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# *Public Education Employee Retirement System of Missouri*

Actuarial Valuation as of  
June 30, 2020





November 12, 2020

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, 2020**

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, 2020 and are presented herein pursuant to the engagement letter between PEERS and PricewaterhouseCoopers LLP ("PwC"), dated July 11, 2019. 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 based on the funding policy, actuarial assumptions, and actuarial methods adopted by the Board.

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 is 86.3% as of June 30, 2020, compared to 86.4% as of June 30, 2019. The decrease is primarily due to the January 1, 2021 COLA being 2.00% versus the 1.30% assumed COLA and by lower than expected investment returns, but partially offset by lower than expected salary increases. We note that the Board's funding policy generally results in a COLA of either 0.00% or 2.00%, with the assumed COLA being an average that is between these amounts. Therefore, in years when a 2.00% COLA is granted, the Plan will experience a loss, and in years when the COLA is 0.00%, the Plan will experience a gain. Over time, we expect the annual gains/losses to be offsetting.

**Benefit Provisions**

The benefit provisions reflected in the valuation reports are those which were in effect at June 30, 2020, as set forth in the related Missouri statutes. It is our understanding that the only change in benefit provisions since the prior valuation was a change in the working after retirement provisions that had no impact on our valuation of the benefit liabilities.

**Assets and Member Data**

The valuation was based on asset values of the trust fund and member census data as of June 30, 2020. 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, 2020 valuation 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. Since the last experience study, the investment return and COLA assumptions have been updated. For the June 30, 2017 valuation, the investment return assumption was lowered from 7.75% to 7.60% and the COLA assumption was increased based on changes to the Board's funding policy relating to COLAs. Both changes were adopted at the November 3, 2017 meeting. For the June 30, 2018 valuation, the investment return assumption was further lowered from 7.60% to 7.50%, as adopted by the Board at the October 29, 2018 meeting. There have been no assumption changes since the June 30, 2018 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 (as amended) 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, 2020 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, as amended. This report also contains employer accounting information prepared in accordance with our understanding of GASB No. 68, as amended.

In preparing the results presented herein, we have used and evaluated actuarial models in accordance with Actuarial Standards of Practice ("ASOP") No. 56. PwC uses the ProVal valuation system developed by Winklevoss Technologies, LLC in performing valuations of pension and postretirement benefit plans. We have utilized the ProVal software to prepare the valuation results presented herein. ProVal is used to value participant data through projecting retirement benefits and applying plan specific assumptions, methods and plan provisions under applicable accounting and funding standards. PwC is not aware of any material limitations or known weaknesses in the ProVal software.

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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Fellow of the Society of Actuaries  
Enrolled Actuary (No. 20-06229)

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## SECTION I - EXECUTIVE SUMMARY

### **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, 2020 and has been prepared to present the current funded status of the Plan, contribution requirements for fiscal year 2022 (July 1, 2021 through June 30, 2022), and certain financial statement disclosure information. The valuation was performed using census data for plan members as of June 30, 2020 provided by PEERS and summarized in Section IV of this report, asset information as of June 30, 2020 provided by PEERS and summarized in Sections II and III, the actuarial assumptions and methods approved by the Board and summarized in Section V, and the plan provisions effective June 30, 2020 summarized in Section VI.

#### **Contributions**

The Board sets, at its discretion, but subject to certain statutory 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, the assumptions and methods approved by the Board, and our valuation of the Actuarially Determined Contribution Rate, the contribution rate approved by the Board is 13.72% (6.86% for employers and 6.86% for members) for fiscal year 2022. A contribution rate of 13.72% represents no change from the rate currently in effect for fiscal year 2021. The contribution rate approved by the Board becomes effective on July 1, 2021. Therefore, the dollar cost will depend on the actual payroll during fiscal year 2022.

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 assumptions and methods summarized in Section V. The funded status is an indicator of future contribution requirements in that a funded status below 100% results in an Actuarially Determined Contribution rate that includes contributions towards the deficit. The funded status measured on this basis is not intended to represent the sufficiency of plan assets for settling the plan's benefit obligations and should not be relied on for that purpose in isolation.

