# Actuarial Section

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January 15, 2016

Board of Trustees
Public School Employees'
Retirement System of Pennsylvania
5 North 5th Street
Harrisburg, Pennsylvania 17101-1905

Re: Actuary's Certification Letter

Members of the Board:

An actuarial valuation of the Pennsylvania Public School Employees' Retirement System (Retirement System or PSERS) is performed annually to measure the ongoing costs of the Retirement System and the progress towards the funding goals of the Retirement System over time. The most recent actuarial valuation was completed as of June 30, 2015. The financing objective of the Retirement System is to:

- Fully fund all current costs based on the normal contribution rate determined under the funding method,

- Liquidate the unfunded accrued liability based on level percentage of pay amortization schedules required by the Public School Employees' Retirement Code, 24 Pa. C.S. §8101 et. seq. (Retirement Code) as amended by Act 2010-120, which requires amortization over 24 years of the unfunded accrued liability as of June 30, 2010, and of each change in the unfunded accrued liability due to actuarial experience after the June 30, 2010 valuation. Any increases in the unfunded liability arising from legislation enacted after June 30, 2010, are to be amortized over 10 years; and

- As directed by Act 2010-120, use pension rate collars to moderate the rise of annual employer pension contribution rates to reach the full actuarially determined contribution funding level in a budgetarily sound manner and within a financially responsible period of time. Effective with the fiscal year during which the pension rate collar no longer applies, the employer contribution rate will be the actuarially determined pension contribution rate, subject to a new minimum employer contribution rate that will be the employer pension normal cost rate.

The contribution policy of the Retirement System is set by statute. The Commonwealth's General Assembly has the authority to amend the benefit terms and funding policy for the System by passing bills in the Senate and House of Representatives and sending them to the Governor for approval.

Based on the June 30, 2015, actuarial valuation, a total contribution rate of 30.03% (29.20% Pension plus 0.83% Premium Assistance) of payroll payable by employers for FY2016/2017, when taken together with the contributions payable by the members, current assets, and expected future asset returns, is sufficient to achieve the financing objective. The Act 2010-120 maximum employer pension contribution rate for fiscal year 2016/2017 is 29.5%, which exceeds the actuarially determined pension rate. In accordance with Act 2010-120, since the employer pension rate collar does not constrain the actuarially determined rate for fiscal year 2016/2017, the Act 2010-120 pension rate collar is no longer effective for future valuations. The Act 120 minimum employer pension rate is the employer pension normal cost rate of 8.31%.

The valuation takes into account all of the promised benefits to which members are entitled as of June 30, 2015, including pension and survivor benefits, and as required by the Retirement Code as the basis for the contribution rate for fiscal year 2016/2017. There were no legislative or administrative changes made to the benefits payable by PSERS since the prior valuation.

As required under Section 8502(j) of the Retirement Code, experience studies are performed for PSERS every five years, the most recent having been made as of June 30, 2010. This valuation was prepared on the basis of the demographic and economic assumptions that were recommended on the basis of the July 1, 2005 – June 30, 2010 Experience Review and approved by the Board of Trustees at its March 11, 2011, meeting.

In our opinion, the actuarial assumptions used for funding purposes are reasonably related to the experience of the System and to reasonable long-term expectations. These assumptions were selected in accordance with applicable Actuarial Standards of Practice published by the Actuarial Standards Board.

The actuarial assumptions and methods used by PSERS for financial reporting meet the requirements set forth in Governmental Accounting Standards Board (GASB) Statements No. 67 and are unchanged from the prior valuation. The actuarial cost method used for GASB Statement No. 67 disclosures differ from the actuarial cost method used for funding purposes in that the market value of assets has been used instead of an actuarial value of assets. The actuarial assumptions and methods for the GASB 25 disclosure are the same as those used for pension funding, except that the GASB 25 amortization payment will be determined on the basis of 30-year level-dollar funding. GASB 25 disclosures are no longer required to be reported due to GASB 67. However, PSERS is voluntarily providing GASB 25 disclosures for historical perspective as PSERS transitions to GASB 67. The Health Insurance funding provisions of the Retirement Code differ from the GASB 43 disclosure requirements. For funding purposes, the actuarial liability equals the assets in the health insurance account, and a contribution is determined to provide for solvency of the account through the third fiscal year following the valuation date. For GASB 43 purposes, the Health Insurance actuarial liability and normal cost requirements are determined under the entry age actuarial cost method, with 30-year level-dollar funding. (The entry age actuarial cost method meets the GASB 43 requirements for determining actuarial liability and normal cost and is the cost method specified by the Retirement Code for the PSERS pension plan.)

The Retirement System reported the individual data for members of the Retirement System as of the valuation date to the actuaries. While we did not verify the data at their source, we did perform tests for internal consistency and reasonableness. The amount of assets in the trust fund taken into account in the valuation was based on statements prepared for us by the Retirement System. The accuracy of the results presented in this report is dependent on the accuracy of the data.

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.

In our opinion, the attached schedules of valuation results fairly represent the status of the Public School Employees' Retirement System and present an accurate view of historical data. The underlying assumptions and methods used for both funding and GASB disclosure purposes are consistent with the statutory specifications and represent a best estimate of the aggregate future experience of the Retirement System.

