



Pennsylvania Public School Employees' Retirement System

June 30, 2016 Actuarial Valuation
Board Presentation
December 7, 2016



Disclosures

The information contained herein is developed for the Board of Trustees and Staff of PSERS by Buck Consultants, LLC using generally accepted actuarial principles and techniques in accordance with all applicable Actuarial Standards of Practice (ASOPs). This document provides key results of the June 30, 2016 actuarial valuation. Interested parties may refer to the full June 30, 2016 Actuary's Report, which is scheduled to be released in January 2017, for a detailed explanation regarding data, assumptions, methods, and plan provisions that underlie the valuation results. In the interim, interested parties may refer to the full Actuary's Report on the June 30, 2015 actuarial valuation for a detailed explanation regarding assumptions, methods and plan provisions that underlie the valuation and the Actuary's Report on the experience review for the period July 1, 2010 to June 30, 2015 (dated August 15, 2016) which provides a summary of the assumptions that have been changed effective for the June 30, 2016 valuation.

The material contained herein is based on member and financial data, actuarial assumptions and methods, and plan provisions applicable for the June 30, 2016 actuarial valuation of the Pennsylvania Public School Employees' Retirement System. Where presented, historical information is based on the parameters of the corresponding actuarial valuation.

No third party recipient of Buck's work product should rely upon Buck's work product absent involvement of Buck or without our approval.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. An analysis of the potential range of future results is beyond the scope of this valuation.

David L. Driscoll is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. Edward Quinn and Salvador Nakar are Members of the American Academy of Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. We are available to answer any questions on the material contained herein, or to provide explanations or further details as may be appropriate.

Agenda

- Overview of 2015 - 2016 fiscal year
- Report on June 30, 2016 valuation results

Overview of 2015/2016 Fiscal Year

- The time-weighted rate of return on the market value of assets was 1.29%
(per Aon Hewitt)
 - Expected return for the period July 1, 2015 to June 20, 2016 was 7.50%
- The Act 120 minimum employer pension rate is the employer normal cost rate
- The Board adopted the recommended changes to the demographic, economic assumptions and optional forms of benefit payment at retirement effective with the June 30, 2016 actuarial valuation
- The proportion of eligible participants who are assumed to elect Premium Assistance coverage was changed from 64% to 63% to reflect a refinement of this estimate per discussions with the Plan Sponsor

Board Adopted Changes in Demographic, Economic Assumptions and Optional Forms of Benefit Payment at Retirement

