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CONSULTING, LLC
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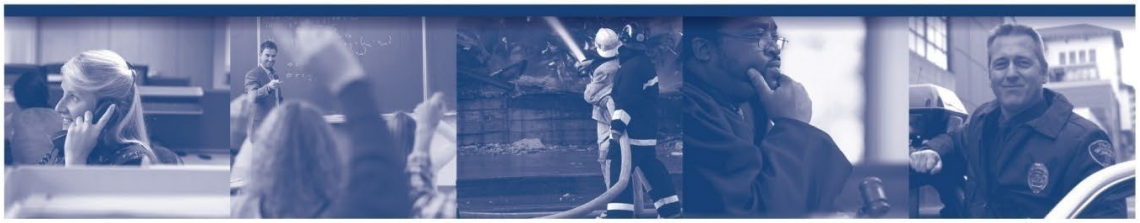
KPERS

Presentation of December 31, 2022 Valuation Results

July 21, 2023

Presented by: Cavanaugh Macdonald Consulting, LLC



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Purpose of an Actuarial Valuation

Performed Annually as of December 31

- Update previous valuation with calendar 2022 events
- Comment on calendar 2022 events that impacted the December 31, 2022 valuation
- Results used for both Funding and GASB Results

Funding Results

Focus of this Presentation

- Employer Contribution Rates for FY 2026 (State) and Calendar Year 2025 (Local)
- Funded Ratios as of December 31, 2022
- Unfunded Actuarial Liability (UAL) as of December 31, 2022

GASB 67/68

- Accounting results as prescribed by the Governmental Accounting Standards Board for Pensions (Numbers 67/68). Measurement date is June 30.
- Used for KPERS Annual Financial Report. Also used by participating employers for their individual employer financial reports.

Actuarial Valuation Process
Reserve Funding

Builds funds during working careers.

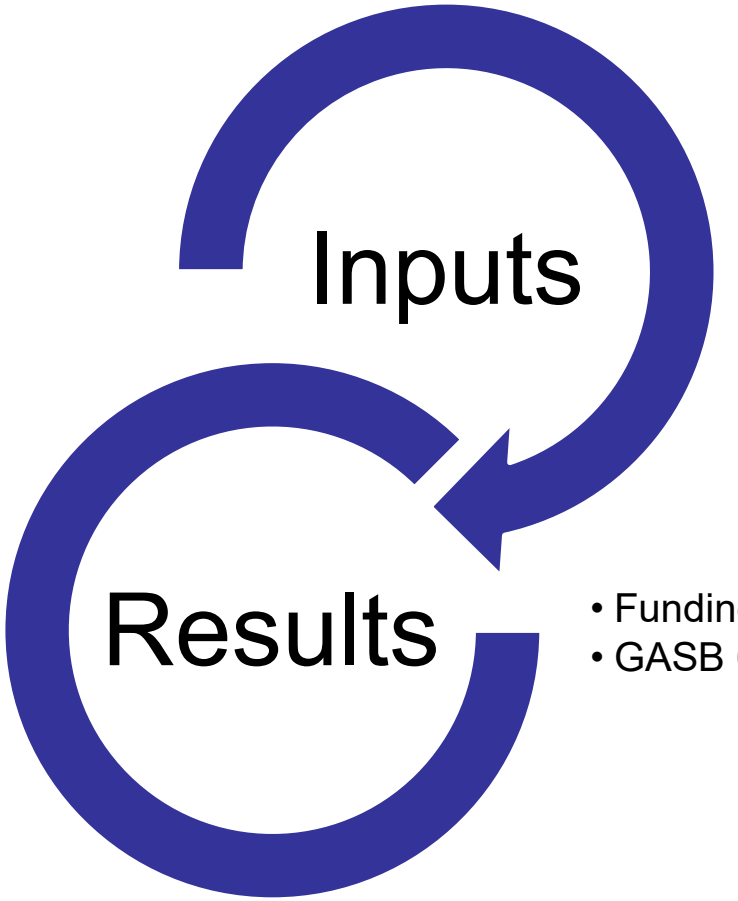
Investment returns help pay for benefits.

Actuarial valuation is mathematical model of financial future of system.

Actuarial cost method's goal is level contributions as percent of payroll.

Goal is contribution equity among generations of active members and taxpayers.

Actuarial Valuation Process



- Member Data
- Asset Information
- Benefit Provisions
- Assumptions
- Actuarial Methods

- Funding Results
- GASB 67/68

The valuation process can be viewed as a budgeting process. Like a budget, we make use of information we know as of a certain date and using assumptions we estimate what we think will happen in the future.

Member Data, Asset Information and Benefit Provisions are provided by Staff. Thank you!!

Assumptions and Actuarial Methods will vary depending on the purpose of the calculation. Unless prescribed elsewhere, these are determined by the Board of Trustees, with input from the actuary and other professionals.

Events During Calendar 2022 That Impacted the December 31, 2022 Actuarial Valuation Results

Plan Experience

- Net market return for Calendar 2022 of -9.8%, as reported by KPERS, was less than the 7.00% assumption; Return on an actuarial basis was +5.6% due to scheduled recognition of deferred asset gains. **Resulted in actuarial loss of $340 million.**
- Net liability loss of $473 million, largely due to higher salaries than expected by actuarial assumptions.

Additional Funding

- Additional contributions of $1.125 billion were deposited into the KPERS trust for the School group. Of this amount, $253.9 million repaid the delayed contributions from FY 2017 and FY 2019. The remainder of the additional contribution ($871 million) plus earnings resulted in a decrease in the State/School unfunded actuarial liability.
- The additional contributions were reflected in developing the unfunded actuarial liability contribution rate in last year's valuation, but not in the funded ratio. The impact on funded ratio is first reflected in the current valuation.

Legislative Changes

- HB 2196 expanded the Deferred Retirement Option Plan (DROP) to all KP&F employers. Previously, it was only available to Kansas Highway Patrol and Kansas Bureau of Investigation.
- Under HB 2196, Kansas Department of Wildlife and Parks (KDWP) became an affiliated KP&F employer with certain law enforcement positions eligible for KP&F participation on July 1, 2023. Affiliation is for future service only so no impact on the December 31, 2022 valuation.

Impact of Events during Calendar 2022 on the December 31, 2022 Actuarial Valuation Results

Funded Ratio	• The total System Funded Ratio (actuarial assets) increased from 71.6% to 73.4% • The Market Value Funded Ratio decreased from 77.7% to 68.1% due to actuarial losses on both assets and liabilities.
Unfunded Actuarial Liability	• Total Unfunded Actuarial Liability (UAL) decreased from $9.827 billion to $9.567 billion, largely driven by the School group experience. UAL for Local, KP&F and Judges all increased. • Additional contributions to the School group of $871 million were the primary reason for the decrease. Impact was offset by aggregate actuarial loss of $813 million.
Employer Contribution Rates	• The Employer Contributions Rates increased for all groups. Smallest change was for State/School group because additional contributions offset adverse experience in calendar year 2022 • **Statutory contribution rate remains equal to the actuarial required rate for all groups**.
Future Results	• The UAL is likely to increase, and the funded ratio decrease, as deferred investment experience is recognized through the asset smoothing method. • Deferred investment experience will also create upward pressure on Employer Contribution Rates.

Factors Impacting Change in Funded Status

	Unfunded Actuarial Liability	Funded Ratio
12/31/21 Valuation	**$9,827M**	**71.6%**
• Contribution cap	0	0.0%
• Amortization method	(168)	1.2%
• Investment experience	340	(0.9%)
• Demographic/other experience	444	(0.9%)
• Benefit changes (KP&F DROP)	25	(0.1%)
• Additional contributions	(901)	2.5%
12/31/22 Valuation	**$9,567M**	**73.4%**

Note: UAL amounts are shown in millions and may not add due to rounding.

DECEMBER 31, 2022
VALUATION RESULTS

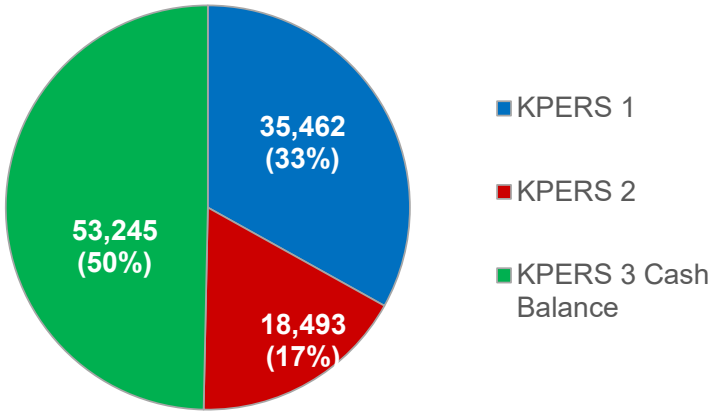
Total Active Members

	12/31/2022	12/31/2021	Change
State	19,993	19,917	0.4%
School	87,207	87,898	(0.8%)
State/School	107,200	107,815	(0.6%)
Local	36,649	36,436	(2.6%)
KP&F	7,868	7,779	1.1%
Judges	267	258	3.5%
Total	151,984	152,288	(0.2%)

Even with the decrease in active membership, total covered payroll increased by 5%, more than the assumed increase of 3%.

