

April 2014



# Asset/Liability Study

Teachers' Retirement System of the State of Illinois



# Table of Contents

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**ACKNOWLEDGEMENTS ..... PAGE 2**

**INTRODUCTION ..... PAGE 3**

**CURRENT STATUS ..... PAGE 6**

**DETERMINISTIC ANALYSIS ..... PAGE 7**

**DETERMINISTIC SCENARIO ANALYSIS..... PAGE 19**

**STOCHASTIC ANALYSIS ..... PAGE 22**

**APPENDIX 1: ALTERNATE STOCHASTIC CONTRIBUTION SCENARIO ..... PAGE 49**

**APPENDIX 2: SENSITIVITY ANALYSIS: VOLATILITY ..... PAGE 71**

**APPENDIX 3: SENSITIVITY ANALYSIS: CORRELATIONS..... PAGE 93**

**APPENDIX 4: ASSUMPTIONS AND METHODS..... PAGE 115**

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## Introduction

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RVK, Inc. (RVK) has prepared this report for the Teachers Retirement System (TRS) to:

- Present projected valuation results with respect to the funded status of the Plan.
- Present projected benefit payments of the Plan.
- Investigate asset mixes to determine those which best serve to protect and increase funding levels, while providing adequate liquidity for benefit payments.

The valuation projections are shown using both a deterministic and stochastic process.

The deterministic process provides an open group analysis of projected valuation results based on a fixed set of future assumptions (see summary in the Assumptions and Methods section of this report).

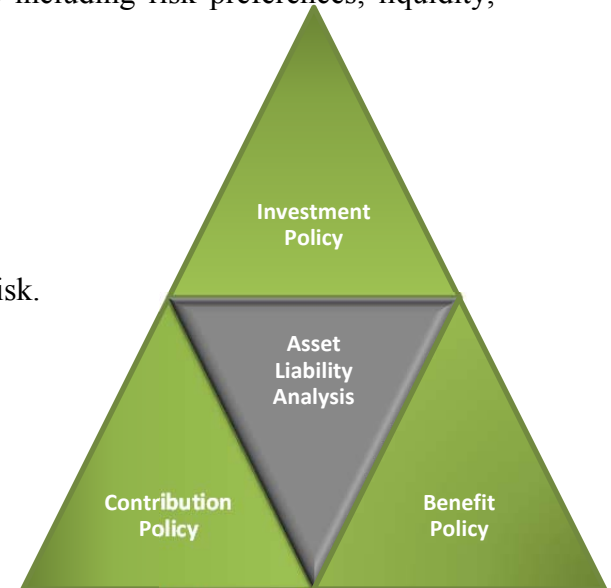
The stochastic process provides an open group analysis of projected valuation results under many capital market environments based on expected asset returns and inflation, and their expected volatility. Using a Monte Carlo simulation technique, both assets and liabilities are assumed to vary stochastically, linked together by changes in inflation. Expected values, variances of the returns and inflation, and correlations are used to generate 2,000 trials to produce a distribution of potential outcomes. A stochastic analysis can answer questions about the best/worst case outcomes along with the probability of such outcomes.

## Introduction (continued)

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### What is an Asset/Liability Study?

- Investment programs and the strategy they seek to implement (Investment Policy) do not exist in a vacuum. They seek to satisfy one or more investment objectives and operate within a plan framework that includes the investment objectives (Benefit Policy) and plan funding (Contribution Policy).
- The purpose of an Asset/Liability Study is to examine how well alternative investment strategies (i.e., differing asset allocations) address the objectives served by the Plan—the Plan's "liabilities" in the context of the Plan's funding streams—the Plan's Contribution Policy. It is the only standard analysis that fully links all three aspects of the Plan's key financial drivers.
- In doing so, it creates an important "guidepost" for the actual asset allocation for the Plan; the asset allocation chosen by the Plan's fiduciaries will likely reflect the nature of the liabilities but also numerous other factors including risk preferences, liquidity, implementation constraints, etc.
- For the TRS Asset/Liability Study, we assume the objectives are:
  1. Fund all participants' benefits over time.
  2. Assure sufficient liquidity to pay benefits at all times.
  3. Foster a stable contribution stream consistent with objectives 1 and 2.
  4. Achieve adequate returns without accepting unnecessary or imprudent levels of risk.



### An Asset/Liability Study is NOT . . .

- An actuarial study of the TRS liabilities—that is the purview of the Plan's actuary.
- A prescription for Plan benefits—that is the purview of the elected representatives.
- An assessment of the affordability of contribution levels—that is the purview of the elected officials and their constituents.
- The sole determinant of the final asset allocation adopted for the Plan—there are a number of factors, including insights from an Asset/Liability Study, which will bear on the optimal asset allocation.

## **Introduction (continued)**

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### **Asset/Liability Studies in Practice . . .**

- Begin with a forecast of the financial liabilities (i.e., benefit obligations).
- Include a baseline estimation of the financial contributions to the Plan over time.
- Compare alternative investment strategies (i.e., total fund asset allocations to the Plan's financial needs).
- Draw conclusions regarding how well various investment strategies satisfy the Plan's financial needs.

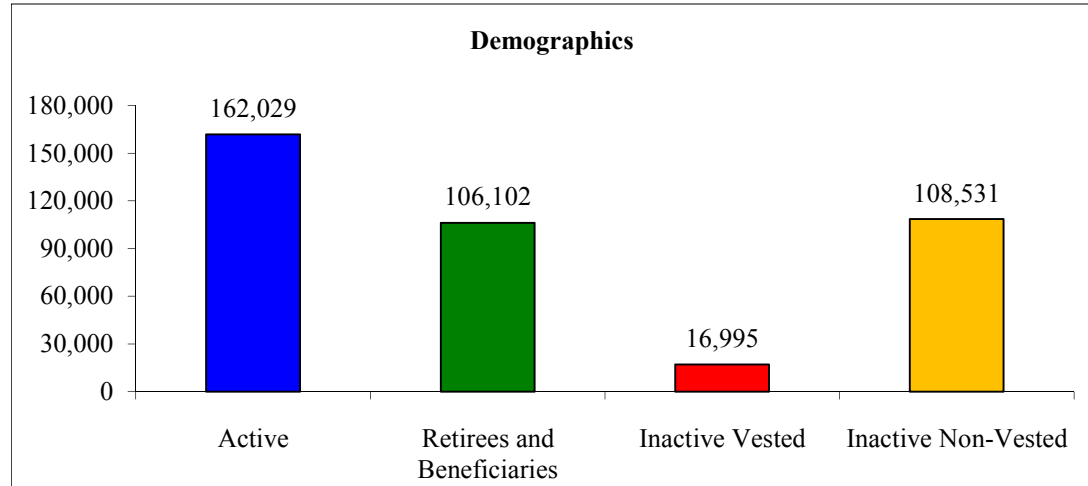
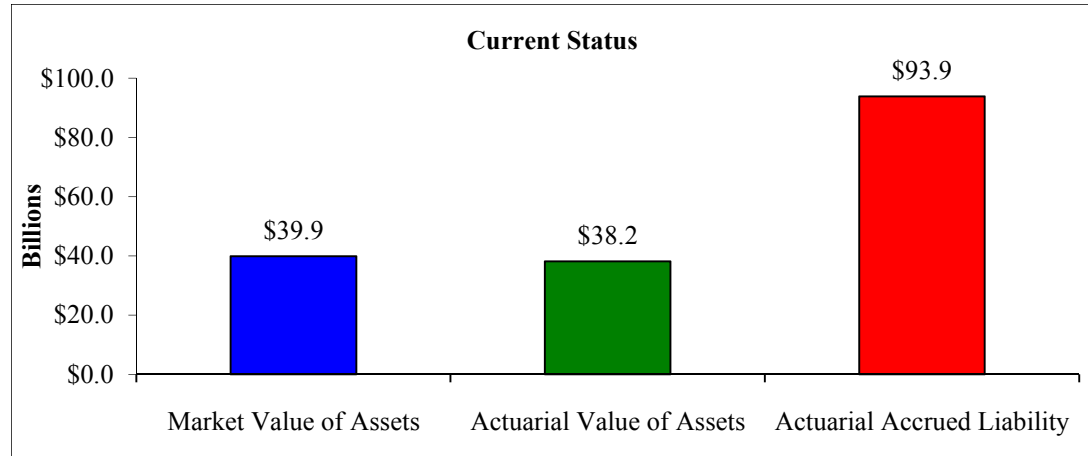
### **This Asset/Liability Study . . .**

- Utilizes the valuation, projection, and forecasting capabilities of the ProVal software system, which is utilized by both Buck Consultants, LLC (Buck) and RVK. We started with the ProVal modeling prepared by Buck including benefit coding, assumptions, and parameters for projecting TRS benefits and liabilities, inclusive of the provisions of Public Act 98-0599/Senate Bill 1 (SB1), effective June 1, 2014. Projected liabilities were adjusted using scaling factors (as provided by Buck). RVK then added parameters to allow for the forecasting of employer and employee contributions, in both deterministic and stochastic environments as Buck's modeling did not include these parameters.
- Uses data from the June 30, 2013 TRS Actuarial Valuation prepared by Buck, to project pension liabilities.
- Uses the Actuarial Cost Method and other assumptions described in the June 30, 2013 TRS Actuarial Valuation report prepared by Buck. Effective June 1, 2014, the Actuarial Cost Method is changed to the Entry Age Normal (level % of pay) method in accordance with SB1.
- Unless otherwise stated, reflects changes to benefit provisions and funding requirements under SB1.
- Compares these specific investment strategies—(A) Interim Target Allocation, (B) Long-Term Target Allocation, (C) a conservative illustrative portfolio (Conservative Portfolio), (D) a diversified lower risk portfolio (Potential Portfolio 1), (E) a diversified higher risk portfolio (Potential Portfolio 2), and (F) an aggressive illustrative portfolio (Aggressive Portfolio).
- Note: Does not assume any actuarial adjustments that may take place in future years.

## Current Status

A summary of the Plan follows:

<b>Valuation Date</b>	June 30, 2013
<b>Market Value of Assets (MVA)</b>	\$39.9 billion
<b>Actuarial Value of Assets (AVA)</b>	\$38.2 billion
<b>Actuarial Accrued Liability (AAL)</b>	\$93.9 billion
<b>Market Value Funded Ratio (MVA/AAL)</b>	42%
<b>Actuarial Value Funded Ratio (AVA/AAL)</b>	41%
<b>Active</b>	162,029
<b>Retirees and Beneficiaries</b>	106,102
<b>Inactive Vested</b>	16,995
<b>Inactive Non-Vested</b>	108,531



Values are as reported in the June 30, 2013 actuarial valuation and do not reflect changes implemented by SB 1 as it was not in effect as of this date.

## Deterministic Analysis

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This section provides an analysis of the Plan's assets, liabilities, funded status, and benefit payments based on a fixed set of future assumptions. Each analysis that follows in this deterministic section rests on the critical assumptions below and must be read and interpreted with them in mind—particularly assumptions #3, #4, #5 and #6.

The deterministic assumptions are as follows:

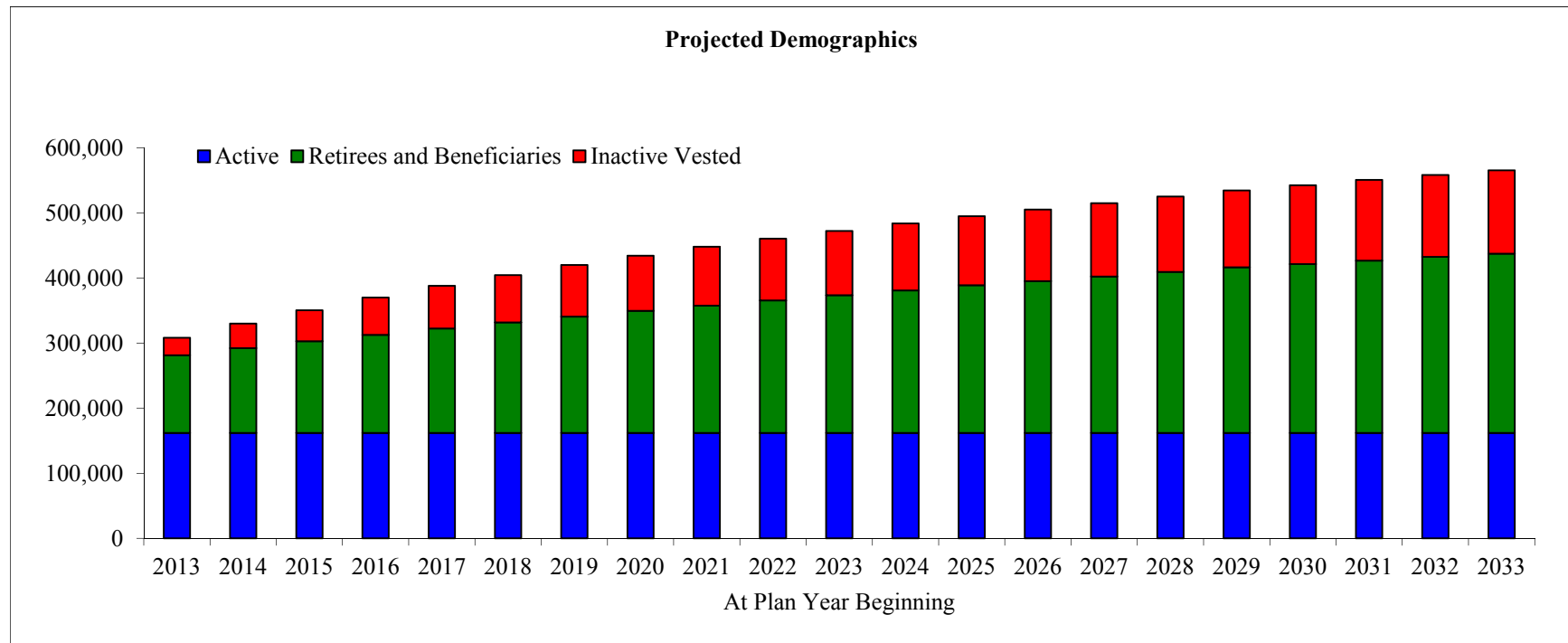
1. Current Plan provisions (see summary of Benefit Provisions in the Assumptions and Methods section of this report). Projected benefits reflect changes made to the Plan by SB1.
2. The actuarial data used by Buck (see summary in the Assumptions and Methods section of this report).
3. Actuarially assumed rate of return on Plan assets for all projection years: 8.00%.
4. For the fiscal year ending 2014, assumes total contributions equal to expected State, District, Federal, and member contributions. For the fiscal year ending 2015, assumes State contributions of \$3.41 billion, and expected District, Federal, and member contributions. Thereafter, assumes contributions are determined as of each valuation date in accordance with the policy established by SB1 for the State, plus assumed administrative expenses.
5. Assumes cost of living adjustments as described in SB1.
6. Open group analysis: Level active population. The characteristics of new active participants entering the Plan were the same as the new member profile described in the Actuarial Valuation report as of June 30, 2013, prepared by Buck.
7. Market values shown include expected Pension Stabilization Fund assets as part of SB 1.



## Deterministic Analysis (continued)

### Demographics

Following are the projected number of active and inactive participants at the beginning of each Plan year from 2013 through 2033 (2013 is actual). These projections are based on an open group analysis. Using the actuary's assumptions for death, termination, retirement, and disability, current participants are assumed to leave the Plan in the future. The number of total inactive participants (Retirees and Beneficiaries and Vested Inactive) increases by approximately 176% during the 20-year projection period shown.

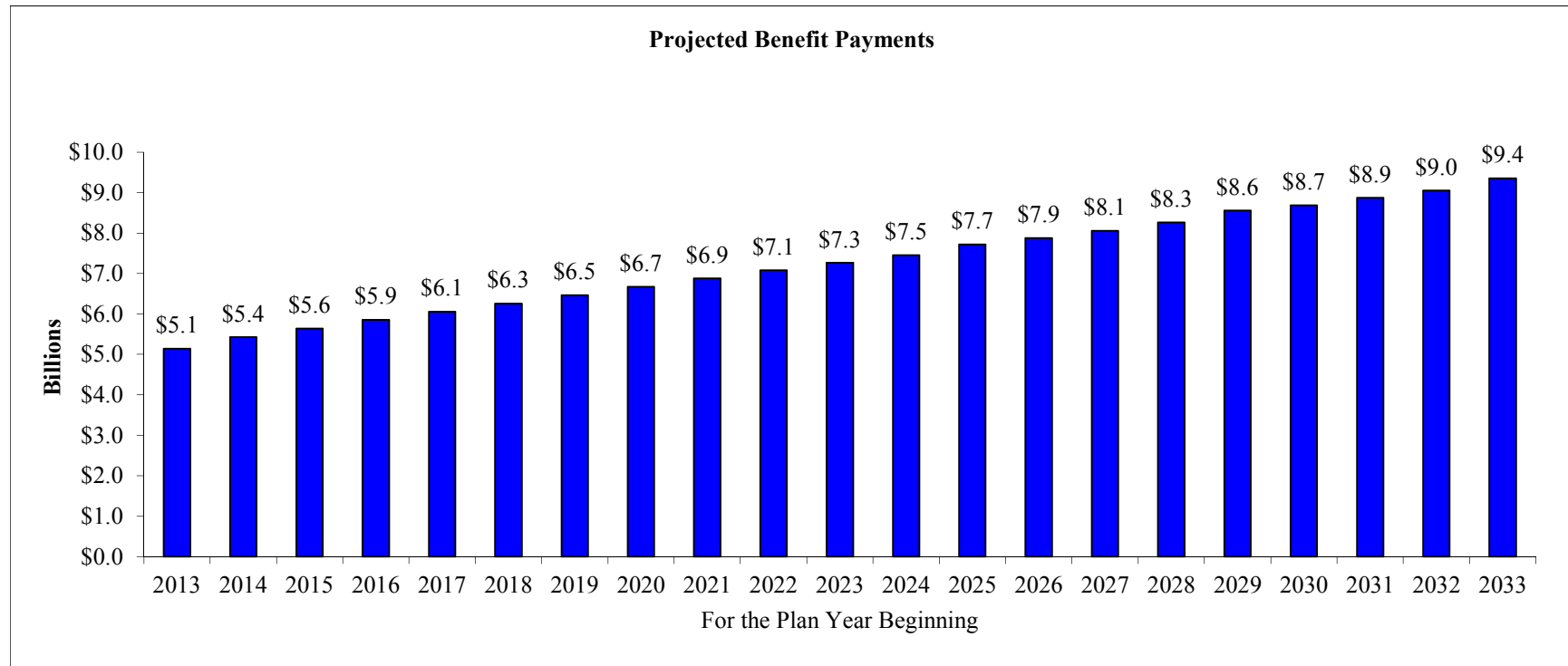


Total Population	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Annual Percent Change	N/A	7.1%	6.2%	5.5%	4.9%	4.3%	3.8%	3.4%	3.1%	2.8%	2.6%	2.4%	2.3%	2.0%	2.0%	2.0%	1.8%	1.5%	1.5%	1.4%	1.3%

## Deterministic Analysis (continued)

### Benefit Payments

The Plan's projected annual benefit payments are shown in the chart below. The projected benefit payments are expected to increase by 82% over the next 20 years. As a percentage of the market value of Plan assets, benefit payments are expected to gradually decrease through the end of the projection period (see next page).

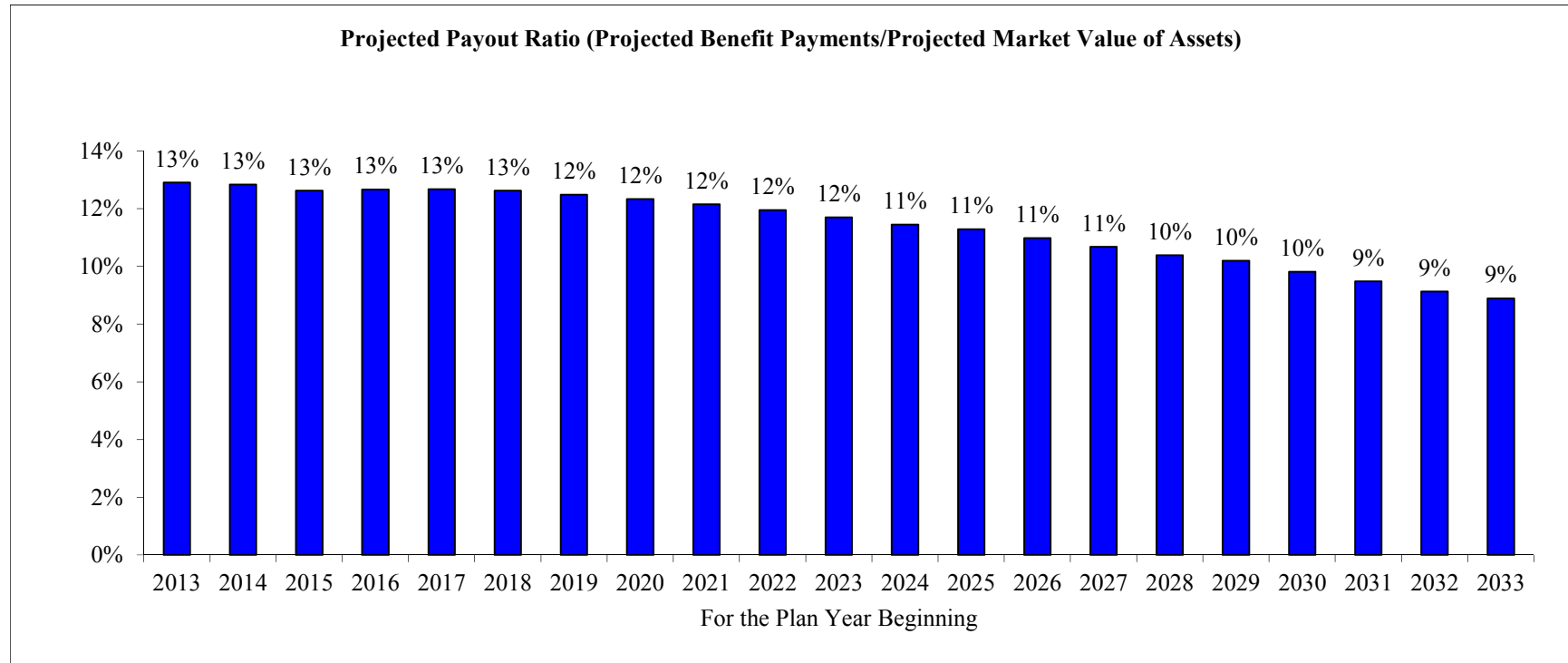


	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Annual Percent Change	N/A	5.6%	4.0%	3.7%	3.5%	3.3%	3.3%	3.2%	3.0%	2.9%	2.6%	2.6%	3.5%	2.1%	2.3%	2.6%	3.6%	1.5%	2.2%	2.0%	3.4%

## Deterministic Analysis (continued)

### Payout Ratio (benefit payments/market value of assets)

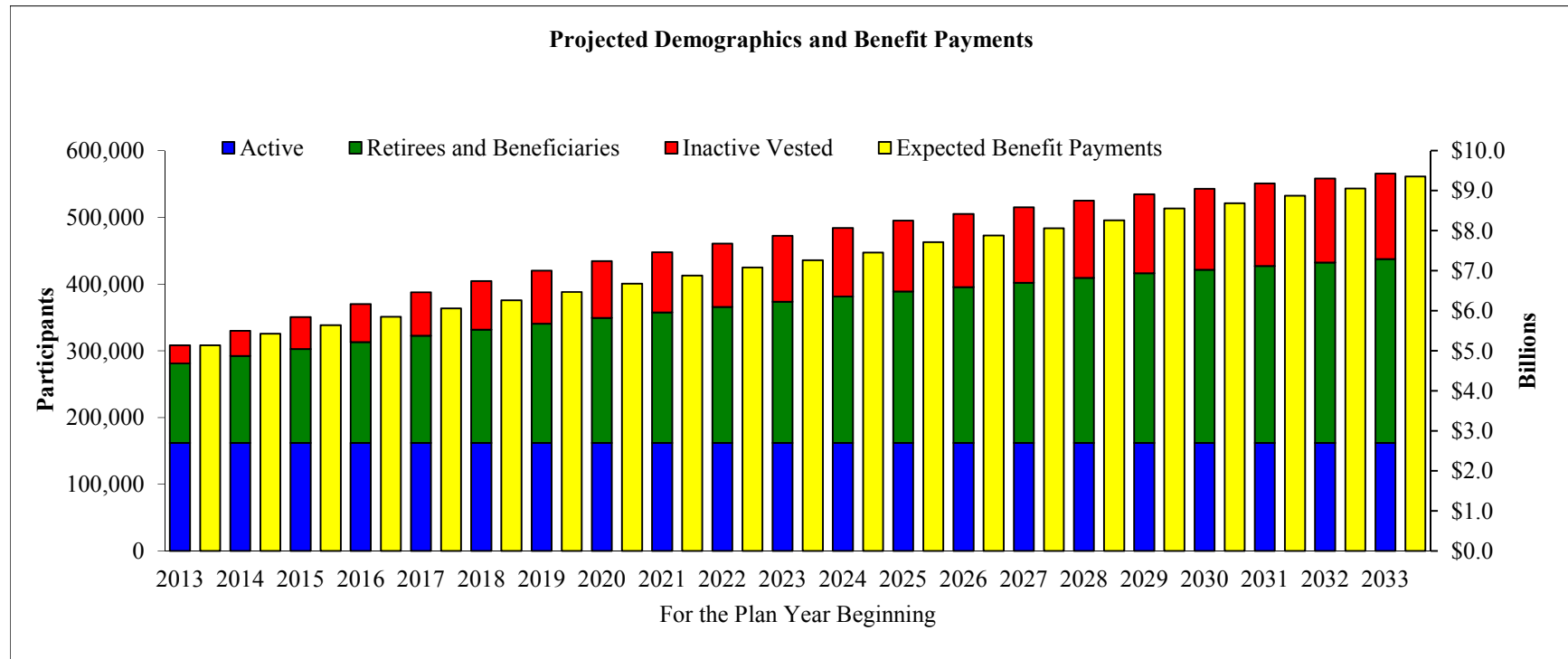
The Plan's projected payout ratios are shown in the chart below. The payout ratios are expected to gradually decrease through the end of the projection period. The results assume the current contribution policy remains unchanged (including Pension Stabilization Fund contributions) and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years.



## Deterministic Analysis (continued)

### Demographics and Benefit Payments

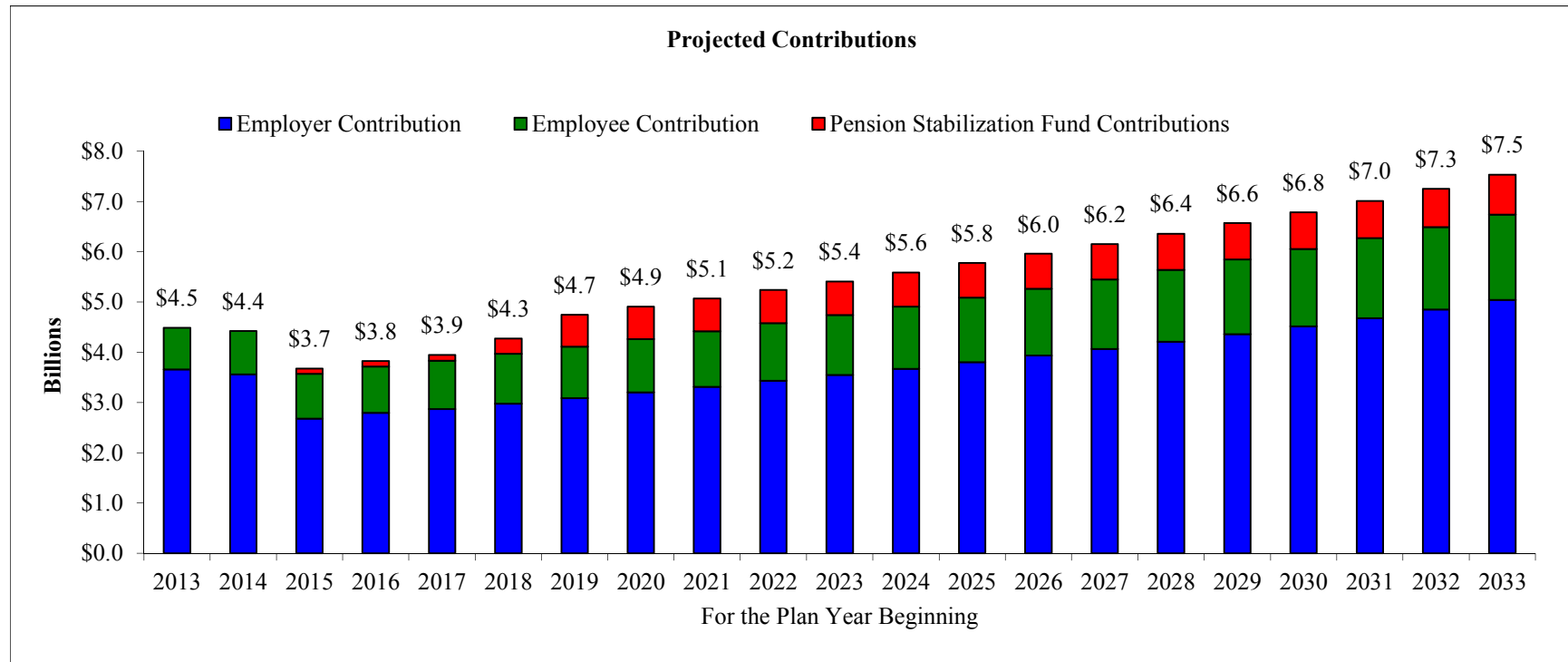
The chart below highlights the demographic and benefit payment projections shown on the prior pages, illustrating the comparison between the projected number of active and inactive participants and the projected benefit payments through the Plan year beginning 2033.



## Deterministic Analysis (continued)

### Contributions

The Plan's projected contributions, expressed as total dollar contributions, are shown in the chart below. The results assume the contribution policy under SB1 remains unchanged, and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years.

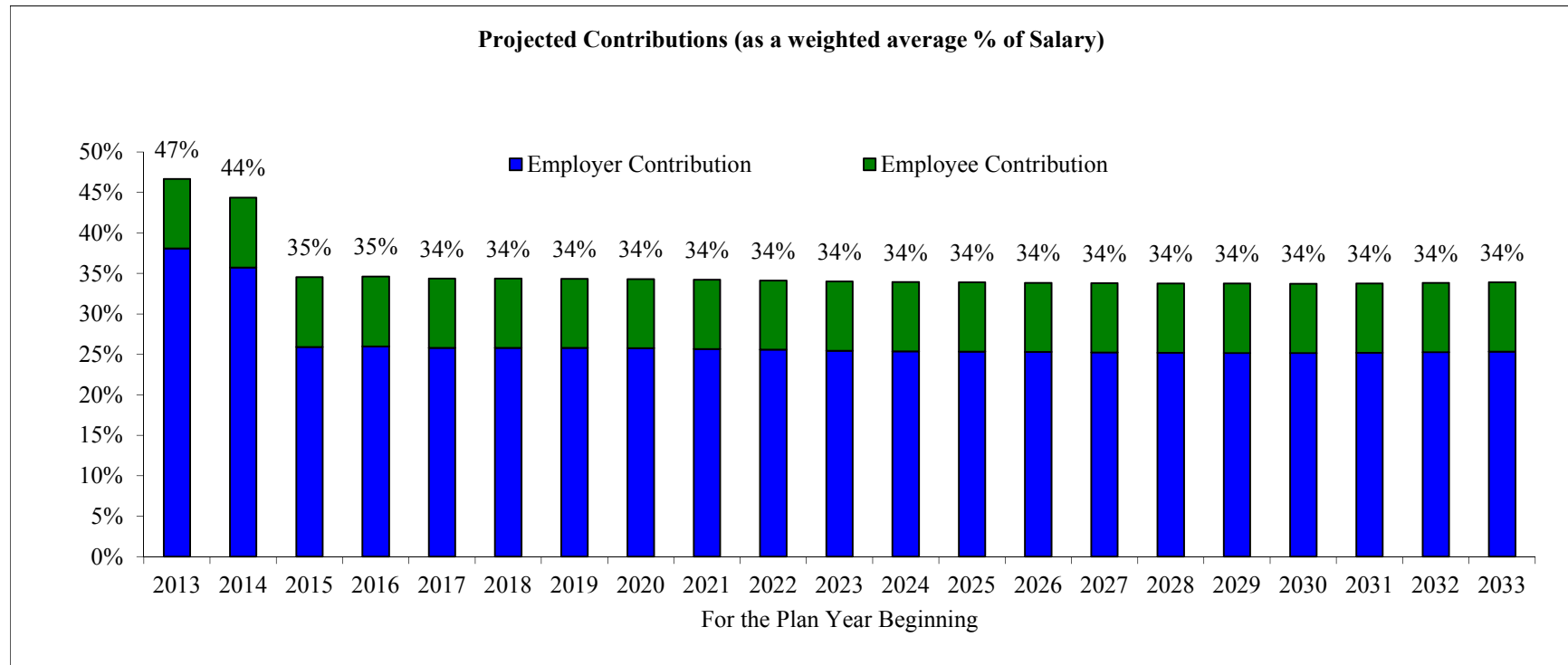


	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Annual Percent Change	N/A	5.6%	4.0%	3.7%	3.5%	3.3%	3.3%	3.2%	3.0%	2.9%	2.6%	2.6%	3.5%	2.1%	2.3%	2.6%	3.6%	1.5%	2.2%	2.0%	3.4%

## Deterministic Analysis (continued)

### Contributions

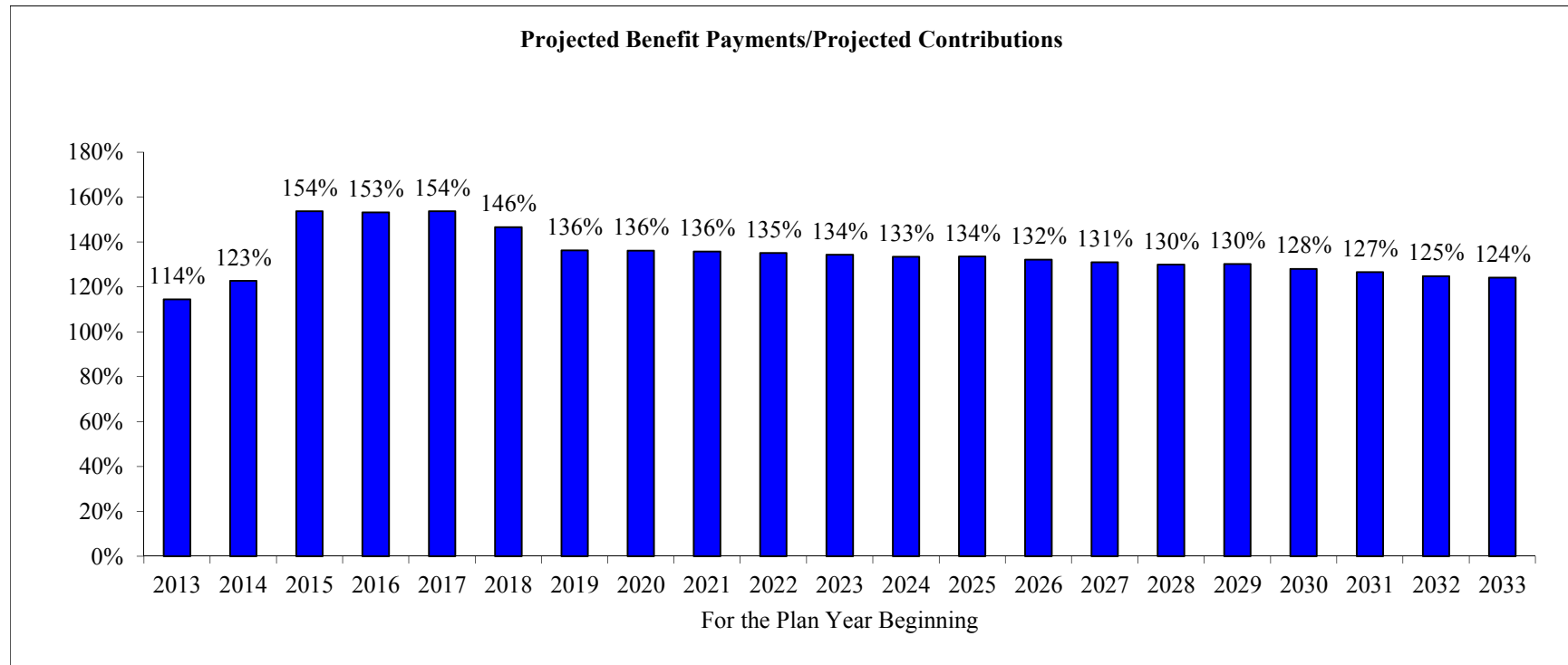
The Plan's projected contributions, expressed as a weighted average percentage of salary, are shown in the chart below. The results assume the contribution policy under SB1 remains unchanged, and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years.



## Deterministic Analysis (continued)

### Benefit Payments/Contributions

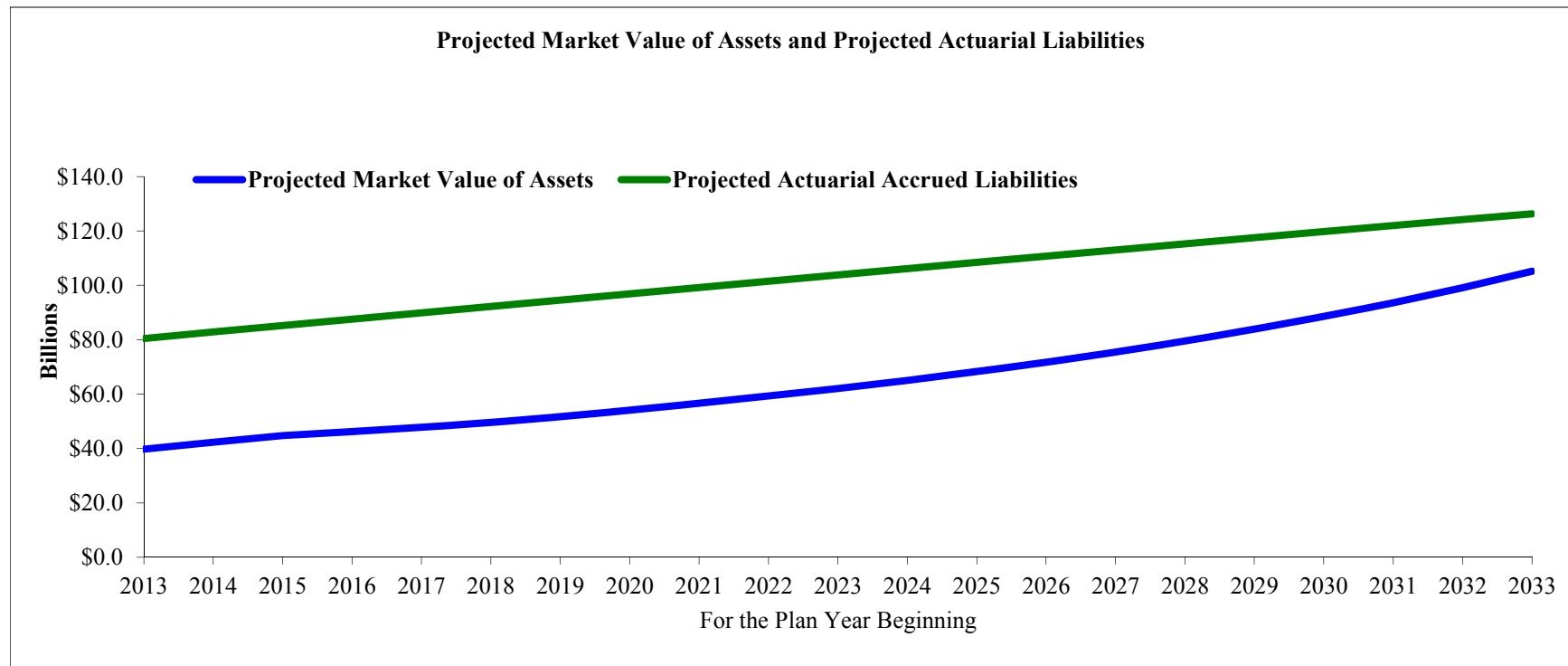
The Plan's projected benefit payments divided by projected contributions are shown in the chart below. The results assume the contribution policy under SB1 remains unchanged, and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years.



## Deterministic Analysis (continued)

### Actuarial Accrued Liabilities and Market Value of Assets

The Plan's projected actuarial accrued liabilities and market value of assets are shown in the chart below. The results assume the contribution policy under SB1 remains unchanged, and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years. Projected assets include accumulations under the Pension Stabilization Fund. The relative disparity between the market value of assets and Plan liabilities is expected to decrease by 48% through the end of the projection period. The funded ratio (based on market value of assets) is expected to increase to approximately 83% by the end of the projection period. This is shown more clearly on the following pages.

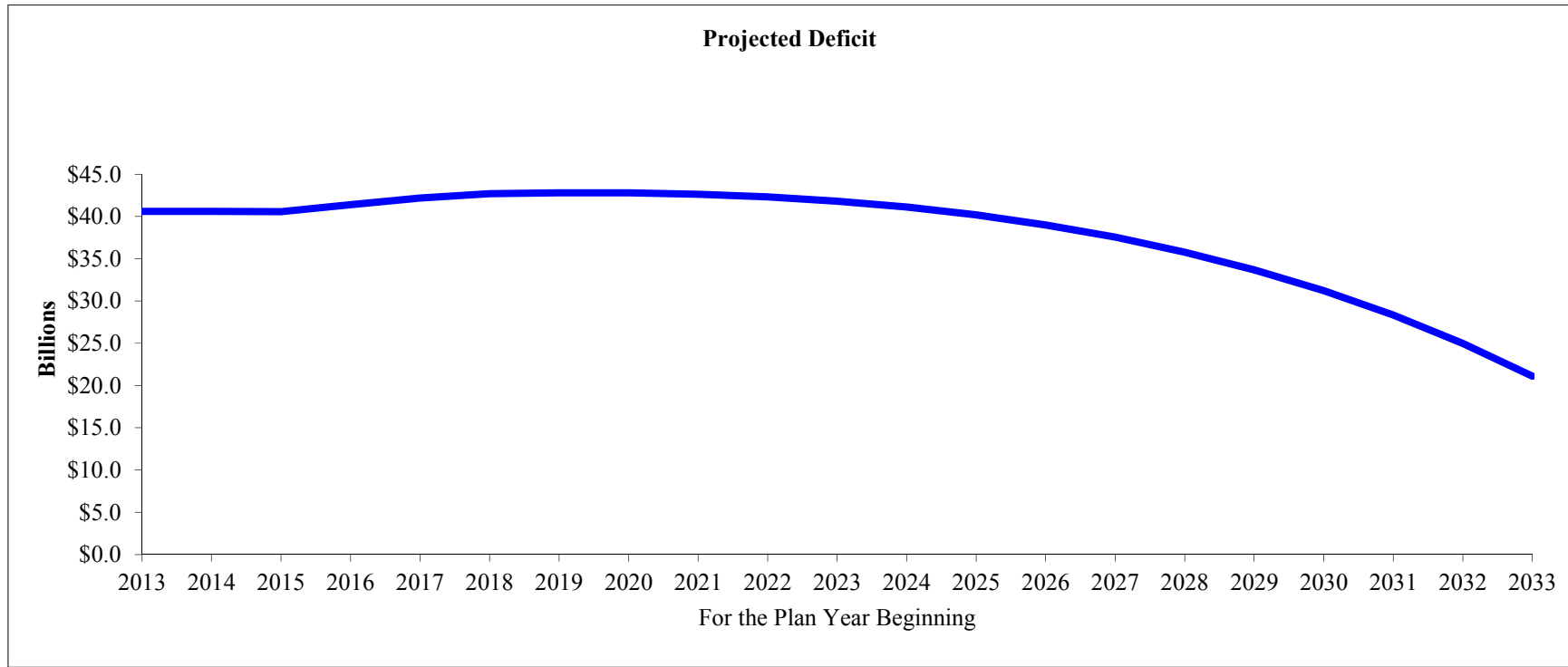




## Deterministic Analysis (continued)

### Deficit (market value of assets – actuarial accrued liabilities)

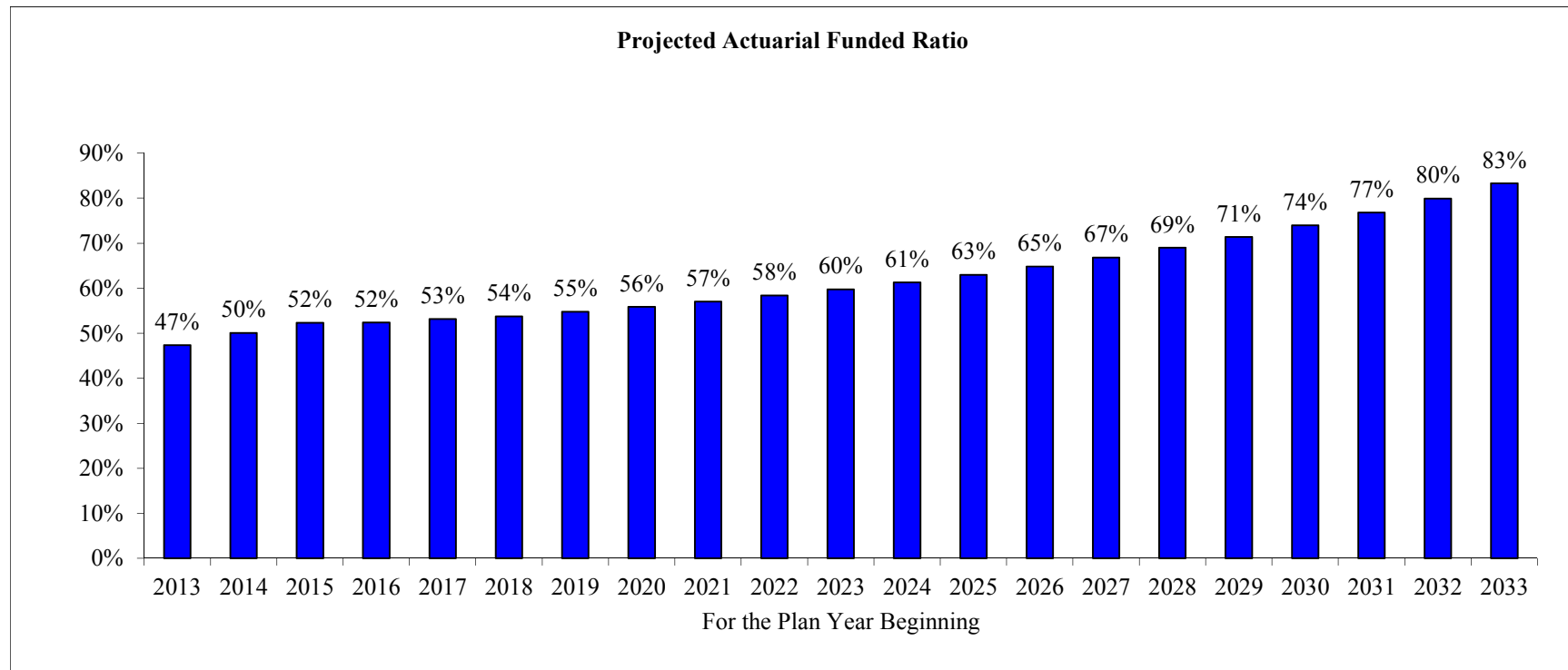
The Plan's projected deficit of assets is shown in the chart below. The results assume the contribution policy under SB1 remains unchanged, and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years. Projected assets include accumulations under the Pension Stabilization Fund. The disparity between the market value of assets and Plan liabilities is expected to decrease by the end of the projection period by 48%.