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 is 86.3% as of June 30, 2020, compared to 86.4% as of June 30, 2019. The decrease is primarily due to the January 1, 2021 COLA being 2.00% versus the 1.30% assumed COLA and lower than expected investment returns, but partially offset by lower than expected salary increases. We note that the Board's funding policy generally results in a COLA of either 0.00% or 2.00%, with the assumed COLA being an average that is between these amounts. Therefore, in years when a 2.00% COLA is granted, the Plan will experience a loss, and in years when the COLA is 0.00%, the Plan will experience a gain. Over time, we expect the annual gains/losses to be offsetting. The funded status is 84.1% when based on the market value of assets rather than the actuarial value of assets.

#### **Investment Experience**

The market value of the assets available for benefits has increased from \$5.02 billion as of June 30, 2019 to \$5.12 billion as of June 30, 2020. The actuarial value of assets increased from \$5.02 billion as of June 30, 2019 to \$5.26 billion as of June 30, 2020. The actuarial value of assets is more than the market value by \$139 million and the difference will be recognized over the next four years.

The assets of the Plan returned 3.7% (net of all expenses) for the year ended June 30, 2020. Based on the Actuarial Value of Assets, the approximate return for the same period was 6.3%. 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 3.7%.

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## SECTION I - EXECUTIVE SUMMARY

### **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.

There have been no changes to the funding policy that affect our valuation since the prior year.

#### **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"), as amended. 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**

There were no changes in the actuarial assumptions for the June 30, 2020 valuation.

#### **Changes in Plan Provisions**

The working after retirement provision for PSRS retirees under Section 169.560 of the Revised Statutes of the State of Missouri was amended during the year to change the working after retirement limitations without a suspension of retirement allowance for PSRS retirees returning to work at community colleges to equal 550 hours and 50% of salary. The limitation for such retired members was \$15,000 of salary (with no hours-based limit). In addition, the community colleges would no longer contribute to PEERS on behalf of PSRS retirees who return to work in positions that do not require certification by DESE, regardless of whether the PSRS retirees exceed the thresholds that would result in a suspension of benefits.

This amendment to the working after retirement provisions has no impact on our valuation of the benefit liabilities as of June 30, 2020.

It is our understanding that other provisions are the same as the prior year.

