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Presentation of December 31, 2016 Valuation Results

July 21, 2017

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- Overview of Key Findings
- Detail of Valuation Results
- Projections of Future Valuation Results

- KPERS Board adopted a new set of actuarial assumptions and methods in November, 2016, as the result of an experience study
 - Lower inflation assumption (2.75%) led to lower interest rate assumption (7.75%) and salary growth assumption (3.50%)
 - Updated mortality, other demographic assumptions
 - Resulted in an increase in Actuarial Liability for all groups
 - Also resulted in an increase in Actuarial Contribution Rates

- Investment return on market value basis in 2016 was 8.5%. Due to the asset smoothing method, the return on actuarial assets was 8.4%.

	<u>Assumptions and Methods</u>		
	<u>Prior</u>	<u>Current</u>	<u>Change</u>
State/School	\$ 18,465	\$ 18,867	\$ 402
Local	4,994	5,095	101
KP&F	3,093	3,175	82
Judges	<u>172</u>	<u>182</u>	<u>10</u>
Total*	\$ 26,724	\$ 27,319	\$ 595

* Amounts are shown in millions and may not add due to rounding



Impact of Assumption Changes on Actuarial Contribution Rate



	<u>Old Assumptions and Methods</u>	<u>New Assumptions and Methods</u>	<u>Change</u>
<u>State/School</u>			
- Normal Cost Rate	8.21%	8.14%	(0.07%)
- UAL Amortization Rate	<u>11.05%</u>	<u>12.60%</u>	<u>1.55%</u>
- Actuarial Contribution Rate	19.26%	20.74%	1.48%
<u>Local</u>			
- Normal Cost Rate	7.82%	7.67%	(0.15%)
- UAL Amortization Rate	<u>6.30%</u>	<u>7.22%</u>	<u>0.92%</u>
- Actuarial Contribution Rate	14.12%	14.89%	0.77%
<u>KP&F</u>			
- Normal Cost Rate	15.10%	14.88%	(0.22%)
- UAL Amortization Rate	<u>12.30%</u>	<u>14.40%</u>	<u>2.10%</u>
- Actuarial Contribution Rate	27.40%	29.28%	1.88%
<u>Judges</u>			
- Normal Cost Rate	19.60%	20.30%	0.70%
- UAL Amortization Rate	<u>(0.07%)</u>	<u>3.99%</u>	<u>4.06%</u>
- Actuarial Contribution Rate	19.53%	24.29%	4.76%

- Key legislative funding changes
 - ❑ Substitute for Senate Sub for HB 2052:
 - Provides that the FY 2017 State/School contributions will be \$64.13M less than the scheduled statutory contributions, to be repaid by the School group in level installments of \$6.4M over 20 years.
 - ❖ Treated as a long-term receivable by KPERS so no direct impact on the valuation results.
 - The FY 2016 contribution reduction (\$97.4M) will not be repaid as previously scheduled for FY 2018.
 - ❖ Considered a long-term receivable by KPERS for FY 2016.
 - ❖ Reflected in this valuation as non-collectible pension contributions.

➤ Key legislative funding changes

❑ Senate Sub for HB 2002:

- FY 2018: State/School contributions made at statutory rate of 12.01% in addition to the first installment of \$6.4M repayment for FY 2017 reduction.
- FY 2019: Reduce School contributions so the total State/School employer contribution is \$420M, including the \$6.4M repayment for FY 2017. Results in estimated reduction of \$194M to be repaid by the School group in level installments of \$19.4M over 20 years.
- FY 2020: Current statutory cap of 1.2% will apply resulting in a statutory rate of 14.41%, in addition to the \$6.4M and \$19.4M payments for the FY 2017 and FY 2019 contribution reductions.

- ❑ Contribution reductions repaid over time are treated as receivables by KPERS and handled consistently in the valuation process

➤ Other legislative changes

- ❑ SB 205: Changed the duty-related death benefit for KP&F members to the greater of 50% of Final Average Salary and the member's accrued retirement benefit under a 100% joint & survivor option, payable to the member's spouse.
- ❑ House Sub for SB 21: Modified the working after retirement rules, including lengthening the waiting period from 60 to 180 days for KPERS members who retire before attaining age 62, removing the earnings limit, and setting a uniform employer contribution schedule.
 - No assumption in the valuation for reemployment so no impact on valuation results
 - Impact on member retirement patterns will be captured in future experience studies and retirement assumptions adjusted

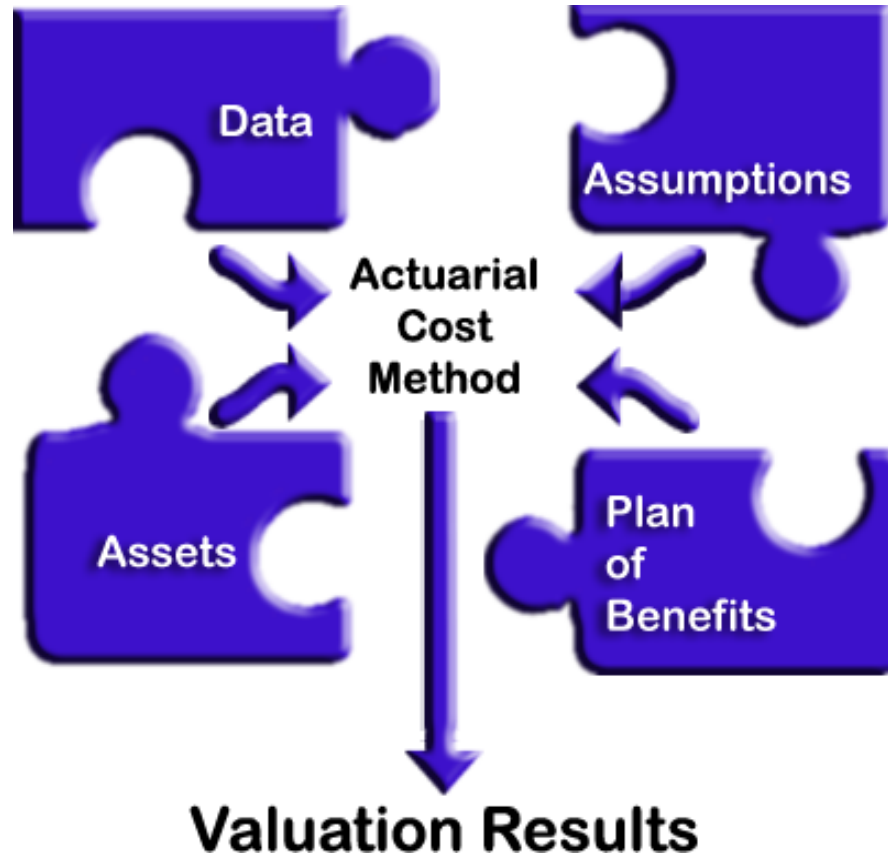
➤ Valuation results

- ❑ Overall funded ratio held steady at 67% from last year despite impact of assumption changes
- ❑ Total unfunded actuarial liability increased from \$8.5 billion last year to \$9.1 billion this year
- ❑ State/School statutory rate is within 0.33% of Actuarial Required Contribution Rate. All other groups are at full Actuarial Required Contribution Rate.

DETAIL OF VALUATION RESULTS

- Measurement of Assets and Liabilities
- Best Estimate of Ultimate Costs
 - Project future benefits using actuarial assumptions
 - Calculate present value of future benefits
 - Apply actuarial cost method to allocate benefit cost to periods of service for each member
- Calculate Employer Contribution Rates
 - FY 2020 for State/School Group
 - CY 2019 for Local Group
- Baseline for Legislative studies in 2018

Where Does the Actuary Get These Numbers?



Demographic Data and Assumptions

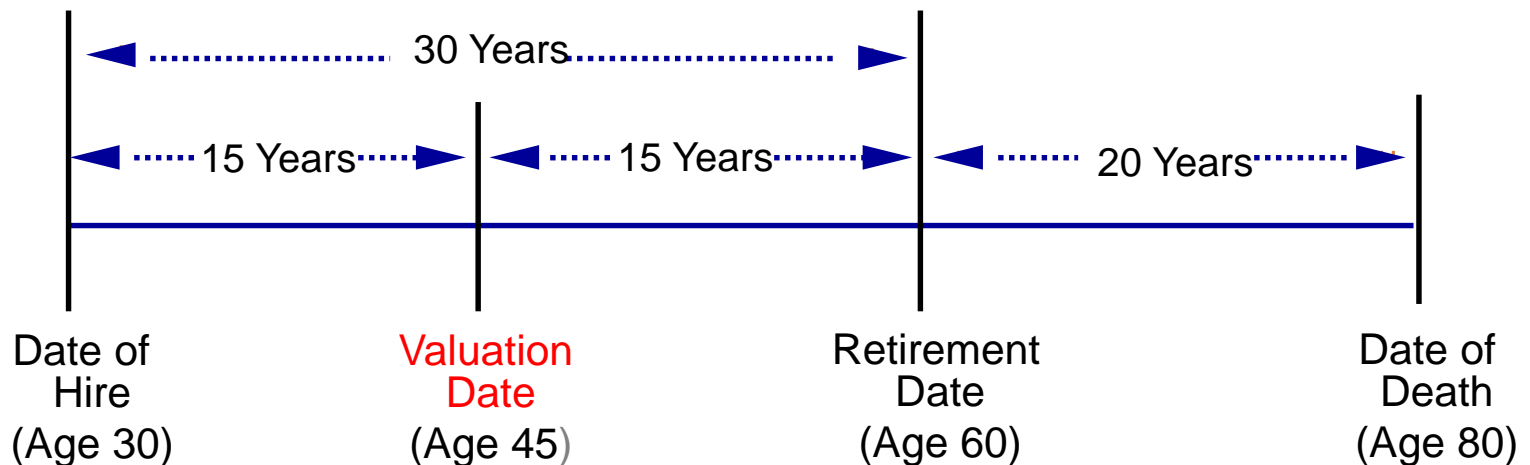


KNOWN at valuation date:

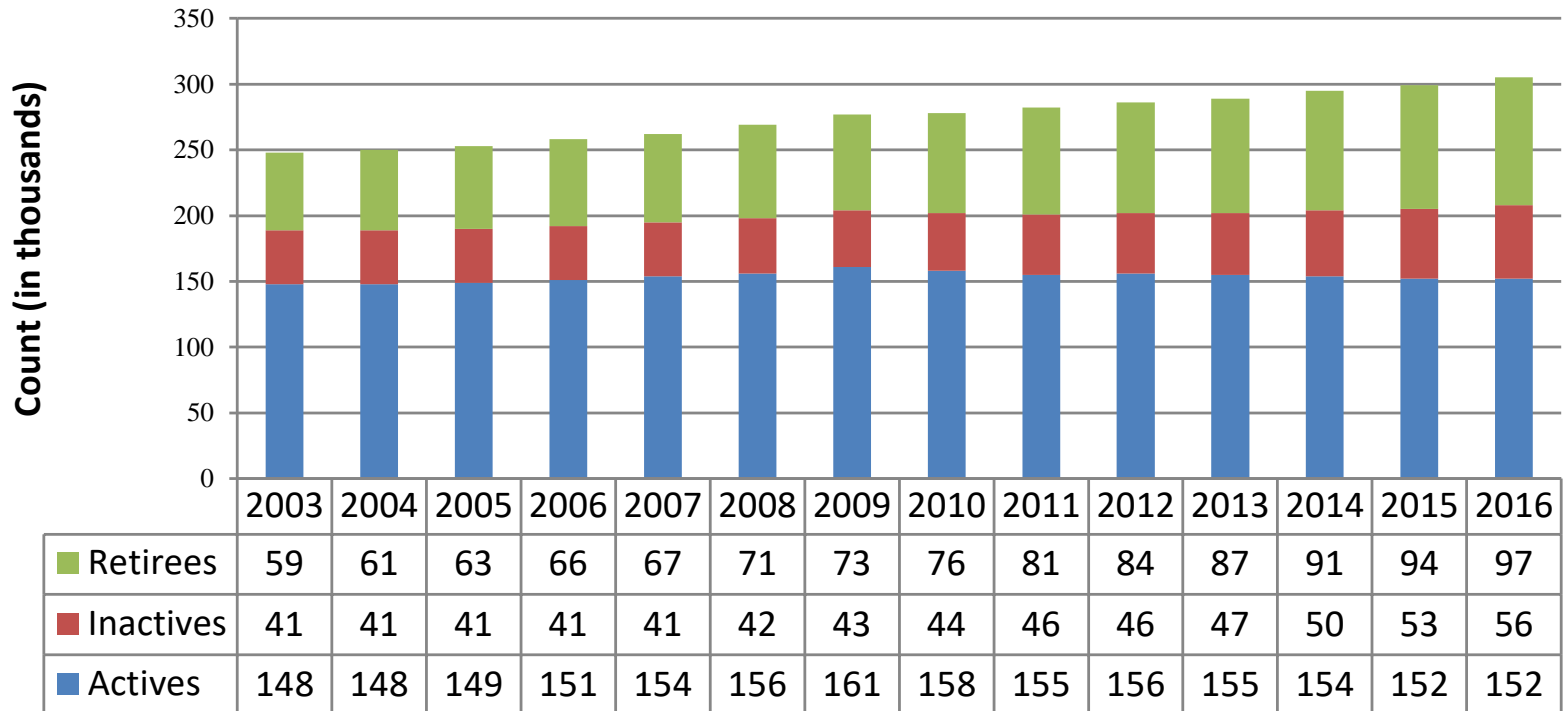
1. age
2. salary
3. gender
4. service to date
5. membership group

ASSUMED at valuation date:

1. future salary increases
2. retirement date(s)
3. death rates before and after retirement
4. disability rates
5. other termination rates

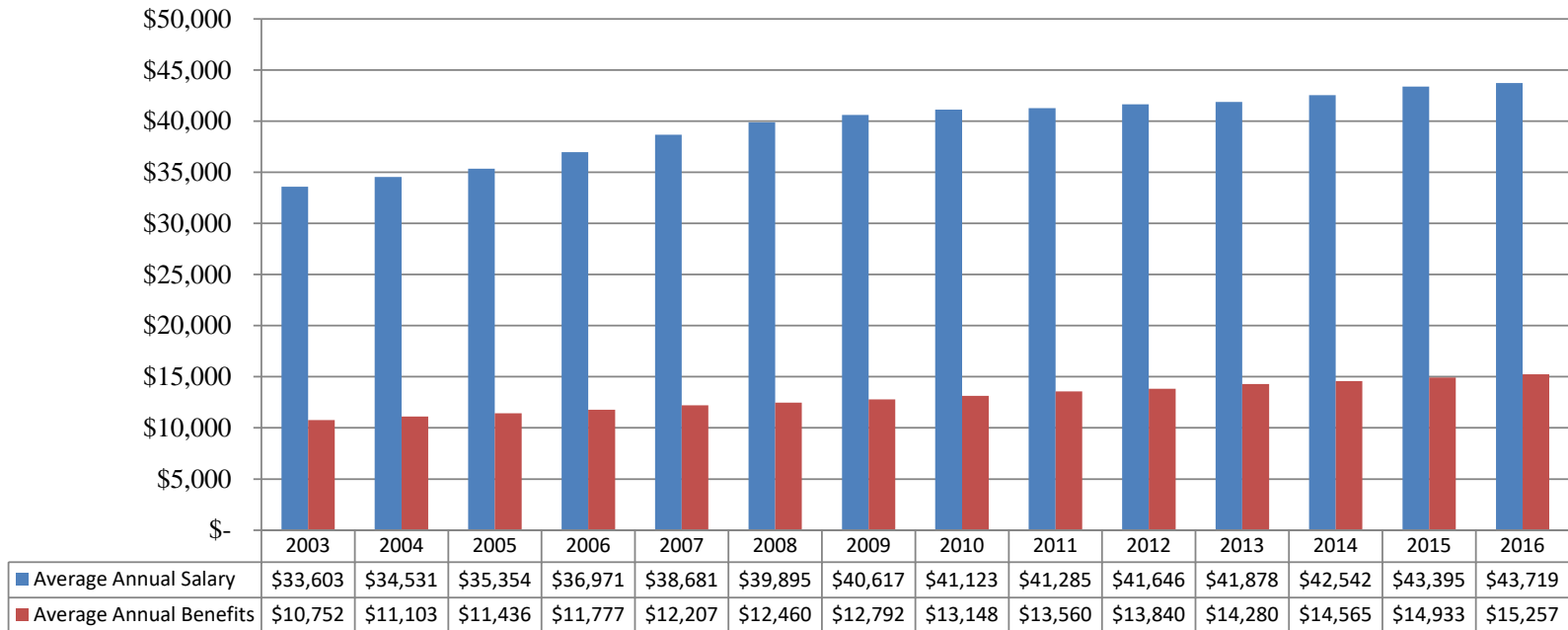


Total Active and Retired Members (Total System)



0.2% average annual increase in active count since 2003 – flat or declining for last few years.
 3.9% average annual increase in retiree count since 2003 – 3.1% increase for 2016.
 2.4% average annual increase in inactive count since 2003 – 4.9% increase for 2016.

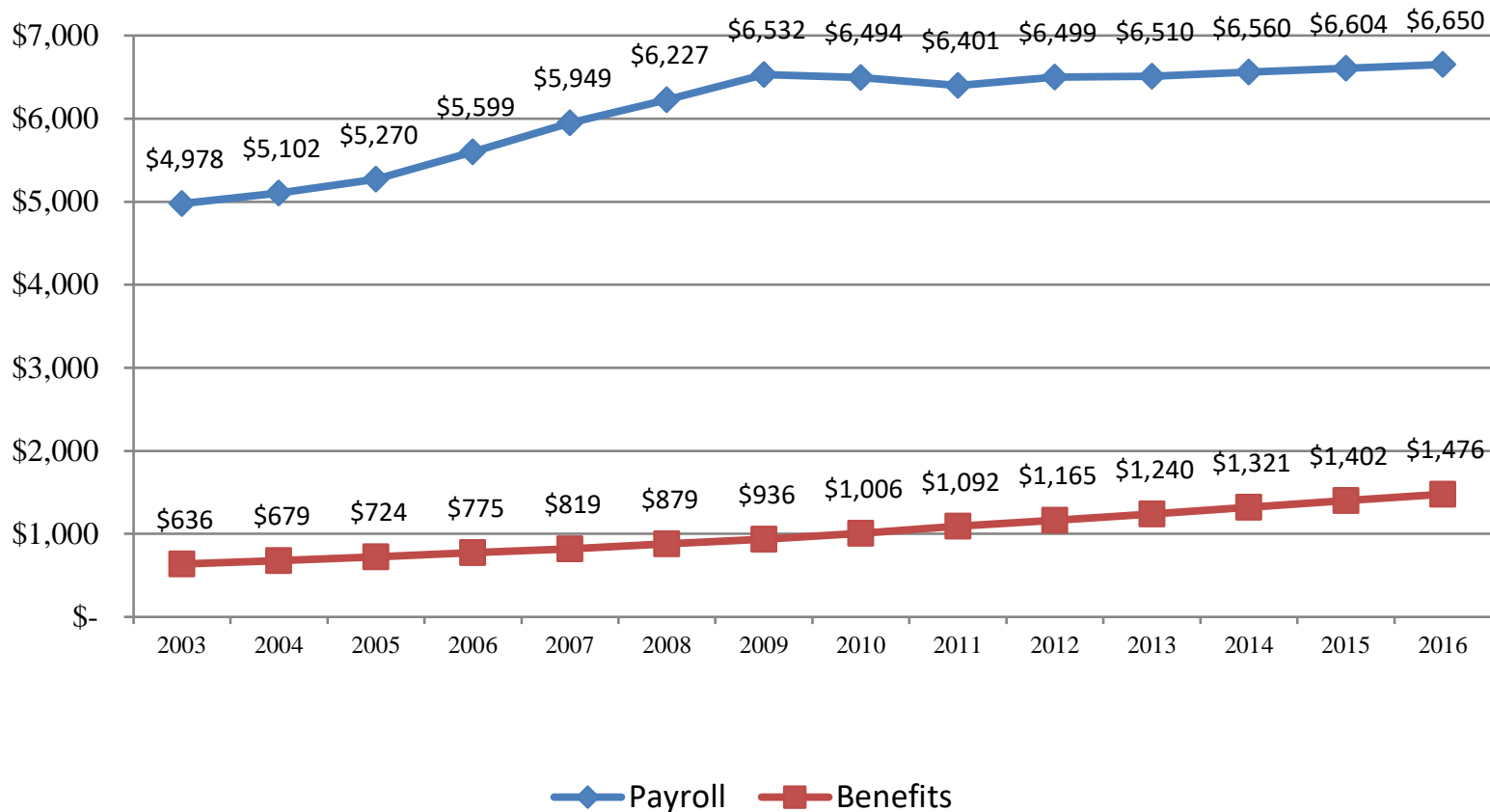
Average Salary and Benefits (Total System)



2.0% annual increase in average salary since 2003. 0.7% increase for 2016.
2.8% annual increase in average benefits since 2003. 2.3% increase for 2016.