## Deterministic Analysis (continued)

### Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability)

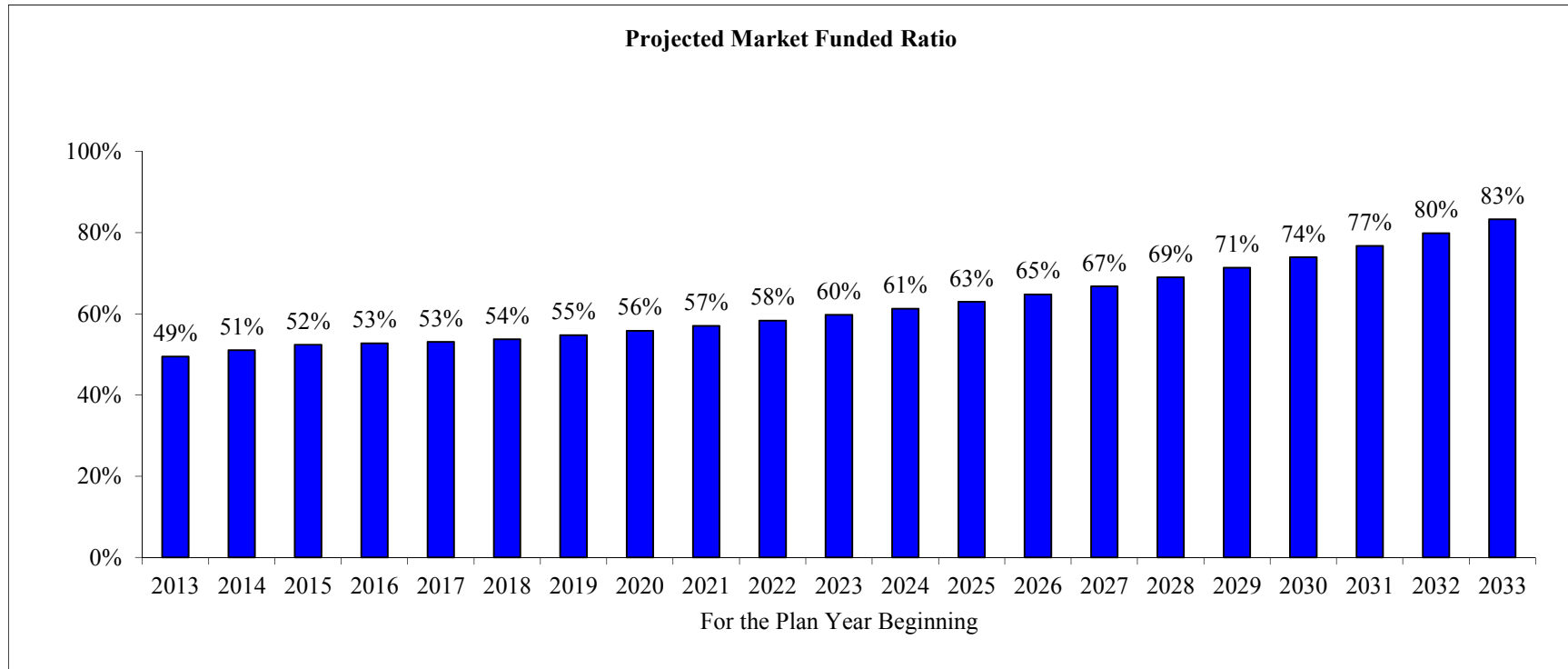
The Plan's projected actuarial funded ratio is shown in the chart below. The Plan is expected to end the projection period at approximately 83% funded. The results assume the contribution policy under SB1 remains unchanged, and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years. Projected assets include accumulations under the Pension Stabilization Fund.



## Deterministic Analysis (continued)

### Market Funded Ratio (market value of assets/actuarial accrued liability)

The Plan's projected market funded ratio is shown in the chart below. The Plan is expected to end the projection period at approximately 83% funded. The results assume the contribution policy under SB1 remains unchanged, and that the Plan's assets return precisely the actuarially assumed rate each year without exception for all projection years. Projected assets include accumulations under the Pension Stabilization Fund.



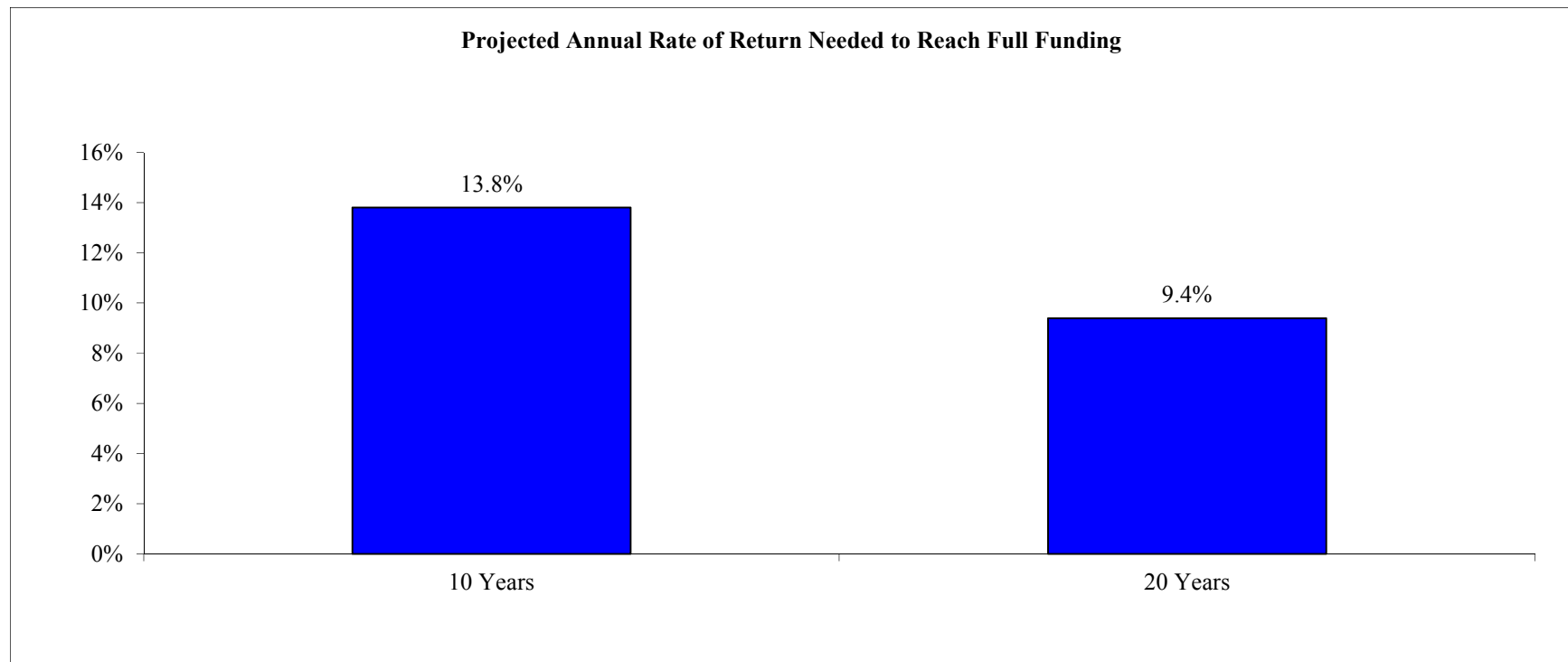
## Deterministic Scenario Analysis

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### Full Funding Implied Returns

The figure below shows the projected investment return for the total fund needed to bring the Plan to 100% funding (on a market value basis) in 10 and 20 years, respectively. The results assume all other actuarial assumptions (including Pension Stabilization Fund contributions) are precisely met over the time periods shown and that these returns are earned for every year, without variance.

Actuarially assumed rate of return – **8.00%**



## Deterministic Scenario Analysis (continued)

### Sensitivity Analysis – Decreased Return

Under the deterministic analysis presented in the preceding pages, the Plan is projected to have a market funded ratio of 83% in 20 years. The table below summarizes the projected funded ratio and other key statistics in 2033 assuming the Plan experiences an annualized investment return of 100 basis points lower (7.00%) than the current actuarially assumed rate of return (8.00%). The values assume all other actuarial assumptions (including Pension Stabilization Fund contributions) are exactly met. The original values are also presented in the table for comparison.

	Value in 2033			
	Actuarially Assumed Rate of Return	Reduced Return (100 bps)	Impact of Reduced Return Assumption	
Projected Payout Ratio	9%	10%	1%	▲
Projected Employer Contributions (billions)	\$5	\$6	\$1	▲
Projected Benefit Payments/Projected Total Contributions	124%	107%	-17%	▼
Projected Actuarial Accrued Liabilities (billions)	\$126	\$126	\$0	▲
Projected Market Value of Assets (billions)	\$105	\$93	(\$13)	▼
Projected Deficit (billions)	\$21	\$34	\$13	▲
Projected Market Funded Ratio	83%	73%	-10%	▼
	20 Year Cumulative Total			
Projected Cumulative Employer Contributions (billions)	\$78	\$87	\$8	▲

Values in impact column may not be additive to due rounding.

## Deterministic Scenario Analysis (continued)

### Sensitivity Analysis – Excluding Pension Stabilization Fund Contributions

Under the deterministic analysis presented in the preceding pages, the Plan is projected to have a funded ratio of 86% in 20 years. The table below summarizes the projected funded ratio and other key statistics in 2033 excluding Pension Stabilization fund contributions. The values assume all other actuarial assumptions are exactly met. The original values are also presented in the table for comparison.

	Value in 2033			
	Including Pension Stabilization Fund Contributions	Excluding Pension Stabilization Fund Contributions	Impact of Excluding Pension Stabilization Contributions	
Projected Payout Ratio	9%	11%	2%	▲
Projected Employer Contributions (billions)	\$5	\$5	\$0	↔
Projected Benefit Payments/Projected Total Contributions	124%	139%	15%	▲
Projected Actuarial Accrued Liabilities (billions)	\$126	\$126	\$0	↔
Projected Market Value of Assets (billions)	\$105	\$84	(\$22)	▼
Projected Deficit (billions)	\$21	\$43	\$22	▲
Projected Market Funded Ratio	83%	66%	-17%	▼
	20 Year Cumulative Total			
Projected Cumulative Employer Contributions (billions)	\$78	\$78	\$0	↔

Values in impact column may not be additive to due rounding.

## Stochastic Analysis

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In the previous section of this report, we assumed the Plan operated going forward with certain knowledge of the future investment returns earned by the Plan's assets. This section introduces the element of uncertainty in those future investment returns. This part of the analysis examines Plan assets and liabilities under many capital market environments based on expected future asset returns and inflation, and their expected volatility. Using a Monte Carlo simulation technique, both assets and liabilities are assumed to vary stochastically, linked together by changes in inflation.

Using the current expected values and variances of the returns and inflation, along with their correlations, 2,000 trials are generated to produce a distribution of results. A stochastic analysis can answer questions about the best/worst case outcomes along with the probability of such outcomes. This is contrasted with the deterministic analysis that provides an expected value if all current Plan assumptions are exactly met.

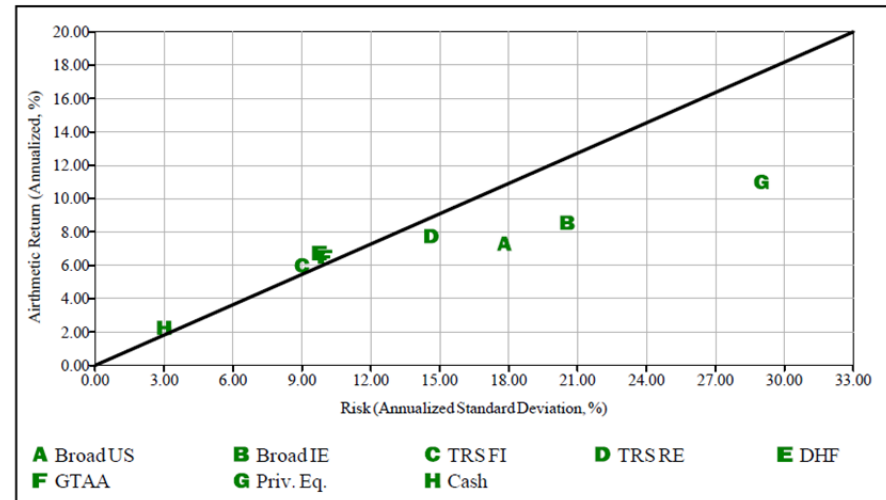
Unless otherwise state all values include projected Pension Stabilization Fund contributions as mandated under SB 1.

## Stochastic Analysis (continued)

### Long-Term Return and Risk Assumptions

In order to perform a stochastic analysis and create asset allocation alternatives, it is necessary to estimate, for each asset class, its probable return and risk. The expected returns are our best estimates of the average annual percentage increases in values of each asset class over a prospective long period of time, and assumed to be normally distributed. The risk of an asset class is measured by its standard deviation, or volatility. If asset returns are normally distributed, two-thirds (67%) of all returns are expected to lie within one standard deviation on either side of the mean. For example, we expect Broad US Equity to return, annually on average, 7.30% with a standard deviation of 17.80%, meaning that two-thirds of the time we expect its return to lie between -10.50% (= 7.30 – 17.80) and 25.10% (= 7.30 + 17.80). Moreover, we expect 95% of all return outcomes to lie within two standard deviations of the mean return, implying only a one-in-twenty chance that the return on Broad US Equity will either fall below -28.30% or rise above 42.90%. The risk and return assumptions used in this study are outlined in the below table and chart:

Asset Class	Arithmetic Return Assumption	Standard Deviation Assumption
Broad US Equity	7.30	17.80
Broad International Equity	8.55	20.55
TRS Fixed Income	6.00	9.00
TRS Real Estate	7.75	14.64
Diversified Hedge Funds	6.75	9.75
GTAA	6.50	10.00
Private Equity	11.00	29.00
Cash Equivalents	2.25	3.00





## Stochastic Analysis (continued)

### Correlation Between Asset Classes

Creating a diversified portfolio of asset classes enables the investor to achieve a high rate of return while minimizing volatility of the portfolio. As defined on the previous page, volatility is “risk” or standard deviation. By minimizing the volatility of a portfolio, we produce asset returns that vary less from year to year. Diversification exists because the returns of different asset classes do not always move in the same direction, at the same time, or with the same magnitude. Correlation values are between 1.00 and –1.00. If returns of two asset classes rise or fall at the same time and in the same magnitude, they have a correlation value of 1.00. Conversely, two asset classes that simultaneously move in opposite directions, and in the same magnitude, have a correlation value of –1.00. A correlation of zero indicates no relationship between returns. The assumed correlations are largely based on historical index data, with some qualitative analysis applied. For instance, where appropriate, we have weighted current history more heavily. The correlation matrix used in this study is shown below:

	Broad US Equity	Broad International Equity	TRS Fixed Income	TRS Real Estate	Diversified Hedge Funds	GTAA	Private Equity	Cash Equivalents
Broad US Equity	1.00	0.84	0.47	0.24	0.51	0.85	0.71	0.04
Broad International Equity	0.84	1.00	0.46	0.26	0.70	0.92	0.71	-0.06
TRS Fixed Income	0.47	0.46	1.00	0.35	0.15	0.51	0.46	0.18
TRS Real Estate	0.24	0.26	0.35	1.00	0.25	0.31	0.51	-0.05
Diversified Hedge Funds	0.51	0.70	0.15	0.25	1.00	0.72	0.62	0.22
GTAA	0.85	0.92	0.51	0.31	0.72	1.00	0.72	-0.03
Private Equity	0.71	0.71	0.46	0.51	0.62	0.72	1.00	0.08
Cash Equivalents	0.04	-0.06	0.18	-0.05	0.22	-0.03	0.08	1.00

The fact that the correlations shown in the table are nearly all positive does not imply that these asset classes do not diversify one another. Their correlations are significantly less than 1.00, meaning we expect a measurable number of instances when the underperformance of one or more of the asset classes will be offset by the outperformance of others. This point is demonstrated on the following pages, which illustrate that diversification into less correlated asset classes can decrease the expected overall volatility of a portfolio.

## Stochastic Analysis (continued)

### Efficient Portfolios

Each frontier portfolio (optimal allocation) is created using target rates of return both above and below the projected rate of return for the current allocation. This range illustrates the trade-off between return and risk; additional return can only be achieved by undertaking additional risk. The table below shows the possible optimal allocations given the selected asset classes and their constraints listed under “Min” and “Max.” The table shows the Interim and Long-Term target allocations and highlights two potential targets (Potential Portfolios 1 and 2) for consideration throughout this study. Two illustrative portfolios (Conservative and Aggressive Portfolios) are also shown for demonstrative purposes.

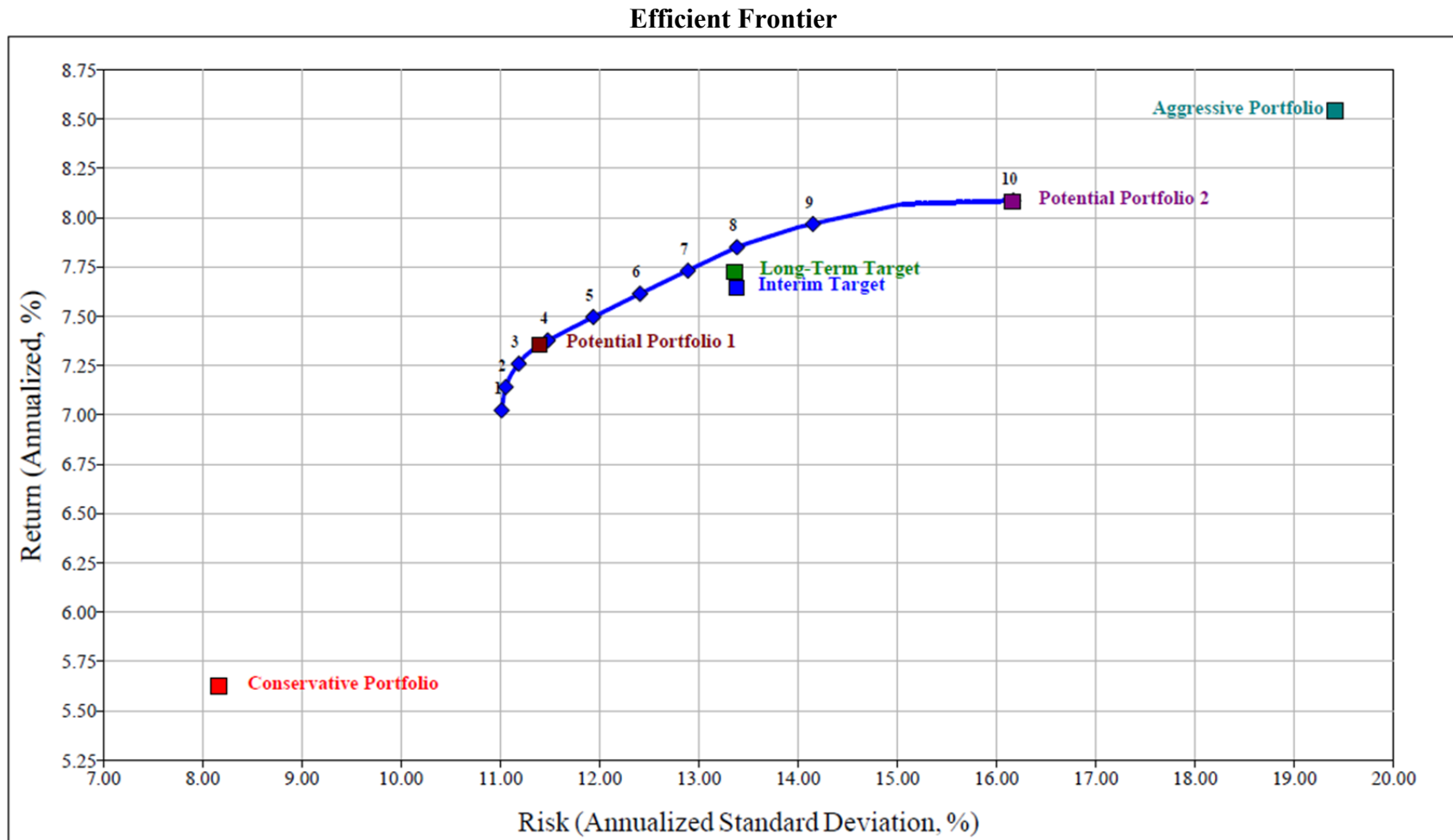
	Min	Max	1	2	3	4	5	6	7	8	9	10	Interim Target	Long-Term Target	Conservative Portfolio	Potential Portfolio 1	Potential Portfolio 2	Aggressive Portfolio
Broad US Equity	15	40	20	20	20	15	15	15	15	15	18	28	23	20	0	15	28	40
Broad International Equity	15	40	15	15	15	20	20	20	20	20	23	33	20	20	0	20	32	40
TRS Fixed Income	10	40	36	28	24	25	22	20	17	15	10	10	16	16	90	25	10	0
TRS Real Estate	5	15	5	11	15	15	15	15	15	15	15	5	13	14	0	15	5	0
Diversified Hedge Funds	5	15	12	14	15	15	15	15	15	15	14	5	6	8	0	15	5	0
GTAA	5	15	5	5	5	5	5	5	5	5	5	5	10	10	0	5	5	0
Private Equity	5	15	5	5	5	5	8	10	13	15	15	15	11	12	0	5	15	20
Cash Equivalents	0	2	2	2	1	0	0	0	0	0	0	0	1	0	10	0	0	0
<b>Total</b>			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Capital Appreciation			57	56	55	55	57	58	59	60	65	81	64	63	41	55	81	100
Capital Preservation			13	11	9	8	7	6	6	5	3	3	6	5	39	8	3	0
Alpha			20	20	22	22	22	21	21	21	19	11	17	19	6	22	11	0
Inflation			10	13	15	15	15	14	14	14	13	5	12	13	14	15	5	0
<b>Expected Return</b>			7.02	7.14	7.26	7.38	7.50	7.61	7.73	7.85	7.97	8.09	7.64	7.72	5.63	7.36	8.08	8.54
<b>Risk (Standard Deviation)</b>			11.01	11.05	11.18	11.48	11.93	12.40	12.89	13.38	14.15	16.17	13.38	13.36	8.16	11.39	16.15	19.41
Return (Compound)			6.46	6.57	6.68	6.77	6.84	6.90	6.97	7.03	7.05	6.90	6.82	6.90	5.32	6.76	6.89	6.85
Return/Risk Ratio			0.64	0.65	0.65	0.64	0.63	0.61	0.60	0.59	0.56	0.50	0.57	0.58	0.69	0.65	0.50	0.44
RVK Expected Eq Beta (LC USE = 1)			0.56	0.56	0.56	0.56	0.58	0.60	0.62	0.65	0.69	0.83	0.68	0.67	0.24	0.56	0.83	1.01
RVK Liquidity Metric (T-Bills = 100)			65	62	60	59	58	57	55	54	57	69	64	61	61	59	69	75

Broad US Equity and Broad International Equity must equal a minimum of 35% of the portfolio, and Broad International Equity cannot exceed Broad US Equity by more than 5%. ARS and GTAA cannot exceed 25% of the portfolio.

## Stochastic Analysis (continued)

### Efficient Frontier

The risk of each alternative allocation is plotted against the horizontal axis, while the return is measured on the vertical axis. The line connecting the points represents all the optimal portfolios subject to the given constraints and is known as the “efficient frontier.” The upward slope of the efficient frontier indicates the direct relationship between return and risk.



## Stochastic Analysis (continued)

### Asset Mixes

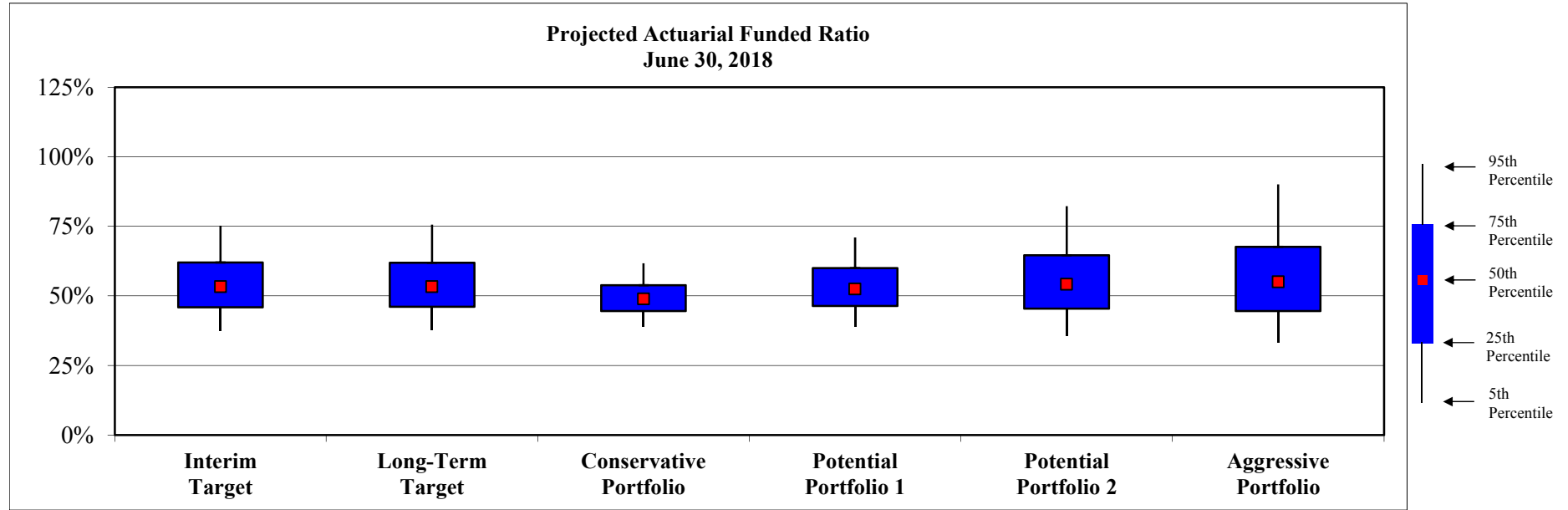
Outlined below are the Interim and Long-Term target allocations and four other mixes to be examined in this stochastic analysis. The expected return, expected risk (as measured by standard deviation), and RVK Liquidity Metric, for each is also shown.

Asset Class	Interim Target	Long-Term Target	Conservative Portfolio	Potential Portfolio 1	Potential Portfolio 2	Aggressive Portfolio
Broad US Equity	23%	20%	0%	15%	28%	40%
Broad International Equity	20%	20%	0%	20%	32%	40%
TRS Fixed Income	16%	16%	90%	25%	10%	0%
TRS Real Estate	13%	14%	0%	15%	5%	0%
Diversified Hedge Funds	6%	8%	0%	15%	5%	0%
GTAA	10%	10%	0%	5%	5%	0%
Private Equity	11%	12%	0%	5%	15%	20%
Cash Equivalents	1%	0%	10%	0%	0%	0%
<b>Total Equity</b>	<b>54%</b>	<b>52%</b>	<b>0%</b>	<b>40%</b>	<b>75%</b>	<b>100%</b>
<b>Total Alternatives</b>	<b>27%</b>	<b>30%</b>	<b>0%</b>	<b>25%</b>	<b>25%</b>	<b>20%</b>
<b>Expected Return</b>	<b>7.64%</b>	<b>7.72%</b>	<b>5.63%</b>	<b>7.36%</b>	<b>8.08%</b>	<b>8.54%</b>
<b>Expected Risk</b>	<b>13.38%</b>	<b>13.36%</b>	<b>8.16%</b>	<b>11.39%</b>	<b>16.15%</b>	<b>19.41%</b>
<b>RVK Liquidity Metric</b>	<b>64</b>	<b>61</b>	<b>61</b>	<b>59</b>	<b>69</b>	<b>75</b>

## Stochastic Analysis (continued)

### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 5 Years

The graph below shows the distribution of possible actuarial funded ratios five years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



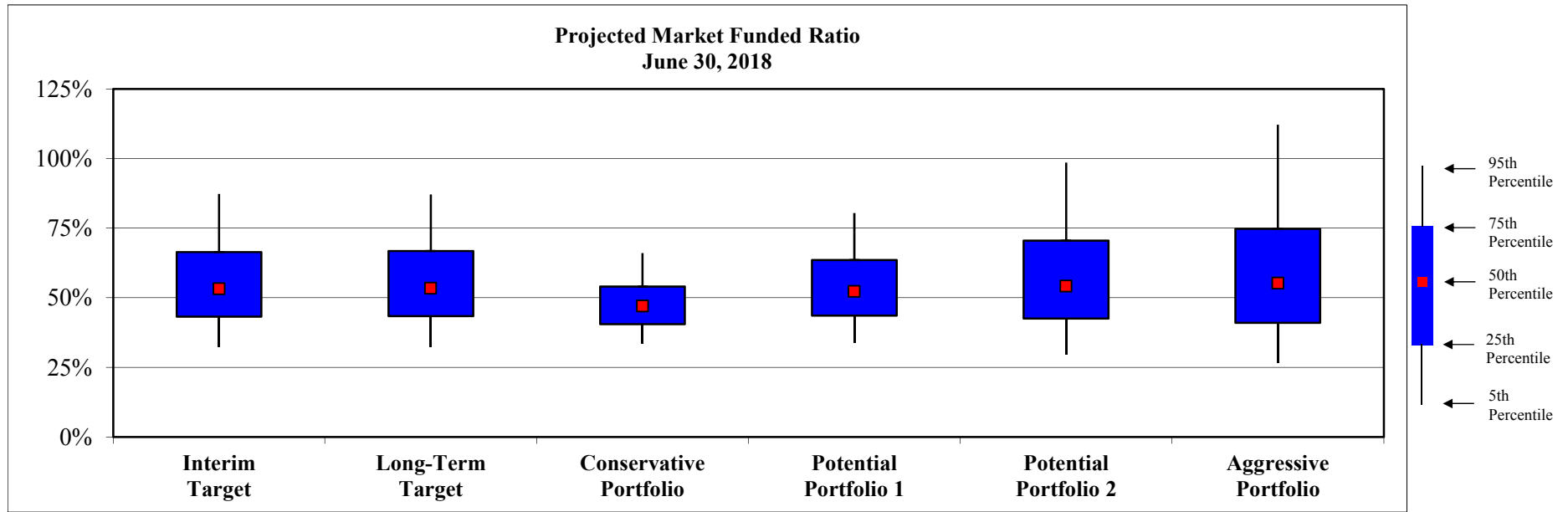
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$58	37%	\$58	38%	\$56	39%	\$56	39%	\$59	36%	\$61	33%
25th Percentile	\$50	46%	\$50	46%	\$51	45%	\$50	46%	\$51	45%	\$52	45%
50th Percentile	\$44	53%	\$43	53%	\$47	49%	\$44	52%	\$43	54%	\$42	55%
75th Percentile	\$36	62%	\$36	62%	\$43	54%	\$37	60%	\$33	65%	\$30	68%
95th Percentile	\$23	75%	\$23	76%	\$36	62%	\$27	71%	\$17	82%	\$9	90%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Stochastic Analysis (continued)

### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 5 Years

The graph below shows the distribution of possible market funded ratios five years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



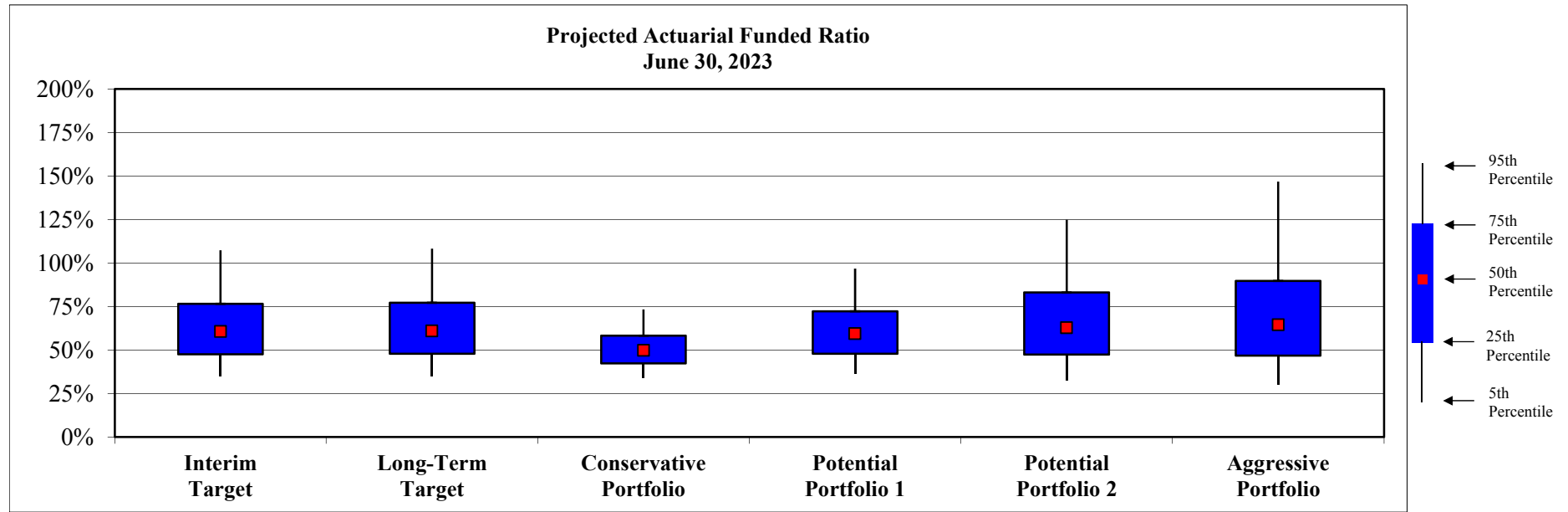
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$63	32%	\$62	32%	\$61	33%	\$61	34%	\$65	30%	\$68	27%
25th Percentile	\$53	43%	\$52	43%	\$55	41%	\$52	44%	\$53	42%	\$54	41%
50th Percentile	\$43	53%	\$43	53%	\$49	47%	\$44	52%	\$42	54%	\$41	55%
75th Percentile	\$31	66%	\$31	67%	\$43	54%	\$34	63%	\$28	71%	\$24	75%
95th Percentile	\$12	87%	\$12	87%	\$33	66%	\$19	80%	\$1	98%	(\$11)	112%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Stochastic Analysis (continued)

### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 10 Years

The graph below shows the distribution of possible actuarial funded ratios ten years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



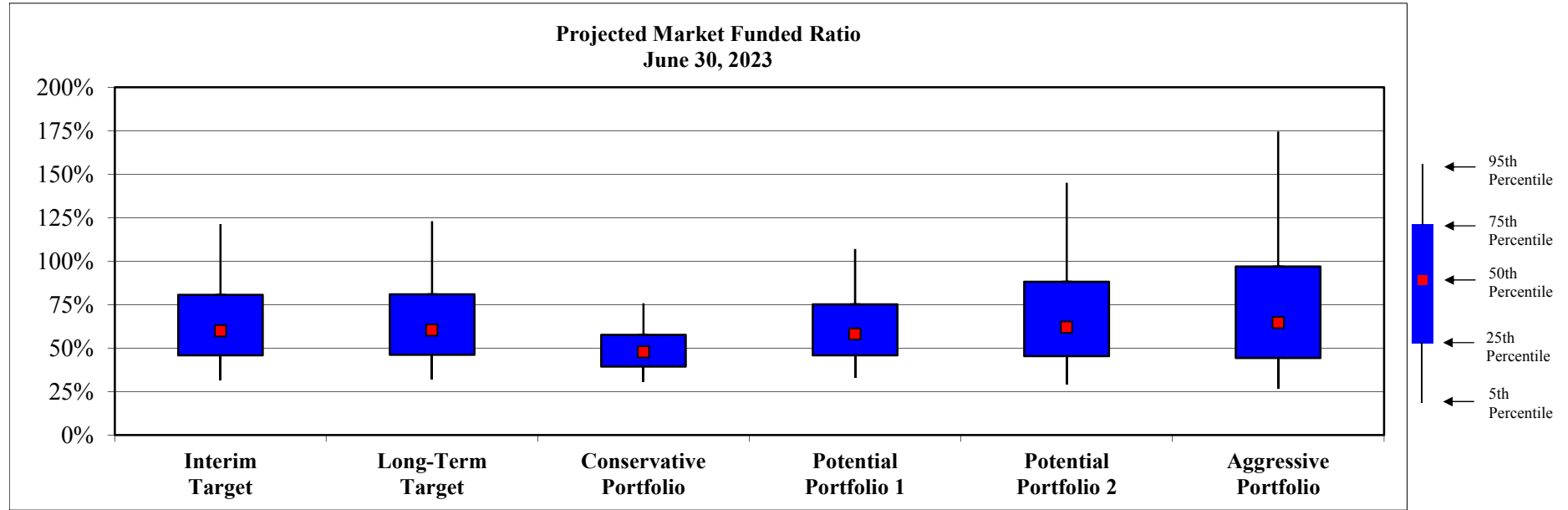
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$67	35%	\$66	35%	\$67	34%	\$65	36%	\$69	33%	\$72	30%
25th Percentile	\$54	47%	\$53	48%	\$59	42%	\$54	48%	\$54	47%	\$55	47%
50th Percentile	\$41	61%	\$41	61%	\$52	50%	\$43	59%	\$39	63%	\$37	64%
75th Percentile	\$25	77%	\$24	77%	\$44	58%	\$29	72%	\$18	83%	\$11	90%
95th Percentile	(\$8)	107%	(\$10)	108%	\$29	73%	\$4	97%	(\$26)	125%	(\$50)	147%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Stochastic Analysis (continued)

### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 10 Years

The graph below shows the distribution of possible market funded ratios ten years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$70	32%	\$69	32%	\$70	31%	\$68	33%	\$72	29%	\$75	27%
25th Percentile	\$56	46%	\$55	46%	\$62	39%	\$55	46%	\$56	45%	\$58	44%
50th Percentile	\$42	60%	\$41	60%	\$55	48%	\$44	58%	\$39	62%	\$37	65%
75th Percentile	\$21	81%	\$20	81%	\$45	58%	\$27	75%	\$12	88%	\$3	97%
95th Percentile	(\$23)	121%	(\$25)	123%	\$27	76%	(\$7)	107%	(\$48)	145%	(\$79)	174%

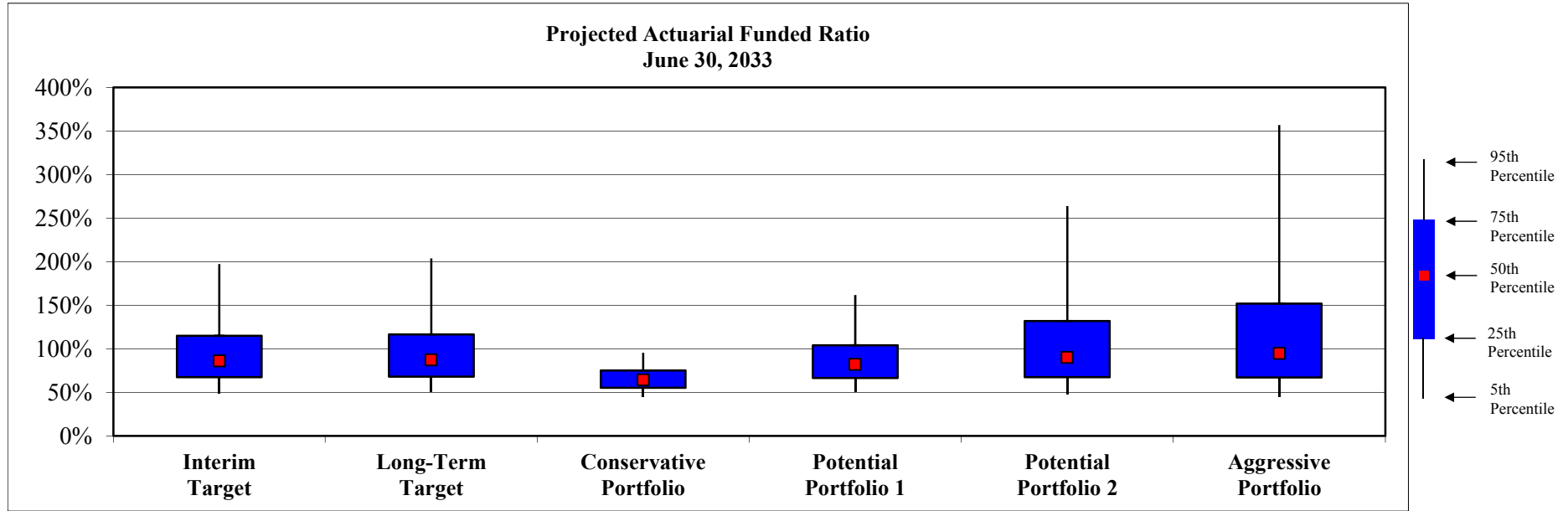
Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.



## Stochastic Analysis (continued)

### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 20 Years

The graph below shows the distribution of possible actuarial funded ratios twenty years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



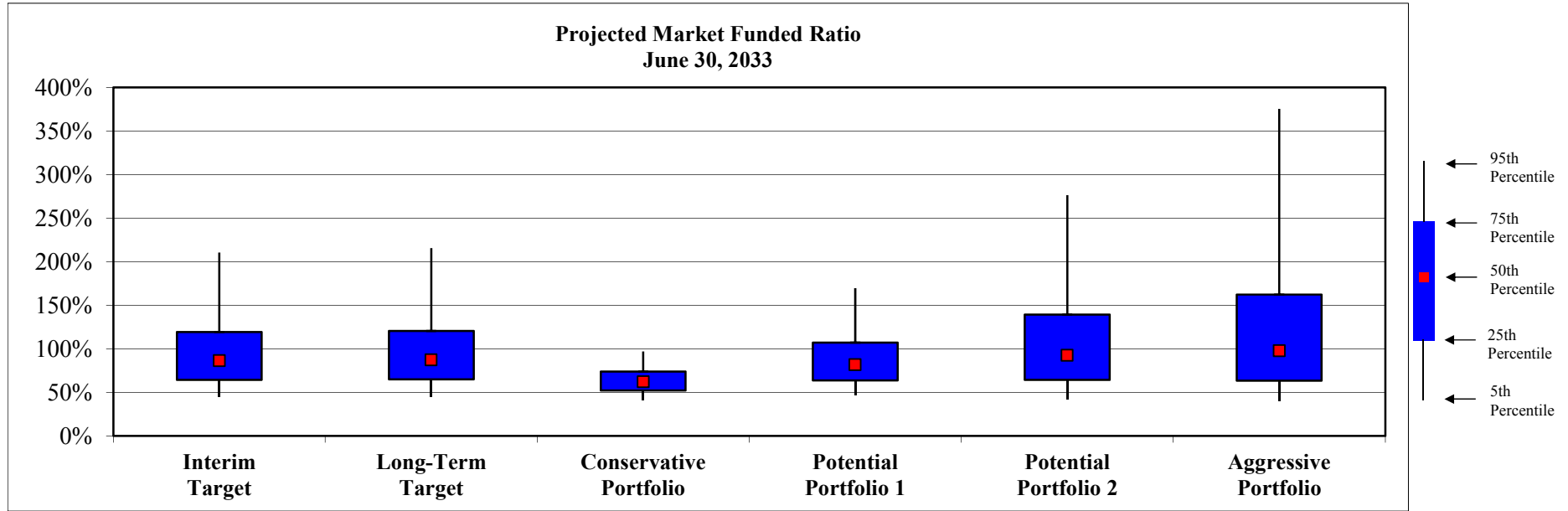
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$63	49%	\$62	50%	\$66	45%	\$60	51%	\$65	47%	\$69	44%
25th Percentile	\$41	67%	\$40	68%	\$56	55%	\$42	67%	\$41	67%	\$41	67%
50th Percentile	\$18	86%	\$17	87%	\$46	64%	\$22	82%	\$13	90%	\$7	95%
75th Percentile	(\$19)	115%	(\$21)	116%	\$33	75%	(\$5)	104%	(\$40)	132%	(\$68)	152%
95th Percentile	(\$136)	197%	(\$144)	203%	\$7	95%	(\$86)	162%	(\$225)	264%	(\$349)	357%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Stochastic Analysis (continued)

### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 20 Years

The graph below shows the distribution of possible market funded ratios twenty years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$67	44%	\$67	45%	\$71	41%	\$65	47%	\$70	42%	\$75	39%
25th Percentile	\$45	64%	\$44	65%	\$59	52%	\$45	64%	\$44	64%	\$46	63%
50th Percentile	\$18	86%	\$16	87%	\$48	62%	\$23	82%	\$10	92%	\$3	98%
75th Percentile	(\$26)	119%	(\$27)	120%	\$34	74%	(\$9)	107%	(\$51)	139%	(\$82)	162%
95th Percentile	(\$153)	210%	(\$160)	216%	\$4	97%	(\$95)	170%	(\$246)	276%	(\$360)	375%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Stochastic Analysis (continued)

### Projected Market Funded Ratio and Maximum 1 Year Investment Loss (market value of assets/actuarial accrued liability)

The tables below show the probability that the Plan will be at various funding levels for each of the six different asset mixes highlighted on the prior pages. The tables also illustrate the maximum 1 year investment loss each portfolio is expected to experience during the given time period. The results assume the current contribution policy remains unchanged for all projection years. The maximum 1 year employer contribution does not include Pension Stabilization Fund contributions.

