



Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve



Virginia
Retirement
System

Virginia Retirement System June 30, 2021 Actuarial Valuations

October 14, 2021

Larry Langer, ASA, FCA, MAAA, EA
Principal and Consulting Actuary

Alisa Bennett, FSA, FCA, MAAA, EA
President



Table of Contents

- The Actuarial Valuation Process and Purpose
- June 30, 2021 Results:
 - Employer Contribution Rates
 - Funded Status
 - Unfunded Actuarial Accrued Liability (UAAL)
- Plan by Plan Analysis
- Appendix

Purpose of the June 30, 2021 Actuarial Valuation



- The actuarial valuation provides a basic source document for information regarding actuarially determined contributions (employer rates) as well as the funded status of pension and other post-employment benefit (OPEB) plans.

- The June 30, 2021 valuations will be used to set contribution rates for the two-year period from July 1, 2022 through June 30, 2024
 - Odd year valuations are for rate setting.
 - Even year valuations are for informational purposes.

Purpose of the June 30, 2021 Actuarial Valuation



- Each fall, CMC presents results over two Board meetings:

Pension	Other Post Employment Benefits (OPEB)
Virginia Retirement System	Group Life Insurance Fund
<ul style="list-style-type: none"> ▪ State Employees ▪ Teachers ▪ Political Subdivisions 	Retiree Health Insurance Credit (HIC)
Virginia Law Officers (VaLORS)	<ul style="list-style-type: none"> ▪ State Employees ▪ Teachers ▪ Political Subdivisions ▪ Constitutional Officers ▪ Social Services Employees ▪ Registrars
State Police Officers (SPORS)	Virginia Sickness and Disability Program (VSDP)
Judges (JRS)	Virginia Local Disability Program (VLDP)
	<ul style="list-style-type: none"> ▪ Teachers ▪ Political Subdivisions
	Line of Duty Act Fund (LODA)

- We present results for the plans **in bold** in October; the remainder will be presented November.

Basic funding equation for benefits:

$$\mathbf{C + I = B + E}$$

Contributions + Investment returns = Benefits + Expenses

- Over the long term, actual investment returns, benefits and expenses determine the amount of contributions.
- Over the short term, estimated investment returns, benefits and expenses developed in an actuarial valuation will determine the amount of contribution.

- 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 data and benefit provisions are provided by Staff. Thank you!!
- Assumptions and funding methodology are determined by the Board of Trustees, Code of Virginia and GASB, with input from the actuary and other professionals.

Inputs

Member Data
Asset Data
Benefit Provisions
Assumptions
Funding Methodology



Results

Actuarial Value of Assets (AVA)
Actuarial Accrued Liability (AAL)
Net Actuarial Gain or Loss
Funded Ratio/UAAL
Employer Contribution Rates
Projections

Executive Summary

- Since the prior valuation, there have been several significant changes to assumptions as well as plan experience that differed from what was assumed which will impact future contribution rates.

- Significant factors that impacted results:
 - Assumptions changes
 - Investment return
 - Salary increases
 - Demographic changes
 - Possible COVID Impacts?
 - Headcounts are down in several plans
 - Higher terminations, deaths, and refunds
 - Fewer new hires

- The impact of these events had mixed results across plans as we will see on the following slides.

- The Teacher plan received an ad-hoc contribution of \$61.3 million in June 2021 which was applied to the 10-year deferred contribution balance.
- The State HIC plan received an ad-hoc contribution of \$38.7 million in June 2021.
- Investment gains had a smaller effect on OPEB plans than the pension plans because the OPEB plans had lower funded status so less opportunity for large gains.

Experience Study Recommendations

- Most significant change was to the mortality assumptions
 - PUB-2010 with generational mortality improvement scale

- Generally increased liabilities for pension plans and had mixed results on OPEB plans

- Changes in assumptions recommended by CMC and adopted by the Board in April 2021 *generally* increased liabilities:

System	Actuarial Accrued Liability		
	Before Assumption Changes	After Assumption Changes	% Change in Liability
State	\$ 26,326,136	\$ 26,727,971	1.53%
Teachers	\$ 51,871,407	\$ 52,747,596	1.69%
SPORS	\$ 1,267,565	\$ 1,326,646	4.66%
VaLORS	\$ 2,339,223	\$ 2,407,153	2.90%
JRS	\$ 681,969	\$ 733,408	7.54%
Group Life	\$ 3,717,938	\$ 3,524,464	-5.20%
HIC State	\$ 1,033,299	\$ 1,044,663	1.10%
HIC Teachers	\$ 1,457,810	\$ 1,471,397	0.93%
VSDP	\$ 254,646	\$ 250,103	-1.78%

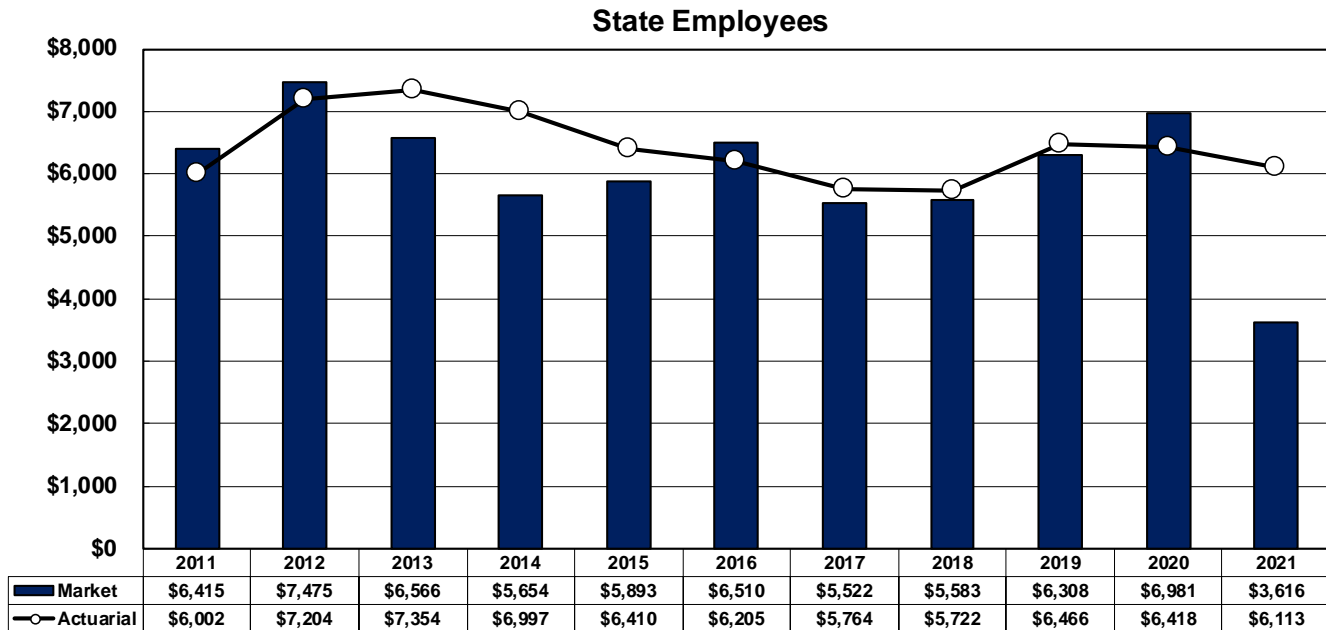
Investment Return for 2021

- Fiscal year investment return for 2021 was 27.5%
- Immediate positive impact to funded status on market value of asset basis
- Investment gain is phased in over a five-year period due to actuarial smoothing of assets for funding calculations

Executive Summary



- Since the actuarial value of assets smooths in the excess gains over a four-year period, the unfunded liabilities on an actuarial value of assets basis should trend downward toward the unfunded liabilities on a market value basis if all other assumptions are met. As seen in projections later, this could help to moderate future contribution rates.



- UAAL graphs for other plans are in the appendix and show similar patterns.

Salary Increases for State Employees

- Governor's budget included 5% salary increases for State employees, with additional compression increases for SPORS members.

System	Average Salary		
	2020	2021	% Change in Average Salary
State	\$ 58,992	\$ 62,350	5.70%
Teachers	\$ 56,401	\$ 57,125	1.30%
SPORS	\$ 68,220	\$ 73,341	7.50%
VaLORS	\$ 42,541	\$ 44,879	5.50%
JRS	\$ 166,445	\$ 174,669	4.90%

Demographic Changes

- Active headcounts are down for State, Teachers and VaLORS. There were more terminations, deaths and refunds than expected and fewer new hires.
- State agencies were generally under a hiring freeze for most of the period and most pay actions were suspended.
- Generally, the impact of demographic changes on the valuation results was less than the impact of the change in assumptions, market returns being more than expected and COLAs being less than expected.