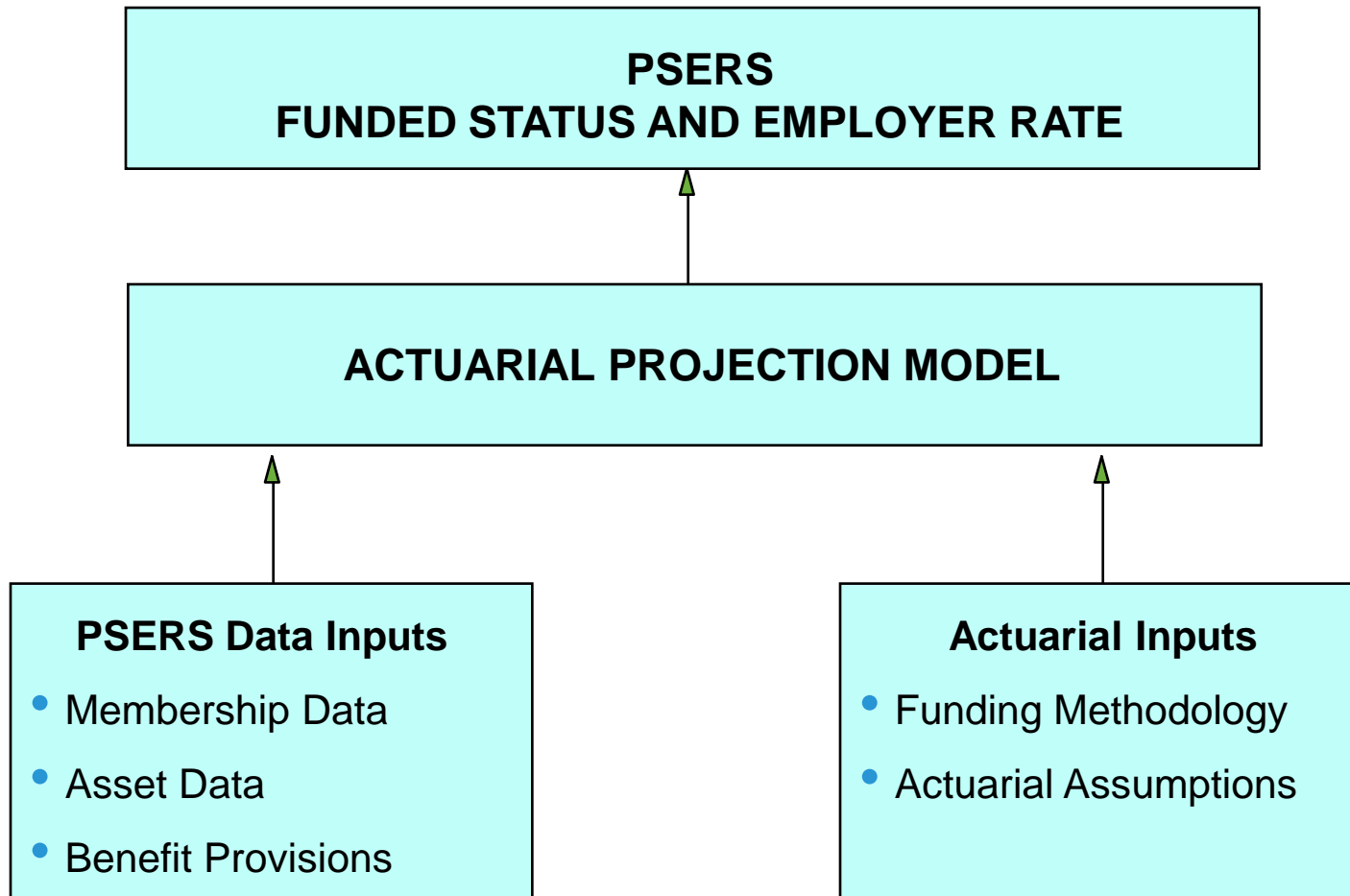
- Effective beginning June 30, 2016 valuation
- Economic Assumptions
 - Investment Rate of Return: Reduce from 7.50% to 7.25%
 - Inflation: Reduce from 3.0% to 2.75%
 - Salary Growth: Reduce from (average) 5.50% to 5.00%
- Demographic Assumptions
 - Update the rates of mortality among active members, annuitants & beneficiaries
 - Update the rates of withdrawal, disability and retirement from employment among active members
- Optional Forms of Benefit Payment at Retirement
 - Update the assumption that all eligible retirements will elect the MSLA form of annuity payment to the following distribution of optional forms of annuity payment elections:
 - 50% will elect MSLA
 - 20% will elect Option 1
 - 20% will elect Option 2 (assuming males are 3 years older than females)
 - 10% will elect Option 3 (assuming males are 3 years older than females)
 - 0% will elect Option 4 (annuity payment only)
 - Update the assumption that 100% of retiring Class TC and Class TD members will elect to withdraw all accumulated deductions under the Option 4 form of payment to 80%.

Results of Actuarial Valuation

- Employer contribution rate for fiscal 2017/2018
 - The fiscal year 2017/2018 actuarially determined employer contribution rate is 32.57%
 - 31.74% Pension plus 0.83% Premium Assistance
 - The Act 120 minimum employer pension rate is the normal cost rate of 7.70%

Results of Actuarial Valuation

- Security of promised benefits
 - Accrued liability exceeds actuarial value of assets by \$42.7 billion
 - Funded status based on the System's actuarial value of assets is 57.3%
 - Funded status as of June 30, 2015 based on the System's actuarial value of assets was 60.6%
 - The above funded ratios have no relationship to the possible funded position on a settlement of liabilities basis.
- Net actuarial (gain) or loss
 - Comparison of actual experience to expected
 - Experience loss for fiscal year ended June 30, 2016 is \$2.135 billion
 - Actuarial asset loss of \$2.016 billion
 - Actuarial liability loss of \$0.119 billion
 - Actuarial loss due to Act 120 under-contribution of \$0.531 billion
 - The Increase in the Unfunded Accrued Liability associated with the change in the assumptions is \$2.521 billion



Active Membership Statistics

Item	June 2016	June 2015
Class T - C	3,682	3,974
Class T - D	195,477	207,425
Class T - E	48,628	41,189
Class T - F	<u>9,293</u>	<u>7,280</u>
Total Number	257,080	259,868
	-1.07 %	
Annualized salaries (Total salaries)	\$ 12.851 Bil +1.36 %	\$ 12.678 Bil
Average compensation	\$ 49,989 +2.46 %	\$ 48,787
Average age	45.1 Yrs.	44.9 Yrs.
Average service	11.3 Yrs.	11.1 Yrs.
Funding year	2017-2018	2016-2017
Appropriation payroll (est.)	\$ 13.449 Bil	\$ 13.549 Bil