The following supporting schedules in the Actuarial Section were prepared by Buck Consultants:

- Summary of Results of Actuarial Valuation as of June 30, 2015
- History and Projection of Contribution Rates and Funded Ratios
- Summary of Actuarial Assumptions and Methods
- Schedule of Active Member Valuation Data
- Schedule of Retired Members and Beneficiaries Added To and Removed From Rolls

- Solvency Test
- Analysis of Past Financial Experience - Reconciliation of Employer Contribution Rates

In addition, Buck Consultants prepared the “Schedule of Changes in the Employer Net Pension Liability,” “Schedule of Employer Net Pension Liability,” “Schedule of Employer Contributions” and the “Schedule of Funding Progress” in the Financial Section.

This report was prepared solely for the Pennsylvania Public School Employees’ Retirement System for the purposes herein stated and may not be appropriate to use for other purposes. Buck does not intend to benefit and assumes no duty or liability to other parties who receive this work. Use of this report for any other purposes or by anyone other than PSERS and its auditors may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. The attached pages should not be provided without a copy of this cover letter. You should ask Buck to review any statement you wish to make on the results contained in this report. Buck will accept no liability for any such statement made without prior review by Buck.

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. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions concerning it.

Respectfully submitted,
Buck Consultants

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## SUMMARY OF RESULTS OF ACTUARIAL VALUATION
## AS OF JUNE 30, 2015
## ($ Amounts in Thousands)

| | Item | June 30, 2015 | June 30, 2014 |
|---|---|---|---|
| | **Member Data** | | |
| 1. | Number of Members | | |
| | a) Active Members | 259,868 | 263,312 |
| | b) Vestees* | 21,909 | 20,467 |
| | c) Annuitants, Beneficiaries and Survivor Annuitants** | 219,775 | 213,900 |
| | d) Total | 501,552 | 497,679 |
| 2. | Annualized Salaries ($ Amounts in Thousands)*** | $ 12,678,213 | $ 12,620,862 |
| 3. | Annual Annuities ($ Amounts in Thousands) | $ 5,520,620 | $ 5,339,477 |
| | **Valuation Results** | | |
| 4. | Present Value of Future Pension Benefits | | |
| | a) Active Members | $ 61,134,713 | $ 60,153,320 |
| | b) Inactive Members and Vestees | 1,613,862 | 1,521,474 |
| | c) Annuitants, Beneficiaries and Survivor Annuitants | 52,739,489 | 51,425,295 |
| | d) Total | $ 115,488,064 | $ 113,100,089 |
| 5. | Present Value of Future Pension Normal Cost | | |
| | a) Active Members | $ 10,232,272 | $ 9,786,167 |
| | b) Employer | 10,679,082 | 10,960,939 |
| | c) Total | $ 20,911,354 | $ 20,747,106 |
| 6. | Pension Accrued Liability | | |
| | a) Active Members (4a) – (5c) | $ 40,223,359 | $ 39,406,214 |
| | b) Inactive Members and Vestees | 1,613,862 | 1,521,474 |
| | c) Annuitants, Beneficiaries and Survivor Annuitants | 52,739,489 | 51,425,295 |
| | d) Total | $ 94,576,710 | $ 92,352,983 |
| 7. | Health Insurance Assets for Premium Assistance | $ 120,643 | $ 112,060 |
| 8. | Total Accrued Liability for Funding (6) + (7) | $ 94,697,353 | $ 92,465,043 |
| 9. | Actuarial Value of Assets | $ 57,361,589 | $ 57,343,859 |
| 10. | Funded Status (9) / (8) | 60.6% | 62.0% |
| 11. | Unfunded Accrued Liability (8) – (9) | $ 37,335,764 | $ 35,121,184 |
| 12. | Total Normal Cost Rate | 15.83% | 15.87% |
| 13. | Member Contribution Rate | 7.52% | 7.49% |
| 14. | Employer Normal Cost Rate (12) – (13) | 8.31% | 8.38% |
| | **Employer Annual Funding Requirement** | **Fiscal 2016/2017** | **Fiscal 2015/2016** |
| 15. | Employer Contribution Rate Calculated by Actuary | | |
| | a) Normal | 8.31% | 8.38% |
| | b) Unfunded Accrued Liability | 20.89% | 19.44% |
| | c) Preliminary Pension Rate | 29.20% | 27.82% |
| | d) Act 120 Employer Pension Rate Collar | 29.50% | 25.00% |
| | e) Health Insurance | 0.83% | 0.84% |
| | f) Total Rate = Minimum [(15)(c), (15)(d)] + (15)(e) | 30.03% | 25.84% |

* Excludes 115,277 and 112,097 inactive members as of June 30, 2015 and June 30, 2014, respectively, who are no longer participating and are valued for their accumulated deductions only.

** Excludes 1,446 and 1,459 beneficiaries as of June 30, 2015 and June 30, 2014, respectively, who are only entitled to a pending lump sum distribution.