5 Years	Probability of Full Funding in 2018	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2018	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	2%	23%	9%	-31%	38%
Long-Term Target	2%	23%	9%	-31%	38%
Conservative Portfolio	0%	32%	7%	-22%	38%
Potential Portfolio 1	1%	22%	7%	-27%	38%
Potential Portfolio 2	4%	25%	12%	-35%	38%
Aggressive Portfolio	8%	27%	15%	-43%	39%

10 Years	Probability of Full Funding in 2023	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2023	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	12%	20%	8%	-36%	44%
Long-Term Target	13%	19%	8%	-35%	44%
Conservative Portfolio	0%	35%	12%	-25%	47%
Potential Portfolio 1	8%	18%	7%	-29%	43%
Potential Portfolio 2	17%	21%	11%	-44%	44%
Aggressive Portfolio	23%	23%	14%	-55%	46%

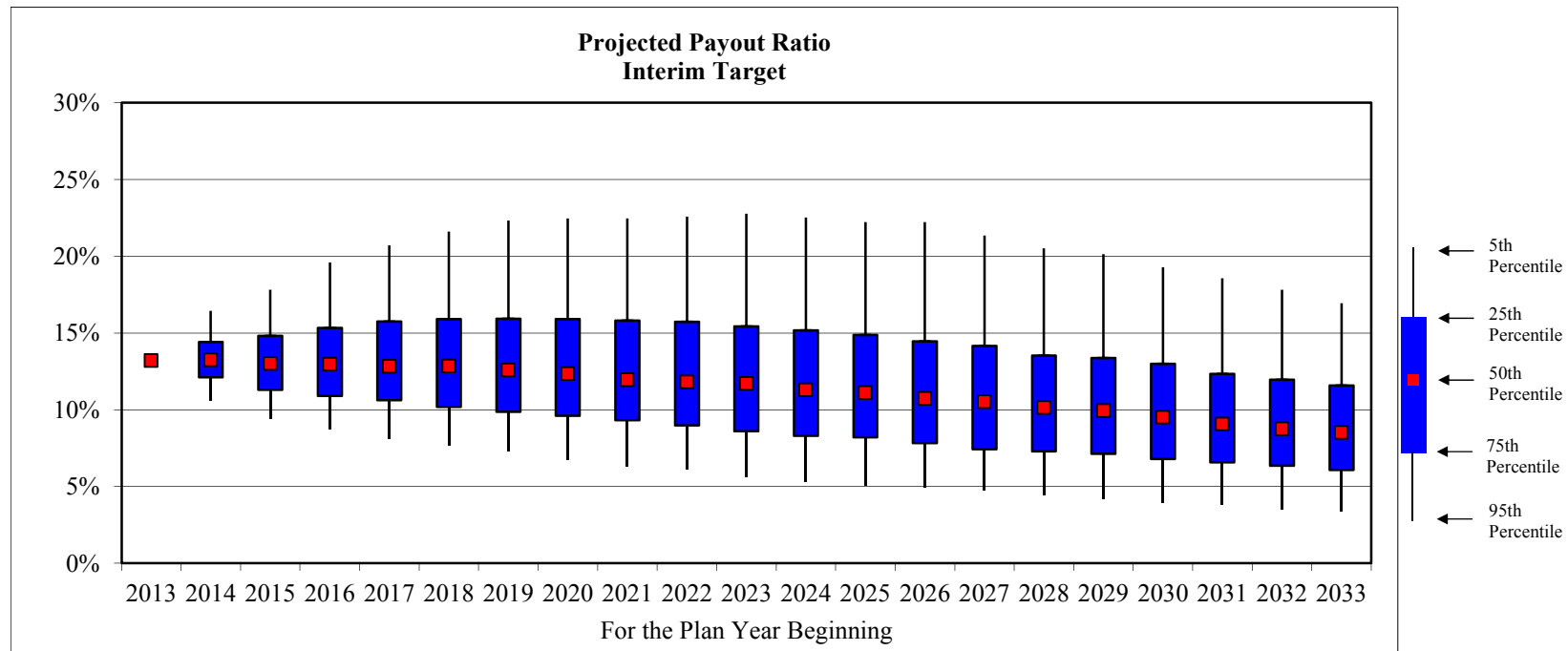
20 Years	Probability of Full Funding in 2033	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2033	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	37%	4%	1%	-43%	57%
Long-Term Target	38%	4%	1%	-43%	56%
Conservative Portfolio	4%	6%	1%	-25%	63%
Potential Portfolio 1	31%	3%	1%	-37%	56%
Potential Portfolio 2	44%	5%	2%	-50%	57%
Aggressive Portfolio	48%	7%	3%	-58%	59%

## Stochastic Analysis (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Interim Target

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Interim Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 9% and 13%. The worst-case scenario could reach 23% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	12%	11%	11%	11%	11%	10%	10%	10%	9%	9%	9%

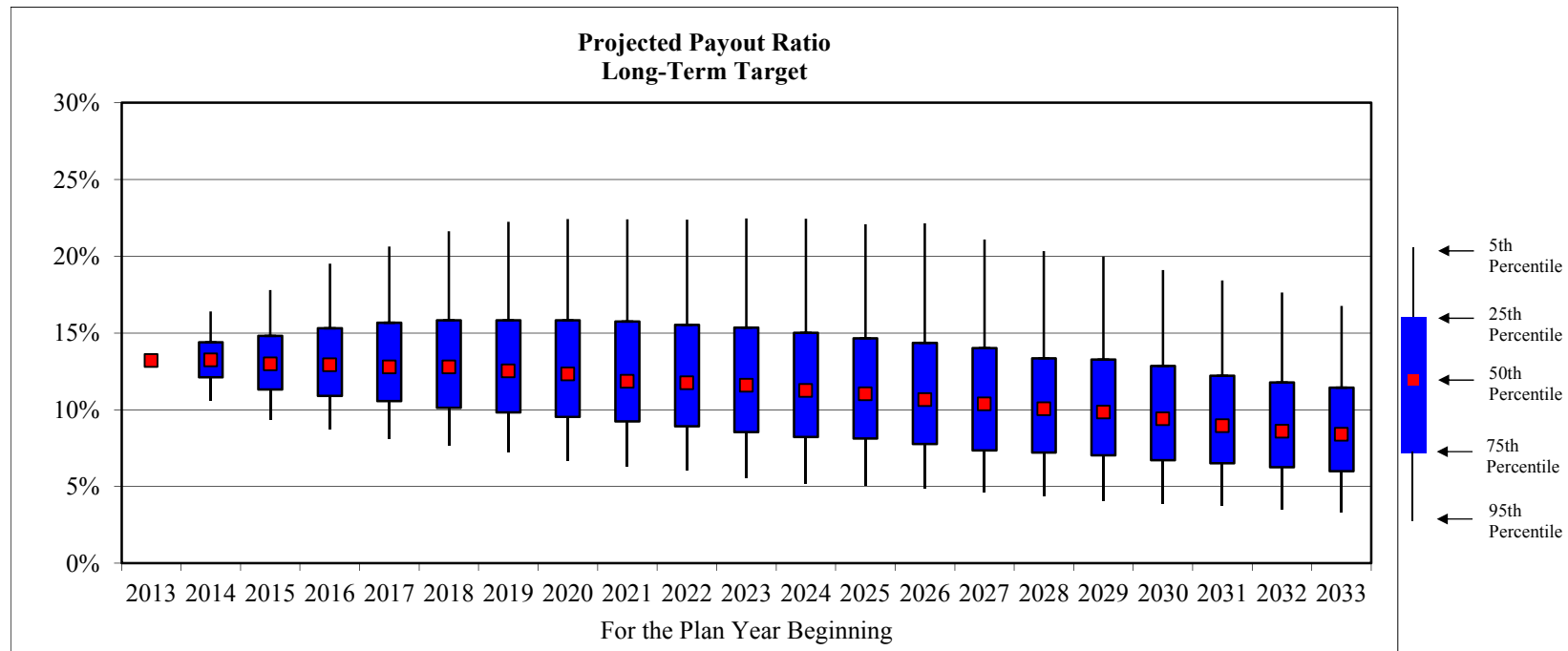
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Stochastic Analysis (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Long-Term Target

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Long-Term Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8% and 13%. The worst-case scenario could reach 22% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	12%	11%	11%	11%	10%	10%	10%	9%	9%	9%	8%

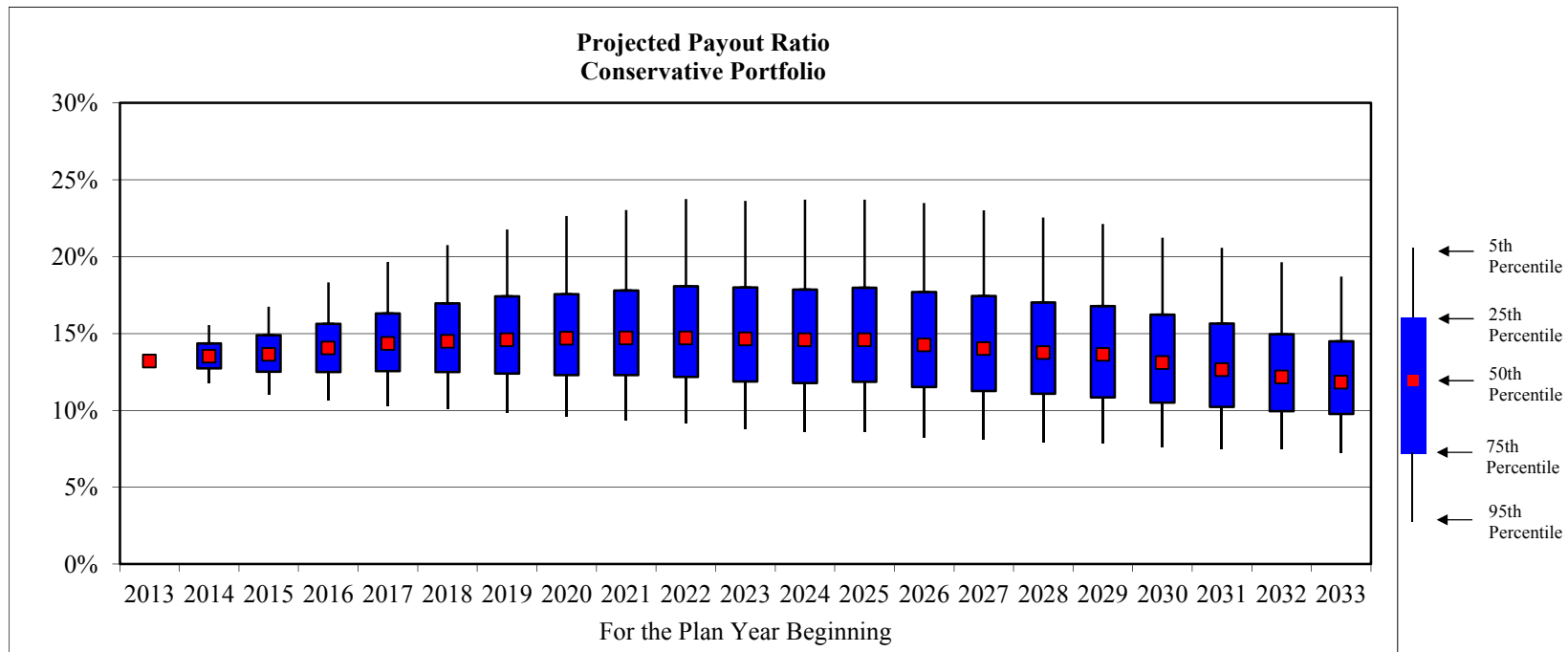
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Stochastic Analysis (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); **Conservative Portfolio**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Conservative Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 12% and 15%. The worst-case scenario could reach 24% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	14%	14%	14%	14%	14%	15%	15%	15%	15%	15%	15%	15%	14%	14%	14%	14%	13%	13%	12%	12%

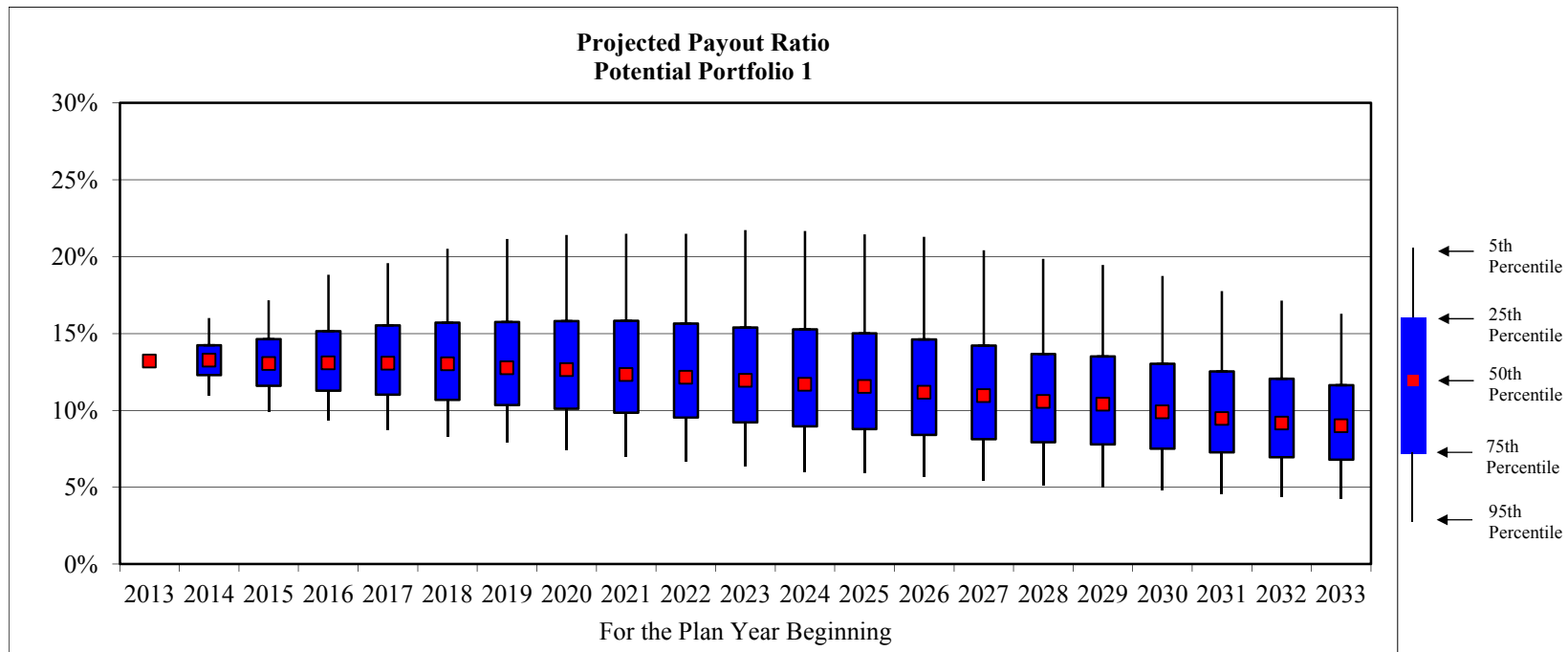
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Stochastic Analysis (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Potential Portfolio 1

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 1 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 9% and 13%. The worst-case scenario could reach 22% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	12%	12%	11%	11%	11%	10%	10%	9%	9%	9%

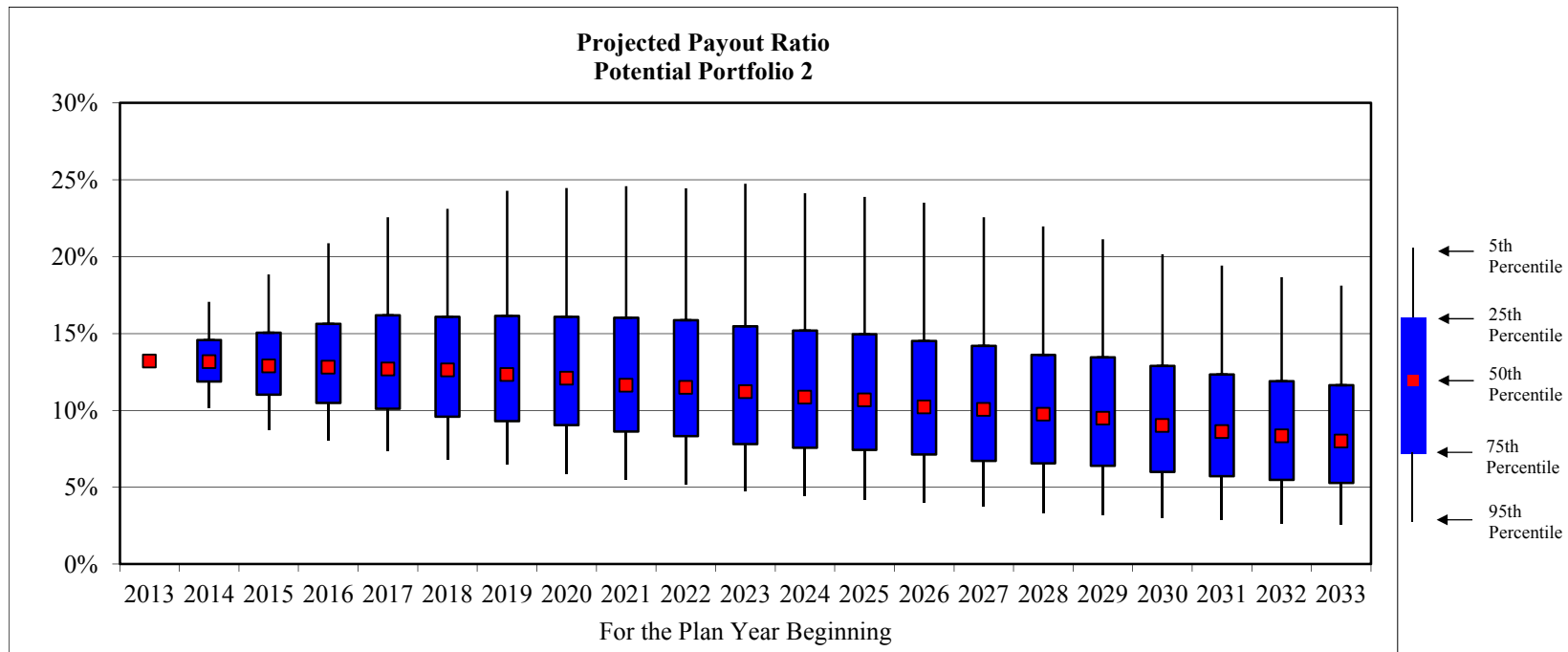
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Stochastic Analysis (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Potential Portfolio 2

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 2 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8% and 13%. The worst-case scenario could reach 25% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	12%	12%	12%	11%	11%	11%	11%	10%	10%	10%	9%	9%	9%	8%	8%

Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

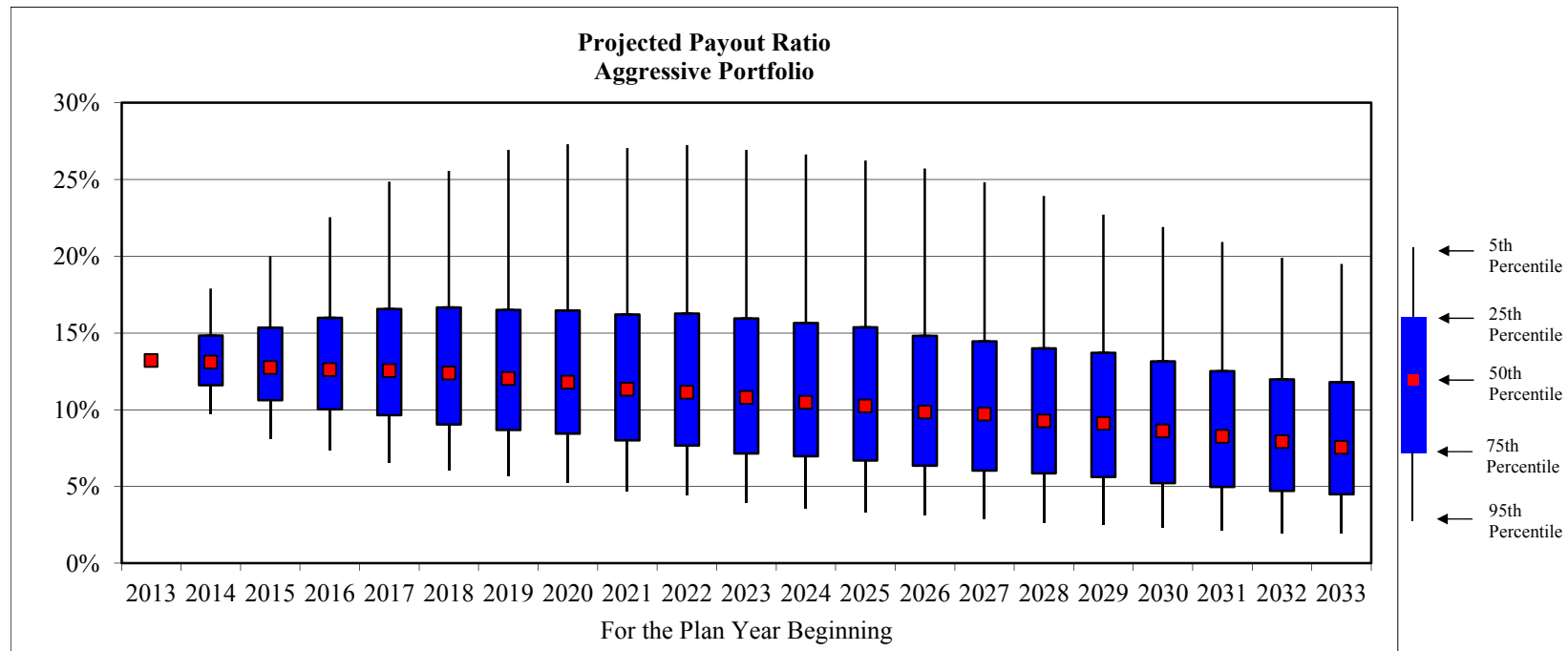


## Stochastic Analysis (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); **Aggressive Portfolio**

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Aggressive Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8% and 13%. The worst-case scenario could reach 27% or higher.



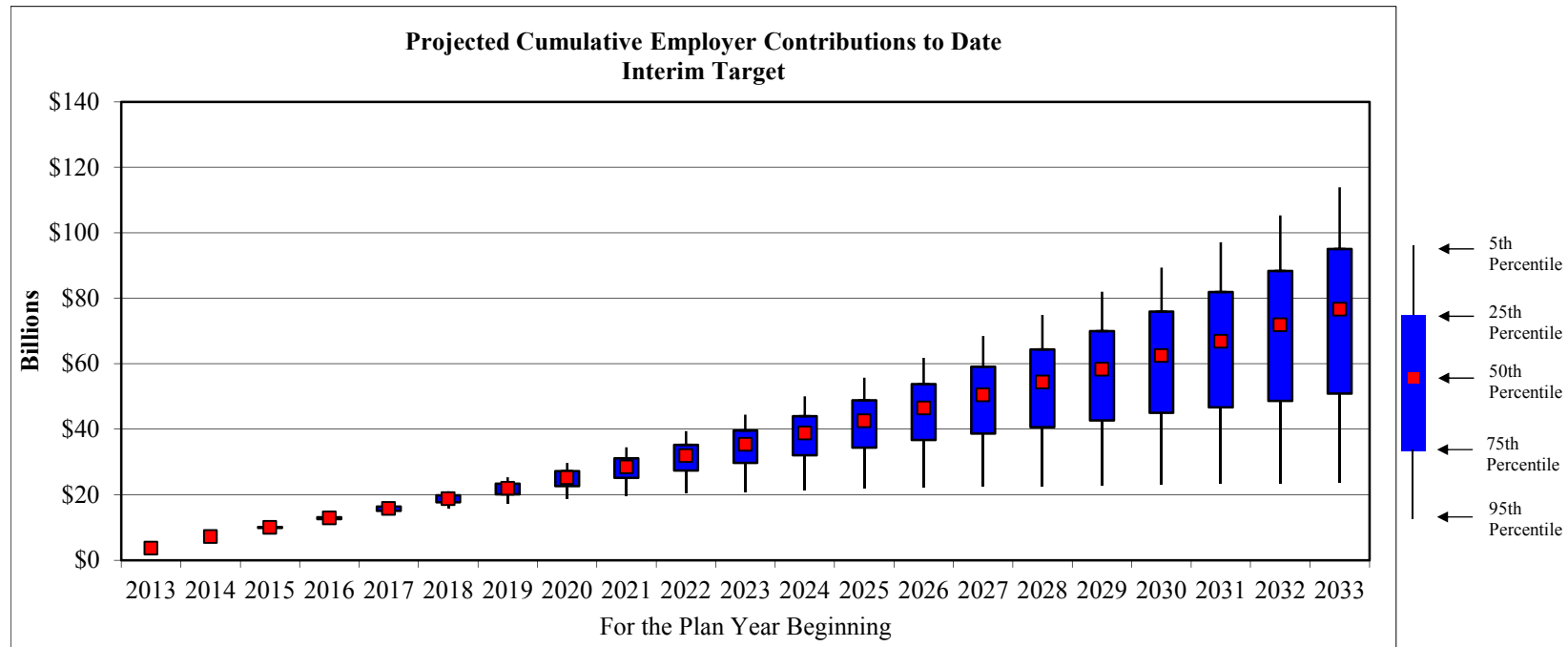
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	12%	12%	12%	11%	11%	11%	10%	10%	10%	10%	9%	9%	9%	8%	8%	8%

Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Stochastic Analysis (continued)

### Cumulative Employer Contributions to Date; Interim Target

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Interim Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



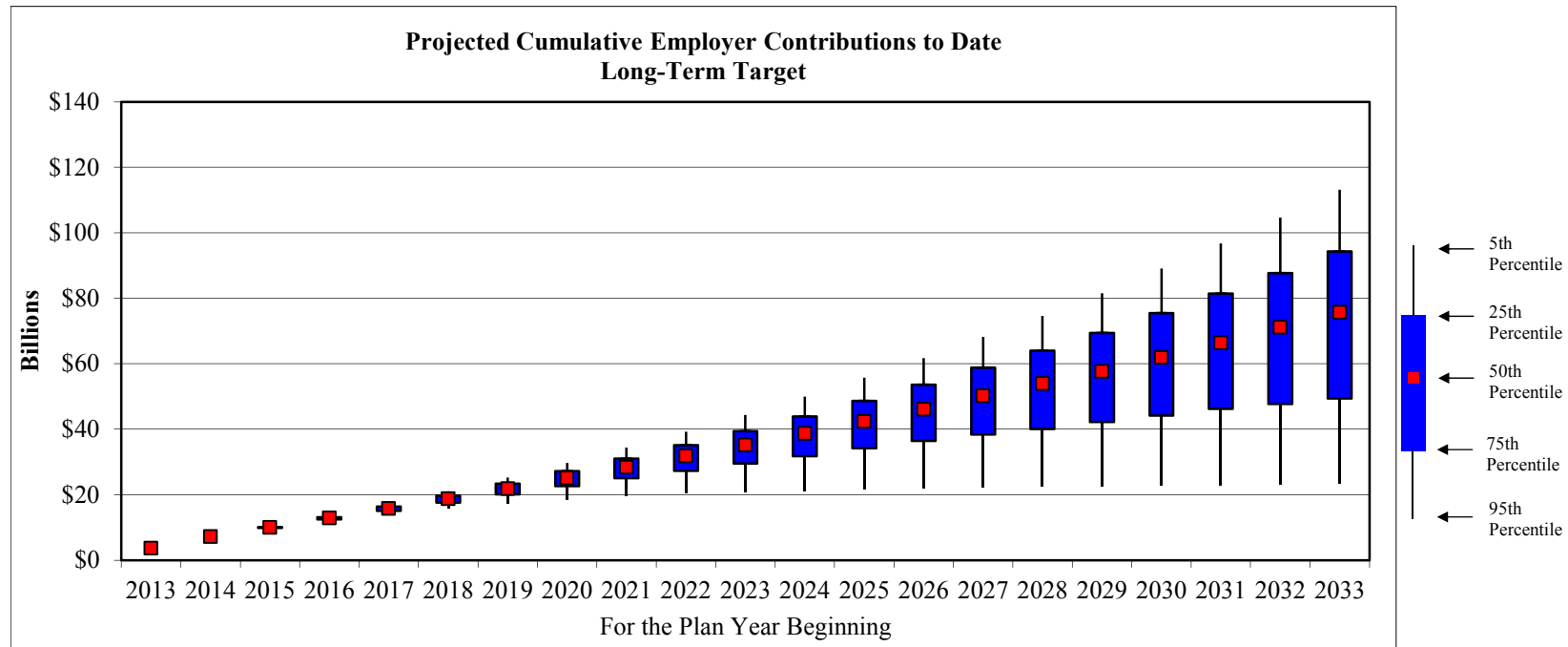
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$17	\$21	\$25	\$30	\$34	\$39	\$44	\$50	\$56	\$62	\$68	\$75	\$82	\$89	\$97	\$105	\$114
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$23	\$27	\$31	\$35	\$40	\$44	\$49	\$54	\$59	\$64	\$70	\$76	\$82	\$88	\$95
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$32	\$35	\$39	\$42	\$46	\$50	\$54	\$58	\$62	\$67	\$72	\$77
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$18	\$20	\$23	\$25	\$27	\$30	\$32	\$34	\$37	\$39	\$41	\$43	\$45	\$47	\$49	\$51
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$14	\$16	\$17	\$19	\$20	\$20	\$21	\$21	\$22	\$22	\$22	\$23	\$23	\$23	\$23	\$23	\$24

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Stochastic Analysis (continued)

### Cumulative Employer Contributions to Date; Long-Term Target

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Long-Term Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



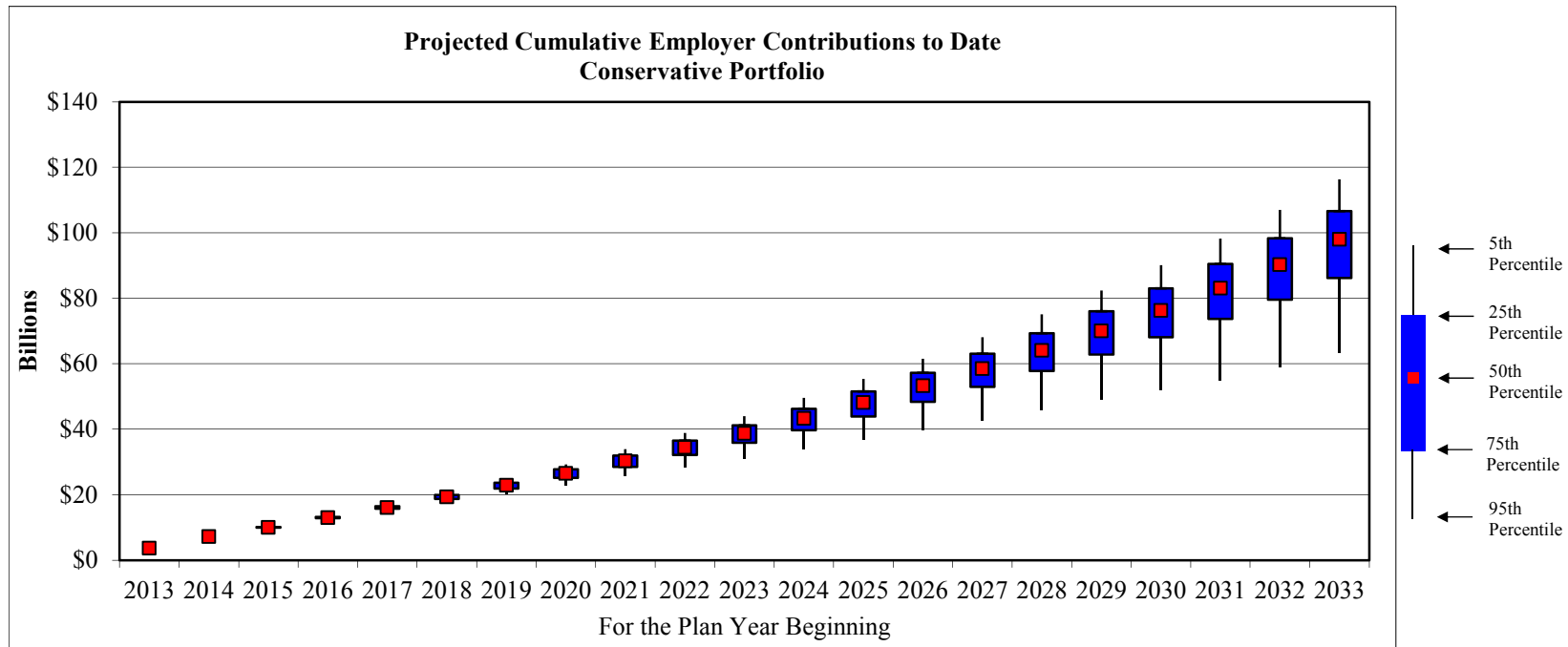
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$17	\$21	\$25	\$30	\$34	\$39	\$44	\$50	\$56	\$62	\$68	\$75	\$82	\$89	\$97	\$105	\$113
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$23	\$27	\$31	\$35	\$39	\$44	\$49	\$54	\$59	\$64	\$69	\$75	\$81	\$88	\$94
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$32	\$35	\$39	\$42	\$46	\$50	\$54	\$58	\$62	\$66	\$71	\$76
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$18	\$20	\$23	\$25	\$27	\$30	\$32	\$34	\$36	\$38	\$40	\$42	\$44	\$46	\$48	\$49
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$14	\$16	\$17	\$19	\$20	\$20	\$21	\$21	\$22	\$22	\$22	\$22	\$22	\$23	\$23	\$23	\$23

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Stochastic Analysis (continued)

### Cumulative Employer Contributions to Date; Conservative Portfolio

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Conservative Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



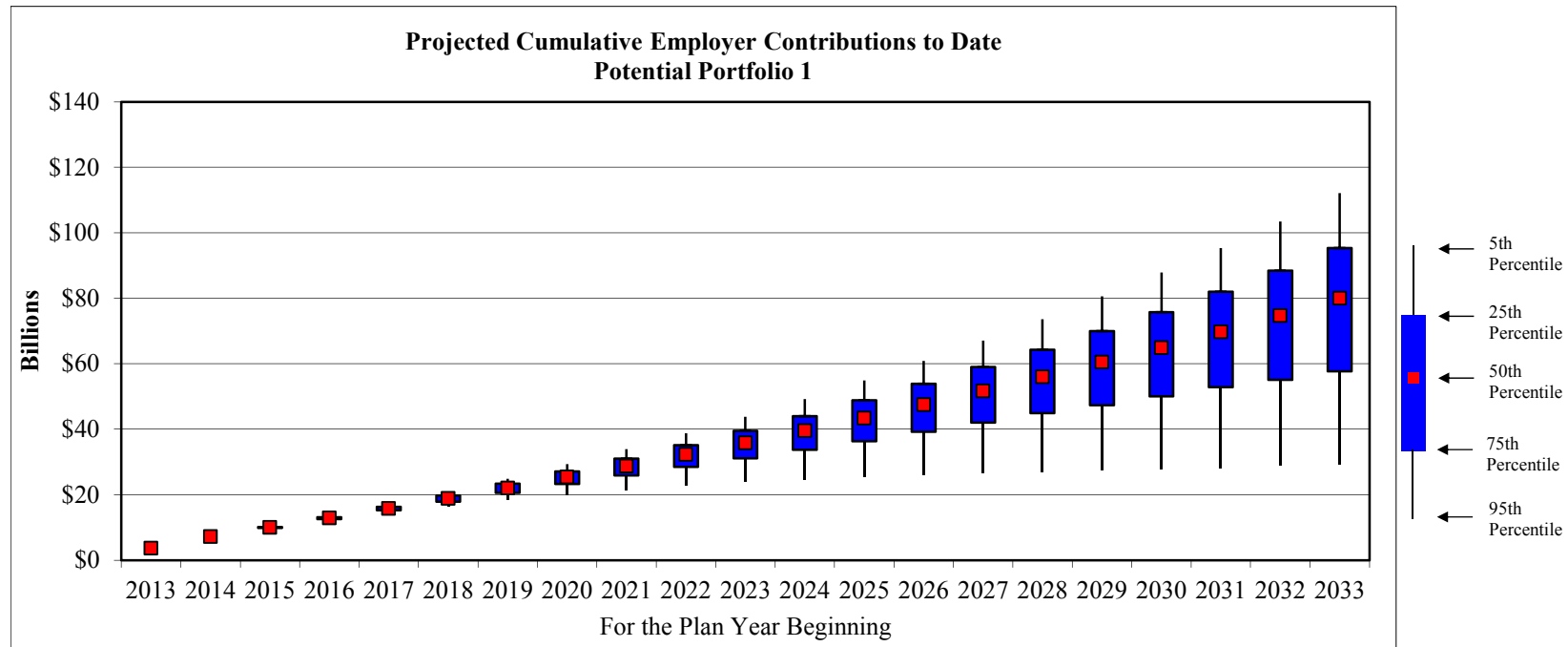
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$21	\$25	\$29	\$34	\$39	\$44	\$50	\$55	\$61	\$68	\$75	\$82	\$90	\$98	\$107	\$116
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$24	\$28	\$32	\$36	\$41	\$46	\$51	\$57	\$63	\$69	\$76	\$83	\$91	\$98	\$107
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$23	\$26	\$30	\$34	\$39	\$43	\$48	\$53	\$58	\$64	\$70	\$76	\$83	\$90	\$98
<b>75th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$29	\$32	\$36	\$40	\$44	\$48	\$53	\$58	\$63	\$68	\$74	\$80	\$86
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$18	\$20	\$23	\$26	\$28	\$31	\$34	\$37	\$40	\$42	\$46	\$49	\$52	\$55	\$59	\$63

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Stochastic Analysis (continued)

### Cumulative Employer Contributions to Date; Potential Portfolio 1

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 1 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



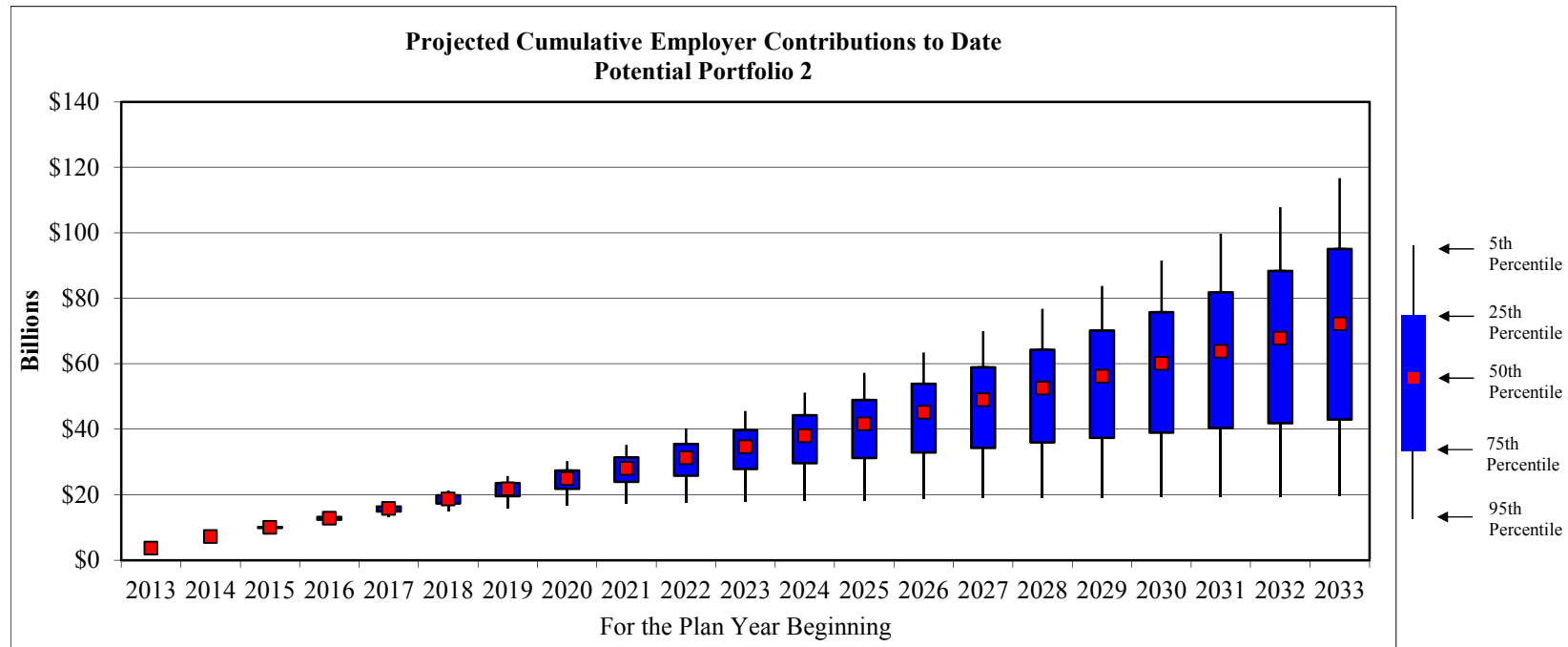
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$21	\$25	\$29	\$34	\$39	\$44	\$49	\$55	\$61	\$67	\$74	\$81	\$88	\$95	\$103	\$112
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$23	\$27	\$31	\$35	\$40	\$44	\$49	\$54	\$59	\$64	\$70	\$76	\$82	\$88	\$95
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$29	\$32	\$36	\$40	\$43	\$47	\$52	\$56	\$60	\$65	\$70	\$75	\$80
<b>75th Percentile</b>	\$4	\$7	\$10	\$13	\$15	\$18	\$21	\$23	\$26	\$28	\$31	\$34	\$36	\$39	\$42	\$45	\$47	\$50	\$53	\$55	\$58
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$14	\$16	\$18	\$20	\$21	\$23	\$24	\$25	\$25	\$26	\$27	\$27	\$27	\$28	\$28	\$29	\$29

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Stochastic Analysis (continued)

### Cumulative Employer Contributions to Date; Potential Portfolio 2

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 2 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



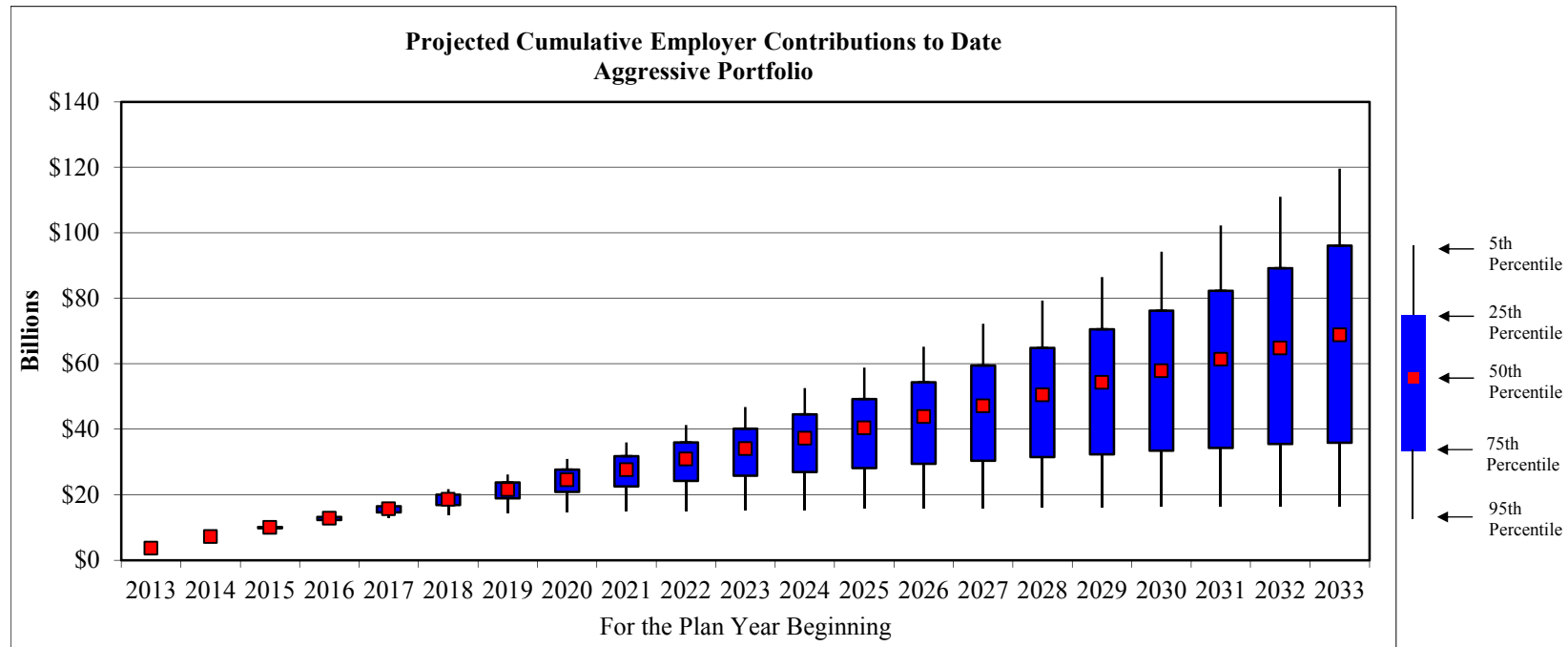
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$17	\$21	\$26	\$30	\$35	\$40	\$46	\$51	\$57	\$63	\$70	\$77	\$84	\$91	\$100	\$108	\$117
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$24	\$27	\$31	\$36	\$40	\$44	\$49	\$54	\$59	\$64	\$70	\$76	\$82	\$88	\$95
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$31	\$35	\$38	\$42	\$45	\$49	\$52	\$56	\$60	\$64	\$68	\$72
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$17	\$20	\$22	\$24	\$26	\$28	\$30	\$31	\$33	\$34	\$36	\$37	\$39	\$40	\$42	\$43
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$13	\$15	\$16	\$17	\$17	\$18	\$18	\$18	\$18	\$19	\$19	\$19	\$19	\$19	\$19	\$19	\$19

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Stochastic Analysis (continued)

### Cumulative Employer Contributions to Date; Aggressive Portfolio

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Aggressive Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$18	\$22	\$26	\$31	\$36	\$41	\$47	\$53	\$59	\$65	\$72	\$79	\$86	\$94	\$102	\$111	\$120
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$24	\$28	\$32	\$36	\$40	\$45	\$49	\$54	\$59	\$65	\$70	\$76	\$82	\$89	\$96
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$31	\$34	\$37	\$40	\$44	\$47	\$50	\$54	\$58	\$61	\$65	\$69
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$17	\$19	\$21	\$23	\$24	\$26	\$27	\$28	\$29	\$30	\$31	\$32	\$33	\$34	\$35	\$36
<b>95th Percentile</b>	\$4	\$7	\$9	\$11	\$13	\$14	\$14	\$15	\$15	\$15	\$15	\$15	\$16	\$16	\$16	\$16	\$16	\$16	\$16	\$16	\$16

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Stochastic Analysis (continued)

### Employer Contributions (as a weighted average percentage of salary)

The tables below show the range of required employer contributions (as a weighted average percentage of salary) assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.

