



North Dakota Public Employees' Retirement System

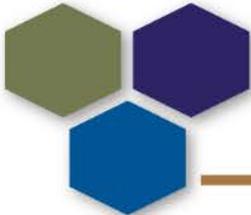
Presentation of July 1, 2016
Actuarial Valuation Results

October 26, 2016

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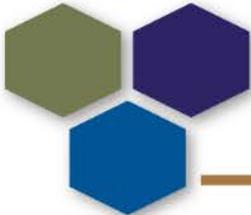


Agenda

- ◆ GRS Actuarial Valuation Methodology and Approach
- ◆ Actuarial Valuation Demographic Data
- ◆ Actuarial Valuation Results – Contribution Rate
- ◆ Actuarial Valuation Results – Funded Ratio
- ◆ Unfunded Liability and Actuarial Contribution Rate Reconciliation
- ◆ Actuarial Valuation Results Summary Comments
- ◆ Projection of Actuarial Valuation Results – Main System
- ◆ Current Events Affecting Public Pension Plans
- ◆ Questions
- ◆ Appendix

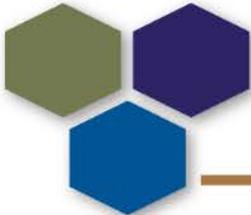
GRS Actuarial Valuation Methodology and Approach



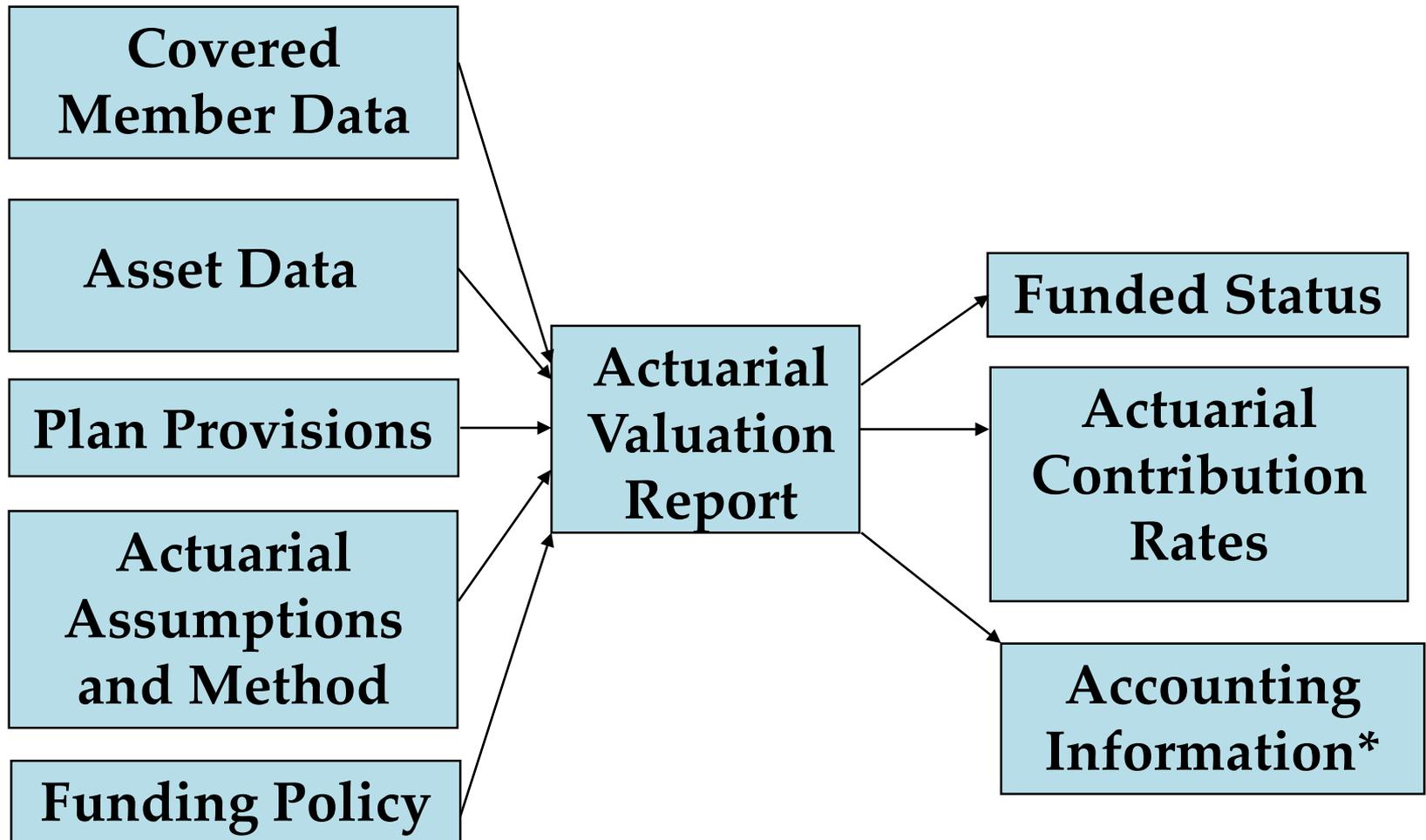


Purpose of Actuarial Valuation

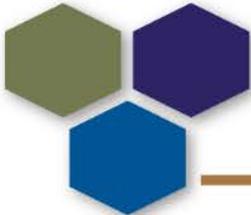
- ◆ Determine Funding Status
- ◆ Develop Actuarial Contribution Rates and Comparison to Statutory Rates
- ◆ Provide Accounting and Other Data
 - ▶ Under the current accounting standards, a separate accounting valuation is performed



Actuarial Valuation Process



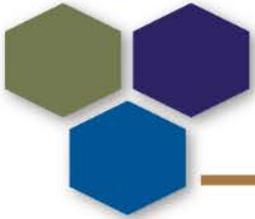
* Under the current accounting requirements, GASB 67 and 68, a separate accounting valuation report is issued.



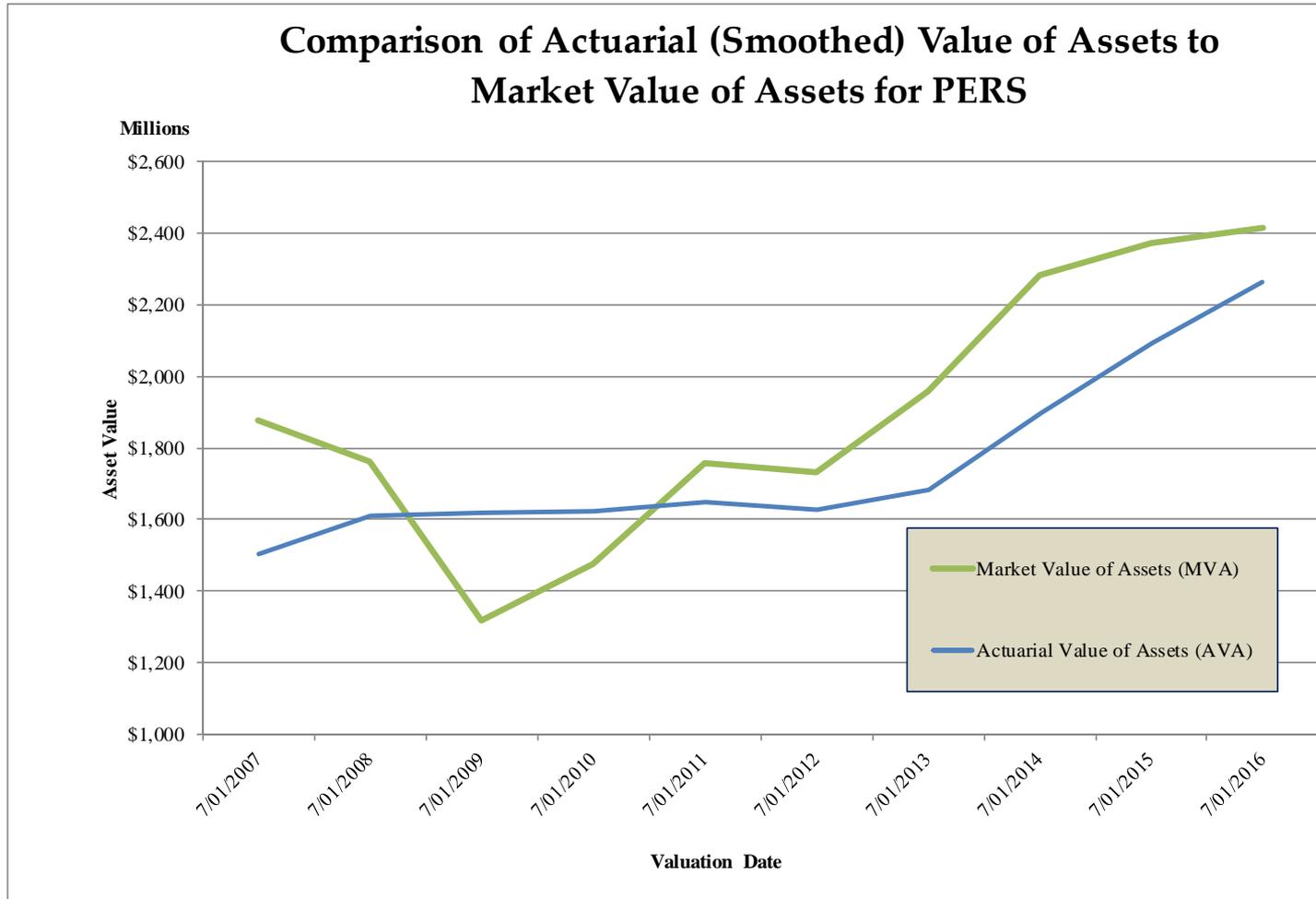
Actuarial Value of Assets

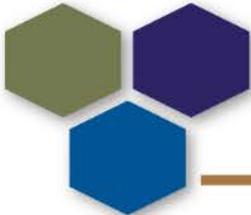
Asset Smoothing

- ◆ Actuarial Value of Assets (AVA or Smoothed Value of Assets)
 - ▶ Immediately recognizes interest and dividends
 - ▶ Recognizes the total appreciation or depreciation from the current year (net change in fair value of investments) over a five-year period
 - 20% of the return attributable to investments (net of investment expenses) is recognized in the current year.
 - 80% of the return attributable to investments is deferred and recognized over the next four years.
 - There will be deferred gains from all years in which the net investment return from investments is greater than 0%
 - ▶ We believe that the current asset valuation method has a systematic bias toward the actuarial value of assets being lower than the market value of assets