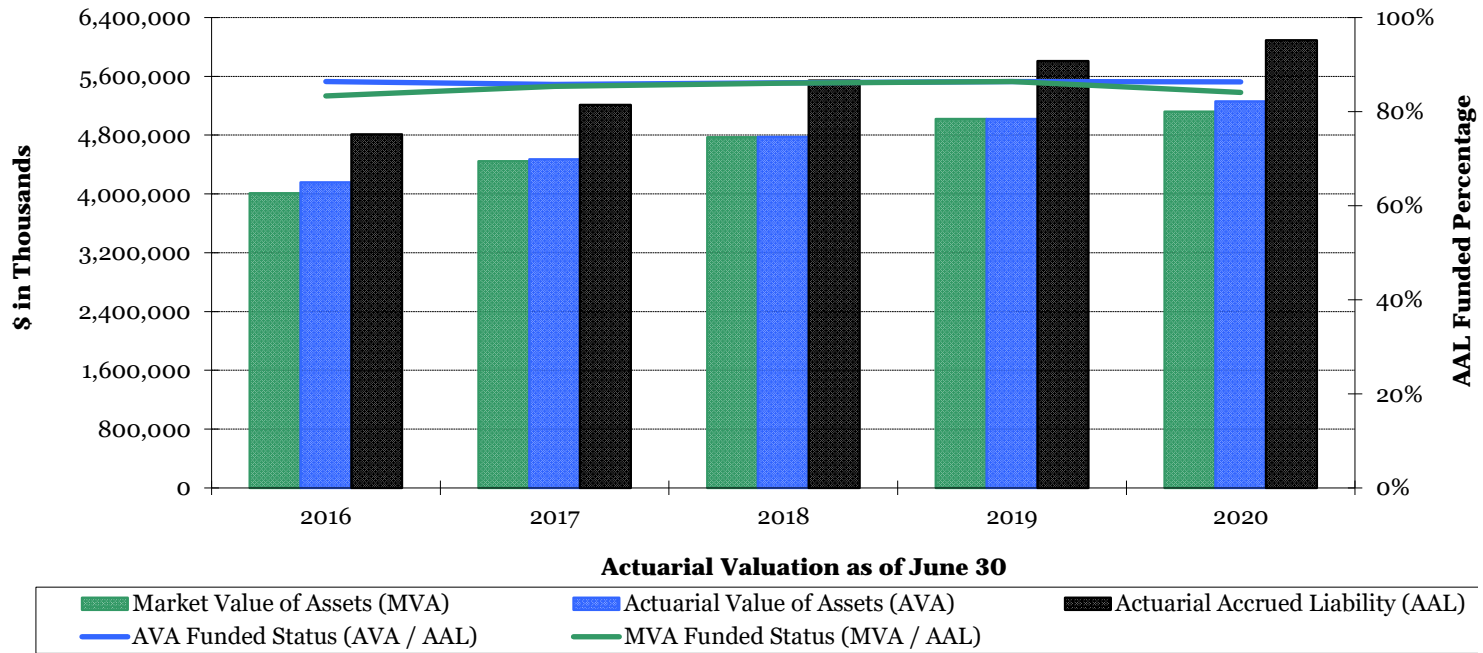
#### **Changes in Actuarial Methods**

There were no changes in the actuarial methods for the June 30, 2020 valuation.