Demographic Changes

System	Active Counts		
	2020	2021	% Change in Active Counts
State	\$ 75,069	\$ 73,686	-1.80%
Teachers	\$ 150,681	\$ 149,793	-0.60%
SPORS	\$ 1,924	\$ 1,947	1.20%
VaLORS	\$ 8,554	\$ 7,823	-8.50%
JRS	\$ 449	\$ 453	0.90%

Results

Employer Defined Benefit Contribution Rate Pension Plans

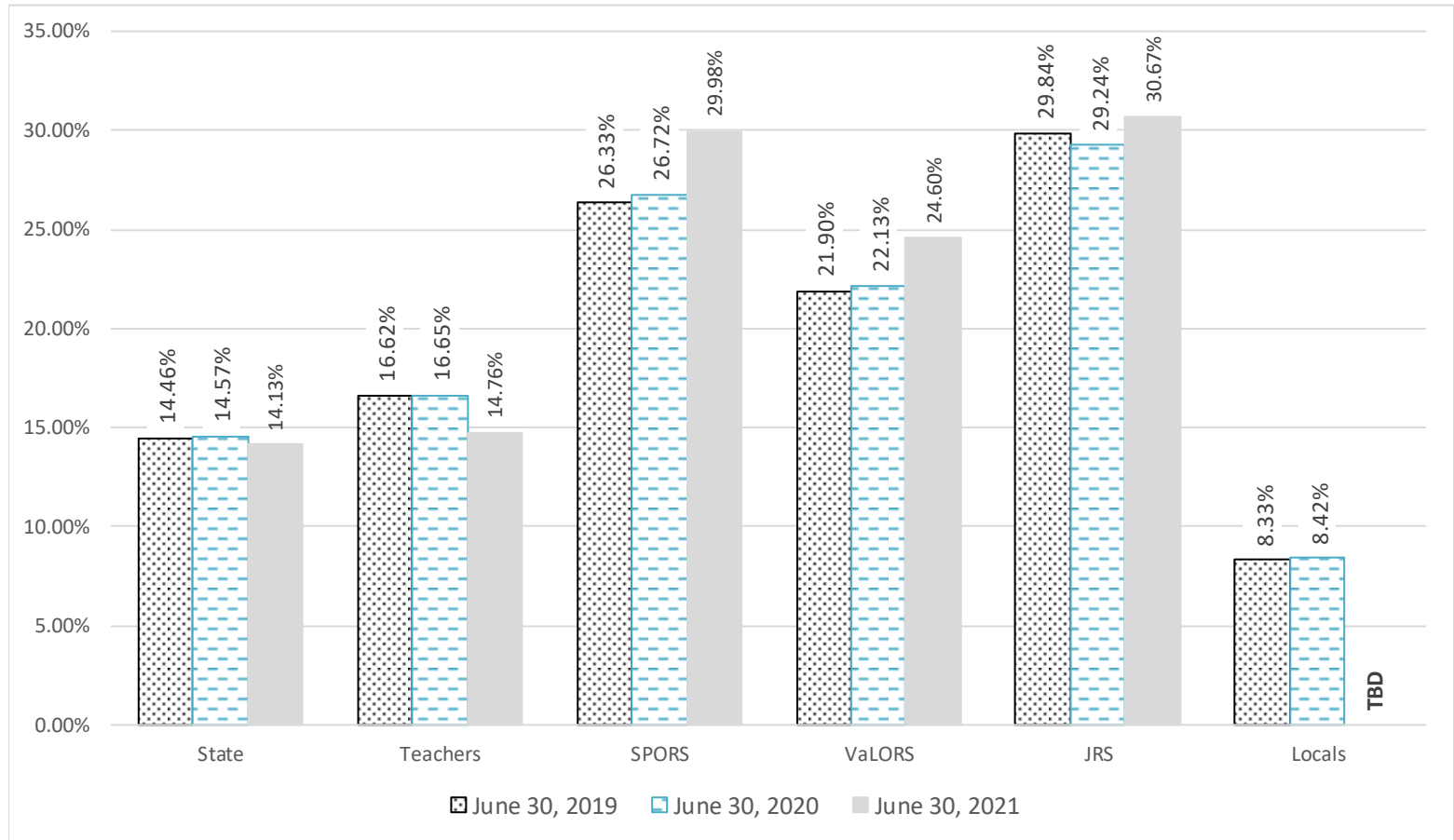


Chart of employer contribution results is also shown in appendix on slide 43.

Employer Contribution Rate OPEB Plans

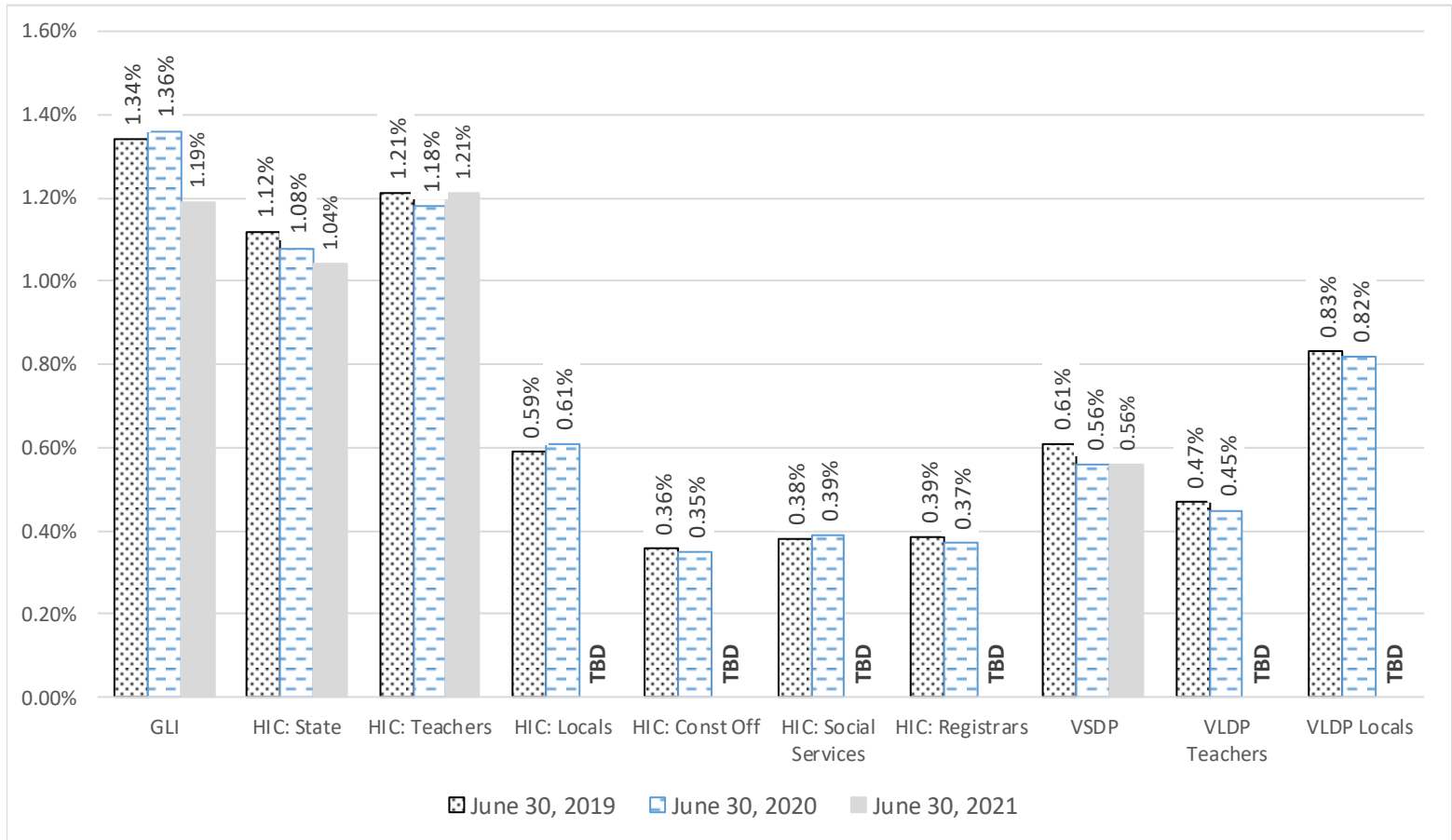
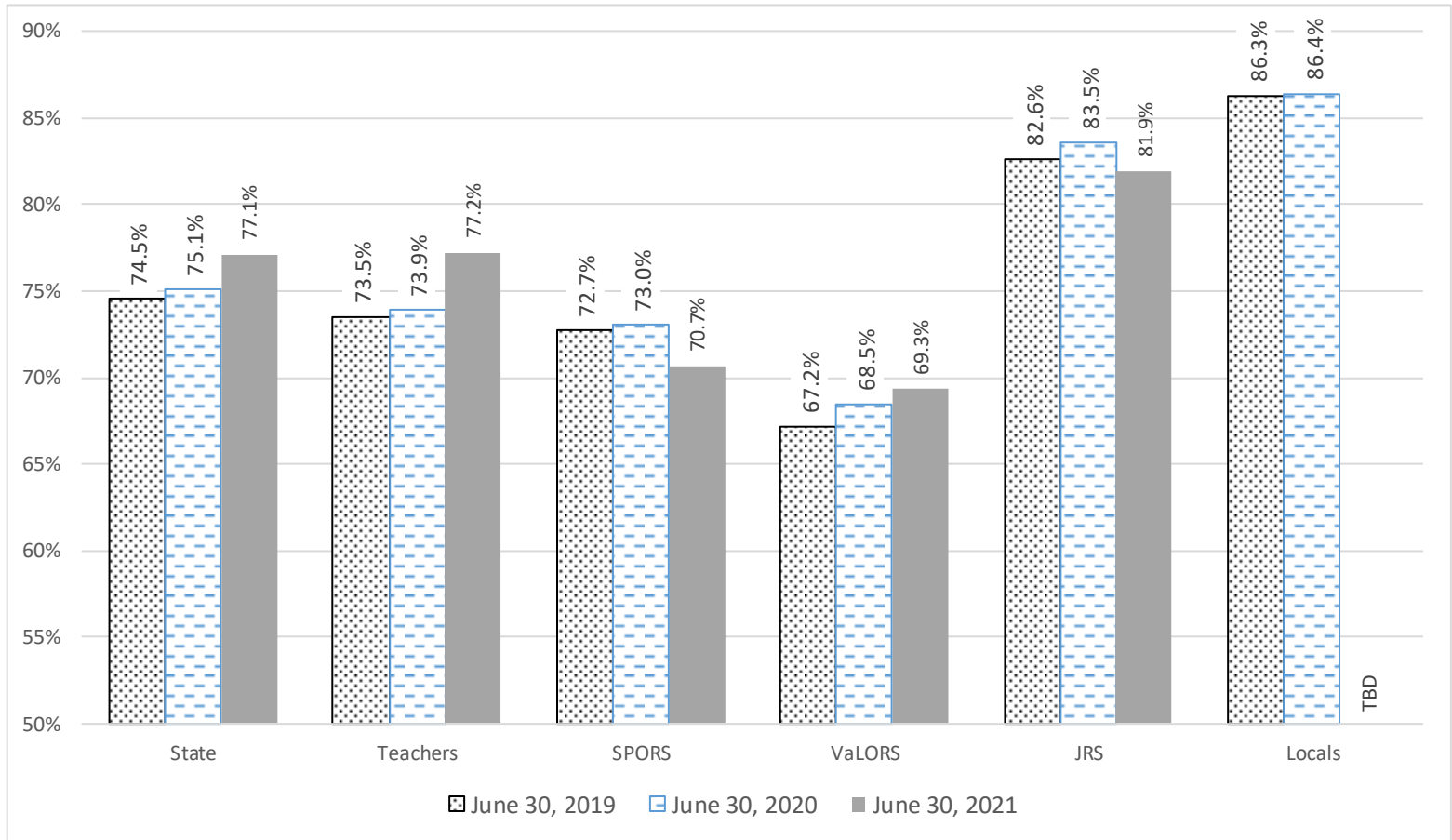
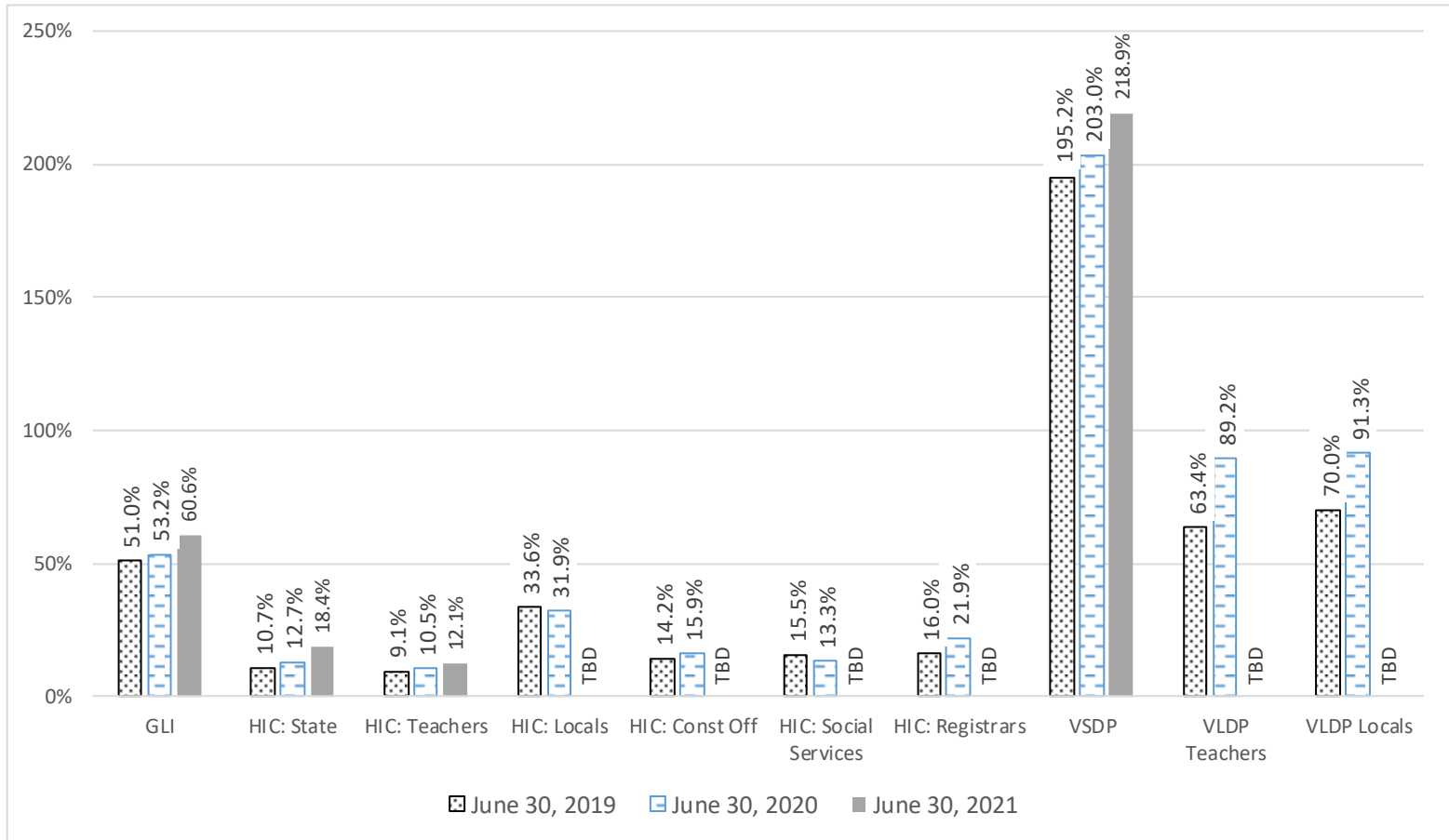


