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# *Public Education Employee Retirement System of Missouri*

Actuarial Valuation as of
June 30, 2017

November 21, 2017

Board of Trustees
Public Education Employee Retirement System of Missouri
3210 W. Truman Blvd.
Jefferson City, MO 65109

**Re: Certification of the Actuarial Valuation of the Public Education Employee Retirement System of Missouri as of June 30, 2017**

Dear Board of Trustees:

An actuarial valuation is performed annually for the Public Education Employee Retirement System of Missouri ("PEERS") defined benefit pension plan ("Plan"). The results of the latest actuarial valuation were prepared as of June 30, 2017 and are presented herein pursuant to the engagement letter between PEERS and PricewaterhouseCoopers LLP ("PwC"), dated June 9, 2014, and amended April 16, 2015. This report is intended to provide the Board of Trustees ("Board") with information on the funded status of the Plan, development of the actuarially determined contribution rates, and certain financial statement disclosure information.

**Financing Objectives and Funding Policy**

Under Missouri statutes, contribution rates are adopted annually by the Board. The actuarially determined contribution presented herein was actuarially determined based on the funding policy, actuarial assumptions, and actuarial methods adopted by the Board and summarized herein.

In setting contribution rates, the principal objectives of the Board's funding policy are:

- To set contribution rates such that the funded ratio will reach 100% over a closed 30-year period.
- To set contribution rates such that they remain stable over time.
- To set contribution rates such that they promote intergenerational equity.
- To provide a reasonable margin for adverse experience to help offset risks of not meeting the above target.

**Progress Toward Realization of Financing Objectives**

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) is a measure of a Plan's funded status. Absent changes in plan provisions and actuarial assumptions and methods, it should increase over time until it reaches 100% under the current funding policy, though adverse experience could prevent this from being achieved. The funded ratio for the Plan decreased by 0.6% from the preceding year to 85.8%, primarily due to the investment return assumption being lowered, the future COLA assumption being increased as a result of changes to the Board's policy for granting COLAs, and the higher than assumed COLA effective January 1, 2018 partially offset by the recognition of excess returns from prior years in the AVA development and favorable salary experience.

**Benefit Provisions**

The benefit provisions reflected in the valuation reports are those which were in effect at June 30, 2017, as set forth in the related Missouri statutes. It is our understanding that there were no changes in benefit provisions that would impact the valuation.

**Assets and Member Data**

The valuation was based on asset values of the trust fund and member census data as of June 30, 2017. All asset information and member data were provided by PEERS. While we performed certain checks for reasonableness relative to the prior year's data, the data was used unaudited. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying asset and census information.

**Actuarial Assumptions and Methods**

The actuarial assumptions used in the June 30, 2017 valuations were adopted by the Board pursuant to an experience study completed in June 2016. All economic and demographic assumptions were reviewed and updated by the Board, where appropriate, based on the results of the experience study completed in June 2016. For the June 30, 2017 valuation, the investment return and COLA assumptions were updated based on changes to the Board's funding policy adopted at the November 3, 2017 meeting. The next experience study is scheduled to be completed prior to the June 30, 2021 valuation.

We believe the actuarial assumptions and methods are reasonable for the purposes of this valuation report, were developed in accordance with the Actuarial Standards of Practice, and comply with the parameters set forth in Statements No. 67 and No. 68 of the Governmental Accounting Standards Board ("GASB"). Different assumptions and methods may be reasonable for other purposes. As such, the results presented in the valuation reports should only be relied upon for the intended purpose.

**Certification**

We certify that the information presented herein is accurate and fairly portrays the actuarial position of the Plan administered by PEERS as of June 30, 2017 based on the underlying census data, asset information and selected assumptions and methods.

This report contains certain accounting information required to be included in the System's Comprehensive Annual Financial Report. This information has been prepared in accordance with our understanding of GASB No.67. This report also contains employer accounting information prepared in accordance with our understanding of GASB No. 68.

A range of results, different from those presented in this report could be considered reasonable. Future actuarial measurements may differ significantly from the current measurement presented in this report due to a number of factors including but not limited 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 methods 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); rounding conventions; and changes in plan provisions or applicable law. Due to the limited scope of this report, an analysis of the potential range of such future measurements has not been performed.

To the best of our knowledge this actuarial statement is complete and accurate and has been prepared in accordance with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Our calculations also reflect our understanding of the requirements of Missouri state law. The undersigned actuaries are members of the Society of Actuaries and other professional organizations, including the American Academy of Actuaries, and meet the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States relating to pension plans. There is no relationship between the PwC practitioners involved in this engagement and PEERS that may impair our objectivity.

The content of this document is limited to the matters specifically addressed herein and does not address any other potential tax consequences, or the potential application of tax penalties, to any matter other than as set forth herein. Our conclusions are not binding upon any taxing authority or the courts and there is no assurance that any relevant taxing authority will not successfully assert a contrary position. In addition, no exceptions (including the reasonable cause exception) are available for any federal or state penalties imposed if any portion of a transaction is determined to lack economic substance or fails to satisfy any similar rule of law, and our advice will not protect you from any such penalties. This document supersedes all prior written or oral advice with respect to the issues addressed in this document and all such prior communications should not be relied upon by any person for any purpose. This document has been prepared pursuant to an engagement letter between PEERS and PwC, and is intended solely for the use and benefits of PEERS and not for reliance by any other person.

Respectfully submitted,


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## HIGHLIGHTS OF THE ACTUARY'S REPORT

This report presents the results of the actuarial valuation of the Public Education Employee Retirement System of Missouri ("PEERS") defined benefit plan ("Plan") as of June 30, 2017 and has been prepared to present the current funded status of the Plan, contribution requirements for fiscal year 2019 (July 1, 2018 through June 30, 2019), and certain financial statement disclosure information. The valuation was performed using census data for plan members as of June 30, 2017 provided by PEERS and summarized in Section IV of this report, asset information as of June 30, 2017 provided by PEERS, the actuarial assumptions and methods approved by the Board and summarized in Section V, and the plan provisions effective June 30, 2017 summarized in Section VI.

### Contributions

The Board sets, at its discretion and subject to certain restrictions, the applicable employer and member contribution rates upon considering the results of the actuarial valuation and other analysis as appropriate. Based on the objectives of the Board's funding policy, our valuation of the Actuarially Determined Contribution Rate, and the assumptions and methods approved by the Board, the contribution rate approved by the Board is 13.72% (6.86% for employers and 6.86% for members) for fiscal year 2019. A contribution rate of 13.72% represents no change from the rate currently in effect for fiscal year 2018. The contribution rate approved by the Board becomes effective on July 1, 2018. Therefore, the dollar cost will depend on the actual payroll during fiscal year 2019.

Members of PEERS pay half of the total contribution rate, currently 6.86% of pay. If a member terminates employment with less than 5 years of service, their accumulated contributions with interest can be withdrawn as a lump sum, or the member may direct PEERS to make a direct rollover of the distribution amount. When a member becomes vested with at least 5 years of service, the member also has the option to leave their contributions in the Plan and select from various retirement annuity options commencing at retirement age.

### Funded Status

The funded status of PEERS is measured as the ratio of assets available for benefits to a benefit liability measure for the System. While there are several such measures that could be appropriately used, the benefit liability measure that ties most closely to the funding strategy is the Actuarial Accrued Liability (“AAL”) computed in accordance with the assumptions and methods summarized in Section V.

Using the Actuarial Value of Assets ("AVA"), a smoothed asset value that recognizes 20% of the total investment gain or loss on the AVA for each of the preceding five (5) years, the PEERS AAL funded ratio decreased from 86.4% as of June 30, 2016 to 85.8% as of June 30, 2017. The decrease is primarily due to the investment return assumption being lowered, the future COLA assumption being increased as a result of changes to the Board's policy for granting COLAs, and the higher than assumed COLA effective January 1, 2018, partially offset by the recognition of excess returns from prior years in the AVA development and favorable salary experience.

### Investment Experience

The market value of the assets available for benefits has increased from $4.01 billion as of June 30, 2016 to $4.45 billion as of June 30, 2017. The actuarial value of assets increased from $4.16 billion as of June 30, 2016 to $4.47 billion as of June 30, 2017. The actuarial value of assets is more than the market value by $0.02 billion and the difference will be recognized over the next four years.

The assets of the Plan returned 12.3% (net of all expenses) for the year ended June 30, 2017. Based on the Actuarial Value of Assets, the approximate return for the same period was 8.5%. The return on actuarial value is different due to the smoothing of returns greater or less than expected returns over five years. For GASB accounting purposes, the money-weighted return, net of investment expenses only, was also 12.3%.

## HIGHLIGHTS OF THE ACTUARY'S REPORT (CONTINUED)

### Funding Policy

The Board has adopted a formal funding policy with the objective of fully funding the system over a closed 30-year period while adhering to the applicable statutes of the State of Missouri, as well as sound financial principles, such as maintaining contribution rate stability and intergenerational equity. The policy sets forth certain actions, actuarial assumptions and actuarial methods that are to be utilized in executing the funding strategy. Key principles and objectives of the funding policy are summarized in Section II.

At the November 3, 2017 meeting, the Board amended its funding policy with respect to granting cost-of-living adjustments (COLAs) to be as follows

- If the June to June change in the CPI-U is less than 2% for consecutive one year periods, a cost-of-living increase of 2% will be granted when the cumulative increase is equal to or greater than 2%, at which point the cumulative increase in the CPI-U will be reset to zero. For the following year, the starting CPI-U will be based on the June value immediately preceding the January 1 at which the 2% cost-of-living increase is granted.
- If the June to June change in the CPI-U is greater than or equal to 2%, but less than 5%, a cost-of-living increase of 2% will be granted.
- If the June to June change in the CPI-U is greater than or equal to 5%, a cost-of-living increase of 5% will be granted.

The Board also lowered its investment return expectation from 7.75% to 7.60%.

### Governmental Accounting Standards

This report contains certain financial statement information, including notes and required supplemental information, prepared in accordance with our understanding of Governmental Accounting Standards No. 67 and No. 68 ("GASB 67" and "GASB 68"). Information prepared in accordance with GASB 67 is intended to assist PEERS with the preparation of its Comprehensive Annual Financial Report. Information shown in this report prepared in accordance with GASB 68 are the collective amounts for all participating employers in aggregate. Further calculation is required to determine the proportionate share applicable to each participating employer. PEERS is responsible for confirming the accuracy and completeness of any financial reporting information contained herein.

### Changes in Actuarial Assumptions

The investment return and COLA assumptions were updated by the Board as follows based on changes to the Board's funding policy adopted at the November 3, 2017 meeting:

The investment return assumption was lowered from 7.75% to 7.60% per year.

The Board adopted a new COLA policy during fiscal 2017 resulting in an increase in the future COLA assumption from an increasing assumption of 1.05%-1.50% over nine years to an increasing assumption of 1.20%-1.65% over nine years, beginning January 1, 2019.

### Changes in Plan Provisions

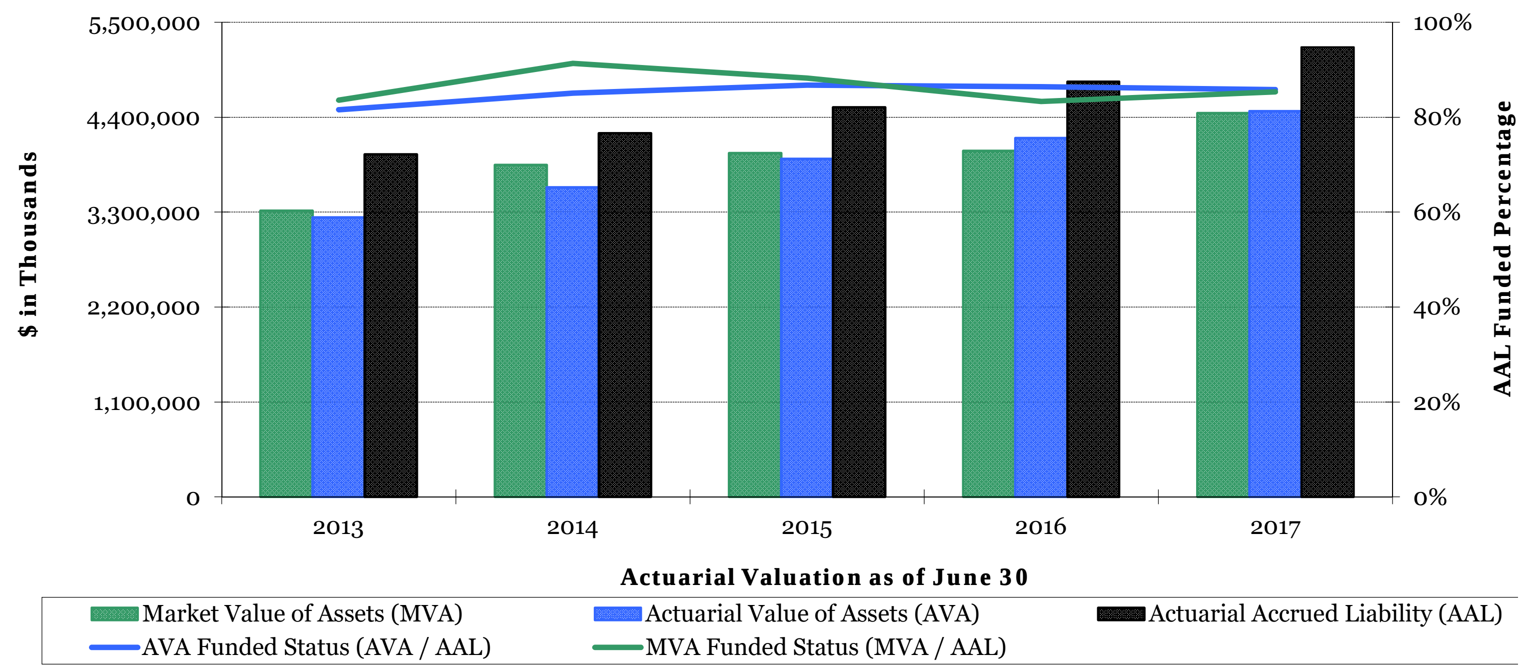
It is our understanding that there were no changes to the plan provisions during the fiscal year that would impact our valuation.

### Changes in Actuarial Methods

There were no changes in the actuarial methods for the June 30, 2017 valuation.

