



COMMONWEALTH OF PENNSYLVANIA

STATE EMPLOYEES' RETIREMENT SYSTEM

DECEMBER 31, 2017 ACTUARIAL VALUATION -

KEY RESULTS

SERS BOARD MEETING – APRIL 25, 2018

State Employees' Retirement System
Valuation Highlights

	<u>December 31, 2017</u>	<u>December 31, 2016</u>
	<u>Valuation</u>	<u>Valuation</u>
Summary of Employer Contributions as a Percent of Total Compensation		
SERS Plan Contribution		
Normal Cost	4.88%	4.91%
Amortization of Liabilities	28.02%	28.31%
Total SERS Plan Contribution	32.90%	33.22%
Benefits Completion Plan Contribution	0.03%	0.02%
Total Contribution	32.93%	33.24%

Demographic Characteristics of the Population

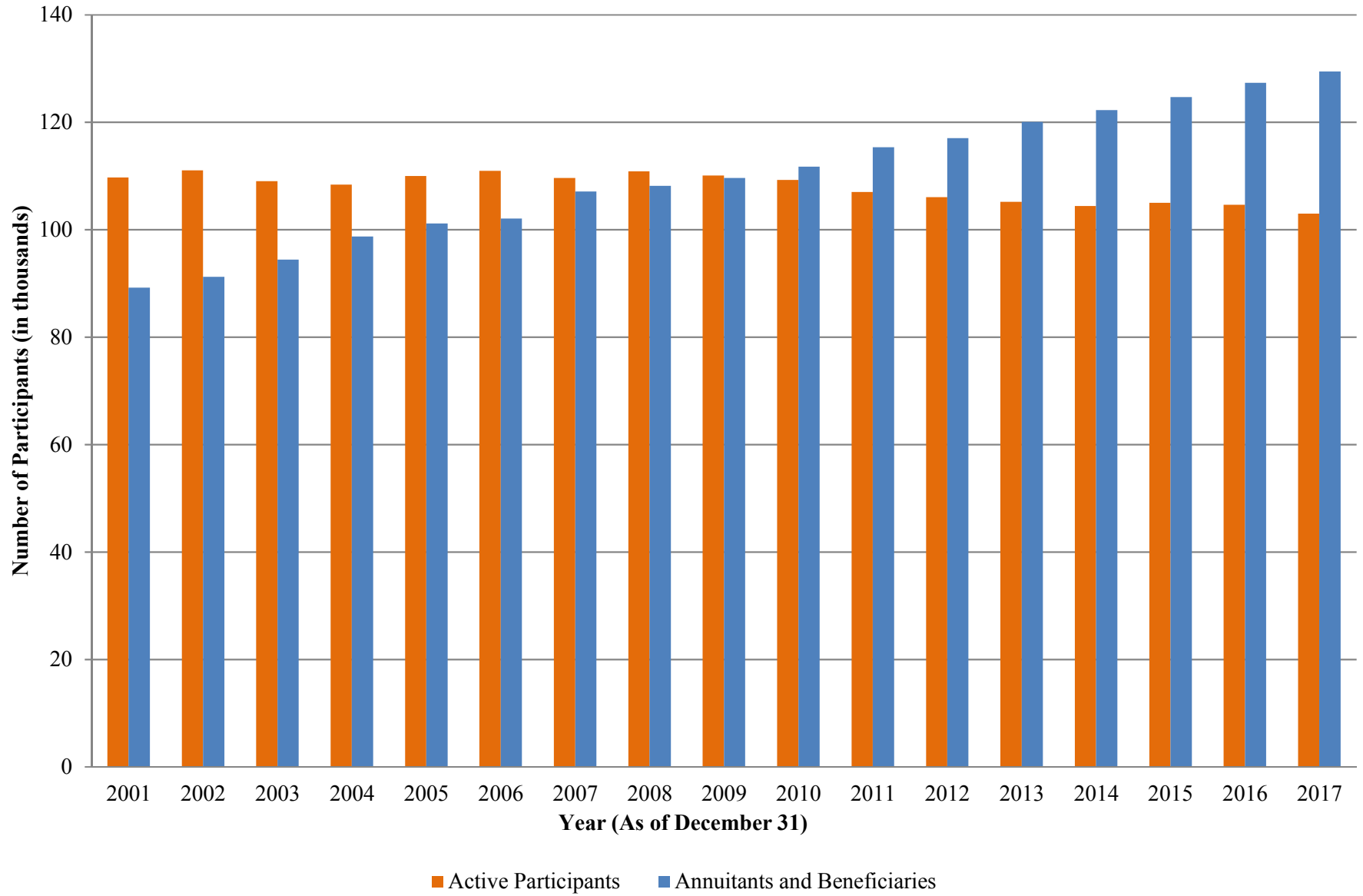
Active Participants:		
Number	102,978	104,632
Average age	46.4	46.3
Average service	11.4	11.4
Average annualized compensation	\$ 58,113	\$ 56,499
Total annualized compensation	\$ 5,984,361,000	\$ 5,911,603,000
Funding payroll	\$ 6,265,071,000	\$ 6,187,427,000