*** The salaries shown represent an annual rate of pay for members who were in active service on the valuation date.

## HISTORY AND PROJECTION OF CONTRIBUTION RATES AND FUNDED RATIOS[1]

| Fiscal Year Ending June 30 | Appropriation Payroll (thousands) | Contribution Rates[2] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Employee | Employer Normal Cost | Employer Unfunded Liability | Preliminary Employer Pension | Final Employer Pension[6] | Employer Health Insurance | Total Employer | Funded Ratio |
| 2006 | $ 11,505,093 | 7.16% | 7.61% | (4.28%) | 3.33% | 4.00% | 0.69% | 4.69% | 81.2% |
| 2007[3] | 11,821,951 | 7.21 | 6.62 | (0.95) | 5.67 | 5.72 | 0.74 | 6.46 | 85.8 |
| 2008 | 12,881,244 | 7.25 | 6.68 | (0.24) | 6.44 | 6.44 | 0.69 | 7.13 | 86.0 |
| 2009 | 12,500,000 | 7.29 | 6.68 | (3.37) | 3.31 | 4.00 | 0.76 | 4.76 | 79.2 |
| 2010[4] | 12,899,000 | 7.32 | 7.35 | (3.72) | 3.63 | 4.00 | 0.78 | 4.78 | 75.1 |
| 2011[4,5] | 13,510,000 | 7.34 | 8.08 | (0.50) | 7.58 | 5.00 | 0.64 | 5.64 | 69.1 |
| 2012 | 14,112,000 | 7.37 | 8.12 | 10.15 | 18.27 | 8.00 | 0.65 | 8.65 | 66.4 |
| 2013[7] | 14,297,000 | 7.40 | 8.66 | 12.99 | 21.65 | 11.50 | 0.86 | 12.36 | 63.8 |
| 2014 | 13,720,000 | 7.43 | 8.57 | 15.25 | 23.82 | 16.00 | 0.93 | 16.93 | 62.0 |
| 2015 | 13,482,000 | 7.46 | 8.46 | 17.51 | 25.97 | 20.50 | 0.90 | 21.40 | 60.6 |
| 2016 | 13,375,000 | 7.49 | 8.38 | 19.44 | 27.82 | 25.00 | 0.84 | 25.84 | 58.2 |
| 2017 | 13,549,000 | 7.52 | 8.31 | 20.89 | 29.20 | 29.20 | 0.83 | 30.03 | 56.8 |
| 2018 | 13,658,010 | 7.52 | 8.14 | 23.07 | 31.21 | 31.21 | 0.83 | 32.04 | 56.1 |
| 2019 | 14,012,675 | 7.52 | 7.98 | 24.47 | 32.45 | 32.45 | 0.82 | 33.27 | 58.6 |
| 2020 | 14,385,408 | 7.53 | 7.81 | 25.59 | 33.40 | 33.40 | 0.80 | 34.20 | 60.1 |
| 2021 | 14,775,522 | 7.53 | 7.66 | 25.06 | 32.72 | 32.72 | 0.79 | 33.51 | 61.2 |
| 2022 | 15,181,732 | 7.53 | 7.51 | 25.23 | 32.74 | 32.74 | 0.77 | 33.51 | 62.6 |
| 2023 | 15,592,952 | 7.53 | 7.36 | 25.63 | 32.99 | 32.99 | 0.76 | 33.75 | 64.1 |
| 2024 | 16,006,876 | 7.53 | 7.21 | 25.89 | 33.10 | 33.10 | 0.74 | 33.84 | 65.5 |
| 2025 | 16,425,303 | 7.53 | 7.06 | 26.16 | 33.22 | 33.22 | 0.72 | 33.94 | 67.3 |
| 2026 | 16,849,867 | 7.53 | 6.90 | 26.56 | 33.46 | 33.46 | 0.72 | 34.18 | 69.2 |
| 2027 | 17,269,991 | 7.53 | 6.74 | 26.87 | 33.61 | 33.61 | 0.69 | 34.30 | 71.2 |

1. The projection of contribution rates is based on the assumption that there are no changes in demographic assumptions, no changes in benefit provisions, and no actuarial gains or losses other than gains or losses on the actuarial value of assets that result from recognizing currently deferred gains or losses on the market value of assets.
2. In general, the Preliminary Employer Pension Rate equals the sum of the rates for the Employer Normal Cost and the Unfunded Liability; and the Final Employer Pension Rate is the greater of the Preliminary Pension Rate and any Pension Rate Floor or Collar stated in the Retirement Code. The Total Employer Rate is the sum of the Final Employer Pension Rate and the Employer Health Insurance Rate.
3. Revised actuarial assumptions based on a five-year experience review ending June 30, 2005 were used to determine the contributions for the fiscal year ended June 30, 2007. Since the benefit changes under Act 2001-9 had not been in effect throughout the entire period covered by the study the Board decided, at its December 2005 meeting, to delay making any changes to the retirement rate assumptions until further data became available. The 5.72% Final Employer Pension Rate equals the 6.46% Total Employer Rate certified by the Board at that meeting, minus the 0.74% Employer Health Insurance Rate. The 5.67% Preliminary Employer Pension Rate equals the sum of the Employer Normal Cost and Unfunded Liability rates. The Normal Cost and Unfunded Liability rates were calculated by the actuary in January 2006, based on the package of assumptions adopted at the December 2005 meeting.
4. At its January 2009 meeting, the Board voted to reduce the interest rate from 8.50% to 8.25% for the June 30, 2008 valuation and to 8.00% for subsequent valuations.
5. Act 2010-46 recertified the fiscal year ended June 30, 2011 pension rate from 7.58% to 5.00%.
6. The Final Employer Pension rate is limited by the Act 2010-120 pension rate collars for fiscal years 2012 through 2016.
7. Revised actuarial assumptions based on a five-year experience review ended June 30, 2010 were used to determine the contributions for the fiscal year ending June 30, 2013 and thereafter, which include an interest rate of 7.50%.

# DESCRIPTION OF ACTUARIAL ASSUMPTIONS AND METHODS

## ASSUMPTIONS

**Investment Rate of Return**: 7.50% per annum, compounded annually (adopted as of June 30, 2011). The components are 3.00% for inflation and 4.50% for the real rate of return. Actuarial equivalent benefits are determined based on 4% (since 1960).