## HISTORICAL SUMMARY

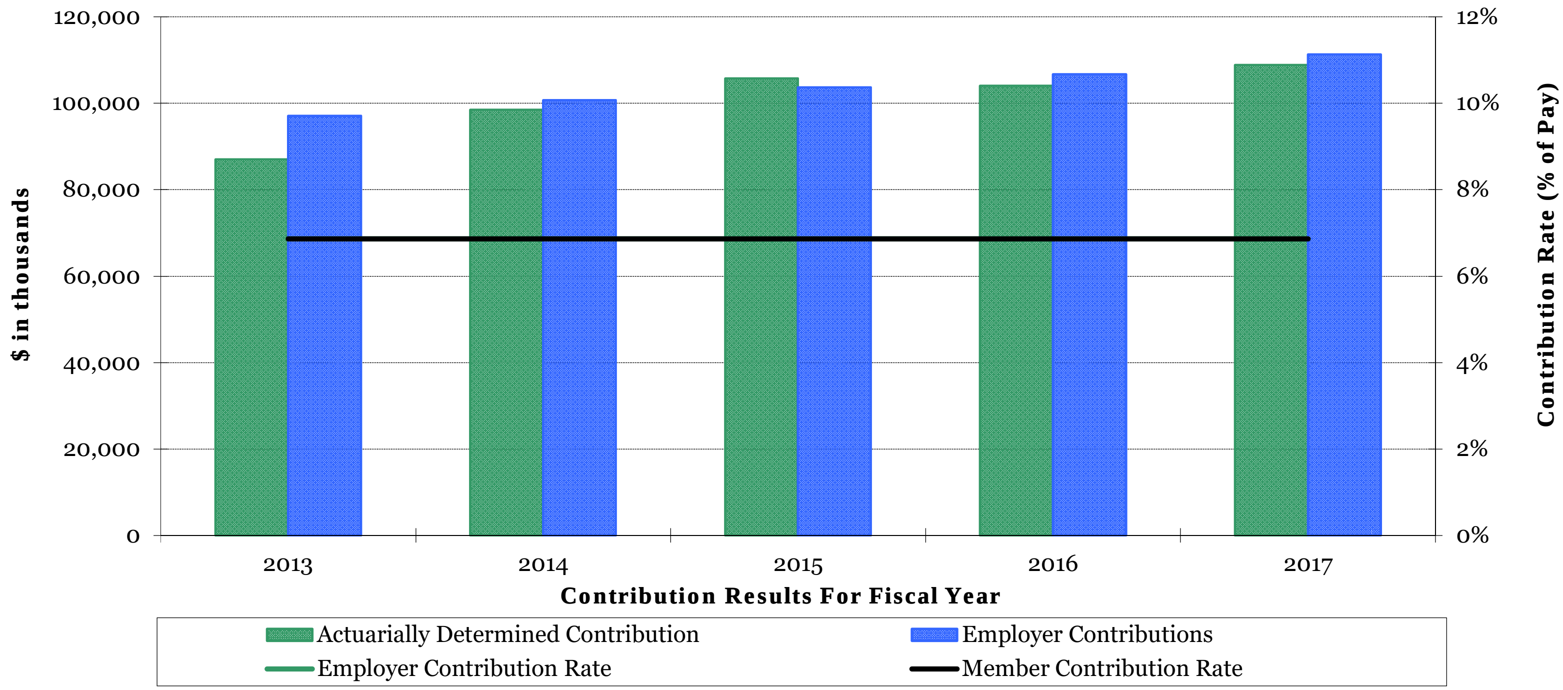
### PEERS – 5 Year History of Funded Status




| **Actuarial Valuation as of June 30:** ($ in '000's) | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Actuarial Accrued Liability (AAL) | $3,967,619 | $4,211,489 | $4,512,317 | $4,809,666 | $5,209,369 |
| Actuarial Value of Assets (AVA) | $3,237,200 | $3,584,719 | $3,915,199 | $4,157,427 | $4,470,270 |
| Market Value of Assets (MVA) | $3,316,513 | $3,846,323 | $3,983,411 | $4,007,331 | $4,446,418 |
| Unfunded Liability (AAL - AVA) | $730,419 | $626,770 | $597,118 | $652,239 | $739,099 |
| AVA Funded Status (AVA / AAL) | 81.6% | 85.1% | 86.8% | 86.4% | 85.8% |
| MVA Funded Status (MVA / AAL) | 83.6% | 91.3% | 88.3% | 83.3% | 85.4% |

## HISTORICAL SUMMARY (CONTINUED)

### PEERS – 5 Year History of Contributions




| Contribution Results For Fiscal Year: ($ in '000's) | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Actuarially Determined Contribution | $87,013.8 | $98,497.8 | $105,739.1 | $104,011.6 | $108,807.2 |
| Employer Contributions | $97,059.3 | $100,699.7 | $103,624.3 | $106,654.6 | $111,239.6 |
| ADC % Contributed | 111.5% | 100.3% | 98.0% | 102.5% | 102.2% |
| Employer Contribution Rate | 6.86% | 6.86% | 6.86% | 6.86% | 6.86% |
| Member Contribution Rate | 6.86% | 6.86% | 6.86% | 6.86% | 6.86% |

## HISTORICAL SUMMARY (CONTINUED)

### Summary of Valuation Results [1]

| Valuation Date | June 30, 2013 | June 30, 2014 | June 30, 2015 | June 30, 2016 | June 30, 2017 |
|---|---|---|---|---|---|
| Development of Actuarially Determined Contribution Rate: | | | | | |
| 1. Anticipated Payroll | $ 1,470,829,580 | $ 1,442,700,979 | $ 1,469,771,528 | $ 1,519,081,146 | $ 1,558,183,433 |
| 2. Total Normal Cost: [2] | | | | | |
| a. Amount | $ 159,672,364 | $ 156,599,641 | $ 161,391,660 | $ 150,975,958 | $ 161,028,014 |
| b. Percentage of Payroll | 10.86% | 10.85% | 10.98% | 9.94% | 10.33% |
| 3. Total Unfunded Actuarial Accrued Liability Annual Amortizations: [3] | | | | | |
| a. Amount | $ 44,064,744 | $ 38,917,522 | $ 38,075,050 | $ 41,637,462 | $ 47,047,980 |
| b. Percentage of Payroll | 3.00% | 2.70% | 2.59% | 2.74% | 3.02% |
| 4. Total Actuarially Determined Contribution Rate: | | | | | |
| a. Percentage of Payroll: (2)(b) + (3)(b) | **13.86%** | **13.55%** | **13.57%** | **12.68%** | **13.35%** |
| b. Effective UAAL Amortization Period | 28.3 Years | 26.8 Years | 25.6 Years | 24.9 Years | 24.4 Years |
| 5. Recommended Total Contribution Rate, Member + Employer: | | | | | |
| a. Percentage of Payroll | **13.72%** | **13.72%** | **13.72%** | **13.72%** | **13.72%** |
| b. Effective UAAL Amortization Period | 31.0 Years | 24.1 Years | 23.2 Years | 15.1 Years | 20.2 Years |
| c. Effective Date | July 1, 2014 | July 1, 2015 | July 1, 2016 | July 1, 2017 | July 1, 2018 |

[1] The contribution rates shown were developed on a funding basis only and do not reflect accounting requirements.

[2] The Normal Cost shown for years prior to June 30, 2016 is mid-year and includes a 1.50% load for anticipated losses on service purchases. The Normal Cost shown after June 30, 2016 is as of the beginning of the year and includes a 1.50% load for anticipated losses on service purchases. As a suggestion noted in the 2016 actuarial audit, this methodology was refined for June 30, 2016 and approved by PEERS.

[3] The Unfunded Actuarial Accrued Liability (UAAL) Amortization shown for years prior to June 30, 2016 is mid-year. The UAAL Amortization after June 30, 2016 is as of the beginning of the year. As a suggestion noted in the 2016 actuarial audit, this methodology was refined for June 30, 2016 and approved by PEERS.

## HISTORICAL SUMMARY (CONTINUED)

### Summary of Valuation Results (Continued)

| | June 30, 2013 | June 30, 2014 | June 30, 2015 | June 30, 2016 | June 30, 2017 |
|---|---|---|---|---|---|
| Census Information | | | | | |
| Active | | | | | |
| Number [1] | 48,709 | 45,589 | 46,835 | 47,851 | 47,953 |
| Average Age | 48.1 | 48.6 | 48.4 | 48.3 | 48.3 |
| Average Years of Service | 8.5 | 8.9 | 8.7 | 8.6 | 8.5 |
| Anticipated Payroll of Actives ($ in 000's) [2] | $ 1,470,830 | $ 1,442,701 | $ 1,469,772 | $ 1,519,081 | $ 1,558,183 |
| Inactive Members | | | | | |
| Vested | | | | | |
| Number [3] | 5,140 | 6,131 | 6,193 | 6,246 | 6,373 |
| Annual Deferred Annuities | $ 17,446,096 | $ 22,283,846 | $ 23,155,969 | $ 23,052,099 | $ 25,166,676 |
| Non Vested | | | | | |
| Number | 9,299 | 10,084 | 10,326 | 10,721 | 12,192 |
| Account Balance | $ 18,843,912 | $ 22,208,522 | $ 22,765,714 | $ 20,227,362 | $ 26,003,850 |
| Former Members | | | | | |
| Entitled to a Deferred Annuity | | | | | |
| Number | 41 | 63 | 117 | 213 | 76 |
| Account Balance | $ 186,326 | $ 229,540 | $ 606,562 | $ 583,480 | $ 427,158 |
| Entitled to a Refund of Contributions | | | | | |
| Number | 14,032 | 15,122 | 14,419 | 14,397 | 14,511 |
| Account Balance | $ 11,122,418 | $ 13,411,695 | $ 13,316,970 | $ 12,827,071 | $ 14,338,372 |
| Retiree/Beneficiary/Disabled | | | | | |
| Number | 23,674 | 25,029 | 26,298 | 27,583 | 29,002 |
| Annual Benefits Payable ($ in 000's) [4] | $ 174,468 | $ 191,823 | $ 210,547 | $ 229,005 | $ 245,448 |

[1] The number of active members as of June 30, 2017 includes 925 members who retired in July 2017.

[2] Figures shown are the anticipated payroll for the one-year period following the valuation date. For the June 30, 2017 valuation, anticipated payroll excludes 925 members who retired in July 2017.

[3] The number of inactive vested members as of June 30, 2017 includes 55 members who retired in July 2017.

[4] The annual benefits payable as of June 30, 2017 does not include 980 members who retired in July 2017.

## HISTORICAL SUMMARY (CONTINUED)

### Summary of Valuation Results (Continued)

| | June 30, 2013 | June 30, 2014 | June 30, 2015 | June 30, 2016 | June 30, 2017 |
|---|---|---|---|---|---|
| **Present Value of Future Benefits** | | | | | |
| Member Contribution Balances | $ 862,034,650 | $ 894,649,839 | $ 892,546,847 | $ 926,273,575 | $ 962,156,459 |
| Retiree/Beneficiary | 1,620,392,250 | 1,826,696,310 | 1,987,643,620 | 2,151,723,215 | 2,395,510,722 |
| Disabled | 33,221,037 | 34,878,711 | 53,003,458 | 53,604,390 | 58,366,475 |
| Inactive | 43,351,365 | 54,693,962 | 57,572,798 | 73,543,298 | 87,659,935 |
| Active | 2,646,723,060 | 2,606,097,222 | 2,771,197,529 | 2,692,310,897 | 2,868,445,165 |
| Total | $ 5,205,722,362 | $ 5,417,016,044 | $ 5,761,964,252 | $ 5,897,455,375 | $ 6,372,138,756 |
| **Actuarial Accrued Liability (AAL)** | | | | | |
| Member Contribution Balances | $ 862,034,650 | $ 894,649,839 | $ 892,546,847 | $ 926,273,575 | $ 962,156,459 |
| Retiree/Beneficiary | 1,620,392,250 | 1,826,696,310 | 1,987,643,620 | 2,151,723,215 | 2,395,510,722 |
| Disabled | 33,221,037 | 34,878,711 | 53,003,458 | 53,604,390 | 58,366,475 |
| Inactive | 43,351,365 | 54,693,962 | 57,572,798 | 73,543,298 | 87,659,935 |
| Active | 1,408,619,450 | 1,400,570,010 | 1,521,550,256 | 1,604,521,479 | 1,705,675,274 |
| Total | $ 3,967,618,752 | $ 4,211,488,832 | $ 4,512,316,979 | $ 4,809,665,957 | $ 5,209,368,865 |
| **Actuarial Value of Assets (AVA)** | | | | | |
| Member Contribution Balances | $ 862,034,650 | $ 894,649,839 | $ 892,546,847 | $ 926,273,575 | $ 962,156,459 |
| Retiree/Beneficiary | 1,620,392,250 | 1,826,696,310 | 1,987,643,620 | 2,151,723,215 | 2,395,510,722 |
| Disabled | 33,221,037 | 34,878,711 | 53,003,458 | 53,604,390 | 58,366,475 |
| Inactive | 43,351,365 | 54,693,962 | 57,572,798 | 73,543,298 | 87,659,935 |
| Active | 678,200,253 | 773,800,411 | 924,432,390 | 952,282,067 | 966,576,322 |
| Total | $ 3,237,199,555 | $ 3,584,719,233 | $ 3,915,199,113 | $ 4,157,426,545 | $ 4,470,269,913 |
| **Unfunded Actuarial Accrued Liability: AAL - AVA [1]** | | | | | |
| Member Contribution Balances | $ - | $ - | $ - | $ - | $ - |
| Retiree/Beneficiary | - | - | - | - | - |
| Disabled | - | - | - | - | - |
| Inactive | - | - | - | - | - |
| Active | 730,419,197 | 626,769,599 | 597,117,866 | 652,239,412 | 739,098,952 |
| Total | $ 730,419,197 | $ 626,769,599 | $ 597,117,866 | $ 652,239,412 | $ 739,098,952 |
| **Funded Percentage: AVA / AAL [1]** | | | | | |
| Member Contribution Balances | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| Retiree/Beneficiary | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| Disabled | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| Inactive | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| Active | 48.1% | 55.2% | 60.8% | 59.3% | 56.7% |
| Total | 81.6% | 85.1% | 86.8% | 86.4% | 85.8% |
| **Market Value of Assets** | $ 3,316,512,798 | $ 3,846,322,885 | $ 3,983,410,820 | $ 4,007,330,673 | $ 4,446,418,007 |
| **Summary of Assumptions [2]** | | | | | |
| Valuation Interest Rate | 8.00% | 8.00% | 8.00% | 7.75% | 7.60% |
| Salary Increases | 5.00% - 12.00% | 5.00% - 12.00% | 5.00% - 12.00% | 4.00% - 11.00% | 4.00% - 11.00% |
| Cost-of-Living Assumption | 2.00% | 2.00% | 2.00% | 1.00% - 1.50% | 1.20% - 1.65% |

[1] In determining the funded percentage, the assets are allocated first to member contribution balances, then to the retiree/beneficiary/disabled liability, then to the inactive liability, and then to the active liability. This does not represent a legal allocation of assets.

[2] The Board adopted a new COLA policy during fiscal 2017 resulting in an increase in the future COLA assumption from an increasing assumption of 1.05%-1.50% over nine years to an increasing assumption of 1.20%-1.65% over nine years, beginning January 1, 2019. In addition, the investment return assumption decreased from 7.75% to 7.60% per year.