Annuitants and Beneficiaries:		
Number	129,473	127,338
Average age	69.3	69.1
Total annual pension	\$ 2,909,332,491	\$ 2,795,080,772

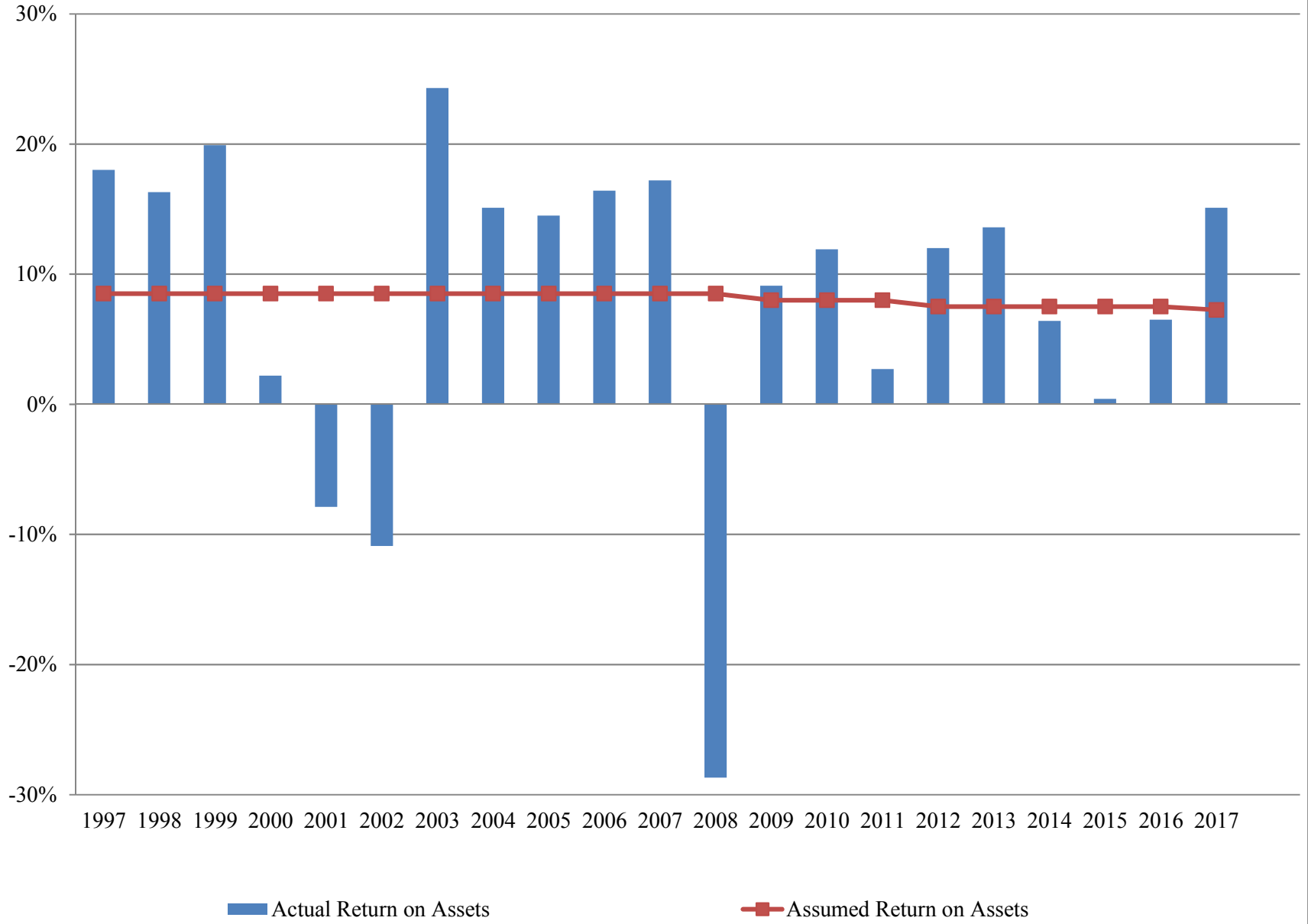
Inactive and Vested Participants:		
Number	6,815	7,133