KPERS Membership by Tier

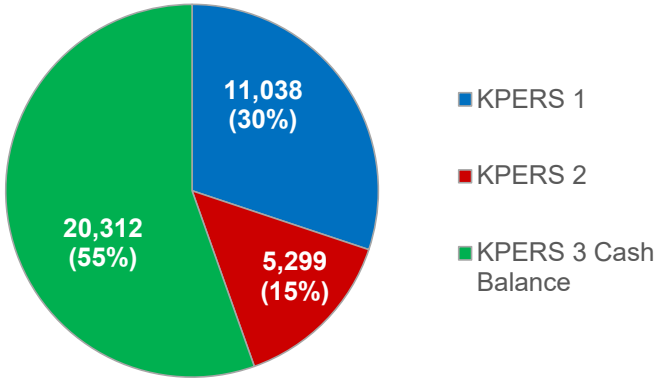
State/School Active Membership



Total State/School: 107,200

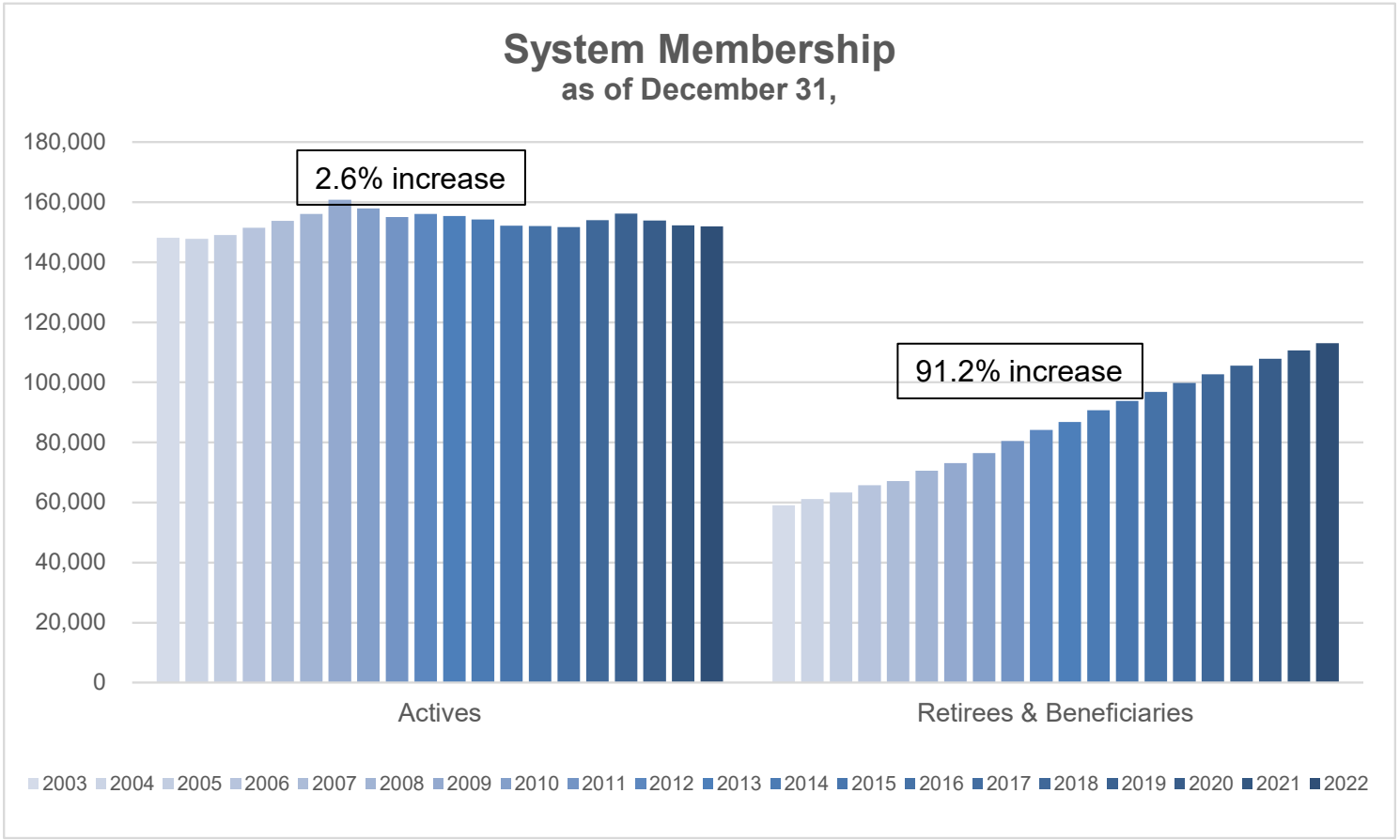
KPERS 1: Hired before 7/1/09
KPERS 2: Hired after 6/30/09
and before 1/1/15
KPERS 3 Cash Balance: Hired on/after 1/1/15

Local Active Membership



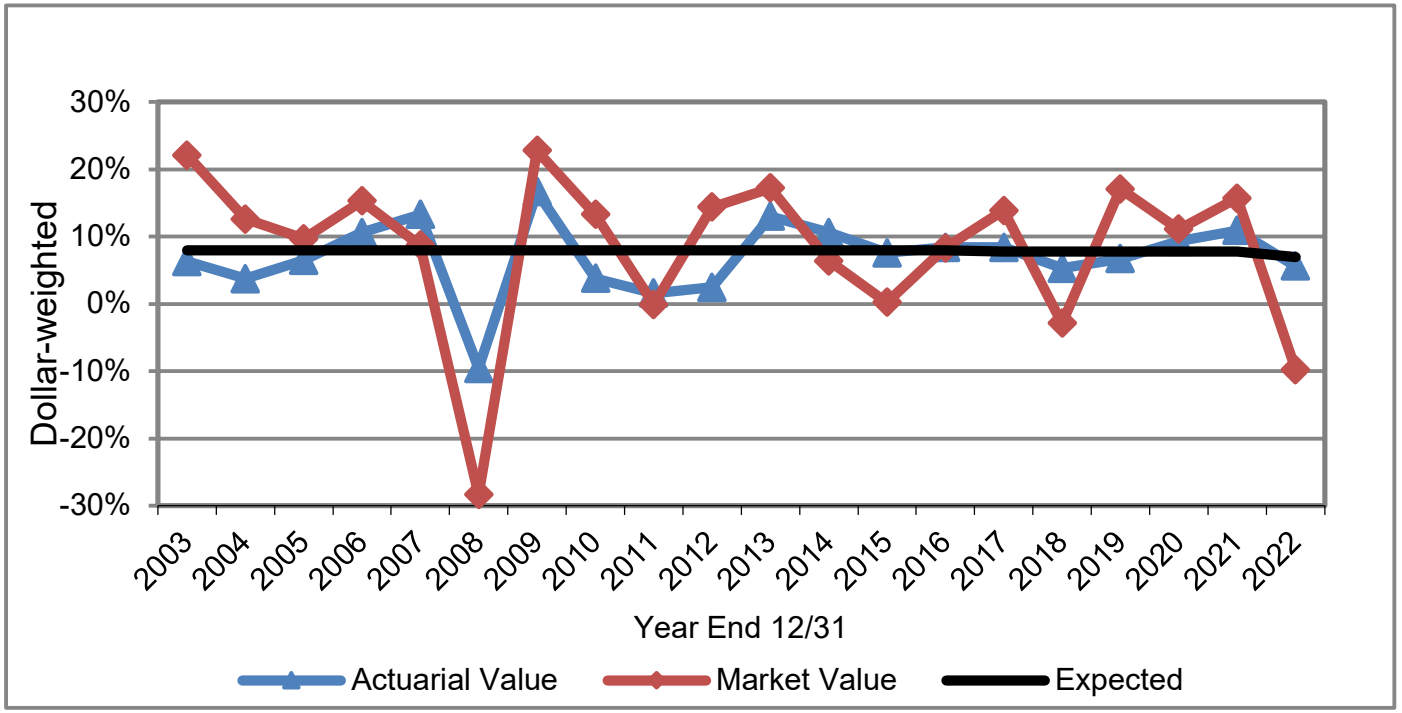
Total Local: 36,649

Total Active and Retired Members (Total System)



The number of retirees has increased while the active count has remained fairly stable, resulting in a decrease in the ratio of actives to retirees. This is not unexpected for a mature retirement system like KPERS. Implications for funding are included in the risk section of the report.

Historical Asset Returns



Extreme volatility in market returns would result in significant volatility in the employer contribution rate. An asset valuation method is used to smooth the actual returns, producing the actuarial value of assets which is used in the actuarial valuation. Use of an asset smoothing method is almost universal for public plans because it improves the stability of contribution rates.

The KPERS smoothing method recognizes the difference in actual and expected return on market value over 5 years, which is a commonly used smoothing method among public plans.

Annual Change in System's Asset Values ($M)

	Market	Actuarial
Value at 12/31/21	$ 26,892	$ 24,804
▪ Employer and Member Contributions	1,548	1,548
▪ Additional Contributions	871	871
▪ Benefit Payments*	(2,160)	(2,160)
▪ Administrative Expenses	(19)	(19)
▪ Net Investment Income	(2,616)	1,406
Value at 12/31/22	$ 24,516	$ 26,450
Net Rate of Return	-9.8%**	5.6%

* Includes monthly benefits, partial lump sum payments, refunds, and death benefits.
** As reported by KPERS

The return on actuarial value of 5.6% was lower than 7% expectation, resulting in an actuarial loss.

Actuarial Value of Assets

- Deferred experience (difference between actuarial and market value) yet to be recognized.
- Negative return in 2022 resulted in a net deferred loss of $1.934 billion as of 12/31/2022 (remaining amount to be recognized as shown below) compared to $2.088 million net deferred gain in last year's valuation.
- Amounts to be recognized in future years:

CY Ending:	2022	2021	2020	2019
Millions $:	(3,606)	1,073	259	339
12/31/23 Valuation:	(902)	358	130	339

Development of 12/31/2022 Unfunded Actuarial Liability

	Actuarial Liability (AL) ($M)	Actuarial Value of Assets ($M)	Unfunded Actuarial Liability ($M)	Funded Ratio
State	$ 5,249	$ 4,022	$ 1,226	77%
School	19,041	14,007	5,034	74%
State/School	24,290	18,029	6,261	74%
Local	7,019	5,067	1,952	72%
KP&F	4,480	3,143	1,337	70%
Judges	227	210	16	93%
Total	$ 36,016	$ 26,450	$ 9,567	73%

* Numbers may not add due to rounding

Change in Unfunded Actuarial Liability (UAL) by Group

	State/ School	Local	KP&F	Judges	Total
12/31/21 UAL ($M)	**$6,892.5**	**$1,783.7**	**$1,140.7**	**$10.2**	**$9,827.0**
• Contribution cap	0.0	0.0	0.0	0.0	0.0
• UAL amortization	(117.2)	(38.4)	(12.1)	(0.4)	(168.2)
• Investment experience	235.2	62.2	39.6	2.7	339.6
• Demographic/other experience	151.6	145.0	143.2	3.9	443.8
• Benefit changes	0.0	0.0	25.5	0.0	25.5
• Additional contributions	(901.1)	0.0	0.0	0.0	(901.1)
12/31/22 UAL ($M)	**$6,260.9**	**$1,952.4**	**$1,336.8**	**$16.4**	**$9,566.5**

Note: Amounts are shown in millions and may not add due to rounding.