## FUNDING

## A. Summary of Funding Policy

### Introduction

The Board of Trustees (Board) for the Public Education Employee Retirement System of Missouri (PEERS) has adopted a funding policy to record the Board's funding objectives, including the systematic funding of future benefit payments for members of PEERS. The Board, through its funding policy, adopts the actuarial assumptions and methods to be used in performing the actuarial valuation, which is the basis for determining the annual contribution rate for both employers and members. The funding policy is updated every five years in conjunction with an experience study. Other changes to the funding policy may be considered in the interim as deemed appropriate by the Board or as recommended by the actuary. The funding policy was most recently amended at the November 3, 2017 Board meeting, with all changes effective for the June 30, 2017 actuarial valuations.

The "Funding" results presented in this section of the report were prepared in accordance with the funding policy.

### Funding Objective

The funding objective set by the Board is to achieve a funded ratio of 100% over a closed 30-year period. For this purpose, the funded ratio is defined as the Actuarial Value of Assets divided by the Actuarial Accrued Liability determined under the Entry Age Normal Level Percent cost method and the actuarial assumptions adopted by the Board.

### Principles of Funding

The Board has identified the following principles to guide its funding policy:

1. Maintain adequate assets so that current plan assets plus future contributions and investment earnings should be sufficient to fund all benefits expected to be paid to members and their beneficiaries.
2. Maintain stability of contribution rates, consistent with other funding objectives.
3. Maintain public policy goals of accountability and transparency. Each policy element is clear in intent and effect, and each should allow an assessment of whether, how, and when the funding requirements of the plan will be met.
4. Promote intergenerational equity. Each generation of members and employers should incur the cost of benefits for the employees who provide services to them, rather than deferring those costs to future members and employers.
5. Provide a reasonable margin for adverse experience to help offset risks.
6. Review the investment earning assumption in conjunction with the periodic asset liability study and in consideration of the Board’s risk profile.
7. Review demographic and economic assumptions in conjunction with an experience study performed by an actuary.
8. Continue progress of systematic reduction of the Unfunded Actuarial Accrued Liabilities (UAAL) while keeping the member and employer contribution rates at or near 6.86% of pay, the contribution rate first paid during 2011-2012.

## A. Summary of Funding Policy (Continued)

### Annual Actuarial Valuation to Set Contribution Rates

In accordance with statute, annual actuarial valuations of the System's assets and liabilities shall be performed by an actuary. The contribution rate shall be established based on the results of these valuations. The funding policy requires that the Actuarially Determined Contribution ("ADC") Rate is equal to the sum of the employer Normal Cost Rate and the Unfunded Actuarial Accrued Liability ("UAAL") Amortization Rate. The Normal Cost Rate is the portion of the Present Value of Future Benefits allocated to the year following the Actuarial Valuation Date by the Actuarial Cost Method, expressed as a percentage of anticipated payroll. The Unfunded Actuarial Accrued Liability (UAAL) Amortization Rate is the portion of the difference between the Actuarial Accrued Liability and Actuarial Value of Assets as of the valuation date, that is to be amortized, expressed as a percentage of anticipated payroll. The contribution rates shall be approved by the Board no later than December 31st for the upcoming school year.

The Board, at its discretion (and to the extent permitted by law), may authorize a change in the member and employer contribution rates from one year to the next should the actuary determine that the contribution rates currently in effect are more or less than required to fully fund the plan over the weighted-average period of the existing UAAL amortization bases established in accordance with the funding policy. The decision by the Board will be based on the expected number of years required to fully fund under the current contribution rates. By statute, the contribution rates cannot be increased by more than 0.5% (0.25% for employers and 0.25% for members) per year.

## B. Development of Funded Status

| | | | June 30, 2016 | | June 30, 2017 |
|---|---|---|---|---|---|
| 1. | Present Value of Future Benefits | | | | |
| | a. Member Contribution Balances | $ | 926,273,575 | $ | 962,156,459 |
| | b. Retirees, Beneficiaries, and Disableds | | 2,205,327,605 | | 2,453,877,197 |
| | c. Inactives | | 73,543,298 | | 87,659,935 |
| | d. Actives | | 2,692,310,897 | | 2,868,445,165 |
| | e. Total: (1)(a) + (1)(b) + (1)(c) + (1)(d) | $ | 5,897,455,375 | $ | 6,372,138,756 |
| 2. | Actuarial Accrued Liability | | | | |
| | a. Member Contribution Balances | $ | 926,273,575 | $ | 962,156,459 |
| | b. Retirees, Beneficiaries, and Disableds | | 2,205,327,605 | | 2,453,877,197 |
| | c. Inactives | | 73,543,298 | | 87,659,935 |
| | d. Actives | | 1,604,521,479 | | 1,705,675,274 |
| | e. Total: (2)(a) + (2)(b) + (2)(c) + (2)(d) | $ | 4,809,665,957 | $ | 5,209,368,865 |
| 3. | Actuarial Value of Assets [1] | | | | |
| | a. Member Contribution Balances | $ | 926,273,575 | $ | 962,156,459 |
| | b. Retirees, Beneficiaries, and Disableds | | 2,205,327,605 | | 2,453,877,197 |
| | c. Inactives | | 73,543,298 | | 87,659,935 |
| | d. Actives | | 952,282,067 | | 966,576,322 |
| | e. Total: (3)(a) + (3)(b) + (3)(c) + (3)(d) | $ | 4,157,426,545 | $ | 4,470,269,913 |
| 4. | Unfunded Actuarial Accrued Liability [1] | | | | |
| | a. Member Contribution Balances: (2)(a) - (3)(a) | $ | - | $ | - |
| | b. Retirees, Beneficiaries, and Disableds: (2)(b) - (3)(b) | | - | | - |
| | c. Inactives: (2)(c) - (3)(c) | | - | | - |
| | d. Actives: (2)(d) - (3)(d) | | 652,239,412 | | 739,098,952 |
| | e Total: (2)(e) - (3)(e) | $ | 652,239,412 | $ | 739,098,952 |
| 5. | Funded Percentage [1] | | | | |
| | a. Member Contribution Balances: (3)(a)/(2)(a) | | 100.0% | | 100.0% |
| | b. Retirees, Beneficiaries, and Disableds: (3)(b)/(2)(b) | | 100.0% | | 100.0% |
| | c. Inactives: (3)(c)/(2)(c) | | 100.0% | | 100.0% |
| | d. Actives: (3)(d)/(2)(d) | | 59.3% | | 56.7% |
| | e. Total: (3)(e)/(2)(e) | | 86.4% | | 85.8% |

[1] In determining the funded percentage, the assets are allocated first to member contribution balances, then to the retiree/beneficiary/disabled liability, then to the inactive liability, and then to the active liability. This does not represent a legal allocation of assets.

## C. Reconciliation of Unfunded Actuarial Accrued Liability

| | | | |
|---|---|---|---|
| 1. | June 30, 2016 Unfunded Actuarial Accrued Liability | $ | 652,239,412 |
| 2. | Normal Cost for 2016 Plan Year | | 150,975,958 |
| 3. | Actuarially Determined Contribution (Employer + Member) | | 192,613,420 |
| 4. | Interest of 7.75% on (1) + (2) - (3) | | 47,321,650 |
| 5. | Expected June 30, 2017 Unfunded Actuarial Accrued Liability<br>(1) + (2) - (3) + (4) | $ | 657,923,600 |
| 6. | Actuarial Value of Assets Experience (Gain)/Loss [1] | $ | (54,777,703) |
| 7. | Actuarial Accrued Liability Experience (Gain)/Loss | | |
| | a. Actuarial Accrued Liability Experience | $ | (14,955,257) |
| | b. Additional Liability Due to Cost-of-living Adjustments [2] | | 10,487,387 |
| | c. Additional Liability Due to Changes in Actuarial Assumptions [3] | | 140,420,925 |
| | d. Additional Liability Due to Changes in Plan Provisions | | - |
| 8. | Total Experience (Gain)/Loss - New Amortization Base<br>(6) + (7)(a) + (7)(b) + (7)(c) + (7)(d) | $ | 81,175,352 |
| 9. | Actual June 30, 2017 Unfunded Actuarial Accrued Liability<br>(5) + (8) | $ | 739,098,952 |

[1] Based on Actuarial (smoothed) Value of Assets. Includes a gain due to contributions made in excess of the Actuarially Determined Contribution and a loss due to member contributions for service purchases being less than the resulting increase in the liability.

[2] The Board granted a Cost-of-Living Adjustment (COLA) of 1.63% effective January 1, 2018, rather than the assumed increase of 1.00%.

[3] The Board adopted a new COLA policy on November 3, 2017 resulting in an increase in the future COLA assumption from an increasing assumption of 1.05%-1.50% over nine years to an increasing assumption of 1.20%-1.65% over nine years, beginning January 1, 2019. In addition, the investment return assumption was lowered from 7.75% to 7.60% per year.

## D. Reconciliation of Actuarial Accrued Liability

| | | | |
|---|---|---|---|
| 1. | June 30, 2016 Actuarial Accrued Liability | $ | 4,809,665,957 |
| 2. | Normal Cost for 2016 Plan Year | | 150,975,958 |
| 3. | Actual Benefit Payments [1] | | 269,268,101 |
| 4. | Transfers, Purchases, and Reinstatements [2] | | 7,544,793 |
| 5. | Interest of 7.75% on (1) + (2) - (3) + (4) [3] | | 374,497,203 |
| 6. | Expected June 30, 2017 Actuarial Accrued Liability: (1) + (2) - (3) + (4) + (5) | $ | 5,073,415,810 |

| | | | | Dollar Change in Liability | Percent Change in Liability |
|---|---|---|---|---|---|
| 7. | (Gain)/Loss Components | | | | |
| | a. | Member Experience Other Than Salary Experience | $ | 2,292,496 | 0.0% |
| | b. | Member Salary Experience | | (17,247,753) | (0.3%) |
| | c. | Additional Liability Due to Cost-of-Living Adjustment [4] | | 10,487,387 | 0.2% |
| | d. | Additional Liability Due to Assumption Changes [5] | | 140,420,925 | 2.8% |
| | e. | Additional Liability Due to Plan Provision Changes | | - | 0.0% |
| | f. | Total: (7)(a) + (7)(b) + (7)(c) + (7)(d) + (7)(e) | $ | 135,953,055 | 2.7% |

| | | | |
|---|---|---|---|
| 8. | Actual June 30, 2017 Actuarial Accrued Liability: (6) + (7)(f) | **$** | **5,209,368,865** |

[1] Includes refunds of accumulated member contributions.

[2] Includes $157,478 of reciprocity and RSMo 169.655 transfers and $7,387,315 of member service purchases and reinstatements.

[3] Reflects a half year of interest on benefit payments and transfers, purchases and reinstatements.

[4] The Board granted a Cost-of-Living Adjustment (COLA) of 1.63% effective January 1, 2018, rather than the assumed increase of 1.00%.

[5] The Board adopted a new COLA policy on November 3, 2017 resulting in an increase in the future COLA assumption from an increasing assumption of 1.05%-1.50% over nine years to an increasing assumption of 1.20%-1.65% over nine years, beginning January 1, 2019. In addition, the investment return assumption was lowered from 7.75% to 7.60% per year.

## E. Reconciliation of Market Value of Assets

| | | June 30, 2016 | June 30, 2017 | |
|---|---|---|---|---|
| 1. | Market Value of Assets, Prior June 30 | $ 3,983,410,820 | $ 4,007,330,673 | |
| 2. | Operating Revenues (Receipts) | | | |
| | a. Employer Contributions | $ 106,717,021 | $ 111,239,585 | [1] |
| | b. Member Contributions | 114,257,497 | 118,446,790 | [2] |
| | c. Interest | 20,041,736 | 21,542,551 | |
| | d. Dividends | 20,567,094 | 23,322,281 | |
| | e. Net Income from Security Lending Activities | 10,556,653 | 577,163 | |
| | f. Net Capital Appreciation/(Depreciation) | 44,363,920 | 488,430,780 | |
| | g. Investment Expenses | (35,212,118) | $ (48,825,931) | |
| | h. Other Income | 104 | 22 | |
| | i Total Receipts: (2)(a) + (2)(b) + (2)(c) + (2)(d) + (2)(e) + (2)(f) + (2)(g) + (2)(h) | $ 281,291,907 | $ 714,733,241 | |
| 3. | Operating Expenses (Disbursements) | | | |
| | a. Benefit Payments | $ 230,685,685 | $ 251,077,530 | |
| | b. Refunds to Members | 19,704,792 | 18,190,571 | |
| | c. Administrative Expenses | 6,981,527 | 6,365,275 | [3] |
| | d. Other Expenses | 50 | 12,531 | |
| | e. Total Disbursements: (3)(a) + (3)(b) + (3)(c) + (3)(d) | $ 257,372,054 | $ 275,645,907 | |
| 4. | Excess of Revenues over Expenses: (2)(i) - (3)(e) | $ 23,919,853 | $ 439,087,334 | |
| 5. | Market Value of Assets, Current June 30: (1) + (4) | **$ 4,007,330,673** | **$ 4,446,418,007** | |

[1] Includes $157,478 of reciprocity and RSMo 169.655 transfers, $734,395 of contributions for system employees other than investment staff, and $103,294 of interest and other adjustments.

[2] Includes $7,387,315 of member service purchases and reinstatements.

[3] Includes $734,395 of contributions for system employees other than investment staff.

## F. Development of Actuarial Value of Assets

| | | | | | |
|---|---|---|---|---|---|
| 1. | Actuarial Value of Assets June 30, 2016 | | | $ | 4,157,426,545 |
| 2. | Activity for Fiscal Year 2017 | | | | |
| | a. Contributions [1] | | | $ | 229,686,375 |
| | b. Benefit Payments [2] | | | | (269,268,101) |
| | c. Net Cash Flow | | | $ | (39,581,726) |
| 3. | Expected Returns [3] | | | $ | 320,695,384 |
| 4. | Assets Before Allocation of Gain/Loss: (1) + (2) + (3) | | | $ | 4,438,540,203 |
| 5. | Actual Returns for 2017 (Net of Expenses) | | | $ | 478,669,060 |
| 6. | Excess Returns for 2017: (5) - (3) | | | $ | 157,973,676 |
| 7. | Recognized Excess Returns: | | | | |
| | Year | Excess Return | % Unrecognized | | |
| | 2017 | 157,973,676 | 80% | $ | 31,594,735 |
| | 2016 | (258,726,115) | 60% | | (51,745,223) |
| | 2015 | (127,847,304) | 40% | | (25,569,461) |
| | 2014 | 280,718,719 | 20% | | 56,143,744 |
| | 2013 | 106,529,578 | 0% | | 21,305,915 |
| | Total | | | $ | 31,729,710 |
| 8. | Actuarial Value of Assets, June 30, 2017: (4) + (7) | | | **$** | **4,470,269,913** |

[1] Includes $157,478 of reciprocity and RSMo 169.655 transfers, $734,395 of contributions for System employees other than investment staff, $103,294 of interest and other adjustments, and $7,387,315 of member service purchases and reinstatements.