Chart of employer contribution results is also shown in appendix on slide 44.

Funded Ratio on Actuarial Value Pension Plans



Funded Ratio on Actuarial Value OPEB Plans



Unfunded Actuarial Accrued Liability on Actuarial Value Basis Pension Plans

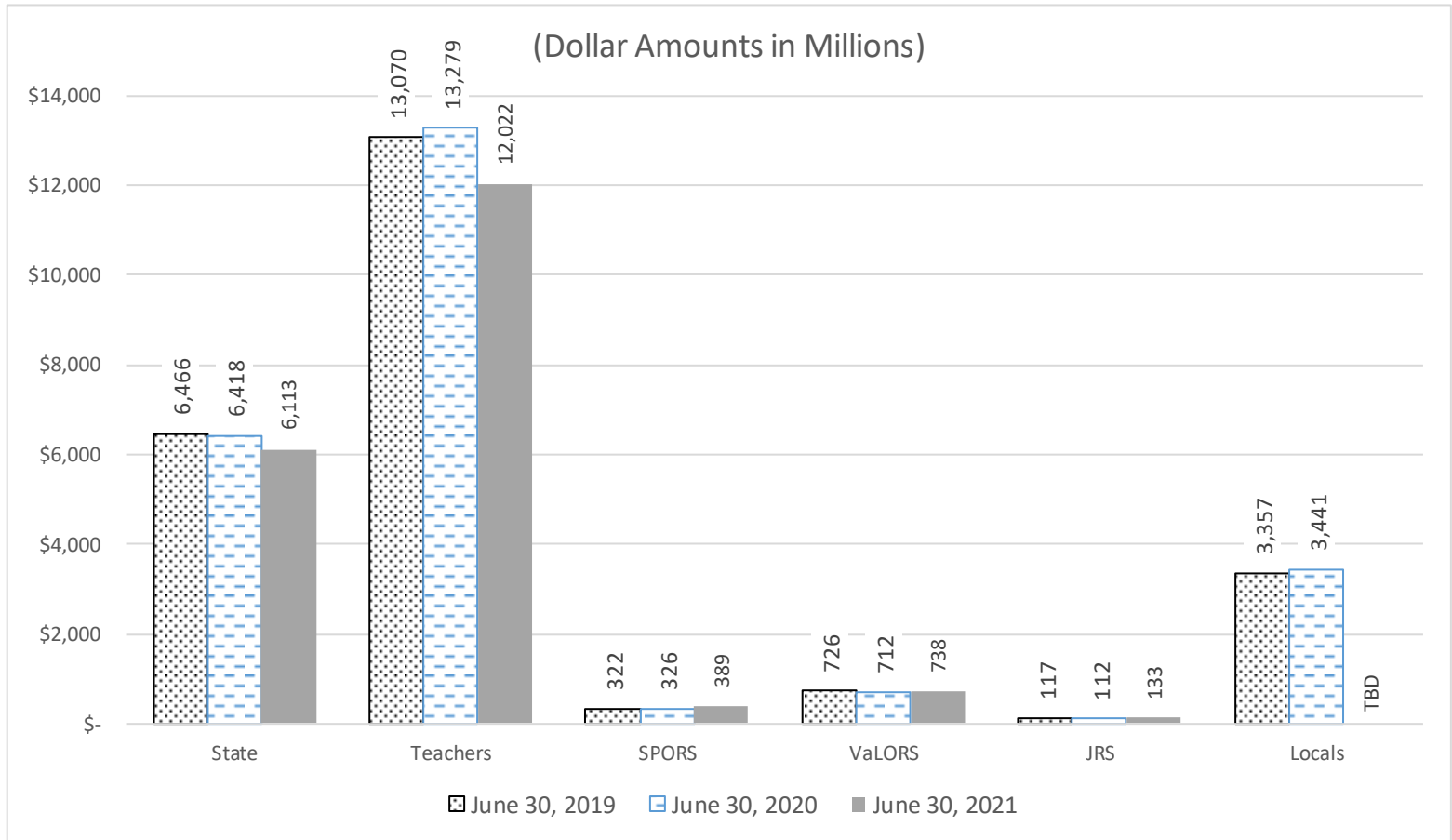


Chart of unfunded liabilities is also shown in appendix on slide 45.