Actuarial Value of Assets





Selection of Actuarial Assumptions

What

Economic

- ◆ Investment Return
- ◆ Payroll Growth Rate
- ◆ Population Growth Rate
(Usually, a constant population size is assumed)

Demographic

- ◆ Retirement Rates
- ◆ Promotional/Step Pay Increases
- ◆ Disability
- ◆ Turnover
- ◆ Mortality

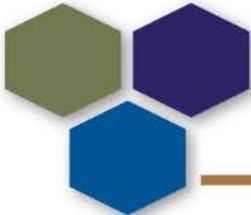
Who Selects

- ◆ Board, Actuary, Other Advisors
- ◆ Board, Actuary, Staff



Actuarial Assumptions

- ◆ Actuarial assumptions should be reviewed periodically (at least every three to five years) to ensure they continue to reasonably represent past and expected future experience
 - ▶ Last experience study (performed by prior actuary) covered the period July 1, 2009, through July 1, 2014, and updated actuarial assumptions were adopted in the July 1, 2015, valuation
 - ▶ Experience is monitored annually through the actuarial valuation gain/loss analysis for each plan
 - ▶ Continued gains or losses due to certain assumptions may require an update to the actuarial assumptions between experience studies

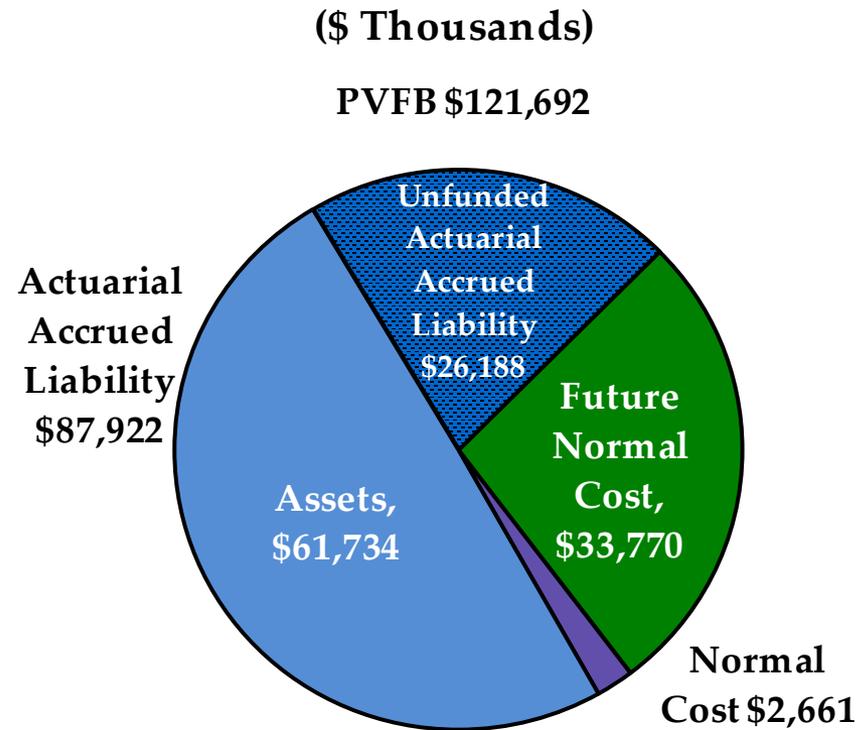


Actuarial Cost Method

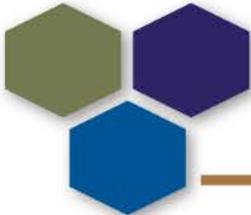
Plan	Actuarial Cost Method
Main System	Entry Age Normal
Judges	Entry Age Normal
Law Enforcement	Entry Age Normal
Highway Patrol	Entry Age Normal
Job Service	Aggregate
RHIC	Projected Unit Credit

Actuarial Cost Method

- ◆ **Present value of future benefits** – present value of all future benefits (PVFB) payable to current participants (active, retired, terminated vested)
- ◆ **Actuarial accrued liability** – portion of PVFB allocated to prior years (equal to unfunded actuarial accrued liability plus assets)
- ◆ **Normal cost** – portion of PVFB allocated to current year
- ◆ **Future normal costs** – portion of PVFB allocated to future years

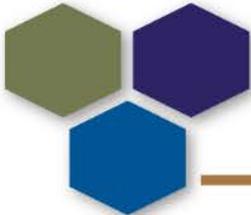


Numbers may not add due to rounding



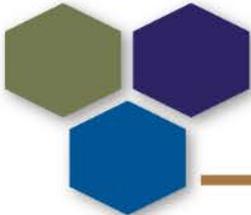
Causes of Unfunded Liability

- ◆ Granting initial benefits or granting benefit increases for service already rendered.
- ◆ Actual experience which is less favorable than assumed. Examples:
 - ▶ Lower rates of investment earnings;
 - ▶ Higher salary increases;
 - ▶ Earlier retirement date(s); and
 - ▶ Lower rates of non-death terminations.
- ◆ Not contributing at least Normal Cost + Interest on the Unfunded Liability.



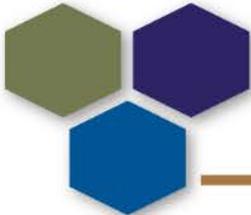
Current Funding Policy

- ◆ Employer contribution rates are based on fixed rates set by Statute or the Board
 - ▶ 7.12% - Main System
 - ▶ 17.52% - Judges
 - ▶ 9.81% - Law Enforcement with Prior Main System Service
 - ▶ 7.93% - Law Enforcement without Prior Main System Service
 - ▶ 19.70% - Highway Patrolmen's Retirement System
 - ▶ 1.14% - Retiree Health Insurance Credit Fund (RHIC)
 - ▶ 0% - Job Service



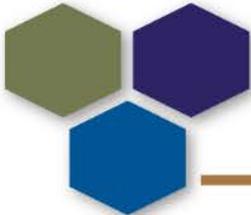
Current Funding Policy

- ◆ Actuarial employer contribution rate equals
 - ▶ Employer Normal Cost, plus
 - ▶ Amortization of Unfunded Liability.
 - Level percent of pay amortization
 - Payment increases as a dollar amount and remains level as a percentage of pay.
 - Payroll is assumed to increase by 4.50% each year (4.00% for Judges)
 - Amortization Period.
 - 20-year open period (Main System, Judges, Law Enforcement, Highway Patrol)
 - 40-year closed period beginning July 1, 1990, 14 years remaining as of July 1, 2016 (RHIC)
 - Not currently applicable for Job Service due to large surplus and Aggregate cost method



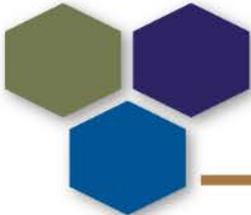
Changes in Provisions

- ◆ There have been no new changes in plan provisions since the last actuarial valuations as of July 1, 2015
 - ▶ Later retirement eligibility conditions for members enrolled in the Main System after December 31, 2015, are reflected in this actuarial valuation
 - ▶ Changes to the employee contribution rate of 5.50% of pay for National Guard members and changes to the employer contribution rate of 9.81% for Bureau of Criminal Investigation (BCI), which affects the Law Enforcement with prior Main system service plan, are reflected in this actuarial valuation
 - ▶ Retiree Health Insurance Credit Fund
 - The plan was changed to no longer require enrollment in the NDPERS health insurance plan. The participation rates were changed in the actuarial valuation as of July 1, 2015, in conjunction with this Plan change.
 - An increase in the covered number of retirees as a result of this change was first reflected in the actuarial valuation as of July 1, 2016



2015 Valuation Replication Results

- ◆ As part of the transition process, GRS replicated the 2015 valuation results for each of the Systems
 - ▶ For the Main System and the Law Enforcement Plans
 - Liabilities that GRS calculated were slightly higher
 - Normal cost that GRS calculated was lower
 - Actuarial contribution rate was lower
 - Differences were within a reasonable range
 - ▶ For the Judges Plan
 - Liabilities that GRS calculated were slightly lower
 - Normal cost that GRS calculated was slightly higher
 - Actuarial contribution rate was lower
 - Differences were within a reasonable range



2015 Valuation Replication Results

- ◆ As part of the transition process, GRS replicated the 2015 valuation results for each of the Systems
 - ▶ For Highway Patrol, using the same method as Segal of limiting projected future benefits to the current Internal Revenue Code Section 415 benefit limits applicable to 2016
 - Liabilities that GRS calculated were slightly lower
 - Normal cost that GRS calculated was lower
 - Actuarial contribution rate was lower
 - ▶ However, GRS recommended that for the 2016 Highway Patrol actuarial valuation the liabilities be calculated by limiting projected future benefits to a projected Section 415 limit
 - This results in a significant increase in the liabilities, normal cost and actuarial contribution rate compared to those calculated in the 2015 valuation
 - GRS believes that this is a more reasonable approach and the typical approach used by most public sector pension plans
 - If all assumptions are realized, including projected inflation, there are not expected to be unanticipated increases in liabilities and the actuarial contribution rate due to increases in the future Section 415 benefit limits