[2] Includes refunds of accumulated member contributions.

[3] Assumes cash flows occur at mid-year.

## G. Contribution Rate

| Development of Actuarially Determined Contribution Rate: | | June 30, 2016 | | June 30, 2017 |
|---|---|---|---|---|
| 1. Anticipated Payroll | $ | 1,519,081,146 | $ | 1,558,183,433 |
| 2. Normal Cost | | | | |
| a. Amount | $ | 150,975,958 | $ | 161,028,014 |
| b. Percentage of Payroll | | 9.94% | | 10.33% |
| 3. Unfunded Actuarial Accrued Liability (UAAL) Amortization | | | | |
| a. Amount | $ | 41,637,462 | $ | 47,047,980 |
| b. Percentage of Payroll | | 2.74% | | 3.02% |
| 4. Actuarially Determined Contribution Rate | | | | |
| a. Percentage of Payroll: (2)(b) + (3)(b) | | **12.68%** | | **13.35%** |
| b. Effective UAAL Amortization Period | | 24.9 Years | | 24.4 Years |
| 5. Recommended Total Contribution Rate, Member + Employer | | | | |
| a. Percentage of Payroll | | **13.72%** | | **13.72%** |
| b. Effective UAAL Amortization Period | | 15.1 Years | | 20.2 Years |
| c. Effective Date | | July 1, 2017 | | July 1, 2018 |

## H. Development of the Normal Cost Rate

| | | | Dollar [1] | Rate |
|---|---|---|---|---|
| 1. | Active Members | | | |
| | a. | Retirement Benefits | $ 117,460,300 | 7.54% |
| | b. | Termination Benefits | 40,152,238 | 2.57% |
| | c. | Death and Disability Benefits | 3,415,476 | 0.22% |
| | e. | Total Normal Cost | $ 161,028,014 | 10.33% |
| 2. | Anticipated Member Payroll | | $ 1,558,183,433 | |

[1] Normal cost amounts include a 1.50% load for anticipated losses on service purchases.

## I. Development of the Unfunded Actuarial Accrued Liability Amortization Rate

| | Date Base Established | Reason | Remaining Balance [1] | Remaining Period | Amortization Amount | Rate |
|---|---|---|---|---|---|---|
| 1. | 6/30/2007 | Plan Amendment | $ 992,015 | 10 | $ 118,610 | 0.01% |
| 2. | 6/30/2011 | UAAL Fresh Start | 568,091,192 | 24 | $ 36,537,216 | 2.34% |
| 3. | 6/30/2012 | Actuarial Experience | 135,997,978 | 25 | $ 8,542,742 | 0.55% |
| 4. | 6/30/2013 | Plan Amendment | 1,723,633 | 16 | $ 144,182 | 0.01% |
| 5. | 6/30/2013 | Actuarial Experience | 66,512,232 | 26 | $ 4,086,493 | 0.26% |
| 6. | 6/30/2014 | Actuarial Experience | (122,291,323) | 27 | $ (7,358,917) | -0.47% |
| 7. | 6/30/2015 | Actuarial Experience | (40,704,852) | 28 | $ (2,401,993) | -0.15% |
| 8. | 6/30/2016 | Actuarial Experience and Assumption Changes | 47,602,725 | 29 | $ 2,757,790 | 0.18% |
| 9. | 6/30/2017 | Actuarial Experience and Assumption Changes [2] | 81,175,352 | 30 | $ 4,621,857 | 0.29% |
| | Total | | $ 739,098,952 | | $ 47,047,980 | 3.02% |

10. Anticipated Member Payroll $ 1,558,183,433

[1] In accordance with the funding policy, amounts are amortized as a level percent of payroll assuming 3.25% payroll growth and 7.60% discount rate.

[2] The Board adopted a new COLA policy on November 3, 2017 resulting in an increase in the future COLA assumption from an increasing assumption of 1.05%-1.50% over nine years to an increasing assumption of 1.20%-1.65% over nine years, beginning January 1, 2019. In addition, the investment return assumption was lowered from 7.75% to 7.60% per year.

## J. History of Contribution Rates [1]

| Valuation Date | Effective Date | Total Contribution Rate |
|---|---|---|
| June 30, 2001 | July 1, 2002 | 10.00% |
| June 30, 2002 | July 1, 2003 | 10.00% |
| June 30, 2003 | July 1, 2004 | 10.50% |
| June 30, 2004 | July 1, 2005 | 11.00% |
| June 30, 2005 | July 1, 2006 | 11.50% |
| June 30, 2006 | July 1, 2007 | 12.00% |
| June 30, 2007 | July 1, 2008 | 12.50% |
| June 30, 2008 | July 1, 2009 | 13.00% |
| June 30, 2009 | July 1, 2010 | 13.26% |
| June 30, 2010 | July 1, 2011 | 13.72% |
| June 30, 2011 | July 1, 2012 | 13.72% |
| June 30, 2012 | July 1, 2013 | 13.72% |
| June 30, 2013 | July 1, 2014 | 13.72% |
| June 30, 2014 | July 1, 2015 | 13.72% |
| June 30, 2015 | July 1, 2016 | 13.72% |
| June 30, 2016 | July 1, 2017 | 13.72% |

[1] Valuation results prior to June 30, 2009 were calculated by the prior actuary.

## K. Historical Investment Experience

| Year Ending June 30 | Rate of Investment Return: Market Basis [1] | Rate of Investment Return: Actuarial Basis [2, 3] | Actuarial Assumed Interest Rate |
|---|---|---|---|
| 2008 | (4.4%) | 7.9% | 8.00% |
| 2009 | (18.9%) | 2.0% | 8.00% |
| 2010 | 12.5% | 2.5% | 8.00% |
| 2011 | 21.2% | 4.3% | 8.00% |
| 2012 | 1.4% | 1.9% | 8.00% |
| 2013 | 12.1% | 4.8% | 8.00% |
| 2014 | 16.7% | 11.4% | 8.00% |
| 2015 | 4.3% | 9.8% | 8.00% |
| 2016 | 1.6% | 7.0% | 8.00% |
| 2017 | 12.3% | 8.5% | 7.75% |

[1] As provided by PEERS. Net of all expenses and fees.

[2] Approximate return net of all expenses and fees and assuming all cash flows occurred at mid-year.

[3] Valuation results prior to June 30, 2009 were calculated by the prior actuary.

## ACCOUNTING

## PLAN FINANCIAL STATEMENTS UNDER GASB #67

### A. Statement of Fiduciary Net Position under GASB #67 as of June 30, 2017

| | | | | |
|---|---|---|---|---|
| 1. | Assets | | | |
| | a. | Cash | $ | 19,214,380 |
| | b. | Receivables | | |
| | | i. Contributions Receivable | $ | 23,511,853 |
| | | ii. Accrued Interest and Dividends | | 8,861,891 |
| | | iii. Investment Sales | | 198,930,997 |
| | | iv. Due from PSRS | | - |
| | | v. Other | | 3,124 |
| | | vi. Total Receivables | $ | 231,307,865 |
| | c. | Total Investments | | |
| | | i. Short-Term Investments | $ | 72,395,763 |
| | | ii. US Treasuries and TIPS | | 746,114,898 |
| | | iii. US Public Equities | | 1,361,493,671 |
| | | iv. Global Public Equities | | 746,487,217 |
| | | v. Public Debt | | 299,390,396 |
| | | vi. Private Equity | | 371,673,265 |
| | | vii. Private Credit | | 29,812,897 |
| | | viii. Private Real Estate | | 336,326,144 |
| | | ix. Hedged Assets | | 506,859,320 |
| | | x. Total Investments | $ | 4,470,553,571 |
| | d. | Invested Securities Lending Collateral | | 29,932,450 |
| | e. | Prepaid Expenses | | - |
| | f. | Fixed Assets, Net of Depreciation | | - |
| | g. | Total Assets: (1)(a) + (1)(b)(vi) + (1)(c)(x) + (1)(d) + (1)(e) + (1)(f) | $ | 4,751,008,266 |
| 2. | Liabilities | | | |
| | a. | Accounts Payable | $ | 1,625,009 |
| | b. | Interest Payable | | 60,725 |
| | c. | Securities Lending Collateral | | 29,930,346 |
| | d. | Investment Purchases | | 270,688,618 |
| | e. | Due to PSRS | | 669,925 |
| | f. | Accrued Medical Claims [1] | | 30,400 |
| | g. | OPEB Liability for System Employees [1] | | 779,038 |
| | h. | Compensated Absences [1] | | 806,198 |
| | i. | Total Liabilities: (2)(a) + (2)(b) + (2)(c) + (2)(d) + (2)(e) + (2)(f) + (2)(g) + (2)(h) | $ | 304,590,259 |
| 3. | Fiduciary Net Position Restricted for Pensions: (1)(g) - (2)(i) | | **$** | **4,446,418,007** |

[1] Compensation and benefit costs related to System employees and paid from the Trust.

## PLAN FINANCIAL STATEMENTS UNDER GASB #67

### B. Statement of Changes in Fiduciary Net Position under GASB #67 for the Year Ended June 30, 2017

| | | | | | |
|---|---|---|---|---|---|
| 1. | Fiduciary Net Position as of June 30, 2016 | | | $ | 4,007,330,673 |
| 2. | Additions | | | | |
| | a. | Contributions | | | |
| | | i. | Member Contributions [1] | $ | 118,446,790 |
| | | ii. | Employer Contributions - Proportionate Share | | 110,244,418 |
| | | iii. | Employer Contributions - Other [2] | | 995,167 |
| | | iv. | Non-Employer Contributing Entity Contributions | | - |
| | | v. | Total Contributions | $ | 229,686,375 |
| | b. | Investment Income/(Loss) | | | |
| | | i. | Net Appreciation/(Depreciation) | $ | 488,430,780 |
| | | ii. | Net Interest and Dividend Income | | 44,864,832 |
| | | iii. | Net Income from Security Lending Activities | | 577,163 |
| | | iv. | Other Net Investment Income | | - |
| | | v. | Investment Expenses and Rebates | | (48,825,931) |
| | | vi. | Total Investment Income/(Loss) | $ | 485,046,844 |
| | c. | Other Additions | | | |
| | | i. | Miscellaneous Income | $ | 22 |
| | | ii. | Total Other Additions | $ | 22 |
| | d. | Total Revenue (Additions): (2)(a)(v) + (2)(b)(vi) + (2)(c)(ii) | | $ | 714,733,241 |
| 3. | Deductions | | | | |
| | a. | Monthly Benefits | | $ | 251,077,530 |
| | b. | Refunds of Contributions | | | 18,190,571 |
| | c. | Administrative Expenses [3] | | | 6,365,275 |
| | d. | Other Expenses | | | 12,531 |
| | e. | Total Expenses (Deductions): (3)(a) + (3)(b) + (3)(c) + (3)(d) | | $ | 275,645,907 |
| 4. | Net Increase (Decrease) in Fiduciary Net Position: (2)(d) - (3)(e) | | | $ | 439,087,334 |
| 5. | Fiduciary Net Position as of June 30, 2017: (1) + (4) | | | **$** | **4,446,418,007** |

[1] Includes $7,387,315 of member service purchases and reinstatements.

[2] Includes $157,478 of reciprocity and RSMo 169.655 transfers, $734,395 of contributions for system employees other than investment staff, and $103,294 of interest and other adjustments.

[3] Includes $734,395 of contributions for system employees other than investment staff.

## EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68

### C. Net Pension Liability under GASB #68 for the Year Ended June 30, 2017

| | | | |
|---|---|---|---|
| 1. | Total Pension Liability | | |
| | a. Total Pension Liability - Beginning of year | | $ 4,809,665,957 |
| | b. Total service cost | | 150,975,958 |
| | c. Interest cost [1] | | 374,497,203 |
| | d. Experience (gains)/losses | | (4,467,870) |
| | e. Assumption changes | | 140,420,925 |
| | f. Plan amendments | | - |
| | g. Benefit payments [2] | | (269,268,101) |
| | h. Transfers, Purchases, and Reinstatements | | 7,544,793 |
| | i. Total Pension Liability - End of year | | $ 5,209,368,865 |
| 2. | Plan Fiduciary Net Position | | |
| | a. Plan Fiduciary Net Position - Beginning of year | | $ 4,007,330,673 |
| | b. Employer contributions [3] | | 111,239,585 |
| | c. Member contributions [4] | | 118,446,790 |
| | d. Non-employer contributing entity contributions | | - |
| | e. Investment return | | |
| | i. Expected investment return [1, 5] | $ 309,062,954 | |
| | ii. Investment gain/(loss) | 175,983,912 | |
| | iii. Net investment return | | 485,046,866 |
| | f. Benefit payments [3] | | (269,268,101) |
| | g. Administrative and Other Expenses [6] | | (6,377,806) |
| | h. Plan Fiduciary Net Position - End of year: | | $ 4,446,418,007 |
| 3. | Net Pension Liability | | |
| | a. Net Pension Liability: (1)(i) - (2)(h) | | **$ 762,950,858** |
| | b. Plan Fiduciary Net Position as a Percentage of the Total Pension Liability : (2)(h) / (1)(i) | | 85.4% |

[1] Reflects actual benefit payments.
[2] Includes refunds of accumulated member contributions.
[3] Includes $157,478 of reciprocity and RSMo 169.655 transfers, $734,395 of contributions for system employees other than investment staff, and $103,294 of interest and other adjustments.
[4] Includes $7,387,315 of member service purchases and reinstatements.
[5] 7.75%, net of investment expenses and assuming cash flows occur at mid-year.
[6] Includes $734,395 of contributions for system employees other than investment staff.

**EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68**

**D. Deferred Inflows and Outflows of Resources under GASB #68 for the Year Ended June 30, 2017 [1]**

| Fiscal Year Established | Reason | | Remaining Balance At Beginning of Year | Remaining Period [2] | | Annual Recognition | | Remaining Balance At End of Year |
|---|---|---|---|---|---|---|---|---|
| 1. Liability experience | | | | | | | | |
| a. Inflows | | | | | | | | |
| 2014 | Experience gain | $ | 3,965,110 | 1.15 | $ | 3,447,922 | $ | 517,188 |
| 2016 | Experience gain | $ | 43,058,808 | 2.71 | $ | 15,888,860 | $ | 27,169,948 |
| 2017 | Experience gain | $ | 4,467,870 | 3.58 | $ | 1,248,009 | $ | 3,219,861 |
| b. Outflows | | | | | | | | |
| 2015 | Experience loss | $ | (23,224,386) | 2.10 | $ | (11,059,232) | $ | (12,165,154) |
| 2. Assumption changes | | | | | | | | |
| a. Inflows | | | | | | | | |
| None | | | | | | | | |
| b. Outflows | | | | | | | | |
| 2016 | Assumption Loss | $ | (47,787,105) | 2.71 | $ | (17,633,619) | $ | (30,153,486) |
| 2017 | Assumption Loss | $ | (140,420,925) | 3.58 | $ | (39,223,723) | $ | (101,197,202) |
| 3. Investment experience [3] | | | | | | | | |
| a. Inflows | | | | | | | | |
| 2014 | Investment gain | $ | 108,752,640 | 2.00 | $ | 54,376,320 | $ | 54,376,320 |
| 2017 | Investment gain | $ | 175,983,912 | 5.00 | $ | 35,196,783 | $ | 140,787,129 |
| b. Outflows | | | | | | | | |
| 2015 | Investment loss | $ | (85,887,728) | 3.00 | $ | (28,629,244) | $ | (57,258,484) |
| 2016 | Investment loss | $ | (205,761,179) | 4.00 | $ | (51,440,295) | $ | (154,320,884) |
| 4. Total deferred inflows / outflows: (1) + (2) + (3) | | | | | | | | |
| a. Inflows | | | | | | | | |
| | Total | **$** | **336,228,340** | | **$** | **110,157,894** | **$** | **226,070,446** |
| b. Outflows | | | | | | | | |
| | Total | **$** | **(503,081,323)** | | **$** | **(147,986,113)** | **$** | **(355,095,210)** |

[1] As allowable under GASB #68, PEERS elected to prepare the information prospectively from June 30, 2013.
[2] The initial amortization period for liability experience gains / losses and assumption change gains / losses is equal to the expected future working lifetime of all members, active and inactive. The initial amortization period for investment gains / losses is five years.
[3] Net of investment expenses.

**EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68**

**D. Deferred Inflows and Outflows of Resources under GASB #68 for the Year Ended June 30, 2017 (Continued)**

Amounts reported as collective deferred inflows / (outflows) of resources to be recognized in pension expense:

| Year Ending June 30: | | |
|---|---|---|
| 2018 | $ | (40,758,953) |
| 2019 | $ | (85,193,167) |
| 2020 | $ | (38,269,424) |
| 2021 | $ | 35,196,780 |
| 2022 | $ | - |
| Thereafter | $ | - |

## EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68

### E. Pension Expense under GASB #68 for the Year Ended June 30, 2017

| | | | |
|---|---|---|---|
| 1. | Service cost | | |
| | a. Total service cost | $ | 150,975,958 |
| | b. Member contributions [1] | | (111,059,475) |
| | c. Administrative and other expenses [2] | | 5,540,117 |
| | d. Net employer service cost | $ | 45,456,600 |
| 2. | Plan amendments | $ | - |
| 3. | Interest cost | $ | 374,497,203 |
| 4. | Expected return on assets | $ | (309,062,954) |
| 5. | Recognition of deferred (inflows) / outflows of resources related to: | | |
| | a. Liability experience (gains) / losses | $ | (9,525,559) |
| | b. Assumption changes (gains) / losses | | 56,857,342 |
| | c. Investment (gains) / losses | | (9,503,564) |
| | d. Total: (5)(a) + (5)(b) + (5)(c) | $ | 37,828,219 |
| 6. | Total collective pension expense: (1)(d) + (2) + (3) + (4) + (5)(d) | **$** | **148,719,068** |

[1] Excludes $7,387,315 of member service purchases and reinstatements.

[2] Administrative expenses exclude $734,395 of contributions for system employees other than investment staff. Reflects $103,294 of interest and other adjustments to employer contributions.

## NOTES TO THE FINANCIAL STATEMENTS UNDER GASB #67 AND #68

### F. Selected Notes to the Financial Statements under GASB #67 and #68

1. The Public Education Employee Retirement System of Missouri is a cost-sharing multiple-employer plan for GASB accounting purposes.

2. Significant actuarial assumptions and other inputs used to measure the total pension liability:

- Measurement Date: June 30, 2017
- Valuation Date: June 30, 2017
- Experience Study: The Board of Trustees adopts actuarial assumptions, each of which individually represents a reasonable long-term estimate of anticipated experience under the System, derived from experience studies conducted every fifth year. The most recent comprehensive experience study was completed in June 2016. All economic and demographic assumptions were reviewed and updated, where appropriate, based on the results of the study and effective with the June 30, 2016 valuation. For the June 30, 2017 valuation, the investment return and COLA assumptions were updated based on changes to the Board's funding policy adopted at the November 3, 2017 meeting. The next experience study is scheduled to be completed prior to the June 30, 2021 valuation.
- Inflation: 2.25% per annum
- Total Payroll Growth: 3.25% per annum, consisting of 2.25% inflation, 0.50% real wage growth due to the inclusion of active health care costs in pensionable earnings, and 0.50% of real wage growth due to productivity.
- Future Salary Increases: 4.00% - 11.00%, depending on service and including 2.25% inflation, 0.50% real wage growth due to the inclusion of active health care costs in pensionable earnings, and 0.50% of real wage growth due to productivity.
- Cost-of-Living Increases: The cost of living adjustment (COLA) assumed in the valuation increases from 1.20% to 1.65% over nine years beginning January 1, 2019. The COLA reflected for January 1, 2018 is 1.63%, in accordance with the actual COLA approved by the Board. This COLA assumption reflects an assumption that general inflation will increase from 1.80% to a normative inflation assumption of 2.25% over nine years. It is also based on the current policy of the Board to grant a COLA on each January 1 as follows:
  - If the June to June change in the CPI-U is less than 2% for consecutive one year periods, a cost-of-living increase of 2% will be granted when the cumulative increase is equal to or greater than 2%, at which point the cumulative increase in the CPI-U will be reset to zero. For the following year, the starting CPI-U will be based on the June value immediately preceding the January 1 at which the 2% cost-of-living increase is granted.
  - If the June to June change in the CPI-U is greater than or equal to 2%, but less than 5%, a cost-of-living increase of 2% will be granted.
  - If the June to June change in the CPI-U is greater than or equal to 5%, a cost-of-living increase of 5% will be granted.

  The COLA is effective each January 1, beginning on the fourth January after retirement, and capped at 80% lifetime increase.
- Mortality Assumption
  - Actives: 75% of the RP-2006 Total Dataset Mortality Tables with static projection to 2028 using the 2014 SSA Improvement Scale.

## NOTES TO THE FINANCIAL STATEMENTS UNDER GASB #67 AND #68

### F. Selected Notes to the Financial Statements under GASB #67 and #68 (Continued)

- Mortality Assumption (Continued)

| | |
|---|---|
| Non-Disabled Retirees, Beneficiaries and Survivors: | RP-2006 Total Dataset Mortality Tables with plan-specific experience adjustments and static projection to 2028 using the 2014 SSA Improvement Scale. |
| Disabled Retirees: | RP-2006 Disabled Retiree Mortality Tables, with static projection to 2028 using the 2014 SSA Improvement Scale. |

A summary of mortality rates can be found in Section V.

- Discount Rate

The discount rate used to measure the total pension liability was 7.60% as of June, 30, 2017, and is equal to the long-term expected return on plan investments. Consistent with the Board's funding policy, we have assumed that the employer contributions would be made at a rate consistent with the actuarially determined rate, computed in accordance with assumptions and methods stated in the funding policy. The funding policy requires payment of the normal cost and amortization of the unfunded actuarially accrued liability as a level percent of employee payroll in installments over 30 years utilizing a closed period, layered approach. Based on this policy, which has been followed for the past several years, the pension plan's fiduciary net position would be sufficient to make all projected future benefit payments of current plan members.

- Discount Rate Sensitivity

| | 1% Decrease (6.60%) | Current Rate (7.60%) | 1% Increase (8.60%) |
|---|---|---|---|
| Net Pension Liability | $ 1,405,450,435 | $ 762,950,858 | $ 224,028,056 |

3. Classes of plan members covered:

| | |
|---|---|
| - Retired members, beneficiaries and disabled members receiving benefits: | 29,002 |
| - Inactive members (vested and non-vested): | 18,565 |
| - Former members: | 14,587 |
| - Active Plan Members: | 47,953 |
| - Total membership: | 110,107 |

4. Money-weighted rate of return:
The money-weighted rate of return equals the investment performance, net of pension plan investment expenses, and adjusted for the changing amounts actually invested. For the fiscal year ending June 30, 2017, the money-weighted return on the plan assets is 12.3%.

5. The components of the Net Pension Liability for the Public Education Employee Retirement System of Missouri as of June 30, 2017, are as follows:

| | |
|---|---|
| - Total Pension Liability | $ 5,209,368,865 |
| - Plan Fiduciary Net Position | 4,446,418,007 |
| - Net Pension Liability | $ 762,950,858 |
| - Plan Fiduciary Net Position as a Percentage of the Total Pension Liability | 85.4% |

## REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #67 AND #68

### G. Schedule of Changes in the Net Pension Liability and Plan Fiduciary Net Position under GASB #67 and #68 [1]

| Year Ending June 30: | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| 1. Total Pension Liability | | | | |
| a. Total Pension Liability - Beginning of year | $ 3,967,618,752 | $ 4,211,488,832 | $ 4,512,316,979 | $ 4,809,665,957 |
| b. Total service cost [2] | 159,672,364 | 156,599,641 | 161,391,660 | 150,975,958 |
| c. Interest cost [3] | 315,131,402 | 333,780,285 | 372,184,628 | 374,497,203 |
| d. Experience (gains)/losses | (14,308,876) | 45,342,850 | (58,947,668) | (4,467,870) |
| e. Assumption changes | - | - | 65,420,724 | 140,420,925 |
| f. Plan amendments | - | - | - | - |
| g. Benefit payments [4] | (216,624,810) | (235,070,181) | (250,390,477) | (269,268,101) |
| h. Transfers, Purchases, and Reinstatements | - | 175,552 | 7,690,111 | 7,544,793 |
| i. Total Pension Liability - End of year | $ 4,211,488,832 | $ 4,512,316,979 | $ 4,809,665,957 | $ 5,209,368,865 |
| 2. Plan Fiduciary Net Position | | | | |
| a. Plan Fiduciary Net Position - Beginning of year | $ 3,316,512,798 | $ 3,846,322,885 | $ 3,983,410,820 | $ 4,007,330,673 |
| b. Employer contributions [5] | 100,699,735 | 103,624,310 | 106,717,021 | 111,239,585 |
| c. Member contributions [6] | 106,420,656 | 110,443,660 | 114,257,497 | 118,446,790 |
| d. Non-employer contributing entity contributions | - | - | - | - |
| e. Net investment return | 544,154,941 | 163,719,697 | 60,317,389 | 485,046,866 |
| f. Benefit payments [4] | (216,624,810) | (235,070,181) | (250,390,477) | (269,268,101) |
| g. Administrative and Other Expenses [7] | (4,840,435) | (5,629,551) | (6,981,577) | (6,377,806) |
| h. Plan Fiduciary Net Position - End of year | $ 3,846,322,885 | $ 3,983,410,820 | $ 4,007,330,673 | $ 4,446,418,007 |

[1] As allowable under GASB #68, PEERS elected to prepare the information prospectively from June 30, 2013.

[2] The Service Cost shown for fiscal years ending on or before June 30, 2016 is mid-year and includes a 1.50% load for anticipated losses on service purchases. The Service Cost for fiscal year ending June 30, 2017 is as of the beginning of the year and includes a 1.50% load for anticipated losses on service purchases. As a suggestion noted in the 2016 actuarial audit, this methodology was refined beginning with the June 30, 2016 valuation and approved by PEERS.

[3] Reflects actual benefit payments. The Interest Cost shown for fiscal year ending June 30, 2016 includes an adjustment due to changes from mid-year to beginning-of-year and from simple to compound interest. As a suggestion noted in the 2016 actuarial audit, this methodology was refined beginning with the June 30, 2016 valuation and approved by PEERS.

[4] Includes refunds of accumulated member contributions and other interfund transfers.

[5] Includes contributions for reciprocity and RSMo 169.655 transfers, contributions for system employees, and interest and other adjustments.

[6] Includes contributions for service purchases and reinstatements.

[7] Includes contributions for system employees.

## REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #67 AND #68

### H. Schedule of Net Pension Liability and Related Ratios under GASB #67 and #68 [1]

| 1. Year Ending | 2. Total Pension Liability | 3. Plan Fiduciary Net Position | 4. Net Pension Liability (2) - (3) | 5. Fiduciary Net Position as a Percentage of Total Pension Liability (3) / (2) | 6. Anticipated Covered Employee Payroll [2] | 7. Net Pension Liability as a Percentage of Covered Payroll (4) / (6) |
|---|---|---|---|---|---|---|
| 6/30/2014 | $ 4,211,488,832 | $ 3,846,322,885 | $ 365,165,947 | 91.3% | $ 1,442,700,979 | 25.3% |
| 6/30/2015 | $ 4,512,316,979 | $ 3,983,410,820 | $ 528,906,159 | 88.3% | $ 1,469,771,528 | 36.0% |
| 6/30/2016 | $ 4,809,665,957 | $ 4,007,330,673 | $ 802,335,284 | 83.3% | $ 1,519,081,146 | 52.8% |
| 6/30/2017 | $ 5,209,368,865 | $ 4,446,418,007 | $ 762,950,858 | 85.4% | $ 1,558,183,433 | 49.0% |

[1] As allowable under GASB #68, PEERS elected to prepare the information prospectively from June 30, 2013.

[2] Pensionable pay as provided by PEERS. Gross member compensation, which may include components of compensation not included in pensionable compensation was not made available to PwC.

## REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #67 AND #68

### I. Schedule of Contributions under GASB #67 and #68 [1]

| 1.<br>Year Ending | 2.<br>Actuarially Determined Contribution [1,2] | 3.<br>Actual Employer Contributions | 4.<br>Contribution Excess / (Deficiency) (Deficiency)<br>(3) - (2) | 5.<br>Actual Covered Member Payroll | 6.<br>Contributions as a Percentage of Covered Payroll<br>(3) / (5) |
|---|---|---|---|---|---|
| 6/30/2008 | 90,727,016 | 77,988,839 | (12,738,177) | 1,299,813,983 | 6.00% |
| 6/30/2009 | 96,775,289 | 85,915,562 | (10,859,727) | 1,374,648,992 | 6.25% |
| 6/30/2010 | 95,560,084 | 91,478,725 | (4,081,359) | 1,407,365,000 | 6.50% |
| 6/30/2011 | 90,816,155 | 90,816,155 | - | 1,369,776,094 | 6.63% |
| 6/30/2012 | 95,094,785 | 95,094,785 | - | 1,386,221,356 | 6.86% |
| 6/30/2013 | 87,013,816 | 97,059,313 | 10,045,497 | 1,414,858,790 | 6.86% |
| 6/30/2014 | 98,497,846 | 100,699,735 | 2,201,889 | 1,467,926,166 | 6.86% |
| 6/30/2015 | 105,739,092 | 103,624,310 | (2,114,782) | 1,510,558,455 | 6.86% |
| 6/30/2016 | 104,011,593 | 106,654,638 | 2,643,045 | 1,554,732,332 | 6.86% |
| 6/30/2017 | 108,807,233 [3] | 111,239,585 | 2,432,352 | 1,621,568,294 | 6.86% |

[1] Valuation results prior to June 30, 2009 were computed by the prior actuary.
[2] Employer portion of the Actuarial Determined Contribution, net of member contributions.
[3] The actuarially determined contribution rate for employers for the year ending June 30, 2017 is 6.71%. This consists of an employer normal cost rate of 4.12%, which is net of the 6.86% contribution rate for members, and a UAAL amortization rate of 2.59%. Based on these percentages, the actuarial determined contribution amount for employers consists of $66,808,614 for normal cost and $41,998,619 for UAAL amortization.