Unfunded Actuarial Accrued Liability on Actuarial Value Basis OPEB Plans

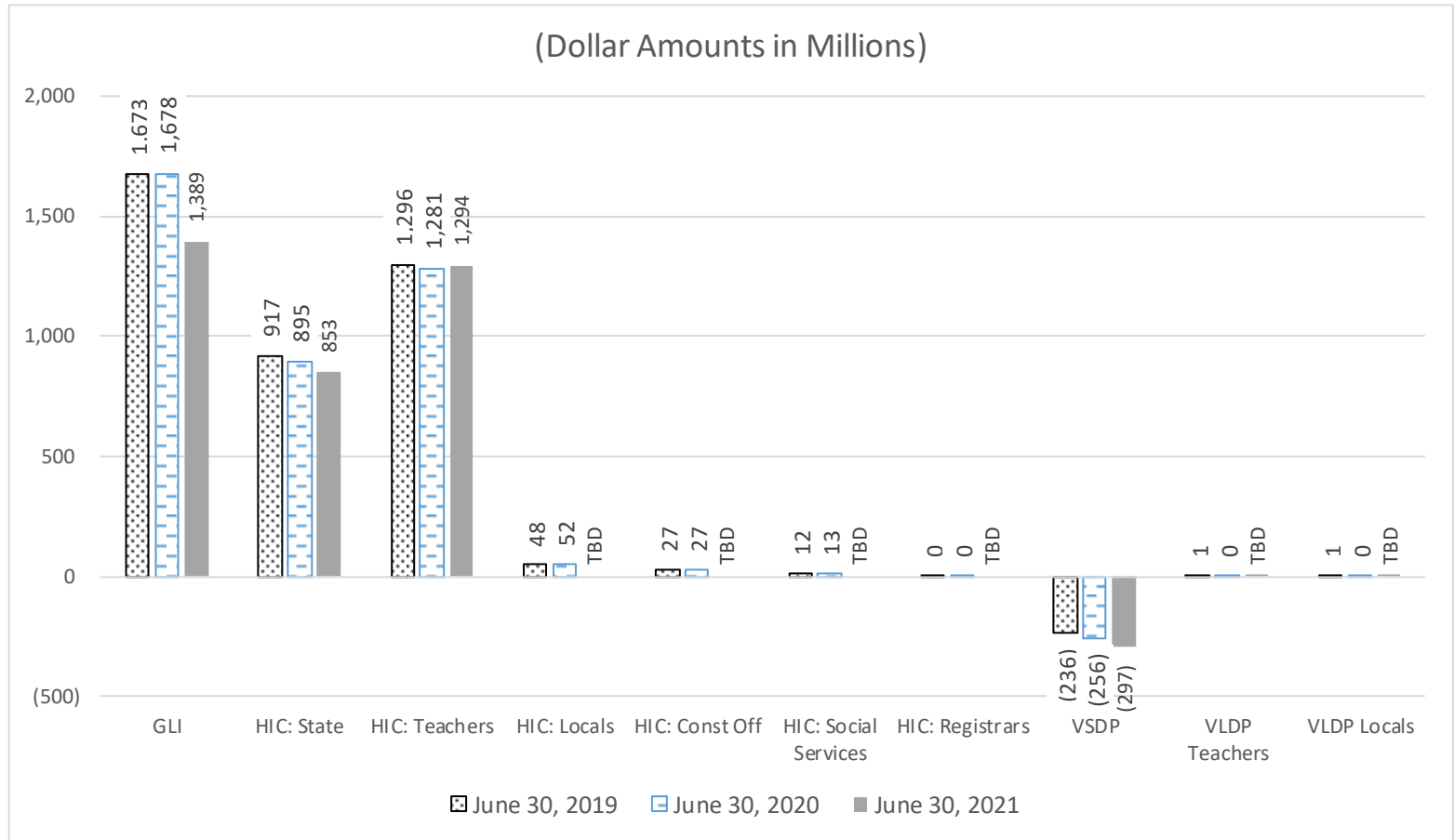
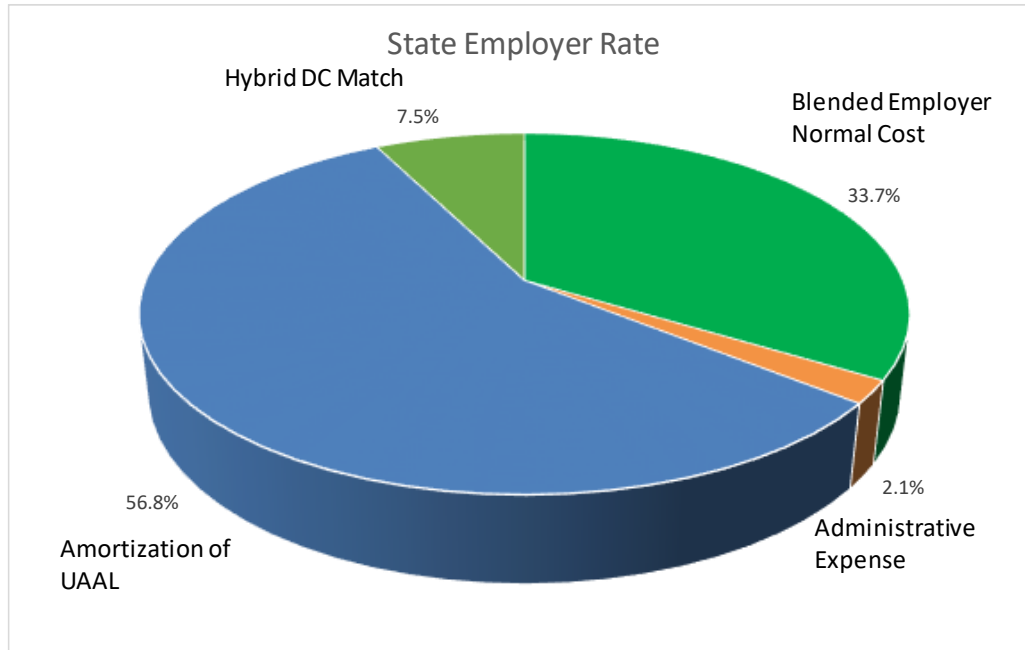


Chart of unfunded liabilities is also shown in appendix on slide 46.

Source of Change in UAAL

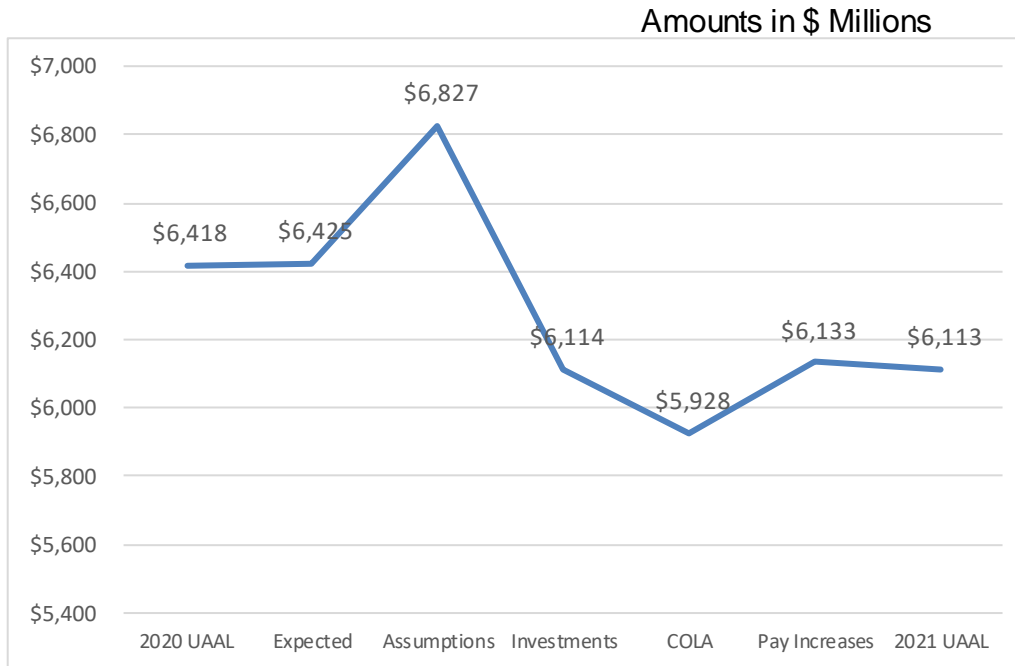
Breakdown of Employer Costs



- Normal cost rate remains relatively stable and continues to trend downward in plans that have hybrid membership.
- Nearly 57% of the employer rate is dedicated to paying down unfunded liabilities, with nearly all of the unfunded liabilities related to the legacy unfunded established in 2013.
- Understanding the impacts of gains and losses is crucial in managing the pay-off of unfunded liabilities.

Blended Employer Normal Cost Rate	4.76%
Administrative Expense	0.29%
Amortization of UAAL	8.02%
Total Defined Benefit Rate	13.07%
DC Contribution for Hybrid Members	1.06%
Total Employer Pension Rate	14.13%

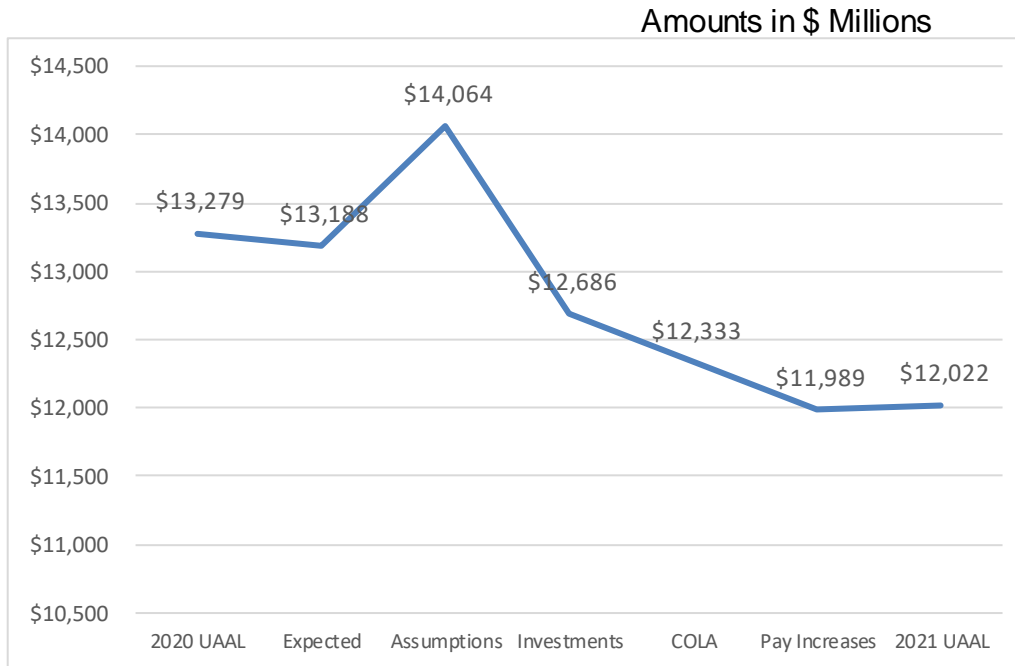
Change in UAAL due to FYE June 30, 2021 Plan Experience State Employees



Change in UAAL by Source	
Expected	\$ 7
Assumptions	402
Investments	(713)
COLA	(186)
Pay Increases	205
All Else	(20)
Total	(305)

- The increases in liability associated with assumption and method changes from the experience study were more than offset by the investment gain.
- Similarly, the decrease in liabilities associated with lower-than-expected COLAs was offset by the larger than expected pay increases.
- The State plan also experienced more deaths than expected which led to a gain of \$38.7 million.