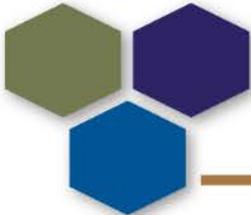
2015 Valuation Replication Results

- ◆ As part of the transition process, GRS replicated the 2015 valuation results for each of the Systems
 - ▶ For the Retiree Health Insurance Credit Fund
 - Liabilities, normal cost and actuarial contribution rate were almost identical to those calculated in the 2015 valuation using the same data, methods and assumptions provided by Segal that were used in the 2015 valuation
 - ▶ For the 2016 valuation of the Retiree Health Insurance Credit Fund, all retirees were included, which is significantly higher than the number of retirees included in 2015. Only those retirees enrolled in the NDPERS health insurance plan were included in the 2015 valuation.
 - Although a change in the participation rate for future retirees was reflected in the 2015 valuation, a change in the expected number of current retirees participating in the Plan was first reflected in the 2016 valuation



Demographic Data



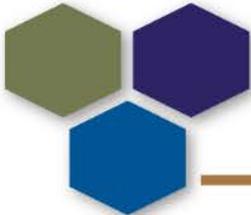


Demographic Data

PERS Plans

	PERS						
	Statistics as of July 1						
	2016					2015	Total % Change
	<u>Main System</u>	<u>Judges</u>	<u>Law Enforcement</u>		<u>Total PERS</u>	<u>Total PERS</u>	
		<u>With Prior Main</u>	<u>Without Prior Main</u>				
Membership Counts							
Active Members	22,762	56	498	100	23,416	22,845	2.5%
Retired Members ¹	10,394	43	79	2	10,518	10,097	4.2%
Vested Former Members	10,460	4	206	63	10,733	9,503	12.9%
Total	43,616	103	783	165	44,667	42,445	5.2%
Average Age (Active)	46.5	57.4	37.3	37.6	46.3	46.4	-0.3%
Average Service (Active)	9.6	10.4	6.6	3.7	9.6	9.6	-0.5%
Total Base Payroll	\$1,007,764,043	\$7,937,062	\$28,225,868	\$4,621,494	\$1,048,548,467	\$961,690,526	9.0%
Average Pay	44,274	141,733	56,678	46,215	44,779	42,096	6.4%
Total Retiree Benefits¹	\$139,645,999	\$2,121,768	\$1,445,651	\$13,056	\$143,226,474	\$135,701,596	5.5%
Avg. Annual Benefit	13,435	49,343	18,299	6,528	13,617	13,440	1.3%

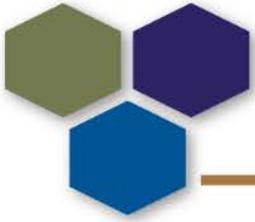
¹ Main System includes 3 pensioners receiving benefits under the Special Prior Service Plan.



Demographic Data

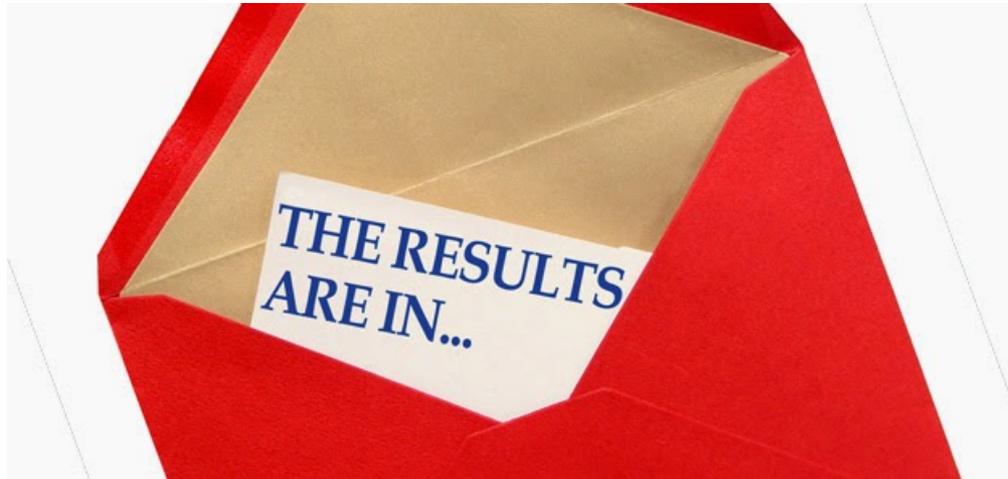
Highway Patrol, Job Service, RHIC

	Highway Patrol			Job Service			RHIC		
	Statistics as of July 1		%	Statistics as of July 1		%	Statistics as of July 1		%
	2016	2015		2016	2015		2016	2015	
Membership Counts									
Active Members	156	161	-3.1%	9	11	-18.2%	23,664	23,237	1.8%
Retired Members	123	128	-3.9%	206	206	0.0%	10,320	5,212	98.0%
Vested Former Members	39	37	5.4%	1	1	0.0%	-	-	
Total	318	326	-2.5%	216	218	-0.9%	33,984	28,449	19.5%
Average Age (Active)	36.4	35.3	1.0	61.6	61.2	0.3	46.2	46.3	(0.1)
Average Service (Active)	9.6	8.6	1.0	40.1	38.9	1.2	9.5	9.7	(0.2)
Total Base Payroll	\$10,526,791	\$9,967,249	5.6%	\$564,684	\$673,836	-16.2%	\$1,066,653,605	\$990,087,194	7.7%
Average Pay	67,479	61,908	9.0%	62,743	61,258	2.4%	45,075	42,608	5.8%
Total Retiree Benefits	\$4,586,664	\$4,697,134	-2.4%	\$5,477,283	\$5,491,161	-0.3%	\$12,369,833	\$7,580,838	63.2%
Avg. Annual Benefit	37,290	36,696	1.6%	26,589	26,656	-0.3%	1,199	1,454	-17.5%



Actuarial Valuation Results

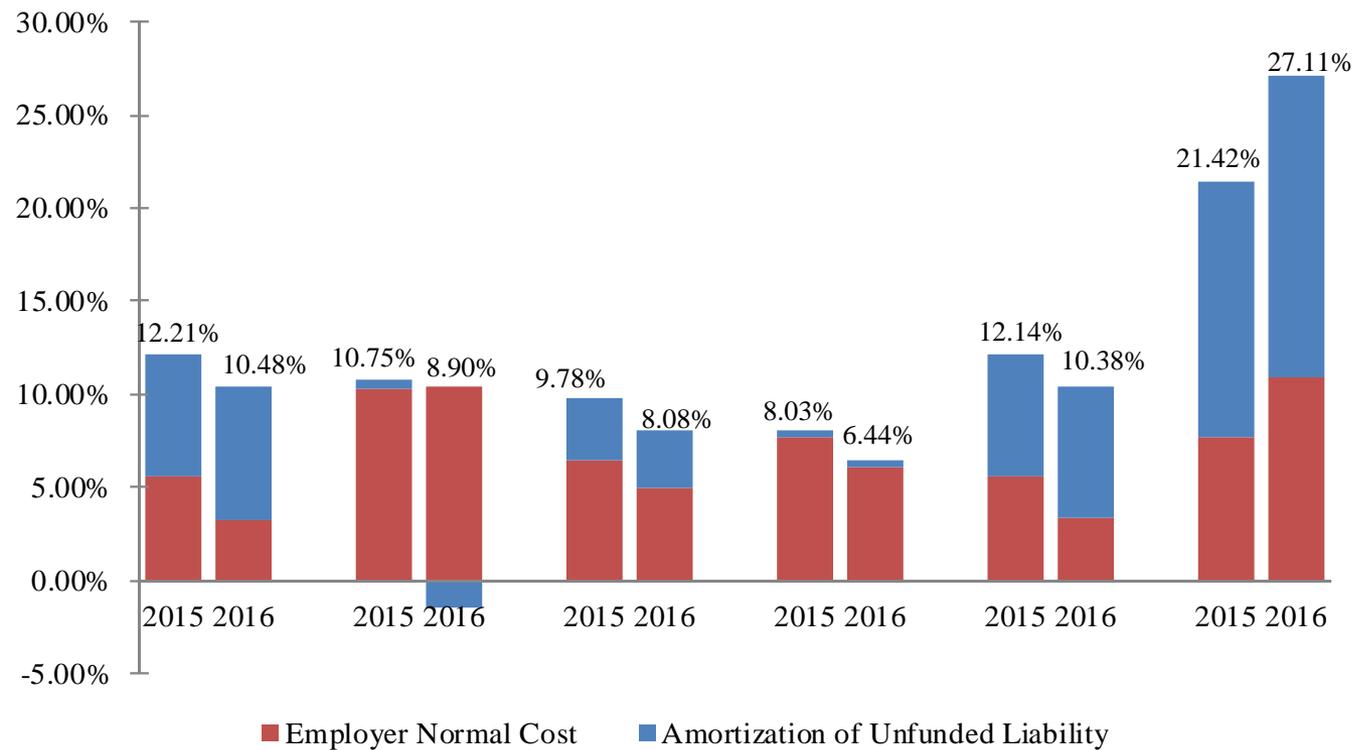
Contribution Rate





Actuarial Valuation Results

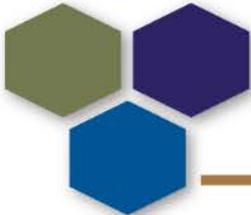
Actuarial Contribution Rate



	Main System	Judges	Law Enforcement		Total PERS	Highway Patrol
			With Prior Main	Without Prior Main		
Employer Normal Cost Rates						
FY 2017 (2016 Valuation)	3.24%	10.40%	4.92%	6.07%	3.35%	10.92%
FY 2016 (2015 Valuation)	5.55%	10.34%	6.43%	7.71%	5.61%	7.66%
Amortization of Unfunded Liability Rates						
FY 2017 (2016 Valuation)	7.24%	-1.50%	3.16%	0.37%	7.03%	16.19%
FY 2016 (2015 Valuation)	6.66%	0.41%	3.35%	0.32%	6.53%	13.76%