Annuitant Membership Statistics

<u>Item</u>	<u>June 2016</u>	<u>June 2015</u>
Number		
Annuitants	204,843	200,161
Survivors and beneficiaries*	10,809	10,509
Disabled annuitants	<u>9,176</u>	<u>9,105</u>
Total	224,828	219,775
	2.30%	
Annual annuities		
Annuitants	\$ 5.342 Bil	\$ 5.211 Bil
Survivors and beneficiaries	0.146 Bil	0.137 Bil
Disabled annuitants	<u>0.178 Bil</u>	<u>0.173 Bil</u>
Total	\$ 5.666 Bil	\$ 5.521 Bil
	2.63%	
Average annuities		
Annuitants	\$ 26,081	\$ 26,030
Survivors and beneficiaries	\$ 13,543	\$ 13,066
Disabled annuitants	\$ 19,350	\$ 19,009
Total	\$ 25,203	\$ 25,119
	0.33%	

* Excludes 1,181 beneficiaries in 2016 and 1,446 beneficiaries in 2015 who are only entitled to a lump sum distribution.

Market Value of Assets

<u>Item</u>	<u>June 2016</u>	<u>June 2015</u>
Beginning of year	\$ 51.706 Bil	\$ 53.051 Bil
Contributions	4.292	3.698
Benefits	(6.469)	(6.327)
Investment income	<u>0.428</u>	<u>1.284</u>
End of year	\$ 49.957 Bil	\$ 51.706 Bil
Rate of return	1.29 % <i>(per Aon Hewitt)</i>	3.04 % <i>(per Aon Hewitt)</i>
Expected rate of return*	7.50 %	7.50 %

* Based on prior year's valuation interest rate

Actuarial Value of Assets

Ten-year asset smoothing method

1. Market value of assets 6/30/2016 \$ 49.957 Bil

2. Determination of deferred gain (loss)

Fiscal Year	Gain (Loss)	Percent Deferred	Deferred Amount
2015/2016	\$ (3.794) Bil	90.00 %	\$ (3.414) Bil
2014/2015	(2.918)	80.00	(2.334)
2013/2014	2.864	70.00	2.005
2012/2013	(0.153)	60.00	(0.092)
2011/2012	(3.246)	50.00	(1.623)
2010/2011	4.598	40.00	1.839
2009/2010	1.449	30.00	0.435
2008/2009	(21.138)	17.78	(3.758)
2007/2008	(6.545)	7.50	(0.491)
	<u>\$ (28.883) Bil</u>		<u>\$ (7.433) Bil</u>

3. Actuarial value of assets 6/30/2016

(1) - (2)

\$ 57.390 Bil

Actuarial Cost Method

- PSERS cost method
 - Entry age normal
 - Required by Code
- Entry age normal method: allocation of reserve over members' working lifetime
 - Pension benefit earned during year (normal cost)
 - Payment toward unfunded accrued liability
- Goal: full reserve at retirement

Accrued Liability

	<u>June 2016</u>		
	<u>New Assumptions</u>	<u>Old Assumptions</u>	<u>June 2015</u>
Annuitants and inactive	\$ 57.144 Bil	\$ 55.366 Bil	\$ 54.354 Bil
Active members	<u>42.845</u>	<u>42.102</u>	<u>40.223</u>
Accrued Liability Pension	\$ 99.989	\$ 97.468	\$ 94.577
Health care payments	<u>0.125</u>	<u>0.125</u>	<u>0.121</u>
Total Accrued liability	\$ 100.114 Bil	\$ 97.593 Bil	\$ 94.698 Bil

Unfunded Accrued Liability and Funded Status

<u>Item</u>	<u>June 2016</u>		<u>June 2015</u>
	<u>New Assumptions</u>	<u>Old Assumptions</u>	
Accrued Liability Pension	\$99.898 Bil	\$97.468 Bil	\$94.577 Bil
Healthcare Payments	<u>0.125</u>	<u>0.125</u>	<u>0.121</u>
Total Accrued liability	\$100.114 Bil	\$97.593 Bil	\$94.698 Bil
<u>Assets</u>			
Market value of assets	\$49.957 Bil	\$49.957 Bil	\$51.706 Bil
Actuarial value of assets	\$57.390 Bil	\$57.390 Bil	\$57.362 Bil
<u>Unfunded accrued liability</u>			
Market value of assets*	\$50.157 Bil	\$47.636 Bil	\$42.992 Bil
Actuarial value of assets**	\$42.724 Bil	\$40.203 Bil	\$37.336 Bil
<u>Funded status</u>			
Actuarial value of assets	57.3%	58.8%	60.6%

* Approximate GASB 67 Net Pension Liability.