SECTION I - EXECUTIVE SUMMARY

**HISTORICAL SUMMARY**

**5-Year History of Funded Status**



**Actuarial Valuation as of June 30:**

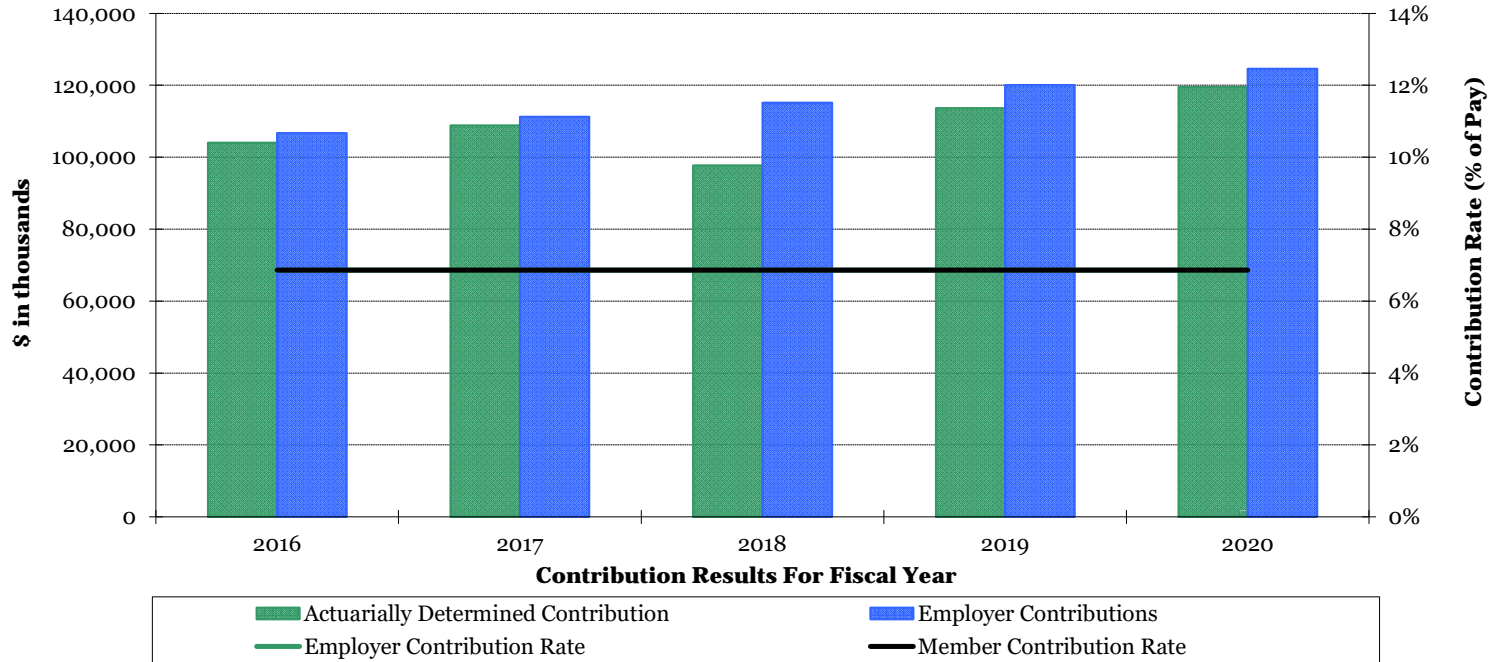
**(\$ in '000's)**

	<b><u>2016</u></b>	<b><u>2017</u></b>	<b><u>2018</u></b>	<b><u>2019</u></b>	<b><u>2020</u></b>
Actuarial Accrued Liability (AAL)	\$4,809,666	\$5,209,369	\$5,542,478	\$5,809,485	\$6,089,401
Actuarial Value of Assets (AVA)	\$4,157,427	\$4,470,270	\$4,774,781	\$5,019,868	\$5,257,847
Market Value of Assets (MVA)	\$4,007,331	\$4,446,418	\$4,769,765	\$5,018,524	\$5,118,844
Unfunded Liability (AAL - AVA)	\$652,239	\$739,099	\$767,697	\$789,617	\$831,554
AVA Funded Status (AVA / AAL)	86.4%	85.8%	86.1%	86.4%	86.3%
MVA Funded Status (MVA / AAL)	83.3%	85.4%	86.1%	86.4%	84.1%

SECTION I - EXECUTIVE SUMMARY

**HISTORICAL SUMMARY (CONTINUED)**

**5-Year History of Contributions**



**Contribution Results For Fiscal Year:**

<b><u>(\$ in '000's)</u></b>	<b><u>2016</u></b>	<b><u>2017</u></b>	<b><u>2018</u></b>	<b><u>2019</u></b>	<b><u>2020</u></b>
Actuarially Determined Contribution <sup>1</sup>	\$104,012	\$108,807	\$97,653	\$113,567	\$119,461
Employer Contributions	\$106,655	\$111,240	\$115,103	\$120,042	\$124,545
ADC % Contributed	102.5%	102.2%	117.9%	105.7%	104.3%
Employer ADC Rate	6.69%	6.71%	5.82%	6.49%	6.58%
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%

<sup>1</sup> Employer portion only

<sup>2</sup> Actuarially Determined Contribution (ADC) based on ADC percentage calculated in the prior fiscal year and payroll during the current year.