	Assets	
Market Value of Assets	\$ 29,402,766,141	\$ 26,384,295,023
Actuarial Value of Assets	\$ 28,776,938,767	\$ 27,596,048,090
Funded Status (Market Assets)	60.7%	55.5%
Funded Status (Actuarial Assets)	59.4%	58.1%

SERS Participation
Pensioner Count First Exceeded Active Count in 2010



SERS Historical Annual Investment Returns



State Employees' Retirement System

Employer Contribution Rate by Group Fiscal Year 2018 - 2019

	<u>SERS Plan</u>	<u>Benefits Completion Plan</u>	<u>Legacy Subtotal</u>	<u>Defined Contribution Plan</u>	<u>Total</u>
Class A-5 Members:	16.14%	0.03%	16.17%	2.25%	18.42%
Class A-6 Members:	16.39%	0.03%	16.42%	2.00%	18.42%
DC Plan Only Members:	14.89%	0.00%	14.89%	3.50%	18.39%
Class A-3 and A-4 Members:					
Age 65 Retirement	23.91%	0.03%	23.94%	0.00%	23.94%
Age 55 Retirement	26.35%	0.03%	26.38%	0.00%	26.38%
Park Rangers	26.34%	0.03%	26.37%	0.00%	26.37%
Capitol Police	26.34%	0.03%	26.37%	0.00%	26.37%
State Police	42.85%	0.03%	42.88%	0.00%	42.88%
Class AA Members:					
Age 60 Retirement	34.60%	0.03%	34.63%	0.00%	34.63%
Age 50 Retirement	38.13%	0.03%	38.16%	0.00%	38.16%
Park Rangers	37.88%	0.03%	37.91%	0.00%	37.91%
Capitol Police	37.88%	0.03%	37.91%	0.00%	37.91%
Enforcement Officers	38.13%	0.03%	38.16%	0.00%	38.16%
Class A Members:					
Age 60 Retirement	27.68%	0.03%	27.71%	0.00%	27.71%
Age 50 Retirement	30.51%	0.03%	30.54%	0.00%	30.54%
Park Rangers	30.41%	0.03%	30.44%	0.00%	30.44%
Capitol Police	30.41%	0.03%	30.44%	0.00%	30.44%
State Police	47.50%	0.03%	47.53%	0.00%	47.53%
Enforcement Officers	30.51%	0.03%	30.54%	0.00%	30.54%
Class D-4 Legislators	45.76%	0.03%	45.79%	0.00%	45.79%
Class E Members	43.87%	0.03%	43.90%	0.00%	43.90%

The above group rates result in employer contribution rates (expressed as a percentage of total projected covered compensation for active members in fiscal year 2018-2019) of 32.90% for the SERS DB Plan, 0.03% for the Benefits Completion Plan and 32.93% in Total for the DB Plan.