Change in Funded Ratio Over Last Year

	December 31	
	2022	2021
State	76.6%	78.6%
School	73.6%	68.6%
State/School	74.2%	70.7%
Local	72.2%	73.3%
KP&F	70.2%	72.8%
Judges	92.8%	95.3%
Total System	**73.4%**	**71.6%**

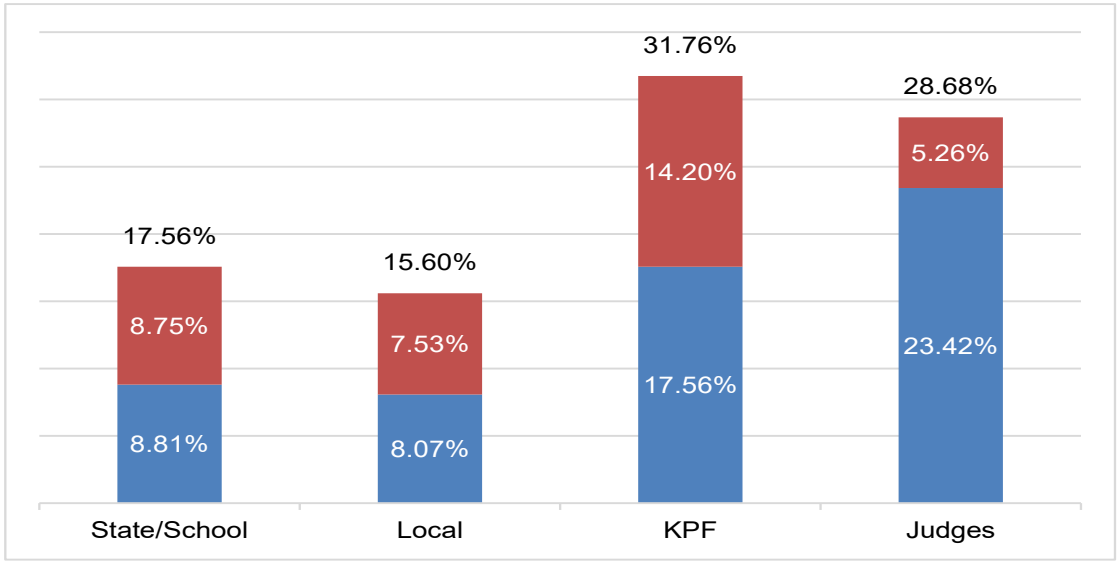
Note: Additional contributions to the School group in 2022 resulted in an increase in the funded ratio.

Development of Actuarial Required Contribution Rates (12/31/2022 valuation applies to FY beginning in 2025)

Split by Components

UAL Amortization Rate

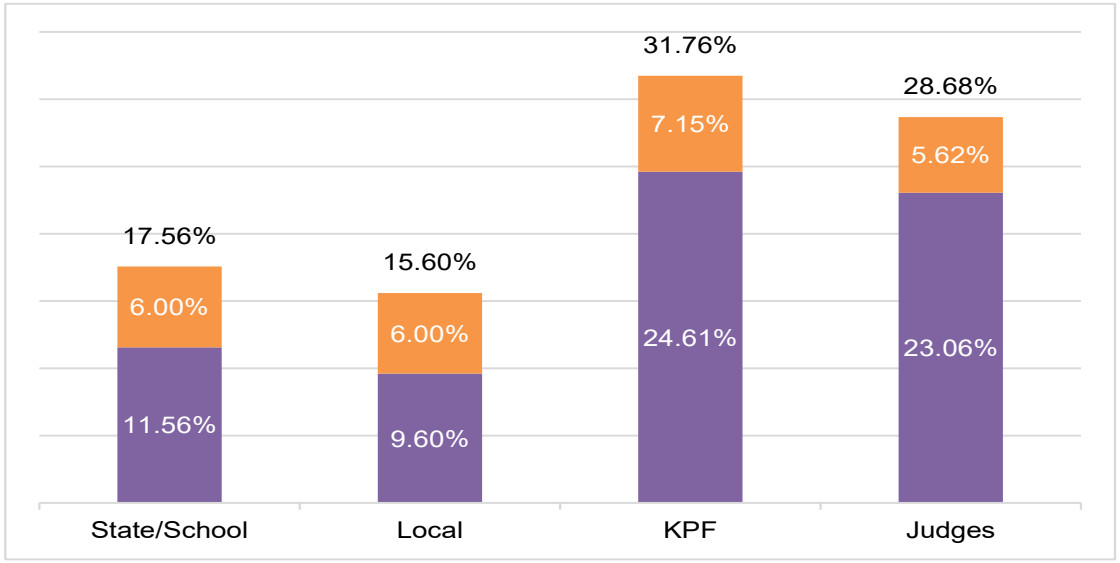
Total Normal Cost Rate (current year cost for active members)



Split by Source

Employee Contribution Rate

Actuarial Required Employer Contribution Rate



Change in Actuarial Required Contribution (ARC) by Group

	State/ School	Local	KP&F	Judges
12/31/21 ARC	**11.42%**	**9.26%**	**23.10%**	**21.35%**
• Contribution cap	0.00%	0.00%	0.00%	0.00%
• Amortization method	0.00%	0.00%	0.00%	(0.11%)
• Investment experience	0.33%	0.22%	0.46%	0.83%
• Demographic/other experience	(0.02%)	0.44%	1.61%	0.85%
• Covered payroll growth	(0.09%)	(0.24%)	(0.92%)	0.00%
• Benefit changes (DROP)	0.00%	0.00%	0.44%	0.00%
• Changes in Employer Normal Cost Rate	(0.08%)	(0.08%)	(0.08%)	0.14%
12/31/22 ARC	**11.56%**	**9.60%**	**24.61%**	**23.06%**

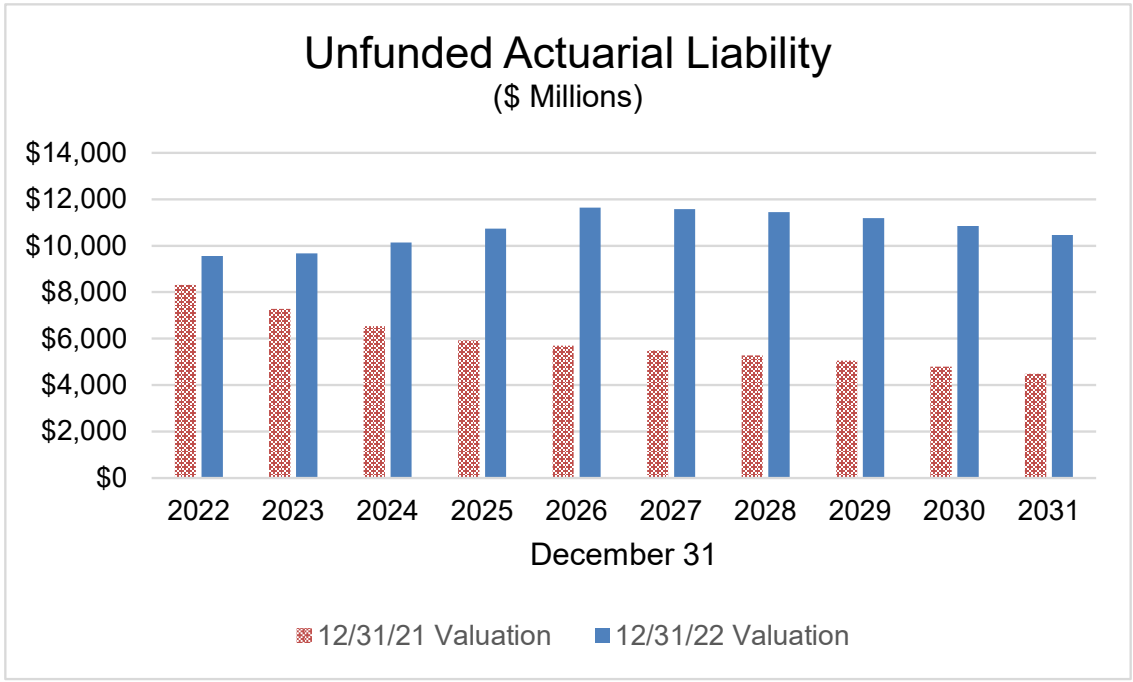
What a Difference a Year Makes

The red bars are based on the December 31, 2021 Actuarial Valuation; the blue bars are based on the December 31, 2022 Actuarial Valuation. Both projections are based on all assumptions being met in the future.

The primary difference in the projections is the investment return for calendar 2022. Other experience had less impact.

The purpose here is a reminder that results can be quite volatile with positive results like we saw with the December 31, 2021 results and not so positive with the December 31, 2022 results.

This volatility is why we perform actuarial valuations every year.



What a Difference a Year Makes

The red dashed lines are based on the December 31, 2021 Actuarial Valuation; the solid blue lines are based on the December 31, 2022 Actuarial Valuation. Both projections are based on all assumptions being met in the future.