SECTION I - EXECUTIVE SUMMARY

**HISTORICAL SUMMARY (CONTINUED)**

**Summary of Valuation Results<sup>1</sup>**

<b><u>Valuation Date</u></b>	<b><u>June 30, 2016</u></b>	<b><u>June 30, 2017</u></b>	<b><u>June 30, 2018</u></b>	<b><u>June 30, 2019</u></b>	<b><u>June 30, 2020</u></b>
Development of Actuarially Determined Contribution Rate:					
1. Anticipated Payroll	\$ 1,519,081,146	\$ 1,558,183,433	\$ 1,636,007,948	\$ 1,665,654,047	\$ 1,732,243,294
2. Total Normal Cost: <sup>2</sup>					
a. Amount	\$ 150,975,958	\$ 161,028,014	\$ 170,543,513	\$ 173,676,697	\$ 181,297,752
b. Percentage of Payroll	9.94%	10.33%	10.42%	10.43%	10.47%
3. Total Unfunded Actuarial Accrued Liability Annual Amortizations: <sup>3</sup>					
a. Amount	\$ 41,637,462	\$ 47,047,980	\$ 49,452,995	\$ 52,046,253	\$ 55,915,866
b. Percentage of Payroll	2.74%	3.02%	3.02%	3.12%	3.23%
4. Total Actuarially Determined Contribution Rate:					
a. Percentage of Payroll: (2)(b) + (3)(b)	<b>12.68%</b>	<b>13.35%</b>	<b>13.44%</b>	<b>13.55%</b>	<b>13.70%</b>
b. Effective UAAL Amortization Period	24.9 Years	24.4 Years	23.6 Years	22.7 Years	22.0 Years
5. Recommended Total Contribution Rate, Member + Employer:					
a. Percentage of Payroll	<b>13.72%</b>	<b>13.72%</b>	<b>13.72%</b>	<b>13.72%</b>	<b>13.72%</b>
b. Effective UAAL Amortization Period	15.1 Years	20.2 Years	20.4 Years	20.9 Years	21.8 Years
c. Effective Date	July 1, 2017	July 1, 2018	July 1, 2019	July 1, 2020	July 1, 2021

<sup>1</sup> The contribution rates shown were developed on a funding basis only and do not reflect accounting requirements.

<sup>2</sup> The Normal Cost is as of the beginning of the year and includes a 1.50% load for anticipated losses on service purchases.

<sup>3</sup> The UAAL Amortization is as of the beginning of the year.

SECTION I - EXECUTIVE SUMMARY

**HISTORICAL SUMMARY (CONTINUED)**

**Summary of Valuation Results (Continued)**

	<u>June 30, 2016</u>	<u>June 30, 2017</u>	<u>June 30, 2018</u>	<u>June 30, 2019</u>	<u>June 30, 2020</u>
Census Information					
Active					
Number <sup>1</sup>	47,851	47,953	48,549	49,345	50,179
Average Age	48.3	48.3	48.2	48.1	48.0
Average Years of Service	8.6	8.5	8.5	8.3	8.2
Anticipated Payroll of Actives (\$ in 000's) <sup>2</sup>	\$ 1,519,081	\$ 1,558,183	\$ 1,636,008	\$ 1,665,654	\$ 1,732,243
Inactive Members					
Vested					
Number <sup>3</sup>	6,246	6,373	6,480	6,744	6,867
Annual Deferred Annuities (\$ in 000's)	\$ 23,052	\$ 25,167	\$ 26,141	\$ 27,890	\$ 29,199
Non Vested					
Number	10,721	12,192	13,299	14,839	15,642
Account Balance (\$ in 000's)	\$ 20,227	\$ 26,004	\$ 28,496	\$ 33,295	\$ 35,400
Former Members					
Entitled to a Deferred Annuity					
Number	213	76	70	63	47
Annual Deferred Annuities (\$ in 000's)	\$ 583	\$ 427	\$ 437	\$ 413	\$ 334
Entitled to a Refund of Contributions					
Number	14,397	14,511	15,560	15,472	16,422
Account Balance (\$ in 000's)	\$ 12,827	\$ 14,338	\$ 18,942	\$ 16,894	\$ 19,580
Retiree/Beneficiary/Disabled					
Number	27,583	29,002	30,360	31,850	33,232
Annual Benefits Payable (\$ in 000's) <sup>4</sup>	\$ 229,005	\$ 245,448	\$ 265,209	\$ 284,525	\$ 302,850

<sup>1</sup> The number of active members as of June 30, 2020 includes 956 members who retired in July 2020.

<sup>2</sup> Figures shown are the anticipated payroll for the one-year period following the valuation date. For the June 30, 2020 valuation, anticipated payroll excludes 956 members who retired in July 2020.

<sup>3</sup> The number of inactive members as of June 30, 2020 includes 63 members who retired in July 2020.