State Employees' Retirement System
Unfunded Liability and Normal Cost as of December 31, 2017

I.	Present Value of Benefits:	
	A) Active and Inactive Participants	
	1) Superannuation and Withdrawal	\$ 26,178,834,063
	2) Disability	892,428,715
	3) Death	824,408,809
	4) Refunds	64,807,641
	5) Special Police and Enforcement Officer Benefits	-
	6) Subtotal	<u>\$ 27,960,479,228</u>
	B) Annuitants and Beneficiaries	<u>27,798,044,799</u>
	C) Total	<u>\$ 55,758,524,027</u>
II.	Present Value of Member and Employer Contributions:	
	A) Employer Portion of Normal Cost	\$ 3,038,712,851
	B) Member Contributions	3,694,181,908
	C) Administrative Expenses	(271,676,418)
	D) Fiscal Year Amortization Payable	<u>857,902,190</u>
	E) Total	<u>\$ 7,319,120,531</u>
III.	Actuarial Accrued Liability: (I) - (II)	\$ 48,439,403,496
IV.	Actuarial Value of Assets	\$ 28,776,938,767
V.	Unfunded Liability (III) - (IV)	\$ 19,662,464,729
VI.	Employer Normal Cost Rate	
	A) Total Normal Cost Rate for new active members to fund:	
	1) Superannuation and Withdrawal	9.67%
	2) Disability	0.72%
	3) Death	0.39%
	4) Refunds	<u>0.35%</u>
	5) Total	11.13%
	B) Member Contribution Rate	6.25%
	C) Employer Normal Cost Rate (A) - (B)	4.88%

State Employees' Retirement System
Employer Contribution Rate in Fiscal Year 2018 - 2019

	<u>Funding Period</u>		Initial Amount of Liability	Outstanding Balance as of 12/31/17	Annual Payment Amount	Payment as a Percent of Compensation*
	Initial Years	From July 1				
I. Amortization of Liability (Asset) For:						
A) Liability Fresh Start	30	2010	\$5,592,323,524	\$5,033,113,021	\$464,496,726	7.41%
B) Changes in 2010	30	2011	4,192,690,873	3,837,457,967	347,736,022	5.55%
C) Changes in 2011	30	2012	5,018,078,343	4,663,955,282	415,609,788	6.63%
D) Changes in 2012	30	2013	3,244,242,829	3,060,379,838	268,554,153	4.29%
E) Changes in 2013	30	2014	344,271,135	329,210,698	28,483,800	0.45%
F) Changes in 2014	30	2015	482,239,376	466,943,355	39,879,267	0.64%
G) Changes in 2015	30	2016	1,522,849,789	1,491,586,530	125,874,260	2.01%
H) Changes in 2016	30	2017	740,369,408	732,877,152	61,169,038	0.98%
I) Changes in 2017	30	2018	46,940,886	<u>46,940,886</u>	<u>3,878,238</u>	<u>0.06%</u>
Total				\$ 19,662,464,729	\$ 1,755,681,292	28.02%
II. Employer Normal Cost						4.88%
III. Total Employer Cost = (I) + (II)						32.90%

* The payment is expressed as a percentage of the total projected covered compensation for active members in fiscal year 2018-2019 of \$6,265,071,000. Percentages may not add due to rounding.