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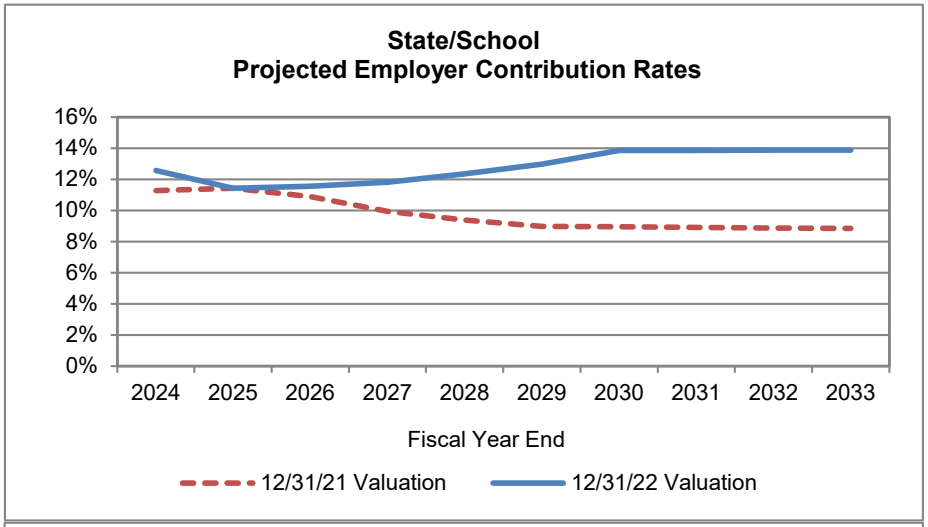

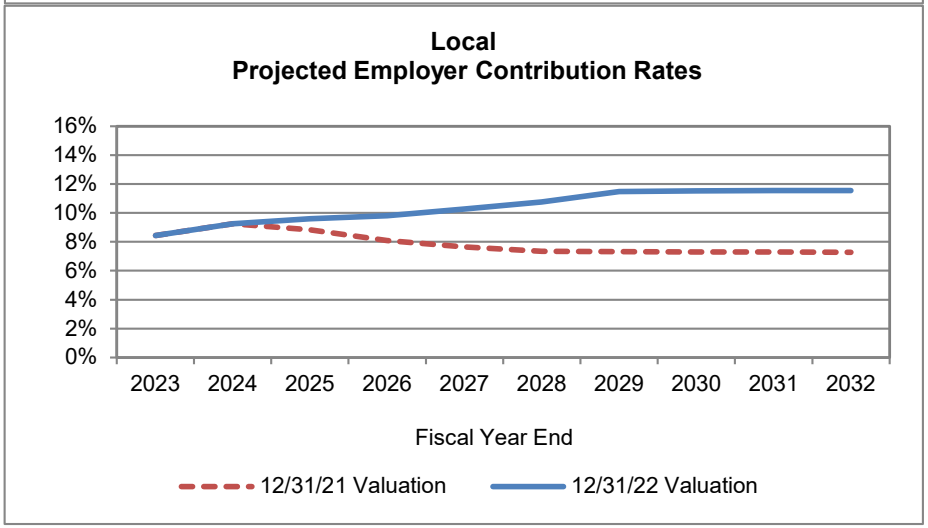

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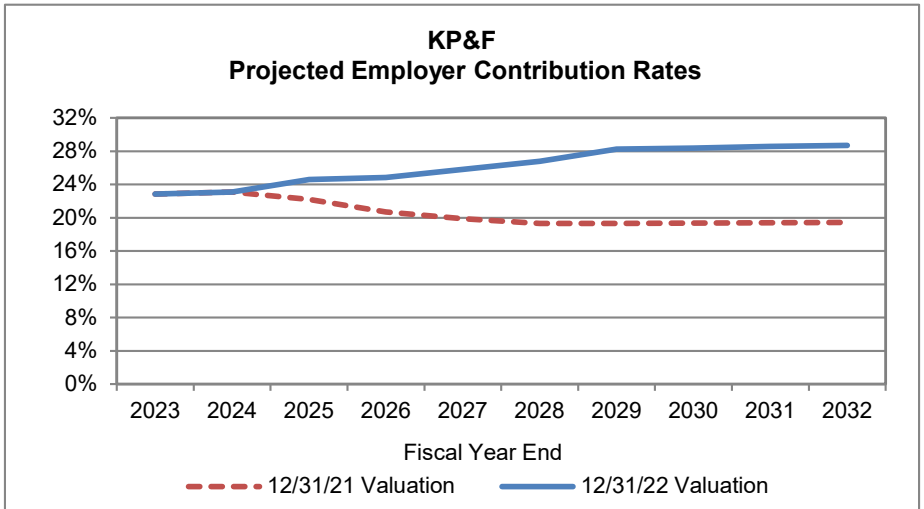
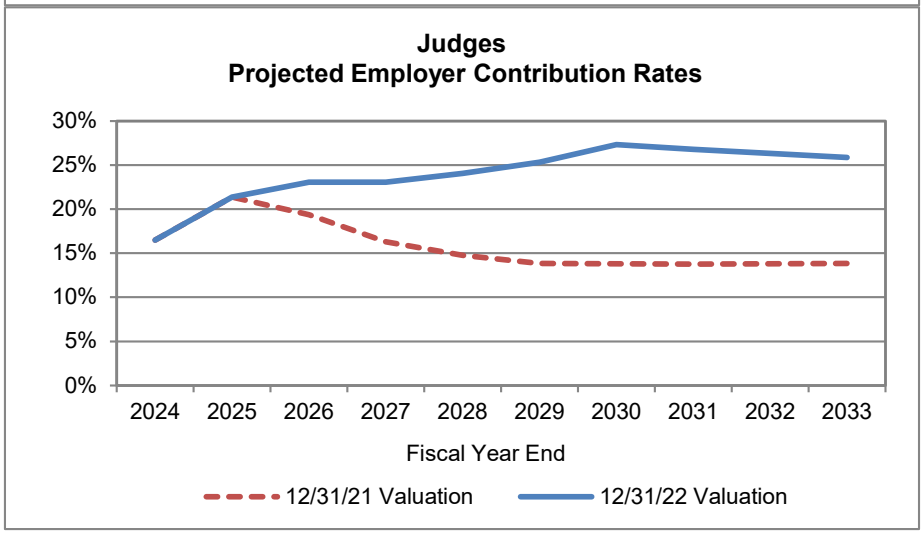
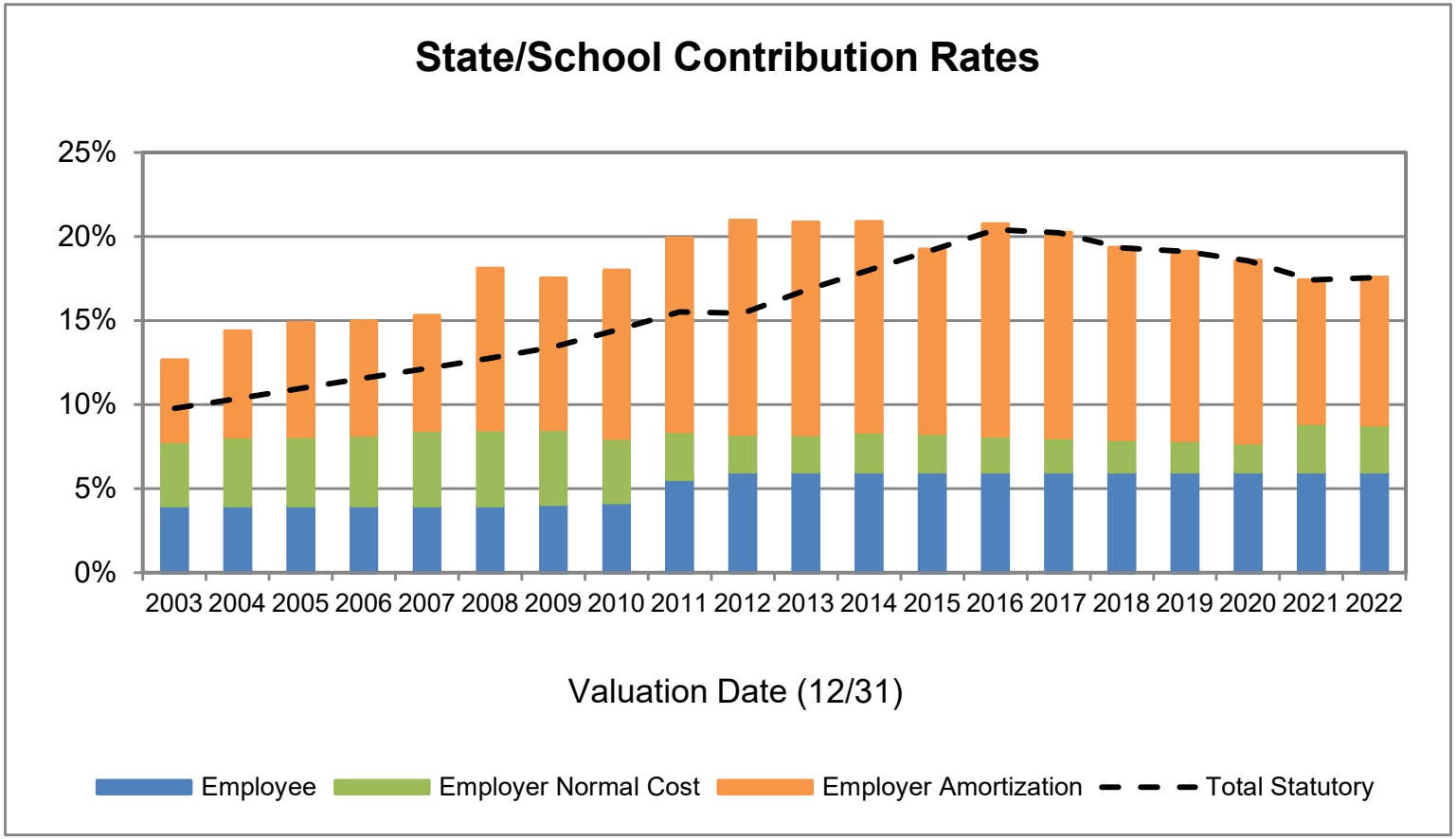