** Act 120 amortization is over a period of 24 years with amounts increasing as a level percent of compensation.

Employer Contribution Rate

<u>Item</u>	<u>June 2016 (FY17/18)</u>	<u>June 2015 (FY16/17)</u>
Normal cost rate	15.24%	15.83%
Member rate (average)	<u>(7.54)</u>	<u>(7.52)</u>
Employer normal cost rate	7.70%	8.31%
Unfunded accrued liability rate	<u>24.04</u>	<u>20.89</u>
Preliminary pension rate	31.74%	29.20%
Act 120 minimum pension rate (employer normal cost rate)	7.70%	8.31%
Final pension rate	31.74%	29.20%
Health insurance rate	<u>0.83</u>	<u>0.83</u>
Total	32.57%	30.03%

Note: The total employer contribution rate is pension rate plus the health insurance rate.

Funding Methodology

Goal - Full Reserve at Retirement

Benefit	Annual Cost	Rate Component
Projected Retirement Benefit	Level % Pay	Normal Cost Rate
Accrued Benefit:		
(1) Unfunded accrued liability as of the June 30, 2010 valuation	24-Year Amortization Level % Pay	Accrued Liability Rate
(2) Legislation which increase liability (e.g. COLAs or ERI windows)	10-Year Amortization Level % Pay	Supplemental Liability Rate
(3) Actuarial Gains and Losses and Assumption Changes	24-Year Amortization Level % Pay	Experience Adjustment Factor

Unfunded Accrued Liability Rate

<u>Rate Component</u>	<u>June 2016 (FY17/18)</u>	<u>June 2015 (FY16/17)</u>
Accrued liability rate	10.64%	10.41%
Supplemental liability rate	0.00	0.00
Experience adjustment factor	<u>13.40</u>	<u>10.48</u>
Unfunded accrued liability rate	24.04%	20.89%

2016 Net Actuarial Loss

1. Investment return loss ¹	\$	2,016 Mil
Experience (gains) and losses		
- New entrants and pickups		283
- Individual salary increases		(169)
- Mortality		(15)
- Terminations (retirement/disability/terminations/non-vested)		10
- Data/misc		<u>10</u>
- Total	\$	119 Mil
2. Net actuarial experience loss: (1) + (2)	\$	2,135 Mil
3. Act 120 under-contribution	\$	531 Mil
4. Change in Assumptions	\$	2,521 Mil

¹13.92% actuarial rate of return vs. 7.50% expected. Actuarial rate of return based on 10 year averaging of (gains)/losses.

Health Insurance Account 2017/2018 Employer Rate

Estimated number of eligible annuitants in FY 2018/2019	150,800
Estimated number of eligible annuitants who elect coverage	95,004
1. Estimated balance at 6/30/2017	\$ 121.0 Mil
2. Disbursements FY 2017/2018	\$ 115.1
3. Disbursements FY 2018/2019	\$ 116.3
4. Required contribution: (2) + (3) – (1)	\$ 110.4
5. FY 2017/2018 membership payroll	\$ 13,449 Mil
6. Health insurance employer rate: (4) ÷ (5) (rounded up)	0.83%

Notes:

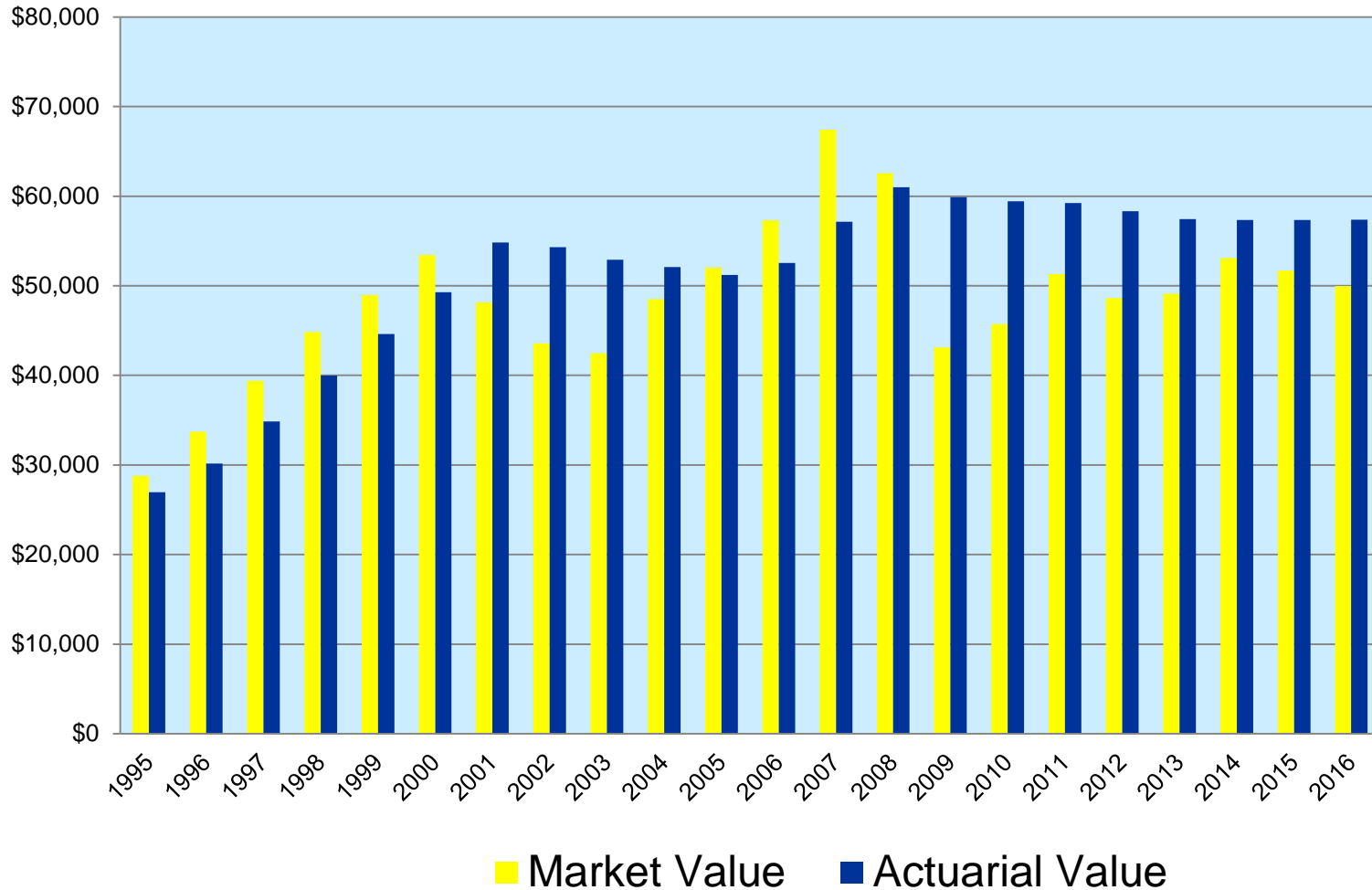
63% of eligible annuitants are assumed to elect coverage. This decreased from the 64% used in the prior valuation.

Actuarial Accrued Liability under GASB 43 is \$1,431 million

Per the most recent financial statement, 88% of the ARC was contributed in fiscal year 2015/2016.