5 Years	Required Employer Contribution for Plan Year Beginning 2018				
	5th	25th	50th	75th	95th
Interim Target	37%	31%	26%	22%	14%
Long-Term Target	37%	31%	26%	21%	14%
Conservative Portfolio	37%	32%	29%	25%	21%
Potential Portfolio 1	36%	31%	27%	22%	16%
Potential Portfolio 2	38%	31%	26%	20%	11%
Aggressive Portfolio	39%	31%	26%	19%	7%

10 Years	Required Employer Contribution for Plan Year Beginning 2023				
	5th	25th	50th	75th	95th
Interim Target	44%	34%	25%	16%	0%
Long-Term Target	44%	34%	25%	16%	0%
Conservative Portfolio	47%	37%	31%	25%	16%
Potential Portfolio 1	43%	34%	26%	18%	5%
Potential Portfolio 2	44%	34%	24%	13%	0%
Aggressive Portfolio	46%	34%	23%	9%	0%

20 Years	Required Employer Contribution for Plan Year Beginning 2033				
	5th	25th	50th	75th	95th
Interim Target	57%	39%	24%	4%	0%
Long-Term Target	56%	38%	23%	3%	0%
Conservative Portfolio	63%	49%	38%	28%	14%
Potential Portfolio 1	56%	40%	26%	11%	0%
Potential Portfolio 2	57%	39%	21%	0%	0%
Aggressive Portfolio	59%	39%	19%	0%	0%



## Stochastic Analysis (continued)

### Drawing Inferences

The tables below compare the projected actuarial and market funded ratios five, ten, and twenty years from now, under the median (50<sup>th</sup> percentile), worst-case (5<sup>th</sup> percentile), and best-case (95<sup>th</sup> percentile) scenarios, assuming the six different asset mixes highlighted on the prior pages. The table also displays for comparative purposes the median, peak, and trough projected payout ratios and cumulative employer contributions assuming the same six asset mixes being examined. The cumulative employer contributions do not include Pension Stabilization Fund contributions.

5 Years	Actuarial Funded Ratio in Year 5			Market Funded Ratio in Year 5			Cumulative Employer Contributions in Year 5 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 5 Median	2013-2018	
											Peak	Trough
Interim Target	53%	37%	75%	53%	32%	87%	\$19	\$21	\$16	13%	22%	8%
Long-Term Target	53%	38%	76%	53%	32%	87%	\$19	\$21	\$16	13%	22%	8%
Conservative Portfolio	49%	39%	62%	47%	33%	66%	\$19	\$21	\$18	14%	21%	10%
Potential Portfolio 1	52%	39%	71%	52%	34%	80%	\$19	\$21	\$16	13%	21%	8%
Potential Portfolio 2	54%	36%	82%	54%	30%	98%	\$19	\$21	\$15	13%	23%	7%
Aggressive Portfolio	55%	33%	90%	55%	27%	112%	\$19	\$22	\$14	12%	26%	6%

10 Years	Actuarial Funded Ratio in Year 10			Market Funded Ratio in Year 10			Cumulative Employer Contributions in Year 10 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 10 Median	2013-2023	
											Peak	Trough
Interim Target	61%	35%	107%	60%	32%	121%	\$35	\$44	\$21	12%	23%	6%
Long-Term Target	61%	35%	108%	60%	32%	123%	\$35	\$44	\$21	12%	22%	6%
Conservative Portfolio	50%	34%	73%	48%	31%	76%	\$39	\$44	\$31	15%	24%	9%
Potential Portfolio 1	59%	36%	97%	58%	33%	107%	\$36	\$44	\$24	12%	22%	6%
Potential Portfolio 2	63%	33%	125%	62%	29%	145%	\$35	\$46	\$18	11%	25%	5%
Aggressive Portfolio	64%	30%	147%	65%	27%	174%	\$34	\$47	\$15	11%	27%	4%

20 Years	Actuarial Funded Ratio in Year 20			Market Funded Ratio in Year 20			Cumulative Employer Contributions in Year 20 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 20 Median	2013-2033	
											Peak	Trough
Interim Target	86%	49%	197%	86%	44%	210%	\$77	\$114	\$24	9%	23%	3%
Long-Term Target	87%	50%	203%	87%	45%	216%	\$76	\$113	\$23	8%	22%	3%
Conservative Portfolio	64%	45%	95%	62%	41%	97%	\$98	\$116	\$63	12%	24%	7%
Potential Portfolio 1	82%	51%	162%	82%	47%	170%	\$80	\$112	\$29	9%	22%	4%
Potential Portfolio 2	90%	47%	264%	92%	42%	276%	\$72	\$117	\$19	8%	25%	3%
Aggressive Portfolio	95%	44%	357%	98%	39%	375%	\$69	\$120	\$16	8%	27%	2%

## **Appendix 1: Alternate Stochastic Contribution Scenario**

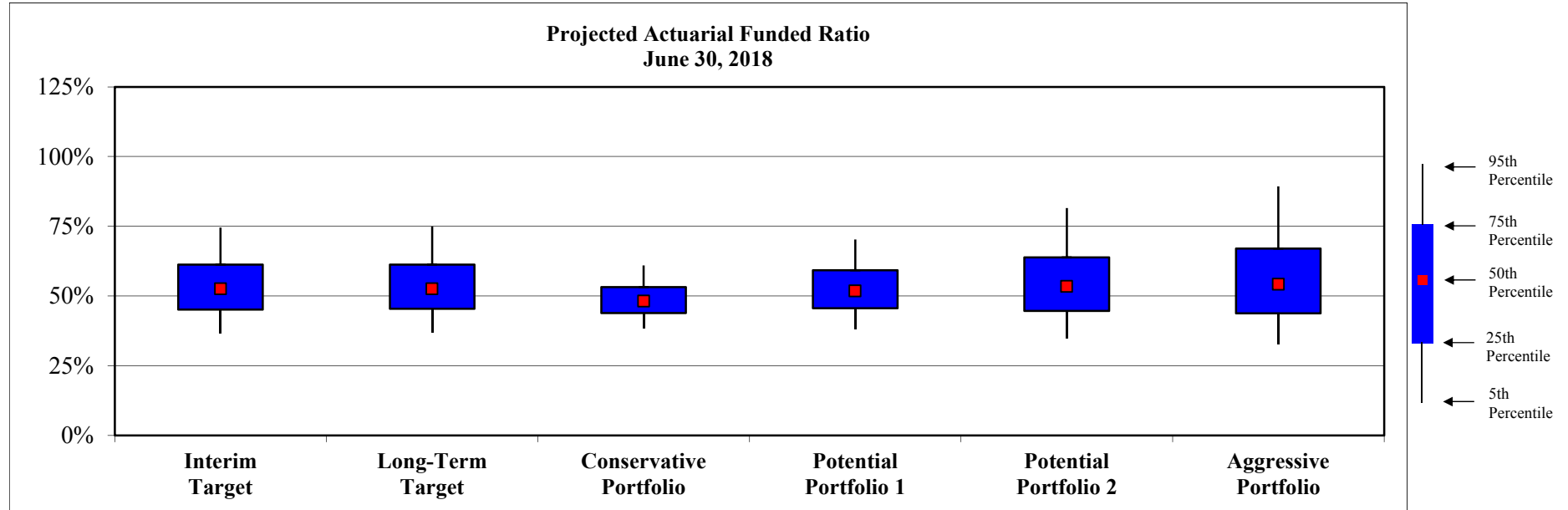
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This section provides a sensitivity analysis of the original stochastic projections by assuming Pensions Stabilization Fund contributions are not made. All other assumptions are as presented in the original stochastic of this report. While these contributions are mandated by law, given the legal uncertainties of the new law it is prudent to evaluate the outcomes without the impact of these critical contributions.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 5 Years

The graph below shows the distribution of possible actuarial funded ratios five years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



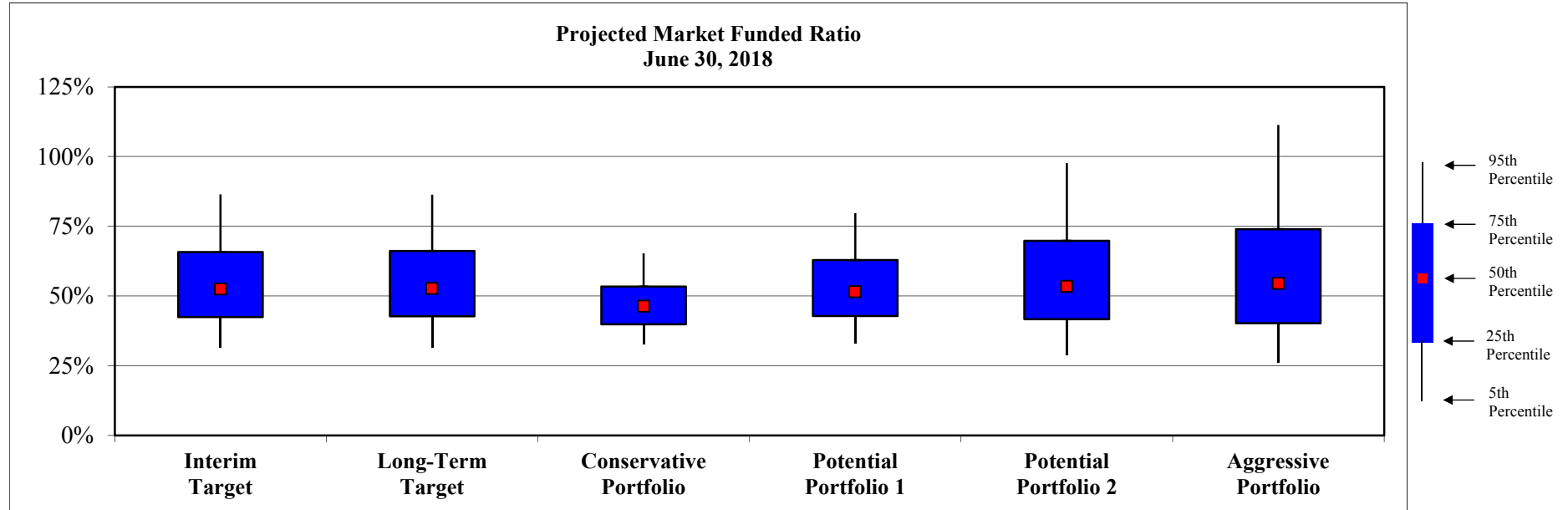
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$58	37%	\$58	37%	\$57	38%	\$57	38%	\$60	35%	\$62	33%
25th Percentile	\$51	45%	\$51	45%	\$52	44%	\$50	46%	\$51	45%	\$52	44%
50th Percentile	\$44	53%	\$44	53%	\$48	48%	\$45	52%	\$43	53%	\$43	54%
75th Percentile	\$36	61%	\$36	61%	\$44	53%	\$38	59%	\$34	64%	\$31	67%
95th Percentile	\$24	75%	\$24	75%	\$37	61%	\$28	70%	\$17	81%	\$10	89%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 5 Years

The graph below shows the distribution of possible market funded ratios five years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



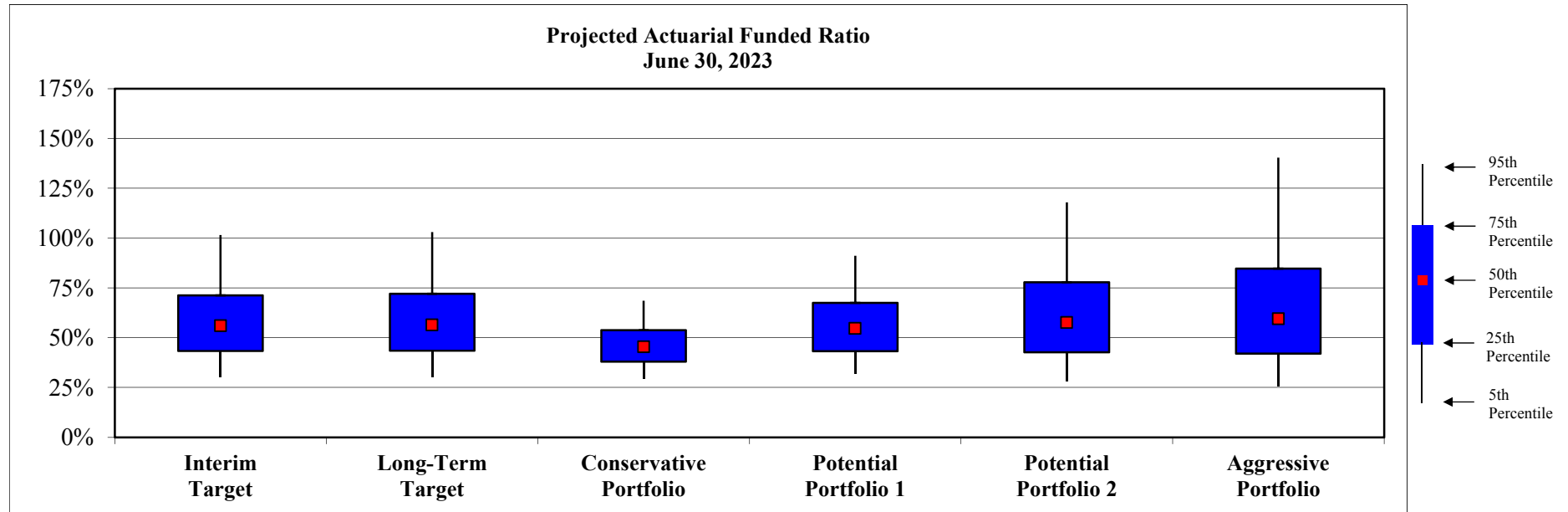
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$63	31%	\$63	32%	\$62	33%	\$61	33%	\$66	29%	\$69	26%
25th Percentile	\$53	42%	\$53	43%	\$56	40%	\$53	43%	\$54	42%	\$55	40%
50th Percentile	\$44	52%	\$44	53%	\$50	46%	\$45	52%	\$43	53%	\$42	54%
75th Percentile	\$32	66%	\$32	66%	\$44	53%	\$35	63%	\$28	70%	\$24	74%
95th Percentile	\$13	86%	\$13	86%	\$33	65%	\$19	80%	\$2	98%	(\$11)	111%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 10 Years

The graph below shows the distribution of possible actuarial funded ratios ten years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



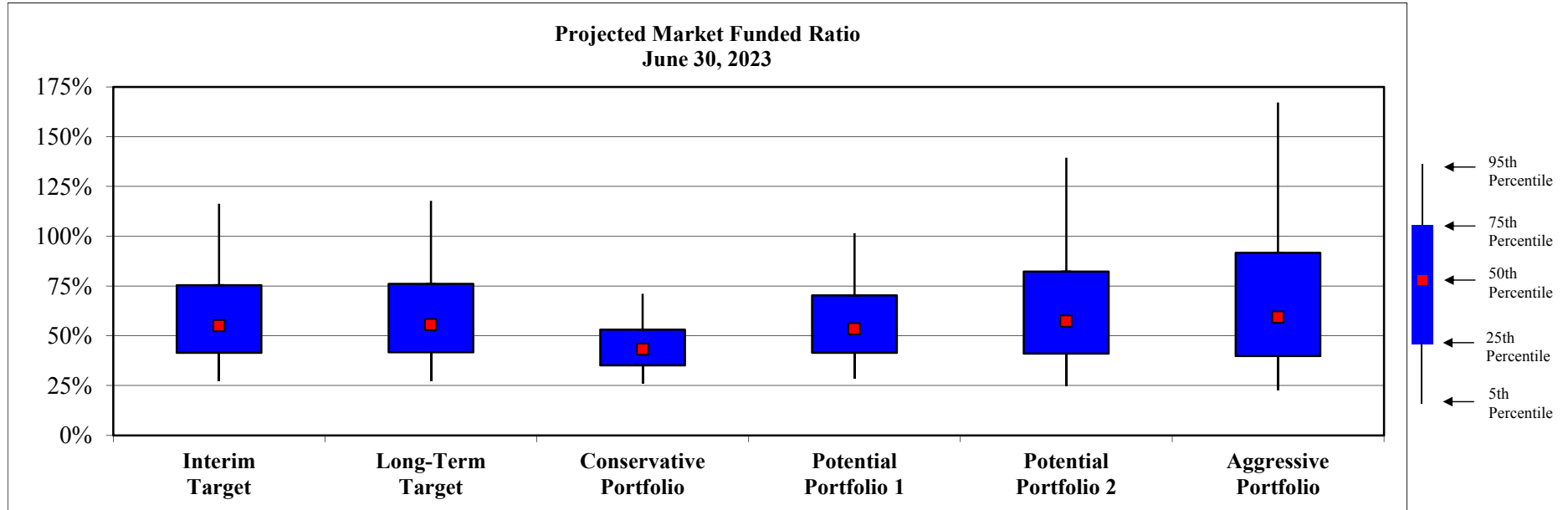
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$71	30%	\$71	30%	\$71	30%	\$70	32%	\$74	28%	\$77	26%
25th Percentile	\$59	43%	\$58	43%	\$64	38%	\$58	43%	\$59	43%	\$60	42%
50th Percentile	\$46	56%	\$46	56%	\$57	45%	\$47	55%	\$44	58%	\$43	60%
75th Percentile	\$30	71%	\$29	72%	\$49	54%	\$34	67%	\$24	78%	\$16	85%
95th Percentile	(\$2)	101%	(\$3)	103%	\$34	69%	\$9	91%	(\$20)	118%	(\$44)	140%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 10 Years

The graph below shows the distribution of possible market funded ratios ten years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



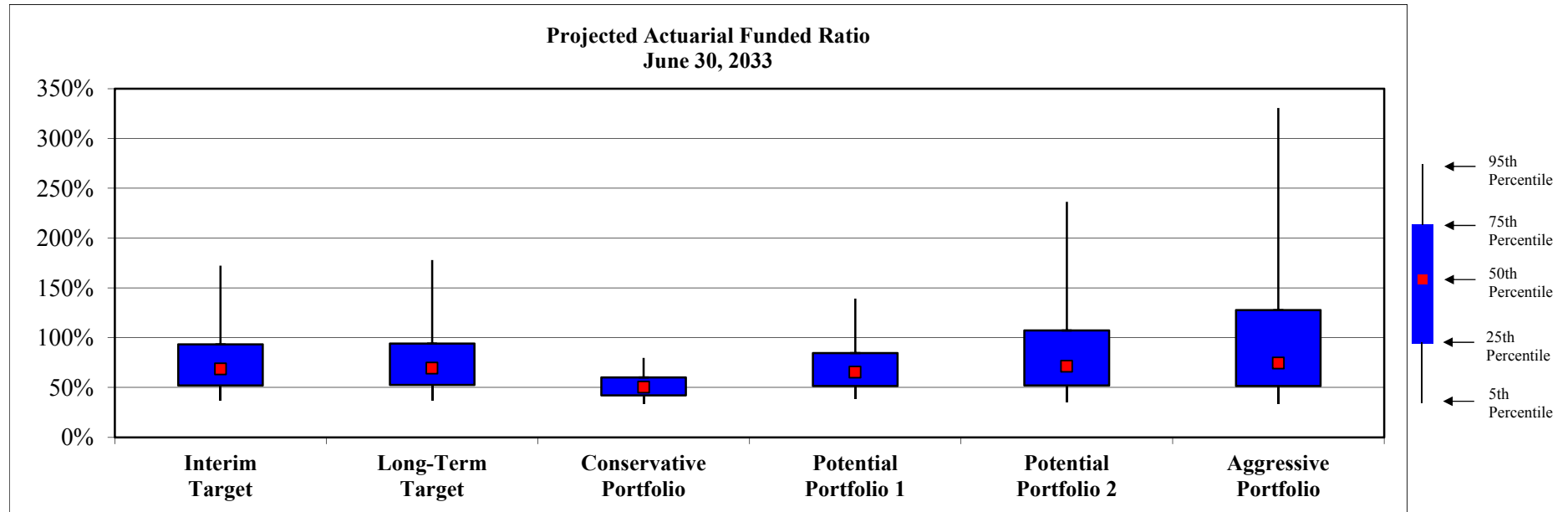
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$74	27%	\$74	27%	\$74	26%	\$72	29%	\$76	25%	\$80	23%
25th Percentile	\$60	41%	\$60	42%	\$67	35%	\$60	41%	\$61	41%	\$62	40%
50th Percentile	\$47	55%	\$46	56%	\$59	43%	\$49	53%	\$44	57%	\$42	59%
75th Percentile	\$26	75%	\$25	76%	\$50	53%	\$32	70%	\$18	82%	\$9	92%
95th Percentile	(\$18)	116%	(\$19)	118%	\$32	71%	(\$2)	102%	(\$42)	139%	(\$73)	167%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 20 Years

The graph below shows the distribution of possible actuarial funded ratios twenty years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



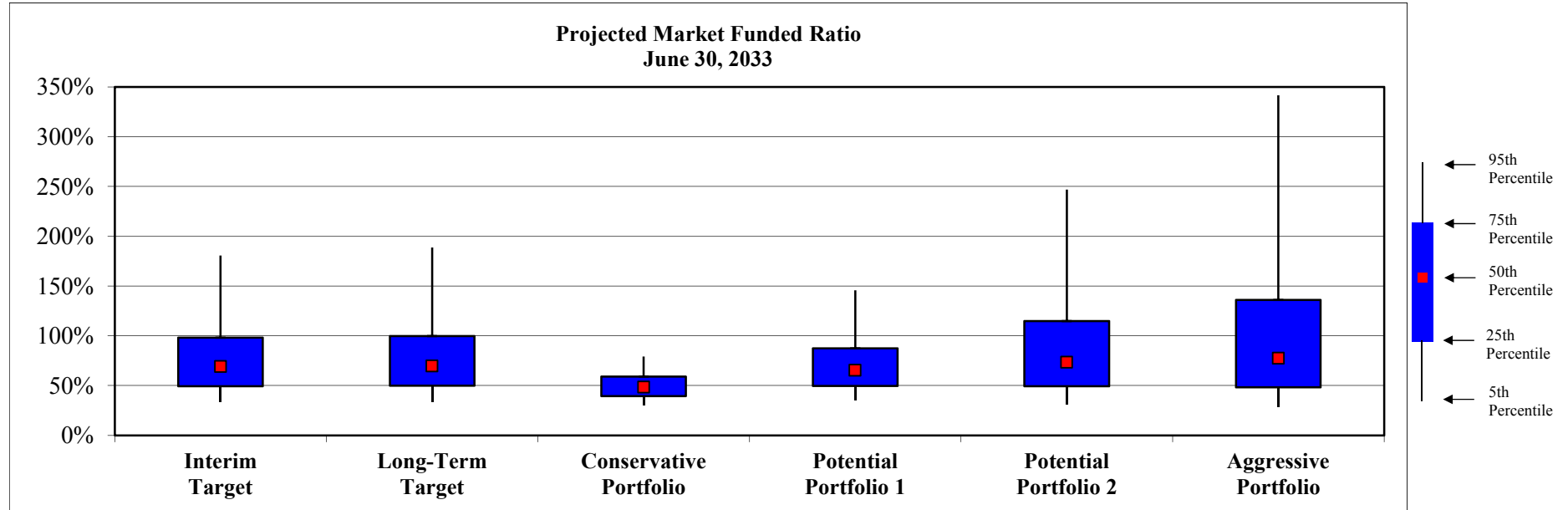
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$77	37%	\$77	37%	\$81	33%	\$76	38%	\$79	36%	\$82	33%
25th Percentile	\$60	52%	\$59	53%	\$72	42%	\$60	51%	\$60	52%	\$61	51%
50th Percentile	\$41	69%	\$39	69%	\$63	50%	\$44	65%	\$36	71%	\$32	74%
75th Percentile	\$9	93%	\$8	94%	\$53	60%	\$20	84%	(\$9)	107%	(\$35)	128%
95th Percentile	(\$102)	172%	(\$106)	178%	\$29	80%	(\$53)	139%	(\$189)	236%	(\$302)	330%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 20 Years

The graph below shows the distribution of possible market funded ratios twenty years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$81	33%	\$81	34%	\$84	30%	\$79	35%	\$83	31%	\$87	29%
25th Percentile	\$63	49%	\$63	50%	\$75	39%	\$64	49%	\$63	49%	\$65	48%
50th Percentile	\$40	69%	\$39	70%	\$66	49%	\$44	65%	\$34	73%	\$29	77%
75th Percentile	\$2	98%	\$0	100%	\$54	59%	\$16	88%	(\$19)	115%	(\$47)	136%
95th Percentile	(\$117)	180%	(\$125)	189%	\$29	79%	(\$63)	146%	(\$201)	247%	(\$310)	341%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.



## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Market Funded Ratio and Maximum 1 Year Investment Loss (market value of assets/actuarial accrued liability)

The tables below show the probability that the Plan will be at various funding levels for each of the six different asset mixes highlighted on the prior pages. The tables also illustrate the maximum 1 year investment loss each portfolio is expected to experience during the given time period. The results assume the current contribution policy remains unchanged for all projection years.

5 Years	Probability of Full Funding in 2018	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2018	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	2%	25%	10%	-31%	38%
Long-Term Target	2%	25%	10%	-31%	38%
Conservative Portfolio	0%	35%	9%	-22%	38%
Potential Portfolio 1	1%	24%	8%	-27%	38%
Potential Portfolio 2	4%	26%	13%	-35%	38%
Aggressive Portfolio	8%	28%	16%	-43%	39%

10 Years	Probability of Full Funding in 2023	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2023	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	10%	27%	14%	-36%	44%
Long-Term Target	11%	27%	14%	-35%	44%
Conservative Portfolio	0%	48%	25%	-25%	47%
Potential Portfolio 1	6%	27%	13%	-29%	43%
Potential Portfolio 2	14%	28%	16%	-44%	44%
Aggressive Portfolio	20%	29%	19%	-55%	46%

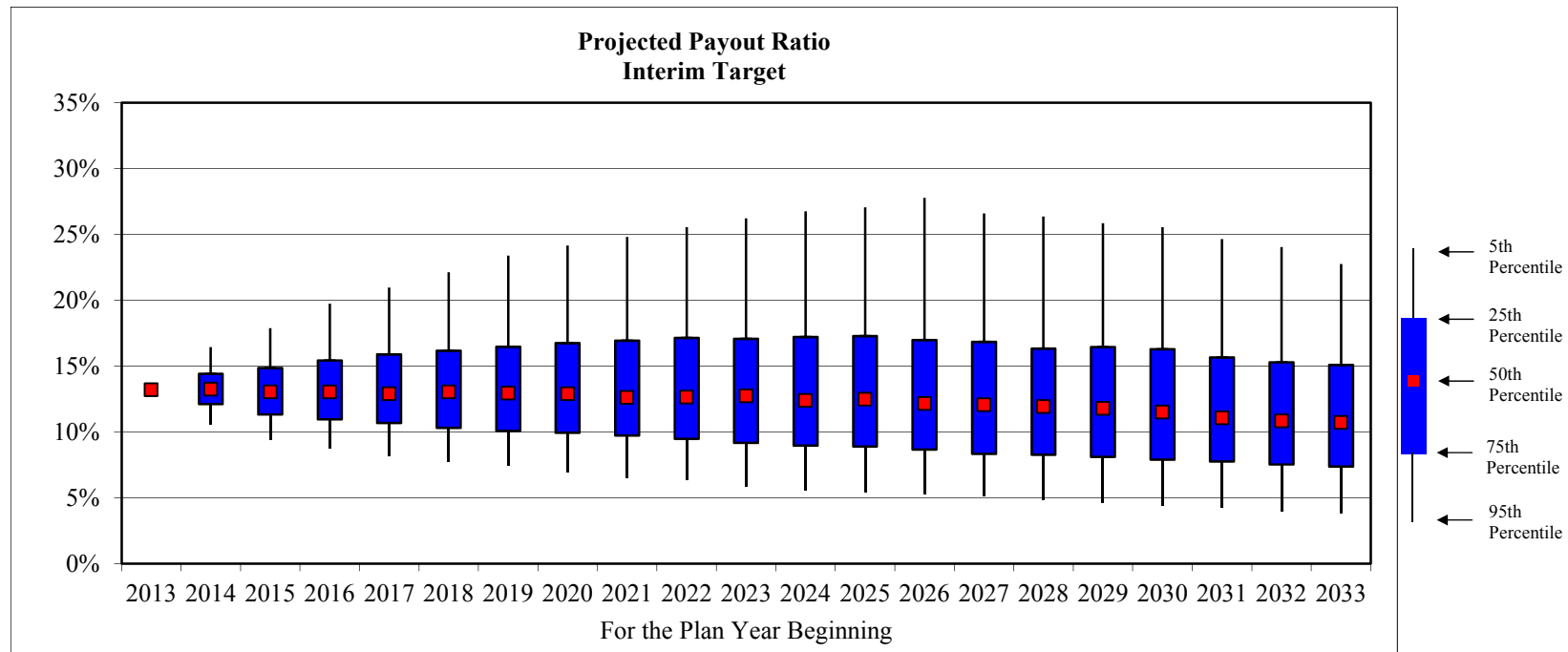
20 Years	Probability of Full Funding in 2033	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2033	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	24%	14%	6%	-43%	57%
Long-Term Target	25%	14%	6%	-43%	56%
Conservative Portfolio	1%	33%	14%	-25%	63%
Potential Portfolio 1	17%	14%	5%	-37%	56%
Potential Portfolio 2	31%	16%	8%	-50%	57%
Aggressive Portfolio	37%	18%	10%	-58%	59%

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Interim Target

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Interim Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 11% and 13%. The worst-case scenario could reach 28% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	12%	12%	12%	12%	11%	11%	11%

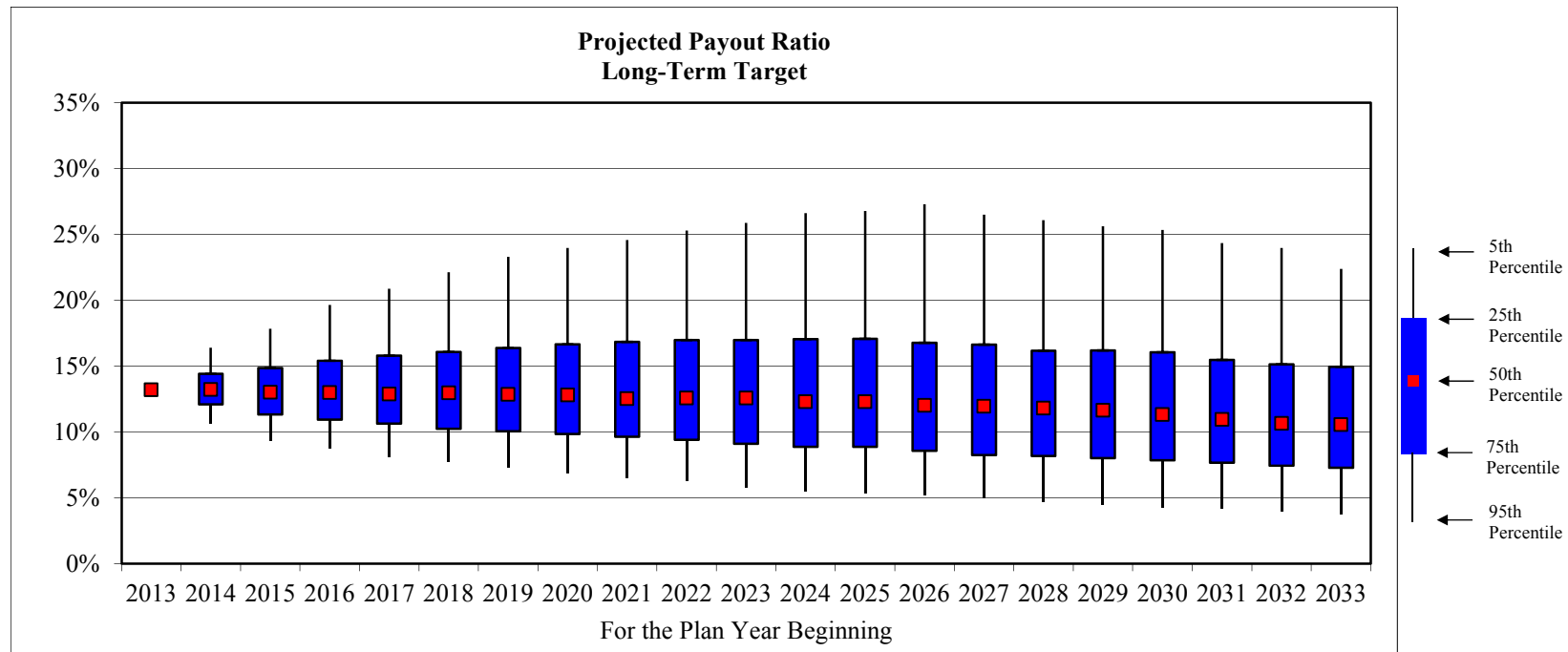
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Long-Term Target

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Long-Term Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 11% and 13%. The worst-case scenario could reach 27% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	12%	12%	12%	11%	11%	11%	11%

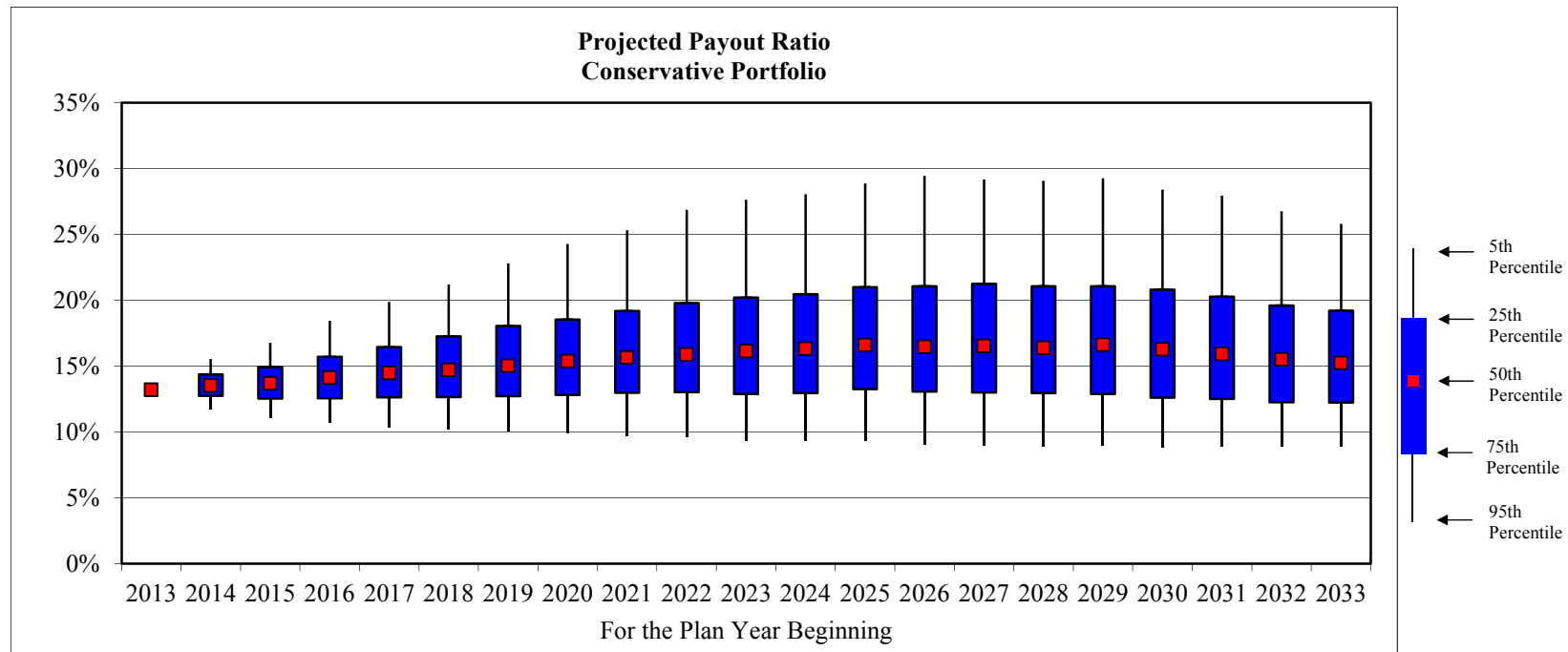
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Conservative Portfolio

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Conservative Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 13% and 17%. The worst-case scenario could reach 29% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	14%	14%	14%	14%	15%	15%	15%	16%	16%	16%	16%	17%	16%	17%	16%	17%	16%	16%	16%	15%

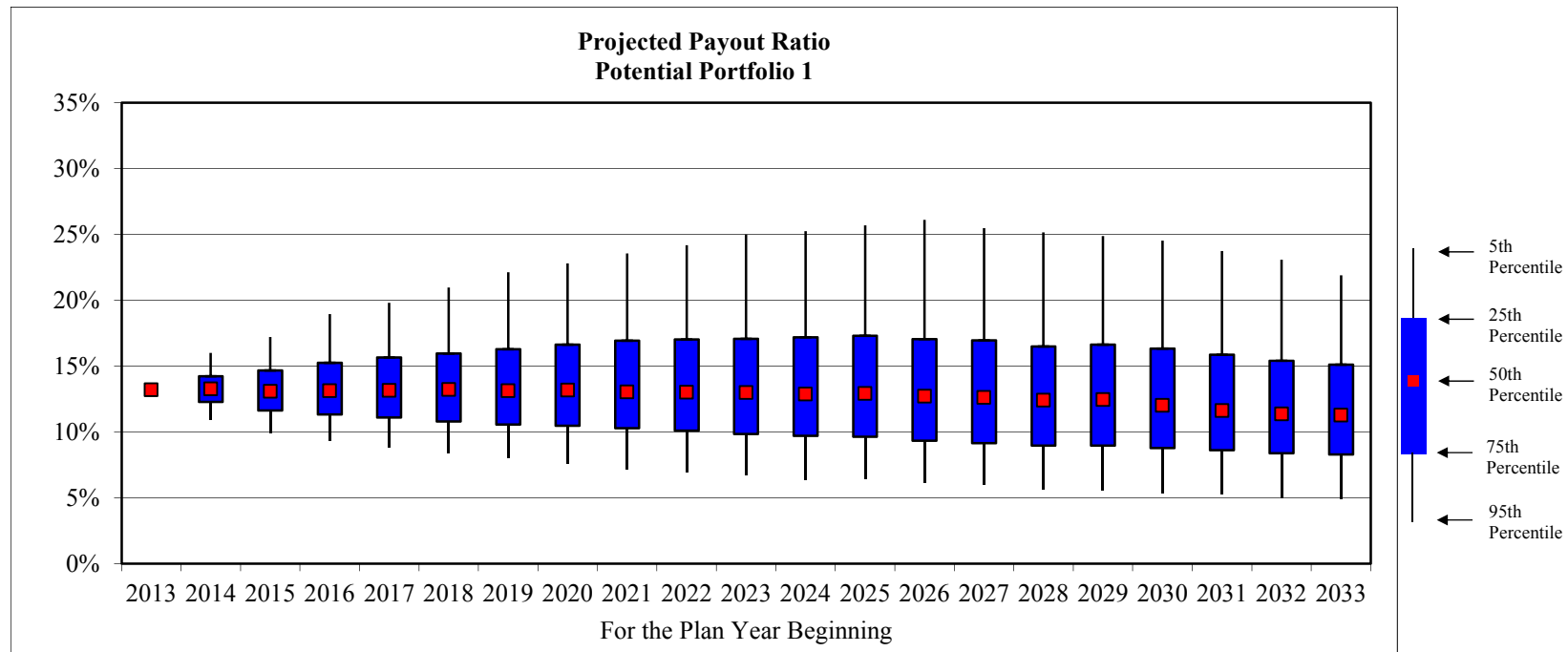
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Potential Portfolio 1

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 1 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 11% and 13%. The worst-case scenario could reach 26% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	12%	11%	11%

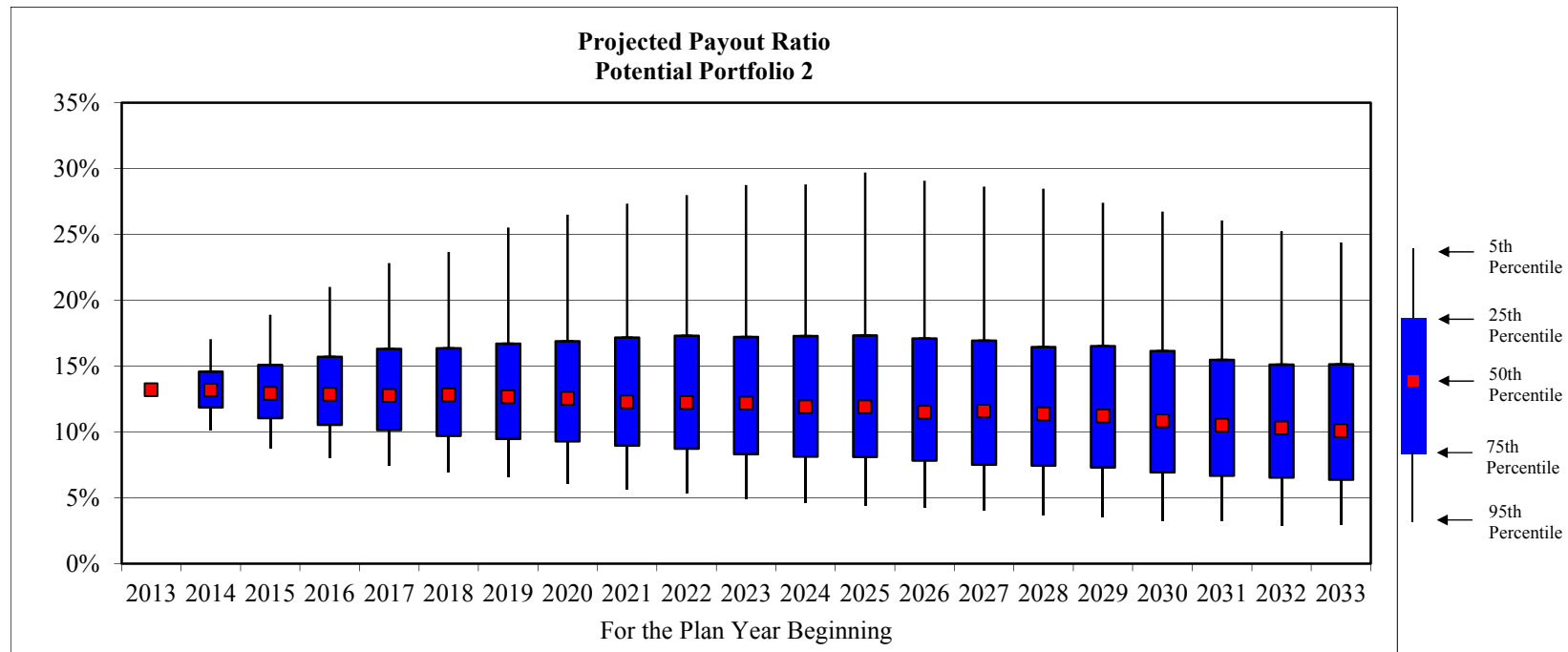
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Potential Portfolio 2

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 2 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 10% and 13%. The worst-case scenario could reach 30% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	12%	12%	11%	12%	11%	11%	11%	11%	10%	10%

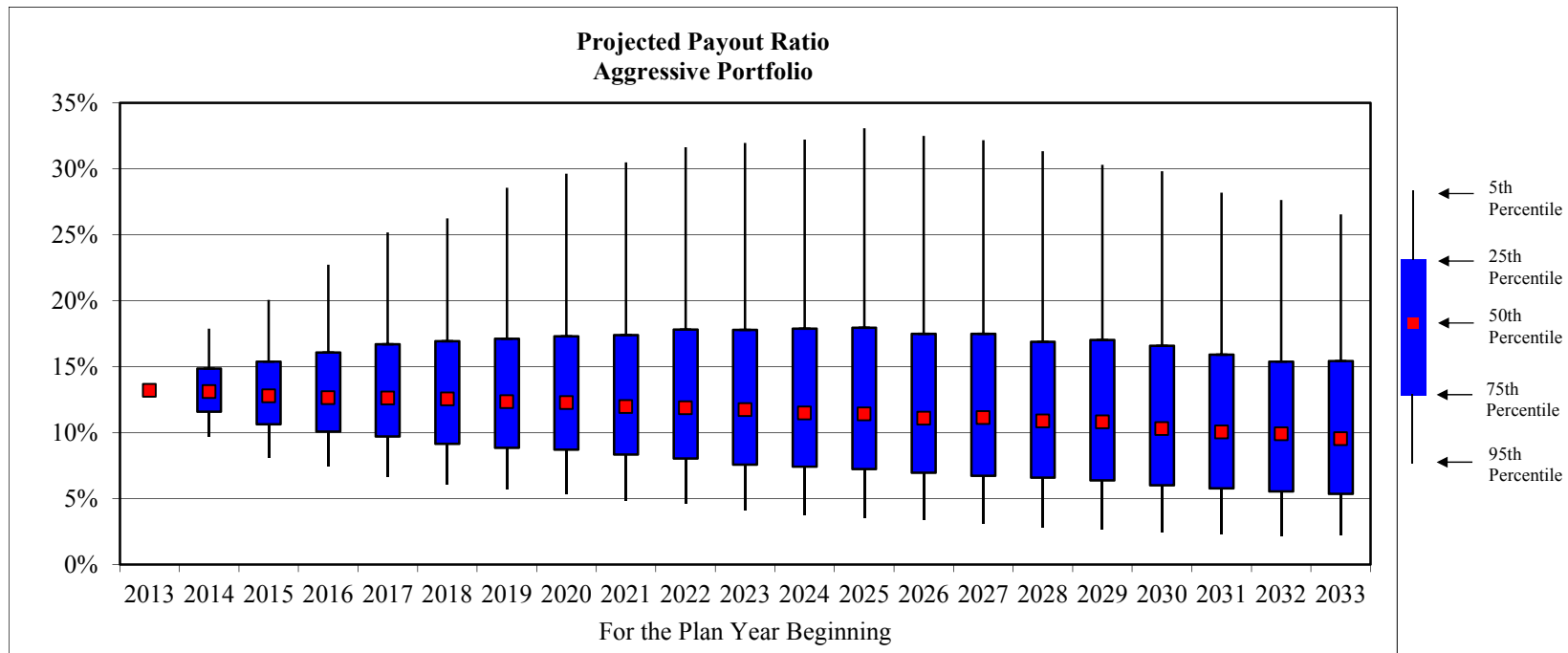
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Aggressive Portfolio

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Aggressive Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 10% and 13%. The worst-case scenario could reach 33% or higher.