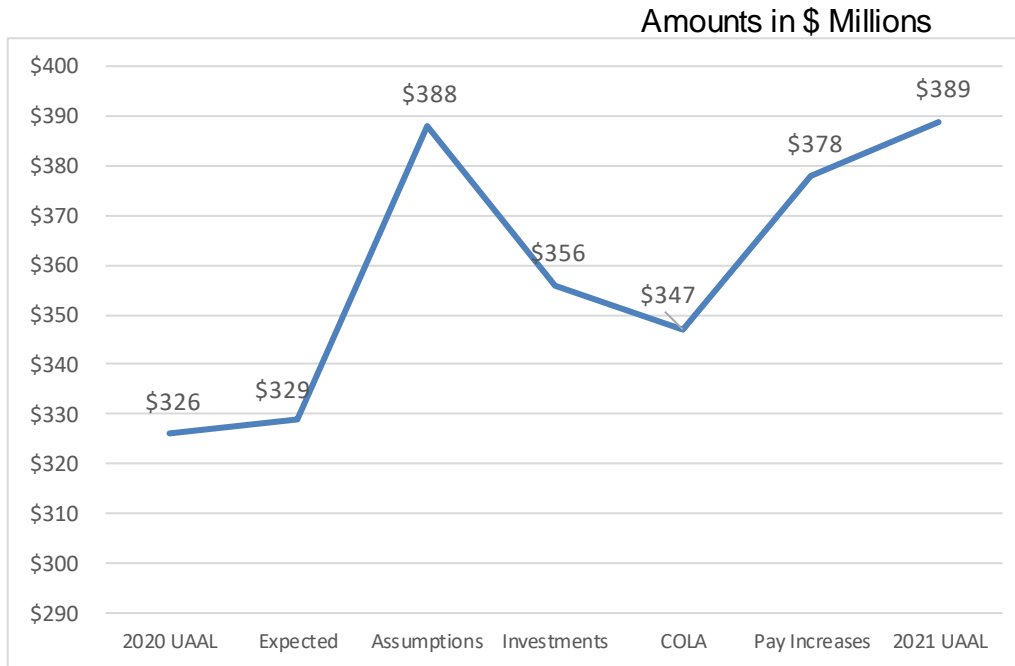
Change in UAAL due to FYE June 30, 2021 Plan Experience Teachers



Change in UAAL by Source	
Expected	(91)
Assumptions	876
Investments	(1,378)
COLA	(353)
Pay Increases	(344)
All Else	33
Total	(1,257)

- The increases in liability associated with assumption and method changes from the experience study were more than offset by the investment gain.
- Lower-than-expected COLAs and pay increases further decreased liabilities.
- Teacher plan received an extra contribution of \$61.3 million in June 2021.
- All other changes including the demographic changes increased the liabilities by approximately \$33 million.

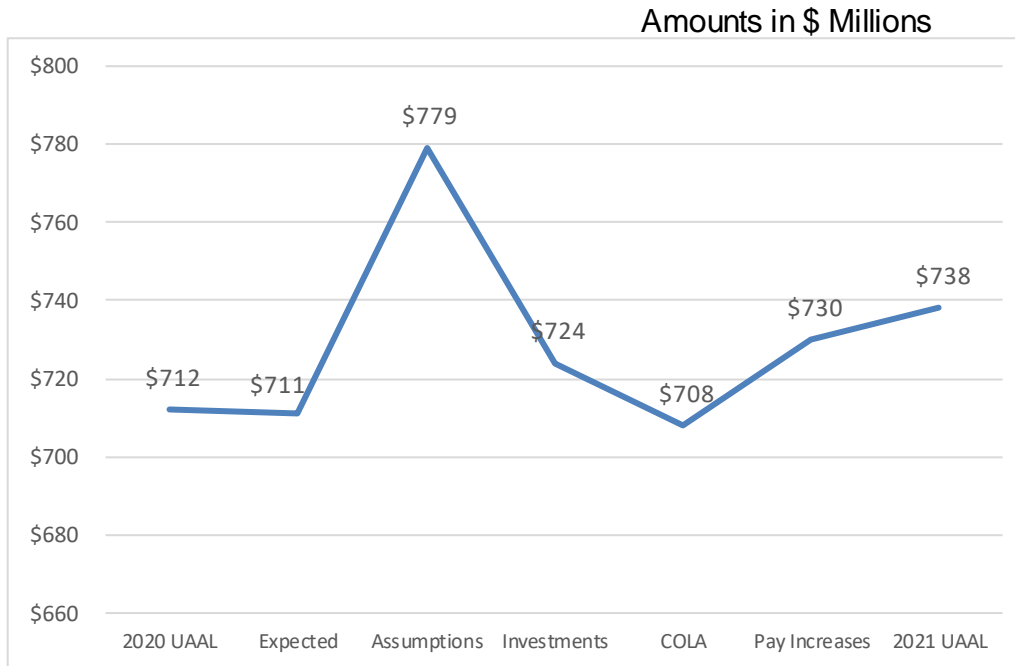
Change in UAAL due to FYE June 30, 2021 Plan Experience State Police



Change in UAAL by Source	
Expected	\$ 3
Assumptions	59
Investments	(32)
COLA	(9)
Pay Increases	31
All Else	11
Total	63

- The increases in liability associated with assumption and method changes from the experience study were partially offset by the investment gain.
- Similarly, higher-than-expected pay increases were partially offset by lower-than-expected COLAs. SPORS received 8% pay increases along with eligible members receiving further compression pay increases.
- All other changes including the demographic changes resulted in increasing the liabilities by approximately \$11 million.

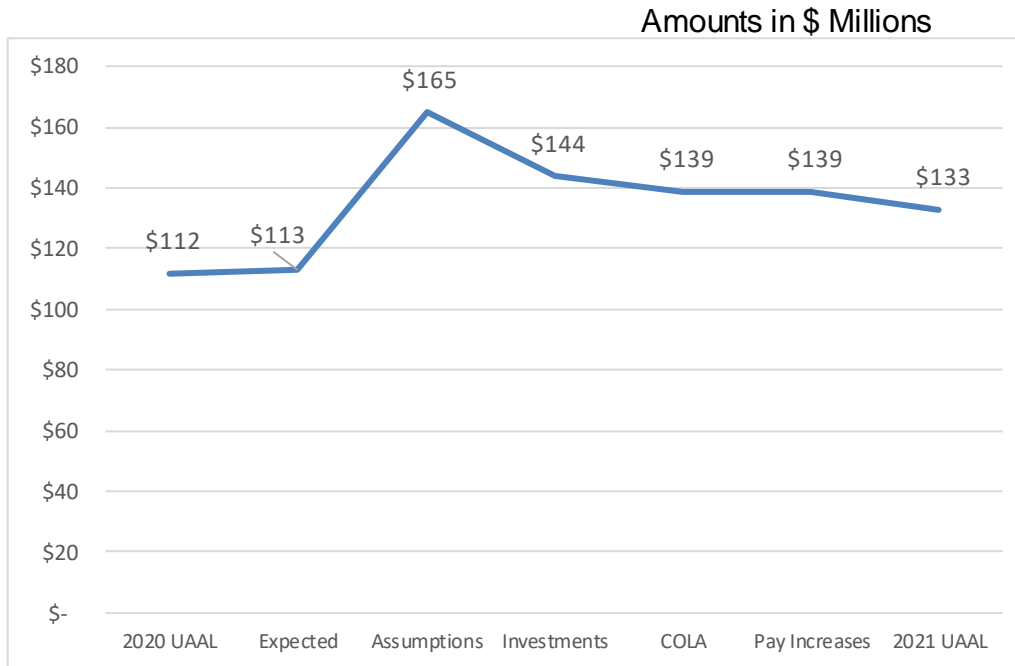
Change in UAAL due to FYE June 30, 2021 Plan Experience Virginia Law Officers



Change in UAAL by Source	
Expected	\$ (1)
Assumptions	68
Investments	(55)
COLA	(16)
Pay Increases	22
All Else	8
Total	26

- The increases in liability associated with assumption and method changes from the experience study were partially offset by the investment gain.
- Similarly, higher-than-expected pay increases were partially offset by lower-than-expected COLAs.
- VaLORS also had more retirements than expected which caused a loss of \$26.3 million.

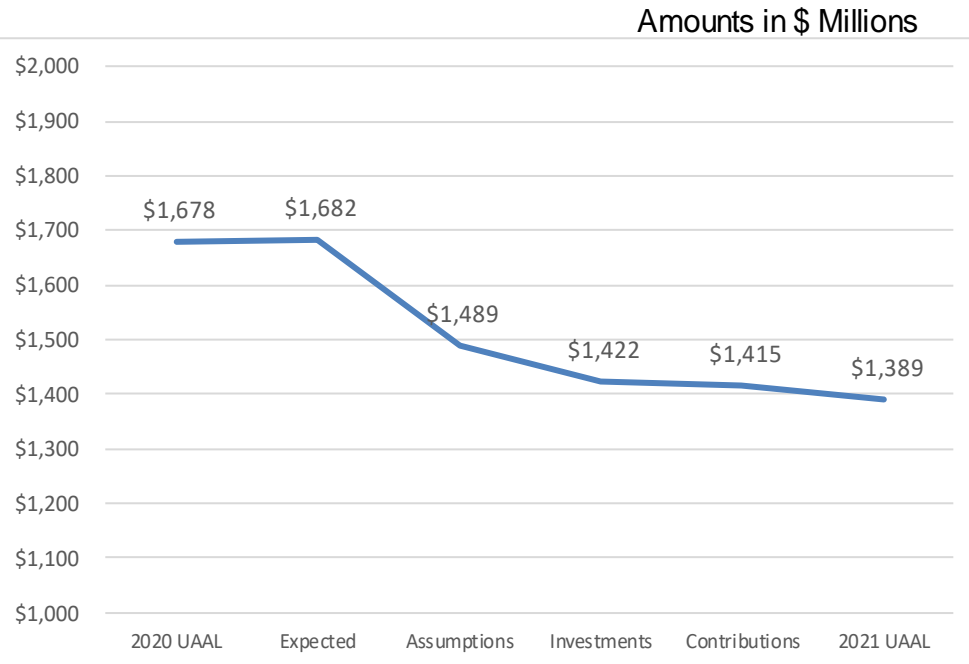
Change in UAAL due to FYE June 30, 2021 Plan Experience Judicial



Change in UAAL by Source	
Expected	\$ 1
Assumptions	52
Investments	(21)
COLA	(5)
Pay Increases	0
All Else	(6)
Total	21

- The increases in liability associated with assumption and method changes from the experience study were partially offset by the investment gain.
- Assumed pay increases for JRS are higher than other employer groups therefore less of an impact related to pay increases.
- Lower-than-expected COLAs further reduced liabilities and were more than offset by retirement losses which increased liability by approximately \$9 million.