SERS Historical Employer Contribution Rates

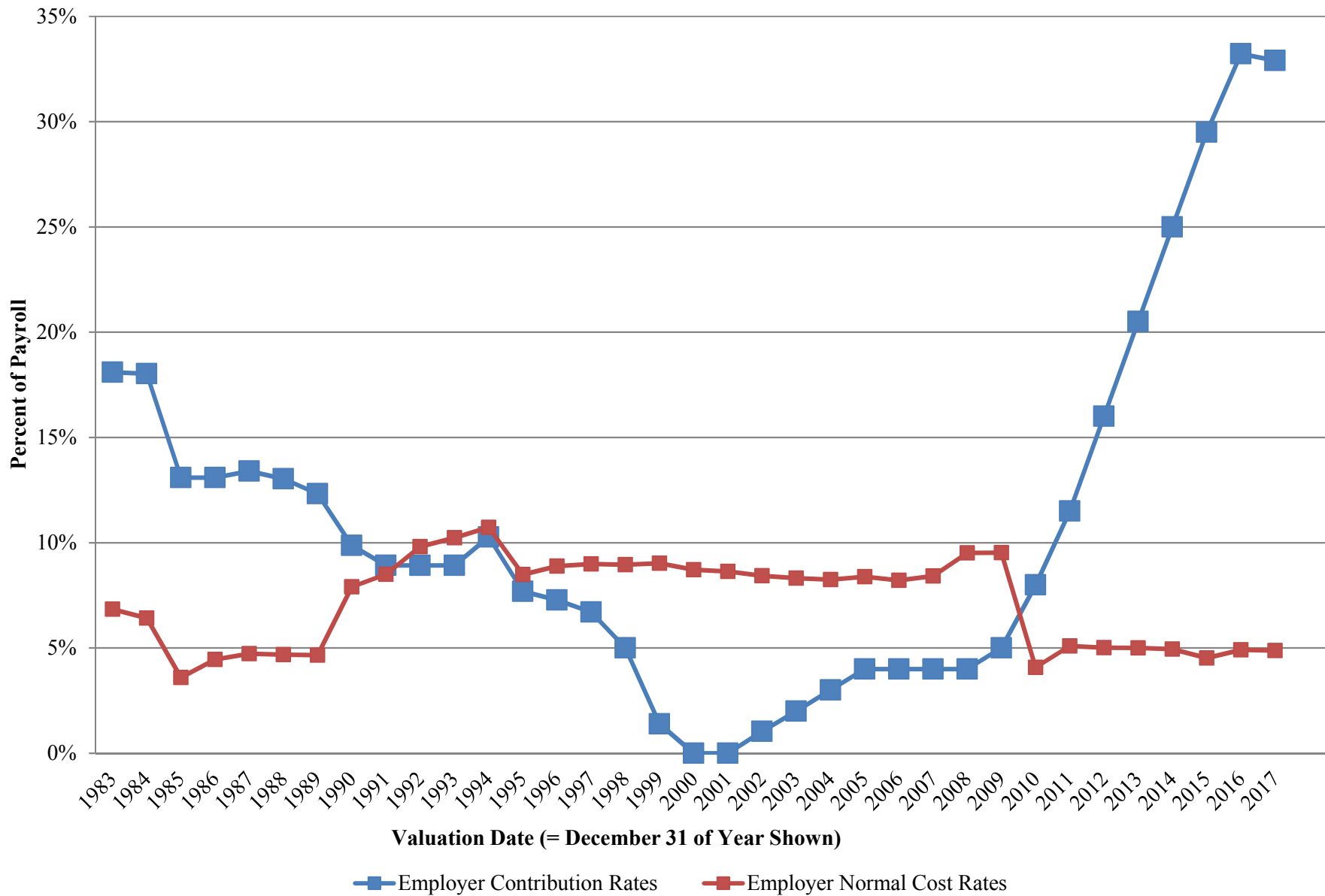


Exhibit 1: GASB 67
SERS December 31, 2017 Changes in the Net Pension Liability

	SERS		
	Increase/(Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances as of December 31, 2016	\$ 45,648,214,610	\$ 26,387,889,157	\$ 19,260,325,453
Changes for the Year:			
1 Service Cost*	\$ 961,156,312	N/A	\$ 961,156,312
2 Interest**	\$ 3,261,521,208	N/A	\$ 3,261,521,208
3 Changes of Benefit Terms	\$ -	N/A	\$ -
4 Differences Between Expected and Actual Experience	\$ 129,401,598	N/A	\$ 129,401,598
5 Changes of Assumptions***	\$ -	N/A	\$ -
6a Contributions - Employer (Proportionate Share Employers)	N/A	\$ 1,880,354,317	\$ (1,880,354,317)
6b Contributions - Employer (Other Employers)	N/A	\$ 3,186,819	\$ (3,186,819)
6c Contributions - Employer (Other - Transfers, etc.)	N/A	\$ 13,862,601	\$ (13,862,601)
7 Contributions - Member	N/A	\$ 383,359,368	\$ (383,359,368)
8 Net Investment Income	N/A	\$ 4,066,055,042	\$ (4,066,055,042)
9 Benefit Payments, Including Refunds of Member Contributions	\$ (3,303,542,815)	\$ (3,303,542,815)	\$ -
10 Plan Administrative Expenses	N/A	\$ (26,122,183)	\$ 26,122,183
11 Other Changes	N/A	\$ -	\$ -
Net Changes	\$ 1,048,536,303	\$ 3,017,153,149	\$ (1,968,616,846)
Balances as of December 31, 2017	\$ 46,696,750,913	\$ 29,405,042,306	\$ 17,291,708,607

