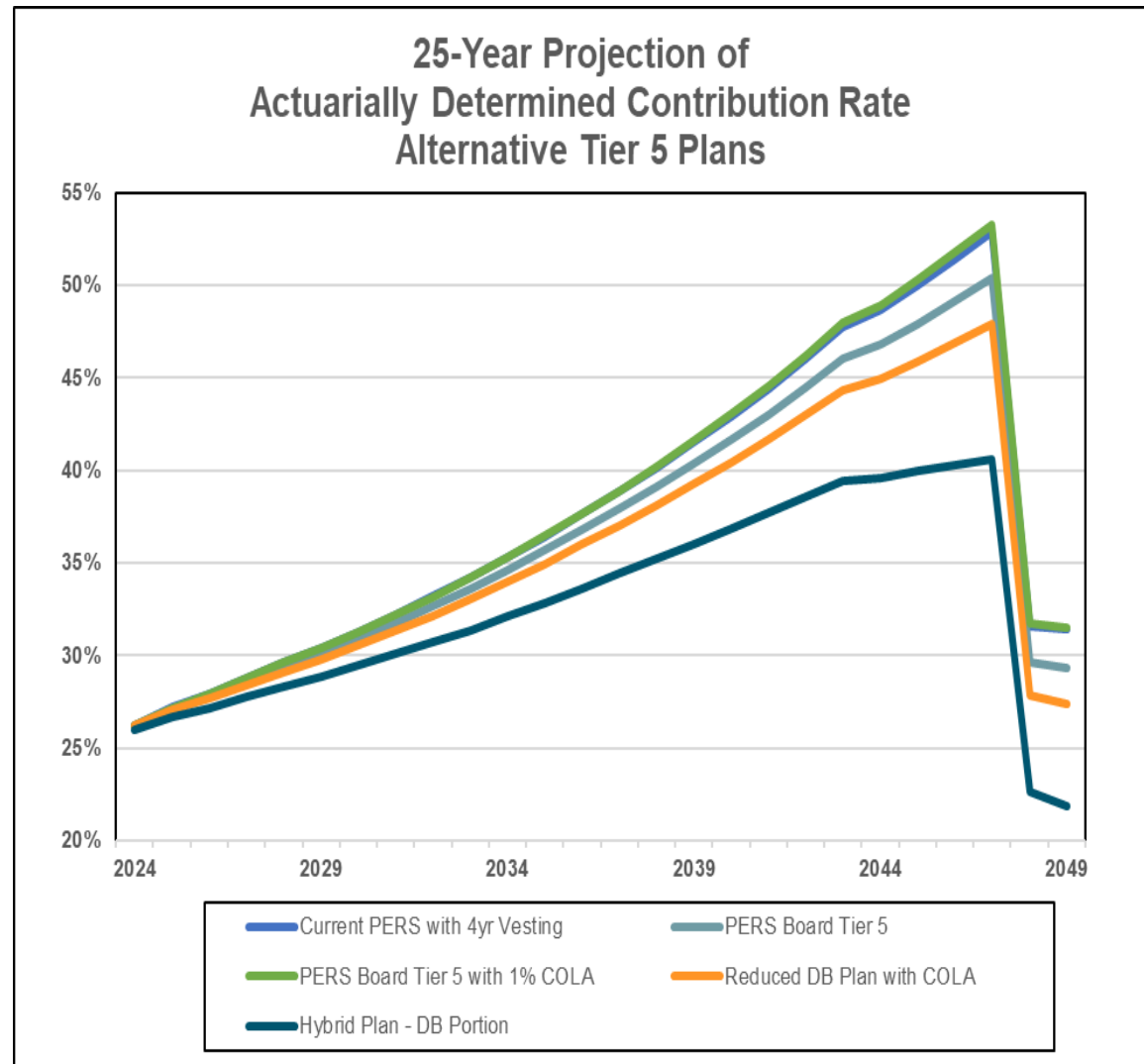
- Almost a mirror of the previous slide, this graph shows the growth of the Unfunded Liability over the next few decades due to contribution losses
- The decline in the latter part of the graph is due to the cash flow increasing and the impact that more of the Statutory Contribution is going to pay down the Unfunded Liability faster
- Since the Hybrid Plan has a smaller employer normal cost, it pays down the Unfunded Liability faster