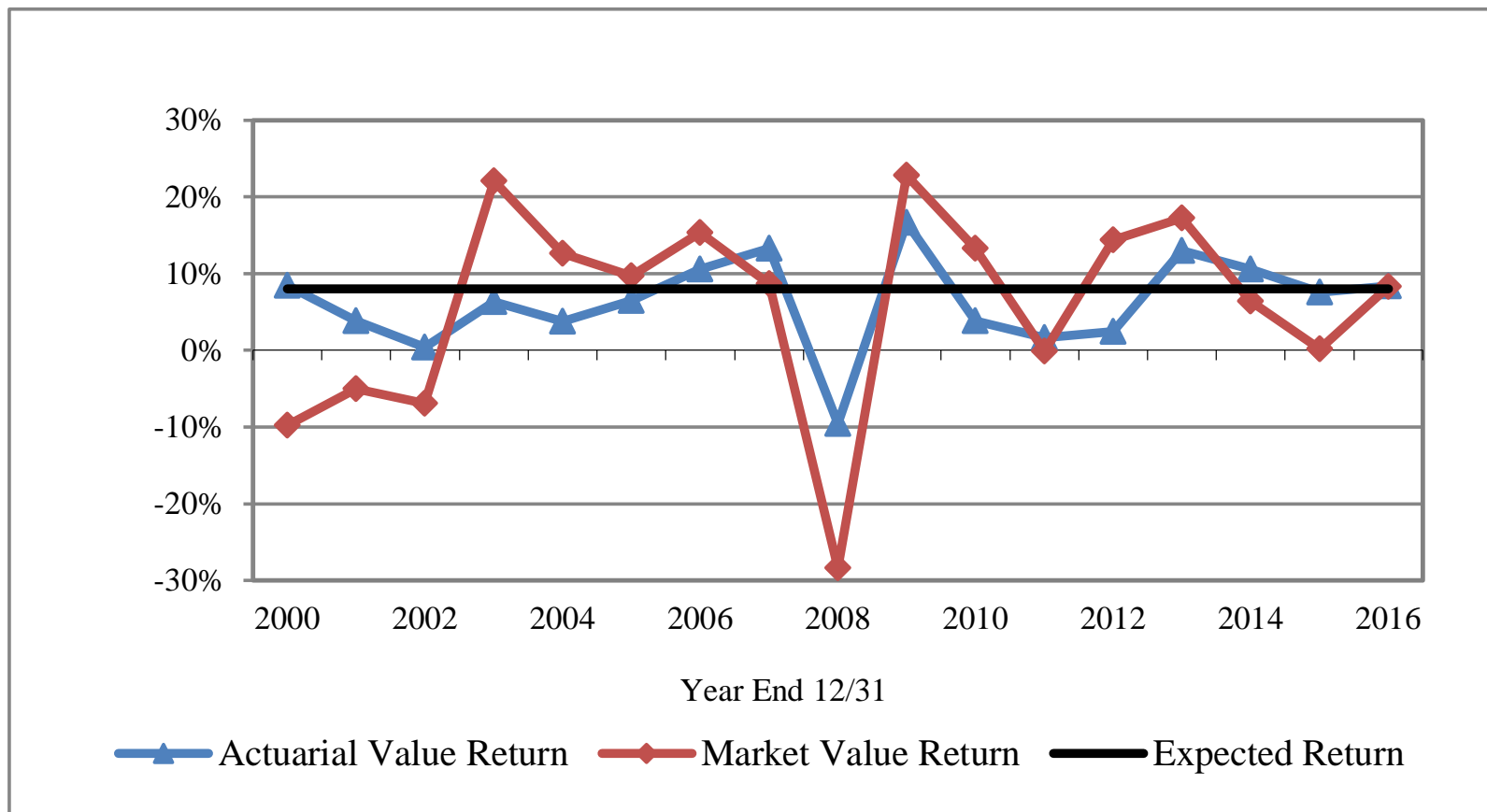
Total Payroll & Benefits (\$M)

(Total System)



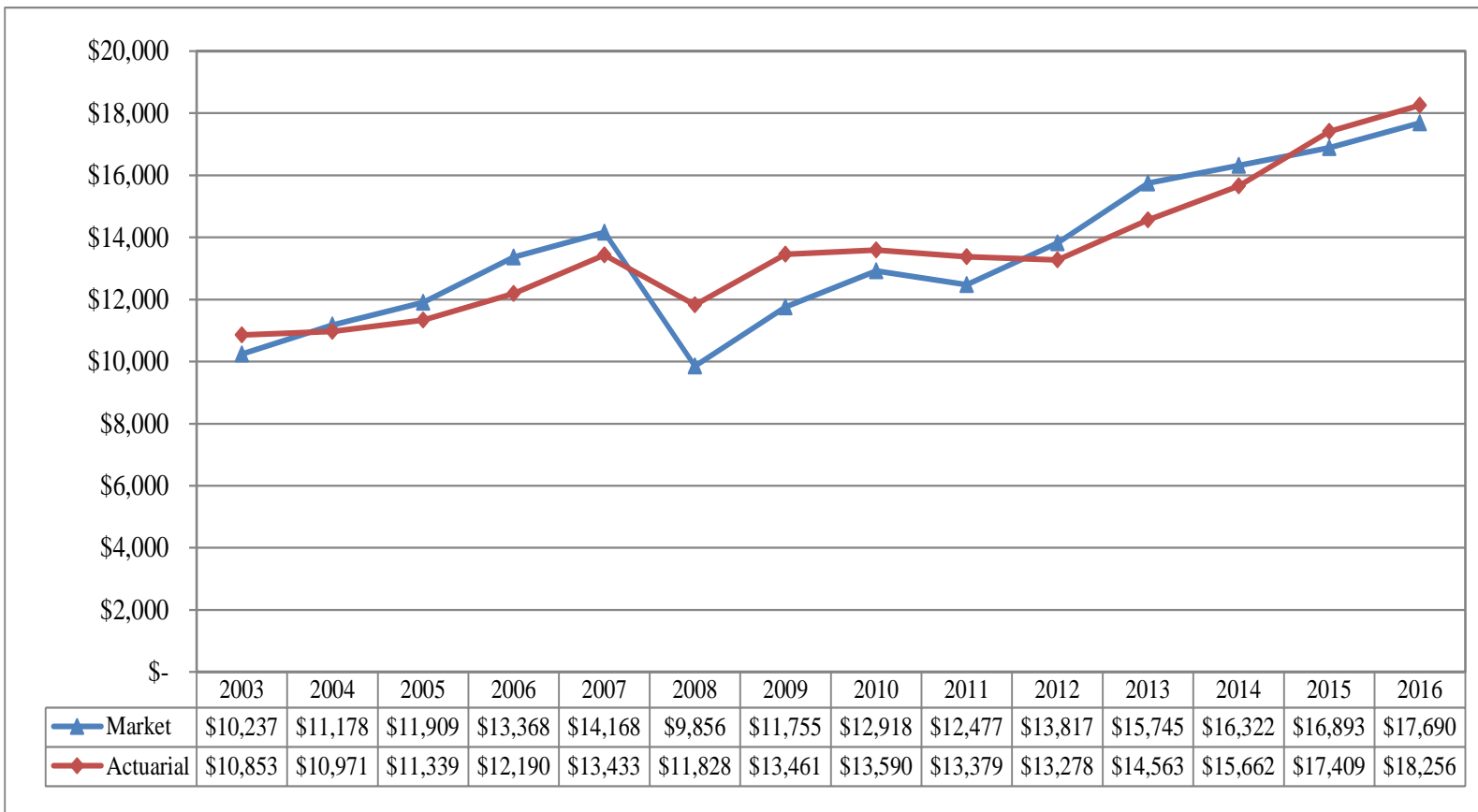
- Market value not used directly in valuation
- Asset valuation method used to smooth the effect of market fluctuations
 - Goal is to provide more stability in contribution rates
 - Smoothed value is called “actuarial value of assets” and is used in all of the measurements in the valuation
- Methodology recognizes the difference in actual investment return compared to expected return (8% in 2016*) evenly over 5 years

*7.75% effective in calendar year 2017 and beyond



Note: Rates of return are dollar-weighted

Total System Assets (\$ Millions)



Year-Over-Year Changes in System's Asset Values (\$M)



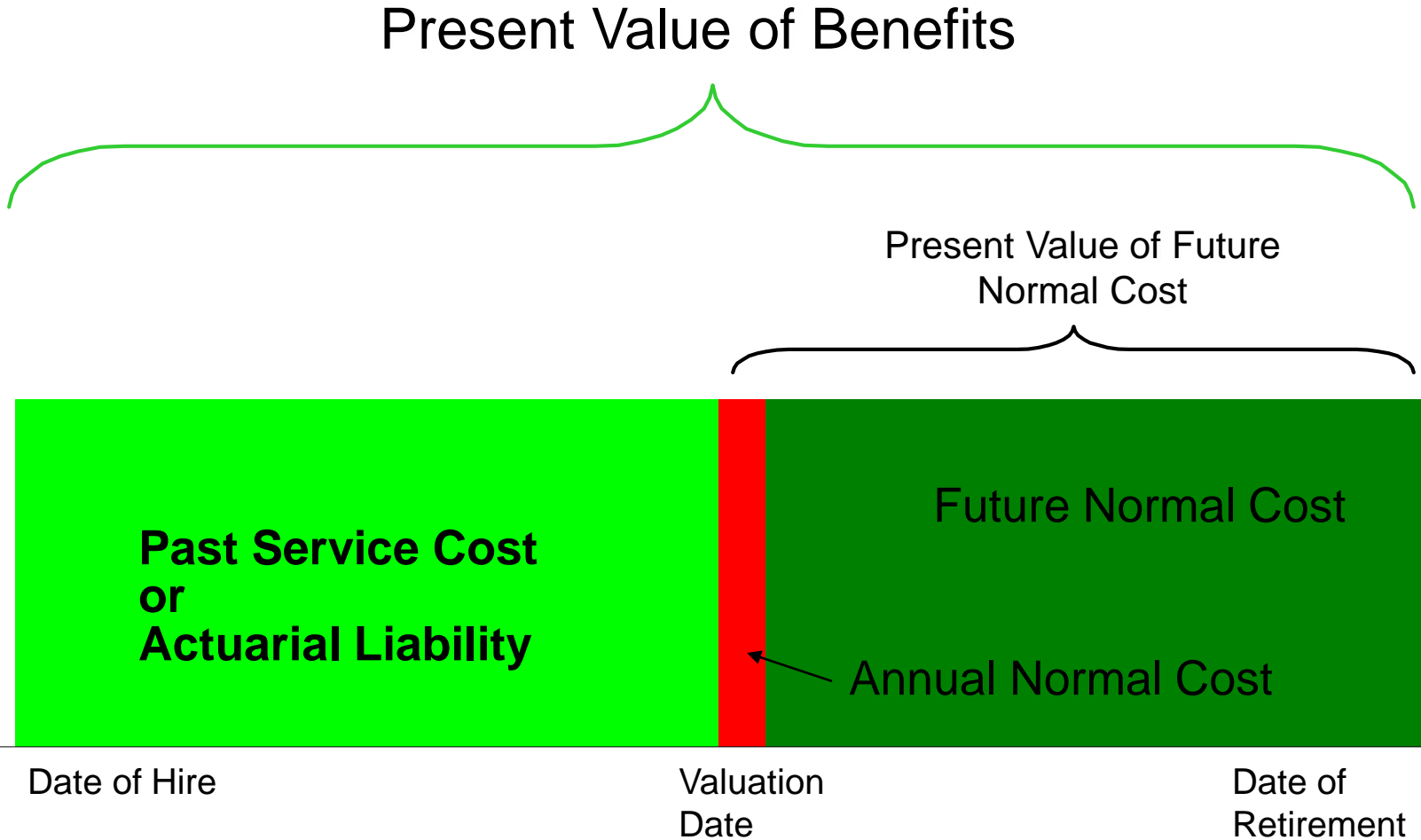
	<u>Market</u>	<u>Actuarial</u>
Value at 12/31/15	\$ 16,893	\$ 17,409
<ul style="list-style-type: none"> ▪ Employer and Member Contributions 	1,163	1,163
<ul style="list-style-type: none"> ▪ Benefit Payments 	(1,649)	(1,649)
<ul style="list-style-type: none"> ▪ Non-collectible Pension Contributions 	(99)	(99)
<ul style="list-style-type: none"> ▪ Investment Income, Net of Expenses 	<u>1,382</u>	<u>1,432</u>
Value at 12/31/16	\$ 17,690	\$ 18,256
Rate of Return	8.5%*	8.4%