**Discount Rate for GASB 67 Accounting**: 7.50% as of June 30, 2014 and June 30, 2015. Rates were determined in accordance with the methods prescribed in GASB Statement No. 67.

**Separation from Service**: Illustrative rates of assumed separation from service are shown in the following table (adopted as of June 30, 2011).

| Age | Annual Rate of: | | | | | | |
|---|---|---|---|---|---|---|---|
| | Non-Vested Withdrawal | Withdrawal | | Death | Disability | Early Retirement* | Superannuation Retirement |
| | | Less Than 10 Years of Service | 10 or More Years of Service | | | | |
| **MALES** | | | | | | | |
| 25 | 12.50% | 5.50% | 2.00% | 0.037% | 0.024% | | |
| 30 | 10.50 | 3.20 | 2.00 | 0.038 | 0.024 | | |
| 35 | 11.00 | 3.00 | 1.50 | 0.056 | 0.100 | | |
| 40 | 13.00 | 3.50 | 1.25 | 0.090 | 0.180 | | |
| 45 | 13.00 | 3.50 | 1.25 | 0.121 | 0.180 | | 25.00% |
| 50 | 13.00 | 3.50 | 1.70 | 0.173 | 0.280 | | 25.00 |
| 55 | 11.00 | 3.50 | 3.00 | 0.245 | 0.430 | 15.00% | 30.00 |
| 60 | 10.50 | 3.50 | 4.50 | 0.363 | 0.580 | 12.00 | 28.00 |
| 65 | | | | 0.592 | 0.100 | | 20.00 |
| 69 | | | | 0.810 | 0.100 | | 18.00 |
| **FEMALES** | | | | | | | |
| 25 | 13.00% | 8.50% | 5.00% | 0.018% | 0.030% | | |
| 30 | 13.00 | 6.50 | 4.00 | 0.019 | 0.040 | | |
| 35 | 13.00 | 5.50 | 3.00 | 0.022 | 0.060 | | |
| 40 | 10.90 | 4.50 | 1.50 | 0.035 | 0.100 | | |
| 45 | 10.90 | 4.00 | 1.50 | 0.055 | 0.150 | | 30.00% |
| 50 | 10.90 | 3.75 | 1.75 | 0.085 | 0.200 | | 30.00 |
| 55 | 10.90 | 3.75 | 3.00 | 0.133 | 0.380 | 15.00% | 30.00 |
| 60 | 10.90 | 4.50 | 5.50 | 0.197 | 0.380 | 15.00 | 30.00 |
| 65 | | | | 0.301 | 0.130 | | 25.00 |
| 69 | | | | 0.428 | 0.130 | | 20.00 |

* Early Retirement – Age 55 with 25 years of service, but not eligible for Superannuation retirement.

## DESCRIPTION OF ACTUARIAL ASSUMPTIONS AND METHODS (Continued)

**Death after Retirement**: The RP-2000 Combined Healthy Annuitant Tables (Male and Female) with age set back 3 years for both genders for healthy annuitants and for dependent beneficiaries. The RP-2000 Combined Disabled Tables (Male and Female) with age set back 7 years for males and set back 3 years for females for disabled annuitants. (A unisex table based on the RP-2000 Combined Healthy Annuitant Tables (Male and Female) with age set back 3 years for both genders assuming the population consists of 25% males and 75% females is used to determine actuarial equivalent benefits.) No specific additional provision has been made to reflect possible future improvements in mortality.

**Salary Increase**: Effective average of 5.50% per annum, compounded annually (adopted as of June 30, 2011). The components are 3.00% for inflation, 1% for real wage growth and 1.5% for merit or seniority increases. Representative values are as follows:

| Age | Annual Rate of Salary Increase |
|---|---|
| 20 | 10.75% |
| 30 | 8.25 |
| 40 | 6.25 |
| 50 | 4.25 |
| 55 | 3.75 |
| 60 | 3.75 |
| 65 | 3.75 |
| 70 | 3.75 |

**Payroll Growth**: 3.50% per annum.

### MISCELLANEOUS

**Option 4 Elections**: 100% of Class T-C and Class T-D members are assumed to elect a refund of contributions and a reduced annuity.

**Withdrawal Annuity**: 90% of members are assumed to commence payment immediately and 10% are assumed to defer payment to superannuation age.

**Health Insurance**

**Elections**: 64% of eligible retirees are assumed to elect premium assistance. This decreased from the 65% used in the prior valuation.

**Administrative Expenses**: Assumed equal to 2% of contributions made during the year.

### METHODS

**Calculations**: The actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the Retirement System, and on actuarial assumptions that are internally consistent and reasonable based on the actual experience of the System.

**Asset Valuation Method**: A ten-year moving market average (five-year moving market average prior to June 30, 2010) value of assets that recognizes the 7.50% (8.00% prior to June 30, 2011, 8.25% prior to June 30, 2009, and 8.50% prior to June 30, 2008) actuarial expected investment return immediately and spreads the difference between the actual return on the market value of assets and the expected return on the actuarial value of assets over a period of ten years. The averaging period is being phased-in from fiscal year 2006.