<sup>4</sup> The annual benefits payable as of June 30, 2020 does not include 1,019 members who retired in July 2020. The annual benefits payable for the 1,019 members who retired in July 2020 are \$13,859,875.

SECTION I - EXECUTIVE SUMMARY

**HISTORICAL SUMMARY (CONTINUED)**

Summary of Valuation Results (Continued)

	<u>June 30, 2016</u>	<u>June 30, 2017</u>	<u>June 30, 2018</u>	<u>June 30, 2019</u>	<u>June 30, 2020</u>
<b>Present Value of Future Benefits</b>					
Member Contribution Balances <sup>1</sup>	\$ 926,273,575	\$ 962,156,459	\$ 1,004,383,341	\$ 1,050,906,650	\$ 1,097,457,007
Retiree/Beneficiary	2,151,723,215	2,395,510,722	2,618,159,105	2,798,909,191	3,007,294,550
Disabled	53,604,390	58,366,475	59,964,464	62,250,936	63,804,762
Inactive	73,543,298	87,659,935	92,492,565	104,954,582	100,631,671
Active	<u>2,692,310,897</u>	<u>2,868,445,165</u>	<u>3,004,286,379</u>	<u>3,056,095,370</u>	<u>3,137,750,045</u>
Total	\$ 5,897,455,375	\$ 6,372,138,756	\$ 6,779,285,854	\$ 7,073,116,729	\$ 7,406,938,035
<b>Actuarial Accrued Liability (AAL)</b>					
Member Contribution Balances <sup>1</sup>	\$ 926,273,575	\$ 962,156,459	\$ 1,004,383,341	\$ 1,050,906,650	\$ 1,097,457,007
Retiree/Beneficiary	2,151,723,215	2,395,510,722	2,618,159,105	2,798,909,191	3,007,294,550
Disabled	53,604,390	58,366,475	59,964,464	62,250,936	63,804,762
Inactive	73,543,298	87,659,935	92,492,565	104,954,582	100,631,671
Active	<u>1,604,521,479</u>	<u>1,705,675,274</u>	<u>1,767,478,135</u>	<u>1,792,463,340</u>	<u>1,820,213,214</u>
Total	\$ 4,809,665,957	\$ 5,209,368,865	\$ 5,542,477,610	\$ 5,809,484,699	\$ 6,089,401,204
<b>Actuarial Value of Assets (AVA)</b>					
Member Contribution Balances	\$ 926,273,575	\$ 962,156,459	\$ 1,004,383,341	\$ 1,050,906,650	\$ 1,097,457,007
Retiree/Beneficiary	2,151,723,215	2,395,510,722	2,618,159,105	2,798,909,191	3,007,294,550
Disabled	53,604,390	58,366,475	59,964,464	62,250,936	63,804,762
Inactive	73,543,298	87,659,935	92,492,565	104,954,582	100,631,671
Active	<u>952,282,067</u>	<u>966,576,322</u>	<u>999,781,712</u>	<u>1,002,847,118</u>	<u>988,658,699</u>
Total	\$ 4,157,426,545	\$ 4,470,269,913	\$ 4,774,781,187	\$ 5,019,868,477	\$ 5,257,846,689
<b>Unfunded Actuarial Accrued Liability: AAL - AVA <sup>2</sup></b>					
Member Contribution Balances	\$ -	\$ -	\$ -	\$ -	\$ -
Retiree/Beneficiary	-	-	-	-	-
Disabled	-	-	-	-	-
Inactive	-	-	-	-	-
Active	<u>652,239,412</u>	<u>739,098,952</u>	<u>767,696,423</u>	<u>789,616,222</u>	<u>831,554,515</u>
Total	\$ 652,239,412	\$ 739,098,952	\$ 767,696,423	\$ 789,616,222	\$ 831,554,515
<b>Funded Percentage: AVA / AAL <sup>2</sup></b>					
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	<u>59.3%</u>	<u>56.7%</u>	<u>56.6%</u>	<u>55.9%</u>	<u>54.3%</u>
Total	86.4%	85.8%	86.1%	86.4%	86.3%
<b>Market Value of Assets</b>	\$ 4,007,330,673	\$ 4,446,418,007	\$ 4,769,765,289	\$ 5,018,523,615	\$ 5,118,843,873
<b>Summary of Assumptions</b>					
Valuation Interest Rate	7.75%	7.60%	7.50%	7.50%	7.50%
Salary Increases	4.00% - 11.00%	4.00% - 11.00%	4.00% - 11.00%	4.00% - 11.00%	4.00% - 11.00%
Cost-of-Living Assumption	1.00% - 1.50%	1.20% - 1.65%	1.20% - 1.65%	1.20% - 1.65%	1.20% - 1.65%