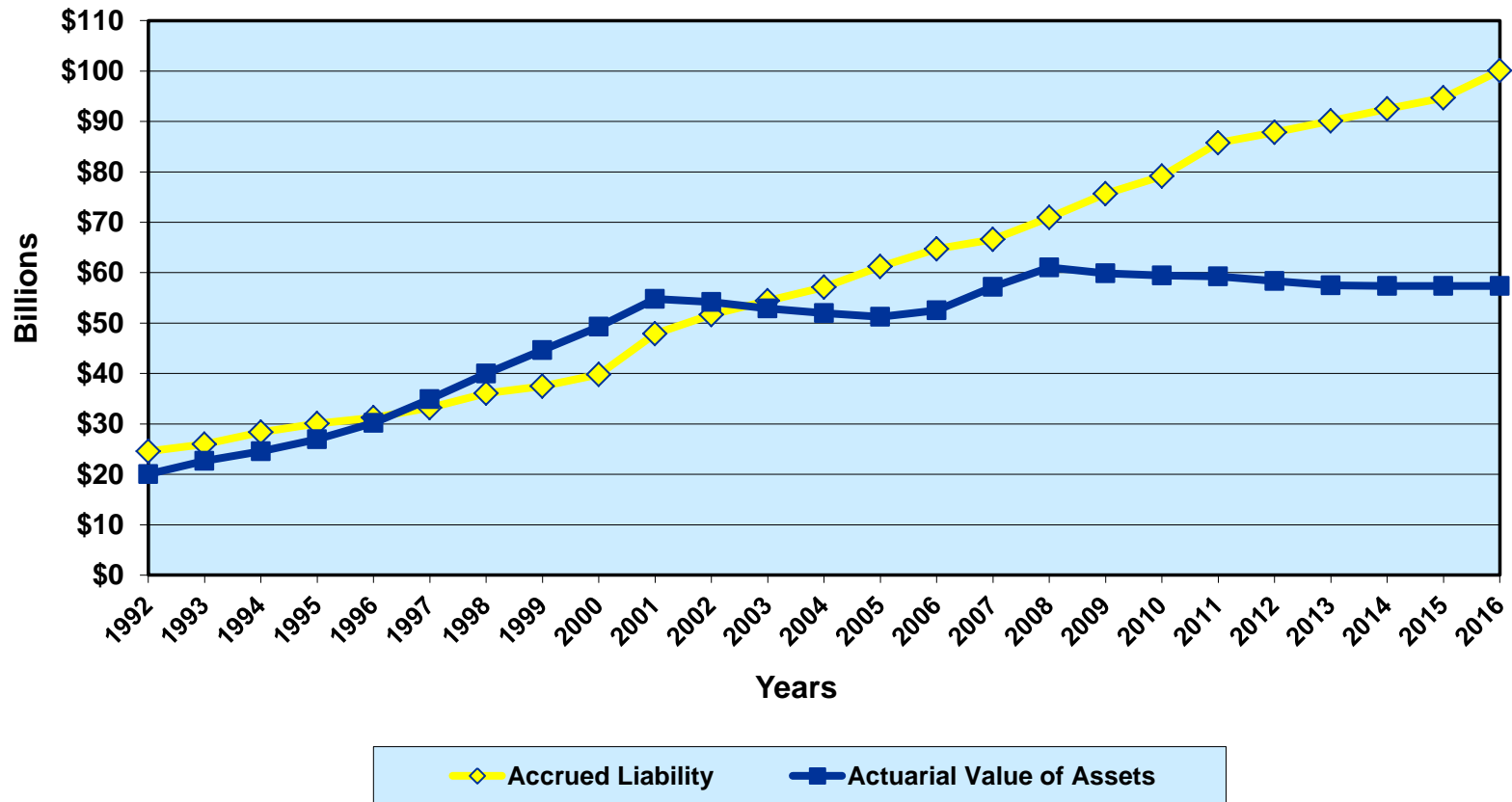
Appendices

Comparison of Asset Values (\$ Millions)



Note: Beginning with the 2010 valuation, the actuarial value of assets