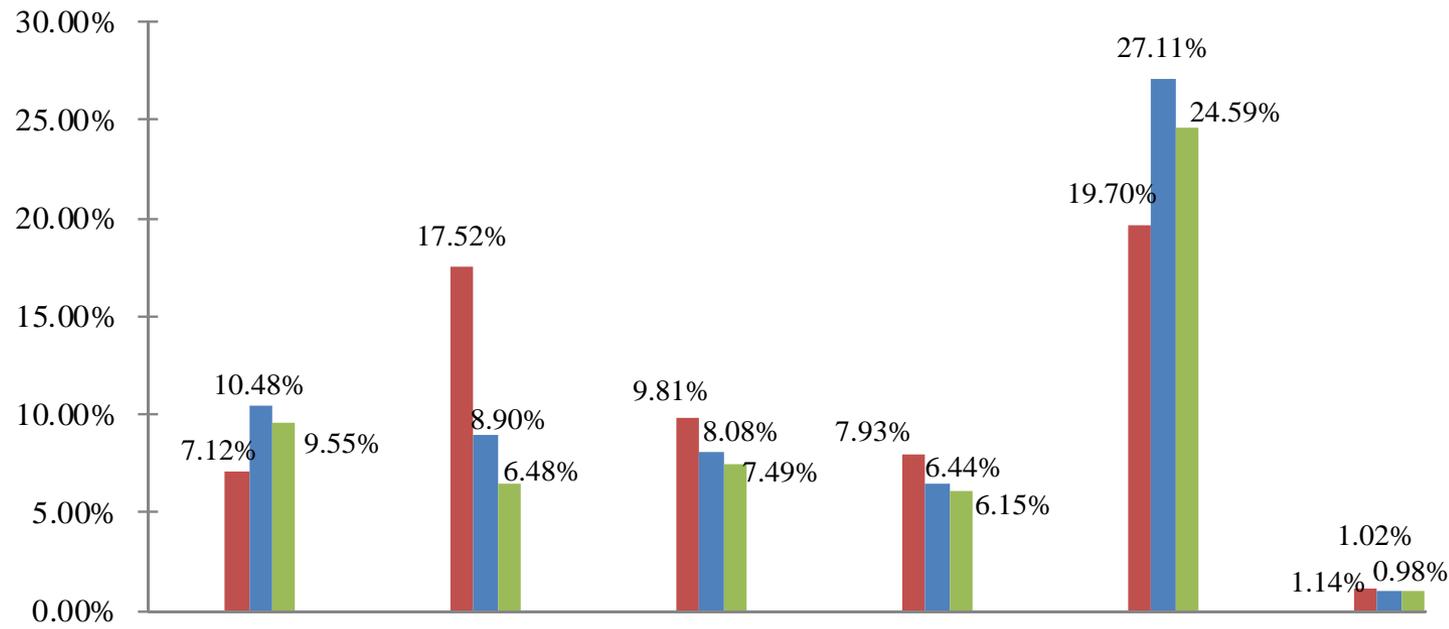
22 Actuarial contribution rate for RHIC was 0.72% for FY 2016 (0.39% ER NC and 0.33% UAAL amortization) and 1.02% for FY 2017 (0.39% for ER NC and 0.63% for UAAL amortization).





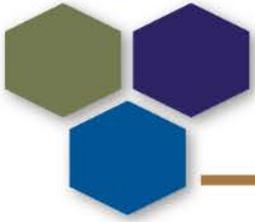
Actuarial Valuation Results

Comparison of Statutory and Actuarial Contribution Rates



■ Statutory Rate ■ Rate Based on Actuarial Value of Assets ■ Rate Based on Market Value of Assets

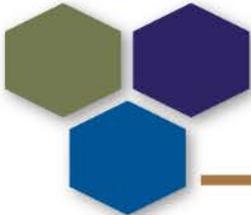
<u>Valuation Results</u>	Main	Judges	Law Enforcement		Highway	RHIC
	System		With Prior Main	Without Prior Main	Patrol	
Statutory Contribution Rate	7.12%	17.52%	9.81%	7.93%	19.70%	1.14%
Actuarial Contribution Rate (AVA)	10.48%	8.90%	8.08%	6.44%	27.11%	1.02%
Statutory Rate Excess/(Deficiency)	-3.36%	8.62%	1.73%	1.49%	-7.41%	0.12%
Actuarial Contribution Rate (MVA)	9.55%	6.48%	7.49%	6.15%	24.59%	0.98%
Statutory Rate Excess/(Deficiency)	-2.43%	11.04%	2.32%	1.78%	-4.89%	0.16%