* The Service Cost is the sum of all of the individual costs of benefits expected to accrue during the upcoming one-year period.

** 7.25% interest is applied for a full year on beginning TPL and Service Cost and for a half year on Benefit Payments.

*** Effective December 31, 2016, the interest rate was reduced from 7.5% to 7.25% and inflation was reduced from 2.75% to 2.60%.

Plan Fiduciary Net Position as a Percentage of the TPL	62.97%
Covered-Employee Payroll	\$ 5,984,361,000
SERS's NPL as a Percentage of Covered-Employee Payroll	288.9%

State Employees' Retirement System
Accounting Disclosure Statements (continued)

I. Schedule of Funding Progress as of December 31, 2017

(Dollars in Thousands)

Note: This table is included in this report **FOR INFORMATION PURPOSES**; it is no longer a required disclosure under GASB.

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded Actuarial Accrued Liability (UAAL) (b-a)	Funded Ratio (a) / (b)	Funding Payroll (c)	Unfunded Actuarial Accrued Liability as a Percentage of Funding Payroll ((b-a)/c)
12/31/1998	20,670,711	18,357,899	(2,312,812)	112.6%	4,446,147	-52.0%
12/31/1999	23,624,267	19,091,840	(4,532,427)	123.7%	4,519,112	-100.3%
12/31/2000*	26,094,306	19,702,278	(6,392,028)	132.4%	4,769,180	-134.0%
12/31/2001	27,505,494	23,658,757	(3,846,737)	116.3%	4,872,375	-78.9%
12/31/2002	27,497,464	25,285,589	(2,211,875)	108.7%	5,093,454	-43.4%
12/31/2003	27,465,615	26,179,761	(1,285,854)	104.9%	4,965,360	-25.9%
12/31/2004	26,900,027	27,999,026	1,099,000	96.1%	5,093,573	21.6%
12/31/2005*	26,793,782	28,851,716	2,057,934	92.9%	5,138,377	40.1%
12/31/2006	28,148,834	30,364,997	2,216,163	92.7%	5,661,675	39.1%
12/31/2007	30,839,877	31,753,971	914,093	97.1%	5,529,069	16.5%
12/31/2008**	30,635,621	34,437,396	3,801,775	89.0%	5,660,319	67.2%
12/31/2009	30,204,693	35,797,017	5,592,324	84.4%	5,935,988	94.2%
12/31/2010*	29,443,945	39,179,594	9,735,649	75.2%	5,851,704	166.4%
12/31/2011***	27,618,461	42,281,862	14,663,401	65.3%	5,890,704	248.9%
12/31/2012	25,302,688	43,055,564	17,752,876	58.8%	5,836,402	304.2%
12/31/2013	25,975,185	43,874,580	17,899,395	59.2%	5,897,627	303.5%
12/31/2014	26,584,948	44,750,670	18,165,722	59.4%	6,021,688	301.7%
12/31/2015*	26,877,127	46,328,929	19,451,802	58.0%	6,255,189	311.0%
12/31/2016****	27,596,048	47,518,964	19,922,916	58.1%	6,187,427	322.0%
12/31/2017	28,776,939	48,439,403	19,662,465	59.4%	6,265,071	313.8%