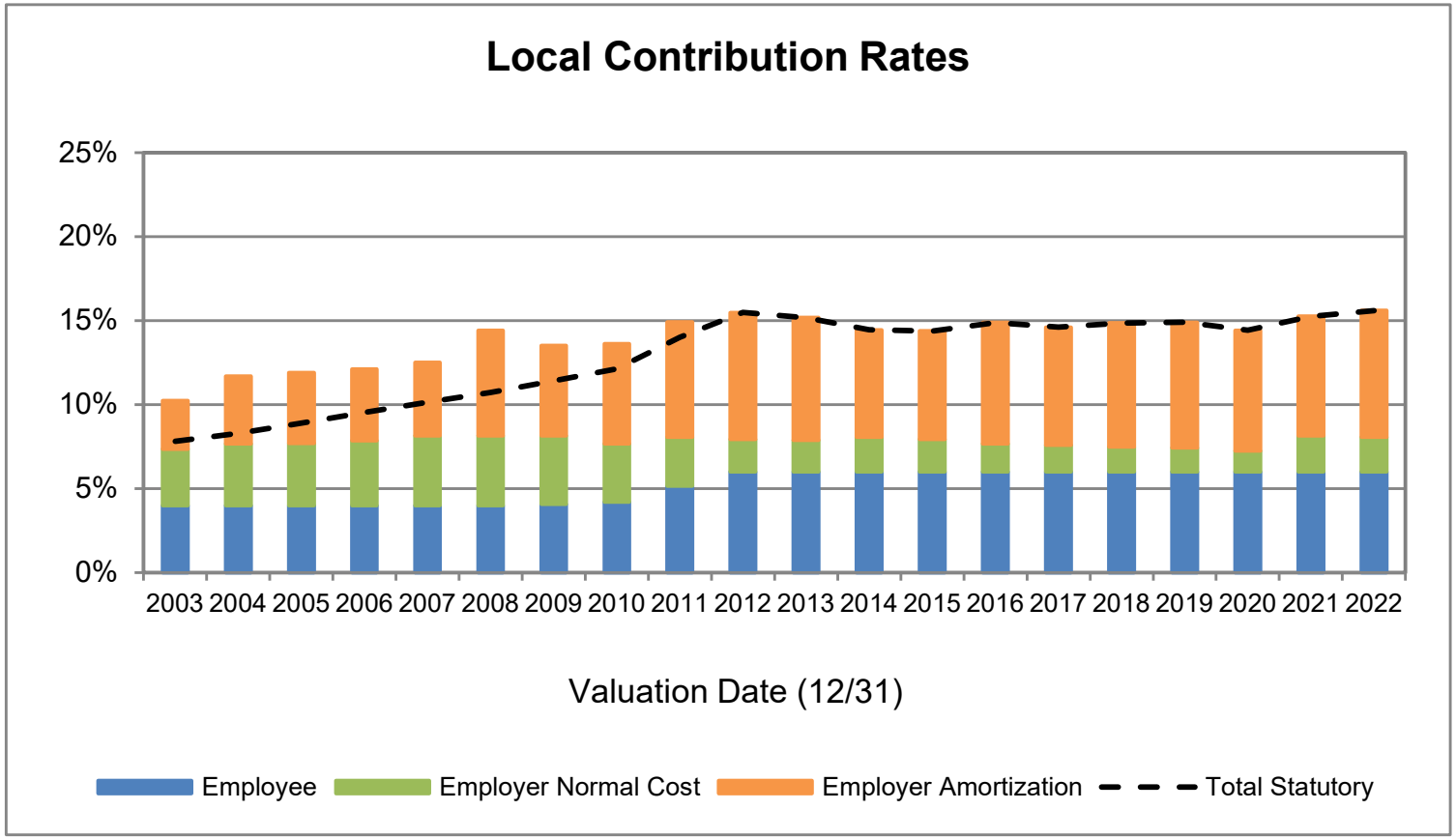


Historical State/School Employer Contribution Rates



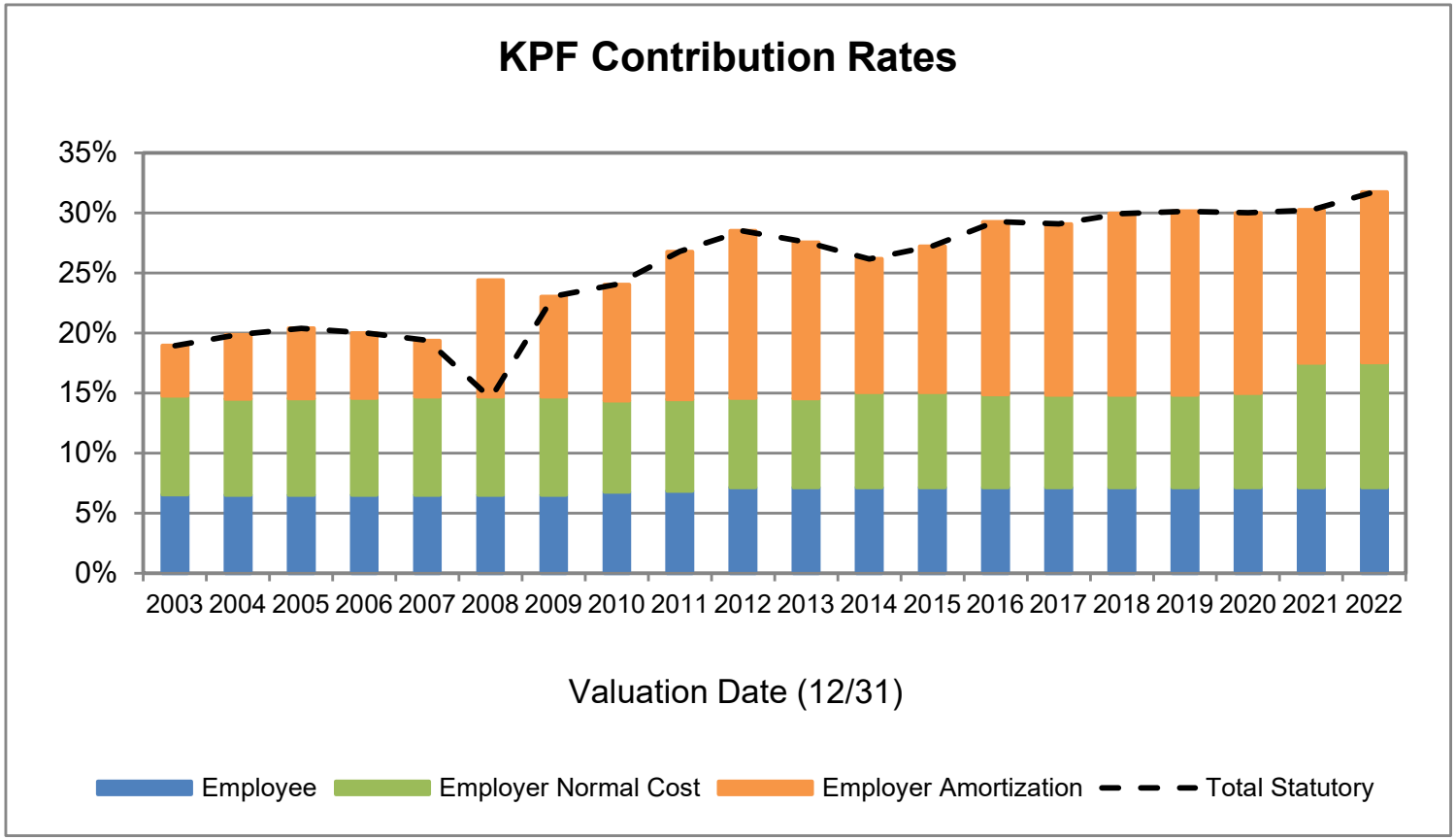
The statutory contribution rate for the State/School group was first equal to the actuarial contribution rate with the December 31, 2017 valuation (FY 2021) and has remained so.