* As reported by KPERS

- Deferred experience yet to be recognized
 - Net deferred loss of \$566 million this year vs. \$515 million net deferred loss in last year's valuation
 - Will flow through smoothing method over the next 4 years
 - Expected to increase the Unfunded Actuarial Liability and lower the funded ratio, absent favorable experience in future years

- System liabilities = present value of future benefit payments expected to be paid
- Cost method is a budgeting tool used to fund benefits
- Allocates the financing of benefits to time periods before and after the valuation date
 - Before valuation date: actuarial liability
 - After valuation date: future normal costs
- Different methods exist - KPERS uses the most common method, called the Entry Age Normal method
 - Funds benefit, as a level percent of pay, from entry age to exit age for each member
 - Produces stable cost for each year (normal cost) if assumptions are met and overall entry age remains the same

Contribution as
% of Pay



$$\text{Actuarial Liability} - \text{Actuarial Assets} = \text{Unfunded Actuarial Liability}$$

Development of 12/31/2016 Unfunded Actuarial Liability



	<u>Actuarial Liability (AL)</u>	<u>Actuarial Assets</u>	<u>Unfunded AL</u>
State	\$ 4,386	\$ 3,464	\$ 922
School	14,481	8,713	5,768
State/School	18,867	12,177	6,690
Local	5,095	3,580	1,515
KP&F	3,175	2,329	846
Judges	<u>182</u>	<u>171</u>	<u>11</u>
Total*	\$ 27,318	\$ 18,256	\$ 9,061

* Amounts are shown in millions and may not add due to rounding

- Unfunded Actuarial Liability is amortized using “Level percent of pay” amortization methodology
- Payments in future years are assumed to increase 3%, with the payroll increase assumption
- When the amortization period is longer (30-40 years), the dollar amount of Unfunded Actuarial Liability increases over more than half of amortization period, even if full Actuarial Required Contribution is paid and assumptions are met
- For KPERS, the amortization period has declined and is now at the point where the Unfunded Actuarial Liability is scheduled to decrease each year if the full Actuarial Required Contribution is paid and all assumptions are met

- New amortization method amortizes the unfunded actuarial liability using a “layered” approach
 - 12/31/15 UAL serves as the initial (legacy) base and continues to be amortized over the closed 40-year period, beginning July 1, 1993 (16 years remain as of 12/31/16 valuation)
 - Increase in the 12/31/16 UAL due to the assumption changes is amortized over a closed 25-year period
 - Current and future period UAL changes resulting from actuarial experience are amortized over closed 20-year periods
 - See detail for State/School UAL amortization on next page

Unfunded Actuarial Liability (UAL) State/School (\$M)



Amortization Base	Original Amount	Remaining Payments	Current Balance	Annual Payment*
Legacy UAL (2015)	\$6,489	16	\$6,460	\$575
Assumption Changes (2016)	451	25	451	31
Actuarial Experience (2016)	(99)	20	(99)	(8)
Total			\$6,813	\$598

*Future payments increase with assumed payroll increase of 3% per year.

- Any shortfall between the statutory contribution rate and the Actuarial Required Contribution rate increases the Unfunded Actuarial Liability
- Other factors such as experience gains/losses, benefit changes, and changes in actuarial assumptions or methods also impact the Unfunded Actuarial Liability

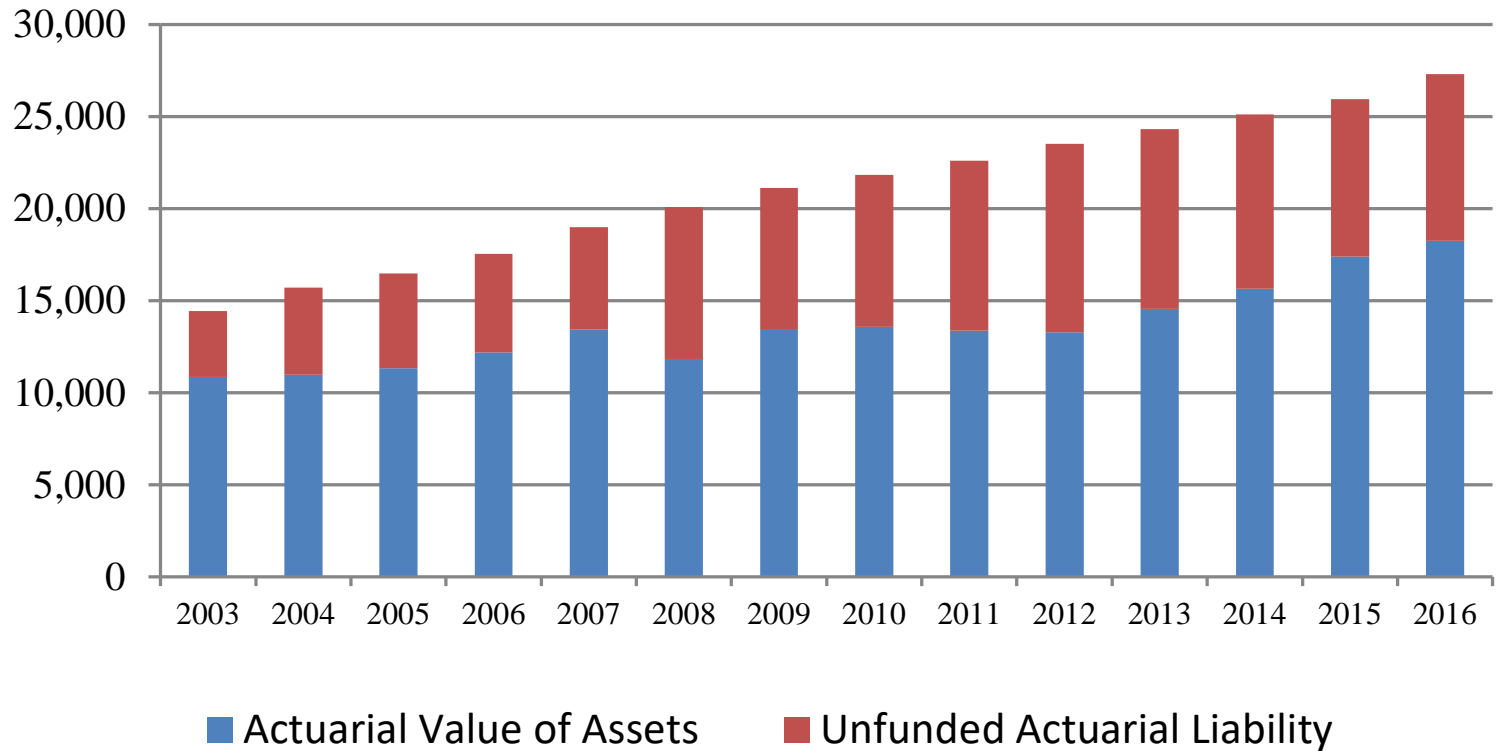
Factors Impacting Change in Unfunded Actuarial Liability (UAL)



	State	School	Local	KPF	Judges	Total
12/31/15 UAL (\$M)	870.4	5,405.5	1,485.7	771.6	6.0	8,539.2
• Contribution cap/lag	(25.7)	119.8	(16.5)	(4.8)	(2.5)	70.3
• Amortization method	(3.9)	(24.2)	(6.6)	(3.4)	(0.2)	(38.3)
• Investment experience	(15.3)	(27.0)	(8.7)	(7.5)	(0.6)	(59.2)
• Demographic/other experience	(28.2)	(81.2)	(39.8)	6.6	(1.2)	(143.9)
• Assumptions	120.3	281.0	100.6	81.9	9.6	593.4
• Benefit provisions	0.0	0.0	0.0	0.7	0.0	0.7
• Non-collectible contributions	4.1	94.4	0.0	0.4	0.0	98.9
12/31/16 UAL (\$M)	921.7	5,768.3	1,514.7	845.5	11.1	9,061.4

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

History of System Funded and Unfunded Portion of Total Actuarial Liability



Year-over-Year Change in Funded Ratio



	December 31	
	2016	2015
State	79.0%	79.3%
School	60.2%	60.8%
State/School	64.5%	65.2%
Local	70.3%	69.1%
KP&F	73.4%	74.0%
Judges	93.9%	96.4%
Total	66.8%	67.1%



Development of Employer Contribution Rates



(12/31/2016 valuation applies to FY beginning in 2019)

	State	School	State/School	Local
Total Normal Cost Rate	7.74%	8.24%	8.14%	7.67%
Unfunded Actuarial Liability Contribution	<u>7.75%</u>	<u>13.91%</u>	<u>12.60%</u>	<u>7.22%</u>
Total Actuarial Contribution Rate	15.49%	22.15%	20.74%	14.89%
Less Member Rate	<u>(6.00%)</u>	<u>(6.00%)</u>	<u>(6.00%)</u>	<u>(6.00%)</u>
Employer Actuarial Required Contribution Rate	9.49%	16.15%	14.74%	8.89%

The School group has an additional contribution of 0.18% beginning in FY 2018 which increases to 0.69% in FY 2020 due to contribution reductions in FY 2017 and FY 2019.



Development of Employer Contribution Rates



(12/31/2016 valuation applies to FY beginning in 2019)

	<u>KP&F</u>	<u>Judges</u>
Total Normal Cost Rate	14.88%	20.30%
Unfunded Actuarial Liability Contribution Rate	<u>14.40%</u>	<u>3.99%</u>
Total Actuarial Contribution Rate	29.28%	24.29%
Less Member Rate	<u>(7.15%)</u>	<u>(5.64%)</u>
Employer Actuarial Required Contribution Rate	22.13%	18.65%

Actuarial vs. Statutory Employer Contribution Rates

(Fiscal Years Beginning in 2019)



	December 31, 2016		Shortfall
	Actuarial	Statutory	
State	9.49%	14.41%	(4.92%)*
School	16.15%	14.41%	1.74%
State/School	14.74%	14.41%	0.33%**
Local	8.89%	8.89%	0.00%
KP&F	22.13%	22.13%	0.00%
Judges	18.65%	18.65%	0.00%

* As provided in statute, the contribution above the State Actuarial Required Contribution (ARC) rate will be used to fund the School Group.