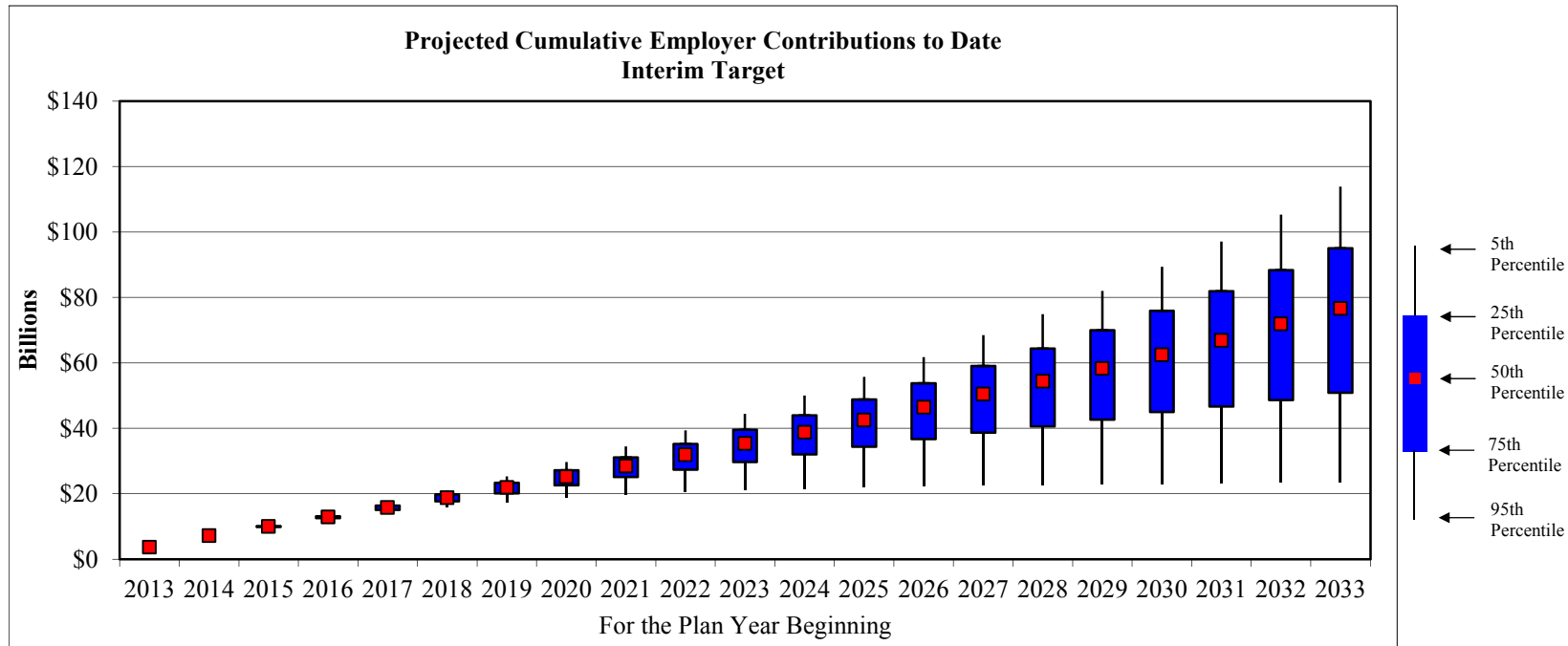
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	12%	12%	12%	12%	12%	11%	11%	11%	11%	11%	11%	10%	10%	10%	10%

Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Cumulative Employer Contributions to Date; Interim Target

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Interim Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$17	\$21	\$25	\$30	\$34	\$39	\$44	\$50	\$56	\$62	\$68	\$75	\$82	\$89	\$97	\$105	\$114
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$23	\$27	\$31	\$35	\$40	\$44	\$49	\$54	\$59	\$64	\$70	\$76	\$82	\$88	\$95
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$32	\$35	\$39	\$42	\$46	\$50	\$54	\$58	\$62	\$67	\$72	\$77
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$18	\$20	\$23	\$25	\$27	\$30	\$32	\$34	\$37	\$39	\$41	\$43	\$45	\$47	\$49	\$51
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$14	\$16	\$17	\$19	\$20	\$20	\$21	\$21	\$22	\$22	\$22	\$23	\$23	\$23	\$23	\$23	\$24

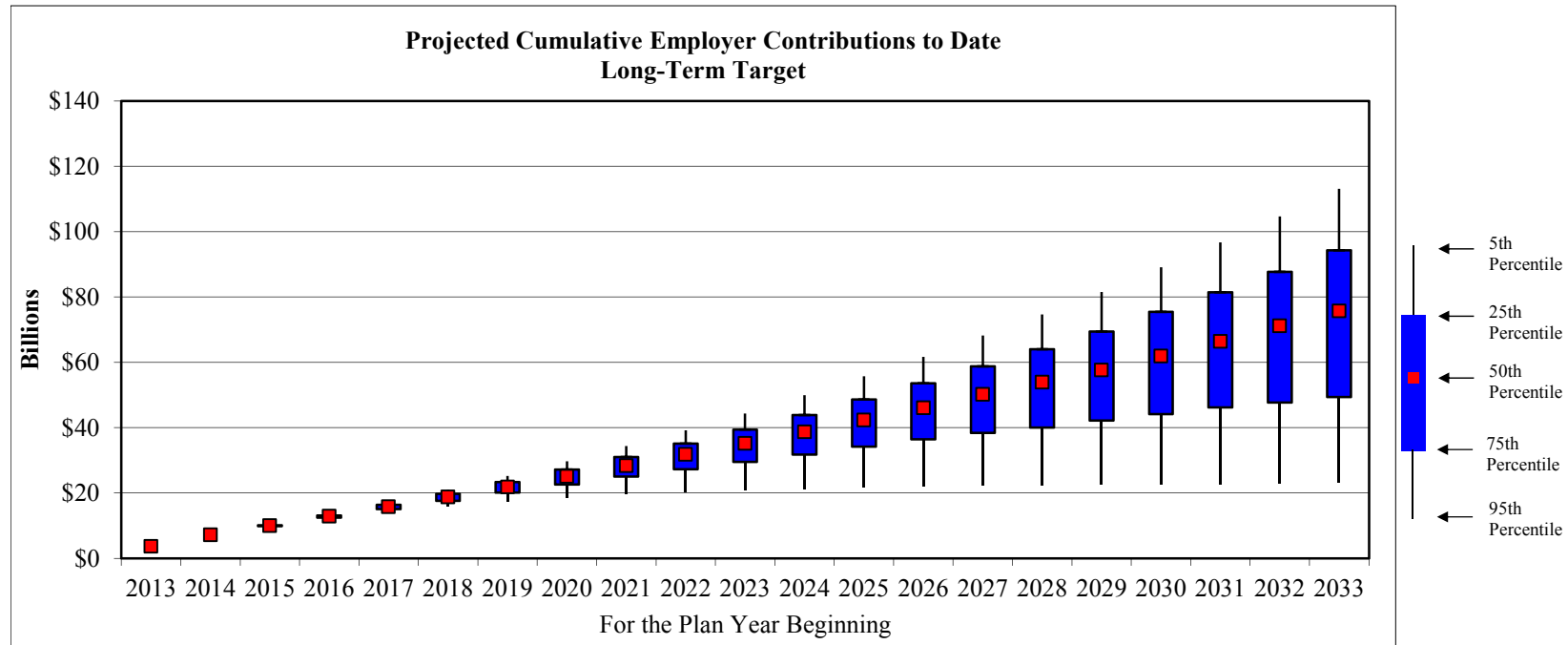
Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.



## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Cumulative Employer Contributions to Date; Long-Term Target

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Long-Term Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.



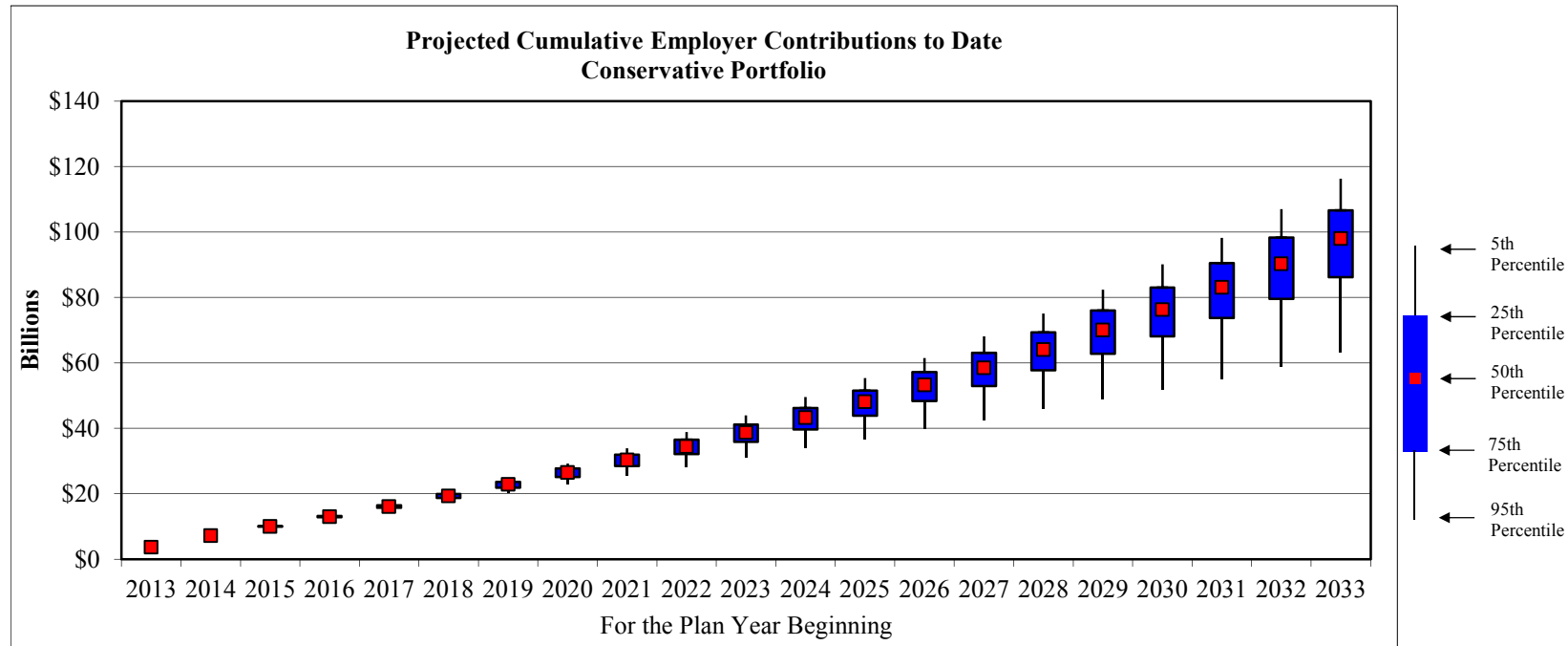
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$17	\$21	\$25	\$30	\$34	\$39	\$44	\$50	\$56	\$62	\$68	\$75	\$82	\$89	\$97	\$105	\$113
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$23	\$27	\$31	\$35	\$39	\$44	\$49	\$54	\$59	\$64	\$69	\$75	\$81	\$88	\$94
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$32	\$35	\$39	\$42	\$46	\$50	\$54	\$58	\$62	\$66	\$71	\$76
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$18	\$20	\$23	\$25	\$27	\$30	\$32	\$34	\$36	\$38	\$40	\$42	\$44	\$46	\$48	\$49
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$14	\$16	\$17	\$19	\$20	\$20	\$21	\$21	\$22	\$22	\$22	\$22	\$22	\$23	\$23	\$23	\$23

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Cumulative Employer Contributions to Date; Conservative Portfolio

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Conservative Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.



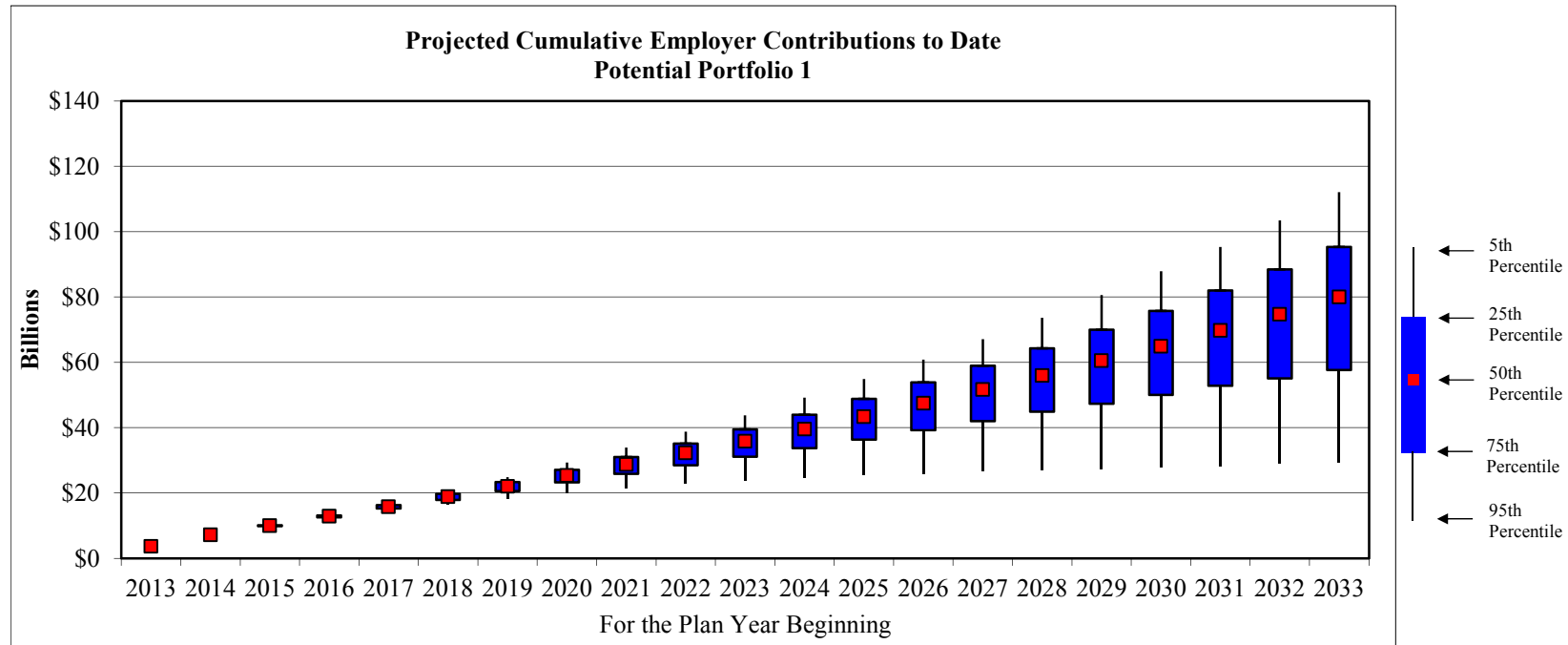
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$21	\$25	\$29	\$34	\$39	\$44	\$50	\$55	\$61	\$68	\$75	\$82	\$90	\$98	\$107	\$116
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$24	\$28	\$32	\$36	\$41	\$46	\$51	\$57	\$63	\$69	\$76	\$83	\$91	\$98	\$107
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$23	\$26	\$30	\$34	\$39	\$43	\$48	\$53	\$58	\$64	\$70	\$76	\$83	\$90	\$98
<b>75th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$29	\$32	\$36	\$40	\$44	\$48	\$53	\$58	\$63	\$68	\$74	\$80	\$86
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$18	\$20	\$23	\$26	\$28	\$31	\$34	\$37	\$40	\$42	\$46	\$49	\$52	\$55	\$59	\$63

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Cumulative Employer Contributions to Date; Potential Portfolio 1

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 1 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.



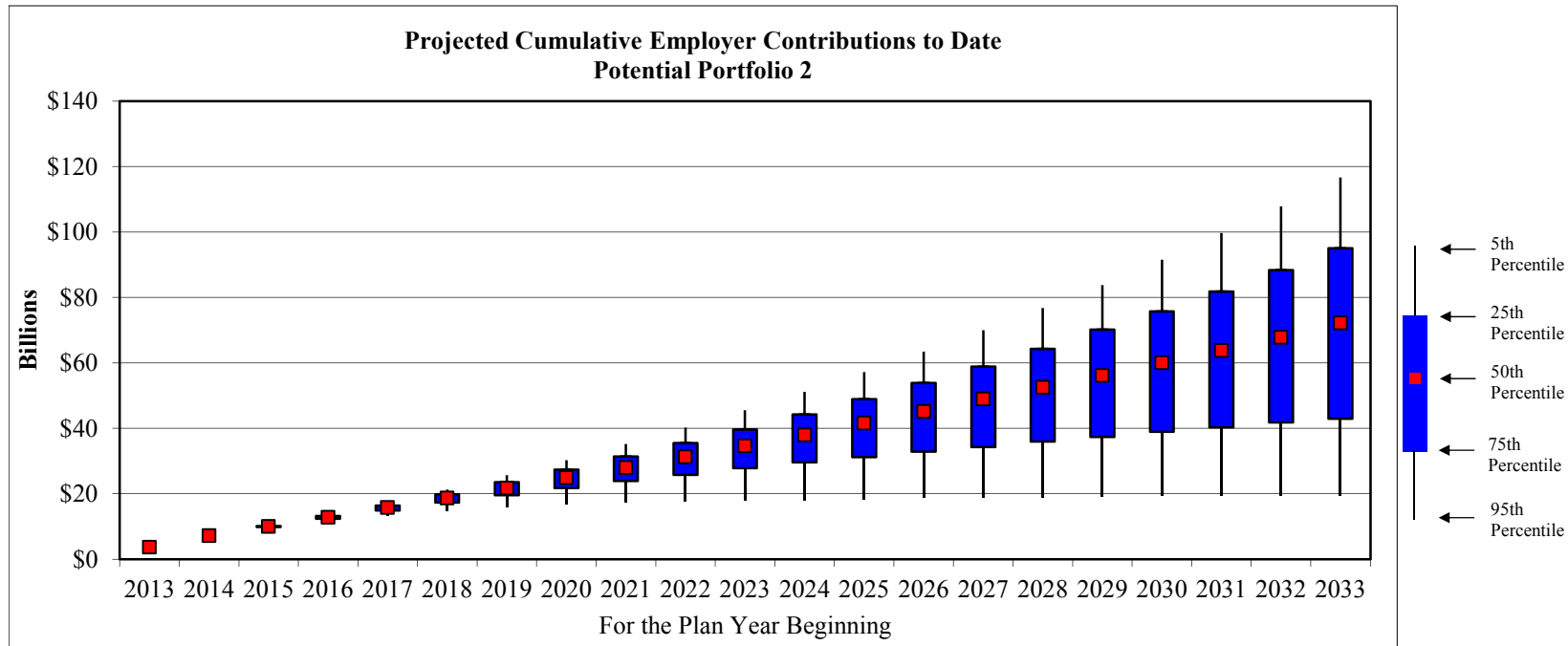
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$21	\$25	\$29	\$34	\$39	\$44	\$49	\$55	\$61	\$67	\$74	\$81	\$88	\$95	\$103	\$112
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$23	\$27	\$31	\$35	\$40	\$44	\$49	\$54	\$59	\$64	\$70	\$76	\$82	\$88	\$95
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$29	\$32	\$36	\$40	\$43	\$47	\$52	\$56	\$60	\$65	\$70	\$75	\$80
<b>75th Percentile</b>	\$4	\$7	\$10	\$13	\$15	\$18	\$21	\$23	\$26	\$28	\$31	\$34	\$36	\$39	\$42	\$45	\$47	\$50	\$53	\$55	\$58
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$14	\$16	\$18	\$20	\$21	\$23	\$24	\$25	\$25	\$26	\$27	\$27	\$27	\$28	\$28	\$29	\$29

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Cumulative Employer Contributions to Date; Potential Portfolio 2

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 2 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.



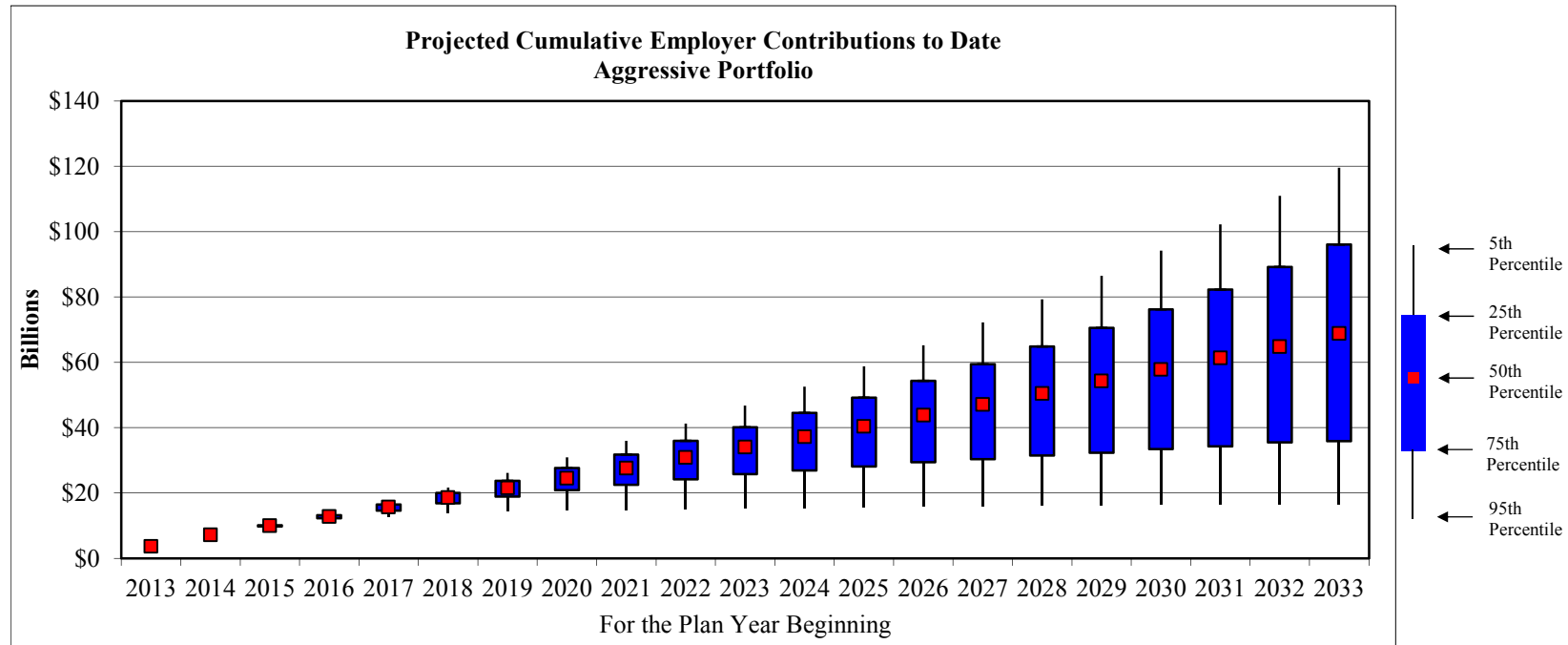
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$17	\$21	\$26	\$30	\$35	\$40	\$46	\$51	\$57	\$63	\$70	\$77	\$84	\$91	\$100	\$108	\$117
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$24	\$27	\$31	\$36	\$40	\$44	\$49	\$54	\$59	\$64	\$70	\$76	\$82	\$88	\$95
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$31	\$35	\$38	\$42	\$45	\$49	\$52	\$56	\$60	\$64	\$68	\$72
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$17	\$20	\$22	\$24	\$26	\$28	\$30	\$31	\$33	\$34	\$36	\$37	\$39	\$40	\$42	\$43
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$13	\$15	\$16	\$17	\$17	\$18	\$18	\$18	\$18	\$19	\$19	\$19	\$19	\$19	\$19	\$19	\$19

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Cumulative Employer Contributions to Date; Aggressive Portfolio

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Aggressive Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$18	\$22	\$26	\$31	\$36	\$41	\$47	\$53	\$59	\$65	\$72	\$79	\$86	\$94	\$102	\$111	\$120
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$24	\$28	\$32	\$36	\$40	\$45	\$49	\$54	\$59	\$65	\$70	\$76	\$82	\$89	\$96
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$31	\$34	\$37	\$40	\$44	\$47	\$50	\$54	\$58	\$61	\$65	\$69
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$17	\$19	\$21	\$23	\$24	\$26	\$27	\$28	\$29	\$30	\$31	\$32	\$33	\$34	\$35	\$36
<b>95th Percentile</b>	\$4	\$7	\$9	\$11	\$13	\$14	\$14	\$15	\$15	\$15	\$15	\$15	\$16	\$16	\$16	\$16	\$16	\$16	\$16	\$16	\$16

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Employer Contributions (as a weighted average percentage of salary)

The tables below show the range of required employer contributions (as a weighted average percentage of salary) assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.

5 Years	Required Employer Contribution for Plan Year Beginning 2018				
	5th	25th	50th	75th	95th
Interim Target	37%	31%	26%	22%	14%
Long-Term Target	37%	31%	26%	21%	14%
Conservative Portfolio	37%	32%	29%	25%	21%
Potential Portfolio 1	36%	31%	27%	22%	16%
Potential Portfolio 2	38%	31%	26%	20%	11%
Aggressive Portfolio	39%	31%	26%	19%	7%

10 Years	Required Employer Contribution for Plan Year Beginning 2023				
	5th	25th	50th	75th	95th
Interim Target	44%	34%	25%	16%	0%
Long-Term Target	44%	34%	25%	16%	0%
Conservative Portfolio	47%	37%	31%	25%	16%
Potential Portfolio 1	43%	34%	26%	18%	5%
Potential Portfolio 2	44%	34%	24%	13%	0%
Aggressive Portfolio	46%	34%	23%	9%	0%

20 Years	Required Employer Contribution for Plan Year Beginning 2033				
	5th	25th	50th	75th	95th
Interim Target	57%	39%	24%	4%	0%
Long-Term Target	56%	38%	23%	3%	0%
Conservative Portfolio	63%	49%	38%	28%	14%
Potential Portfolio 1	56%	40%	26%	11%	0%
Potential Portfolio 2	57%	39%	21%	0%	0%
Aggressive Portfolio	59%	39%	19%	0%	0%

## Appendix 1: Alternate Stochastic Contribution Scenario (continued)

### Drawing Inferences

The tables below compare the projected actuarial and market funded ratios five, ten, and twenty years from now, under the median (50<sup>th</sup> percentile), worst-case (5<sup>th</sup> percentile), and best-case (95<sup>th</sup> percentile) scenarios, assuming the six different asset mixes highlighted on the prior pages. The table also displays for comparative purposes the median, peak, and trough projected payout ratios and cumulative employer contributions assuming the same six asset mixes being examined.

5 Years	Actuarial Funded Ratio in Year 5			Market Funded Ratio in Year 5			Cumulative Employer Contributions in Year 5 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 5 Median	2013-2018	
											Peak	Trough
Interim Target	53%	37%	75%	52%	31%	86%	\$19	\$21	\$16	13%	22%	8%
Long-Term Target	53%	37%	75%	53%	32%	86%	\$19	\$21	\$16	13%	22%	8%
Conservative Portfolio	48%	38%	61%	46%	33%	65%	\$19	\$21	\$18	15%	21%	10%
Potential Portfolio 1	52%	38%	70%	52%	33%	80%	\$19	\$21	\$16	13%	21%	8%
Potential Portfolio 2	53%	35%	81%	53%	29%	98%	\$19	\$21	\$15	13%	24%	7%
Aggressive Portfolio	54%	33%	89%	54%	26%	111%	\$19	\$22	\$14	13%	26%	6%

10 Years	Actuarial Funded Ratio in Year 10			Market Funded Ratio in Year 10			Cumulative Employer Contributions in Year 10 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 10 Median	2013-2023	
											Peak	Trough
Interim Target	56%	30%	101%	55%	27%	116%	\$35	\$44	\$21	13%	26%	6%
Long-Term Target	56%	30%	103%	56%	27%	118%	\$35	\$44	\$21	13%	26%	6%
Conservative Portfolio	45%	30%	69%	43%	26%	71%	\$39	\$44	\$31	16%	28%	9%
Potential Portfolio 1	55%	32%	91%	53%	29%	102%	\$36	\$44	\$24	13%	25%	7%
Potential Portfolio 2	58%	28%	118%	57%	25%	139%	\$35	\$46	\$18	12%	29%	5%
Aggressive Portfolio	60%	26%	140%	59%	23%	167%	\$34	\$47	\$15	12%	32%	4%

20 Years	Actuarial Funded Ratio in Year 20			Market Funded Ratio in Year 20			Cumulative Employer Contributions in Year 20 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 20 Median	2013-2033	
											Peak	Trough
Interim Target	69%	37%	172%	69%	33%	180%	\$77	\$114	\$24	11%	28%	4%
Long-Term Target	69%	37%	178%	70%	34%	189%	\$76	\$113	\$23	11%	27%	4%
Conservative Portfolio	50%	33%	80%	49%	30%	79%	\$98	\$116	\$63	15%	29%	9%
Potential Portfolio 1	65%	38%	139%	65%	35%	146%	\$80	\$112	\$29	11%	26%	5%
Potential Portfolio 2	71%	36%	236%	73%	31%	247%	\$72	\$117	\$19	10%	30%	3%
Aggressive Portfolio	74%	33%	330%	77%	29%	341%	\$69	\$120	\$16	10%	33%	2%

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility”

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This section provides a sensitivity analysis of the original stochastic projections by assuming the risk (as measured by standard deviation) of each asset class is doubled. These modified assumptions are outlined in the table below, compared to the original values:

Asset Class	Arithmetic Return Assumption	Standard Deviation Assumption	Standard Deviation Assumption Doubled
Broad US Equity	7.30	17.80	35.60
Broad International Equity	8.55	20.55	41.10
TRS Fixed Income	6.00	9.00	18.00
TRS Real Estate	7.75	14.64	29.28
Diversified Hedge Funds	6.75	9.75	19.50
GTAA	6.50	10.00	20.00
Private Equity	11.00	29.00	58.00
Cash Equivalents	2.25	3.00	6.00

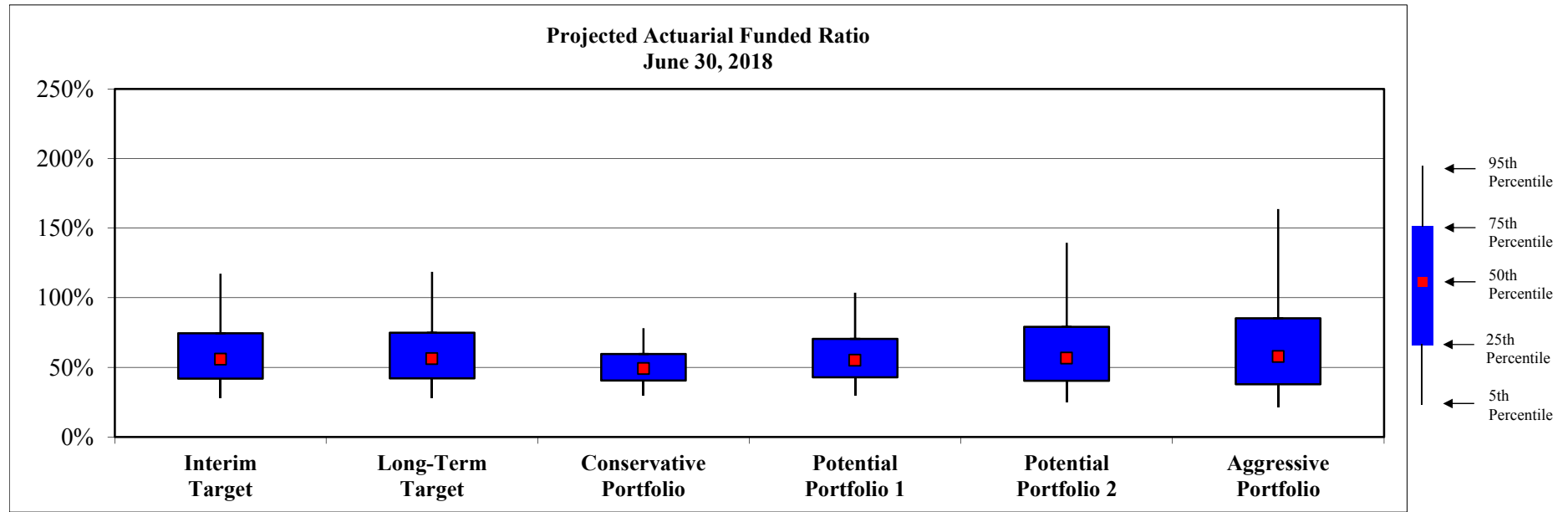
RVK supports the recommendations based on the original assumptions shown in the Stochastic Analysis section of this report. However, this stress-testing illustrates that potential increased capital market volatility does not change the asset allocation recommendations, based on the current status of the Plan. Instead it simply widens the range of potential results, exacerbating the potential best and worst-case scenarios.



## Appendix 2: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 5 Years

The graph below shows the distribution of possible actuarial funded ratios five years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



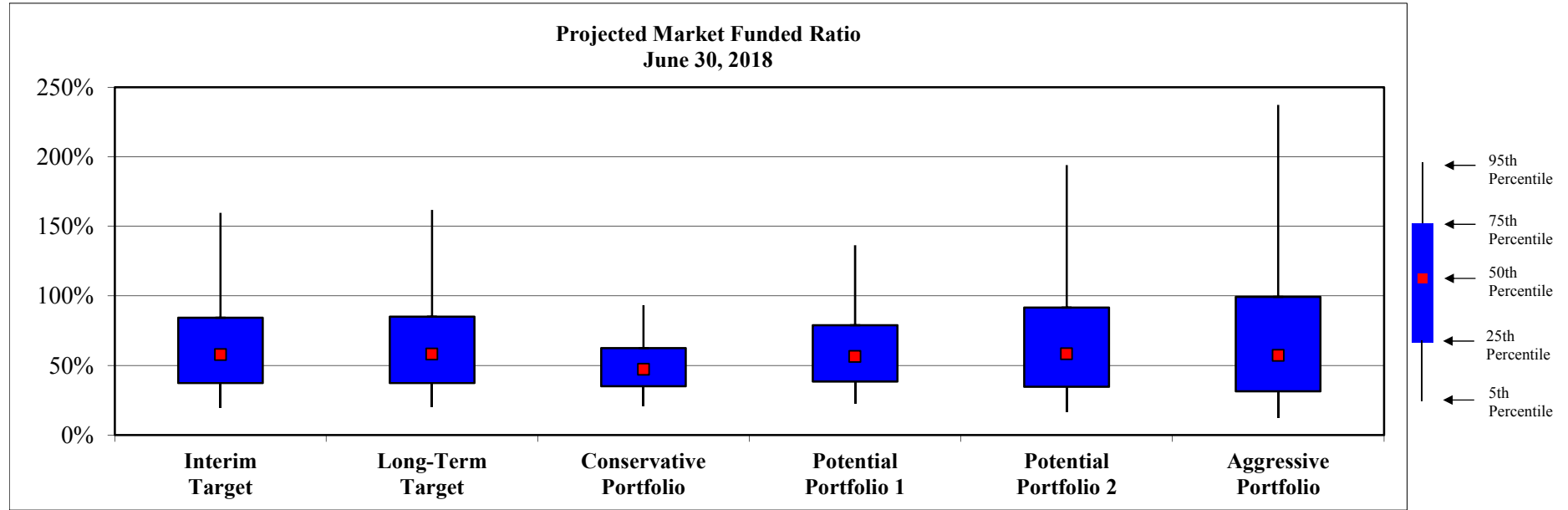
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$66	28%	\$66	28%	\$65	30%	\$64	30%	\$69	25%	\$73	22%
25th Percentile	\$54	42%	\$54	42%	\$55	41%	\$53	43%	\$56	40%	\$57	38%
50th Percentile	\$41	56%	\$41	56%	\$48	49%	\$42	55%	\$41	57%	\$40	58%
75th Percentile	\$24	74%	\$24	75%	\$38	59%	\$28	70%	\$20	79%	\$14	85%
95th Percentile	(\$17)	117%	(\$17)	119%	\$21	78%	(\$4)	104%	(\$37)	140%	(\$63)	164%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 5 Years

The graph below shows the distribution of possible market funded ratios five years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



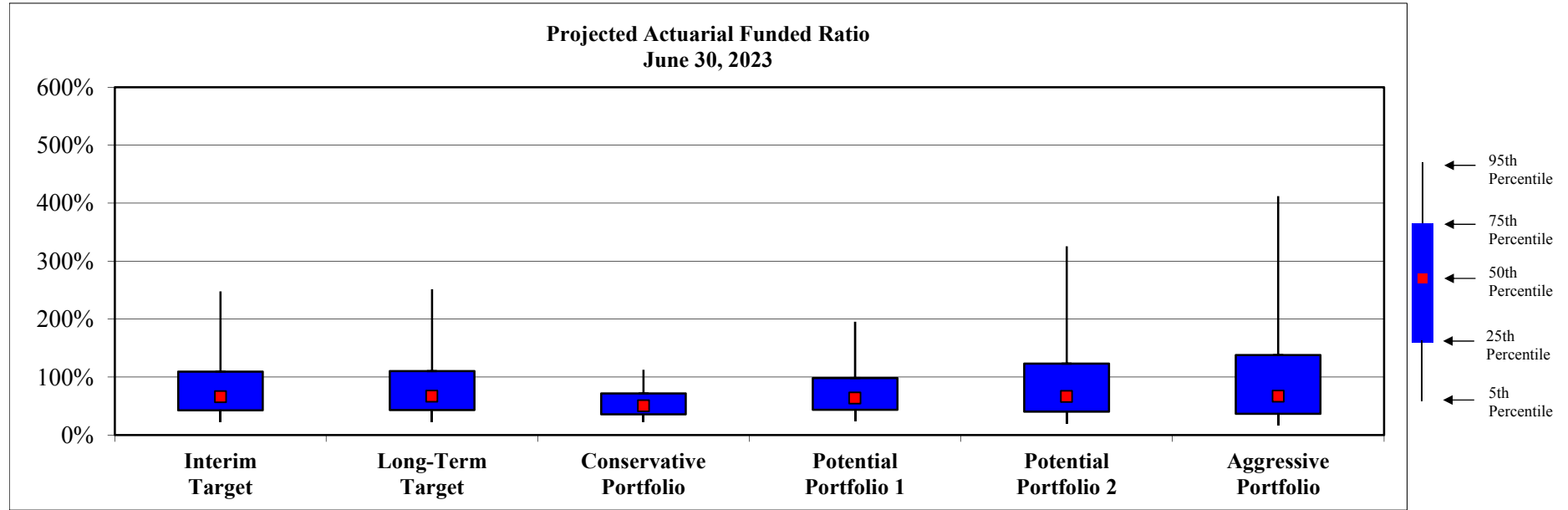
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$74	20%	\$74	20%	\$71	21%	\$71	22%	\$77	16%	\$81	13%
25th Percentile	\$58	37%	\$58	37%	\$60	35%	\$57	38%	\$60	35%	\$64	31%
50th Percentile	\$40	58%	\$39	58%	\$49	47%	\$41	56%	\$39	58%	\$40	57%
75th Percentile	\$15	84%	\$14	85%	\$36	63%	\$20	79%	\$8	92%	\$1	99%
95th Percentile	(\$58)	160%	(\$60)	162%	\$6	93%	(\$36)	136%	(\$90)	194%	(\$131)	237%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 10 Years

The graph below shows the distribution of possible actuarial funded ratios ten years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



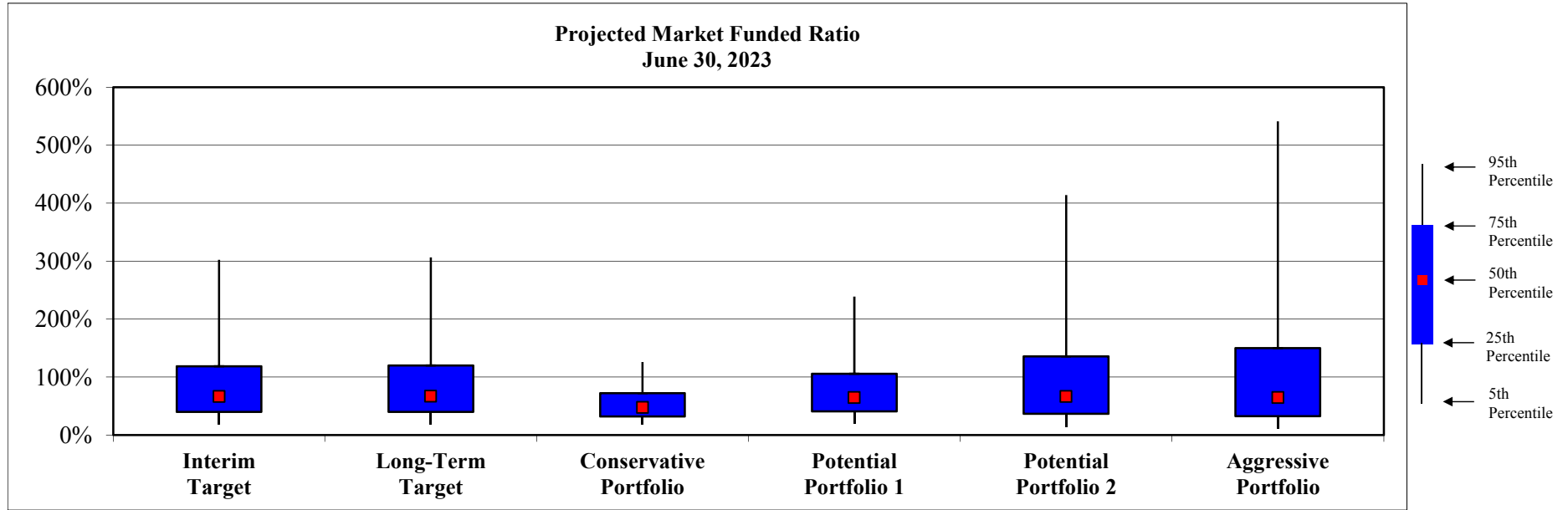
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$80	23%	\$79	23%	\$78	22%	\$77	25%	\$83	20%	\$86	17%
25th Percentile	\$60	43%	\$59	43%	\$67	36%	\$59	44%	\$63	41%	\$66	37%
50th Percentile	\$37	66%	\$36	67%	\$54	50%	\$39	64%	\$37	66%	\$36	67%
75th Percentile	(\$10)	109%	(\$11)	110%	\$32	72%	\$2	98%	(\$24)	123%	(\$42)	138%
95th Percentile	(\$160)	248%	(\$168)	252%	(\$14)	113%	(\$113)	196%	(\$257)	325%	(\$358)	412%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 10 Years

The graph below shows the distribution of possible market funded ratios ten years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



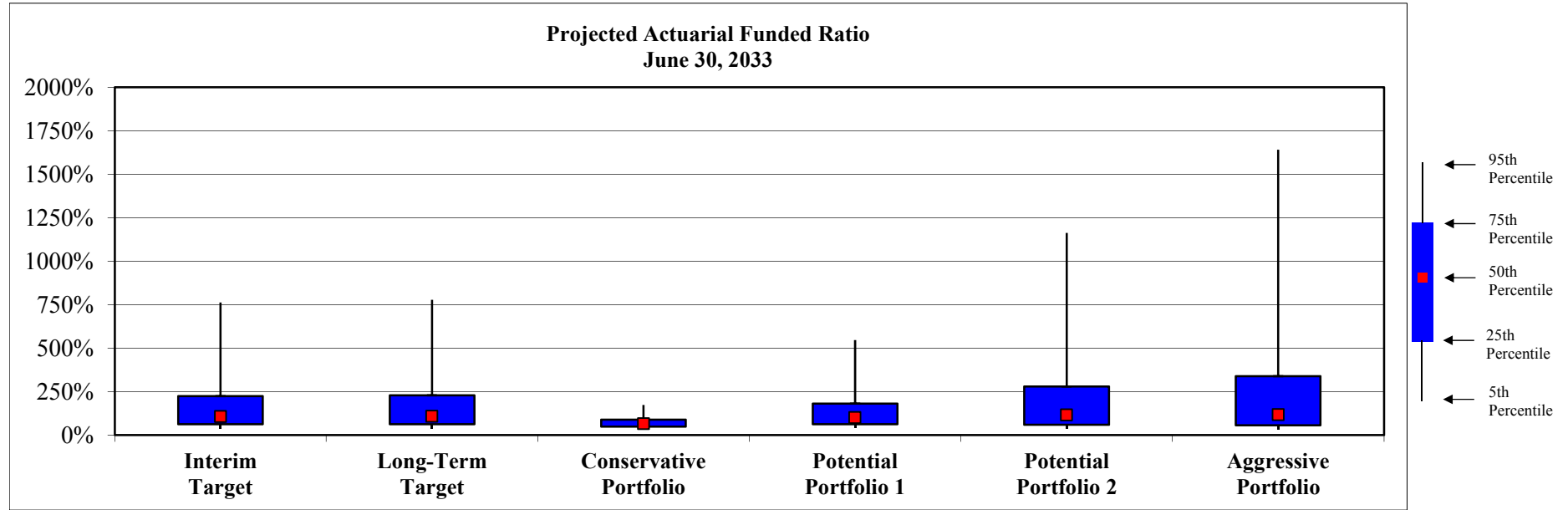
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$82	18%	\$82	18%	\$82	18%	\$80	20%	\$86	15%	\$90	12%
25th Percentile	\$63	40%	\$63	40%	\$70	32%	\$62	41%	\$67	37%	\$71	32%
50th Percentile	\$36	66%	\$35	67%	\$56	47%	\$38	64%	\$37	66%	\$38	64%
75th Percentile	(\$21)	119%	(\$22)	120%	\$31	72%	(\$7)	106%	(\$39)	135%	(\$56)	150%
95th Percentile	(\$230)	302%	(\$239)	306%	(\$31)	126%	(\$156)	239%	(\$356)	414%	(\$516)	541%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 20 Years

The graph below shows the distribution of possible actuarial funded ratios twenty years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



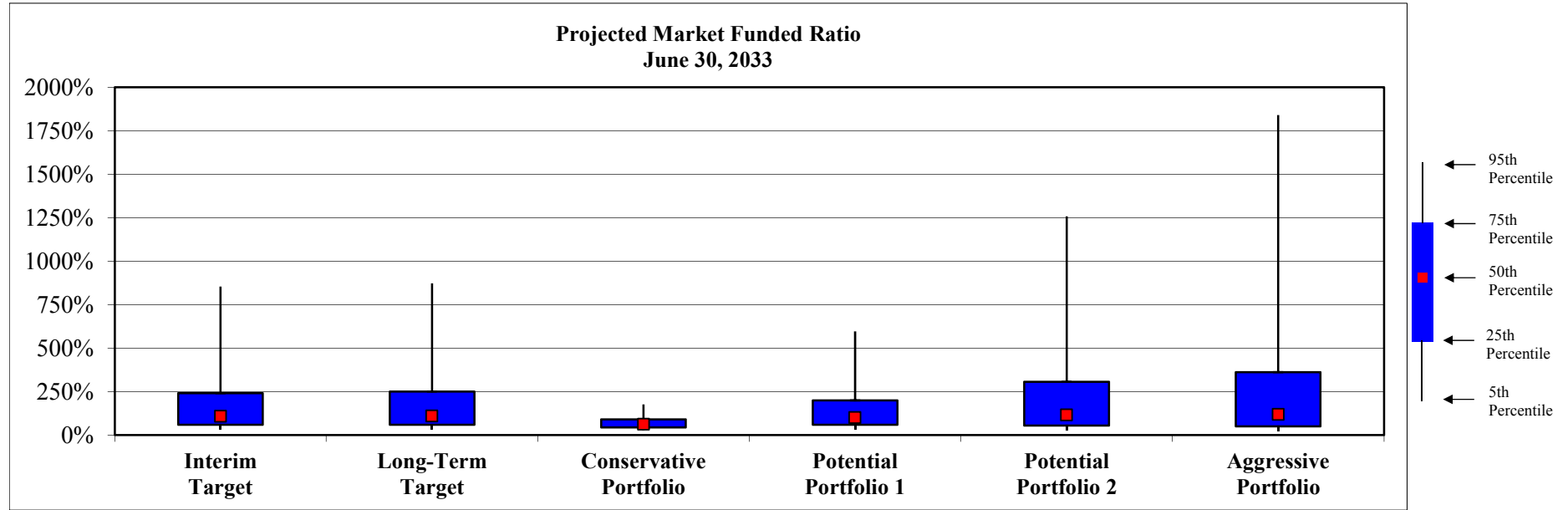
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$78	37%	\$78	37%	\$83	34%	\$75	39%	\$83	34%	\$89	31%
25th Percentile	\$47	62%	\$46	63%	\$65	48%	\$48	62%	\$50	60%	\$56	56%
50th Percentile	(\$9)	107%	(\$11)	108%	\$48	64%	\$1	99%	(\$21)	115%	(\$26)	118%
75th Percentile	(\$182)	223%	(\$190)	229%	\$15	89%	(\$116)	181%	(\$257)	278%	(\$329)	338%
95th Percentile	(\$1,058)	761%	(\$1,102)	777%	(\$119)	173%	(\$721)	546%	(\$1,648)	1161%	(\$2,565)	1640%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 2: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 20 Years

The graph below shows the distribution of possible market funded ratios twenty years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$85	31%	\$84	31%	\$91	28%	\$80	33%	\$91	27%	\$100	23%
25th Percentile	\$52	59%	\$52	60%	\$70	45%	\$52	59%	\$55	56%	\$60	51%
50th Percentile	(\$10)	108%	(\$13)	110%	\$51	61%	(\$1)	100%	(\$21)	115%	(\$29)	119%
75th Percentile	(\$213)	241%	(\$223)	249%	\$13	91%	(\$144)	199%	(\$294)	306%	(\$371)	361%
95th Percentile	(\$1,187)	854%	(\$1,245)	873%	(\$125)	175%	(\$812)	596%	(\$1,814)	1257%	(\$2,508)	1840%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Projected Market Funded Ratio and Maximum 1 Year Investment Loss (market value of assets/actuarial accrued liability)

The tables below show the probability that the Plan will be at various funding levels for each of the six different asset mixes highlighted on the prior pages. The tables also illustrate the maximum 1 year investment loss each portfolio is expected to experience during the given time period. The results assume the current contribution policy remains unchanged for all projection years. The maximum 1 year employer contribution does not include Pension Stabilization Fund contributions.