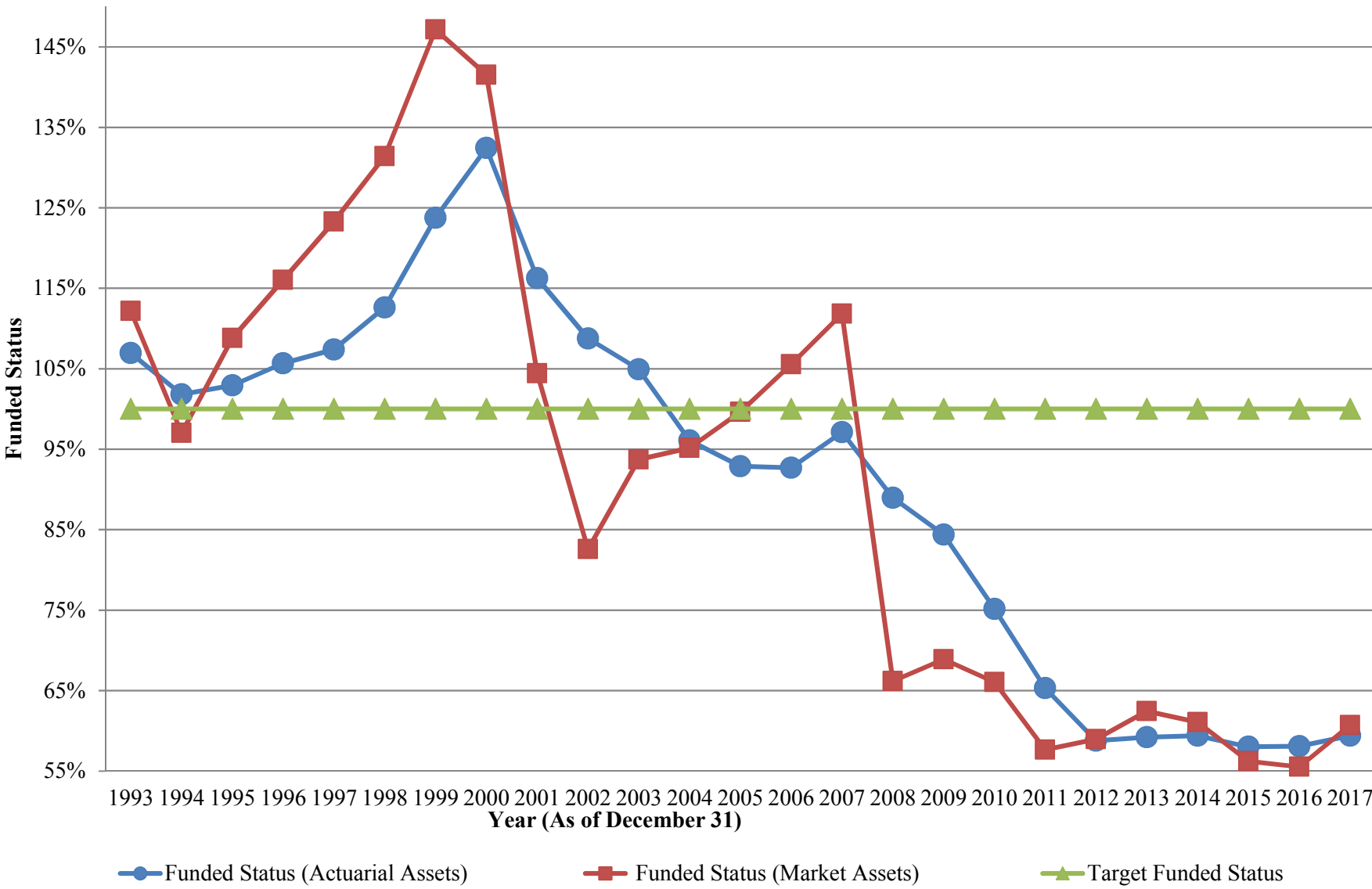
* Revised economic and demographic assumptions due to experience review.

** Revised interest rate assumption from 8.5% to 8.0%.

*** Revised interest rate assumption from 8.0% to 7.5%.

**** Revised interest rate assumption from 7.5% to 7.25%.

**SERS Historical Funded Status =
Assets / Actuarial Accrued Liability**



State Employees' Retirement System
Accounting Disclosure Statements (continued)

II. Schedule of Employer Contributions as of December 31, 2017

(Dollars in Thousands)

Note: This table is included in this report **FOR INFORMATIONAL PURPOSES**; it is no longer a required disclosure under GASB.