**Actuarial Cost Method for Pension Funding**: Entry Age Normal Cost Method (modified slightly as of June 30, 2005 to use a pay-weighted average normal contribution rate). The results of each June 30 valuation normally determine the employer contribution rate for the second succeeding fiscal year. Act 120 revised the funding method effective with the June 30, 2010 valuation. Act 120 mandated that the outstanding balance of the unfunded accrued liability as of June 30, 2010, including changes in the unfunded accrued liability due to the funding reforms of Act 120, be amortized over a 24-year period, as a level percent of pay, beginning July 1, 2011. Future valuation gains and losses, and changes in the unfunded accrued liability resulting from changes in actuarial assumptions and methods, are amortized over a 24-year period, as a level percent of pay. Future increases in the unfunded accrued liability due to legislation will be amortized over a 10-year period, as a level percent of pay. Act 120 also modified the employer pension contribution requirements by imposing collars on the rate at which employer contributions may rise from year to year. For the fiscal years ending June 30, 2012, June 30, 2013, and on or after June 30, 2014 the pension contribution rate can be no more than 3%, 3.5% and 4.5%, respectively, of total compensation of all active members, greater than the prior year's final contribution rate. Beginning with the fiscal year in which the actuarially required contribution rate is less than the collared rate, the final contribution rate is the

## DESCRIPTION OF ACTUARIAL ASSUMPTIONS AND METHODS (Continued)

actuarially determined contribution rate, provided that the final contribution rate is not less than the employer normal contribution rate.

**Actuarial Cost Method for GASB 67 Accounting for Pensions:** Same as for pension funding except that the market value of assets is used instead of an actuarial value of assets.

**Actuarial Cost Method for Health Insurance Funding**: The actuarial liability equals the assets in the health insurance account, and the results of the June 30 valuation determine the contribution rate for the second succeeding fiscal year. The rate so determined is the rate necessary to establish reserves sufficient to cover administrative expenses and provide premium assistance payments for all participating eligible annuitants during the third fiscal year that follows the valuation date. This funding method is set by statute.

**Actuarial Cost Method for GASB 43 Accounting for Health Insurance**: The actuarial liability is determined under the entry age actuarial cost method, and the Annual Required Contribution (ARC) for the second fiscal year that follows the valuation date is equal to the entry age normal cost for health insurance plus an amount that will amortize the entry age unfunded actuarial liability for health insurance over a period of 30 years.

### DATA

**Census and Assets**: The valuation was based on members of the Retirement System as of June 30, 2015 and does not take into account future members. All census data was supplied by the Retirement System and was subject to reasonable consistency checks. The actuary adjusts the data to account for service and pay earned by members on or before the valuation that is not reported by the Retirement System until after the actuarial valuation is performed. Asset data was supplied by the Retirement System.

## SCHEDULE OF ACTIVE MEMBERS VALUATION DATA

| Valuation as of June 30 | Number of Participating Employers | Number of Active Members | Annual Compensation (Thousands) | Average Compensation | % Increase in Average |
|---|---|---|---|---|---|
| 2015 | 784 | 259,868 | $ 12,678,213 | $ 48,787 | 1.02% |
| 2014 | 784 | 263,312 | 12,620,862 | 47,931 | 1.92 |
| 2013 | 782 | 267,428 | 12,577,105 | 47,030 | 1.17 |
| 2012 | 773 | 273,504 | 12,714,371 | 46,487 | 0.52 |
| 2011 | 747 | 279,152 | 12,910,043 | 46,247 | 1.99 |
| 2010 | 747 | 282,041 | 12,788,847 | 45,344 | 1.26 |
| 2009 | 742 | 279,701 | 12,524,593 | 44,779 | 2.43 |
| 2008 | 739 | 272,690 | 11,921,469 | 43,718 | 1.16 |
| 2007 | 739 | 264,023 | 11,410,257 | 43,217 | (0.33) |
| 2006 | 733 | 263,350 | 11,419,049 | 43,361 | 5.22 |

## SCHEDULE OF RETIRED MEMBERS AND BENEFICIARIES ADDED TO AND REMOVED FROM ROLLS

| Valuation Date as of June 30 | Added to Rolls | | Removed from Rolls | | Rolls at End of Year | | % Increase in Annual Allowance | Average Annual Allowance |
|---|---|---|---|---|---|---|---|---|
| | Number | Annual Allowance (Millions) | Number | Annual Allowance (Millions) | Number | Annual Allowance* (Millions) | | |
| 2015 | 15,017 | $ 297.3 | 9,142 | $ 91.7 | 219,775 | $ 5,520.6 | 3.39% | $ 25,119 |
| 2014 | 15,225 | 300.5 | 8,878 | 84.9 | 213,900 | 5,339.5 | 3.74 | 24,962 |
| 2013 | 16,404 | 377.6 | 10,866 | 83.7 | 207,553 | 5,147.1 | 5.63 | 24,800 |
| 2012 | 14,579 | 332.7 | 7,186 | 66.6 | 202,015 | 4,872.9 | 4.78 | 24,122 |
| 2011 | 16,228 | 453.7 | 6,540 | 76.4 | 194,622 | 4,650.8 | 7.17 | 23,897 |
| 2010 | 12,649 | 372.8 | 5,678 | 77.6 | 184,934 | 4,339.6 | 8.59 | 23,466 |
| 2009 | 9,651 | 314.9 | 5,228 | 74.4 | 177,963 | 3,996.3 | 4.85 | 22,456 |
| 2008 | 10,911 | 345.3 | 5,397 | 73.9 | 173,540 | 3,811.5 | 8.18 | 21,963 |
| 2007 | 10,612 | 307.5 | 4,399 | 56.0 | 168,026 | 3,523.4 | 7.60 | 20,970 |

* Reflects changes in annuities for continuing payees due to finalization of benefit calculations and due to the commencement of supplemental annuity payments.

## POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS SCHEDULE OF RETIRED MEMBERS ADDED TO AND REMOVED FROM ROLLS

| Valuation Date as of June 30 | Added to Rolls | | Removed from Rolls | | Rolls at End of Year | | % Increase in Annual Premium Assistance | Average Annual Premium Assistance |
|---|---|---|---|---|---|---|---|---|
| | Number* | Annual Premium Assistance (Millions) | Number* | Annual Premium Assistance (Millions) | Number* | Annual Premium Assistance (Millions) | | |
| 2015 | 6,516 | $ 5.0 | 3,635 | $ 2.8 | 143,254 | $ 110.0 | 0.46% | $ 1,200 |
| 2014 | 4,969 | 3.9 | 2,289 | 1.8 | 140,373 | 109.5 | 0.37 | 1,200 |
| 2013 | 6,759 | 5.4 | 2,364 | 1.9 | 137,693 | 109.1 | 3.31 | 1,200 |
| 2012 | 5,751 | 4.6 | 1,372 | 1.1 | 133,298 | 105.6 | 3.43 | 1,200 |
| 2011 | 8,185 | 6.5 | 2,074 | 1.6 | 128,919 | 102.1 | 4.93 | 1,200 |
| 2010 | 6,709 | 5.3 | 2,323 | 1.8 | 122,808 | 97.3 | 3.73 | 1,200 |
| 2009 | 6,285 | 5.0 | 3,079 | 2.4 | 118,422 | 93.8 | 2.74 | 1,200 |
| 2008 | 8,792 | 7.0 | 6,050 | 4.8 | 115,216 | 91.3 | 2.47 | 1,200 |
| 2007 | 7,072 | 5.6 | 2,637 | 2.1 | 112,474 | 89.1 | 4.09 | 1,200 |

* Number of retired members eligible to participate in the Health Insurance Premium Assistance; 64% of eligible retirees are assumed to elect premium assistance as of June 30, 2015; 65% of eligible retirees are assumed to elect premium assistance as of June 30, 2014; 66% of eligible retirees are assumed to elect premium assistance for the periods June 30, 2007 to June 30, 2013.

## SOLVENCY TESTS
## COMPARATIVE SUMMARY OF ACCRUED LIABILITY AND ACTUARIAL VALUE OF ASSETS
### ($ Amounts in Thousands)

### PENSIONS

| Valuation as of June 30 | (1) Active Member Contributions | (2) Retirees and Beneficiaries | (3) Active Member Employer Financed | Actuarial Value of Assets | Portion of Accrued Liability Covered by Valuation Assets | | |
|---|---|---|---|---|---|---|---|
| | | | | | (1) | (2) | (3) |
| 2015 | $ 14,079,658 | $ 52,739,489 | $ 27,757,563 | $ 57,240,946 | 100% | 82% | 0% |
| 2014 | 13,554,229 | 51,425,295 | 27,373,459 | 57,231,799 | 100 | 85 | 0 |
| 2013 | 13,089,342 | 49,979,444 | 26,883,030 | 57,353,262 | 100 | 89 | 0 |
| 2012 | 12,535,442 | 47,511,912 | 27,713,306 | 58,227,622 | 100 | 96 | 0 |
| 2011 | 12,242,308 | 45,648,780 | 27,749,295 | 59,141,131 | 100 | 100 | 5 |
| 2010 | 11,850,031 | 40,284,383 | 26,871,014 | 59,306,848 | 100 | 100 | 27 |
| 2009 | 11,087,345 | 37,112,318 | 27,321,073 | 59,781,575 | 100 | 100 | 42 |
| 2008 | 10,532,683 | 34,617,953 | 25,695,001 | 60,922,157 | 100 | 100 | 61 |
| 2007 | 10,183,433 | 31,603,788 | 24,708,649 | 57,057,838 | 100 | 100 | 62 |
| 2006 | 9,571,668 | 29,117,164 | 25,938,529 | 52,464,726 | 100 | 100 | 53 |

### POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS

| Valuation as of June 30 | (1) Active Member Contributions | (2) Retirees and Beneficiaries | (3) Active Member Employer Financed | Actuarial Value of Assets | Portion of Accrued Liability Covered by Valuation Assets | | |
|---|---|---|---|---|---|---|---|
| | | | | | (1) | (2) | (3) |
| 2015 | $ 0 | $ 957,954 | $ 410,135 | $ 120,643 | N/A | 13% | 0% |
| 2014 | 0 | 959,079 | 415,033 | 112,060 | N/A | 12 | 0 |
| 2013 | 0 | 961,701 | 423,332 | 100,349 | N/A | 10 | 0 |
| 2012 | 0 | 934,506 | 430,161 | 93,753 | N/A | 10 | 0 |
| 2011 | 0 | 909,076 | 430,368 | 111,258 | N/A | 12 | 0 |
| 2010 | 0 | 767,587 | 394,632 | 116,831 | N/A | 15 | 0 |
| 2009 | 0 | 759,891 | 399,164 | 105,114 | N/A | 14 | 0 |
| 2008 | 0 | 749,070 | 383,941 | 95,785 | N/A | 13 | 0 |
| 2007 | 0 | 684,677 | 373,415 | 97,292 | N/A | 14 | 0 |
| 2006 | 0 | 684,435 | 371,719 | 92,777 | N/A | 14 | 0 |

The solvency test compares the actuarial accrued liabilities by various categories with the System’s actuarial value of assets.