** State/School projected to reach ARC date in FY 2021 (12/31/2017 valuation) at a rate of 14.99%.

Change in Actuarial Required Contribution (ARC) by Group



	State	School	Local	KPF	Judges
12/31/15 ARC	8.28%	14.59%	8.39%	20.09%	14.68%
• Contribution cap/lag	(0.23)	0.29	(0.08)	(0.08)	(0.92)
• Amortization method	(0.03)	(0.06)	(0.03)	(0.06)	(0.04)
• Investment experience	(0.13)	(0.06)	(0.04)	(0.13)	(0.22)
• Demographic/other experience	0.26	(0.35)	(0.12)	0.41	0.39
• Assumptions and Method Changes	1.30	1.52	0.77	1.88	4.76
• Benefit Provisions	0.00	0.00	0.00	0.01	0.00
• Non-Collectible Contributions	0.04	0.22	0.00	0.01	0.00
12/31/16 ARC	9.49%	16.15%	8.89%	22.13%	18.65%

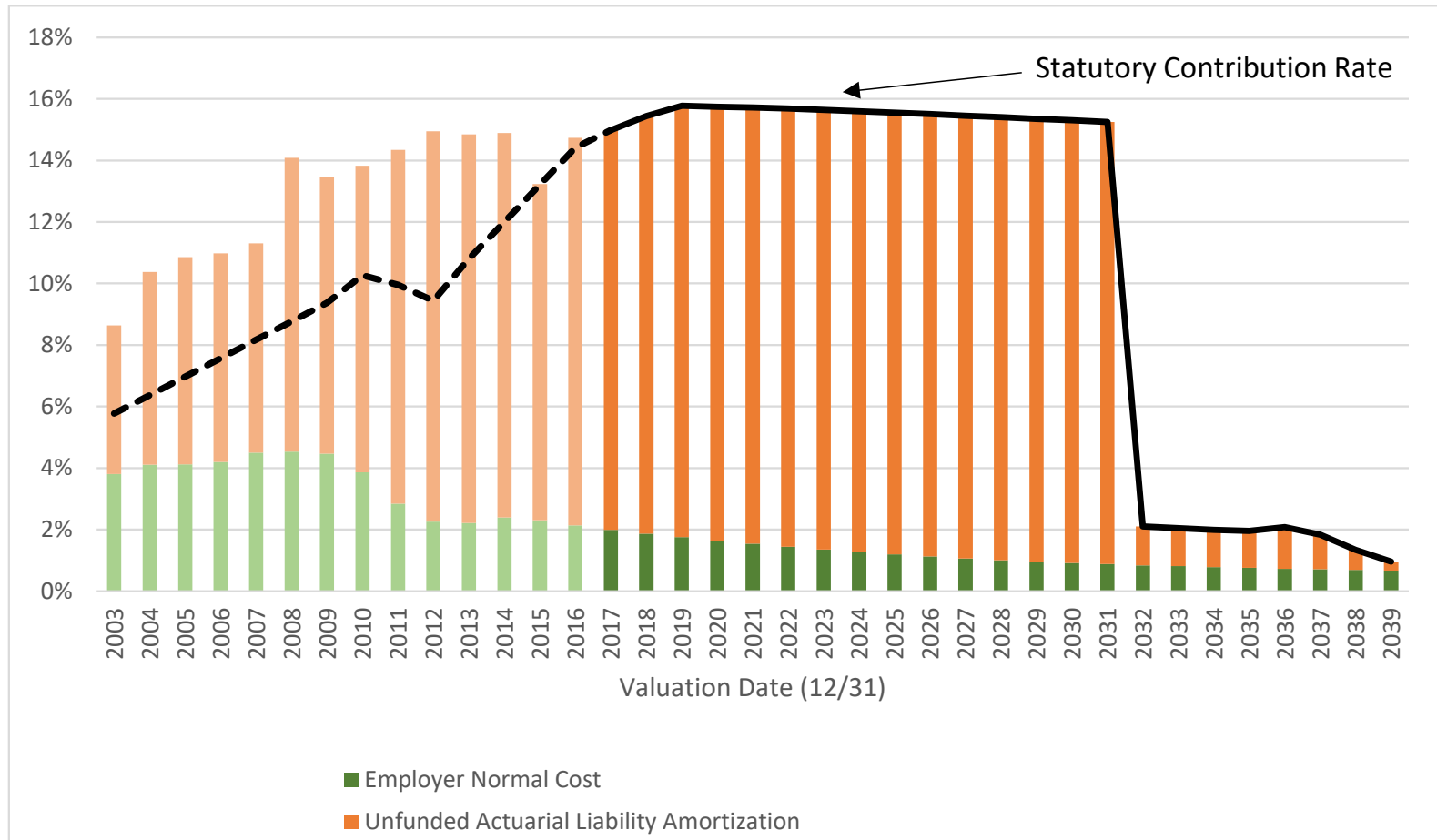
Employer Contribution Rate Comparisons



<u>System</u>	Actuarial Required Contribution Rate		Statutory Contribution Rate		Statutory/ Actuarial
	<u>12/31/2015</u>	<u>12/31/2016</u>	<u>12/31/2015</u>	<u>12/31/2016</u>	<u>12/31/2016</u>
State	8.28%	9.49%	13.21%	14.41%	151.8%
School	14.59%	16.15%	13.21%	14.41%	89.2%
State/School	13.23%	14.74%	13.21%	14.41%	97.8%
Local	8.39%	8.89%	8.39%	8.89%	100.0%
KP&F	20.09%	22.13%	20.09%	22.13%	100.0%
Judges	14.68%	18.65%	14.68%	18.65%	100.0%

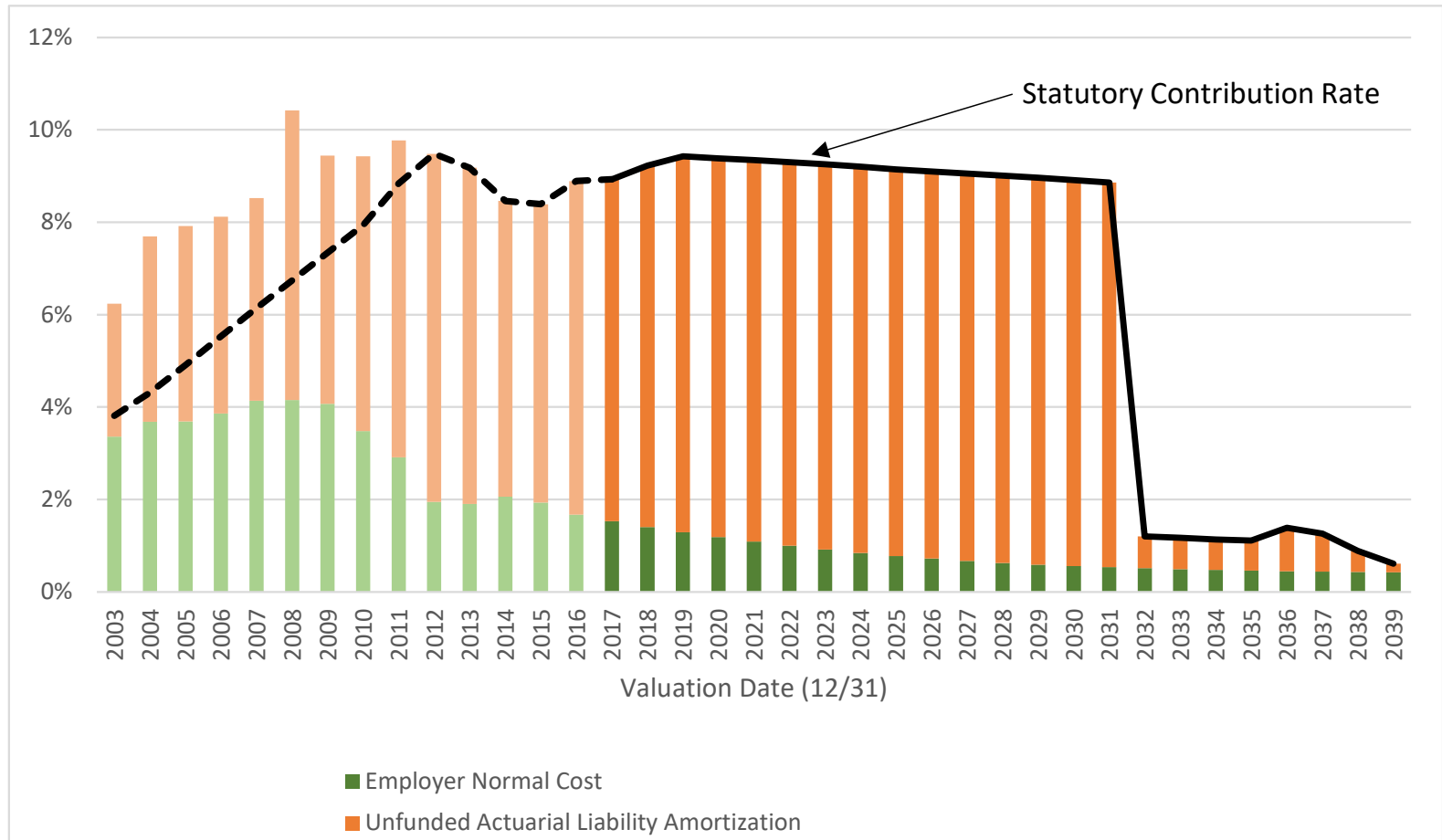
NOTE: The excess of the statutory over the actuarial required contribution rate on State payroll is contributed to the School group.