## REQUIRED SUPPLEMENTARY INFORMATION UNDER GASB #67 AND #68

### J. Schedule of Money-Weighted Returns under GASB #67 and #68 [1]

| 1. Year Ending | 2. Money-Weighted Rate of Return |
|---|---|
| 6/30/2014 | 16.7% |
| 6/30/2015 | 4.3% |
| 6/30/2016 | 1.6% |
| 6/30/2017 | 12.3% |

[1] As allowable under GASB #68, PEERS elected to prepare the information prospectively from June 30, 2013.

## CENSUS DATA

## A. Reconciliation of Member Counts

| | Actives [1] | Former Members [2] | Inactive Members [3] | Disabled Retirements | Service Retirements [4] | Beneficiary | Total |
|---|---|---|---|---|---|---|---|
| Total as of June 30, 2016 | 47,851 | 14,610 | 16,967 | 782 | 25,061 | 1,740 | 107,011 |
| New Memberships [5] | 6,998 | 3 | 1,261 | 0 | 0 | 0 | 8,262 |
| Terminated Members Reinstated | 397 | 0 | (395) | (2) | 0 | 0 | 0 |
| Refunds | (1,786) | (1,557) | (994) | 0 | 0 | 0 | (4,337) |
| Other Terminations | (3,678) | 1,544 | 2,135 | (1) | 0 | 0 | 0 |
| Service Retirements | (1,673) | 0 | (350) | 0 | 2,023 | 0 | 0 |
| Disabled Retirements | (39) | 0 | (7) | 46 | 0 | 0 | 0 |
| Death with Beneficiary | (24) | (13) | (1) | (16) | (153) | 207 | 0 |
| Death without Beneficiary | (47) | (46) | (21) | (7) | (599) | (88) | (808) |
| Voided memberships | (30) | 0 | (14) | 0 | 0 | 0 | (44) |
| Refund Pending [6] | (17) | 46 | (16) | 0 | 0 | 0 | 13 |
| Benefit Expirations | 0 | 0 | 0 | 0 | 0 | (5) | (5) |
| Data Adjustments [7] | 1 | 0 | 0 | 2 | 3 | 9 | 15 |
| Total as of June 30, 2017 | 47,953 | 14,587 | 18,565 | 804 | 26,335 | 1,863 | 110,107 |

[1] The number of active members as of June 30, 2017 includes 925 members who retired in July 2017.
[2] Includes terminated and deceased former members whose contributions had yet to be distributed as of the valuation date.
[3] The number of inactive members as of June 30, 2017 includes 55 members who retired in July 2017.
[4] Includes members with benefits on hold that will be re-started at a future date.
[5] Includes 5 inactive members who transferred from PSRS during the plan year.
[6] Includes 13 members who were hired, terminated, and have a refund pending in the plan year.
[7] The data adjustments reflect the addition of 1 active member who returned to work and earned one year of additional service for a new benefit, 2 disabled members who were suspended in the prior year and returned to compliance in current year, 1 retroactive service retiree, 1 service retiree who returned to work in the prior year and returned to pay status in the current year, 1 new service retiree who was excluded in the prior year due to compliance issues, and 9 beneficiaries of members who died in a prior plan year and commenced benefits during the current plan year.

## B. Member Census Statistics as of June 30, 2017

| | Male | Female | Total |
|---|---|---|---|
| 1. Active | | | |
| Number [1] | 12,554 | 35,399 | 47,953 |
| Average Age | 48.5 | 48.2 | 48.3 |
| Average Years of Service | 7.6 | 8.8 | 8.5 |
| Anticipated Payroll of Actives [2] | $ 483,767,350 | $ 1,074,416,083 | $ 1,558,183,433 |
| 2. Inactive | | | |
| Vested | | | |
| Number [3] | 1,017 | 5,356 | 6,373 |
| Annual Deferred Annuities | $ 5,713,733 | $ 19,452,943 | $ 25,166,676 |
| Non Vested | | | |
| Number | 3,268 | 8,924 | 12,192 |
| Account Balance | $ 7,488,109 | $ 18,515,741 | $ 26,003,850 |
| Former Members Entitled to a Deferred Annuity | | | |
| Number | 24 | 52 | 76 |
| Annual Deferred Annuities | $ 193,969 | $ 233,189 | $ 427,158 |
| Former Members Entitled to a Refund of Contributions | | | |
| Number | 5,292 | 9,219 | 14,511 |
| Account Balance | $ 4,066,752 | $ 10,271,620 | $ 14,338,372 |
| 3. Retiree/Beneficiary/Disabled | | | |
| Number [4] | 7,083 | 21,919 | 29,002 |
| Annual Benefits Payable [5] | $ 69,814,943 | $ 175,633,343 | $ 245,448,286 |

[1] Includes 925 members who retired in July 2017.

[2] Figures shown are the anticipated pay for the one-year period following the valuation date; excludes 925 members who retired or became disabled in July 2017.

[3] Includes 55 members who retired in July 2017.

[4] Seventeen (17) beneficiaries missing gender are assumed to be male.

[5] Does not include 980 members who retired in July 2017. Of these 980 members, 925 members are included in the active number and 55 are included in the inactive number.

## C. History of Active Member Average Pay, Age, and Service [1]

| 1. Valuation Date | 2. Active Members | 3. Covered Payroll ($ in Thousands) | 4. Average Pay (3) / (2) | 5. Annual Percent Change | Average Attained Age | Average Years of Service |
|---|---|---|---|---|---|---|
| 6/30/1998 | 38,672 | 616,303 | 15,937 | 3.0% | 44.8 | 6.7 |
| 6/30/1999 | 41,599 | 685,272 | 16,473 | 3.4% | 44.6 | 6.5 |
| 6/30/2000 | 43,533 | 735,400 | 16,893 | 2.5% | 44.5 | 6.4 |
| 6/30/2001 | 45,517 | 814,158 | 17,887 | 5.9% | 44.6 | 6.3 |
| 6/30/2002 | 46,728 | 895,420 | 19,162 | 7.1% | 44.8 | 6.4 |
| 6/30/2003 | 46,863 | 971,177 | 20,724 | 8.2% | 45.3 | 6.6 |
| 6/30/2004 | 45,880 | 984,866 | 21,466 | 3.6% | 46.2 | 7.0 |
| 6/30/2005 | 46,598 | 1,055,204 | 22,645 | 5.5% | 46.6 | 7.1 |
| 6/30/2006 | 48,188 | 1,190,994 | 24,716 | 9.1% | 46.4 | 7.1 |
| 6/30/2007 | 49,281 | 1,275,199 | 25,876 | 4.7% | 46.6 | 7.2 |
| 6/30/2008 | 50,865 | 1,377,506 | 27,082 | 4.7% | 46.8 | 7.3 |
| 6/30/2009 | 51,234 | 1,417,485 | 27,667 | 2.2% | 47.1 | 7.5 |
| 6/30/2010 | 50,363 | 1,433,691 | 28,467 | 2.9% | 47.5 | 8.0 |
| 6/30/2011 | 48,800 | 1,414,442 | 28,984 | 1.8% | 47.9 | 8.3 |
| 6/30/2012 | 48,605 | 1,437,310 | 29,571 | 2.0% | 48.1 | 8.4 |
| 6/30/2013 | 48,709 | 1,470,830 | 30,196 | 2.1% | 48.1 | 8.5 |
| 6/30/2014 | 45,589 | 1,442,701 | 31,646 | 4.8% | 48.6 | 8.9 |
| 6/30/2015 | 46,835 | 1,469,772 | 32,006 | 1.1% | 48.4 | 8.7 |
| 6/30/2016 | 47,851 | 1,519,081 | 32,404 | 2.4% | 48.3 | 8.6 |
| 6/30/2017 | 47,953 [2] | 1,558,183 [3] | 33,133 [3] | 2.2% | 48.3 | 8.5 |

[1] Valuation results prior to June 30, 2009 were computed by the prior actuary.
[2] Includes 925 members who retired in July 2017.
[3] Excludes pay for the 925 members who retired in July 2017.

## D. Distribution of Active Members by Salary[1]

| Salary | Number | Percent |
|---|---|---|
| Under $5,000 | 805 | 1.71% |
| $5,000 - 9,999 | 1,788 | 3.80% |
| $10,000 - 14,999 | 3,110 | 6.61% |
| $15,000 - 19,999 | 4,893 | 10.41% |
| $20,000 - 24,999 | 6,939 | 14.76% |
| $25,000 - 29,999 | 7,184 | 15.28% |
| $30,000 - 34,999 | 5,517 | 11.73% |
| $35,000 - 39,999 | 4,455 | 9.47% |
| $40,000 - 44,999 | 3,502 | 7.45% |
| $45,000 - 49,999 | 2,654 | 5.64% |
| $50,000 - 54,999 | 2,005 | 4.26% |
| $55,000 - 59,999 | 1,240 | 2.64% |
| $60,000 - 64,999 | 836 | 1.78% |
| $65,000 - 69,999 | 589 | 1.25% |
| $70,000 - 74,000 | 401 | 0.85% |
| $75,000 & Over | 1,110 | 2.36% |
| Total | 47,028 | 100.00% |

[1] Excludes 925 members who retired in July 2017.

## E. Distribution of Active Members by Age and Service [1]

| Attained Age | Distribution of Active Members by Age and Service as of June 30, 2017 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0 to 4 years | 5 to 9 | 10 to 14 | 15 to 19 | 20 to 24 | 25 to 29 | Over 30 | Total |
| <25 | 1,543 | 6 | | | | | | 1,549 |
| 25-29 | 2,703 | 288 | 3 | | | | | 2,994 |
| 30-34 | 2,432 | 744 | 232 | 5 | | | | 3,413 |
| 35-39 | 2,647 | 937 | 520 | 190 | 12 | | | 4,306 |
| 40-44 | 2,524 | 1,197 | 744 | 426 | 81 | 5 | | 4,977 |
| 45-49 | 2,490 | 1,494 | 1,183 | 678 | 238 | 74 | 2 | 6,159 |
| 50-54 | 2,196 | 1,508 | 1,534 | 1,252 | 531 | 209 | 65 | 7,295 |
| 55-59 | 2,036 | 1,487 | 1,541 | 1,581 | 980 | 260 | 112 | 7,997 |
| 60-64 | 1,416 | 1,160 | 1,054 | 1,100 | 722 | 310 | 156 | 5,918 |
| ≥65 | 936 | 778 | 620 | 434 | 266 | 165 | 146 | 3,345 |
| Total | 20,923 | 9,599 | 7,431 | 5,666 | 2,830 | 1,023 | 481 | 47,953 |

[1] Includes 925 members who retired in July 2017.

## F. Distribution of Inactive Members by Age and Service [1]

| Attained Age | Distribution of Inactive Members by Age and Service as of June 30, 2017 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0 to 4 years | 5 to 9 | 10 to 14 | 15 to 19 | 20 to 24 | 25 to 29 | Over 30 | Total |
| <25 | 1,105 | | | | | | | 1,105 |
| 25-29 | 2,802 | 54 | | | | | | 2,856 |
| 30-34 | 1,981 | 286 | 13 | | | | | 2,280 |
| 35-39 | 1,348 | 424 | 60 | 7 | | | | 1,839 |
| 40-44 | 1,250 | 533 | 122 | 22 | 2 | | | 1,929 |
| 45-49 | 1,184 | 712 | 221 | 53 | 12 | | | 2,182 |
| 50-54 | 972 | 968 | 370 | 116 | 27 | 1 | | 2,454 |
| 55-59 | 776 | 1,095 | 490 | 168 | 18 | 2 | | 2,549 |
| 60-64 | 444 | 339 | 104 | 34 | 8 | | 2 | 931 |
| ≥65 | 327 | 82 | 19 | 10 | 2 | | | 440 |
| Total | 12,189 | 4,493 | 1,399 | 410 | 69 | 3 | 2 | 18,565 |

[1] Includes 55 members who retired in July 2017.

## G. Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired

| Attained Age | Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired as of June 30, 2017 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0 to 4 years | 5 to 9 | 10 to 14 | 15 to 19 | 20 to 24 | 25 to 29 | Over 30 | Total |
| <50 | 91 | 40 | 23 | 8 | 5 | 2 | 1 | 170 |
| 50-54 | 183 | 47 | 17 | 12 | 3 | 1 | | 263 |
| 55-59 | 989 | 240 | 55 | 25 | 10 | 2 | 2 | 1,323 |
| 60-64 | 3,323 | 809 | 138 | 34 | 6 | 9 | 5 | 4,324 |
| 65-69 | 3,107 | 2,474 | 636 | 88 | 13 | 9 | 7 | 6,334 |
| 70-74 | 1,350 | 2,329 | 1,853 | 491 | 39 | 5 | 10 | 6,077 |
| 75- 79 | 487 | 866 | 1,516 | 1,354 | 300 | 16 | 4 | 4,543 |
| 80-84 | 128 | 284 | 473 | 1,127 | 812 | 139 | 9 | 2,972 |
| 85-89 | 31 | 104 | 154 | 283 | 752 | 495 | 30 | 1,849 |
| ≥90 | 6 | 17 | 48 | 65 | 168 | 462 | 381 | 1,147 |
| Total | 9,695 | 7,210 | 4,913 | 3,487 | 2,108 | 1,140 | 449 | 29,002 |

[1] Does not include 980 members who retired in July 2017.