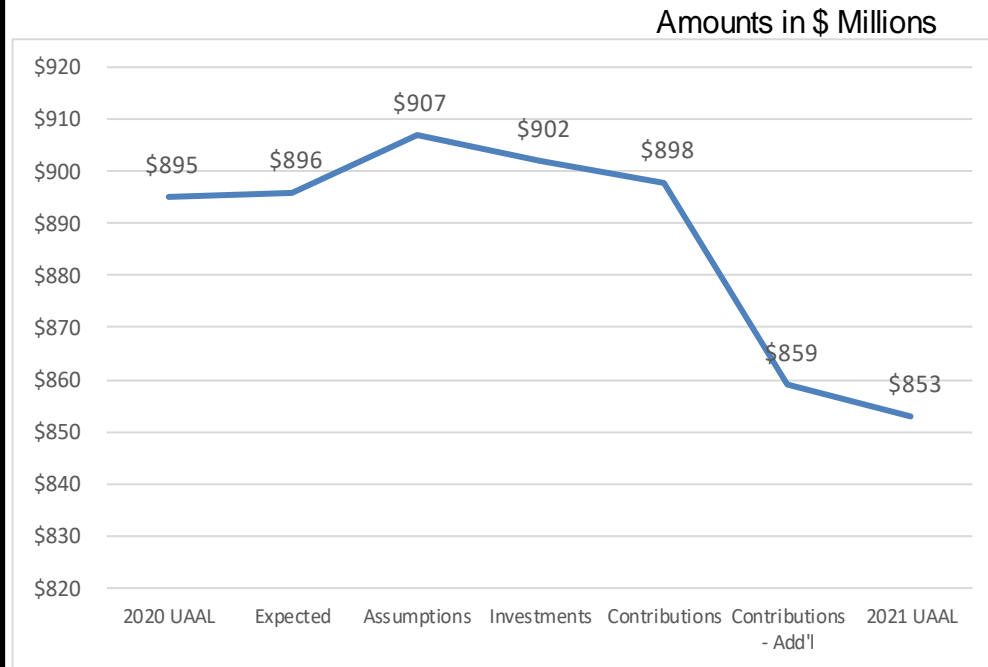
Change in UAAL due to FYE June 30, 2021 Plan Experience Group Life Insurance



Change in UAAL by Source	
Expected	\$ 4
Assumptions	(193)
Investments	(67)
Contributions	(7)
All Else	(26)
Total	(289)

- Experience study caused a decrease in both liabilities and the employer contribution rate, primarily due to improved mortality which lowers life insurance cost.
- There were additional decreases in liability associated with investment gains and higher than anticipated contributions.
- All other changes including the demographic changes resulted in lowering the liabilities by approximately \$26 million.

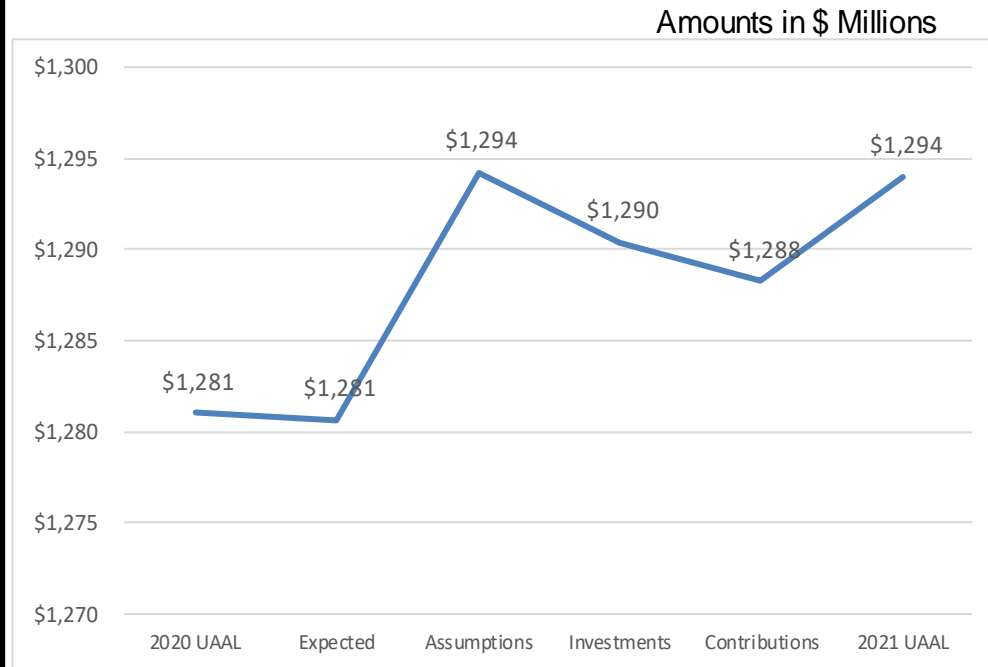
Change in UAAL due to FYE June 30, 2021 Plan Experience Health Insurance Credit - State



Change in UAAL by Source	
Expected	\$ 1
Assumptions	11
Investments	(5)
Contributions	(4)
Contributions - Add'l	(39)
All Else	(6)
Total	(42)

- The increases in liability associated with assumption and method changes from the experience study were more than offset by the investment gain, employer contributions, and an additional one-time contribution.
- All other changes, including the demographic changes, resulted in lowering the liabilities by approximately \$6 million.

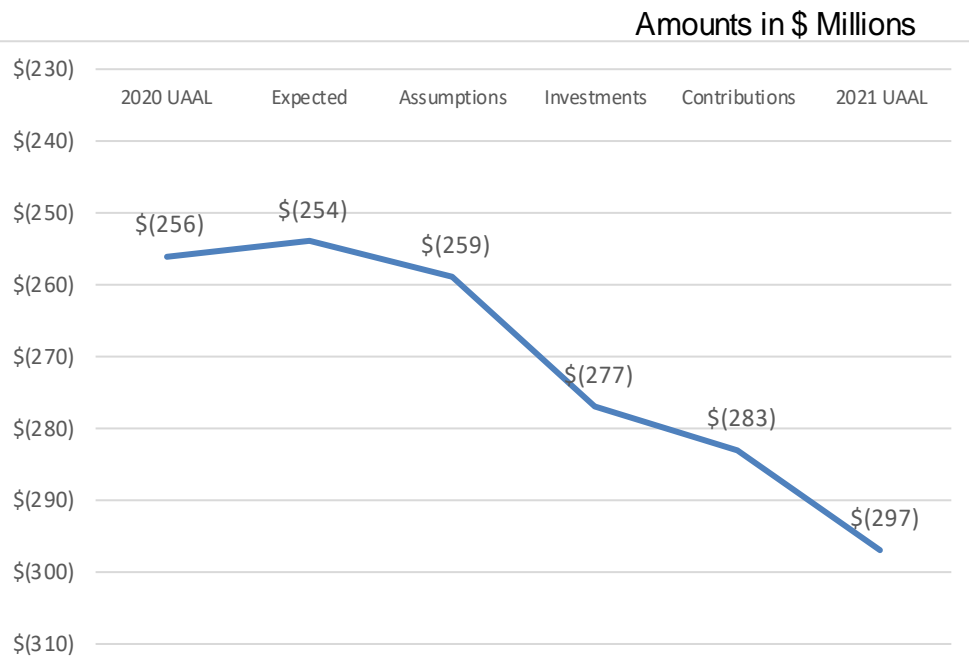
Change in UAAL due to FYE June 30, 2021 Plan Experience Health Insurance Credit - Teachers



Change in UAAL by Source	
Expected	\$ -
Assumptions	13
Investments	(4)
Contributions	(2)
All Else	6
Total	13

- Liabilities increased with assumption and method changes from the experience study, while normal cost decreased.
- Liability increases were partially offset by the investment gain and higher than anticipated employer contributions which lowered liabilities by approximately \$6 million.
- All other changes including the demographic changes resulted in increasing the liabilities by approximately \$6 million.
- Employer contribution rate would have been expected to decrease slightly but increased slightly instead due to payroll being flat.