Components of State/School Employer Contribution Rates



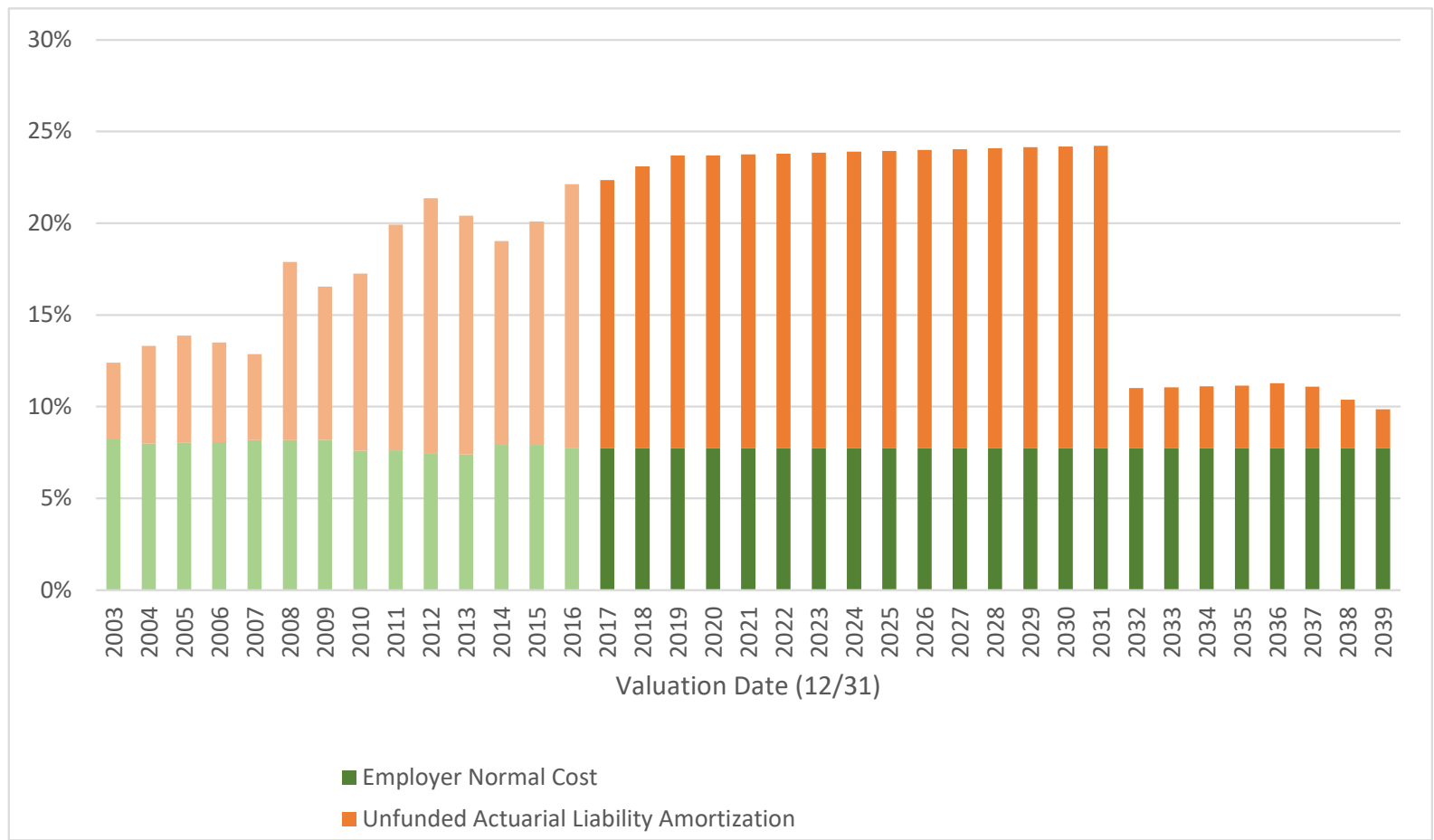
Beginning in 2016, Employer Normal Cost includes a load for Administrative Expenses (0.16% for 2016).

Components of Local Employer Contribution Rates



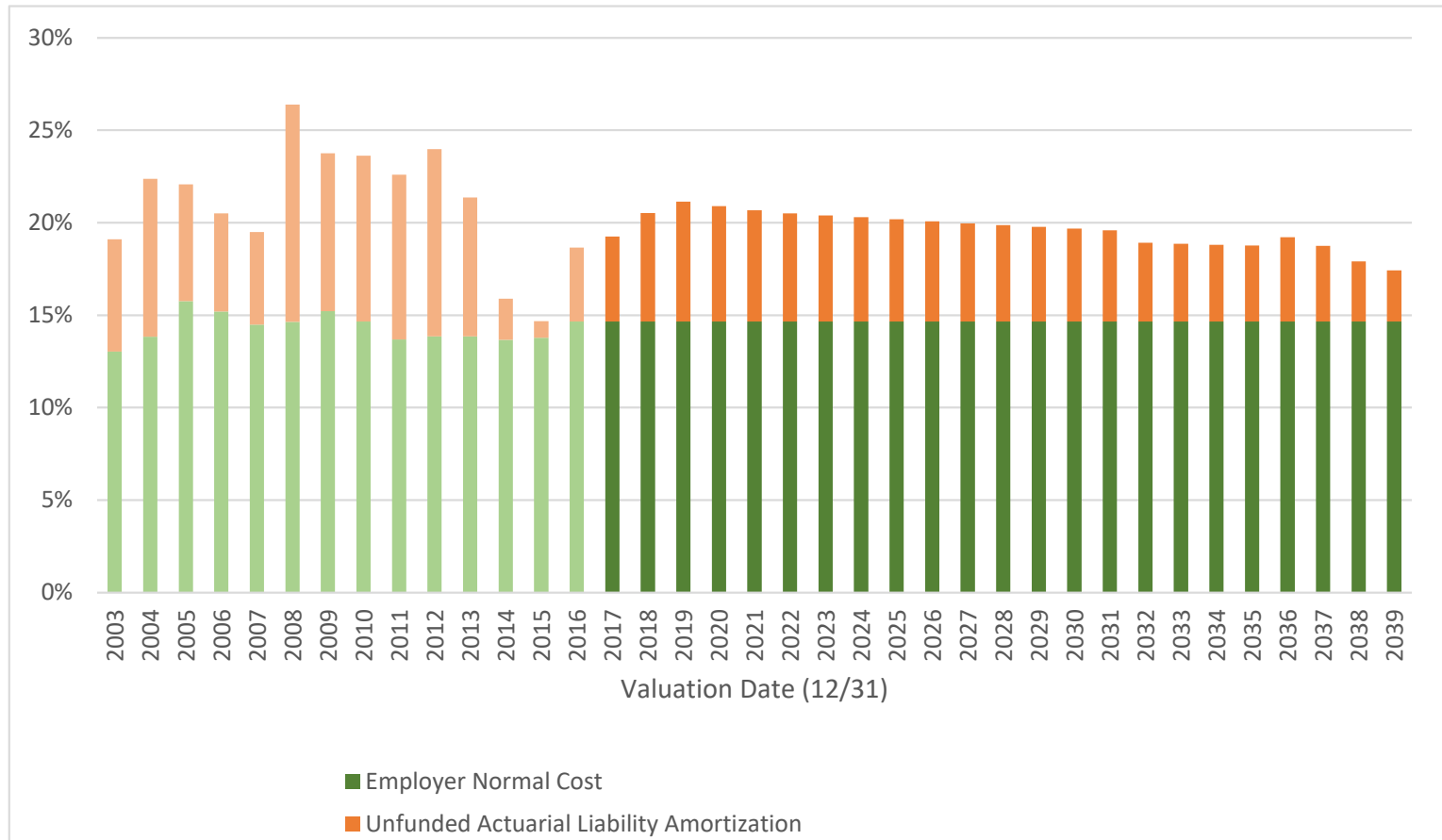
Beginning in 2016, Employer Normal Cost includes a load for Administrative Expenses (0.16% for 2016).

Components of KP&F Employer Contribution Rates



Beginning in 2016, Employer Normal Cost includes a load for Administrative Expenses (0.16% for 2016).

Components of Judges Employer Contribution Rates



Beginning in 2016, Employer Normal Cost includes a load for Administrative Expenses (0.16% for 2016).

FUNDING PROJECTIONS

- Not precise predictions but general estimates
 - Preliminary model results – final review in process
- Projections based on many assumptions
 - 7.75% return on market value in 2017 and all future years
 - All other actuarial assumptions met in the future
 - Current plan provisions in place during projection period
 - Contributions are paid per statutory cap and FY 2017 and FY 2019 delayed contributions are repaid, as scheduled
 - New entrants in future years are similar to recent history