Actuarial Valuation Results

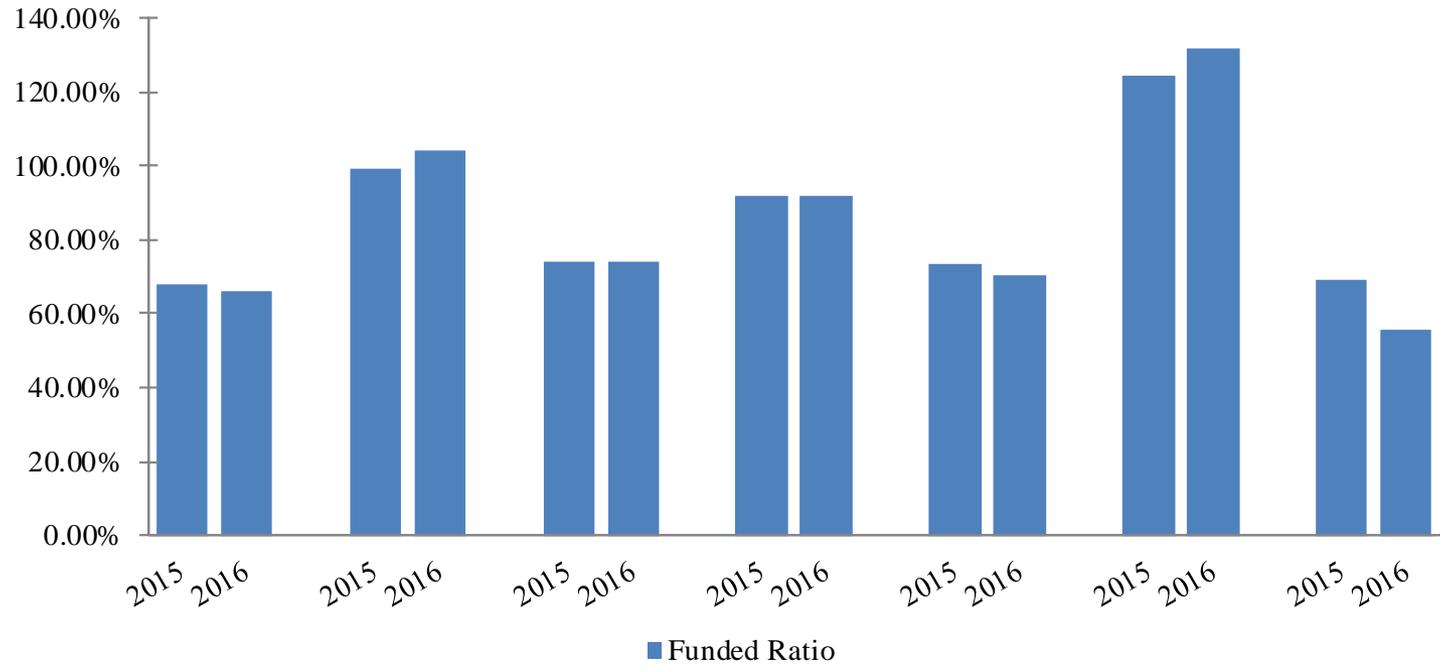
Funded Ratio



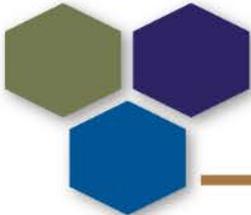


Actuarial Valuation Results

Funded Ratio All Plans – Actuarial Value of Assets

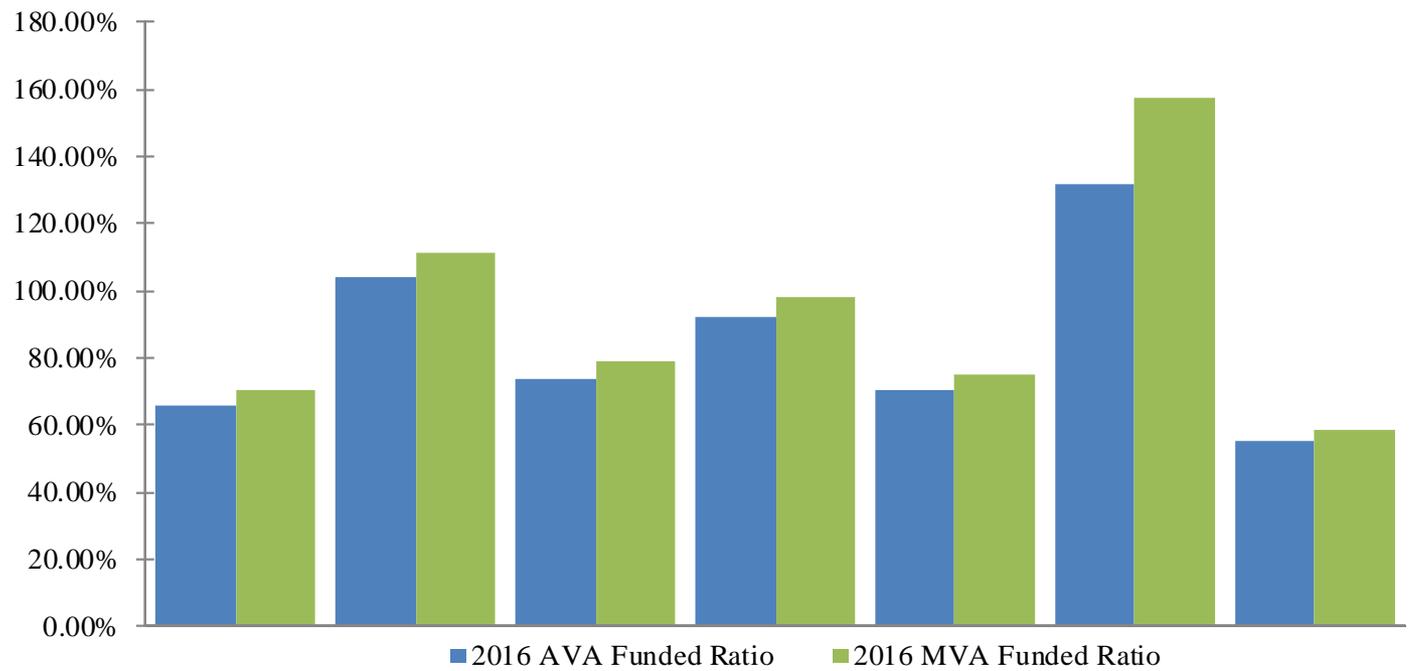


Valuation Results	Main System	Judges	Law Enforcement		Highway Patrol	Job Service	RHIC
			With Prior Main	Without Prior Main			
Actuarial Accrued Liability	\$ 3,299,381,100	\$ 39,819,443	\$ 53,865,148	\$ 3,499,776	\$ 87,921,960	\$ 61,371,296	\$ 176,592,907
Actuarial Value of Assets	2,180,748,616	41,526,834	39,779,332	3,222,859	61,733,910	80,980,498	97,782,124
2016 Unfunded Actuarial Liability	1,118,632,484	(1,707,391)	14,085,816	276,917	26,188,050	(19,609,202)	78,810,783
UAL as Percent of Payroll	111%	-22%	50%	6%	249%	-3473%	7%
2015 Unfunded Actuarial Liability	\$ 948,595,594	\$ 407,537	\$ 8,982,396	\$ 209,656	\$ 21,236,686	\$ (15,573,387)	\$ 39,506,015
2016 Funded Ratio	66.1%	104.3%	73.8%	92.1%	70.2%	132.0%	55.4%
2015 Funded Ratio	68.1%	99.0%	73.8%	92.2%	73.5%	124.5%	69.4%



Actuarial Valuation Results

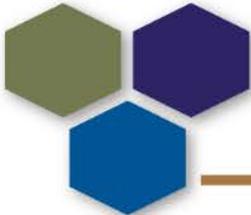
Funded Ratio All Plans – Actuarial/Market Value



<u>Valuation Results</u>	Main System	Judges	Law Enforcement		Highway Patrol	Job Service	RHIC
			With Prior Main	Without Prior Main			
2016 Unfunded Actuarial Liability (AVA)	\$ 1,118,632,484	\$ (1,707,391)	\$ 14,085,816	\$ 276,917	\$ 26,188,050	\$ (19,609,202)	\$ 78,810,783
2015 Unfunded Actuarial Liability (AVA)	948,595,594	407,537	8,982,396	209,656	21,236,686	(15,573,387)	39,506,015
2016 Unfunded Actuarial Liability (MVA)	974,597,477	(4,450,173)	11,458,454	64,052	22,110,623	(35,162,658)	73,671,832
2015 Unfunded Actuarial Liability (MVA)	679,982,928	(4,755,969)	5,625,806	(117,035)	13,436,489	(32,659,593)	29,797,963
2016 Funded Ratio (AVA)	66.1%	104.3%	73.8%	92.1%	70.2%	132.0%	55.4%
2015 Funded Ratio (AVA)	68.1%	99.0%	73.8%	92.2%	73.5%	124.5%	69.4%
2016 Funded Ratio (MVA)	70.5%	111.2%	78.7%	98.2%	74.9%	157.3%	58.3%
2015 Funded Ratio (MVA)	77.2%	112.1%	83.6%	104.4%	83.2%	151.3%	76.9%

Unfunded Liability and Actuarial Contribution Rate Reconciliation

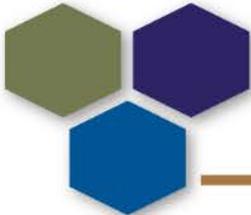




Unfunded Liability Reconciliation

PERS Plans

	Main System	Judges	Law Enforcement With Prior Main	Law Enforcement Without Prior Main
Unfunded liability at previous valuation	\$ 948,595,594	\$ 407,537	\$ 8,982,396	\$ 209,656
Unfunded liability at previous valuation - GRS replication results	\$1,056,939,932	\$ (372,669)	\$ 9,461,676	\$ 305,662
<u>Expected unfunded liability at current valuation</u>				
Normal cost for plan year	103,608,361	1,366,793	1,961,430	533,646
Interest on unfunded liability and normal cost	88,619,801	23,806	833,882	45,388
Contributions using actuarial rate with interest to current valuation date	<u>184,330,892</u>	<u>1,392,282</u>	<u>2,724,616</u>	<u>576,750</u>
Total expected change in unfunded liability at current valuation	7,897,270	(1,683)	70,696	2,284
Total expected unfunded liability at current valuation	1,064,837,202	(374,352)	9,532,372	307,946
Change due to:				
Amount and timing of contributions (based on statutory rate)	33,686,864	(672,994)	(1,148,269)	(75,440)
Amount and timing of administrative expenses	4,091,878	131	7,658	326
Recognition of asset (gains)/losses	14,659,356	482,468	1,655,823	93,070
Salary experience	(42,485,719)	(120,993)	1,178,788	11,506
Retirement experience	(2,559,270)	(535,764)	(148,714)	(6,177)
Withdrawal experience	(1,270,432)	(6,972)	107,787	(31,220)
Disability experience	139,652	(19,505)	56,586	(3,282)
Death in Service experience	(306,953)	(41,050)	(266)	381
Death After Retirement experience	(799,983)	(793,090)	(340,274)	(52,788)
New entrants	54,046,549	165,148	2,383,870	64,328
Data changes and other experience	(5,406,660)	209,582	800,455	(31,733)
Change in actuarial assumptions	-	-	-	-
Changes in plan provisions	-	-	-	-
Total change	53,795,282	(1,333,039)	4,553,444	(31,029)
Unfunded liability at current valuation	\$1,118,632,484	\$ (1,707,391)	\$ 14,085,816	\$ 276,917

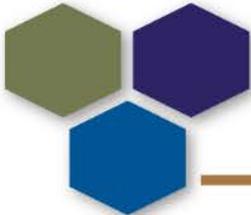


Actuarial Contribution Rate Reconciliation

PERS Plans

	Main System	Judges	Law Enforcement With Prior Main	Law Enforcement Without Prior Main
FY 2016 Actuarial Employer Contribution	12.21%	10.75%	9.78%	8.03%
GRS Replication Results FY 2016 Actuarial Employer Contribution	10.76%	10.40%	8.67%	6.52%
Expected FY 2017 Actuarial Employer Contribution	10.49%	10.42%	8.51%	6.51%
Change due to:				
Amount and timing of contributions (based on statutory rate)	0.22%	-0.65%	-0.42%	-0.11%
Amount and timing of administrative expenses	0.04%	0.00%	0.05%	0.00%
Recognition of asset (gains)/losses	0.10%	0.47%	0.59%	0.14%
Salary experience	-0.32%	-0.12%	0.29%	0.03%
Retirement experience	-0.01%	-0.52%	-0.05%	-0.01%
Withdrawal experience	-0.01%	-0.01%	0.04%	-0.04%
Disability experience	0.00%	-0.02%	0.02%	-0.01%
Death in Service experience	0.00%	-0.04%	0.00%	0.00%
Death After Retirement experience	-0.01%	-0.76%	-0.12%	-0.08%
New entrants	0.01%	-0.06%	-1.01%	0.05%
Data changes and other experience	-0.03%	0.19%	0.18%	-0.04%
Change in actuarial assumptions	0.00%	0.00%	0.00%	0.00%
Changes in plan provisions	0.00%	0.00%	0.00%	0.00%
Total change	-0.01%	-1.52%	-0.43%	-0.07%
FY 2017 Actuarial Employer Contribution	10.48%	8.90%	8.08%	6.44%

New entrants includes the net impact of liability and asset transfers and change in payroll.