Historical Local Employer Contribution Rates



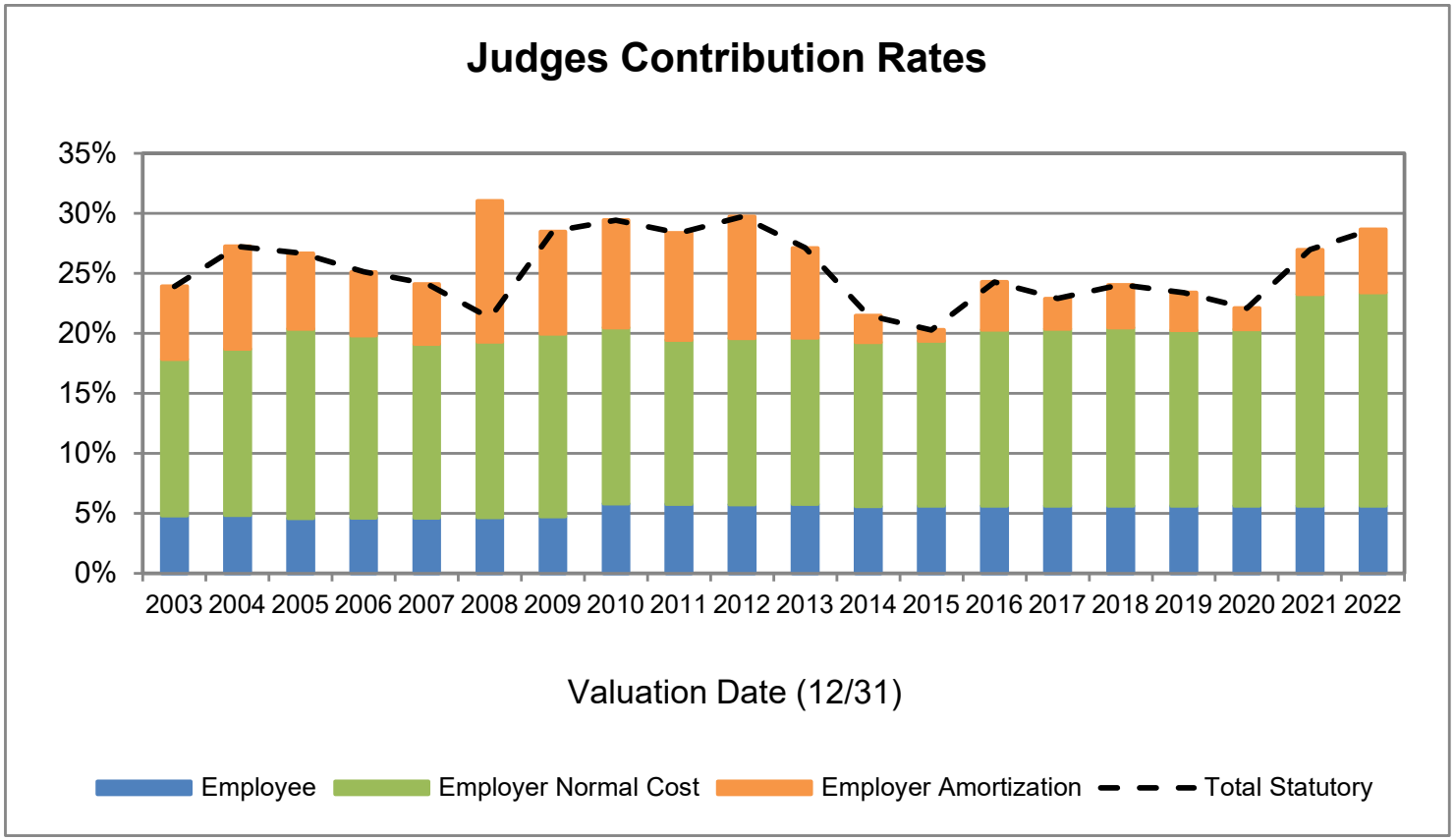
The statutory contribution rate for the Local group was equal to the actuarial rate (ARC date) with the December 31, 2012 valuation (CY 2015) and has remained so.

Historical KP&F
Employer Contribution Rates



With the exception of 2008, KP&F employers have always contributed the full actuarial required contribution rate.

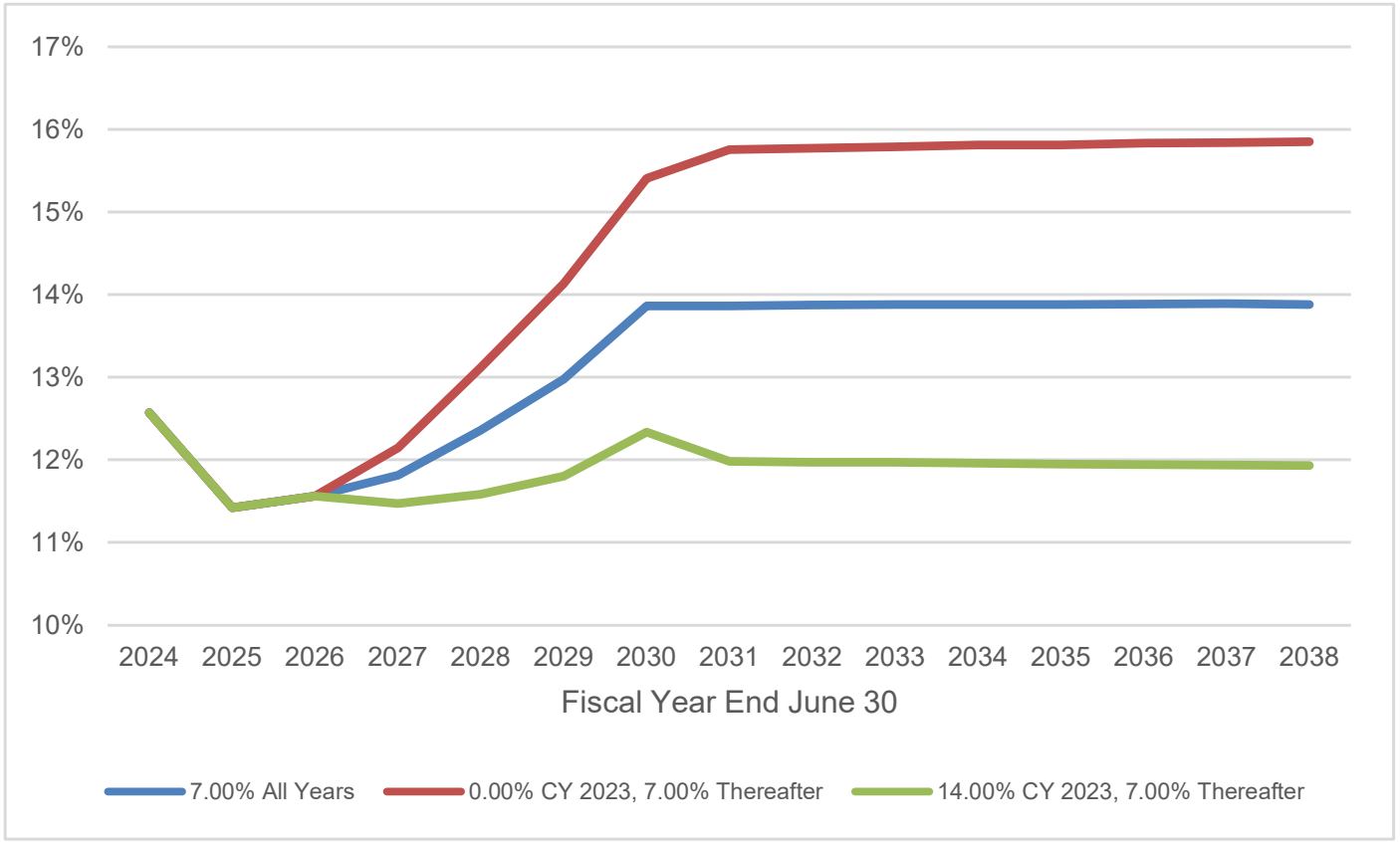
Historical Judges
Employer Contribution Rates



With the exception of 2008, the state has always contributed the full actuarial required contribution rate for the Judges System.

SENSITIVITY ANALYSIS

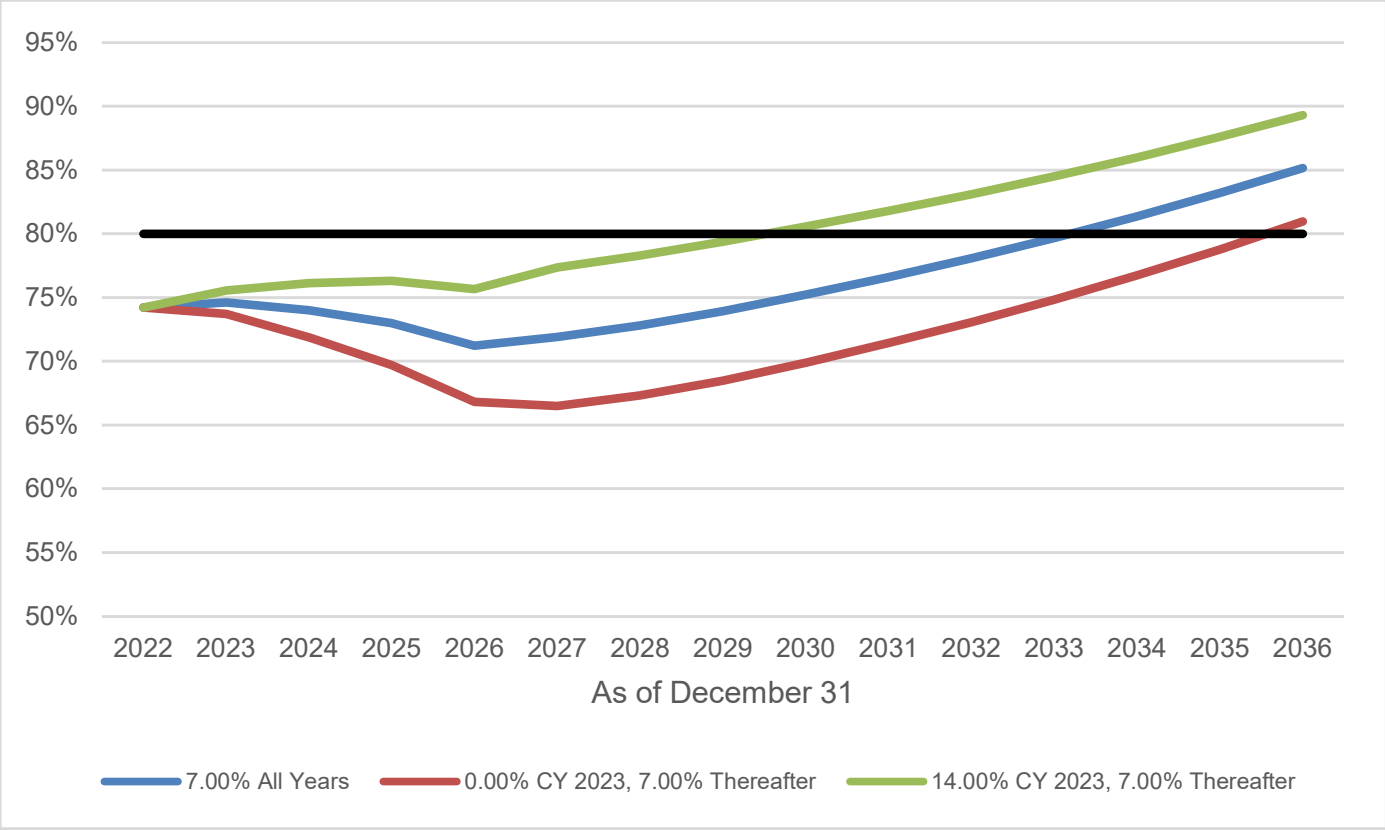
Sensitivity Analysis
State/School Projected Employer Contribution Rate



The employer contribution rate stabilizes just under 14% if all assumptions are met. With a 0% return in calendar year 2023, the rate increases to nearly 16% and with a 14% return in 2023, the rate decreases to 12%.