5 Years	Probability of Full Funding in 2018	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2018	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	19%	32%	22%	-57%	46%
Long-Term Target	19%	32%	22%	-56%	46%
Conservative Portfolio	4%	41%	25%	-47%	47%
Potential Portfolio 1	14%	31%	20%	-51%	46%
Potential Portfolio 2	21%	34%	26%	-66%	48%
Aggressive Portfolio	25%	36%	29%	-76%	49%

10 Years	Probability of Full Funding in 2023	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2023	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	32%	28%	20%	-57%	63%
Long-Term Target	32%	28%	20%	-56%	63%
Conservative Portfolio	11%	43%	30%	-47%	66%
Potential Portfolio 1	28%	27%	19%	-51%	63%
Potential Portfolio 2	35%	30%	23%	-66%	65%
Aggressive Portfolio	37%	34%	27%	-76%	67%

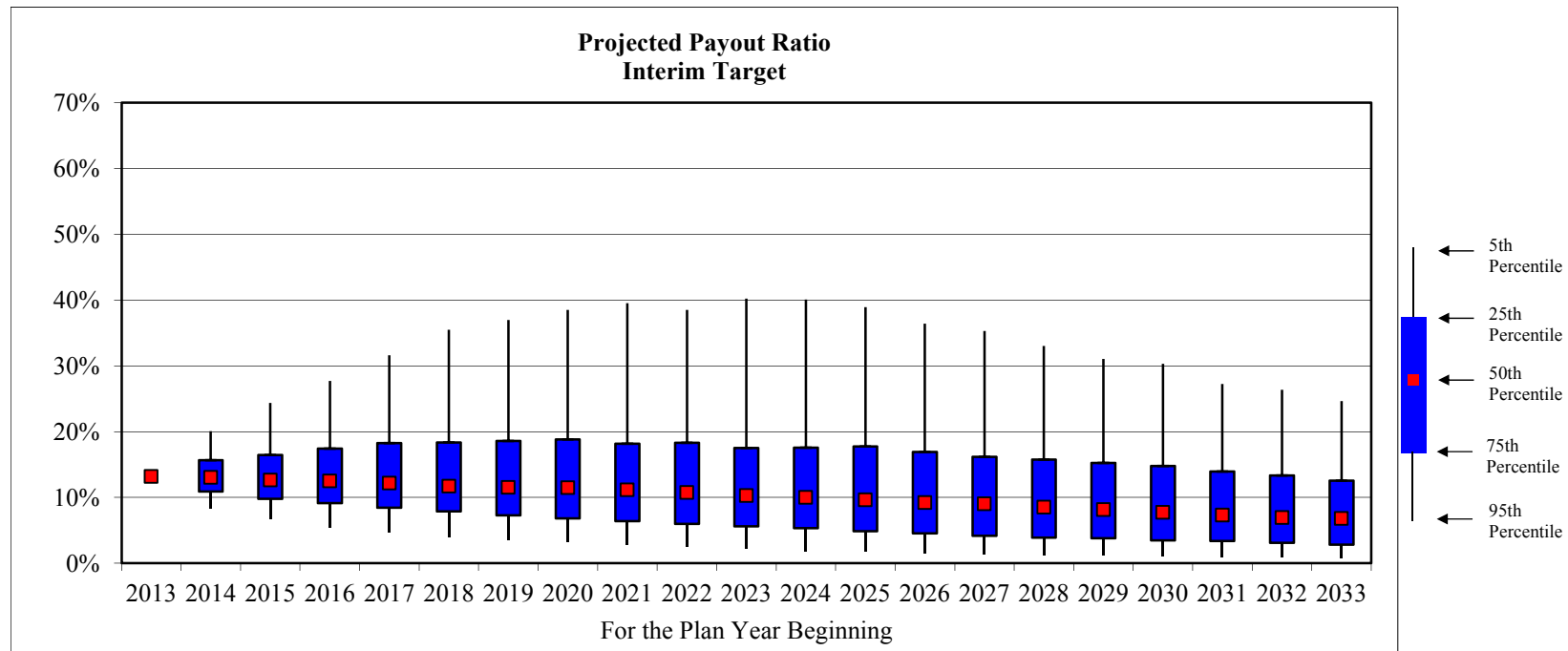
20 Years	Probability of Full Funding in 2033	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2033	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	53%	13%	7%	-57%	89%
Long-Term Target	54%	13%	7%	-56%	89%
Conservative Portfolio	20%	22%	12%	-47%	97%
Potential Portfolio 1	50%	12%	6%	-51%	88%
Potential Portfolio 2	55%	15%	10%	-66%	91%
Aggressive Portfolio	55%	19%	13%	-76%	92%

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Interim Target

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan’s assets are allocated according to the Interim Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 7% and 13%. The worst-case scenario could reach 40% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	12%	12%	12%	11%	11%	11%	10%	10%	10%	9%	9%	9%	8%	8%	7%	7%	7%

Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

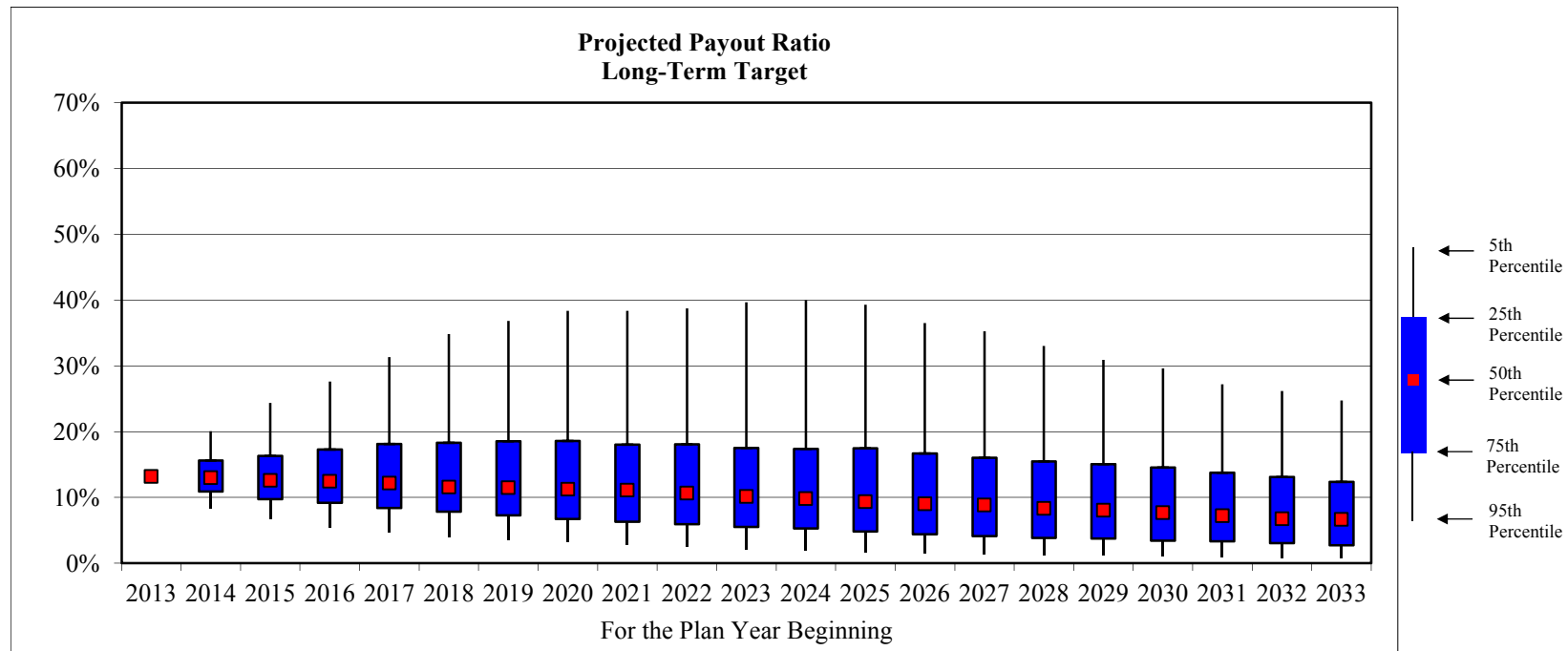


## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Long-Term Target

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan’s assets are allocated according to the Long-Term Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 7% and 13%. The worst-case scenario could reach 40% or higher.



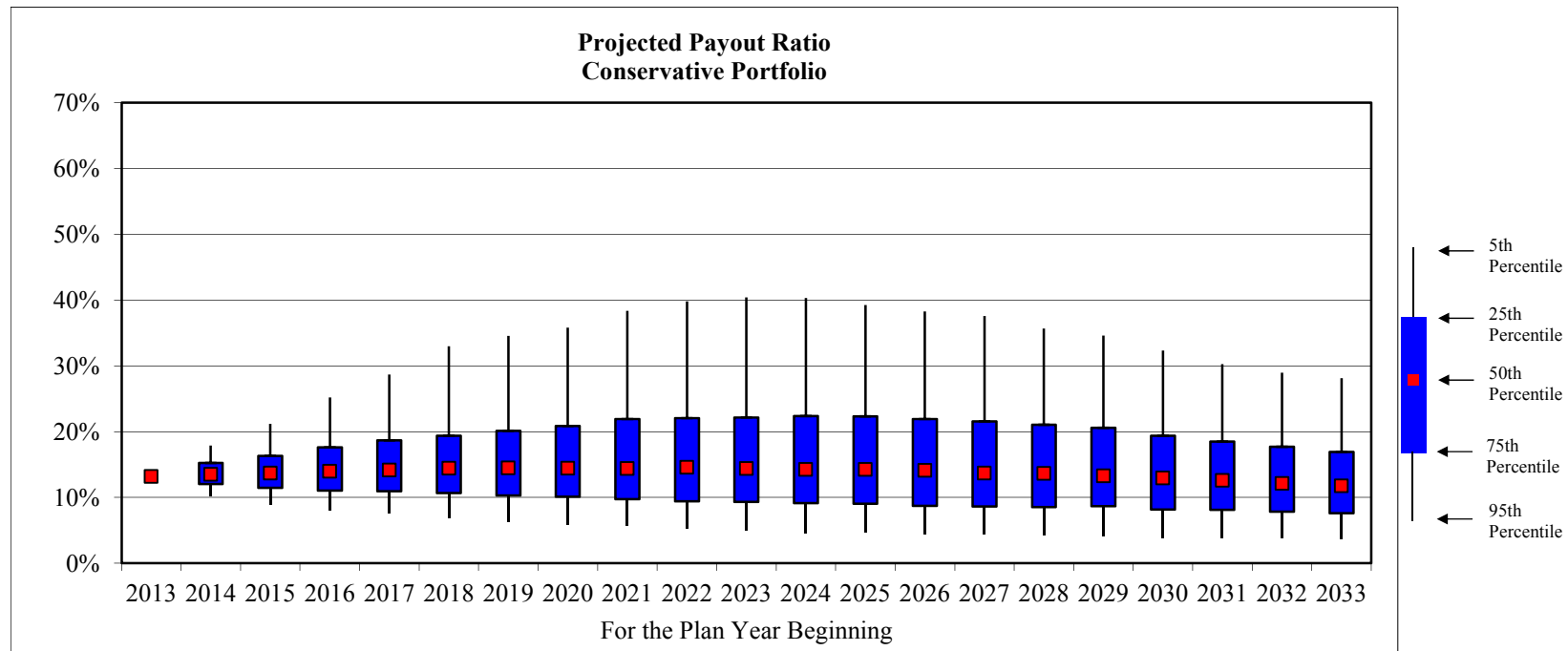
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Conservative Portfolio

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan’s assets are allocated according to the Conservative Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 12% and 15%. The worst-case scenario could reach 40% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	14%	14%	14%	14%	14%	14%	14%	14%	15%	14%	14%	14%	14%	14%	14%	13%	13%	13%	12%	12%

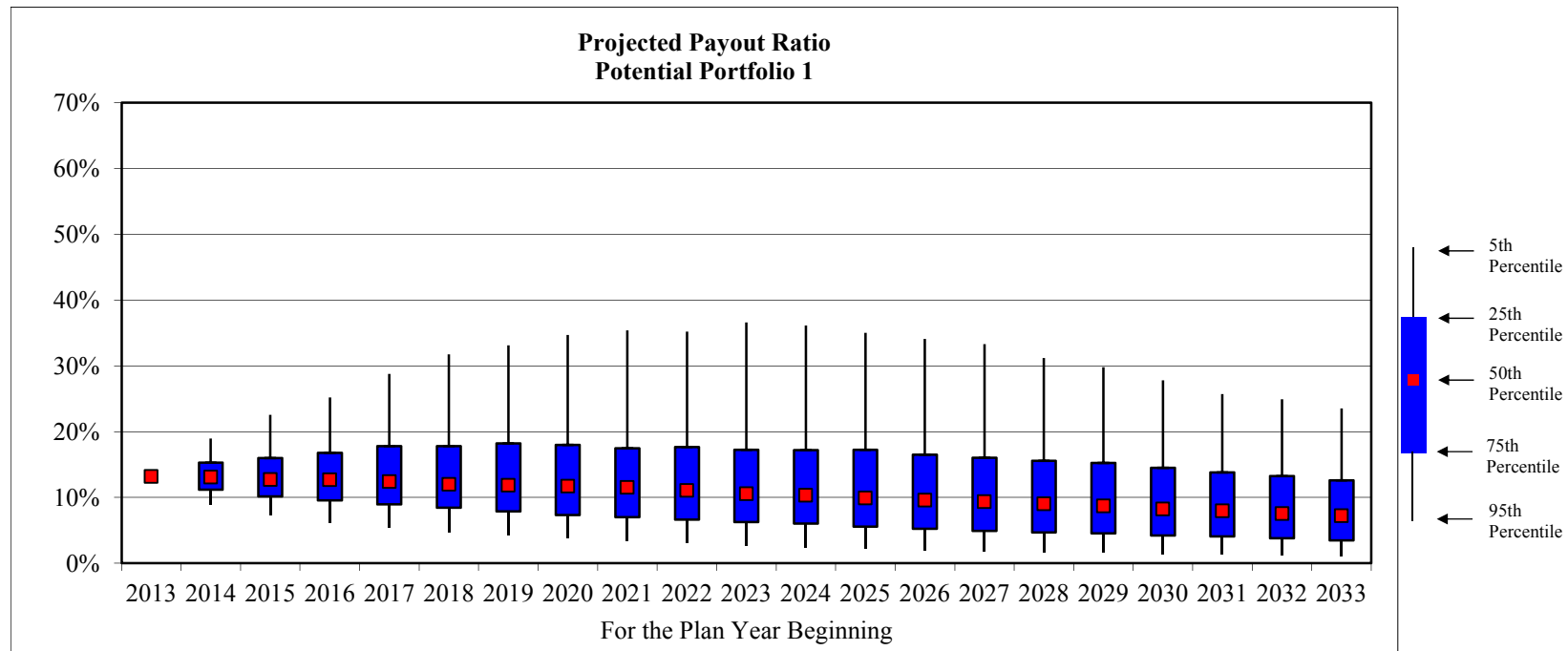
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Potential Portfolio 1

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan’s assets are allocated according to Potential Portfolio 1 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 7% and 13%. The worst-case scenario could reach 37% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	12%	12%	12%	12%	12%	11%	11%	10%	10%	10%	9%	9%	9%	8%	8%	8%	7%

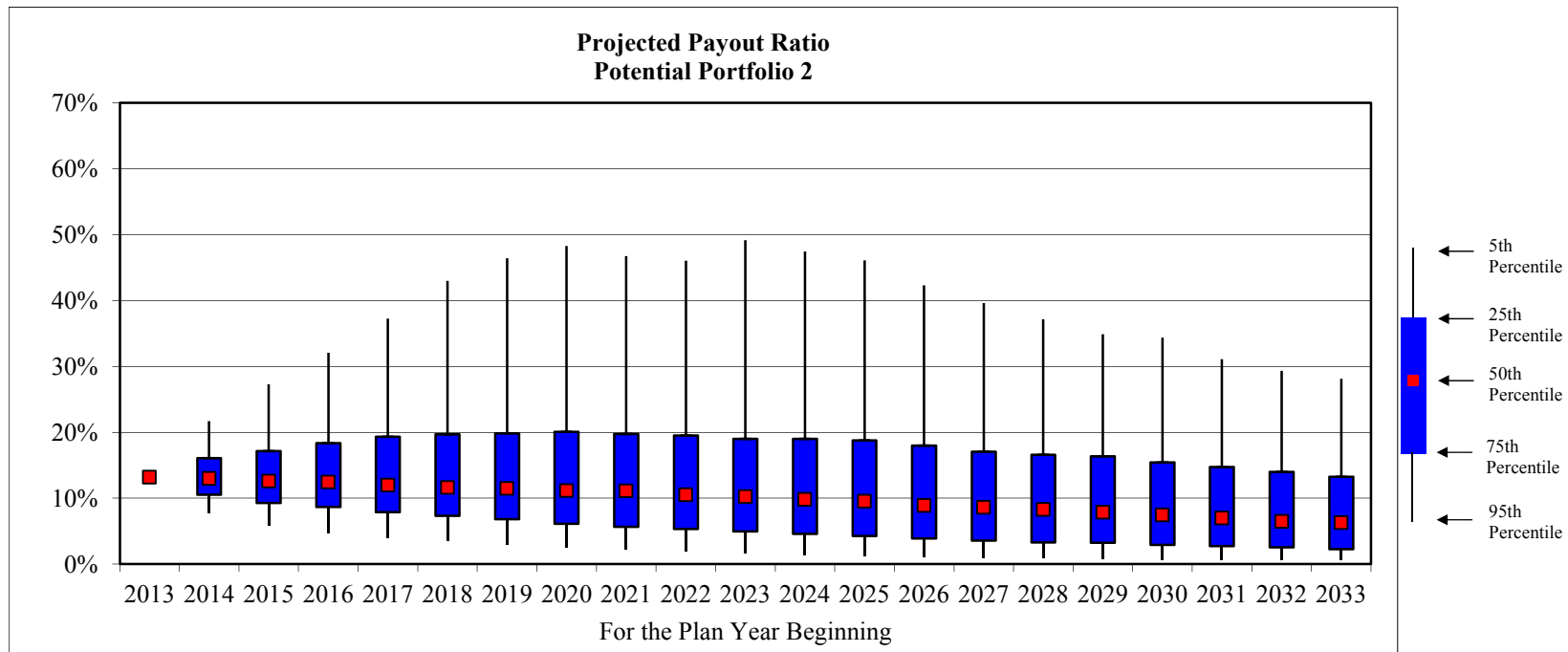
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Potential Portfolio 2

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan’s assets are allocated according to Potential Portfolio 2 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 6% and 13%. The worst-case scenario could reach 49% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	12%	12%	12%	11%	11%	11%	11%	10%	10%	10%	9%	9%	8%	8%	7%	7%	6%	6%

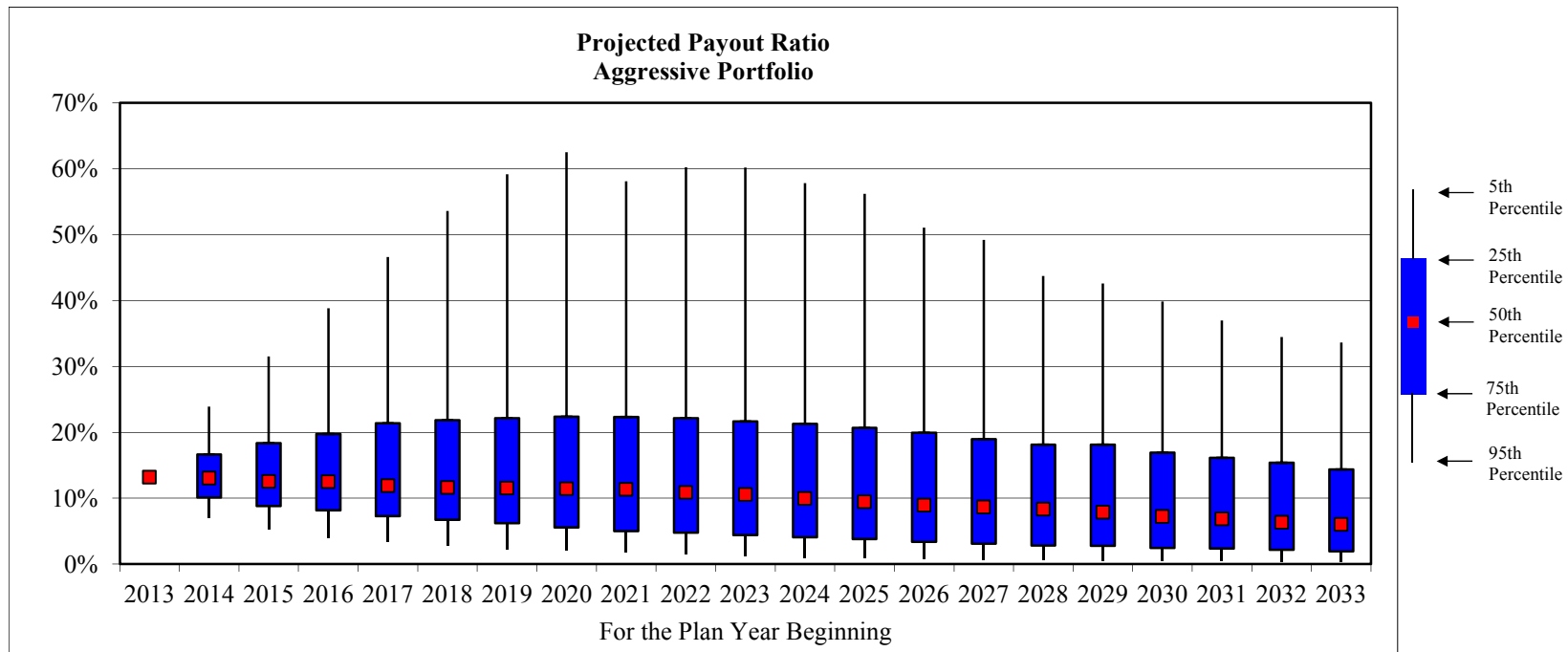
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 2: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

### Projected Payout Ratio (expected benefit payments/market value of assets); Aggressive Portfolio

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Aggressive Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 6% and 13%. The worst-case scenario could reach 62% or higher.



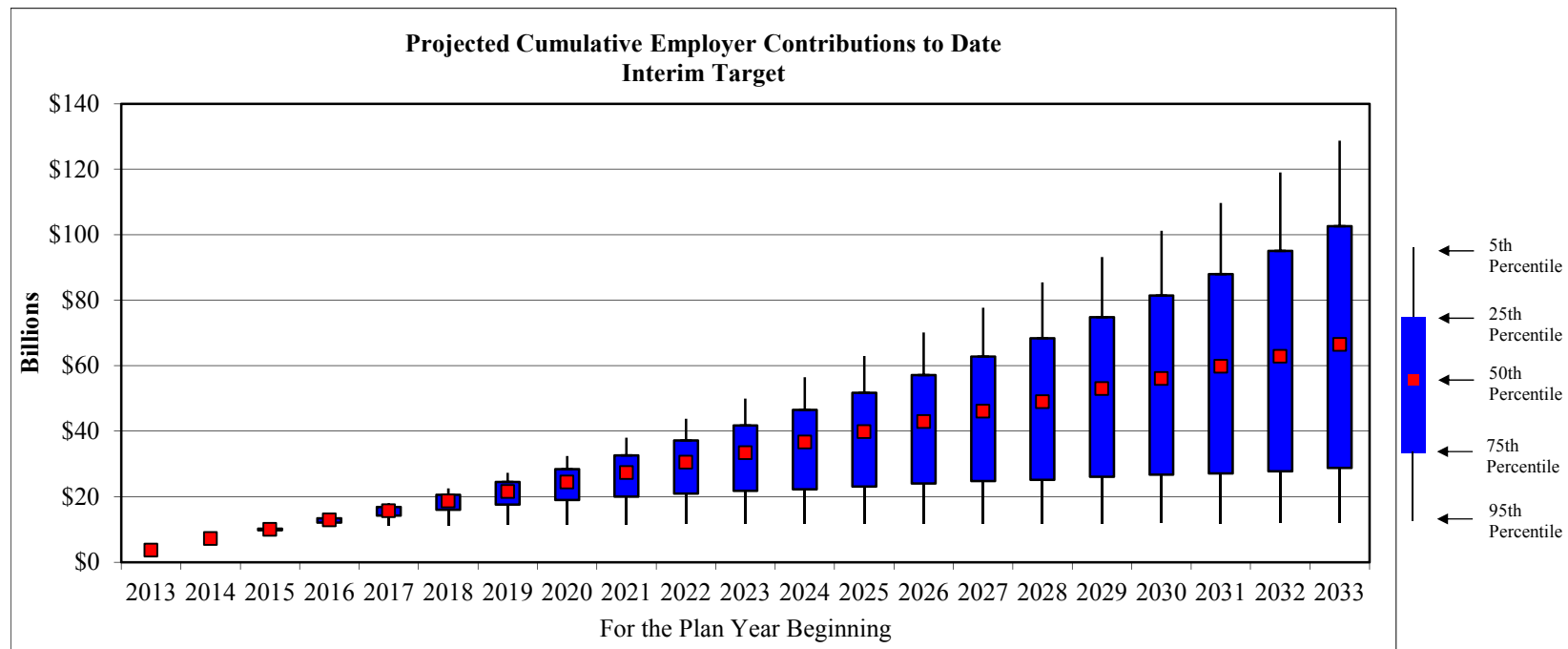
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	12%	12%	12%	12%	11%	11%	11%	11%	10%	9%	9%	9%	8%	8%	7%	7%	6%	6%

Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

## Appendix 2: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

### Cumulative Employer Contributions to Date; Interim Target

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Interim Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



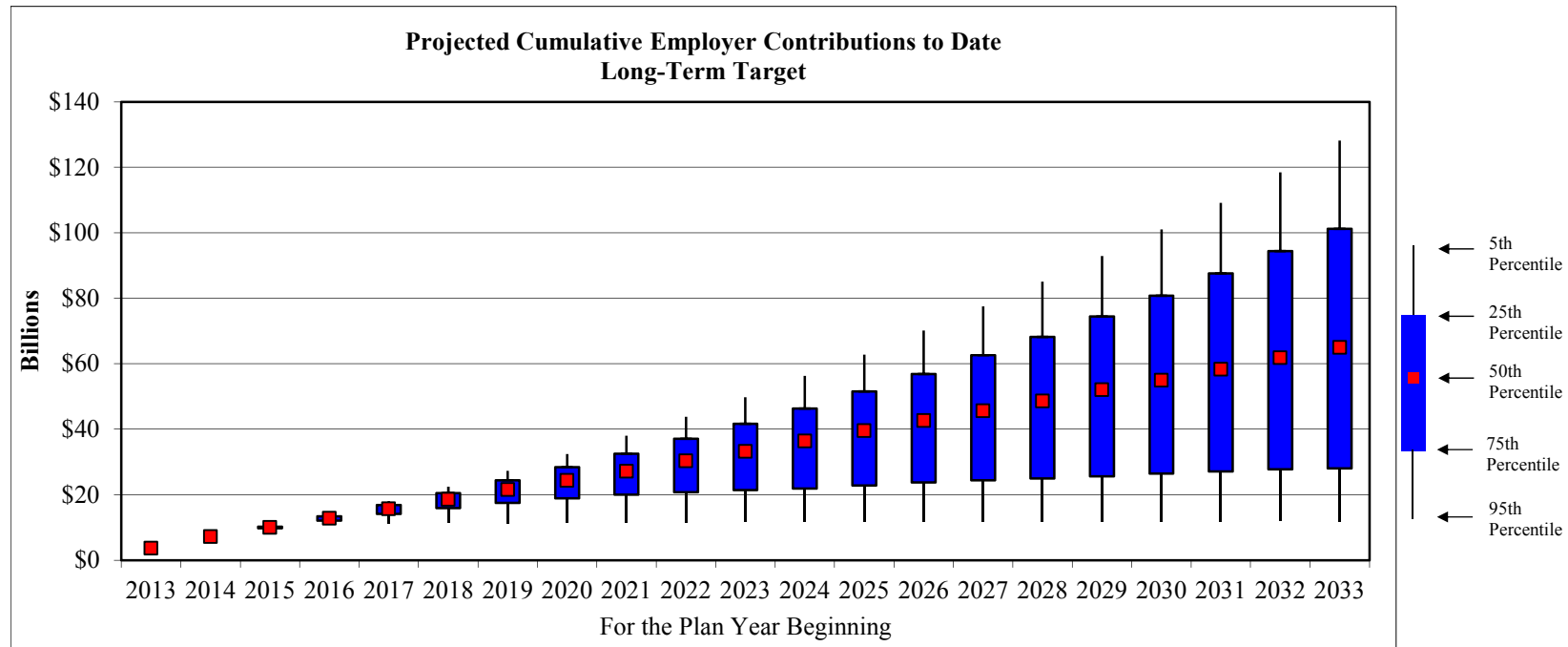
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$18	\$22	\$27	\$32	\$38	\$44	\$50	\$56	\$63	\$70	\$78	\$85	\$93	\$101	\$110	\$119	\$129
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$21	\$24	\$28	\$33	\$37	\$42	\$47	\$52	\$57	\$63	\$68	\$75	\$81	\$88	\$95	\$103
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$24	\$27	\$30	\$33	\$37	\$40	\$43	\$46	\$49	\$53	\$56	\$60	\$63	\$66
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$14	\$16	\$18	\$19	\$20	\$21	\$22	\$22	\$23	\$24	\$25	\$25	\$26	\$27	\$27	\$28	\$29
<b>95th Percentile</b>	\$4	\$7	\$9	\$11	\$11	\$11	\$11	\$11	\$11	\$12	\$12	\$12	\$12	\$12	\$12	\$12	\$12	\$12	\$12	\$12	\$12

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 2: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

### Cumulative Employer Contributions to Date; Long-Term Target

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Long-Term Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



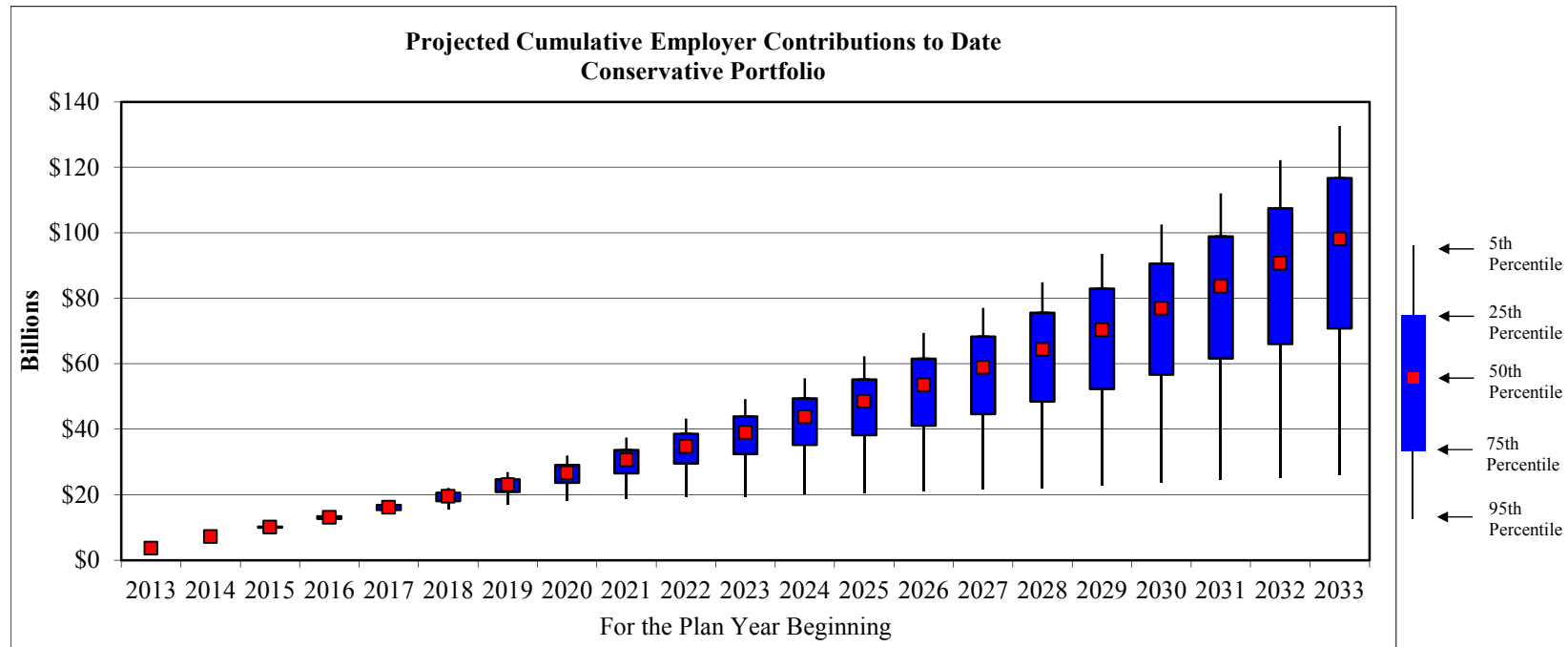
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$18	\$22	\$27	\$32	\$38	\$44	\$50	\$56	\$63	\$70	\$77	\$85	\$93	\$101	\$109	\$118	\$128
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$21	\$24	\$28	\$32	\$37	\$42	\$46	\$52	\$57	\$63	\$68	\$74	\$81	\$88	\$94	\$101
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$21	\$24	\$27	\$30	\$33	\$36	\$40	\$43	\$46	\$49	\$52	\$55	\$58	\$62	\$65
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$14	\$16	\$17	\$19	\$20	\$21	\$21	\$22	\$23	\$24	\$24	\$25	\$26	\$26	\$27	\$28	\$28
<b>95th Percentile</b>	\$4	\$7	\$9	\$11	\$11	\$11	\$11	\$11	\$11	\$12	\$12	\$12	\$12	\$12	\$12	\$12	\$12	\$12	\$12	\$12	\$12

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 2: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

### Cumulative Employer Contributions to Date; Conservative Portfolio

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Conservative Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$18	\$22	\$27	\$32	\$37	\$43	\$49	\$55	\$62	\$69	\$77	\$85	\$94	\$102	\$112	\$122	\$133
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$21	\$25	\$29	\$34	\$39	\$44	\$49	\$55	\$61	\$68	\$76	\$83	\$91	\$99	\$107	\$117
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$23	\$27	\$31	\$35	\$39	\$44	\$48	\$54	\$59	\$64	\$70	\$77	\$84	\$91	\$98
<b>75th Percentile</b>	\$4	\$7	\$10	\$13	\$15	\$18	\$21	\$24	\$27	\$30	\$32	\$35	\$38	\$41	\$45	\$48	\$52	\$57	\$62	\$66	\$71
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$14	\$16	\$17	\$18	\$19	\$19	\$19	\$20	\$21	\$21	\$22	\$22	\$23	\$24	\$25	\$25	\$26

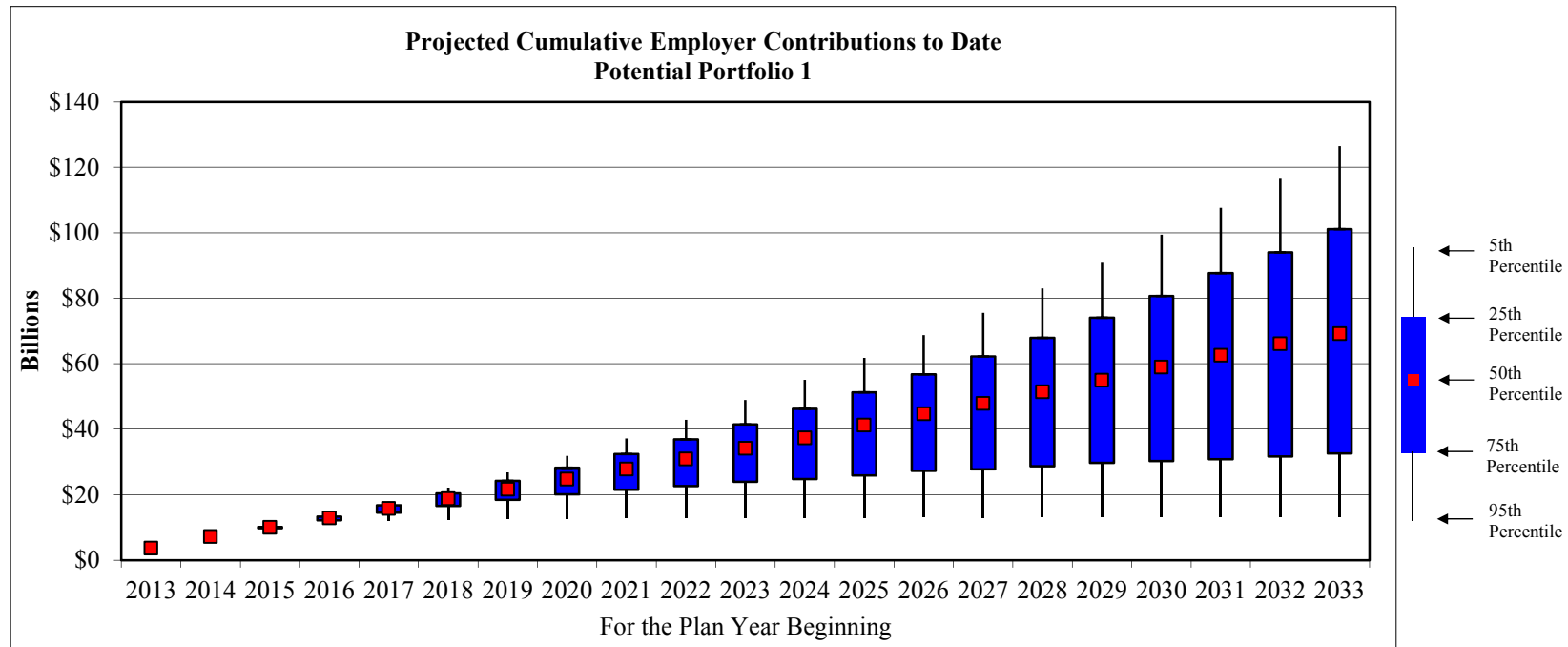
Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.