Change in UAAL due to FYE June 30, 2021 Plan Experience VSDP



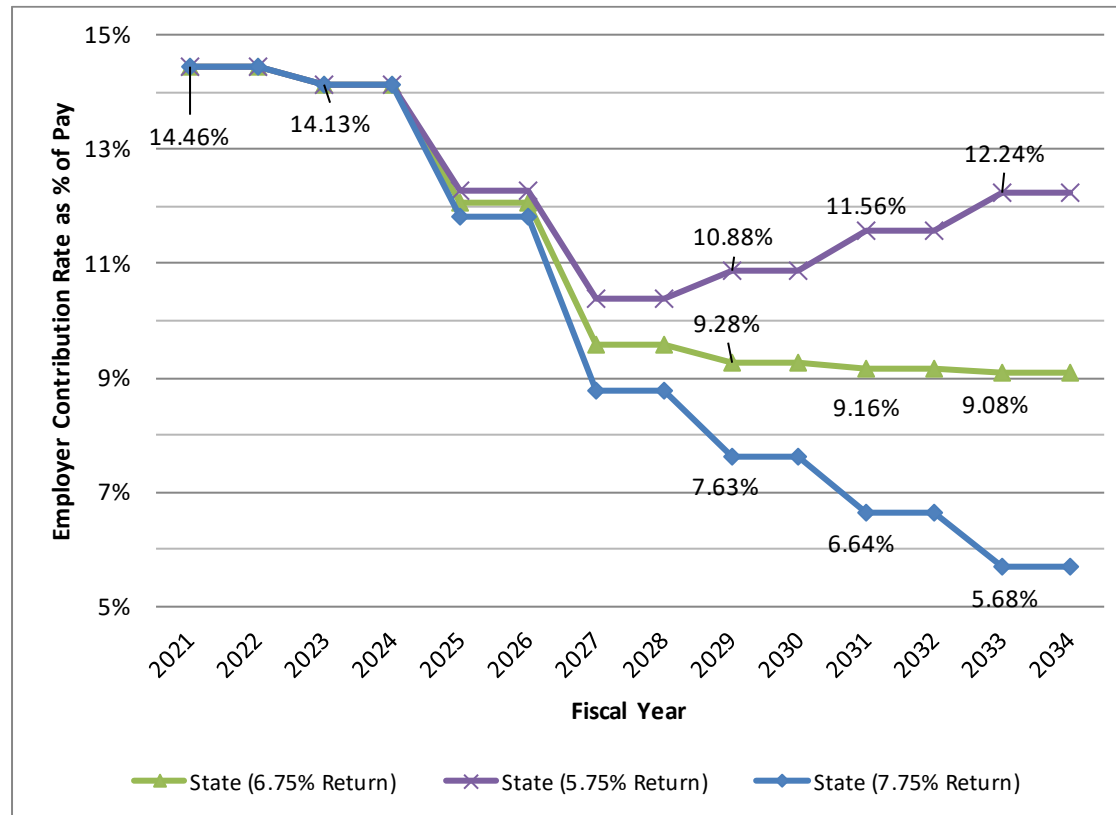
Change in UAAL by Source	
Expected	\$ 2
Assumptions	(5)
Investments	(18)
Contributions	(6)
All Else	(14)
Total	(41)

- There was a small decrease in liability associated with assumption and method changes from the experience study. The experience study caused an increase to the normal cost.
- There were additional decreases in liability associated with investment gains and higher than anticipated contributions.
- All other changes, including the demographic changes, resulted in lowering the liabilities by approximately \$14 million. Experience gains are to be expected in a disability plan due the nature of the benefit.
- An increase to the employer contribution rate was expected due to the experience study, but the rate actually decreased due to asset and experience gains.

Projection of Employer Rates and Funded Status

State Projected Employer Contribution Rates Including Defined Contribution Hybrid

Investment Return Sensitivity

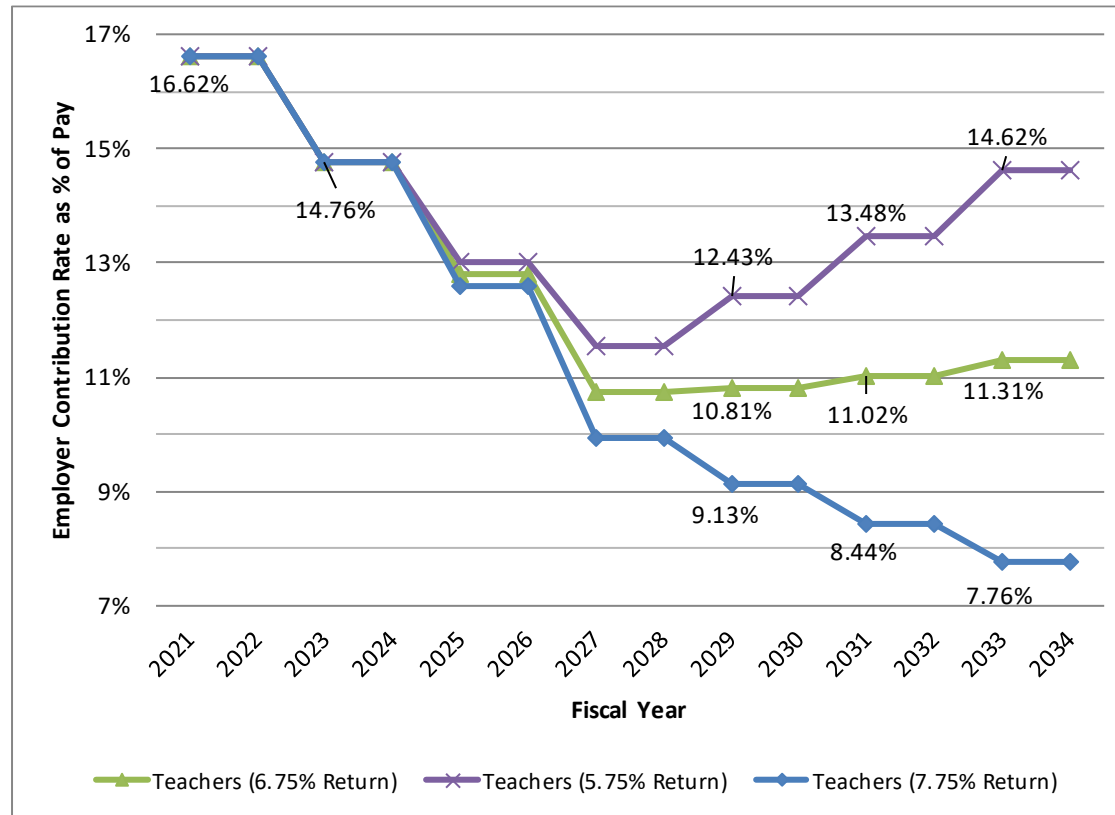


Assumes employer match to defined contribution portion of the Hybrid Plan of 2.28% for members in the Hybrid Plan, which is 1.06% of total payroll for 2021.

Rates above are for alternative investment return scenarios only. Liabilities are calculated at 6.75% under all scenarios.

Teachers Projected Employer Contribution Rates Including Defined Contribution Hybrid

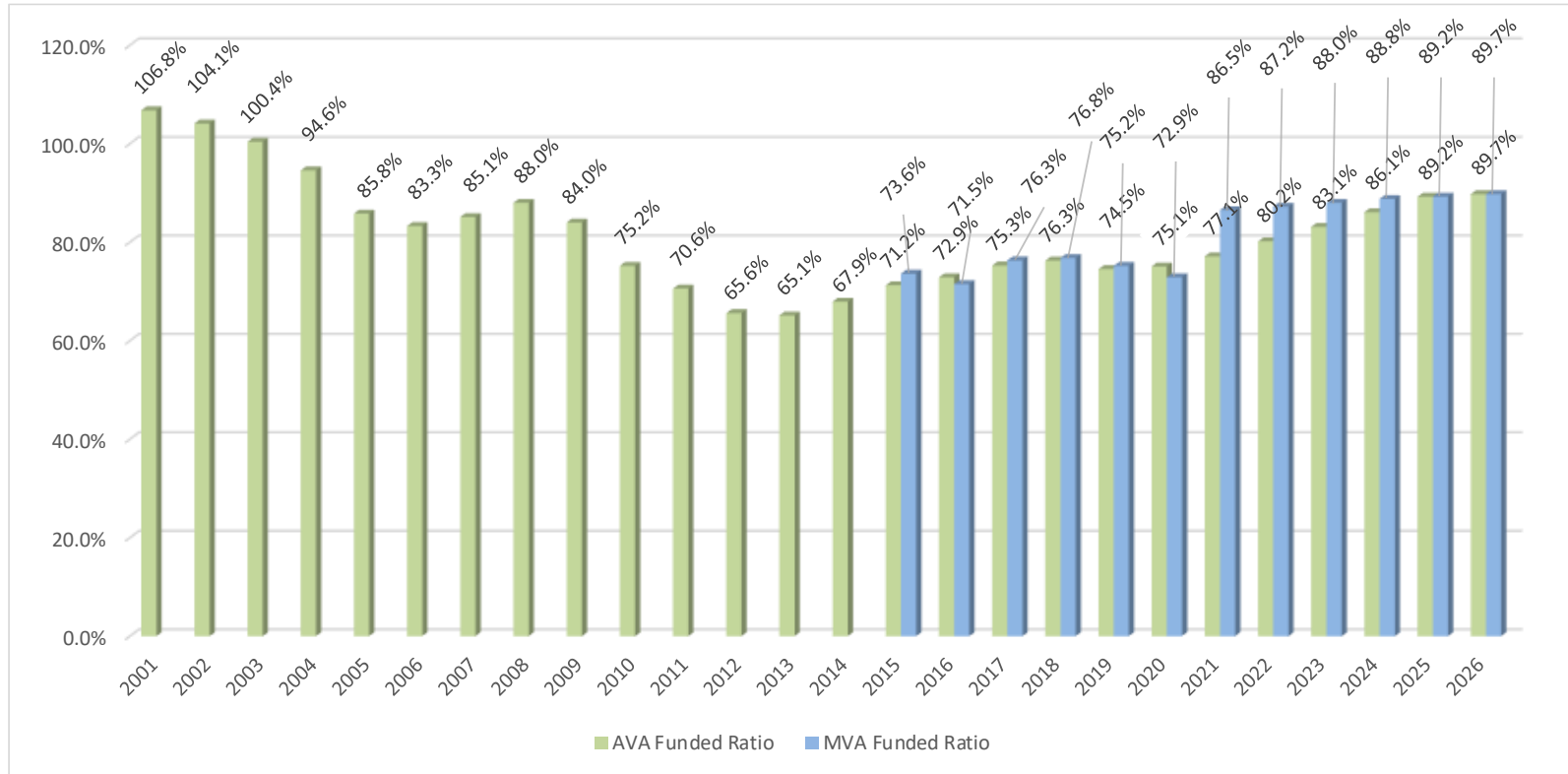
Investment Return Sensitivity



Assumes employer match to defined contribution portion of the Hybrid Plan of 2.12% for members in the Hybrid Plan, which is 0.81% of total payroll for 2021.

Rates above are for alternative investment return scenarios only. Liabilities are calculated at 6.75% under all scenarios.

Projected Funded Status State Employees Pension Plan



Notes and Assumptions:

AVA are actuarial value of assets (five-year smoothing) and MVA are market value of assets.