For sensitivity analysis to demonstrate the importance of actual returns, a 2023 return 7% higher and lower than assumed was modeled.

Sensitivity Analysis
State/School Projected Funded Ratio



State/School is expected to reach 80% funded in 2034 if all assumptions are met. With a 0% return in calendar year 2023, that date is pushed back two years (2036), and with a 14% return in 2023, moved up four years (2030).

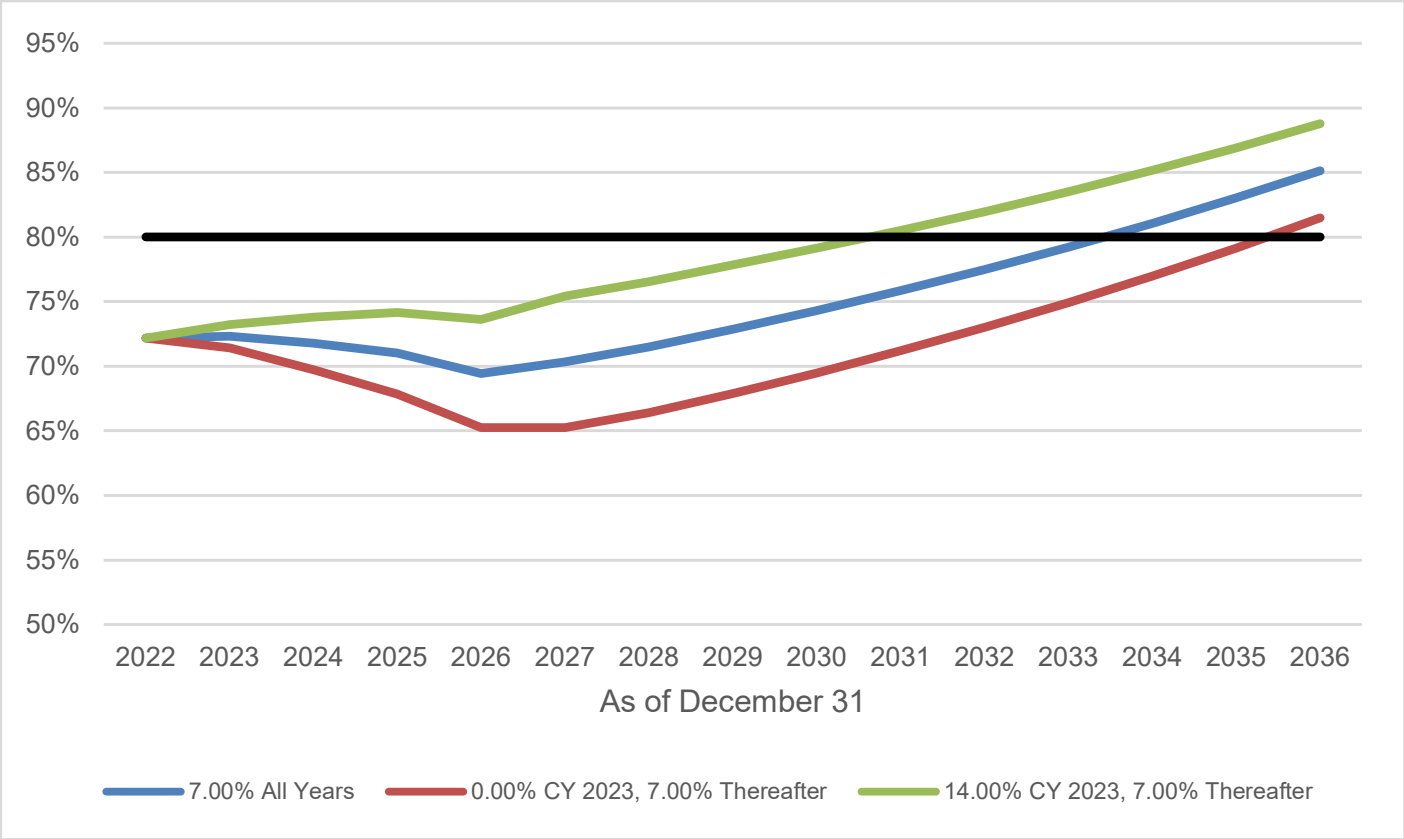
For sensitivity analysis to demonstrate the importance of actual returns, a 2023 return 7% higher and lower than assumed was modeled.

Local Projected Employer Contribution Rate

The employer contribution rate stabilizes around 11.6%% if all assumptions are met. With a 0% return in calendar year 2023, the rate increases to 13% and with a 14% return in 2023, the rate decreases to just over 10%.

For sensitivity analysis to demonstrate the importance of actual returns, a 2023 return 7% higher and lower than assumed was modeled.

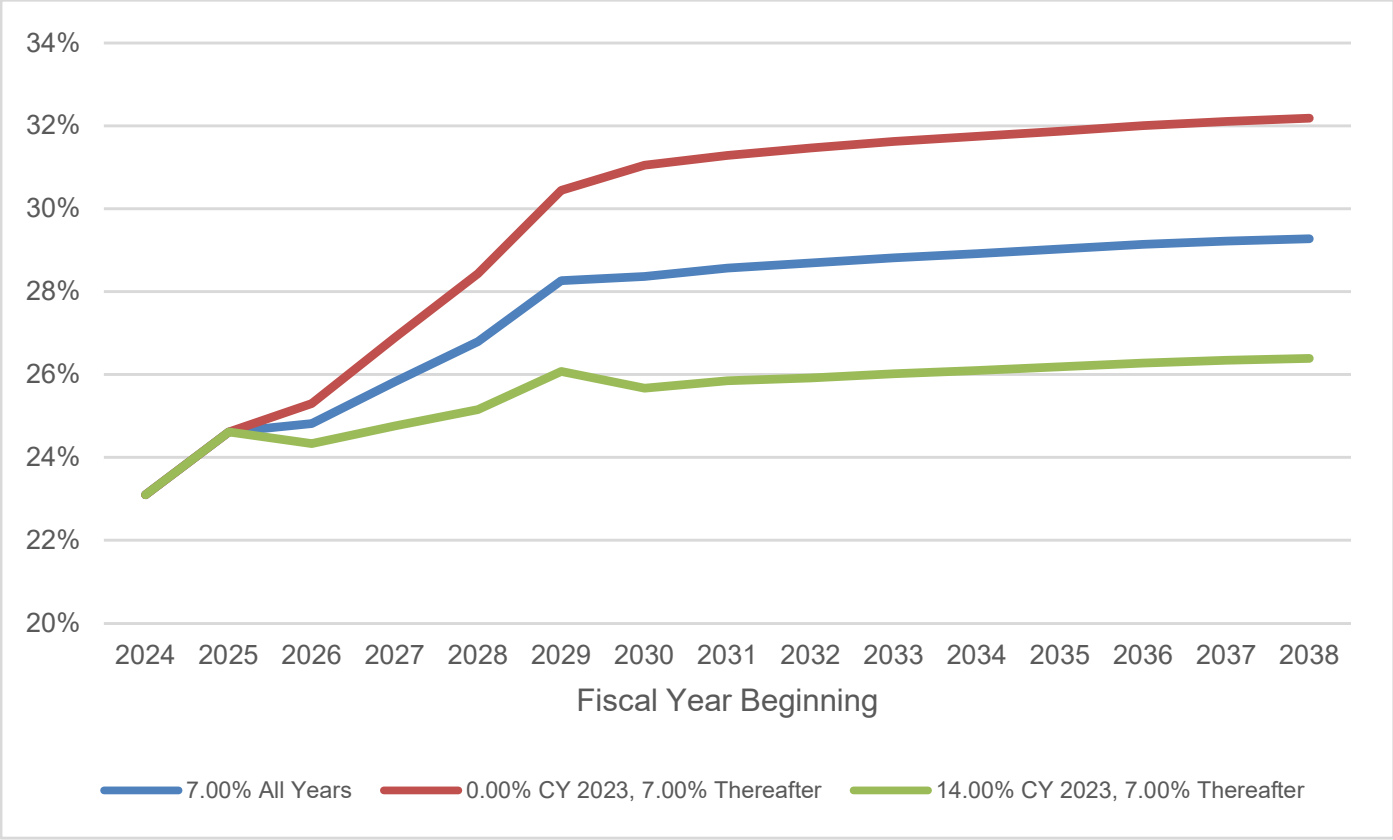
Local Projected Funded Ratio



Local is expected to reach 80% funded in 2034 if all assumptions are met. With a 0% return in calendar year 2023, that date is pushed back two years (2036), and with a 14% return in 2023, moved up three years (2031).

For sensitivity analysis to demonstrate the importance of actual returns, a 2023 return 7% higher and lower than assumed was modeled.

KP&F Projected Employer Contribution Rate



Once the deferred investment experience is recognized, the employer contribution rate reaches 28% if all assumptions are met. With a 0% return in calendar year 2023, the rate increases to 31% and with a 14% return in 2023, the rate decreases to around 26%.