## Appendix 2: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

### Cumulative Employer Contributions to Date; Potential Portfolio 1

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 1 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



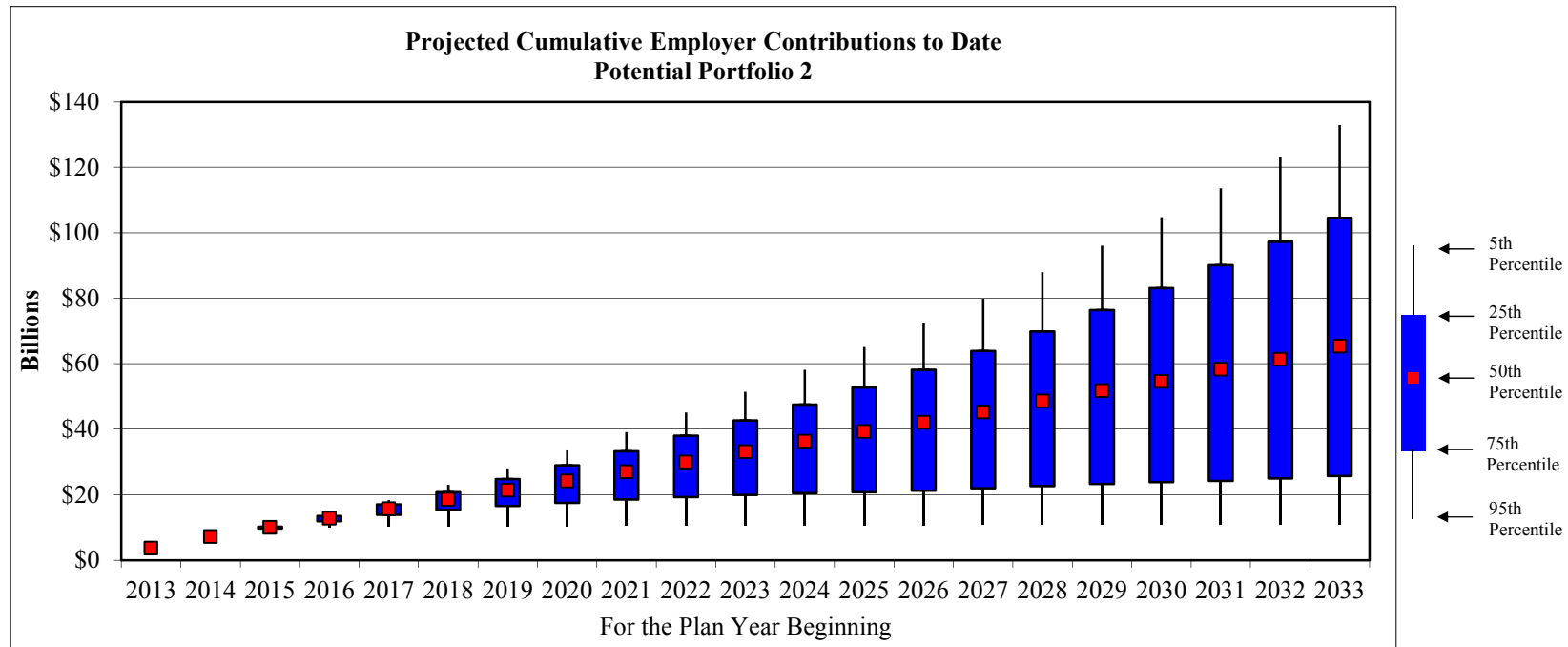
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$18	\$22	\$27	\$32	\$37	\$43	\$49	\$55	\$62	\$69	\$76	\$83	\$91	\$99	\$108	\$117	\$126
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$20	\$24	\$28	\$32	\$37	\$41	\$46	\$51	\$57	\$62	\$68	\$74	\$81	\$88	\$94	\$101
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$31	\$34	\$37	\$41	\$45	\$48	\$51	\$55	\$59	\$63	\$66	\$69
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$17	\$18	\$20	\$22	\$23	\$24	\$25	\$26	\$27	\$28	\$29	\$30	\$30	\$31	\$32	\$33
<b>95th Percentile</b>	\$4	\$7	\$9	\$11	\$12	\$12	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 2: Sensitivity Analysis: "Effect of Higher Volatility" (continued)

### Cumulative Employer Contributions to Date; Potential Portfolio 2

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 2 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



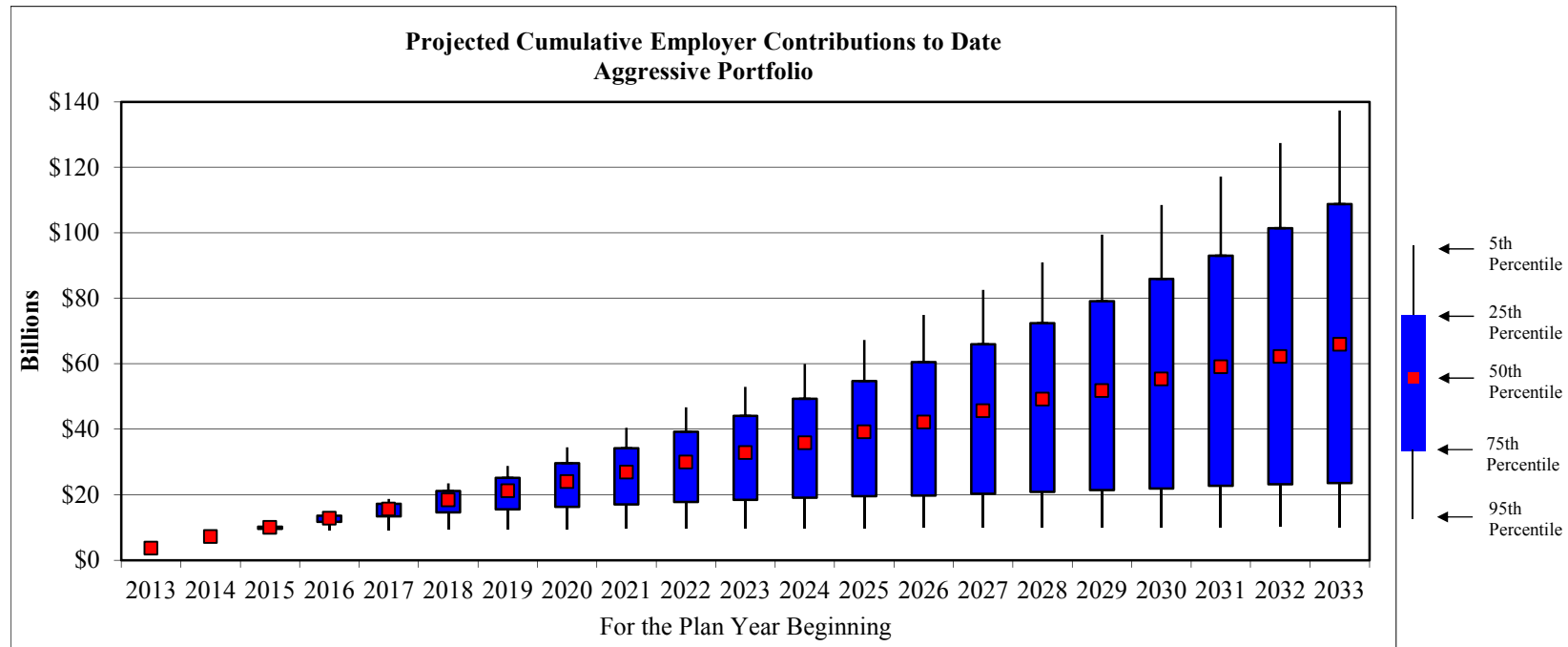
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$18	\$23	\$28	\$33	\$39	\$45	\$51	\$58	\$65	\$73	\$80	\$88	\$96	\$105	\$114	\$123	\$133
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$21	\$25	\$29	\$33	\$38	\$43	\$48	\$53	\$58	\$64	\$70	\$76	\$83	\$90	\$97	\$105
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$21	\$24	\$27	\$30	\$33	\$36	\$39	\$42	\$45	\$49	\$52	\$55	\$58	\$61	\$65
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$14	\$15	\$17	\$18	\$19	\$19	\$20	\$20	\$21	\$21	\$22	\$23	\$23	\$24	\$24	\$25	\$26
<b>95th Percentile</b>	\$4	\$7	\$9	\$10	\$10	\$10	\$10	\$10	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11	\$11

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Cumulative Employer Contributions to Date; Aggressive Portfolio

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan’s assets are allocated according to the Aggressive Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$11	\$14	\$19	\$23	\$29	\$34	\$40	\$47	\$53	\$60	\$67	\$75	\$83	\$91	\$99	\$108	\$117	\$127	\$137
<b>25th Percentile</b>	\$4	\$7	\$10	\$14	\$17	\$21	\$25	\$30	\$34	\$39	\$44	\$49	\$55	\$60	\$66	\$72	\$79	\$86	\$93	\$101	\$109
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$18	\$21	\$24	\$27	\$30	\$33	\$36	\$39	\$42	\$46	\$49	\$52	\$55	\$59	\$62	\$66
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$13	\$15	\$16	\$16	\$17	\$18	\$18	\$19	\$20	\$20	\$20	\$21	\$21	\$22	\$23	\$23	\$24
<b>95th Percentile</b>	\$4	\$7	\$9	\$9	\$9	\$9	\$9	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10	\$10

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Employer Contributions (as a weighted average percentage of salary)

The tables below show the range of required employer contributions (as a weighted average percentage of salary) assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.

5 Years	Required Employer Contribution for Plan Year Beginning 2018				
	5th	25th	50th	75th	95th
Interim Target	46%	34%	25%	15%	0%
Long-Term Target	46%	34%	25%	15%	0%
Conservative Portfolio	47%	35%	28%	22%	12%
Potential Portfolio 1	46%	34%	25%	17%	0%
Potential Portfolio 2	48%	35%	24%	12%	0%
Aggressive Portfolio	49%	36%	24%	10%	0%

10 Years	Required Employer Contribution for Plan Year Beginning 2023				
	5th	25th	50th	75th	95th
Interim Target	63%	37%	22%	0%	0%
Long-Term Target	63%	37%	22%	0%	0%
Conservative Portfolio	66%	42%	30%	18%	0%
Potential Portfolio 1	63%	37%	23%	4%	0%
Potential Portfolio 2	65%	39%	22%	0%	0%
Aggressive Portfolio	67%	40%	22%	0%	0%

20 Years	Required Employer Contribution for Plan Year Beginning 2033				
	5th	25th	50th	75th	95th
Interim Target	89%	46%	12%	0%	0%
Long-Term Target	89%	45%	11%	0%	0%
Conservative Portfolio	97%	59%	37%	18%	0%
Potential Portfolio 1	88%	45%	17%	0%	0%
Potential Portfolio 2	91%	47%	9%	0%	0%
Aggressive Portfolio	92%	49%	8%	0%	0%

## Appendix 2: Sensitivity Analysis: “Effect of Higher Volatility” (continued)

### Drawing Inferences

The tables below compare the projected actuarial and market funded ratios five, ten, and twenty years from now, under the median (50<sup>th</sup> percentile), worst-case (5<sup>th</sup> percentile), and best-case (95<sup>th</sup> percentile) scenarios, assuming the six different asset mixes highlighted on the prior pages. The table also displays for comparative purposes the median, peak, and trough projected payout ratios and cumulative employer contributions assuming the same six asset mixes being examined. The cumulative employer contributions do not include Pension Stabilization Fund contributions.

5 Years	Actuarial Funded Ratio in Year 5			Market Funded Ratio in Year 5			Cumulative Employer Contributions in Year 5 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 5 Median	2013-2018	
											Peak	Trough
Interim Target	56%	28%	117%	58%	20%	160%	\$19	\$22	\$11	12%	35%	4%
Long-Term Target	56%	28%	119%	58%	20%	162%	\$19	\$22	\$11	12%	35%	4%
Conservative Portfolio	49%	30%	78%	47%	21%	93%	\$20	\$22	\$16	14%	33%	7%
Potential Portfolio 1	55%	30%	104%	56%	22%	136%	\$19	\$22	\$12	12%	32%	5%
Potential Portfolio 2	57%	25%	140%	58%	16%	194%	\$19	\$23	\$10	12%	43%	3%
Aggressive Portfolio	58%	22%	164%	57%	13%	237%	\$18	\$23	\$9	12%	54%	3%

10 Years	Actuarial Funded Ratio in Year 10			Market Funded Ratio in Year 10			Cumulative Employer Contributions in Year 10 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 10 Median	2013-2023	
											Peak	Trough
Interim Target	66%	23%	248%	66%	18%	302%	\$33	\$50	\$12	10%	40%	2%
Long-Term Target	67%	23%	252%	67%	18%	306%	\$33	\$50	\$12	10%	40%	2%
Conservative Portfolio	50%	22%	113%	47%	18%	126%	\$39	\$49	\$19	14%	40%	5%
Potential Portfolio 1	64%	25%	196%	64%	20%	239%	\$34	\$49	\$13	11%	37%	3%
Potential Portfolio 2	66%	20%	325%	66%	15%	414%	\$33	\$51	\$11	10%	49%	2%
Aggressive Portfolio	67%	17%	412%	64%	12%	541%	\$33	\$53	\$10	11%	62%	1%

20 Years	Actuarial Funded Ratio in Year 20			Market Funded Ratio in Year 20			Cumulative Employer Contributions in Year 20 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 20 Median	2013-2033	
											Peak	Trough
Interim Target	107%	37%	761%	108%	31%	854%	\$66	\$129	\$12	7%	40%	1%
Long-Term Target	108%	37%	777%	110%	31%	873%	\$65	\$128	\$12	7%	40%	1%
Conservative Portfolio	64%	34%	173%	61%	28%	175%	\$98	\$133	\$26	12%	40%	4%
Potential Portfolio 1	99%	39%	546%	100%	33%	596%	\$69	\$126	\$13	7%	37%	1%
Potential Portfolio 2	115%	34%	1161%	115%	27%	1257%	\$65	\$133	\$11	6%	49%	1%
Aggressive Portfolio	118%	31%	1640%	119%	23%	1840%	\$66	\$137	\$10	6%	62%	0%

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations”

This section provides a sensitivity analysis of the original stochastic projections by assuming that all asset classes are perfectly positively correlated (i.e. correlation = 1.00). A correlation matrix reflecting these modified assumptions is provided below:

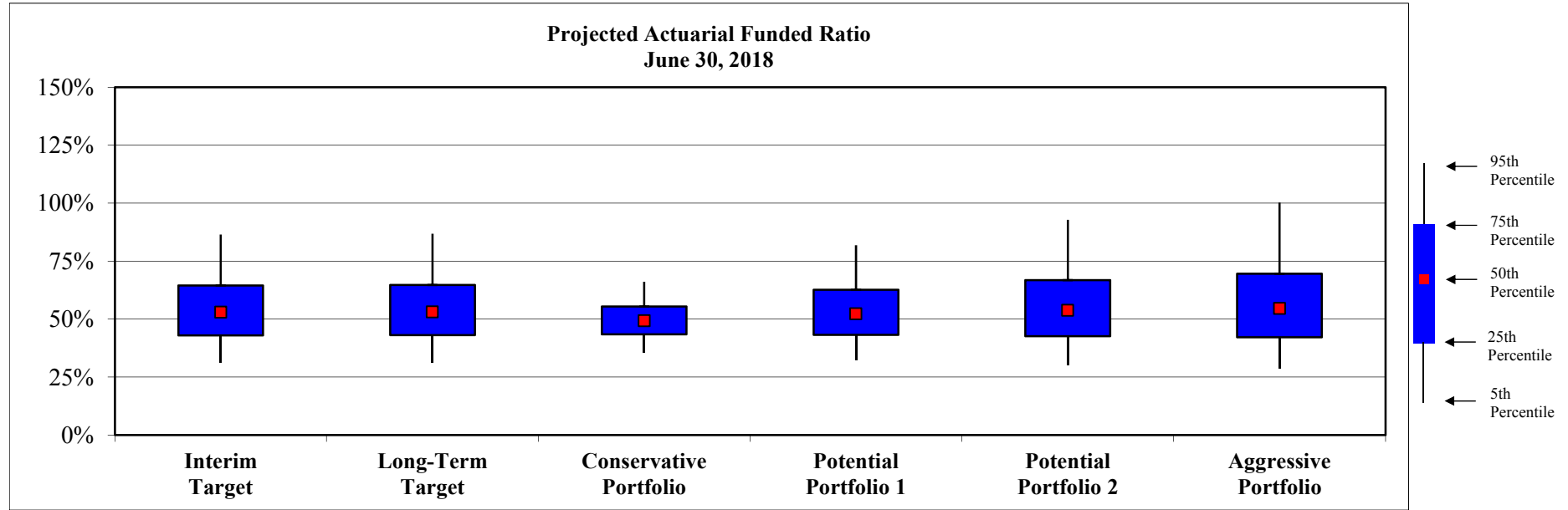
	Broad US Equity	Broad International Equity	TRS Fixed Income	TRS Real Estate	Diversified Hedge Funds	GTAA	Private Equity	Cash Equivalents
Broad US Equity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Broad International Equity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TRS Fixed Income	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TRS Real Estate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Diversified Hedge Funds	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GTAA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Private Equity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cash Equivalents	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

RVK supports the recommendations based on the original assumptions shown in the Stochastic Analysis section of this report. However, this stress-testing illustrates that converging correlations across capital markets does not change the asset allocation recommendations, based on the current status of the Plan. Instead it simply widens the range of potential results, indicating higher risk for all asset mixes given the dampened effects of total fund diversification.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 5 Years

The graph below shows the distribution of possible actuarial funded ratios five years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



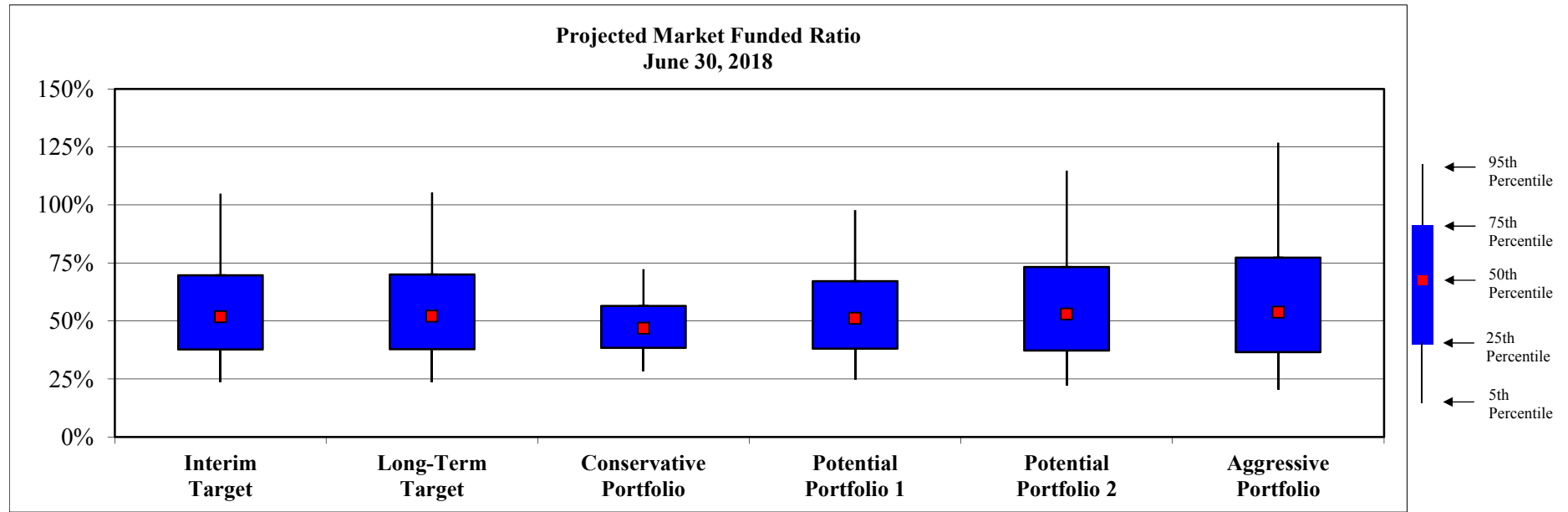
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$61	31%	\$61	31%	\$57	36%	\$60	32%	\$62	30%	\$64	29%
25th Percentile	\$52	43%	\$52	43%	\$52	43%	\$52	43%	\$52	43%	\$52	42%
50th Percentile	\$44	53%	\$44	53%	\$47	49%	\$44	52%	\$43	54%	\$42	55%
75th Percentile	\$34	64%	\$33	65%	\$42	55%	\$35	63%	\$31	67%	\$29	70%
95th Percentile	\$13	86%	\$13	87%	\$33	66%	\$18	82%	\$7	93%	(\$0)	100%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 5 Years

The graph below shows the distribution of possible market funded ratios five years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$68	24%	\$68	24%	\$64	29%	\$67	25%	\$69	22%	\$71	21%
25th Percentile	\$57	38%	\$57	38%	\$56	38%	\$56	38%	\$57	37%	\$58	37%
50th Percentile	\$45	52%	\$45	52%	\$49	47%	\$45	51%	\$44	53%	\$43	54%
75th Percentile	\$29	70%	\$28	70%	\$41	56%	\$31	67%	\$25	73%	\$22	77%
95th Percentile	(\$5)	105%	(\$5)	105%	\$27	72%	\$2	98%	(\$15)	115%	(\$27)	127%

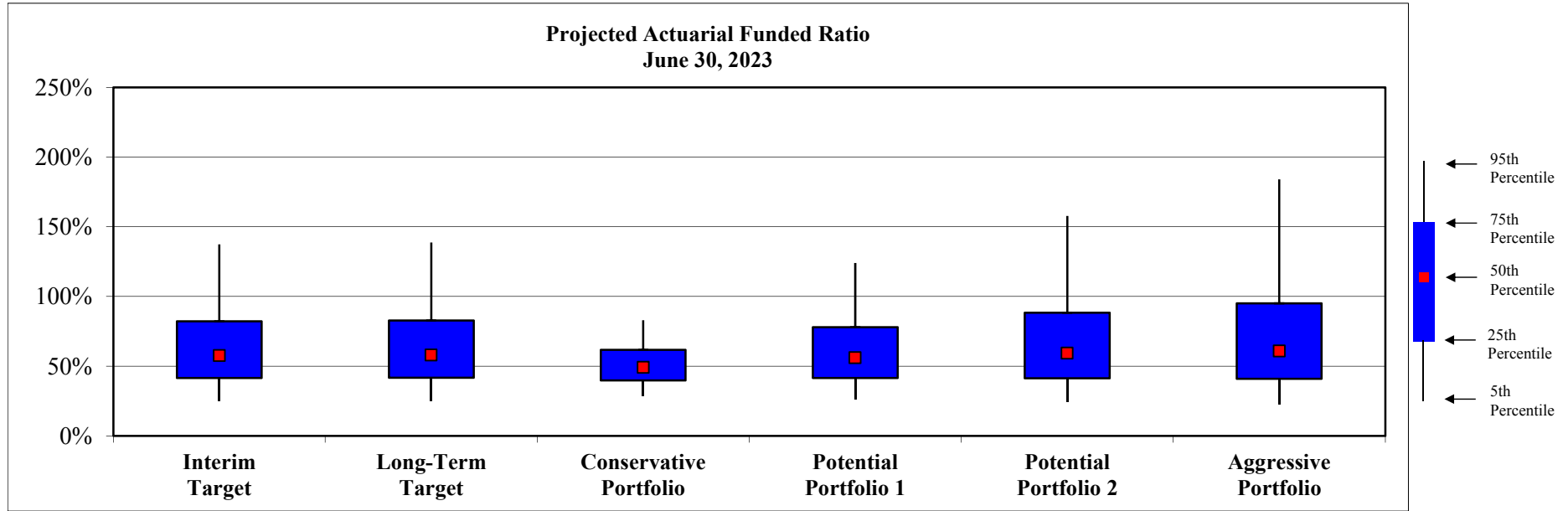
Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.



### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 10 Years

The graph below shows the distribution of possible actuarial funded ratios ten years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



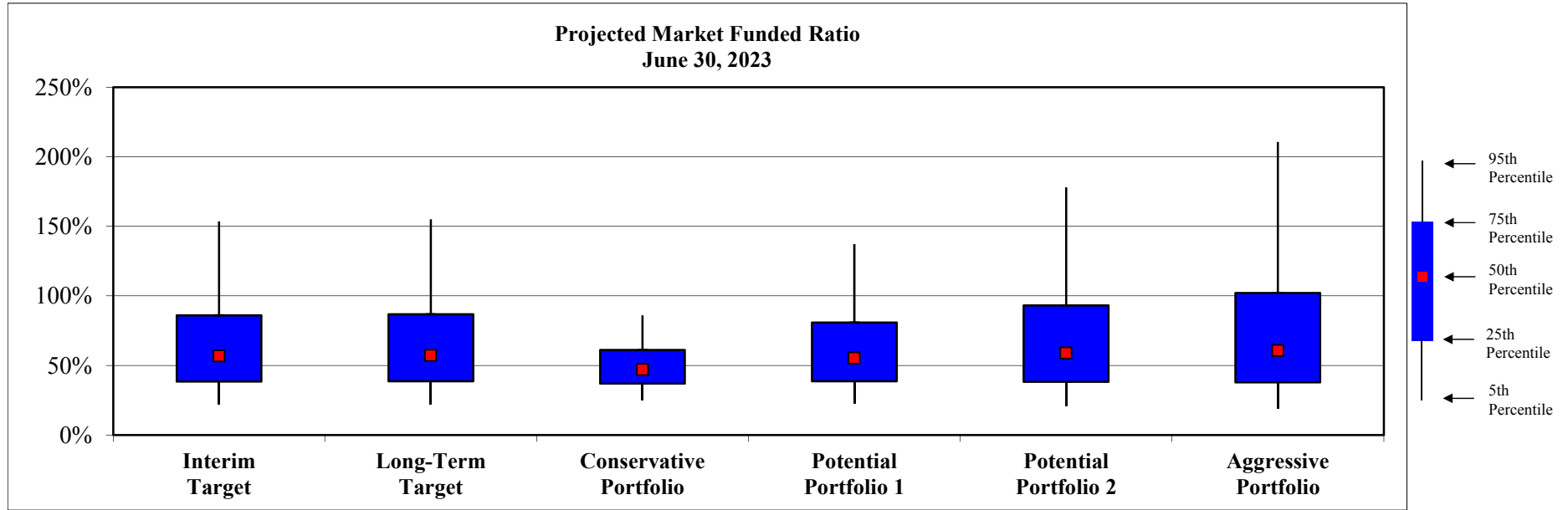
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$72	25%	\$72	25%	\$69	29%	\$71	26%	\$73	24%	\$75	23%
25th Percentile	\$59	42%	\$59	42%	\$60	40%	\$59	42%	\$59	41%	\$59	41%
50th Percentile	\$44	58%	\$44	58%	\$53	49%	\$46	56%	\$42	59%	\$41	61%
75th Percentile	\$19	82%	\$19	83%	\$41	62%	\$24	78%	\$13	88%	\$5	95%
95th Percentile	(\$44)	137%	(\$45)	139%	\$19	83%	(\$28)	124%	(\$67)	158%	(\$97)	184%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 10 Years

The graph below shows the distribution of possible market funded ratios ten years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



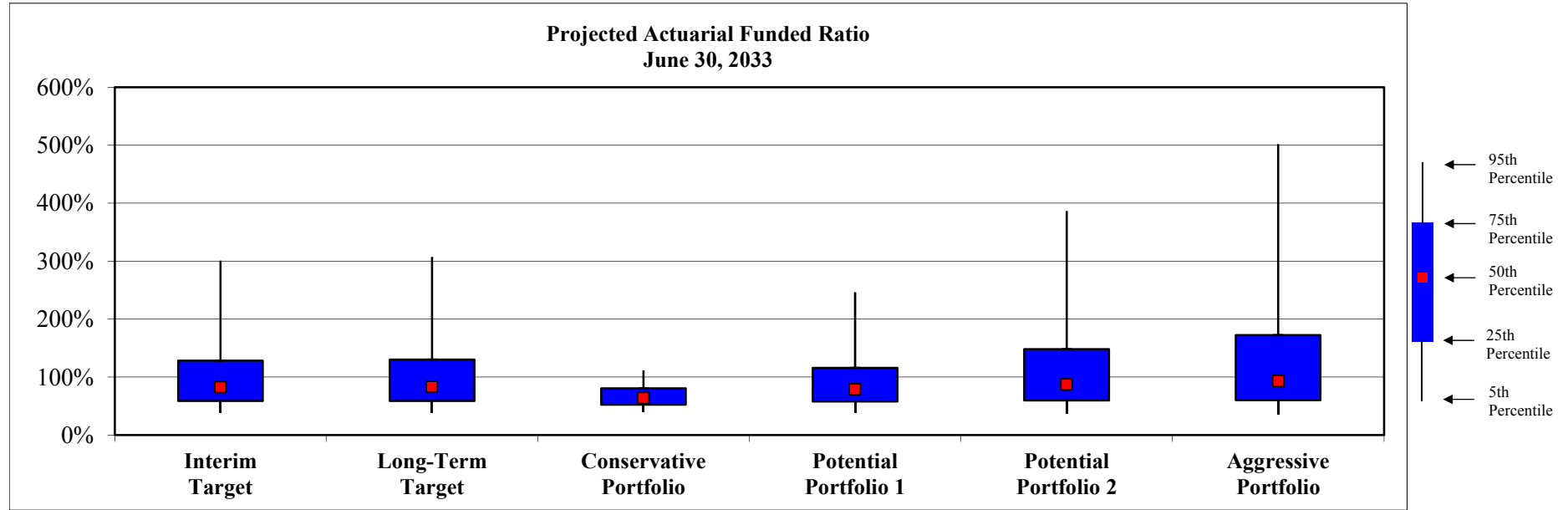
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$75	22%	\$75	22%	\$72	25%	\$75	23%	\$77	20%	\$78	19%
25th Percentile	\$62	39%	\$61	39%	\$63	37%	\$62	39%	\$62	38%	\$62	38%
50th Percentile	\$45	57%	\$45	57%	\$55	47%	\$46	55%	\$43	59%	\$41	61%
75th Percentile	\$15	86%	\$14	87%	\$42	61%	\$21	81%	\$7	93%	(\$2)	102%
95th Percentile	(\$63)	153%	(\$65)	155%	\$16	86%	(\$43)	137%	(\$90)	178%	(\$127)	211%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Actuarial Funded Ratio (actuarial value of assets/actuarial accrued liability); 20 Years

The graph below shows the distribution of possible actuarial funded ratios twenty years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



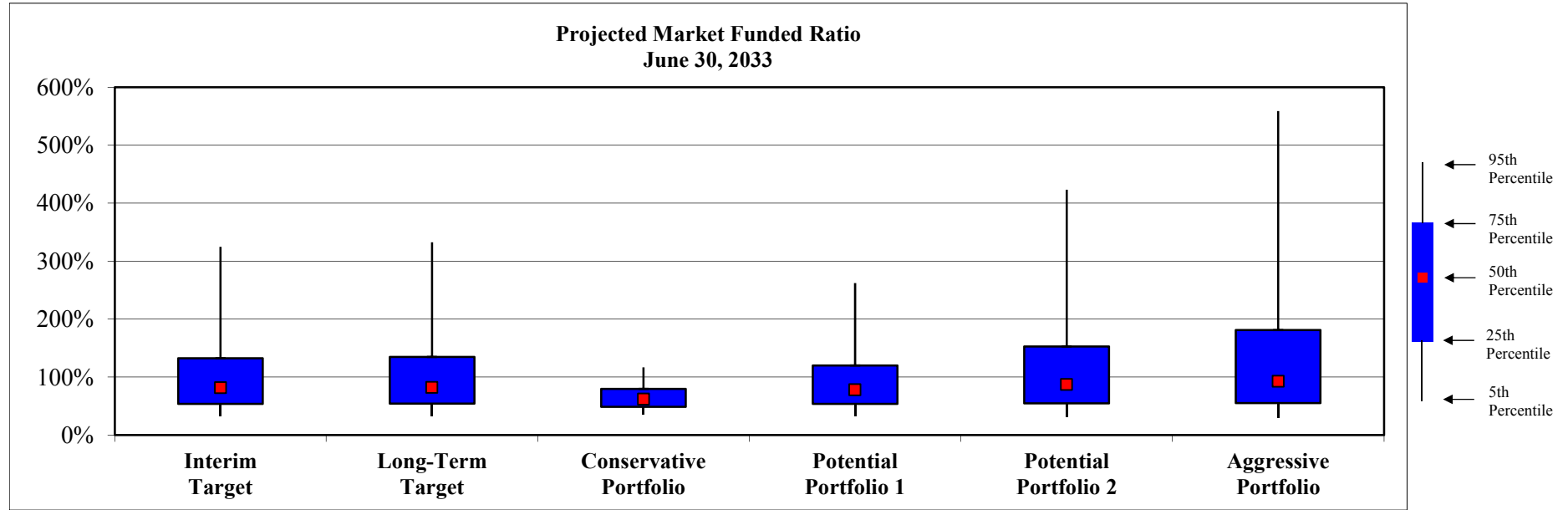
	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$68	38%	\$68	38%	\$66	39%	\$67	38%	\$69	37%	\$71	36%
25th Percentile	\$50	59%	\$49	59%	\$57	52%	\$50	58%	\$48	60%	\$48	60%
50th Percentile	\$22	82%	\$21	83%	\$46	64%	\$27	79%	\$16	87%	\$9	93%
75th Percentile	(\$39)	128%	(\$42)	130%	\$27	80%	(\$22)	116%	(\$67)	148%	(\$100)	172%
95th Percentile	(\$322)	301%	(\$332)	307%	(\$18)	112%	(\$236)	247%	(\$457)	386%	(\$648)	502%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Market Funded Ratio (market value of assets/actuarial accrued liability); 20 Years

The graph below shows the distribution of possible market funded ratios twenty years from now, assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years.



	Interim Target		Long-Term Target		Conservative Portfolio		Potential Portfolio 1		Potential Portfolio 2		Aggressive Portfolio	
	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio	Unfunded Liability (Bil)	Funded Ratio
5th Percentile	\$76	32%	\$75	33%	\$72	35%	\$75	33%	\$77	31%	\$78	30%
25th Percentile	\$55	54%	\$54	54%	\$61	49%	\$55	53%	\$53	55%	\$53	55%
50th Percentile	\$23	81%	\$22	82%	\$48	62%	\$28	78%	\$16	87%	\$9	93%
75th Percentile	(\$46)	132%	(\$48)	135%	\$28	80%	(\$28)	120%	(\$74)	153%	(\$112)	181%
95th Percentile	(\$362)	325%	(\$374)	332%	(\$26)	117%	(\$261)	262%	(\$518)	423%	(\$729)	559%

Percentiles indicate the probability of achieving a Funded Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Funded Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Market Funded Ratio and Maximum 1 Year Investment Loss (market value of assets/actuarial accrued liability)

The tables below show the probability that the Plan will be at various funding levels for each of the six different asset mixes highlighted on the prior pages. The tables also illustrate the maximum 1 year investment loss each portfolio is expected to experience during the given time period. The results assume the current contribution policy remains unchanged for all projection years. The maximum 1 year employer contribution does not include Pension Stabilization Fund contributions.

5 Years	Probability of Full Funding in 2018	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2018	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	6%	33%	20%	-44%	44%
Long-Term Target	7%	33%	20%	-44%	44%
Conservative Portfolio	0%	36%	16%	-29%	41%
Potential Portfolio 1	4%	33%	19%	-41%	43%
Potential Portfolio 2	10%	33%	21%	-47%	44%
Aggressive Portfolio	13%	34%	23%	-52%	45%

10 Years	Probability of Full Funding in 2023	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2023	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	18%	30%	20%	-44%	55%
Long-Term Target	19%	30%	20%	-44%	55%
Conservative Portfolio	2%	39%	21%	-30%	53%
Potential Portfolio 1	15%	31%	20%	-41%	54%
Potential Portfolio 2	22%	30%	21%	-48%	56%
Aggressive Portfolio	26%	30%	21%	-52%	57%

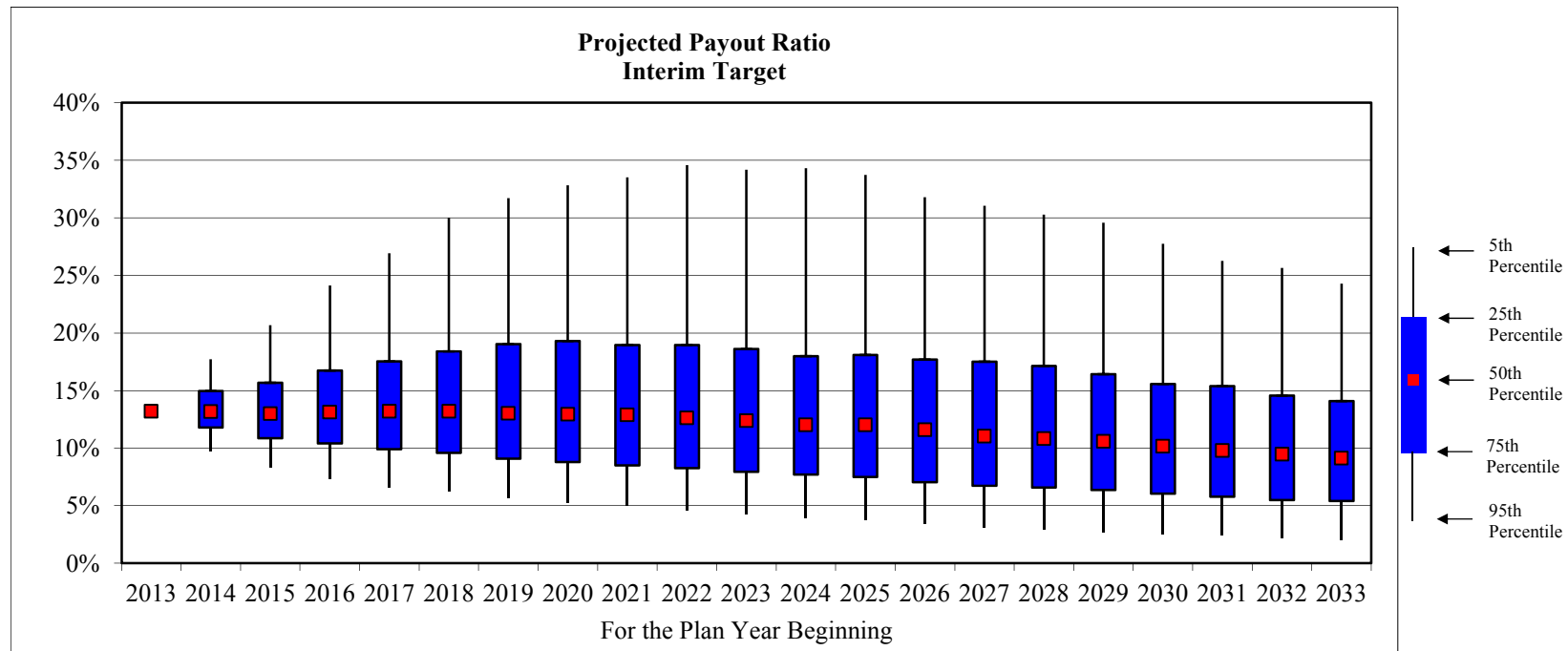
20 Years	Probability of Full Funding in 2033	Probability of less than 42.5% (Current) Funding in	Probability of less than 35% Funding in 2033	Maximum 1 Year Portfolio Investment Loss	Maximum 1 Year Employer Contribution
Interim Target	38%	14%	7%	-46%	73%
Long-Term Target	39%	14%	7%	-46%	73%
Conservative Portfolio	11%	15%	5%	-32%	72%
Potential Portfolio 1	34%	14%	6%	-43%	73%
Potential Portfolio 2	44%	14%	7%	-50%	74%
Aggressive Portfolio	47%	15%	8%	-54%	75%

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Payout Ratio (expected benefit payments/market value of assets); Interim Target

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan’s assets are allocated according to the Interim Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 9% and 13%. The worst-case scenario could reach 35% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	12%	11%	11%	11%	10%	10%	9%	9%

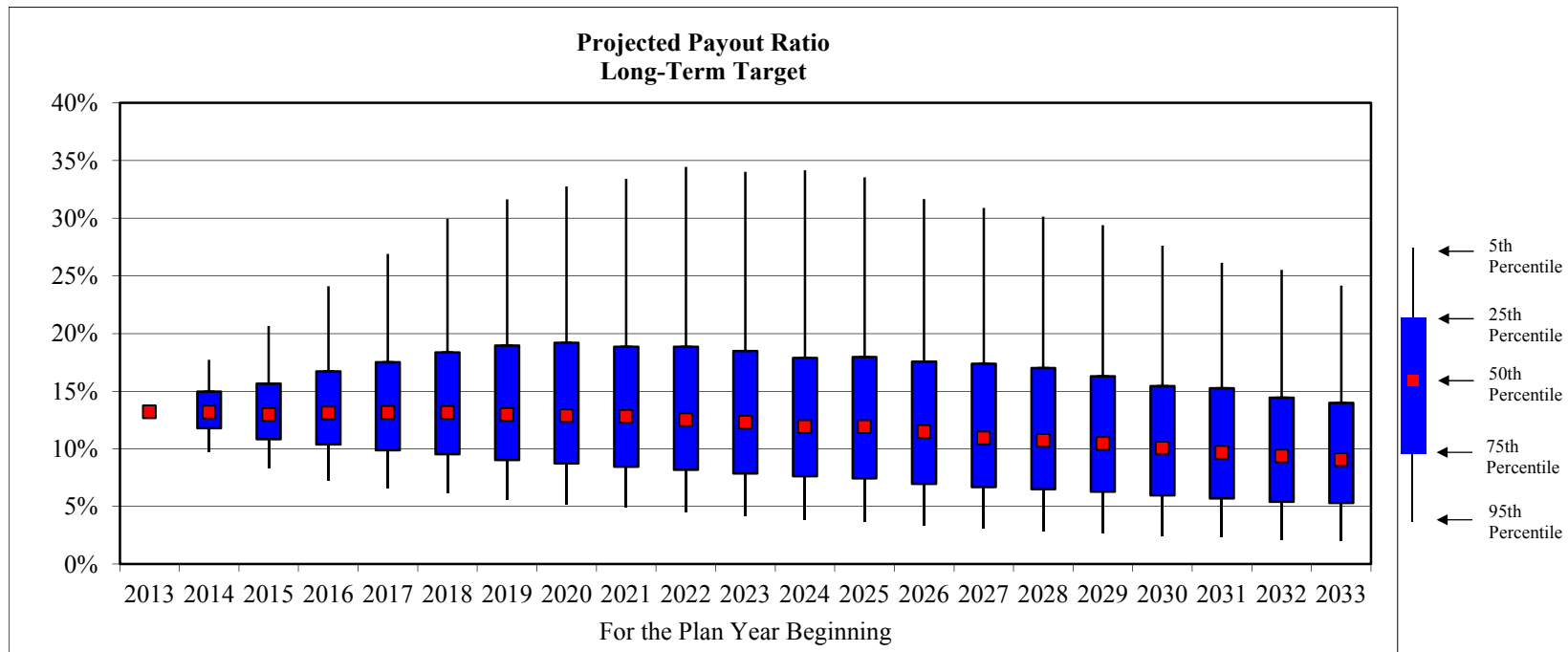
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Payout Ratio (expected benefit payments/market value of assets); Long-Term Target

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan’s assets are allocated according to the Long-Term Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 9% and 13%. The worst-case scenario could reach 34% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	11%	11%	11%	10%	10%	10%	9%	9%

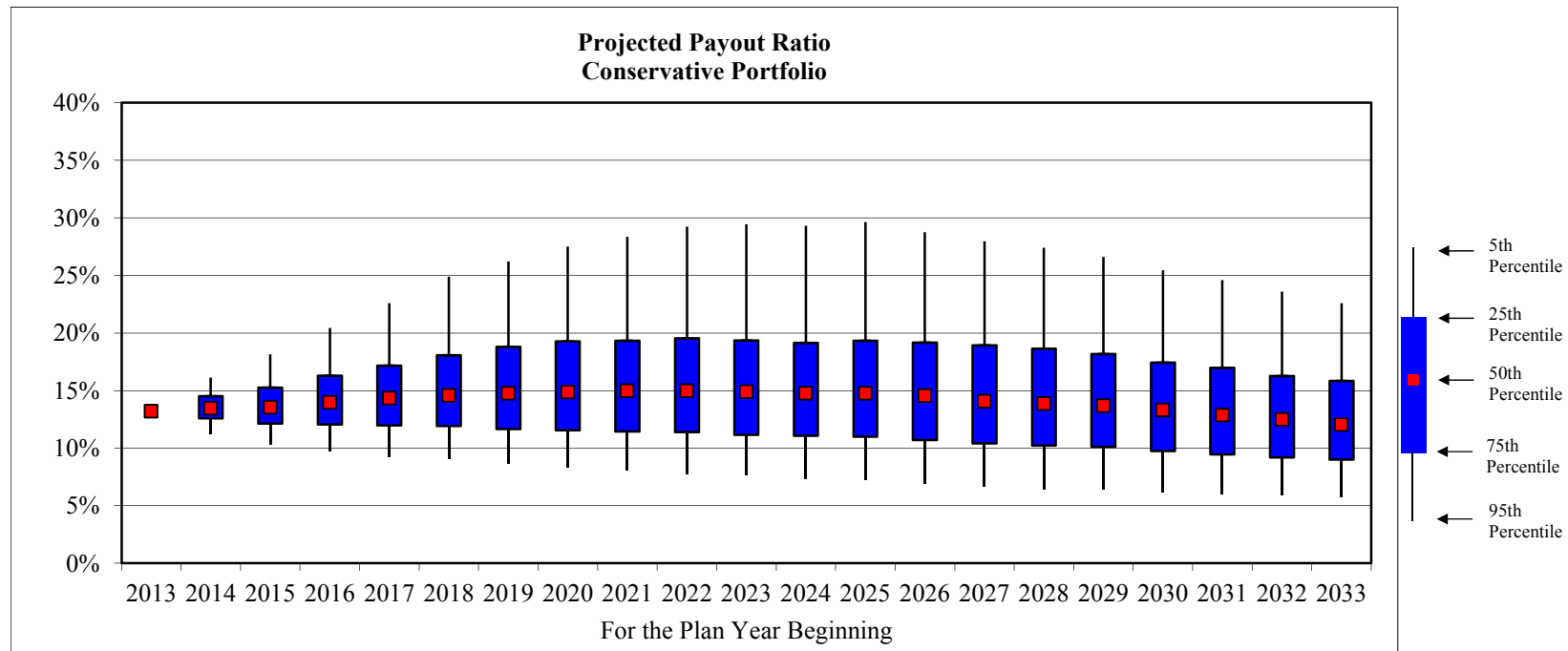
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

### Appendix 3: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

#### Projected Payout Ratio (expected benefit payments/market value of assets); Conservative Portfolio

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan's assets are allocated according to the Conservative Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 12% and 15%. The worst-case scenario could reach 30% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	14%	14%	14%	15%	15%	15%	15%	15%	15%	15%	15%	15%	14%	14%	14%	13%	13%	12%	12%

Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

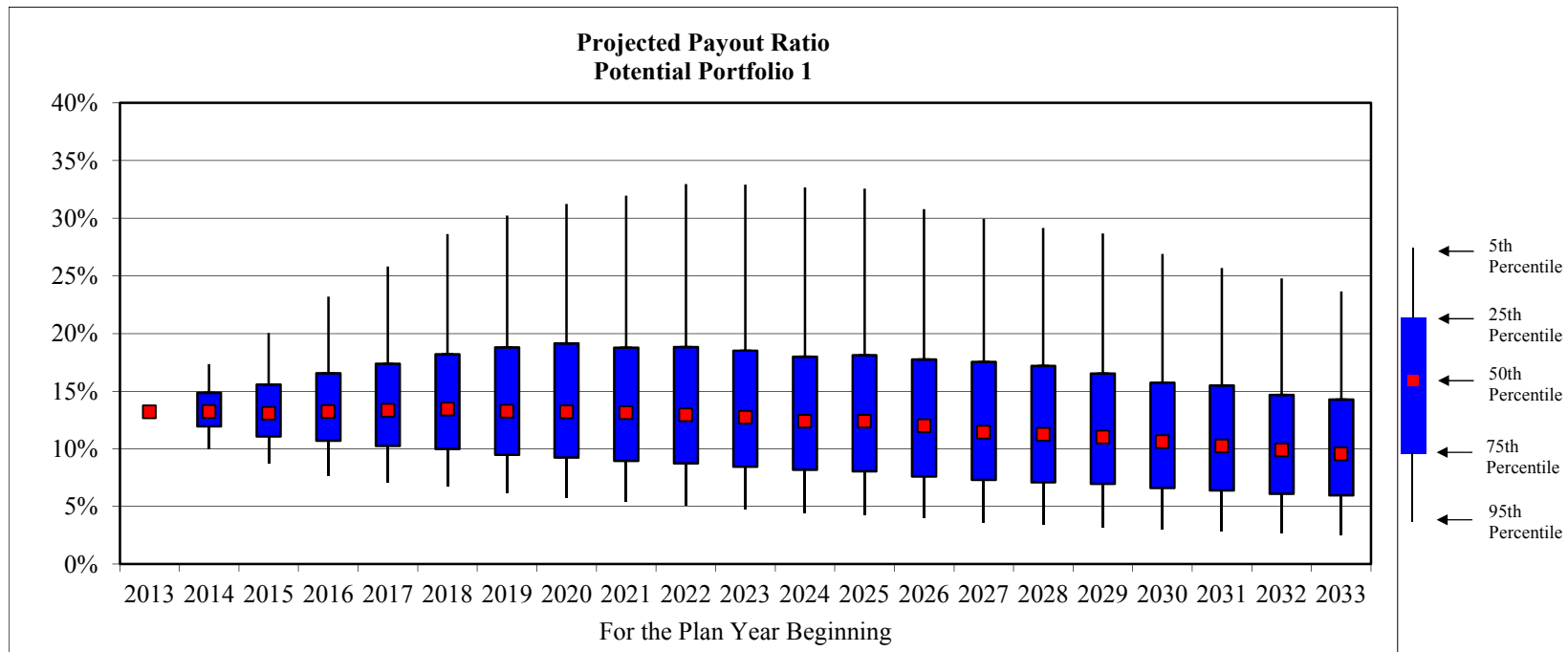


### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Payout Ratio (expected benefit payments/market value of assets); Potential Portfolio 1

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan’s assets are allocated according to Potential Portfolio 1 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 10% and 13%. The worst-case scenario could reach 33% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	11%	11%	11%	11%	10%	10%	10%

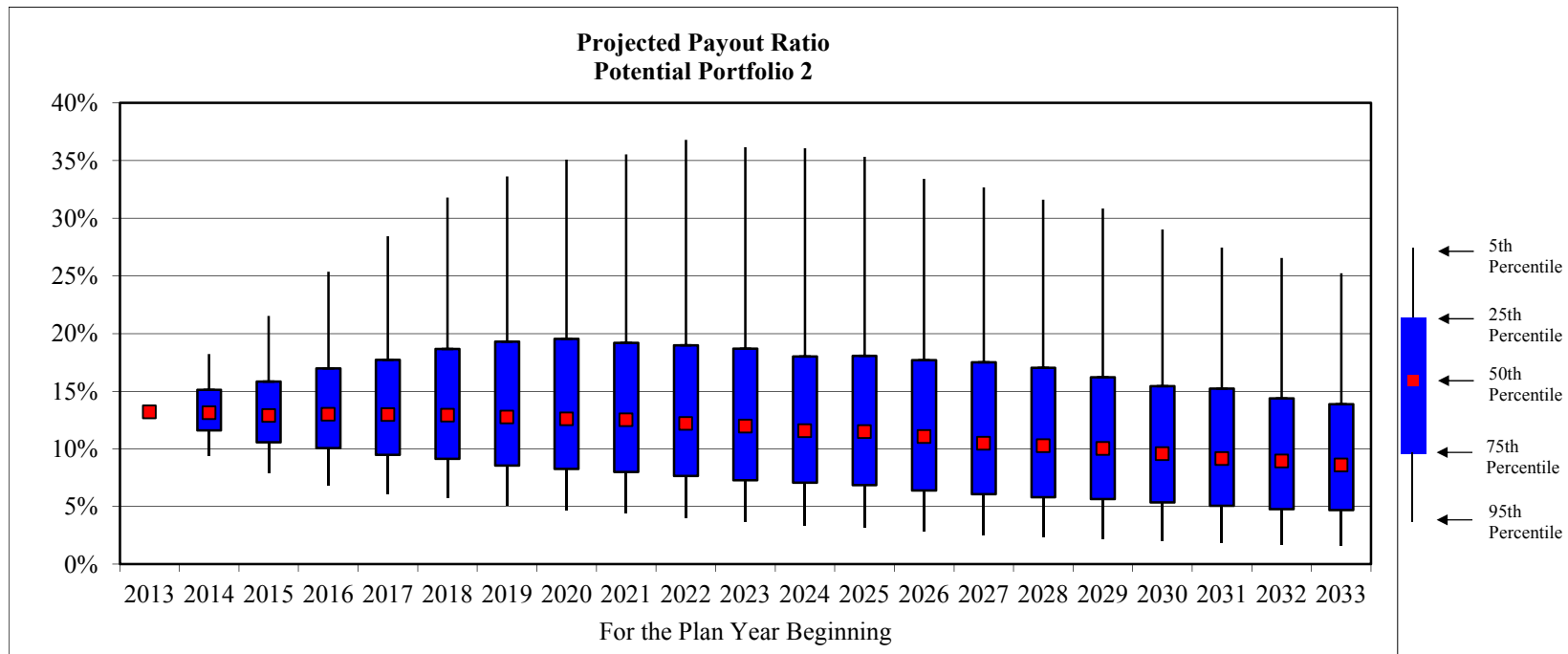
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Payout Ratio (expected benefit payments/market value of assets); Potential Portfolio 2

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan’s assets are allocated according to Potential Portfolio 2 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 9% and 13%. The worst-case scenario could reach 37% or higher.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	11%	11%	10%	10%	10%	10%	9%	9%	9%

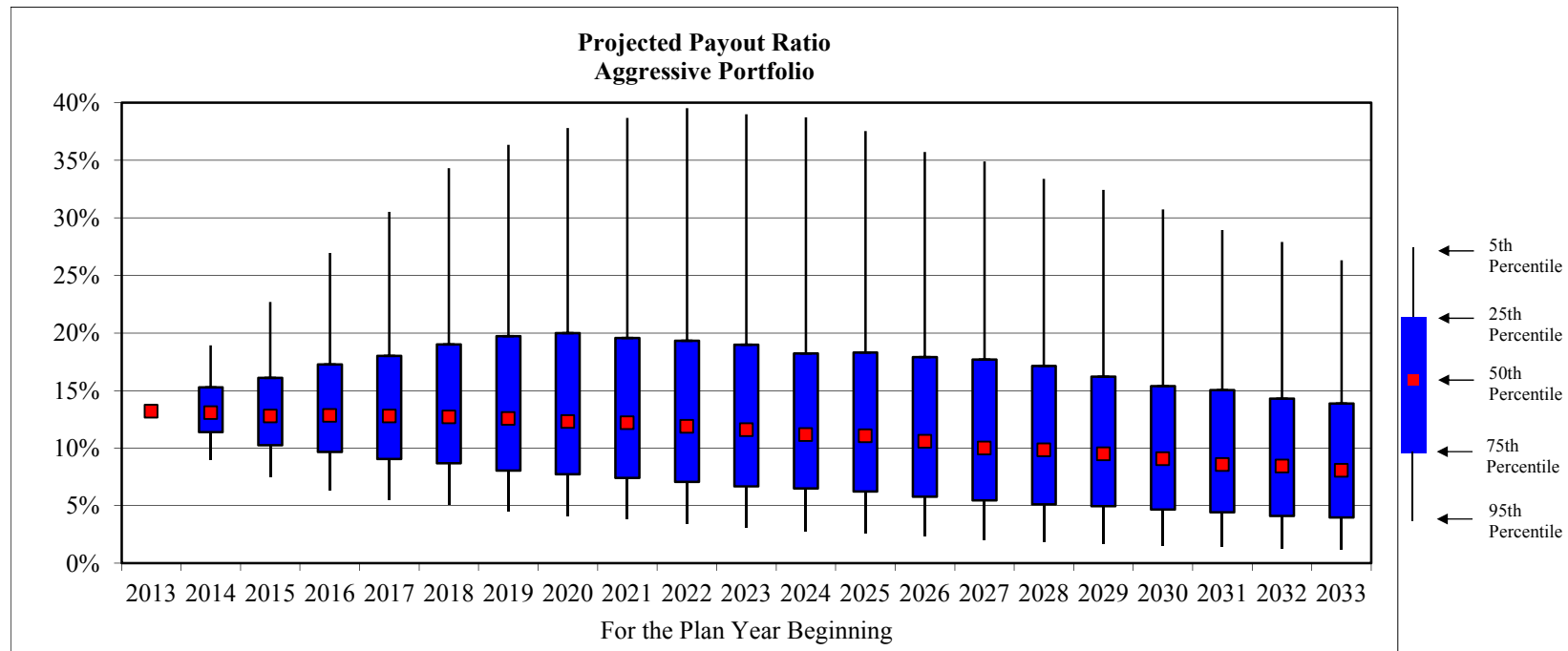
Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Projected Payout Ratio (expected benefit payments/market value of assets); Aggressive Portfolio

The graph below displays the range of possible payout ratios over the next twenty years, assuming the Plan’s assets are allocated according to the Aggressive Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years.

The annual median benefit payment as percentage of market value of assets is expected to range between 8% and 13%. The worst-case scenario could reach 40% or higher.



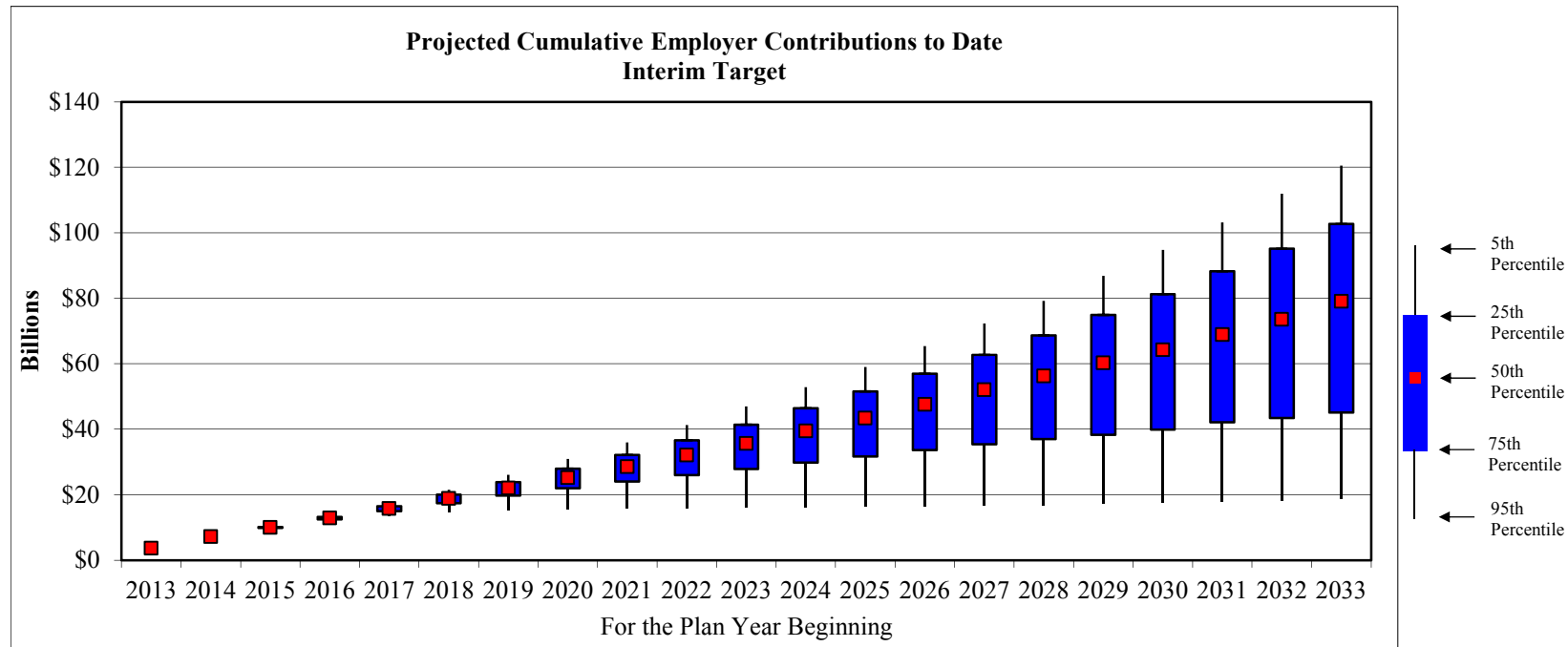
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Median</b>	13%	13%	13%	13%	13%	13%	13%	12%	12%	12%	12%	11%	11%	11%	10%	10%	10%	9%	9%	8%	8%

Percentiles indicate the probability of achieving a Payout Ratio higher or lower than the corresponding ratio. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect a Payout Ratio lower than the ratio shown, and 50% of the time a higher ratio can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Cumulative Employer Contributions to Date; Interim Target

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan’s assets are allocated according to the Interim Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



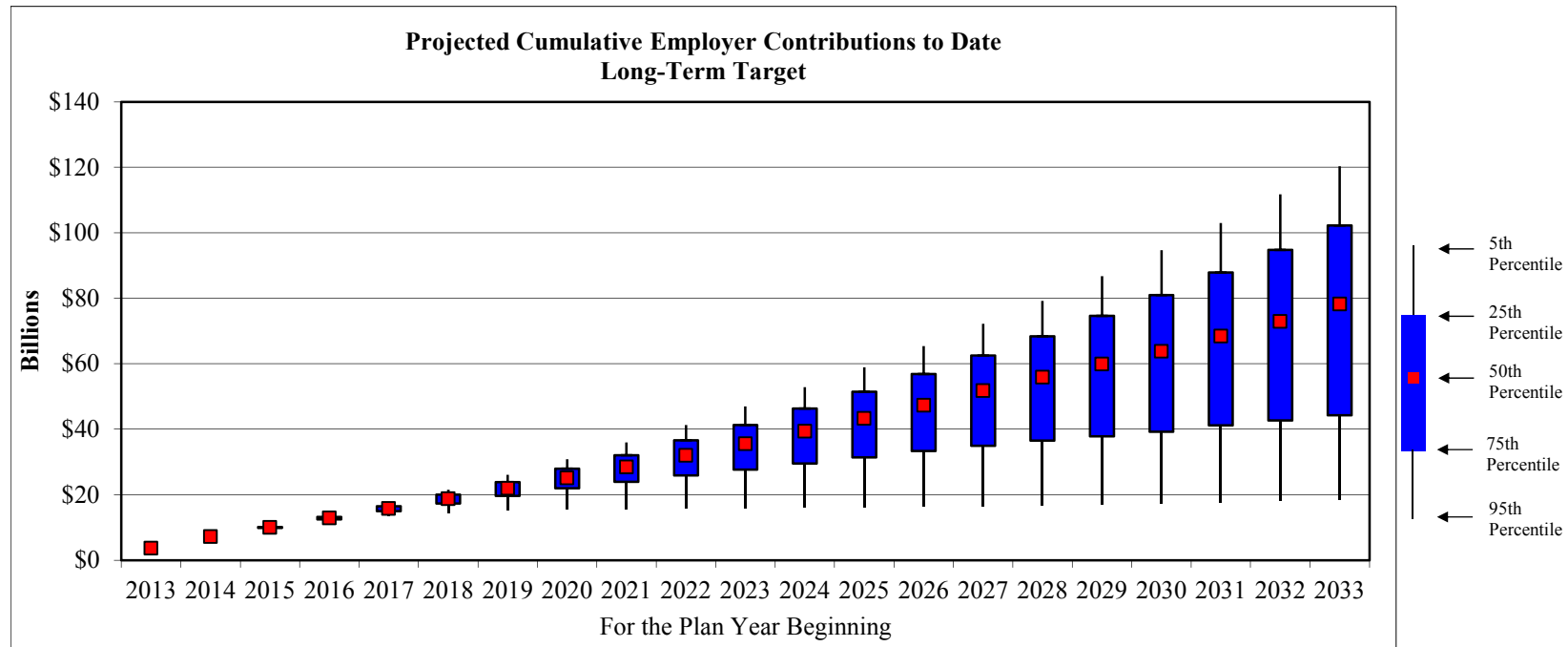
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$17	\$22	\$26	\$31	\$36	\$41	\$47	\$53	\$59	\$65	\$72	\$79	\$87	\$95	\$103	\$112	\$120
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$24	\$28	\$32	\$37	\$41	\$46	\$51	\$57	\$63	\$69	\$75	\$81	\$88	\$95	\$103
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$29	\$32	\$36	\$39	\$43	\$48	\$52	\$56	\$60	\$64	\$69	\$74	\$79
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$17	\$20	\$22	\$24	\$26	\$28	\$30	\$32	\$34	\$35	\$37	\$38	\$40	\$42	\$43	\$45
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$13	\$14	\$15	\$16	\$16	\$16	\$16	\$16	\$16	\$17	\$17	\$17	\$17	\$18	\$18	\$18	\$19

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Cumulative Employer Contributions to Date; Long-Term Target

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan’s assets are allocated according to the Long-Term Target (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



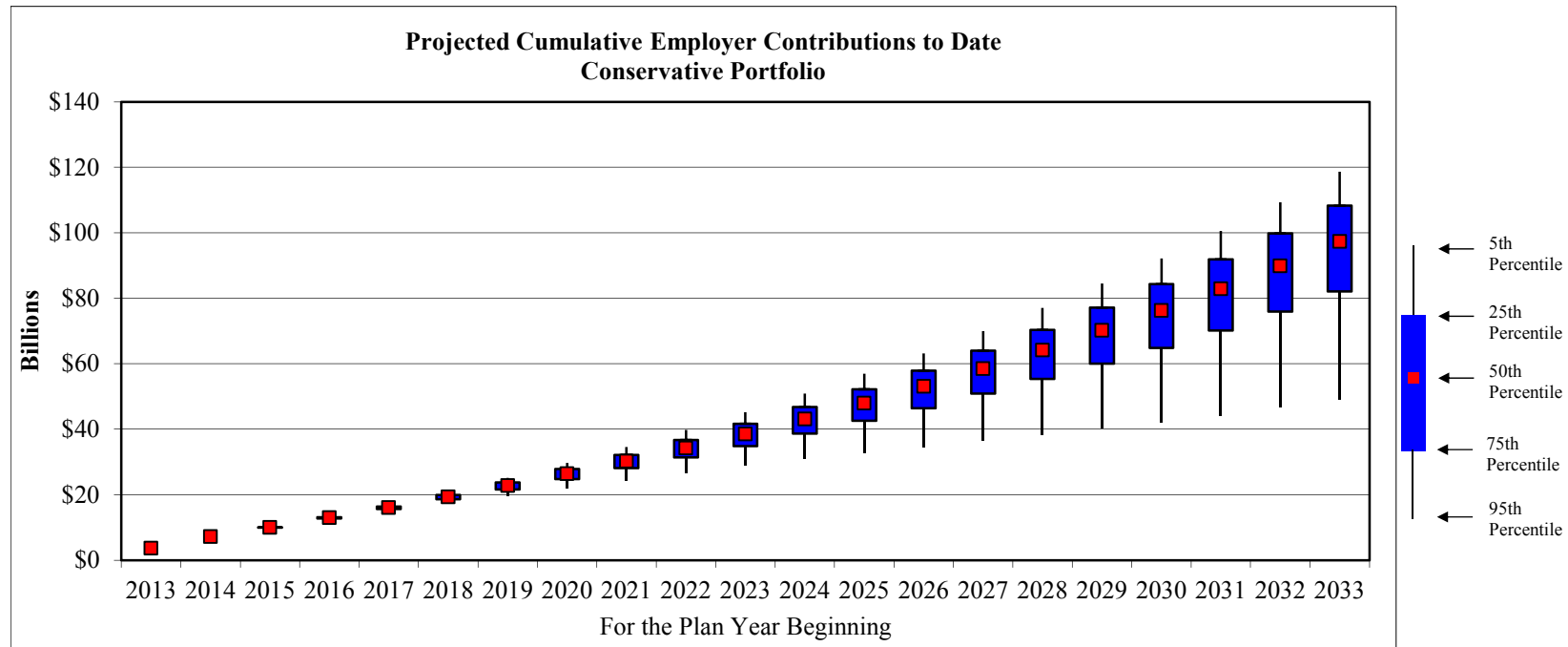
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$17	\$22	\$26	\$31	\$36	\$41	\$47	\$53	\$59	\$65	\$72	\$79	\$87	\$95	\$103	\$112	\$120
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$24	\$28	\$32	\$37	\$41	\$46	\$51	\$57	\$63	\$68	\$75	\$81	\$88	\$95	\$102
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$32	\$35	\$39	\$43	\$47	\$52	\$56	\$60	\$64	\$68	\$73	\$78
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$17	\$20	\$22	\$24	\$26	\$28	\$30	\$31	\$33	\$35	\$36	\$38	\$39	\$41	\$43	\$44
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$13	\$14	\$15	\$15	\$16	\$16	\$16	\$16	\$16	\$16	\$16	\$17	\$17	\$17	\$18	\$18	\$18

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Cumulative Employer Contributions to Date; Conservative Portfolio

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan’s assets are allocated according to the Conservative Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



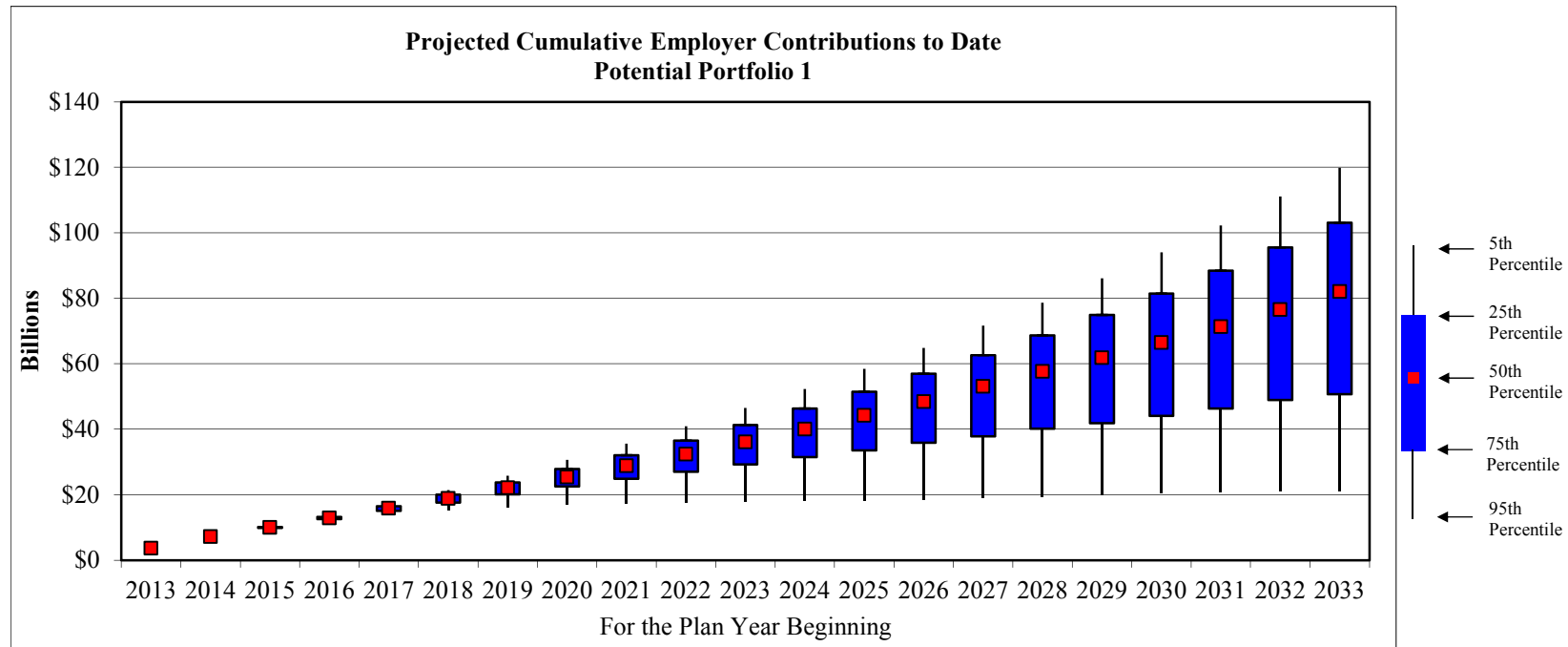
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$21	\$25	\$30	\$35	\$40	\$45	\$51	\$57	\$63	\$70	\$77	\$85	\$92	\$101	\$109	\$119
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$24	\$28	\$32	\$37	\$42	\$47	\$52	\$58	\$64	\$70	\$77	\$84	\$92	\$100	\$108
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$23	\$26	\$30	\$34	\$39	\$43	\$48	\$53	\$58	\$64	\$70	\$76	\$83	\$90	\$97
<b>75th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$31	\$35	\$39	\$43	\$46	\$51	\$55	\$60	\$65	\$70	\$76	\$82
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$17	\$20	\$22	\$24	\$26	\$29	\$31	\$33	\$35	\$36	\$38	\$40	\$42	\$44	\$47	\$49

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 3: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

### Cumulative Employer Contributions to Date; Potential Portfolio 1

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to Potential Portfolio 1 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



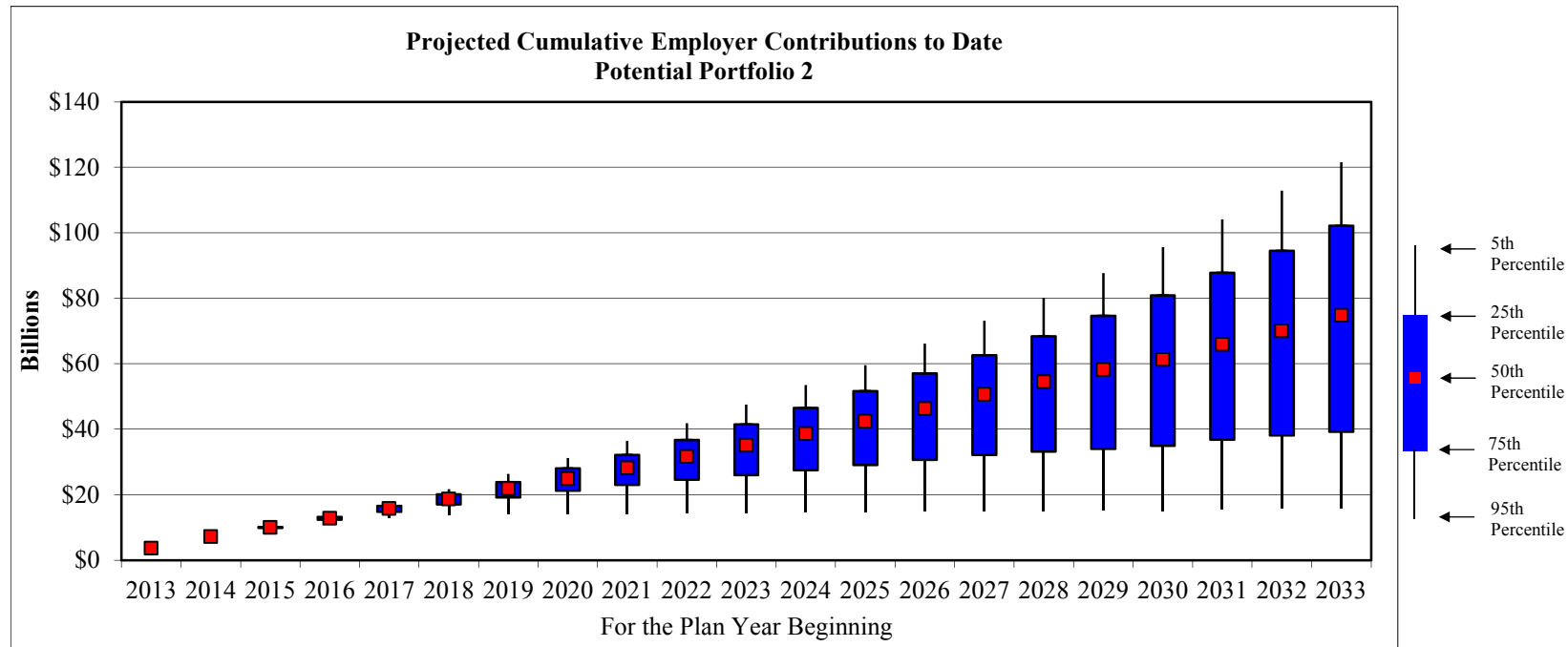
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$17	\$21	\$26	\$31	\$36	\$41	\$46	\$52	\$58	\$65	\$72	\$79	\$86	\$94	\$102	\$111	\$120
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$20	\$24	\$28	\$32	\$37	\$41	\$46	\$51	\$57	\$63	\$69	\$75	\$81	\$88	\$95	\$103
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$29	\$32	\$36	\$40	\$44	\$48	\$53	\$58	\$62	\$66	\$71	\$76	\$82
<b>75th Percentile</b>	\$4	\$7	\$10	\$13	\$15	\$18	\$20	\$23	\$25	\$27	\$29	\$31	\$34	\$36	\$38	\$40	\$42	\$44	\$46	\$49	\$51
<b>95th Percentile</b>	\$4	\$7	\$10	\$12	\$14	\$15	\$16	\$17	\$17	\$17	\$18	\$18	\$18	\$19	\$19	\$19	\$20	\$20	\$21	\$21	\$21

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

## Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

### Cumulative Employer Contributions to Date; Potential Portfolio 2

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan’s assets are allocated according to Potential Portfolio 2 (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$17	\$22	\$26	\$31	\$36	\$42	\$47	\$53	\$60	\$66	\$73	\$80	\$88	\$96	\$104	\$113	\$122
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$20	\$24	\$28	\$32	\$37	\$41	\$46	\$52	\$57	\$63	\$68	\$75	\$81	\$88	\$94	\$102
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$32	\$35	\$39	\$42	\$46	\$51	\$54	\$58	\$61	\$66	\$70	\$75
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$17	\$19	\$21	\$23	\$25	\$26	\$28	\$29	\$31	\$32	\$33	\$34	\$35	\$37	\$38	\$39
<b>95th Percentile</b>	\$4	\$7	\$10	\$11	\$13	\$14	\$14	\$14	\$14	\$14	\$14	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$15	\$16	\$16

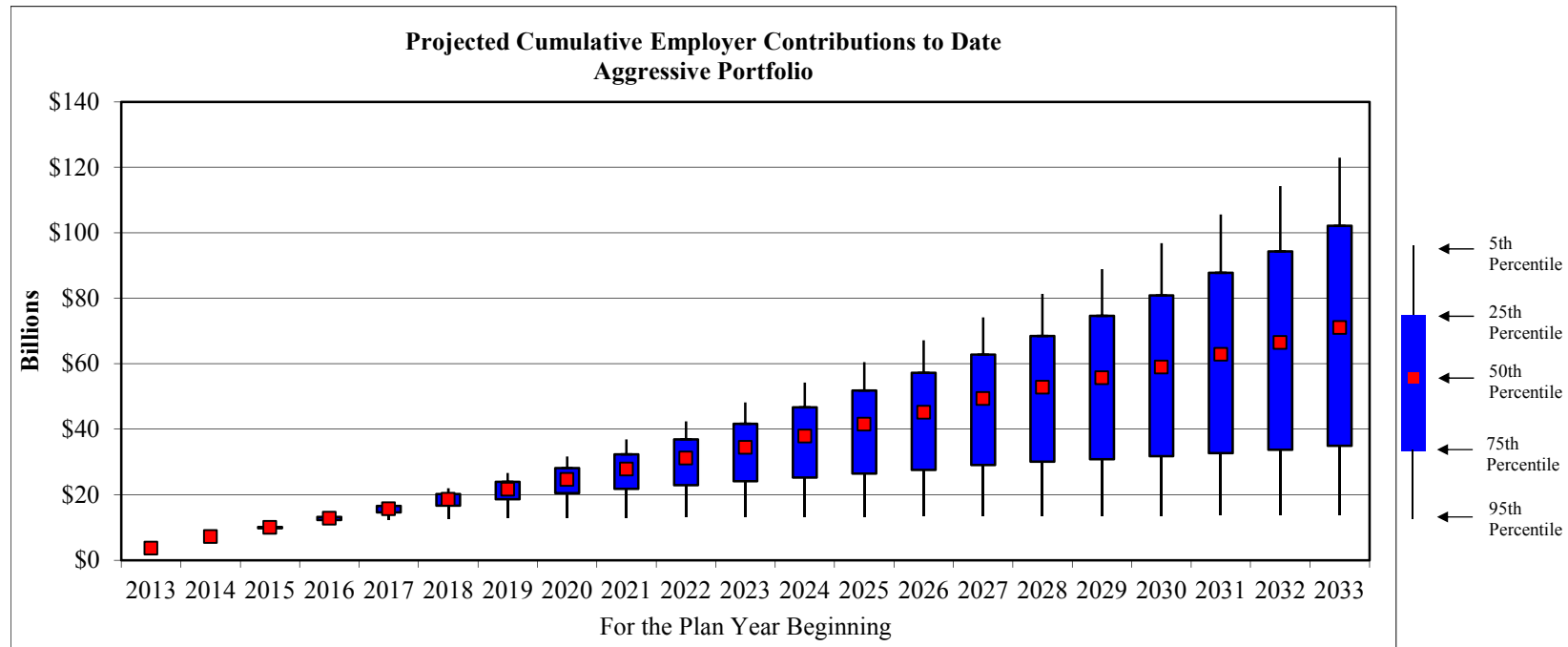
Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.



### Appendix 3: Sensitivity Analysis: "Effect of Higher Correlations" (continued)

#### Cumulative Employer Contributions to Date; Aggressive Portfolio

The graph and table below show the range of projected cumulative employer contributions over the next twenty years, assuming the Plan's assets are allocated according to the Aggressive Portfolio (highlighted on the prior pages). The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>5th Percentile</b>	\$4	\$7	\$10	\$14	\$18	\$22	\$27	\$32	\$37	\$42	\$48	\$54	\$60	\$67	\$74	\$81	\$89	\$97	\$106	\$114	\$123
<b>25th Percentile</b>	\$4	\$7	\$10	\$13	\$17	\$20	\$24	\$28	\$32	\$37	\$42	\$47	\$52	\$57	\$63	\$68	\$75	\$81	\$88	\$94	\$102
<b>50th Percentile</b>	\$4	\$7	\$10	\$13	\$16	\$19	\$22	\$25	\$28	\$31	\$34	\$38	\$41	\$45	\$49	\$53	\$56	\$59	\$63	\$66	\$71
<b>75th Percentile</b>	\$4	\$7	\$10	\$12	\$15	\$17	\$19	\$20	\$22	\$23	\$24	\$25	\$26	\$28	\$29	\$30	\$31	\$32	\$33	\$34	\$35
<b>95th Percentile</b>	\$4	\$7	\$9	\$11	\$12	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$13	\$14	\$14	\$14	\$14	\$14

Percentiles indicate the probability of achieving total employer contributions higher or lower than the corresponding figure. For instance, the 50<sup>th</sup> percentile indicates that 50% of the time the Plan can expect total contributions lower than the figure shown, and 50% of the time a higher figure can be expected.

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Employer Contributions (as a weighted average percentage of salary)

The tables below show the range of required employer contributions (as a weighted average percentage of salary) assuming the six different asset mixes highlighted on the prior pages. The results assume the current contribution policy remains unchanged for all projection years. The values do not include Pension Stabilization Fund contributions.

5 Years	Required Employer Contribution for Plan Year Beginning 2018				
	5th	25th	50th	75th	95th
Interim Target	44%	34%	27%	20%	8%
Long-Term Target	44%	34%	27%	20%	8%
Conservative Portfolio	41%	33%	28%	24%	18%
Potential Portfolio 1	43%	34%	27%	21%	10%
Potential Portfolio 2	44%	34%	26%	19%	5%
Aggressive Portfolio	45%	34%	26%	17%	2%

10 Years	Required Employer Contribution for Plan Year Beginning 2023				
	5th	25th	50th	75th	95th
Interim Target	55%	39%	27%	12%	0%
Long-Term Target	55%	39%	27%	12%	0%
Conservative Portfolio	53%	40%	32%	23%	10%
Potential Portfolio 1	54%	39%	28%	14%	0%
Potential Portfolio 2	56%	39%	26%	9%	0%
Aggressive Portfolio	57%	39%	25%	6%	0%

20 Years	Required Employer Contribution for Plan Year Beginning 2033				
	5th	25th	50th	75th	95th
Interim Target	73%	49%	28%	0%	0%
Long-Term Target	73%	49%	27%	0%	0%
Conservative Portfolio	72%	52%	39%	25%	3%
Potential Portfolio 1	73%	49%	30%	3%	0%
Potential Portfolio 2	74%	49%	25%	0%	0%
Aggressive Portfolio	75%	49%	22%	0%	0%

### Appendix 3: Sensitivity Analysis: “Effect of Higher Correlations” (continued)

#### Drawing Inferences

The tables below compare the projected actuarial and market funded ratios five, ten, and twenty years from now, under the median (50<sup>th</sup> percentile), worst-case (5<sup>th</sup> percentile), and best-case (95<sup>th</sup> percentile) scenarios, assuming the six different asset mixes highlighted on the prior pages. The table also displays for comparative purposes the median, peak, and trough projected payout ratios and cumulative employer contributions assuming the same six asset mixes being examined. The cumulative employer contributions do not include Pension Stabilization Fund contributions.

5 Years	Actuarial Funded Ratio in Year 5			Market Funded Ratio in Year 5			Cumulative Employer Contributions in Year 5 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 5	2013-2018	
										Median	Peak	Trough
Interim Target	53%	31%	86%	52%	24%	105%	\$19	\$22	\$14	13%	30%	6%
Long-Term Target	53%	31%	87%	52%	24%	105%	\$19	\$22	\$14	13%	30%	6%
Conservative Portfolio	49%	36%	66%	47%	29%	72%	\$19	\$21	\$17	15%	25%	9%
Potential Portfolio 1	52%	32%	82%	51%	25%	98%	\$19	\$21	\$15	13%	29%	7%
Potential Portfolio 2	54%	30%	93%	53%	22%	115%	\$19	\$22	\$14	13%	32%	6%
Aggressive Portfolio	55%	29%	100%	54%	21%	127%	\$19	\$22	\$13	13%	34%	5%

10 Years	Actuarial Funded Ratio in Year 10			Market Funded Ratio in Year 10			Cumulative Employer Contributions in Year 10 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 10	2013-2023	
										Median	Peak	Trough
Interim Target	58%	25%	137%	57%	22%	153%	\$36	\$47	\$16	12%	35%	4%
Long-Term Target	58%	25%	139%	57%	22%	155%	\$35	\$47	\$16	12%	34%	4%
Conservative Portfolio	49%	29%	83%	47%	25%	86%	\$39	\$45	\$29	15%	29%	8%
Potential Portfolio 1	56%	26%	124%	55%	23%	137%	\$36	\$46	\$18	13%	33%	5%
Potential Portfolio 2	59%	24%	158%	59%	20%	178%	\$35	\$47	\$14	12%	37%	4%
Aggressive Portfolio	61%	23%	184%	61%	19%	211%	\$34	\$48	\$13	12%	40%	3%

20 Years	Actuarial Funded Ratio in Year 20			Market Funded Ratio in Year 20			Cumulative Employer Contributions in Year 20 (Billions)			Payout Ratios		
	50th	5th	95th	50th	5th	95th	50th	5th	95th	Year 20	2013-2033	
										Median	Peak	Trough
Interim Target	82%	38%	301%	81%	32%	325%	\$79	\$120	\$19	9%	35%	2%
Long-Term Target	83%	38%	307%	82%	33%	332%	\$78	\$120	\$18	9%	34%	2%
Conservative Portfolio	64%	39%	112%	62%	35%	117%	\$97	\$119	\$49	12%	30%	6%
Potential Portfolio 1	79%	38%	247%	78%	33%	262%	\$82	\$120	\$21	10%	33%	3%
Potential Portfolio 2	87%	37%	386%	87%	31%	423%	\$75	\$122	\$16	9%	37%	2%
Aggressive Portfolio	93%	36%	502%	93%	30%	559%	\$71	\$123	\$14	8%	40%	1%

## Appendix 4: Assumptions and Methods

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**Actuarial Valuation Assumptions and Methods:** At the beginning of each projection year, an actuarial valuation is performed to determine employer contributions. The methods and assumptions used in each projected actuarial valuation are generally the same used in the valuation as of June 30, 2013, prepared by Buck Consultants, LLC. These methods and assumptions are described below:

<b>Actuarial Cost Method</b>	Projected Unit Credit (FY 2014), Entry-Age Normal (level % of pay) thereafter.
<b>Liability Discount Rate</b>	8.00% per year, net of investment expenses, compounded annually.
<b>Administrative Expenses</b>	\$20.8 million for FY 2014, growing at the rate of inflation thereafter.
<b>Future Pay Increases</b>	Future pay increases are outlined on page 38 of the June 30, 2013 Actuarial Valuation and vary by age and years of service. Pay increases include a 4.00% inflation and productivity rate.
<b>Retirement</b>	Retirement assumptions as outlined on pages 39-40 of the June 30, 2013 Actuarial Valuation.
<b>Mortality</b>	Mortality assumptions as outlined on pages 38 and 40 of the June 30, 2013 Actuarial Valuation
<b>Disability</b>	Rates of disability as outlined on page 38 of the June 30, 2013 Actuarial Valuation.
<b>Withdrawal</b>	Rates of withdrawal as outlined on page 38 of the June 30, 2013 Actuarial Valuation.
<b>Asset Valuation Method</b>	Asset valuation method is described on page 45 of the June 30, 2013 Actuarial Valuation. The asset valuation method utilizes a five-year smoothing period with no corridor.
<b>Contribution Policy</b>	For the fiscal year ending 2014, total contributions were assumed to equal expected State, District, Federal, and member contributions. For the fiscal year ending 2015, State contributions of \$3.41 billion were assumed, plus expected District, Federal, and member contributions. Thereafter, contributions were determined as of each valuation date in accordance with the policy established by SB1 for the State.
<b>Cost of Living Adjustments</b>	As described in the June 30, 2013 Actuarial Valuation, adjusted in FY 2015 to reflect the provisions of SB1.

## Appendix 4: Assumptions and Methods (continued)

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**Projection Assumptions (used in the deterministic and stochastic asset/liability projections):** These projections begin with the Plan's participant population as of June 30, 2013, as provided by Buck Consultants, LLC. The Plan's population is projected forward and assumed to change as a result of employment separation, death, and retirement, as predicted by the assumptions outlined in the June 30, 2013 Actuarial Valuation provided by Buck Consultants, LLC (and described on the prior pages), and as new employees enter the Plan. Employee compensation is projected into the future in accordance with the assumptions described on the prior pages. Investment returns are projected into the future in accordance with the assumptions described below.

### **Total Contributions**

For the fiscal year ending 2014, total contributions were assumed to equal expected State, District, Federal, and member contributions. For the fiscal year ending 2015, State contributions of \$3.41 billion were assumed, plus expected District, Federal, and member contributions. Thereafter, contributions were determined as of each valuation date in accordance with the policy established by SB1 for the State.

### **Pension Stabilization Fund**

Payments to the Pension Stabilization Fund for the TRS Plan have been estimated for purposes of the deterministic and stochastic projections and balances were accumulated at 8% interest per year in deterministic analysis and vary in stochastic analysis at the same return as Plan assets. Pension Stabilization Fund assets have been included in plan assets for calculating funded ratios on a projected basis. Under SB1, Pension Stabilization Fund payments do not constitute any portion of required State contributions until the Plan's funded ratio reaches 100%. For purposes of this study, Pension Stabilization Fund balances were not included in assets in the determination of required contributions in any year of the deterministic or stochastic projections.

### **New Entrants**

New employees are assumed to join the Plan such that the active population remains level throughout the projection. New employees entering the Plan are assumed to have characteristics described on pages 43-44 of the Actuarial Valuation as of June 30, 2013, prepared by Buck Consultants, LLC.

### **Rate of Return on Assets**

Deterministic Analysis: 8.00% compounded annually.

Stochastic Analysis: Returns on the portfolio are based on the expected returns of each asset class and the correlations between each class which are detailed in the Stochastic Analysis section of this report.

## Appendix 4: Assumptions and Methods (continued)

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**Inflation**

2.50% per year with a standard deviation of 3.00%.

**Other**

All other projection assumptions are the same as those chosen by the Plan's actuary shown above.

The participant data, Plan liabilities, and assets as of June 30, 2013, were provided by Buck Consultants, LLC.