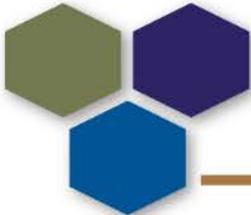


Unfunded Liability Reconciliation

Highway Patrol, RHIC, Job Service

	Highway Patrol	RHIC	Job Service
Unfunded liability at previous valuation	\$ 21,236,686	\$ 39,506,015	\$ (15,573,387)
Unfunded liability at previous valuation - GRS replication results	\$ 25,182,487	\$ 40,767,475	\$ (15,534,859)
<u>Expected unfunded liability at current valuation</u>			
Normal cost for plan year	2,616,207	4,225,270	31,271
Interest on unfunded liability and normal cost	2,117,234	3,427,157	(1,086,364)
Contributions using actuarial rate with interest to current valuation date	<u>4,545,282</u>	<u>8,050,416</u>	<u>34,153</u>
Total expected change in unfunded liability at current valuation	188,159	(397,989)	(1,089,246)
Total expected unfunded liability at current valuation	25,370,646	40,369,486	(16,624,105)
Change due to:			
Amount and timing of contributions (based on statutory rate)	841,890	(4,801,268)	(11,545)
Amount and timing of administrative expenses	(579)	213,741	1,016
Recognition of asset (gains)/losses	623,964	1,510,912	(987,223)
Salary experience	(547,785)	-	15,294
Retirement experience	(17,157)	(82,418)	(73,314)
Withdrawal experience	34,419	(2,205,453)	3,205
Disability experience	(11,700)	(64,330)	3,275
Death in Service experience	16,311	(135,947)	12,036
Death After Retirement experience	(673,671)	2,747,519	5,286
New entrants	68,662	622,038	-
Data changes and other experience	483,050	40,636,503	(1,953,126)
Change in actuarial assumptions	-	-	-
Changes in plan provisions	-	-	-
Total change	<u>817,404</u>	<u>38,441,297</u>	<u>(2,985,096)</u>
Unfunded liability at current valuation	\$ 26,188,050	\$ 78,810,783	\$ (19,609,201)

Data changes and other experience includes the increase in the number of covered retirees under RHIC and a COLA gain for Job Service.

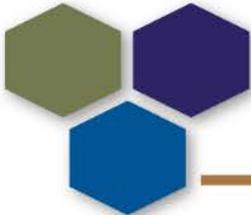


Actuarial Contribution Rate Reconciliation

Highway Patrol and RHIC

	Highway Patrol	RHIC
FY 2016 Actuarial Employer Contribution	21.42%	0.72%
GRS Replication Results FY 2016 Actuarial Employer Contribution	27.48%	0.73%
Expected FY 2017 Actuarial Employer Contribution	26.89%	0.73%
Change due to:		
Amount and timing of contributions (based on statutory rate)	0.52%	-0.04%
Amount and timing of administrative expenses	-0.01%	0.02%
Recognition of asset (gains)/losses	0.39%	0.01%
Salary experience	-0.41%	0.00%
Retirement experience	-0.01%	0.00%
Withdrawal experience	0.02%	-0.02%
Disability experience	-0.01%	0.00%
Death in Service experience	0.01%	0.00%
Death After Retirement experience	-0.41%	0.03%
New entrants	-0.17%	-0.03%
Data changes and other experience	0.30%	0.32%
Change in actuarial assumptions	0.00%	0.00%
Changes in plan provisions	0.00%	0.00%
Total change	0.22%	0.29%
FY 2017 Actuarial Employer Contribution	27.11%	1.02%

Data changes and other experience includes the increase in the number of covered retirees under RHIC.

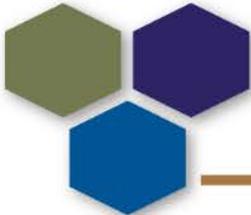


Actuarial Valuation Results

Summary Comments

◆ Public Employees' Retirement System Plans

- ▶ Actuarial employer contribution rates have decreased for FY 2017 compared to FY 2016
 - GRS 2015 replication results and expected 2016 valuation results calculated a lower normal cost rate and actuarial contribution rate
 - Actual plan experience resulted in a net decrease in the actuarial contribution rates compared to the expected rates
 - Asset Experience
 - » The investment rate of return was approximately 0.5% on a market value of assets basis
 - » The investment rate of return was approximately 6.6% on an actuarial value of assets basis
 - » Because the asset return was less than the assumed rate of 8.0%, there was a loss due to assets
 - Liability Experience
 - » There was overall favorable experience which offset the asset losses
- ▶ Statutory contribution rate is lower than the actuarial contribution rates (AVA and MVA) for the Main System
- ▶ Funded ratio changes between July 1, 2015 and July 1, 2016
 - Decreased by about 2% (AVA basis) and 7% (MVA basis) for the Main System
 - Increased by about 5% (AVA basis) and decreased by about 1% (MVA basis) for the Judges System
 - Remained about the same on an AVA basis for the Law Enforcement (LE) Plans and decreased by about 5% for LE with prior Main System service and decreased by about 6% for LE without prior Main System service

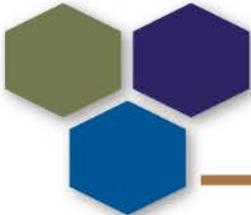


Actuarial Valuation Results

Summary Comments

◆ Highway Patrolmen's Retirement System

- ▶ Actuarial employer contribution rate has increased for FY 2017 compared to FY 2016
 - Updated assumption to reflect projected IRC Section 415 benefit limits increased the contribution rate
 - Actual plan experience resulted in a net increase in the actuarial contribution rate compared to the expected rate
 - Asset Experience
 - » The investment rate of return was approximately 0.5% on a market value of assets basis
 - » The investment rate of return was approximately 6.6% on an actuarial value of assets basis
 - » Because the asset return was less than the assumed rate of 8.0%, there was a loss due to assets
 - Contribution Experience
 - » The statutory contribution rate is lower than the actuarial contribution rate, which caused the actuarial contribution rate for FY 2017 to further increase
 - Liability Experience
 - » Salary increases were lower than assumed
 - » There was favorable death after retirement plan experience
 - » Favorable liability experience partially offset asset and contribution experience losses
- ▶ Statutory contribution rate is lower than the actuarial contribution rates (AVA and MVA)
- ▶ Funded ratio decreased by about 3% on an AVA basis and 8% on an MVA basis between July 1, 2015 and July 1, 2016

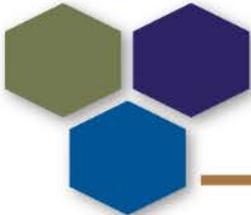


Actuarial Valuation Results

Summary Comments

◆ Retiree Health Insurance Credit Fund

- ▶ Actuarial employer contribution rate has increased for FY 2017 compared to FY 2016
 - The increase in the number of covered retirees included in the valuation due to the plan change to no longer require enrollment in the NDPERS health insurance plan increased the contribution rate.
 - Plan experience, including statutory contributions that were higher than the actuarial rate, slightly offset the increase in the contribution rate due to plan changes
- ▶ Statutory contribution rate is higher than the actuarial contribution rates (AVA and MVA)
- ▶ Funded ratio decreased by about 14% on an AVA basis and 19% on an MVA basis between July 1, 2015 and July 1, 2016

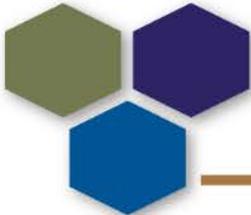


Actuarial Valuation Results

Summary Comments

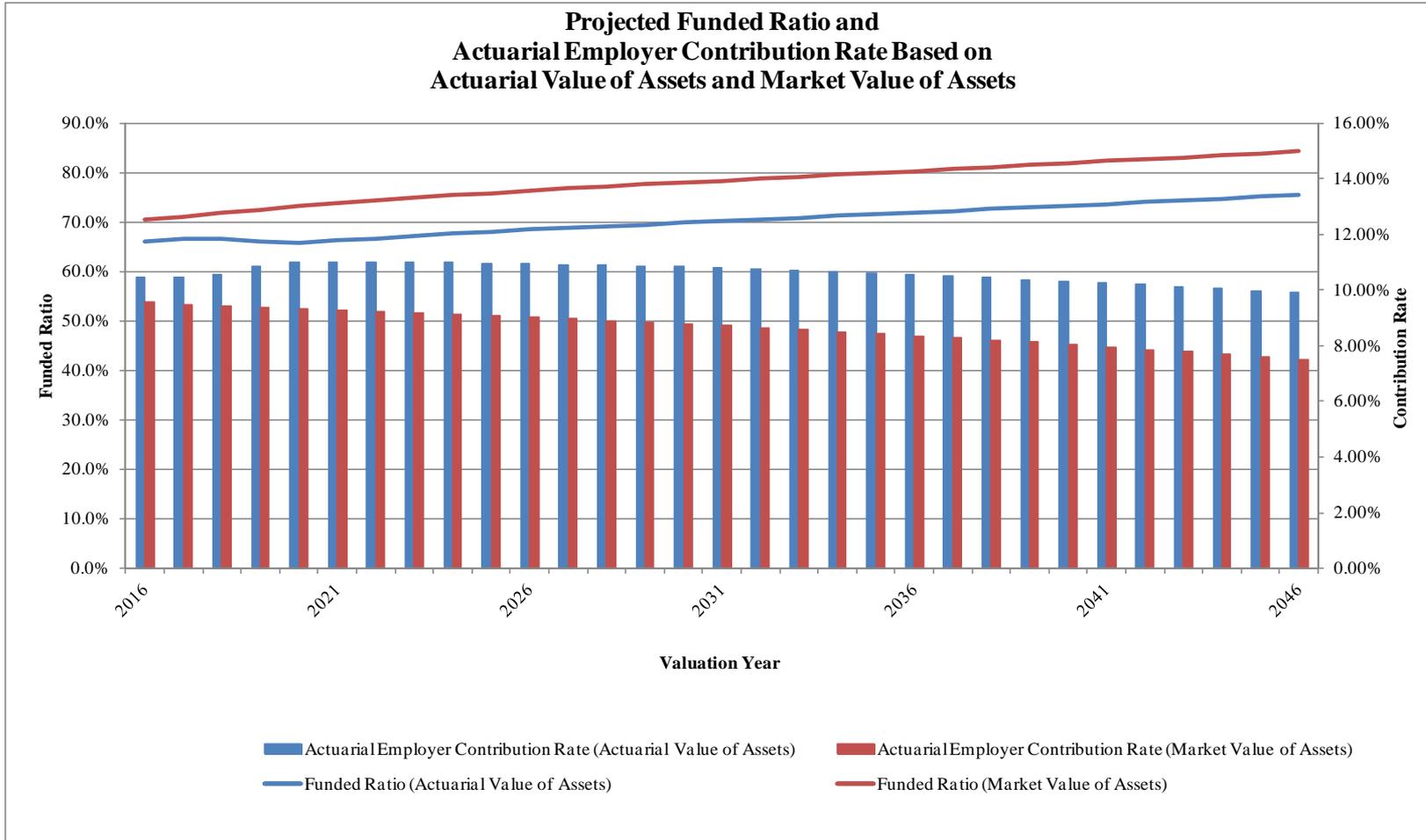
◆ Retirement Plan for Employees of Job Service