reflects the 10-year asset smoothing method enacted by Act 120.

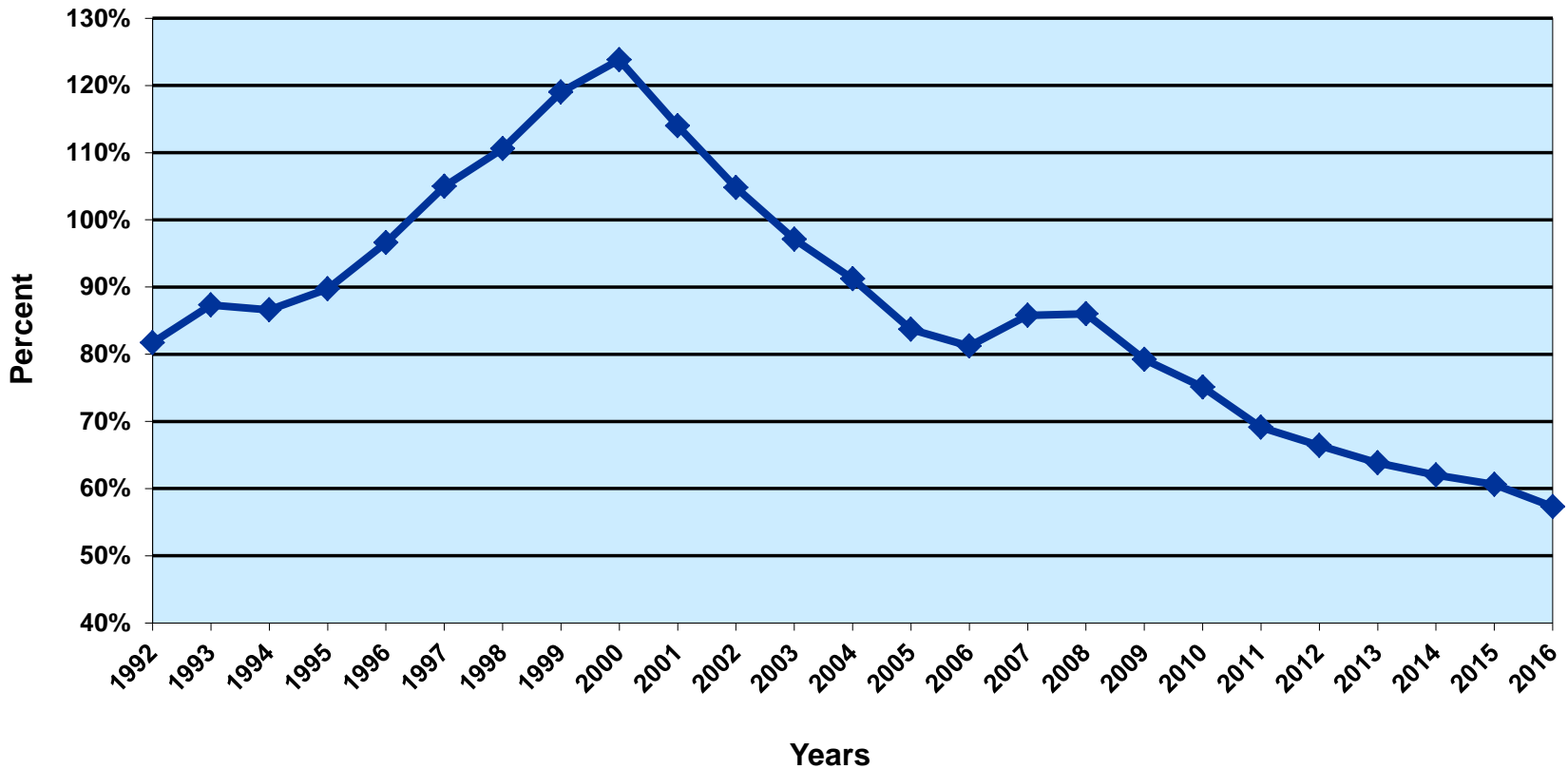
Accrued Liability and Actuarial Value of Assets: 1992 - 2016