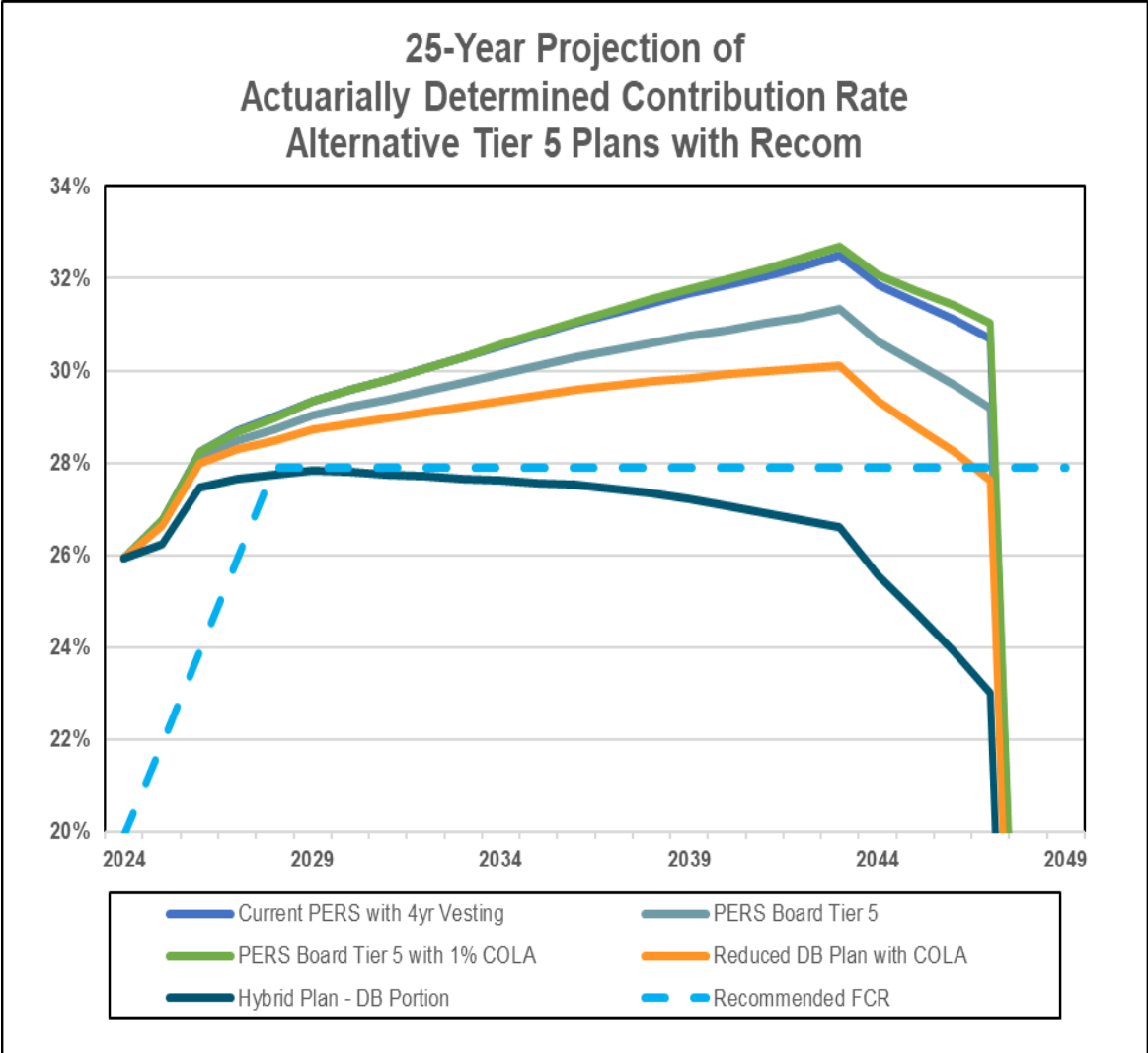
- As can be seen in the graph, without additional funding, the cash flow rates for the current plan and all Tier 5 plans will reach dangerous levels (near negative 7%)
- Due to Ee contributions being lower for Alternative Tier 5 options, the cash flow is worse than current Tier 4 Plan with 4-year vesting until about 2054
- However, as designed, over the long-term the cash flows for these alternative Tier 5 designs will increase significantly in 50 years



- As can be seen in the graph and as mentioned before, the Actuarially Determined Contribution (ADC) is expected to increase under all scenarios as contribution losses impact the Unfunded Liability
- If more funding is provided to PERS, this graph will look very different and many of the alternate Tier 5 designs may not need further contribution increases



- This graph assumes that the Fixed Contribution Rate for PERS is increased to the recommended actuarial rates from the 2024 valuation
- As you can see from the graph, more funding results in lower calculated ADC rates for PERS
- With this additional funding all these alternative designs would remain in the Yellow status, with the Hybrid option remaining in Green status for the ADC/FCR comparison



- The ultimate cost of any of these plan designs is the total normal cost rate at the 7.00% assumption
- Total normal cost rate is the value of a given year's expected benefit accruals for every active member summed together and divided by that year's expected payroll
- All the Tier 5 design options result in a lower total normal cost rate compared to the current Tier 4 design

Tier 5 Design	Total Normal Cost (NC) Rate	Employee Contribution Rate	Ultimate Employer NC Rate	Amount of FCR to Pay Down UAAL
Current Tier 4	12.26%	9.00%	3.26%	16.64%
Tier 5 Board Approved with No COLA	9.58%	7.00%	2.58%	17.32%
Tier 5 Board Approved with 1% COLA	10.31%	7.00%	3.31%	16.59%
Tier 5 Board Approved with 1% COLA	10.31%	9.00%	1.31%	18.59%
Tier 5 Reduced DB Multiplier with 2% COLA	8.97%	7.00%	1.97%	17.93%
Tier 5 Hybrid DB with No COLA	5.25%	5.00%	0.25%	19.65%



- **With a Fixed (Statutory) Contribution Rate of 19.90% of compensation, PERS funding projection is heading in the wrong direction**
  - The System needs additional contributions
- **New Tier 5 designs help funding in the long-term and provide for reasonable and attractive benefits to new employees**
  - Improves sustainability and future cash flow issues and may reduce the probability of increases in employer contribution rates in the future





THANK  
YOU