Calendar Year	Annual Required Contribution (ARC)	Actual Contribution	Percentage Contributed
1998	310,501	310,501	100.0%
1999	269,869	269,869	100.0%
2000	168,002	168,002	100.0%
2001	52,104	76,709	147.2%
2002	22,906	50,831	221.9%
2003	55,079	67,947	123.4%
2004	105,229	105,229	100.0%
2005	319,190	147,163	46.1%
2006	548,745	195,407	35.6%
2007	617,253	242,337	39.3%
2008	584,248	233,138	39.9%
2009	643,861	251,870	39.1%
2010	866,822	272,525	31.4%
2011	913,778	391,189	42.8%
2012	1,044,632	562,883	53.9%
2013	1,314,925	790,996	60.2%
2014	1,407,361	1,081,826	76.9%
2015	1,469,116	1,359,246	92.5%
2016	1,613,626	1,613,626	100.0%
2017	1,883,541	1,883,541	100.0%

Notes Pertaining to Governmental Accounting Standards Board Statement No. 25 (Although Statement 25 has been replaced by Statement 67, the Statement 25 notes below and on the following pages are provided FOR INFORMATIONAL PURPOSES.)

The actual contribution amounts in the above table include the employer share of regular contributions, the employer share of purchased service and contributions for employee service under the Public School Employees' Retirement System.

The information presented above was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial funding valuation follows.

State Employees' Retirement System
Actuarial Value of Assets

I.	Development of 12/31/17 Expected Actuarial Value:	
	A) Actuarial Value as of 12/31/16	\$ 27,596,048,090
	B) Contributions in 2017	2,279,865,622
	C) Benefits and Expenses in 2017	(3,327,423,357)
	D) Investment return at 7.25% to 12/31/17 on (A)	2,000,713,487
	E) Investment return at 7.25% to 12/31/17 on (B) and (C):	<u>(37,973,968)</u>
	7.25% x .5 x ((B) + (C))	
	F) Expected Actuarial Value as of 12/31/17:	\$ 28,511,229,874
	(A) + (B) + (C) + (D) + (E)	
II.	Previous Differences Not Yet Amortized:	
	A) Unrecognized amount of 12/31/13 Difference:	\$ 378,167,667
	.2 x \$1,890,838,336	
	B) Unrecognized amount of 12/31/14 Difference:	(171,646,870)
	.4 x (\$429,117,174)	
	C) Unrecognized amount of 12/31/15 Difference:	(1,112,696,887)
	.6 x (\$1,854,494,812)	
	D) Unrecognized amount of 12/31/16 Difference:	<u>(305,576,977)</u>
	.8 x (\$381,971,221)	
	E) Total	\$ (1,211,753,067)
III.	Gain or Loss from 2017	
	A) Market Value of Assets on 12/31/17	\$ 29,402,766,141
	B) Expected Market Value II(E) + I(F)	<u>27,299,476,807</u>
	C) Gain (loss) from 2017 Investments (A) - (B)	\$ 2,103,289,334
IV.	Development of Actuarial Value of Assets as of 12/31/17:	
	A) 20% of \$1,890,838,336 (12/31/13 Difference):	\$ 378,167,667
	B) 20% of (\$429,117,174) (12/31/14 Difference):	(85,823,435)
	C) 20% of (\$1,854,494,812) (12/31/15 Difference):	(370,898,962)
	D) 20% of (\$381,971,221) (12/31/16 Difference):	(76,394,244)
	E) 20% of \$2,103,289,334 (12/31/17 Difference):	<u>420,657,867</u>
	F) Total Difference:	\$ 265,708,893
	(A) + (B) + (C) + (D) + (E)	
	G) Actuarial Value at 12/31/17: I(F) + IV(F)	\$ 28,776,938,767

**SERS Actuarial (5-Year Smoothed) & Market
Values of Assets**