## ANALYSIS OF PAST FINANCIAL EXPERIENCE
## RECONCILIATION OF EMPLOYER CONTRIBUTION RATES

| Fiscal Year Ending June 30 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|
| Effective Prior Year Contribution Rate | 25.84% | 21.40% | 16.93% | 12.36% | 8.65% | 5.64% | 4.78% | 4.76% | 7.13% | 6.46% |
| Prior Year Adjustment for Legislation | 2.82 | 5.47 | 7.82 | 10.15 | 10.27 | 2.58 | (0.37) | (0.69) | N/A | (0.05) |
| **Net Change Due to:** | | | | | | | | | | |
| Change in Normal Rate | (0.07) | (0.08) | (0.11) | (0.09) | (0.22) | 0.04 | 0.00 | (0.02) | 0.00 | 0.06 |
| Payroll Growth and Liability Experience | 0.14 | 0.58 | 0.68 | 0.72 | (0.21) | 0.40 | (0.03) | 0.33 | (0.88) | 0.47 |
| Investment Loss/(Gain) | 0.83 | 0.66 | 0.81 | 0.78 | 0.59 | 1.94 | 2.04 | (1.71) | (2.25) | 0.24 |
| Health Insurance Contribution Change | (0.01) | (0.06) | (0.03) | 0.07 | 0.21 | 0.01 | (0.14) | 0.02 | 0.07 | (0.05) |
| Assumption/Method Change | N/A | N/A | N/A | N/A | 3.04 | N/A | 1.94 | 1.72 | N/A | N/A |
| Act 40 4.00% Floor* | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.37 | 0.69 | N/A |
| Act 120 Funding Reforms | N/A | N/A | N/A | N/A | N/A | 8.31 | N/A | N/A | N/A | N/A |
| Amortization of Prior Legislation Deferrals | 0.48 | 0.69 | 0.77 | 0.76 | 0.18 | N/A | N/A | N/A | N/A | N/A |
| **Legislation Deferrals:** | | | | | | | | | | |
| Act 46 Rate Cap** | N/A | N/A | N/A | N/A | N/A | N/A | (2.58) | N/A | N/A | N/A |
| Act 120 Collar*** | N/A | (2.82) | (5.47) | (7.82) | (10.15) | (10.27) | N/A | N/A | N/A | N/A |
| Actual Contribution Rate: | 30.03% | 25.84% | 21.40% | 16.93% | 12.36% | 8.65% | 5.64% | 4.78% | 4.76% | 7.13% |

* Act 2003-40 amended the Retirement Code to increase the Employer Pension Rate Floor from 1% to 4%.

** Act 2010-46 recertified the fiscal year ending June 30, 2011 pension rate from 7.58% to 5.00%.

*** The Final Employer Pension rate is limited by the Act 2010-120 pension rate collar. For the fiscal years ending June 30, 2012, June 30, 2013, and on or after June 30, 2014 the pension contribution rate can be no more than 3%, 3.5%, and 4.5%, respectively, of total compensation of all active members, greater than the prior year's final contribution rate. Beginning with fiscal year 2017, the actuarially required contribution rate is less than the collared rate and the final contribution rate is the actuarially determined contribution rate, provided that the final contribution rate is not less than the employer normal contribution rate.

## SCHEDULE OF FUNDING PROGRESS FOR PENSIONS*
### ($ Amounts in Thousands)

| Valuation as of June 30 | Actuarial Value of Assets | Actuarial Accrued Liability | Unfunded Actuarial Accrued Liability | Funded Ratio | Covered Payroll | Unfunded Accrued Liability as a Percentage of Covered Payroll |
|---|---|---|---|---|---|---|
| 2015 | $ 57,240,946 | $ 94,576,710 | $ 37,335,764 | 60.5% | $ 12,678,213 | 294.5% |
| 2014 | 57,231,799 | 92,352,983 | 35,121,184 | 62.0 | 12,620,862 | 278.3 |
| 2013 | 57,353,262 | 89,951,816 | 32,598,554 | 63.8 | 12,577,105 | 259.2 |
| 2012 | 58,227,622 | 87,760,660 | 29,533,038 | 66.3 | 12,714,371 | 232.3 |
| 2011 | 59,141,131 | 85,640,383 | 26,499,252 | 69.1 | 12,910,043 | 205.3 |
| 2010 | 59,306,848 | 79,005,428 | 19,698,580 | 75.1 | 12,788,847 | 154.0 |
| 2009 | 59,781,575 | 75,520,736 | 15,739,161 | 79.2 | 12,524,593 | 125.7 |
| 2008 | 60,922,157 | 70,845,637 | 9,923,480 | 86.0 | 11,921,469 | 83.2 |
| 2007 | 57,057,838 | 66,495,870 | 9,438,032 | 85.8 | 11,410,257 | 82.7 |
| 2006 | 52,464,726 | 64,627,361 | 12,162,635 | 81.2 | 11,419,049 | 106.5 |

* The amounts reported above include assets and liabilities for Pensions.

The schedule above is not required by current GASB standards. PSERS is voluntarily providing this information for historical perspective as PSERS transitions to GASB Statement No. 67.