- ▶ The plan surplus has increased by about \$4 million from July 1, 2015, to July 1, 2016
 - Asset Experience
 - The investment rate of return was approximately 5.2% on a market value of assets basis
 - The investment rate of return was approximately 8.3% on an actuarial value of assets basis
 - Because the asset return was greater than the assumed rate of 7.0%, there was a gain due to assets
 - Liability Experience
 - There was a COLA gain due to no COLA increases being granted on retiree benefits compared to the actuarial assumption of 3.0%
- ▶ Funded ratio increased by about 8% on an AVA basis and 6% on an MVA basis between July 1, 2015 and July 1, 2016

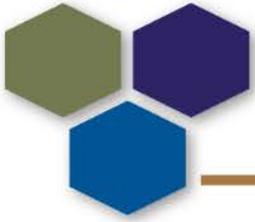


Projection of Actuarial Valuation Results

Main System

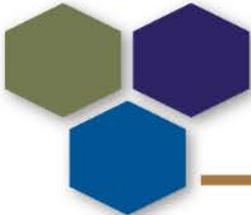


The funded ratio for the Main System is projected to increase after 30 years to 75.4% based on the actuarial value of assets and 84.3% based on the market value of assets under the current benefit provisions (7.12% statutory rate) if all assumptions are realized (including annual investment return of 8.0%).



Current Events Affecting Public Pension Plans

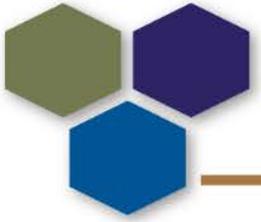




Current Events

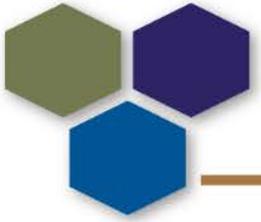
Retirement Environment Today

- ◆ Pension plans are continuing to be impacted by a volatile investment market
- ◆ In general, expectations for future investment returns are decreasing
 - ▶ Plans are decreasing their investment return assumption
 - ▶ Decreases in the investment return assumption increase liabilities and decrease the funded ratio
- ◆ Plan sponsors are making changes to help manage costs
 - ▶ Reducing benefits (for new hires and/or future benefits for current members)
 - ▶ Eliminating or reducing certain provisions (such as COLA and DROP)
 - ▶ Increasing member contributions

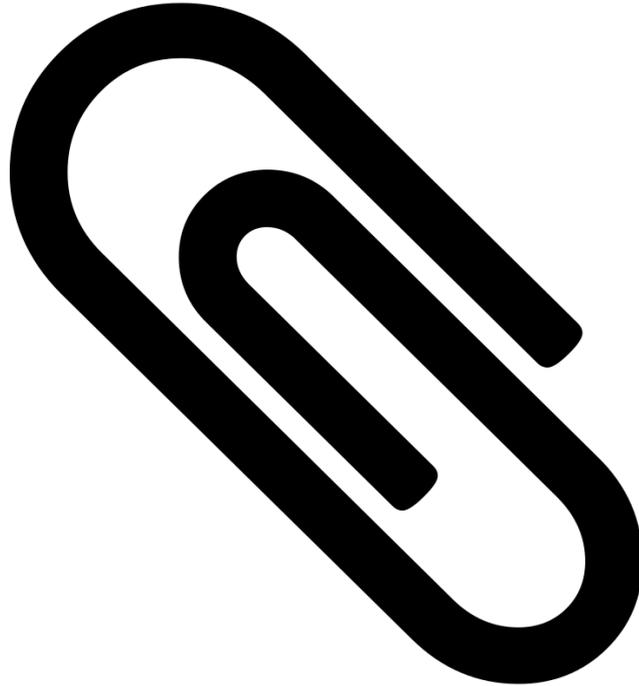


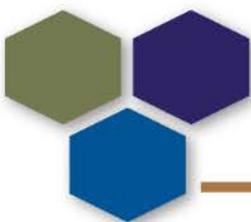
Questions?