## H. History of Retirees, Beneficiaries, and Disabled Members [1,2]

| Valuation Date | Service Retirees Added | Service Retirees Removed | Service Retirees End of Year | Disability Retirees Added | Disability Retirees Removed | Disability Retirees End of Year | Beneficiaries Added | Beneficiaries Removed | Beneficiaries End of Year |
|---|---|---|---|---|---|---|---|---|---|
| 6/30/1997 | 823 | 388 | 10,811 | 22 | 13 | 276 | 63 | 18 | 460 |
| 6/30/1998 | 841 | 424 | 11,218 | 29 | 17 | 288 | 59 | 22 | 497 |
| 6/30/1999 | 813 | 431 | 11,600 | 35 | 7 | 316 | 67 | 19 | 545 |
| 6/30/2000 | 945 | 432 | 12,113 | 45 | 14 | 347 | 76 | 20 | 601 |
| 6/30/2001 | 987 | 468 | 12,632 | 53 | 22 | 378 | 76 | 14 | 663 |
| 6/30/2002 | 980 | 471 | 13,141 | 30 | 21 | 387 | 97 | 18 | 742 |
| 6/30/2003 | 979 | 501 | 13,619 | 31 | 13 | 405 | 96 | 25 | 813 |
| 6/30/2004 | 1,081 | 541 | 14,159 | 44 | 18 | 431 | 86 | 44 | 855 |
| 6/30/2005 | 1,116 | 505 | 14,770 | 43 | 26 | 448 | 98 | 29 | 924 |
| 6/30/2006 | 1,080 | 528 | 15,322 | 53 | 23 | 478 | 86 | 50 | 960 |
| 6/30/2007 | 1,250 | 563 | 16,009 | 29 | 18 | 489 | 120 | 39 | 1,041 |
| 6/30/2008 | 1,256 | 569 | 16,696 | 46 | 21 | 514 | 99 | 62 | 1,078 |
| 6/30/2009 | 1,439 | 578 | 17,557 | 45 | 18 | 541 | 113 | 41 | 1,150 |
| 6/30/2010 | 1,471 | 670 | 18,358 | 51 | 15 | 577 | 140 | 67 | 1,223 |
| 6/30/2011 | 1,681 | 595 | 19,444 | 74 | 31 | 620 | 114 | 73 | 1,264 |
| 6/30/2012 | 1,680 | 587 | 20,537 | 65 | 17 | 668 | 152 | 59 | 1,357 |
| 6/30/2013 | 1,656 | 674 | 21,519 | 68 | 27 | 709 | 164 | 75 | 1,446 |
| 6/30/2014 | 1,886 | 649 | 22,756 | 59 | 33 | 735 | 156 | 64 | 1,538 |
| 6/30/2015 | 1,866 | 722 | 23,900 | 57 | 25 | 767 | 159 | 66 | 1,631 |
| 6/30/2016 | 1,907 | 746 | 25,061 | 53 | 38 | 782 | 199 | 90 | 1,740 |
| 6/30/2017 | 2,026 | 752 | 26,335 | 48 | 26 | 804 | 216 | 93 | 1,863 |

[1] Does not include 980 members who retired or became disabled in July 2017.
[2] Valuation results prior to June 30, 2009 were computed by the prior actuary.

SECTION IV - CENSUS DATA

## I. History of Cost of Living Increases to Retired Members

| Retirement In | Effective Date of First COLA | First COLA Percentage Increase | Total Increases Through January 2017 [1] | January 2017 Increase Based on Proposal | Total Increases Through January 2018 [1] | Number of Retired Members at 6/30/2017 [2] |
|---|---|---|---|---|---|---|
| 1988 & Earlier | Various | Various | 80.00% | 0.00% | 80.00% | 559 |
| 1989 | Jan. 1993 | 3.10% | 77.82% | 1.23% | 80.00% | 188 |
| 1990 | Jan. 1994 | 3.00% | 72.49% | 1.63% | 75.30% | 235 |
| 1991 | Jan. 1995 | 2.50% | 67.46% | 1.63% | 70.19% | 244 |
| 1992 | Jan. 1996 | 3.00% | 63.37% | 1.63% | 66.03% | 302 |
| 1993 | Jan. 1997 | 2.80% | 58.61% | 1.63% | 61.20% | 303 |
| 1994 | Jan. 1998 | 2.30% | 54.28% | 1.63% | 56.79% | 350 |
| 1995 | Jan. 1999 | 1.70% | 50.81% | 1.63% | 53.27% | 414 |
| 1996 | Jan. 2000 | 2.00% | 48.28% | 1.63% | 50.70% | 479 |
| 1997 | Jan. 2001 | 3.70% | 45.38% | 1.63% | 47.75% | 539 |
| 1998 | Jan. 2002 | 3.30% | 40.20% | 1.63% | 42.49% | 538 |
| 1999 | Jan. 2003 | 1.10% | 35.73% | 1.63% | 37.94% | 644 |
| 2000 | Jan. 2004 | 2.10% | 34.24% | 1.63% | 36.43% | 723 |
| 2001 | Jan. 2005 | 3.30% | 31.48% | 1.63% | 33.62% | 700 |
| 2002 | Jan. 2006 | 2.50% | 27.30% | 1.63% | 29.37% | 760 |
| 2003 | Jan. 2007 | 4.30% | 24.19% | 1.63% | 26.21% | 845 |
| 2004 | Jan. 2008 | 2.70% | 19.06% | 1.63% | 21.00% | 884 |
| 2005 | Jan. 2009 | 5.00% | 15.92% | 1.63% | 17.81% | 932 |
| 2006 | Jan. 2010 | 0.00% | 10.40% | 1.63% | 12.20% | 983 |
| 2007 | Jan. 2011 | 0.00% | 10.40% | 1.63% | 12.20% | 1,130 |
| 2008 | Jan. 2012 | 2.00% | 10.40% | 1.63% | 12.20% | 1,144 |
| 2009 | Jan. 2013 | 2.00% | 8.24% | 1.63% | 10.00% | 1,226 |
| 2010 | Jan. 2014 | 2.00% | 6.12% | 1.63% | 7.85% | 1,612 |
| 2011 | Jan. 2015 | 2.00% | 4.04% | 1.63% | 5.74% | 1,633 |
| 2012 | Jan. 2016 | 2.00% | 2.00% | 1.63% | 3.66% | 1,591 |
| 2013 | Jan. 2017 | 0.00% | 0.00% | 1.63% | 1.63% | 1,794 |
| 2014 | Jan. 2018 | 1.63% | | 1.63% | 1.63% | 1,878 |
| 2015 | | | | | | 1,919 |
| 2016 | | | | | | 2,043 |
| 2017 | | | | | | 547 |
| **Total** | | | | | | **27,139** |

[1] Cumulative lifetime COLA increases are limited to 80%.

[2] Includes Service Retirees and Disabled Retirees (beneficiaries of deceased members are excluded) as of June 30, 2017; exclude 980 members who retired in July 2017, and any members who retired in August through December 2017.

## J. Distribution of Retired Members by Type and Monthly Amount [1]

| Monthly | Service | Disability | Beneficiary | Total |
|---|---|---|---|---|
| Less than $100 | 1,301 | 24 | 161 | 1,486 |
| $100-199 | 3,873 | 125 | 372 | 4,370 |
| $200-299 | 3,577 | 141 | 313 | 4,031 |
| $300-399 | 2,759 | 143 | 216 | 3,118 |
| $400-499 | 2,190 | 98 | 180 | 2,468 |
| $500-999 | 6,444 | 224 | 417 | 7,085 |
| $1,000-1,499 | 3,147 | 45 | 125 | 3,317 |
| $1,500 & Over | 3,044 | 4 | 79 | 3,127 |
| Total | 26,335 | 804 | 1,863 | 29,002 |

[1] Does not include 980 members who retired in July 2017.

## K. Distribution of Retired Members by Type of Benefit [1]

| Type of Benefit | Number | Annual Benefit |
|---|---|---|
| Service Retirees | | |
| Options 1 & 10 (Life Only) | 18,094 | $ 144,438,013 |
| Options 2 & 21 (100% J&S with Pop-Up) | 4,946 | $ 48,330,087 |
| Options 3 & 31 (75% J&S with Pop-Up) | 776 | $ 10,395,088 |
| Options 4 & 41 (50% J&S with Pop-Up) | 1,208 | $ 16,879,746 |
| Option 5 (10 Years Certain & Life) | 946 | $ 6,809,149 |
| Option 6 (5 Years Certain & Life) | 274 | $ 2,295,108 |
| Options 20 (100% J&S) | 51 | $ 286,911 |
| Options 30 (75% J&S) | 1 | $ 4,311 |
| Options 40 (50% J&S) | 8 | $ 82,874 |
| Accelerated Payment | 31 | $ 514,971 |
| Total | 26,335 | $ 230,036,258 |
| | | |
| Disability Retirees | 804 | $ 4,421,203 |
| | | |
| Beneficiaries | 1,863 | $ 10,990,825 |

[1] Does not include 980 members who retired in July 2017.

## ACTUARIAL ASSUMPTIONS AND METHODS

Page

## A. Actuarial Assumptions

The assumptions used in the valuation were selected and approved by the PEERS Board of Trustees. The demographic assumptions are reviewed every five years through a study of actual experience. In this way, the actuary provides guidance to the Board in selecting the assumptions. The actuary and other economic and investment professionals also provide advice for selecting the economic assumptions. The most recent comprehensive experience study was completed in June 2016. For the June 30, 2017 valuation, the investment return and COLA assumptions were updated based on changes to the Board's funding policy adopted at the November 3, 2017 meeting. In our opinion, the assumptions are reasonable for purposes of this valuation.

Inflation — 2.25% per annum

Payroll Growth — 3.25% per annum, consisting of 2.25% inflation, 0.50% real wage growth due to the inclusion of active health care costs in pensionable earnings, and 0.50% of real wage growth due to productivity.

Salary and Payroll Increases

| Service | Inflation | Health Care Cost | Productivity | Merit, Promotion, Seniority | Total Individual Salary Growth |
|---|---|---|---|---|---|
| 0 | 2.25% | 0.50% | 0.50% | 7.75% | 11.00% |
| 1 | 2.25% | 0.50% | 0.50% | 3.00% | 6.25% |
| 2 | 2.25% | 0.50% | 0.50% | 2.50% | 5.75% |
| 3 | 2.25% | 0.50% | 0.50% | 2.25% | 5.50% |
| 4 | 2.25% | 0.50% | 0.50% | 2.00% | 5.25% |
| 5 | 2.25% | 0.50% | 0.50% | 1.90% | 5.15% |
| 6 | 2.25% | 0.50% | 0.50% | 1.80% | 5.05% |
| 7 | 2.25% | 0.50% | 0.50% | 1.70% | 4.95% |
| 8 | 2.25% | 0.50% | 0.50% | 1.60% | 4.85% |
| 9 | 2.25% | 0.50% | 0.50% | 1.50% | 4.75% |
| 10 | 2.25% | 0.50% | 0.50% | 1.40% | 4.65% |
| 11 | 2.25% | 0.50% | 0.50% | 1.30% | 4.55% |
| 12 | 2.25% | 0.50% | 0.50% | 1.20% | 4.45% |
| 13 | 2.25% | 0.50% | 0.50% | 1.10% | 4.35% |
| 14 | 2.25% | 0.50% | 0.50% | 1.00% | 4.25% |
| 15 | 2.25% | 0.50% | 0.50% | 0.95% | 4.20% |
| 16 | 2.25% | 0.50% | 0.50% | 0.90% | 4.15% |
| 17 | 2.25% | 0.50% | 0.50% | 0.85% | 4.10% |
| 18 | 2.25% | 0.50% | 0.50% | 0.80% | 4.05% |
| 19 | 2.25% | 0.50% | 0.50% | 0.75% | 4.00% |
| 20+ | 2.25% | 0.50% | 0.50% | 0.75% | 4.00% |

## A. Actuarial Assumptions (Continued)

Investment Returns

Funding: 7.60% per annum (net of investment and administrative expenses).

Accounting: 7.60% per annum (net of investment expenses).

Cost of Living Adjustments (COLA)

The COLA reflected for January 1, 2018 is 1.63%, in accordance with the actual COLA approved by the Board. The COLA assumed for future years increases from 1.20% to 1.65% over nine years, beginning January 1, 2019. This COLA assumption reflects an assumption that general inflation will increase from 1.80% to a normative inflation assumption of 2.25% over nine years. It is also based on the current policy of the Board to grant a COLA on each January 1 as follows:

- If the June to June change in the CPI-U is less than 2% for consecutive one year periods, a cost-of-living increase of 2% will be granted when the cumulative increase is equal to or greater than 2%, at which point the cumulative increase in the CPI-U will be reset to zero. For the following year, the starting CPI-U will be based on the June value immediately preceding the January 1 at which the 2% cost-of-living increase is granted.
- If the June to June change in the CPI-U is greater than or equal to 2%, but less than 5%, a cost-of-living increase of 2% will be granted.
- If the June to June change in the CPI-U is greater than or equal to 5%, a cost-of-living increase of 5% will be granted

The COLA is effective each January 1, beginning on the fourth January after retirement, and capped at 80% lifetime increase.

The COLA assumption applies to service retirements and beneficiary annuities. The COLA does not apply to the benefits for in-service death payable to spouses (where the spouse is over age 60). Members begin receiving COLAs on the fourth January after benefit commencement. The total lifetime COLA cannot exceed 80% of the original benefit. Future COLAs for current benefit recipients reflect actual cumulative adjustments granted at the time of valuation.