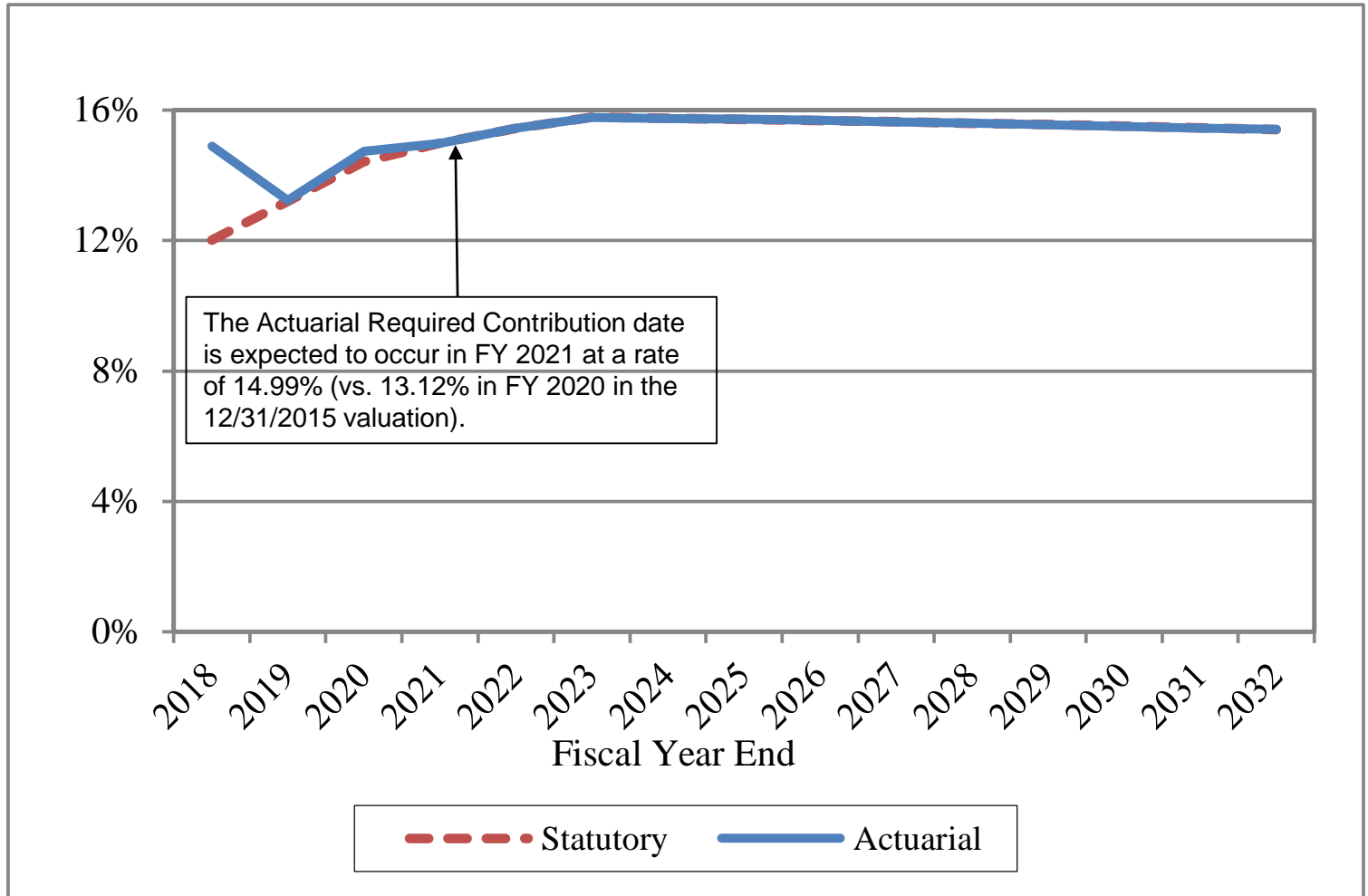
➤ December 31, 2016 Valuation

- Funded Ratio: 65%
- Actuarial required rate: 14.74%
- Statutory rate: 14.41%

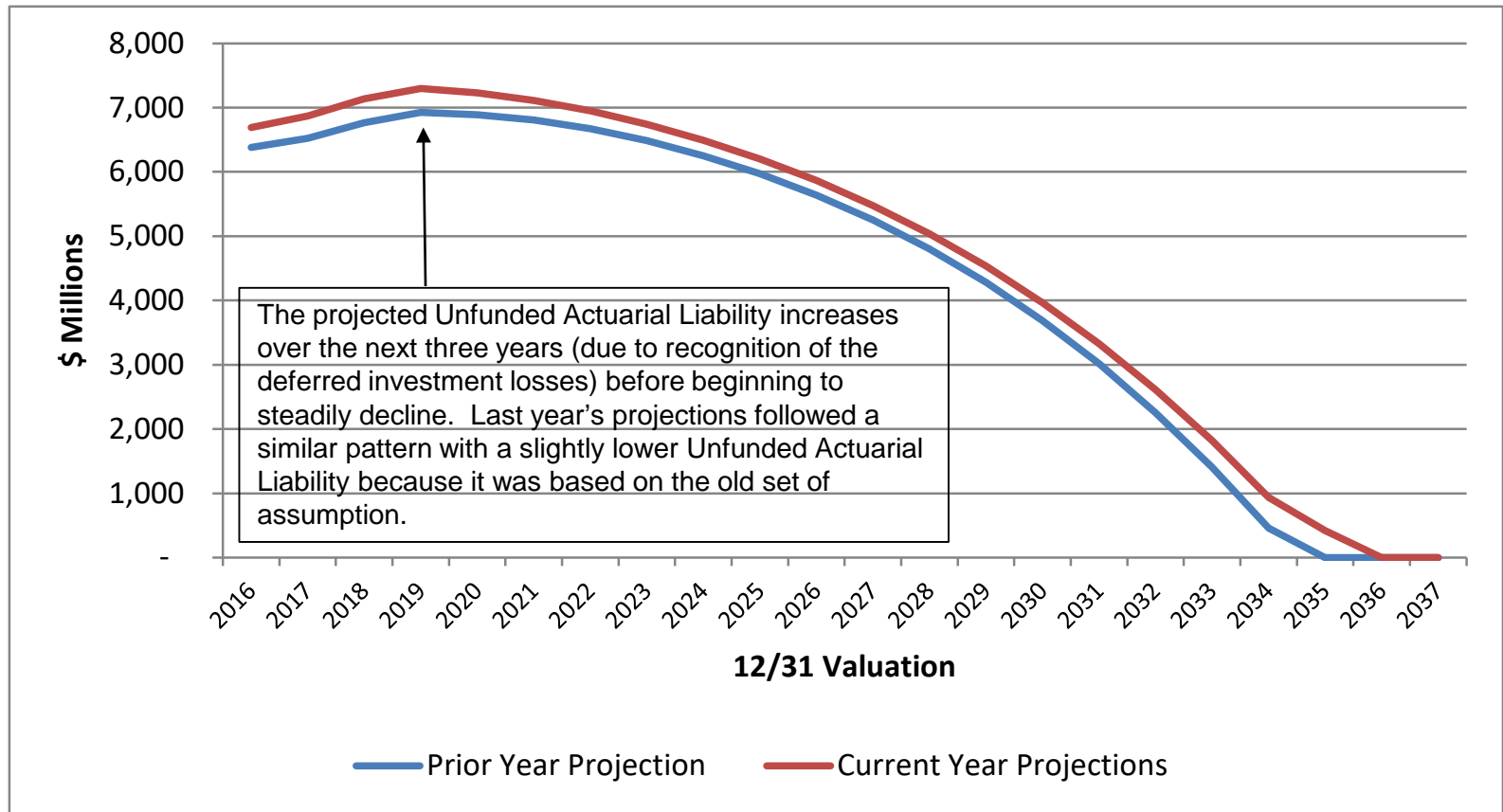
➤ Actuarial Required Contribution (ARC) Date/Rate (actuarial and statutory contribution rates are equal)

- Date: FY 2021 at rate of 14.99%
- Projected Date and Rate, based on prior valuation, was 13.12% in FY 2020
- State/School statutory rate has exceeded the State-only actuarial rate since the December 31, 2010 valuation (setting the FY 2014 contribution rate), except for the Legislature's reset of the FY 2016 statutory rate.
- Repayment of delayed State/School contributions for FY 2016 with 8% interest (\$115 million) in FY 2018 will not be made.
- Delay of State/School contributions for FY 2017 of \$16.4M and FY 2019 of \$194M will be repaid in level installments over closed 20-year periods and are treated as receivables.

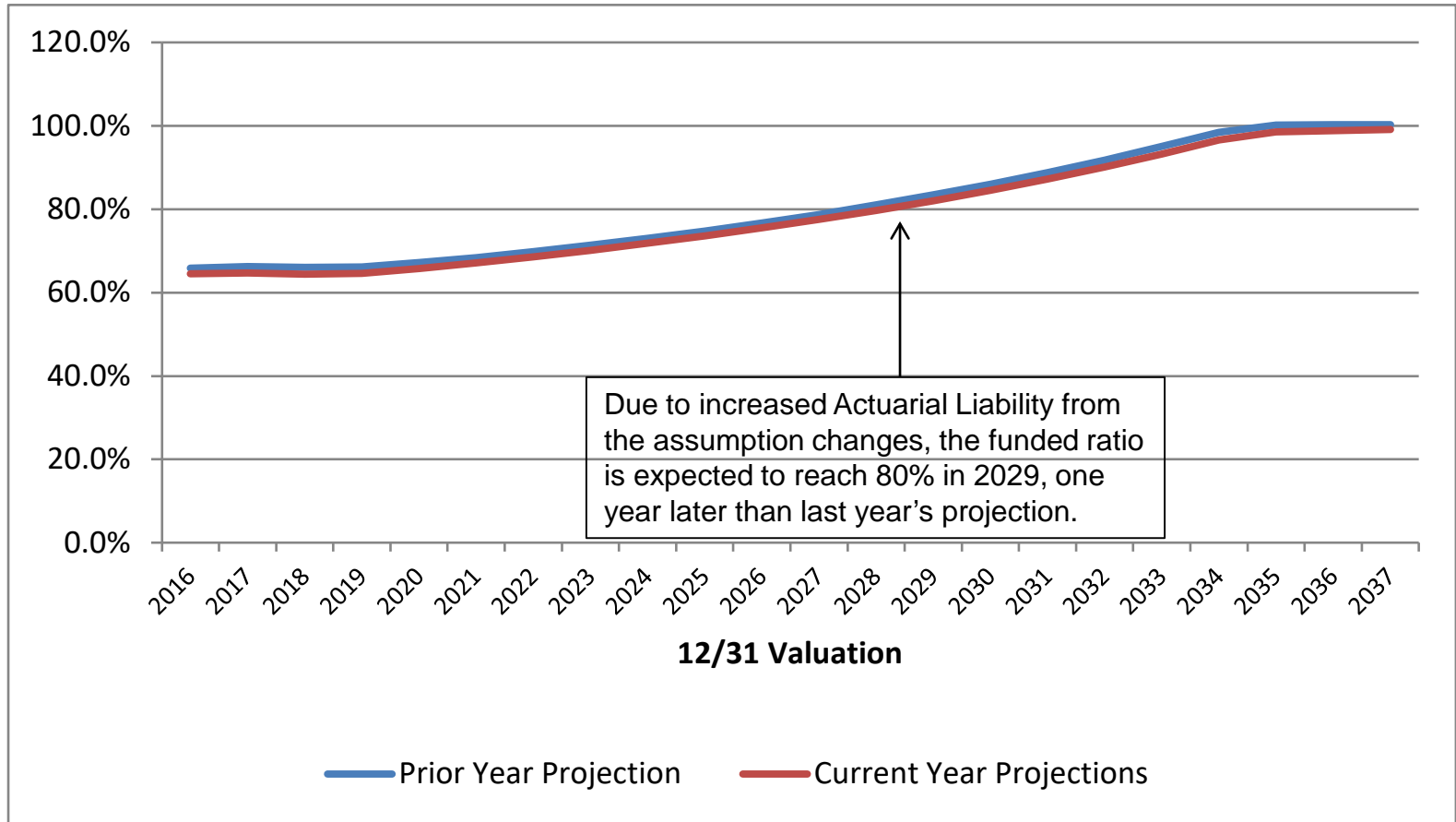
Projected State/School Employer Contribution Rates