Note: Beginning with the 2010 valuation, the actuarial value of assets reflects the 10-year asset smoothing method enacted by Act 120.

Financial Position Funded Status

Actuarial Value of Assets as a % of Accrued Liability: 1992 - 2016



Note: Beginning with the 2010 valuation, the actuarial value of assets reflects the 10-year asset smoothing method enacted by Act 120.

Total Contribution Rate

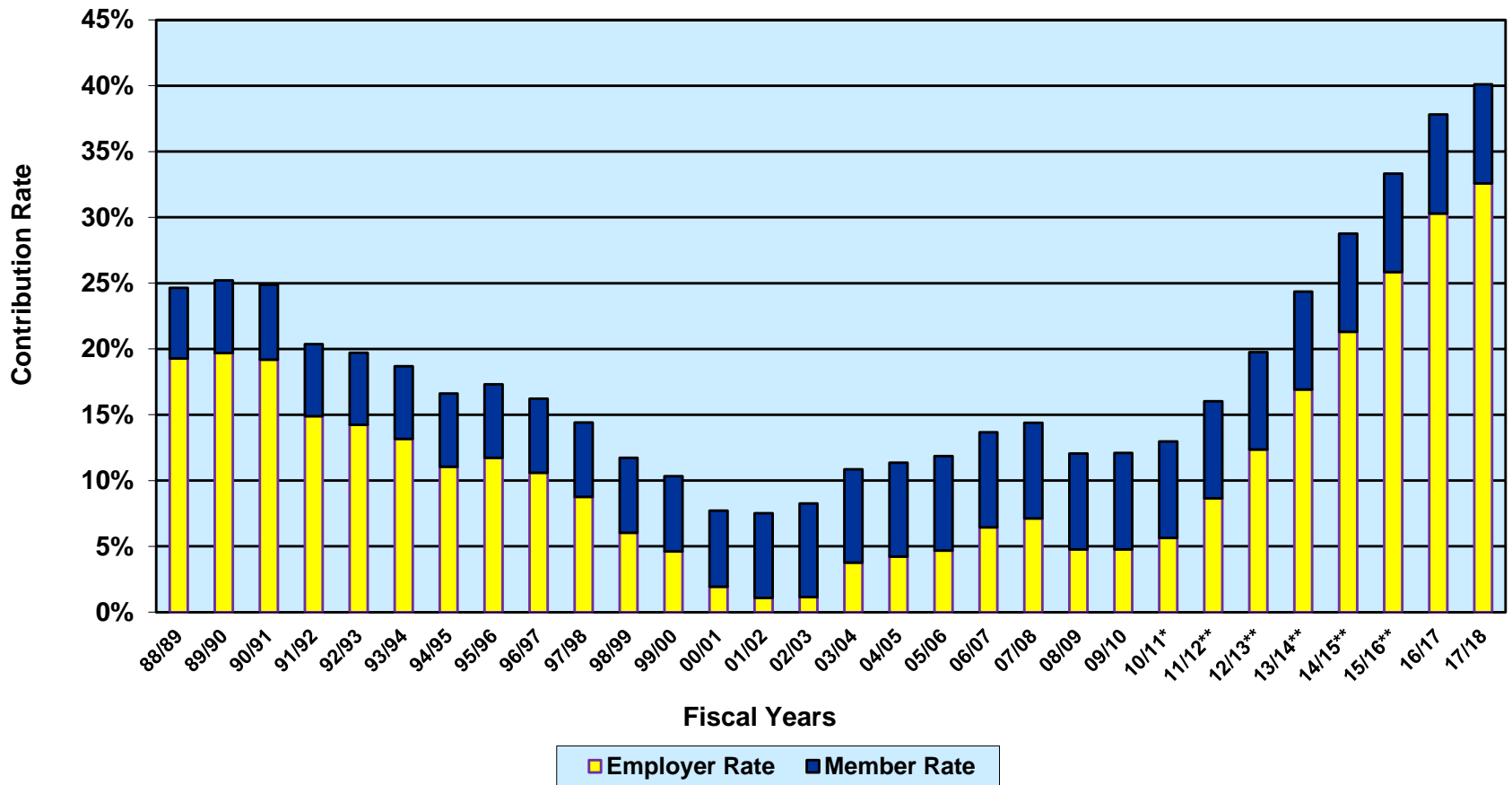
Fiscal Year	Normal Cost	Unfunded Accrued Liability	Health Care Contribution	Total Employer	Member Contribution (Average)*	Total Contribution Rate
17/18	7.70%	24.04%	.83%	32.57%	7.54%	40.11%
16/17	8.31	20.89	.83%	30.03	7.52	37.55
15/16	8.38	19.44	.84	25.84**	7.49	33.33
14/15	8.46	17.51	.90	21.40**	7.46	28.86
13/14	8.57	15.25	.93	16.93**	7.43	24.36
12/13	8.66	12.99	.86	12.36**	7.40	19.76
11/12	8.12	10.15	.65	8.65**	7.37	16.02
10/11	8.08	(0.50)	.64	5.64***	7.34	12.98
09/10	7.35	(3.72)	.78	4.78	7.32	12.10
08/09	6.68	(3.37)	.76	4.76	7.29	12.05
07/08	6.68	(.24)	.69	7.13	7.25	14.38
06/07	6.62	(.95)	.74	6.46	7.21	13.67
05/06	7.61	(4.28)	.69	4.69	7.16	11.85
04/05	7.48	(7.10)	.23	4.23	7.12	11.35
03/04	7.25	(4.27)	.79	3.77	7.08	10.85
02/03	7.20	(10.03)	.97	1.15	7.10	8.25
01/02	5.63	(6.05)	1.09	1.09	6.43	7.52
00/01	6.29	(4.65)	.30	1.94	5.77	7.71
99/00	6.40	(2.04)	.25	4.61	5.72	10.33
98/99	6.33	(.44)	.15	6.04	5.69	11.73
97/98	6.44	2.17	.15	8.76	5.65	14.41
96/97	6.44	3.56	.60	10.60	5.62	16.22

* Act 9 member rate change took effect January 1, 2002.

** Act 120 limited the employer pension contribution of 27.82% to 25.00% for Fiscal Year 15/16 (prior rate of 20.50% + 4.50% collar), 25.97% to 20.50% for Fiscal Year 14/15 (prior rate of 16.00% + 4.50% collar), 23.82% to 16.00% for Fiscal Year 13/14 (prior rate of 11.50% + 4.50% collar), 21.65% to 11.50% for Fiscal Year 12/13 (prior rate of 8.00% + 3.50% collar) and 18.27% to 8.00% for Fiscal Year 11/12 (prior rate of 5.00% + 3.00% collar).

*** Act 46 reduced the employer pension contribution from 7.58% to 5.00% for Fiscal Year 10/11.

30-Year History of Member and Employer Contribution Rates



Notes:

* Act 46 reduced the employer pension contribution from 7.58% to 5.00% for Fiscal Year 10/11.

** Act 120 limited the employer pension contribution of 27.82% to 25.00% for Fiscal Year 15/16 (prior rate of 20.50% + 4.50 collar), 25.97% to 20.50% for Fiscal Year 14/15 (prior rate of 16.00% + 4.50% collar), 23.82% to 16.00% for Fiscal Year 13/14 (prior rate of 11.50% + 4.50% collar), 21.65% to 11.50% for Fiscal Year 12/13 (prior rate of 8.00% + 3.50% collar) and 18.27% to 8.00% for Fiscal Year 11/12 (prior rate of 5.00% + 3.00% collar).