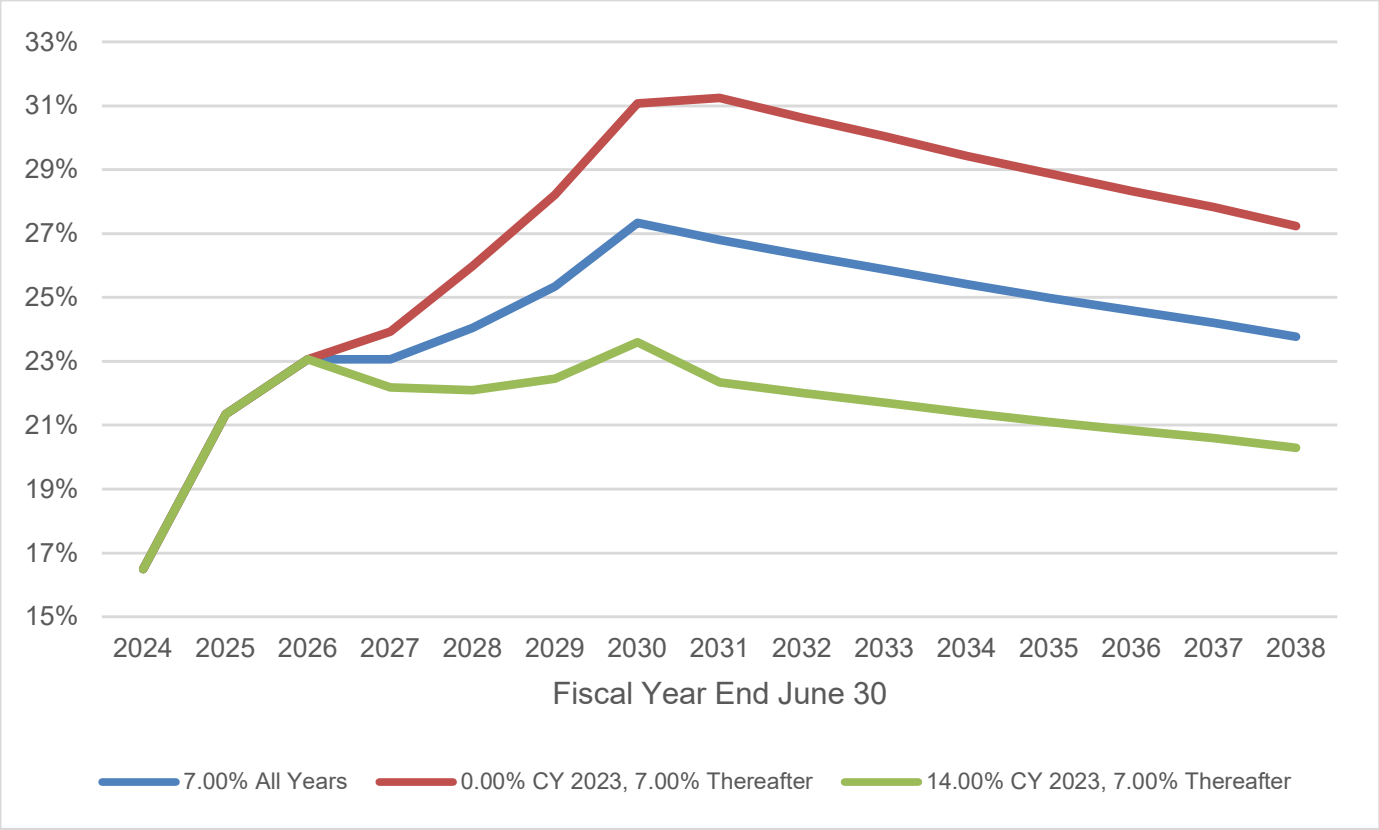
For sensitivity analysis to demonstrate the importance of actual returns, a 2023 return 7% higher and lower than assumed was modeled.

KP&F Projected Funded Ratio

Once the deferred investment experience flows through the smoothing method, the funded ratio is expected to increase. If all assumptions are met the funded ratio in 2036 is 81%. With a 0% return in calendar year 2023, the funded ratio declines to 78%, and with a 14% return in 2023, the funded ratio is 85%.

For sensitivity analysis to demonstrate the importance of actual returns, a 2023 return 7% higher and lower than assumed was modeled.

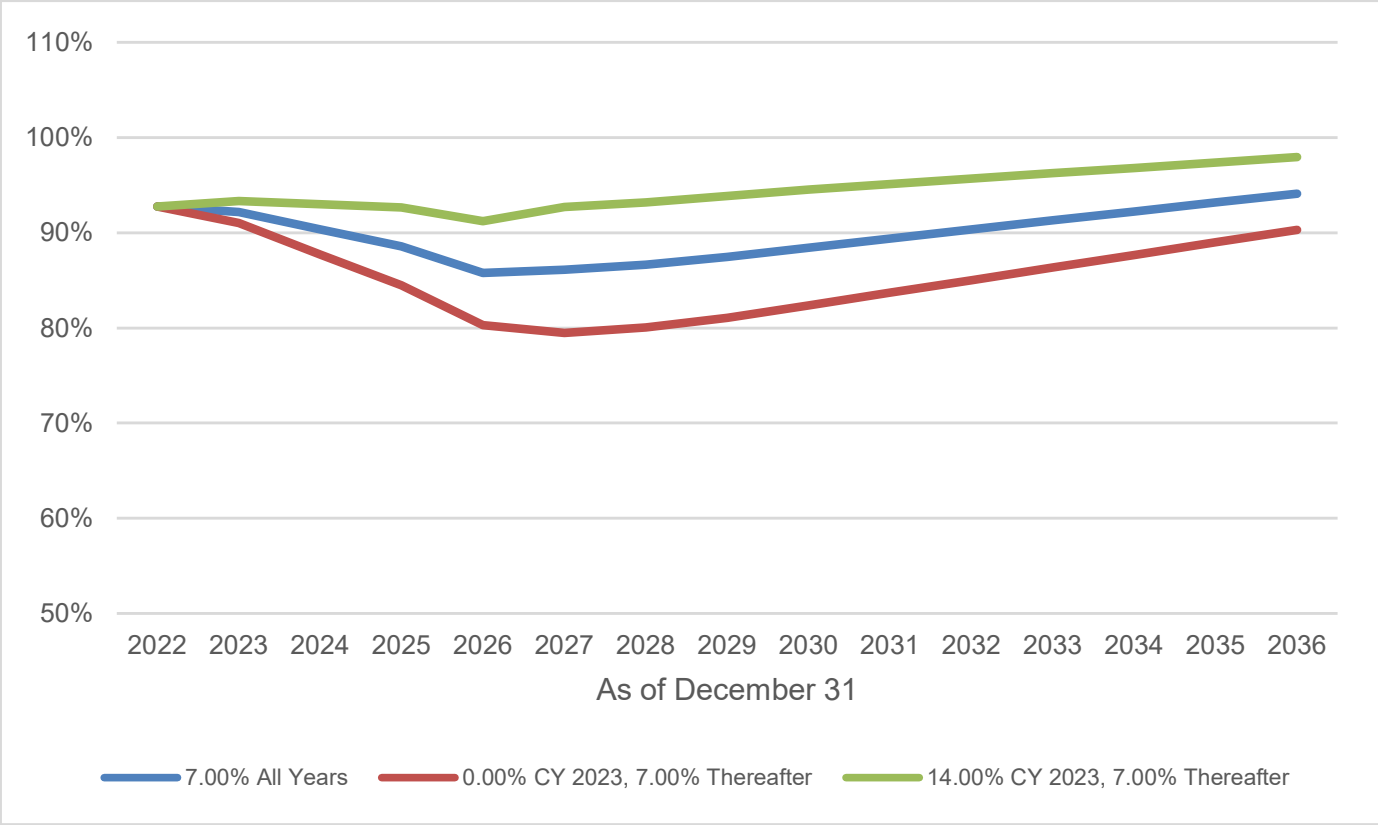
Judges Projected Employer Contribution Rate



Once the deferred investment experience is recognized, the employer contribution rate reaches 27% if all assumptions are met and then declines. With a 0% return in calendar year 2023, the rate reaches 31% before declining. With a 14% return in 2023, the rate remains around 23% before declining beyond FY 2030.

For sensitivity analysis to demonstrate the importance of actual returns, a 2023 return 7% higher and lower than assumed was modeled.

Judges Projected Funded Ratio



Once the deferred investment experience flows through the smoothing method, the funded ratio is expected to increase. If all assumptions are met the funded ratio in 2036 is 94%. With a 0% return in calendar year 2023, the funded ratio declines to 90%, and with a 14% return in 2023, the funded ratio is 98%.

For sensitivity analysis to demonstrate the importance of actual returns, a 2023 return 7% higher and lower than assumed was modeled.

Total System Short Term Projections Sensitivity Analysis

	Return in 2023*					
	7.00%		0%		- 7.00%	
Valuation Date (12/31)	Unfunded Actuarial Liability(M)	Funded Ratio	Unfunded Actuarial Liability(M)	Funded Ratio	Unfunded Actuarial Liability(M)	Funded Ratio
2022	$9,567	73%	$9,567	73%	$9,567	73%
2023	$9,676	74%	$10,014	73%	$10,488	72%
2024	$10,143	73%	$10,935	71%	$11,728	69%
2025	$10,732	72%	$11,988	69%	$13,244	66%

- Assumes a 7.00% return in all years after 2023 so current deferred investment experience is reflected in future years.

Key Takeaways

Additional contributions to the School group in 2022 were reflected in the employer contribution rate last year but are first reflected in the funded ratio in this valuation. As a result, the School funded ratio increased by 5%.

Investment return in 2022 for KPERS, like many Systems, was much lower than expected which puts upward pressure on future contribution rates.

Liability losses, largely from higher salary increases than expected, also had a negative impact on funded status and employer contribution rates. Similar experience is being observed in other public retirement systems.

As noted in the projections, the funded ratios of all groups are projected to decline over the next few years if assumptions are met. Actual investment returns are the key driver to future funded status and contribution rates.

Actuarial Certification

I, Patrice A. Beckham, FSA, am a consulting actuary with Cavanaugh Macdonald Consulting, LLC. I am a member of the American Academy of Actuaries, Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. I am available to answer any questions or provide additional information as needed.

Sincerely,

Patrice A. Beckham, FSA, EA, FCA, MAAA

Principal and Consulting Actuary