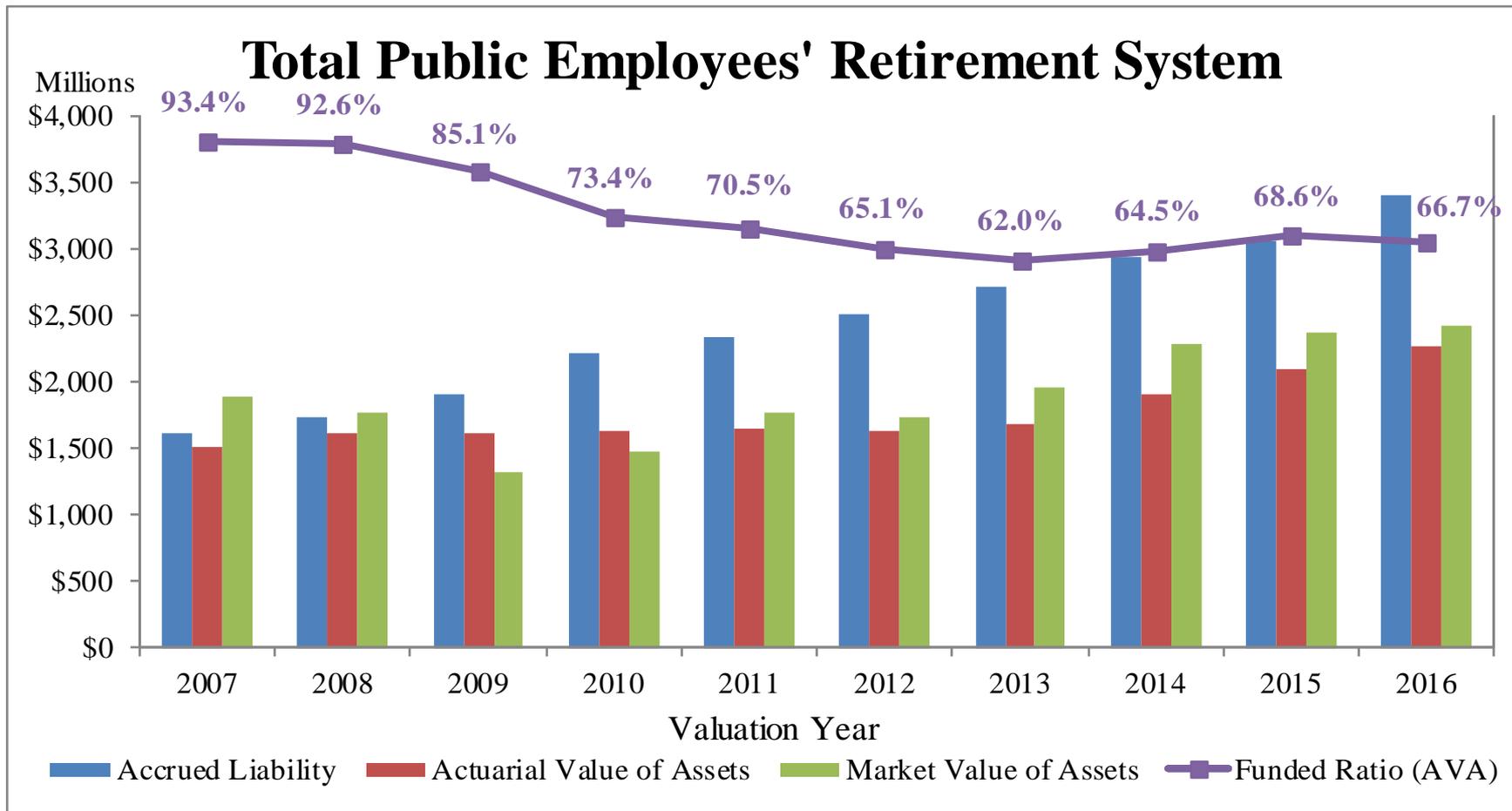
Appendix

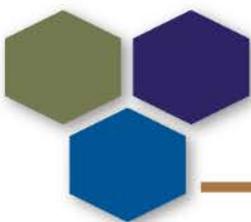




Historical Trends

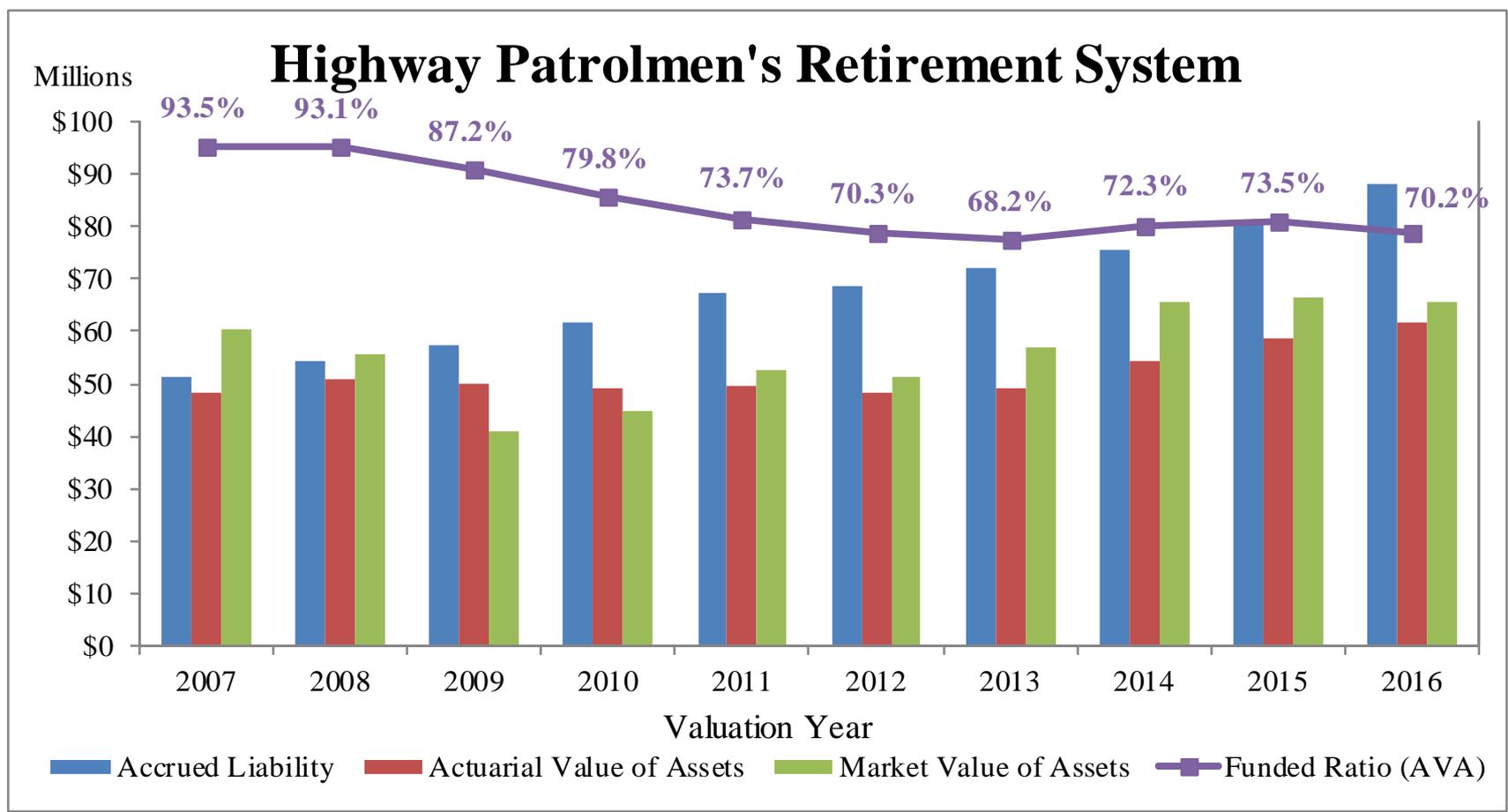
Change in Funded Status

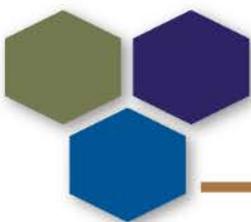




Historical Trends

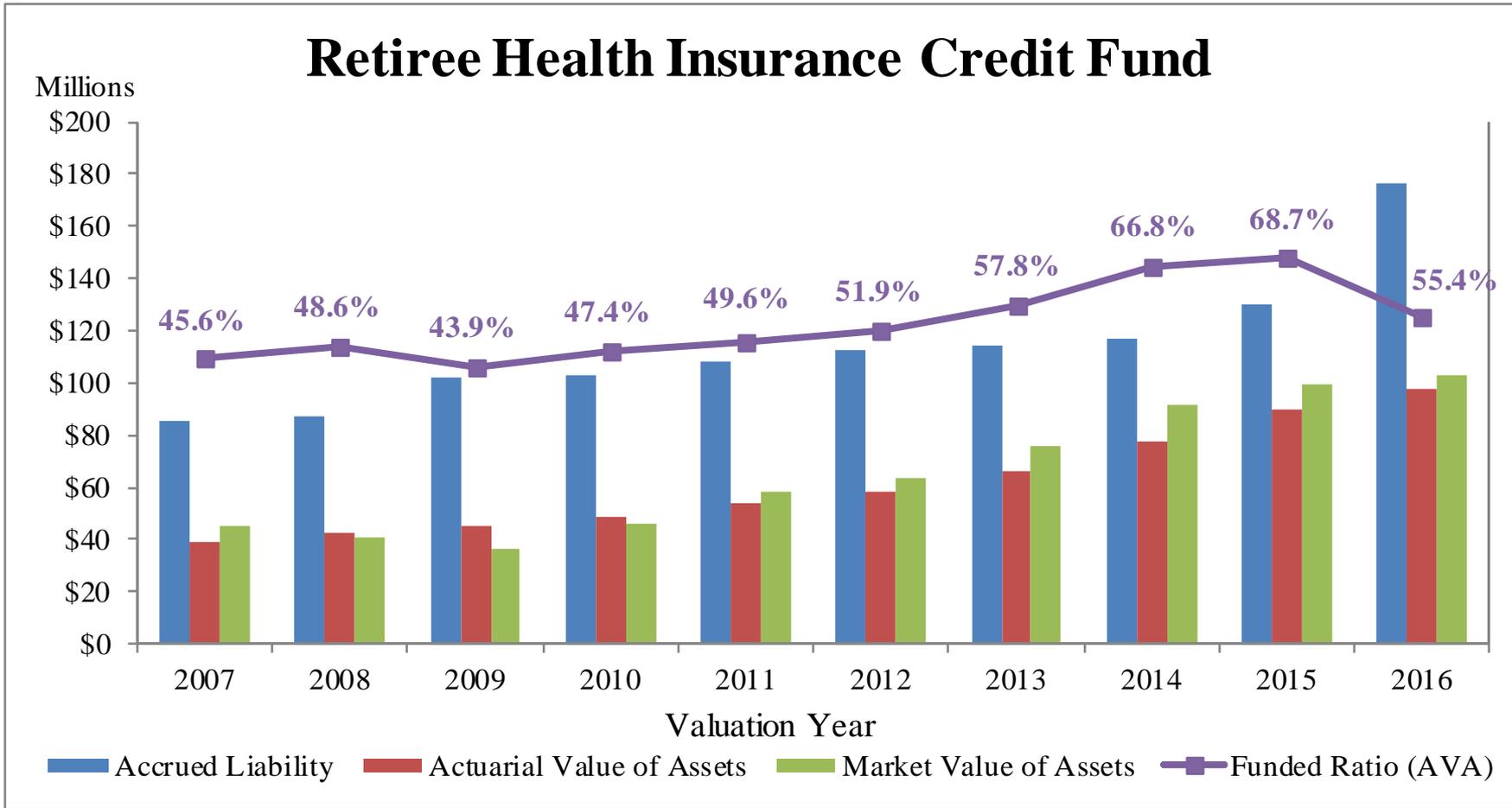
Change in Funded Status

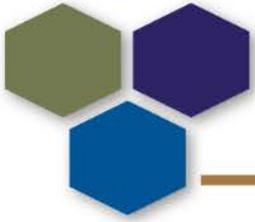




Historical Trends

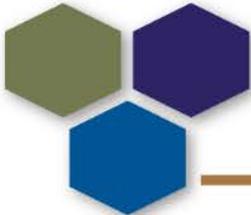
Change in Funded Status





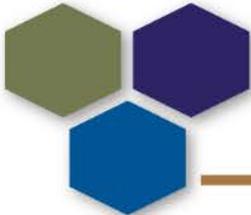
Disclosures





Disclosures

- ◆ This presentation shall not be construed to provide tax advice, legal advice or investment advice.
- ◆ The actuaries submitting this presentation (Lance Weiss, Amy Williams, and Alex Rivera) are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.
- ◆ The purposes of the actuarial valuation are to measure the financial position of the North Dakota Public Employees' Retirement System, calculate the actuarial employer contribution rates and provide actuarial reporting and disclosure information for financial reporting.
- ◆ The assumptions used in the calculation of the July 1, 2016 actuarial valuation results are the same as those used in the July 1, 2015 actuarial valuation (except as described) and were provided by, and are the responsibility of, the NDPERS Board. GRS was unable to judge the reasonableness of the actuarial assumptions and methods without performing a substantial amount of additional work beyond the scope of the assignment, and did not do so.



Disclosures

- ◆ Future actuarial measurements may differ significantly from the current and projected measurements presented in this presentation due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.
- ◆ This is one of multiple documents comprising the actuarial reports for the NDPERS Plans. Additional information regarding actuarial assumptions and methods and important additional disclosures are provided in the Actuarial Valuation Reports as of July 1, 2016.
- ◆ If you need additional information to make an informed decision about the contents of this presentation, or if anything appears to be missing or incomplete, please contact us before relying on this presentation.