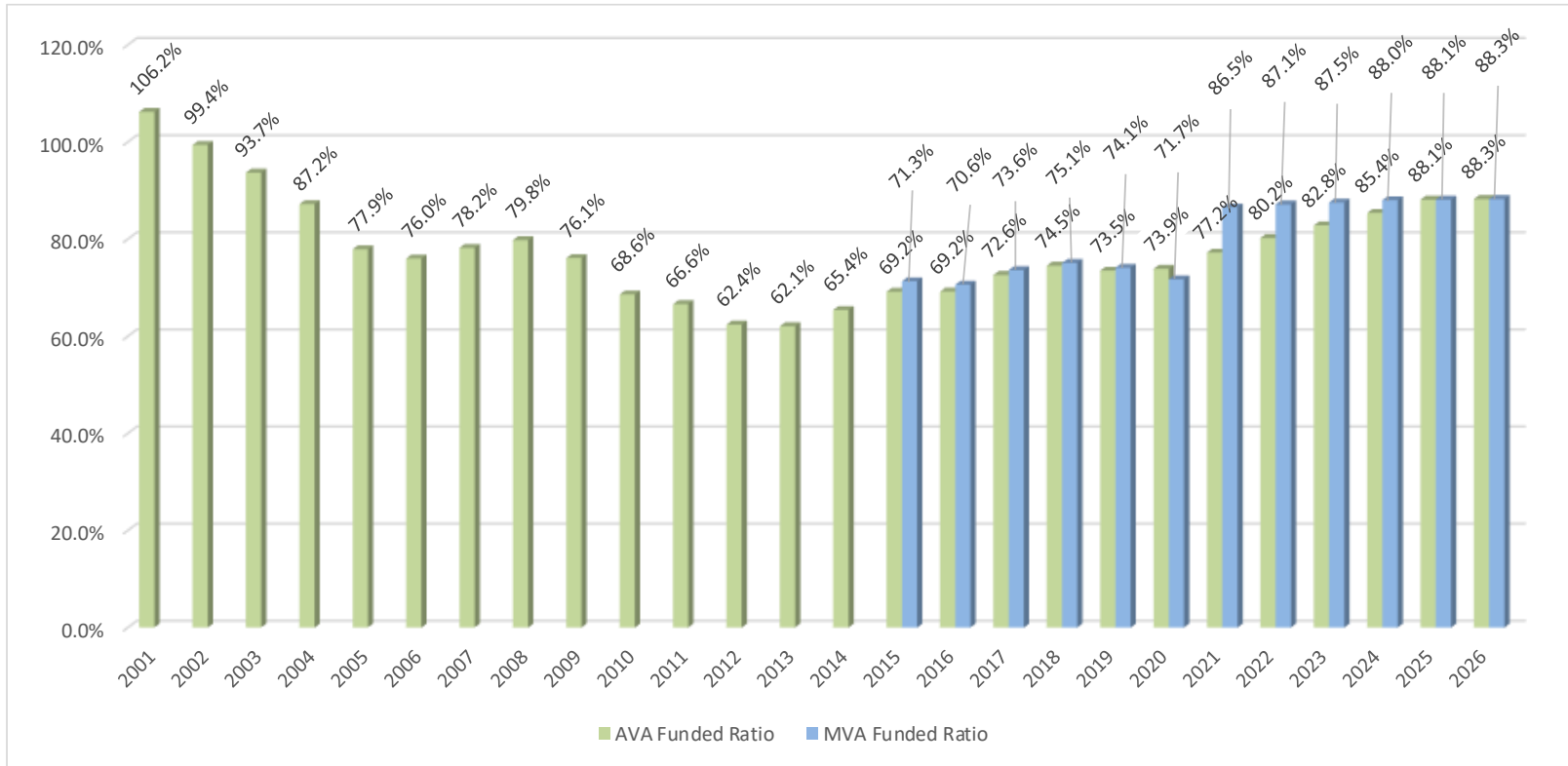
The AVA funded ratio, shown in light green, is used for funding purposes. The MVA funded ratio, shown in blue, is used for GASB 67 & 68 purposes. GASB 67 & 68 were first effective in 2015.

Projected years' investment returns assume 6.75% with 2.5% inflation rate.

Annual discount rates 8% from 2001-2004; 7.5% from 2005 – 2009; 7% from 2010 – 2018; 6.75% from 2019 on.

Projections for 2022-2026 assume 100% of future contributions are made.

Projected Funded Status Teachers Pension Plan



Notes and Assumptions:

AVA are actuarial value of assets (five-year smoothing) and MVA are market value of assets.

The AVA funded ratio, shown in light green, is used for funding purposes. The MVA funded ratio, shown in blue, is used for GASB 67 & 68 purposes. GASB 67 & 68 were first effective in 2015.

Projected years' investment returns assume 6.75% with 2.5% inflation rate.

Annual discount rates 8% from 2001-2004; 7.5% from 2005 – 2009; 7% from 2010 – 2018; 6.75% from 2019 on.

Projections for 2022-2026 assume 100% of future contributions are made.

THANK YOU!

Appendix

Detailed Results

Summary Rates for Pension Plans

Fiscal Years Ending June 30,	2019/2020	2021/2022	2023/2024
Actuarial Valuation date	June 30, 2017	June 30, 2019	June 30, 2021
Pension Plan	Board & General Assembly Approved	Board & General Assembly Approved	Submitted for Approval
State	13.52%	14.46%	14.13%
Teachers	15.68%	16.62%	14.76%
SPORS	24.88%	26.33%	29.98%
VaLORS	21.61%	21.90%	24.60%
JRS	34.39%	29.84%	30.67%
Political Subdivisions (Average rates)	7.60%	8.33%	TBD

Contribution rates for retirement systems are net of 5% and 4% member contribution rates for Plan 1 and 2 and Hybrid Plan, respectively.

Employer rate for Hybrid defined contribution component assumes employer match to DC portion of the Hybrid Plan based on DC rates for each individual employer observed during prior fiscal year.

TBD - Available at the November 2021 Board Meeting.

Summary Rates for OPEB Plans

Fiscal Years Ending June 30,	2019/2020	2021/2022	2023/2024
Actuarial Valuation date	June 30, 2017	June 30, 2019	June 30, 2021
OPEB Plan	Board & General Assembly Approved	Board & General Assembly Approved	Submitted for Approval
Group Life Insurance*	1.31%	1.34%	1.19%
Health Insurance Credit (HIC) Program			
▪ State Employees	1.17%	1.12%	1.04%
▪ Teachers	1.20%	1.21%	1.21%
▪ Participating Political Subdivisions**	0.32%	0.59%	TBD
▪ Constitutional Officers	0.38%	0.36%	TBD
▪ Social Service Employees	0.43%	0.38%	TBD
▪ Registrars	0.39%	0.39%	TBD
Virginia Sickness and Disability Program (VSDP)	0.62%	0.61%	0.56%
Virginia Local Disability Program (VLDP)			
▪ Teachers	0.41%	0.47%	TBD
▪ Political Subdivisions	0.72%	0.83%	TBD

* The contribution rate for GLI includes an adjustment of .34% for active group life insurance for the 2017 and 2019 valuation dates and an adjustment of .35% for the 2021 valuation date.

** Average of individual rates. The contribution rate includes the impact of HB 1513 (2020).

TBD - Available at the November 2021 Board Meeting.

Unfunded Liabilities



Unfunded Pension Liabilities (\$ in thousands)

System	Unfunded Liability Using Actuarial Value of Assets		
	2020	2021	
		Before Assumption Changes	After Assumption Changes
State	\$ 6,417,661	\$ 5,710,835	\$ 6,112,670
Teachers	\$ 13,278,662	\$ 11,145,625	\$ 12,021,814
SPORS	\$ 325,590	\$ 330,233	\$ 389,314
VaLORS	\$ 712,025	\$ 670,421	\$ 738,351
JRS	\$ 111,633	\$ 81,299	\$ 132,738
Total Statewide Systems	\$ 20,845,571	\$ 17,938,413	\$ 19,394,887
Locals Aggregate	\$ 3,441,151		Available at November 2021 Board Meeting
Total Fund	\$ 24,286,722		

System	Unfunded Liability Using Market Value of Assets		
	2020	2021	
		Before Assumption Changes	After Assumption Changes
State	\$ 6,981,267	\$ 3,213,719	\$ 3,615,554
Teachers	\$ 14,385,554	\$ 6,253,529	\$ 7,129,718
SPORS	\$ 351,662	\$ 217,417	\$ 276,498
VaLORS	\$ 758,084	\$ 470,299	\$ 538,229
JRS	\$ 128,417	\$ 8,817	\$ 60,256
Total Statewide Systems	\$ 22,604,984	\$ 10,163,781	\$ 11,620,255
Locals Aggregate	\$ 4,076,749		Available at November 2021 Board Meeting
Total Fund	\$ 26,681,733		

Unfunded Liabilities



Unfunded OPEB Liabilities (\$ in thousands)

System	Unfunded Liability Using Actuarial Value of Assets		
	2020	2021	
		Before Assumption Changes	After Assumption Changes
Group Life	\$ 1,677,898	\$ 1,582,751	\$ 1,389,277
HIC State	\$ 894,542	\$ 841,227	\$ 852,591
HIC Teachers	\$ 1,280,589	\$ 1,280,412	\$ 1,293,999
VSDP	\$ (256,367)	\$ (292,733)	\$ (297,276)
HIC Locals	\$ 52,204	Available at November 2021 Board Meeting	
HIC Constitutional Officers	\$ 27,069		
HIC Social Services	\$ 12,646		
HIC Registrars	\$ 450		
VLDP Teachers	\$ 360		
VLDP Locals	\$ 327		

System	Unfunded Liability Using Market Value of Assets		
	2020	2021	
		Before Assumption Changes	After Assumption Changes
Group Life	\$ 1,728,029	\$ 1,304,864	\$ 1,111,390
HIC State	\$ 899,066	\$ 824,150	\$ 835,514
HIC Teachers	\$ 1,286,380	\$ 1,263,508	\$ 1,277,095
VSDP	\$ (241,350)	\$ (357,273)	\$ (361,816)
HIC Locals	\$ 52,204	Available at November 2021 Board Meeting	
HIC Constitutional Officers	\$ 27,069		
HIC Social Services	\$ 12,646		
HIC Registrars	\$ 450		
VLDP Teachers	\$ 447		
VLDP Locals	\$ 433		