## SCHEDULE OF FUNDING PROGRESS FOR POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS** GASB STATEMENT NO. 43 DISCLOSURE
### ($ Amounts in Thousands)

| Valuation as of June 30 | Actuarial Value of Assets | Actuarial Accrued Liability | Unfunded Actuarial Accrued Liability | Funded Ratio | Covered Payroll | Unfunded Accrued Liability as a Percentage of Covered Payroll |
|---|---|---|---|---|---|---|
| 2015 | $ 120,643 | $ 1,368,089 | $ 1,247,446 | 8.8% | $ 12,678,213 | 9.8% |
| 2014 | 112,060 | 1,374,112 | 1,262,052 | 8.2 | 12,620,862 | 10.0 |
| 2013 | 100,349 | 1,385,033 | 1,284,684 | 7.2 | 12,577,105 | 10.2 |
| 2012 | 93,753 | 1,364,667 | 1,270,914 | 6.9 | 12,714,371 | 10.0 |
| 2011 | 111,258 | 1,339,444 | 1,228,186 | 8.3 | 12,910,043 | 9.5 |
| 2010 | 116,831 | 1,162,219 | 1,045,388 | 10.1 | 12,788,847 | 8.2 |
| 2009 | 105,114 | 1,159,055 | 1,053,941 | 9.1 | 12,524,593 | 8.4 |
| 2008 | 95,785 | 1,133,011 | 1,037,226 | 8.5 | 11,921,469 | 8.7 |
| 2007 | 97,292 | 1,058,092 | 960,800 | 9.2 | 11,410,257 | 8.4 |
| 2006 | 92,777 | 1,056,154 | 963,377 | 8.8 | 11,419,049 | 8.4 |

** The amounts reported above include assets and liabilities for Health Insurance Premium Assistance. The health insurance liabilities for GASB 43 disclosure have been calculated under the entry age normal cost method, which provides liabilities that differ from those determined under the funding requirements of the Retirement Code.

## SCHEDULE OF EMPLOYER CONTRIBUTIONS FOR PENSIONS
## ($ Amounts in Thousands)

| Fiscal Year Ended June 30 | Annual Required Contribution | Actual Employer Contribution | Percentage Contributed |
|---|---|---|---|
| 2015 | $ 3,760,827 | $ 2,596,731 | 69% |
| 2014 | 3,410,373 | 1,986,384 | 58 |
| 2013 | 3,110,429 | 1,434,815 | 46 |
| 2012 | 2,629,244 | 1,001,140 | 38 |
| 2011 | 2,436,602 | 647,000 | 27 |
| 2010 | 1,928,278 | 527,212 | 27 |
| 2009 | 1,761,295 | 503,227 | 29 |
| 2008 | 1,852,238 | 753,532 | 41 |
| 2007 | 1,708,821 | 659,545 | 39 |
| 2006 | 1,328,373 | 456,878 | 34 |

The Annual Required Contribution (ARC) presented above was determined as part of the actuarial valuation as of two years prior to the dates indicated (i.e., the ARC for the fiscal year ended June 30, 2015 was determined by the valuation completed as of June 30, 2013 which was based on an 7.50% interest rate).

Additional information as of the latest actuarial valuation follows:

| | |
|---|---|
| Valuation Date: | 6/30/2015 |
| Actuarial Cost Method: | Entry Age |
| Amortization Method: | Level Dollar, Open |
| Remaining Amortization Period: | 30 Years |
| Asset Valuation Method: | 10 Year Smoothed Market |
| Actuarial Assumptions: | |
| -Investment Rate of Return* | 7.50% |
| -Projected Salaried Increases* | 5.50% |
| *Includes Inflation at: | 3.00% |

The schedule above is not required by current GASB standards. PSERS is voluntarily providing this information for historical perspective as PSERS transitions to GASB Statement No. 67.

## SCHEDULE OF EMPLOYER CONTRIBUTIONS FOR POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS GASB STATEMENT NO. 43 DISCLOSURE

### ($ Amounts in Thousands)

| Fiscal Year Ended June 30 | Annual Required Contribution | Actual Employer Contribution | Percentage Contributed |
|---|---|---|---|
| 2015 | $ 128,489 | $ 116,808 | 91% |
| 2014 | 121,260 | 117,471 | 97 |
| 2013 | 113,016 | 107,993 | 96 |
| 2012 | 102,104 | 80,936 | 79 |
| 2011 | 119,320 | 88,796 | 74 |
| 2010 | 117,187 | 102,703 | 88 |
| 2009 | 109,531 | 92,493 | 84 |
| 2008 | 101,352 | 81,317 | 80 |
| 2007 | 94,970 | 86,763 | 91 |

The Annual Required Contribution (ARC) beginning with the fiscal year ended June 30, 2009 was determined as part of the actuarial valuation as of two years prior to the date indicated (i.e., the ARC for the fiscal year ended June 30, 2015 was determined by the valuation completed as of June 30, 2013, which was based on a 7.50% interest rate). Prior to the fiscal year which ended June 30, 2009, the ARC was determined as part of the actuarial valuation as of one year prior to the dates indicated.

Additional information as of the latest actuarial valuation follows:

| | |
|---|---|
| Valuation Date: | 6/30/2015 |
| Actuarial Cost Method: | Entry Age |
| Amortization Method: | Level Dollar, Open |
| Remaining Amortization Period: | 30 Years |
| Asset Valuation Method: | Market |
| Actuarial Assumptions: | |
| -Investment Rate of Return* | 7.50% |
| -Projected Salaried Increases* | 5.50% |
| *Includes Inflation at: | 3.00% |

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