State/School Projected Unfunded Actuarial Liability

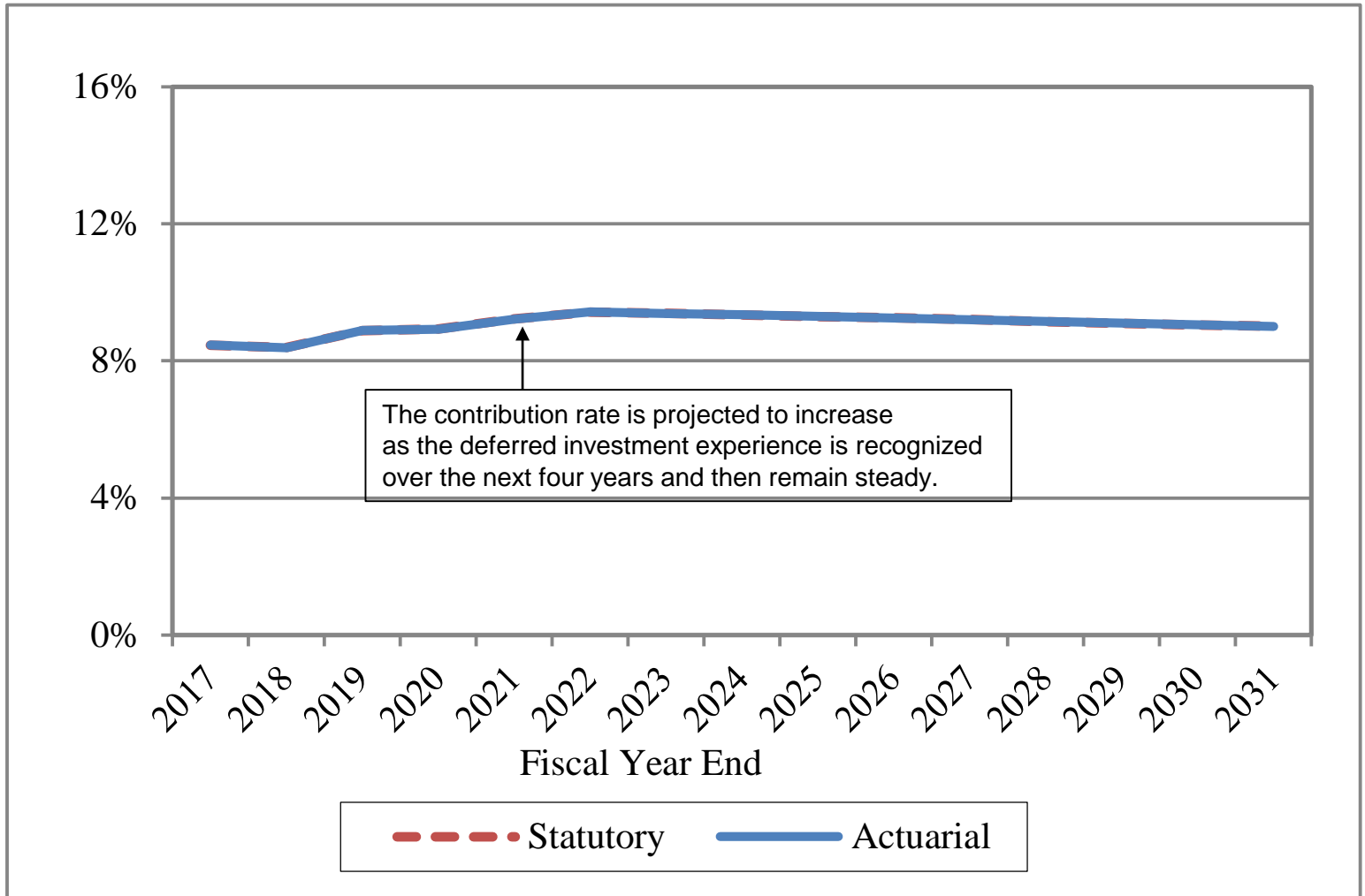


State/School Projected Funded Ratio

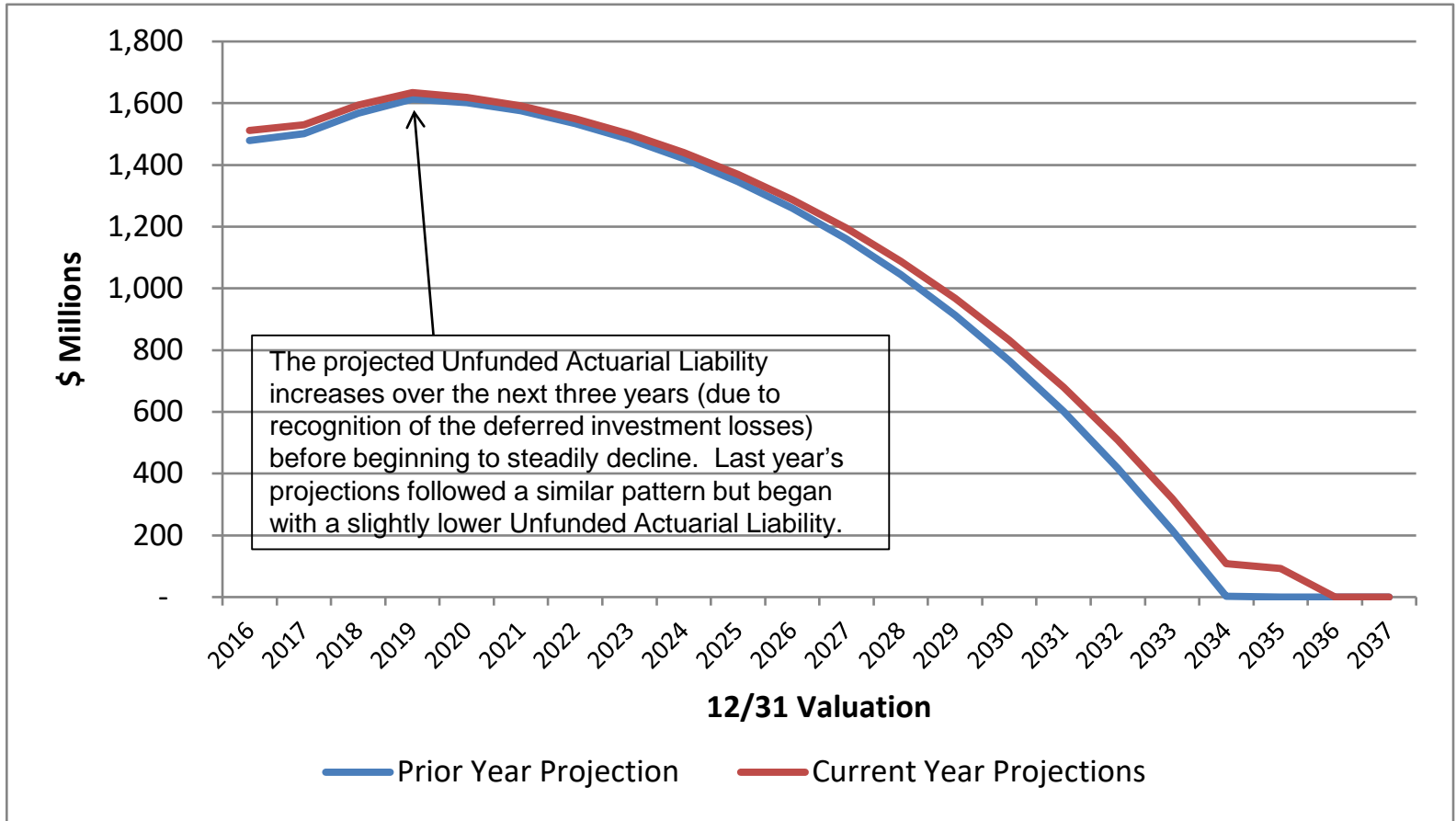


- December 31, 2016 Valuation
 - Funded ratio: 70%
 - Actuarial rate: 8.89%
 - Statutory rate: 8.89%
- Actuarial Required Contribution Date/Rate occurred in 12/31/12 valuation (setting the calendar year 2015 contribution rate)
 - Continues to be at full actuarial contribution rate in the 12/31/16 valuation
 - Actuarial required contribution rate increased from 8.39% in last year's valuation to 8.89% in this year's valuation.

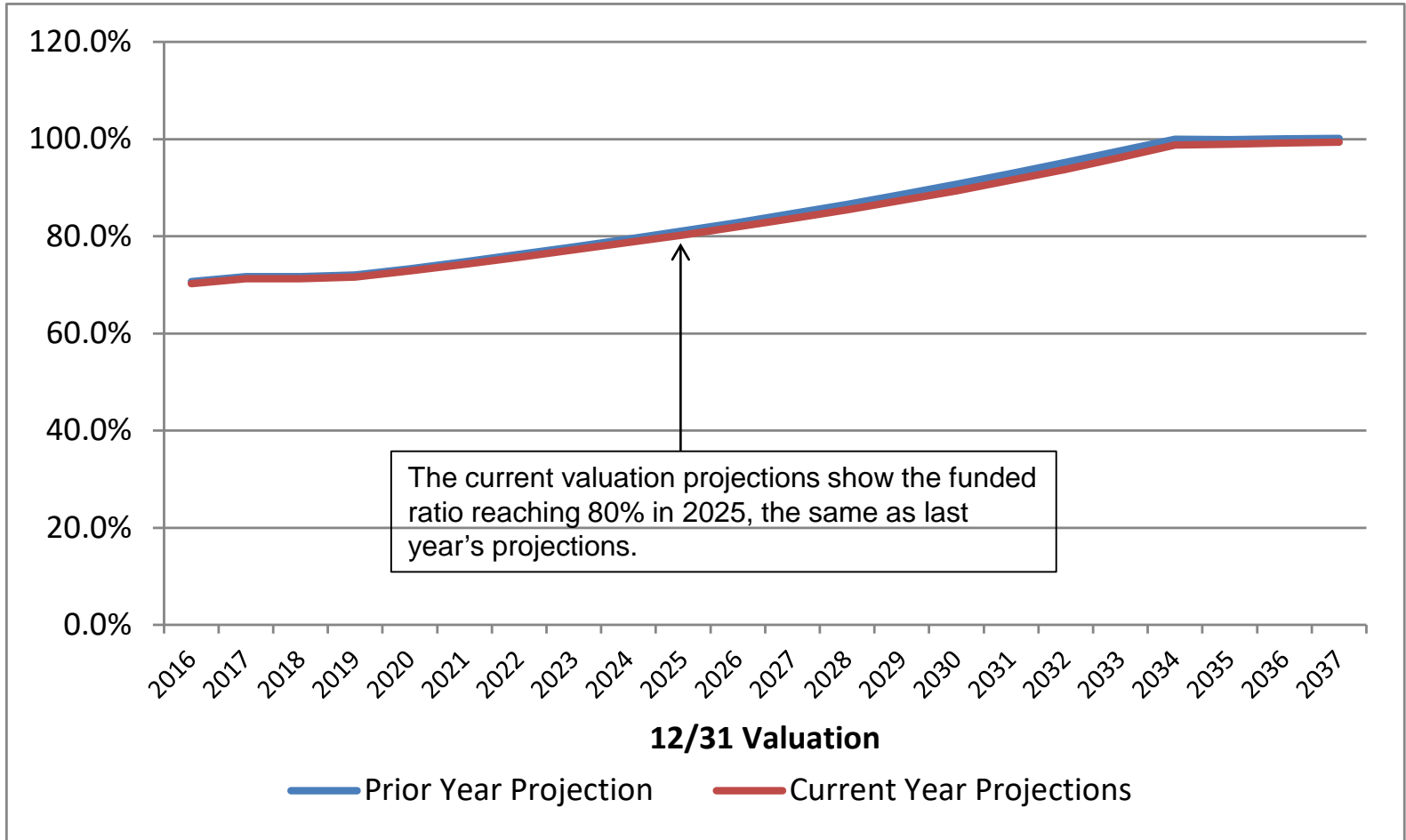
Projected Local Employer Contribution Rates



Projected Unfunded Actuarial Liability - Local



Projected Funded Ratio Local



Short Term Projections (Total System)



Return in 2017*

Valuation Date (12/31)	7.75%		0%		- 7.75%	
	<u>Unfunded Actuarial Liability(M)</u>	<u>Funded Ratio</u>	<u>Unfunded Actuarial Liability(M)</u>	<u>Funded Ratio</u>	<u>Unfunded Actuarial Liability(M)</u>	<u>Funded Ratio</u>
2017	\$9,284	67%	\$9,554	66%	\$9,824	65%
2018	9,665	67%	10,309	65%	10,953	63%
2019	9,900	67%	10,927	64%	11,954	60%
2020	9,807	68%	11,209	64%	12,611	59%

- Assumes a 7.75% return in all years after 2017 so current deferred investment experience is reflected in future years. Also assumes delayed contributions for FY 2017 and FY 2019 are repaid as scheduled.