Mortality Rates

Pre-Retirement: 75% of the RP-2006 Total Dataset Mortality Tables with static projection to 2028 using the 2014 SSA Improvement Scale. Illustrative rates per 1,000 members at various ages are as follows:

| Age | Male | Female |
|---|---|---|
| 20 | 0.279 | 0.114 |
| 30 | 0.325 | 0.146 |
| 40 | 0.399 | 0.265 |
| 50 | 1.214 | 0.789 |
| 60 | 2.751 | 1.429 |
| 70 | 8.672 | 4.156 |

## A. Actuarial Assumptions (Continued)

Mortality Rates (Continued):

Post-Retirement: RP-2006 Total Dataset Mortality Tables with plan specific experience adjustments and static projection to 2028 using the 2014 SSA Improvement Scale. The plan-specific experience adjustments as follows:

| Age | Males | Females |
|---|---|---|
| <60 | 1.00 | 1.00 |
| 60-74 | 1.49 | 0.77 |
| 75-89 | 1.27 | 1.03 |
| >=90 | 1.16 | 1.04 |

Illustrative rates per 1,000 members at various ages are as follows:

| Age | Male | Female |
|---|---|---|
| 40 | 0.532 | 0.353 |
| 50 | 3.904 | 2.642 |
| 60 | 9.060 | 3.119 |
| 70 | 20.854 | 8.702 |
| 80 | 50.476 | 33.375 |
| 90 | 153.099 | 113.293 |
| 100 | 347.456 | 278.540 |
| 110 | 514.345 | 442.593 |

Disabled Retirees: RP-2006 Disabled Retiree Mortality Tables with static projection to 2028 using the 2014 SSA Improvement Scale. Illustrative rates per 1,000 members at various ages are as follows:

| Age | Male | Female |
|---|---|---|
| 40 | 9.317 | 4.862 |
| 50 | 19.588 | 11.367 |
| 60 | 20.817 | 13.263 |
| 70 | 33.674 | 24.771 |
| 80 | 68.090 | 56.760 |
| 90 | 168.008 | 134.892 |
| 100 | 311.674 | 275.075 |
| 110 | 443.401 | 425.570 |

## A. Actuarial Assumptions (Continued)

Withdrawal Rates

Termination of membership prior to eligibility for retirement from all causes other than death, disability or retirement, whether resulting in a refund or a deferred benefit, is assumed in accordance with the following illustrative rates per 1,000 members:

| Years of Service | Rate |
|---|---|
| 0 | 350 |
| 1 | 230 |
| 2 | 180 |
| 3 | 150 |
| 4 | 125 |
| 5 | 100 |
| 10 | 55 |
| 15 | 33 |
| 20 | 18 |
| 25+ | 0 |

Disability Rates

Retirement for disability prior to age 60 is assumed in accordance with the following illustrative rates per 1,000 eligible members:

| Age | Male and Female Rates |
|---|---|
| 30 | 0.08 |
| 35 | 0.16 |
| 40 | 0.32 |
| 45 | 0.64 |
| 50 | 1.22 |
| 55 | 2.10 |

## A. Actuarial Assumptions (Continued)

Retirement Rates Retirement is assumed in accordance with the following rates per 1,000 eligible members:

| | Service | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | <=20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | >=30 |
| <50 | 0 | 0 | 0 | 0 | 0 | 50 | 50 | 50 | 50 | 50 | 300 |
| 50 | 0 | 0 | 0 | 0 | 0 | 50 | 50 | 50 | 50 | 50 | 200 |
| 51 | 0 | 0 | 0 | 0 | 0 | 50 | 50 | 50 | 50 | 300 | 200 |
| 52 | 0 | 0 | 0 | 0 | 0 | 50 | 50 | 50 | 300 | 200 | 200 |
| 53 | 0 | 0 | 0 | 0 | 0 | 50 | 50 | 300 | 200 | 200 | 200 |
| 54 | 0 | 0 | 0 | 0 | 0 | 50 | 300 | 200 | 200 | 200 | 200 |
| 55 | 50 | 50 | 50 | 50 | 50 | 300 | 200 | 200 | 200 | 200 | 200 |
| 56 | 50 | 50 | 50 | 50 | 300 | 200 | 200 | 200 | 200 | 200 | 200 |
| 57 | 50 | 50 | 50 | 300 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 58 | 50 | 50 | 300 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 59 | 50 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 60 | 100 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| 61 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 62 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 |
| 63 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 64 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| 65 | 260 | 260 | 260 | 260 | 260 | 260 | 260 | 260 | 260 | 260 | 260 |
| 66 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 67 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 68 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 69 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 70 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 71 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 72 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 73 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 74 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| >=75 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |

**A. Actuarial Assumptions (Continued)**

| | |
|---|---|
| Refund of Contributions | For active members assumed to terminate employment with less than five years of service, regardless of age, 100% take an immediate refund of their contributions.<br><br>For active members assumed to terminate employment with five or more years of service, but prior to satisfying the age and service requirements for service retirement, the member will select the option that has the greater present value between an immediate refund and a deferred annuity.<br><br>For active members assumed to terminate employment with five or more years of service and satisfy the age and service requirements for service retirement upon termination, 100% are assumed to elect a lifetime annuity benefit.<br><br>For inactive members, the member will select the option that has the greater present value between an immediate refund and a deferred annuity. |
| Interest on Member Accounts | 1.00% per annum. |
| Service Purchases | A 1.50% load is added to the Normal Cost to account for anticipated losses resulting from service purchases and reinstatements. |
| Provisions for Expenses | There is no specific provision for expenses. The implicit assumption for funding purposes is that investment and administrative expenses are paid from investment income in excess of 7.60% per annum. For accounting purposes the expected return is assumed to be net of investment expenses. Administrative expenses are included in the current year expense. |
| Dependent Assumptions (Pre-Retirement) | 70% of male and female members are assumed to be married.<br><br>Beneficiaries are assumed to be of the opposite sex from the member.<br><br>Male spouses are assumed to be 2 years older than females spouses. |
| Beneficiary Age (Post-Retirement) | Members are assumed to be 3 years older than their joint annuitant. |
| Return of Unused Member Account Balance | The cash refund is explicitly valued. |
| Form of Payment | For active members assumed to terminate employment with five or more years of service, benefits are assumed to be paid in the form of a single life annuity since all optional forms are actuarially equivalent using the same interest and mortality assumptions used in the valuation. |

## A. Actuarial Assumptions (Continued)

| | |
|---|---|
| Data Assumptions | Members without a date of birth provided are assumed to be 30 years old. Pensionable pay for valuation purposes is assumed to be the greater of the current year's salary, the previous year's salary and $5,000. Pensionable pay for active members hired in the current year is assumed to be the greater of annualized pay and $5,000. Pensionable pay for valuation purposes for inactive members is assumed to be the greater of the two most recent years of salary history provided and $5,000. |
| Assumption Changes Since the Prior Valuation | The investment return and COLA assumptions were updated by the Board as follows based on changes to the Board's funding policy adopted at the November 3, 2017 meeting:<br><br>The investment return assumption was lowered from 7.75% to 7.60% per year.<br><br>The Board adopted a new COLA policy on November 3, 2017 resulting in an increase in the future COLA assumption from an increasing assumption of 1.05%-1.50% over nine years to an increasing assumption of 1.20%-1.65% over nine years, beginning January 1, 2019. |

## B. Assumptions Rationale

| | |
|---|---|
| Investment Return | The investment return assumption is based on analysis completed by the PSRS investment advisor and an independent, high-level analysis completed by PwC using a "building block" approach that considered the target asset allocation from the Board's investment policy and capital market forecasts from various investment professionals. It is also based on the Board's funding policy, which was most recently amended at the November 3, 2017 meeting. |
| Cost of Living Adjustments | The cost of living adjustment (COLA) assumed in the valuation increases from 1.20% to 1.65% over nine years, beginning January 1, 2019. This COLA assumption reflects an assumption that general inflation will increase from 1.80% to a normative inflation assumption of 2.25% over nine years. It is also based on the current policy of the Board to grant a COLA on each January 1 as follows:<br>• If the June to June change in the CPI-U is less than 2% for consecutive one year periods, a cost-of-living increase of 2% will be granted when the cumulative increase is equal to or greater than 2%, at which point the cumulative increase in the CPI-U will be reset to zero. For the following year, the starting CPI-U will be based on the June value immediately preceding the January 1 at which the 2% cost-of-living increase is granted.<br>• If the June to June change in the CPI-U is greater than or equal to 2%, but less than 5%, a cost-of-living increase of 2% will be granted.<br>• If the June to June change in the CPI-U is greater than or equal to 5%, a cost-of-living increase of 5% will be granted. |
| Other Assumptions | The Board of Trustees adopts actuarial assumptions, each of which individually represents a reasonable long-term estimate of anticipated experience under the System, derived from experience studies conducted every fifth year. The most recent comprehensive experience study was completed in June 2016. The economic and demographic assumptions listed previously in the report were reviewed and updated, where appropriate, based on the historical experience observed during the study and expectations for the future. |

## C. Actuarial Methods

The actuarial methods used in the valuation for funding purposes and noted below were selected and approved by the PEERS Board of Trustees. The actuarial methods are generally reviewed in conjunction with experience studies of the assumptions. In this way, the actuary provides guidance to the Board in selecting the methods. The actuarial methods used for financial reporting purposes and noted below are prescribed by GASB 67 and 68.

| | |
|---|---|
| Actuarial Cost Method | The actuarial cost method is Entry Age Normal - Level Percent of Payroll.<br><br>The Normal Cost is calculated separately for each active member and is equal to the level percentage of payroll needed as an annual contribution from entry age to retirement age to fund projected benefits. The Actuarial Accrued Liability on any valuation date is the accumulated value of such Normal Costs from entry age to the valuation date. |
| Amortization of Unfunded Actuarial Accrued Liability | For funding, gains and losses occurring from census experience different than assumed and assumption changes are amortized over a 30-year period as a level percent of payroll. A new gain or loss base is established each year based on the additional gain or loss during that year and that base is amortized over a new 30-year period. The purpose of the method is to give a smooth progression of the costs from year to year and, at the same time, provide for an orderly funding of the unfunded liabilities.<br><br>Increases in the Actuarial Accrued Liability caused by changes in the benefit provisions are amortized over 20 years, as determined in the 2007 session of the Legislature.<br><br>For accounting, gains and losses occurring from census experience different than assumed and assumption changes are amortized into expense over the average expected future service of all plan participants (actives and inactives). Gains and losses occurring from investment experience different than assumed are amortized into expense over a 5-year period. The effect of plan changes on the plan liability are fully recognized in expense in the year in which they occur. |
| Asset Valuation Method | The Actuarial Value of Assets is a smoothed value of assets. The actuarial value at June 30, 2016 was projected by increasing the amount with 7.75% interest, adding contributions made during the year with 7.75% interest for half the year, and subtracting benefit payments made during the year with 7.75% interest for half the year to arrive at a preliminary June 30, 2017 Actuarial Value of Assets. 20% of the difference between the actual returns on market value for the year and the expected 7.75% return from the projection of the prior year Actuarial Value, along with corresponding amounts from each of the prior four years, is added to the preliminary value to arrive at the final June 30, 2017 Actuarial Value of Assets. For the June 30, 2018 valuation, the Actuarial Value of Assets will be developed using the new 7.60% investment return assumption.<br><br>For accounting purposes, market value was used. |
| Changes Since the Prior Valuation | There have been no changes in the actuarial methods since the June 30, 2016 valuation. |

## SECTION VI - SUMMARY OF PLAN PROVISIONS

### SUMMARY OF BENEFIT PROVISIONS

## SECTION VI - SUMMARY OF PLAN PROVISIONS

### A. Summary of Benefit Provisions

Below is a summary of the plan provisions that are pertinent to the valuation herein and may exclude certain provisions that are not deemed relevant to our calculations. This summary is based on our understanding of the plan provisions set forth in the applicable statutes of the State of Missouri. If there is a discrepancy between the summary below and the applicable statutes, the applicable statutes shall govern.

| | |
|---|---|
| Member Contributions | Half the total PEERS contribution rate. For fiscal year 2017, the total PEERS contribution rate was 13.72%. |
| Normal (Unreduced) Retirement | |
| Eligibility | Attainment of age 60 with at least five years of Creditable Service, or at any age after completion of 30 years of Creditable Service, or at any age when age plus Creditable Service is at least 80. |
| Benefit | 1.61% of Final Average Salary for each year of Membership Service. A year of Prior Service is treated as 0.6 year of Membership Service. Any person retiring prior to age 62 under the Rule of 80 or with 30 years of creditable service will receive an additional benefit payable to attainment of age 62. This benefit is equal to 0.8% of Final Average Salary for each year of Membership Service. |
| Compensation | All regular earnings as an employee of a PEERS-covered employer. Compensation or salary includes, but is not limited to, payments for extra duties, overtime payments and employer-paid medical, dental and vision insurance premiums for the member. |
| Final Average Salary | Average monthly salary over the Member's three highest consecutive years of service. Effective August 28, 2007, the maximum increase in the annual compensation used for the final average salary shall not exceed twenty percent. |
| Membership Service | Service while a participating member of PEERS. Service is measured each year in relation to minimum salary for 20 hours per week in the position for that year. |
| Prior Service | Service rendered in a covered position prior to November 1, 1965. |
| Creditable Service | Membership Service plus any Prior Service. |
| Normal Form of Benefit | Single Life Annuity<br><br>Options available include joint and survivor (50%, 75%, or 100%), term certain (60 or 120 months) and life thereafter, partial lump sum option (PLSO), and accelerated payment plan (APP). |

## A. Summary of Benefit Provisions (Continued)

Early (Age Reduced) Retirement

| | |
|---|---|
| Eligibility | Attainment of age 55 and under age 60 with at least five years of creditable service. |
| Benefit | Normal retirement benefit accrued to the date of early retirement, actuarially reduced from age 60. |

Special Early Retirement Under Modified Formula

| | |
|---|---|
| Eligibility | Retirement at an age under 55 and with at least 25 years of creditable service but not eligible for the Rule of 80. |
| Benefit | Based on a percentage of final average salary per year of creditable service. Percentages are as follows: |

| Years of Service | Benefit Percentage |
|---|---|
| 25-25.9 | 1.51% |
| 26-26.9 | 1.53% |
| 27-27.9 | 1.55% |
| 28-28.9 | 1.57% |
| 29-29.9 | 1.59% |

COLA Adjustments

Applicable statutes provide the Board with limited discretion in granting COLAs. The Board has established a policy of granting a COLA on each January 1 as follows, which is compliant with current statutes:

- If the June to June change in the CPI-U is less than 2% for consecutive one year periods, a cost-of-living increase of 2% will be granted when the cumulative increase is equal to or greater than 2%, at which point the cumulative increase in the CPI-U will be reset to zero. For the following year, the starting CPI-U will be based on the June value immediately preceding the January 1 at which the 2% cost-of-living increase is granted.
- If the June to June change in the CPI-U is greater than or equal to 2%, but less than 5%, a cost-of-living increase of 2% will be granted.
- If the June to June change in the CPI-U is greater than or equal to 5%, a cost-of-living increase of 5% will be granted.

For any member such adjustments commence in the fourth January after commencement of benefits. The total of such increases may not exceed 80% of the original benefit for any member.

## A. Summary of Benefit Provisions (Continued)

Disability Benefits

| | |
|---|---|
| Definition of Disability | Incapacity for performance of gainful employment after completion of five years of creditable service and before age 60. |
| Benefit | Lifetime benefit equal to 90% of accrued normal retirement benefit. |
| Form of Benefit | If eligible, surviving spouse may elect a survivor benefit. COLA adjustments similar to those provided to retirees are provided on this benefit. |

Vesting

| | |
|---|---|
| Eligibility | Completion of five years of creditable service. |
| Benefit | Accrued normal retirement benefit payable at earliest retirement age based on service at date of termination. Benefit is based on formula in effect at commencement of benefit. |

Death/Survivor Benefits

| | |
|---|---|
| Refund | Refund of accumulated member contributions with interest. |
| Survivor Benefits | If the member has at least 5 years of creditable service at date of death, the spouse may receive a survivor benefit based on 100% J&S equivalent of the benefit accrued to date of death. The benefit may commence:<br>1. Immediately if member is eligible to retire at date of death, or<br>2. At a future retirement date of the deceased member.<br>The benefit may be reduced for early commencement if the deceased member would not have been eligible for unreduced retirement at that date based on service to date of death.<br>COLA adjustments similar to those provided to retirees are provided on these benefits. |

Changes in Benefit Provisions — There have been no changes since the June 30, 2016 valuation.