<sup>1</sup> Member contribution balances as of June 30, 2020 include \$925,150,595 associated with active members and \$172,306,412 associated with inactive members.

<sup>2</sup> 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.

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## SECTION II - FUNDING

### **FUNDING**

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## SECTION II - 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 October 29, 2018 Board meeting, with all changes effective for the June 30, 2018 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.

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## SECTION II - FUNDING

### **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, but subject to certain statutory restrictions, 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.

SECTION II - FUNDING

**B. Development of Funded Status**

	<b>June 30, 2019</b>	<b>June 30, 2020</b>
1. Present Value of Future Benefits		
a. Member Contribution Balances <sup>1</sup>	\$ 1,050,906,650	\$ 1,097,457,007
b. Retirees, Beneficiaries, and Disableds	2,861,160,127	3,071,099,312
c. Inactives	104,954,582	100,631,671
d. Actives	3,056,095,370	3,137,750,045
e. Total: (1)(a) + (1)(b) + (1)(c) + (1)(d)	\$ 7,073,116,729	\$ 7,406,938,035
2. Actuarial Accrued Liability		
a. Member Contribution Balances <sup>1</sup>	\$ 1,050,906,650	\$ 1,097,457,007
b. Retirees, Beneficiaries, and Disableds	2,861,160,127	3,071,099,312
c. Inactives	104,954,582	100,631,671
d. Actives	1,792,463,340	1,820,213,214
e. Total: (2)(a) + (2)(b) + (2)(c) + (2)(d)	\$ 5,809,484,699	\$ 6,089,401,204
3. Actuarial Value of Assets <sup>2</sup>		
a. Member Contribution Balances	\$ 1,050,906,650	\$ 1,097,457,007
b. Retirees, Beneficiaries, and Disableds	2,861,160,127	3,071,099,312
c. Inactives	104,954,582	100,631,671
d. Actives	1,002,847,118	988,658,699
e. Total: (3)(a) + (3)(b) + (3)(c) + (3)(d)	\$ 5,019,868,477	\$ 5,257,846,689
4. Unfunded Actuarial Accrued Liability <sup>2</sup>		
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)	789,616,222	831,554,515
e. Total: (2)(e) - (3)(e)	\$ 789,616,222	\$ 831,554,515
5. Funded Percentage <sup>2</sup>		
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)	55.9%	54.3%
e. Total: (3)(e)/(2)(e)	86.4%	86.3%

<sup>1</sup> Member contribution balances include \$925,150,595 associated with active members and \$172,306,412 associated with inactive members.

<sup>2</sup> 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.

SECTION II - FUNDING

**C. Reconciliation of Unfunded Actuarial Accrued Liability**

1. June 30, 2019 Unfunded Actuarial Accrued Liability	\$	789,616,222
2. Normal Cost for 2019 Plan Year		173,676,697
3. Actuarially Determined Contribution (Employer + Member)		225,722,950
4. Interest of 7.50% on (1) + (2) - (3)		<u>55,317,748</u>
5. Expected June 30, 2020 Unfunded Actuarial Accrued Liability: (1) + (2) - (3) + (4)	\$	792,887,717
6. Actuarial Value of Assets Experience (Gain)/Loss <sup>1</sup>	\$	46,833,212
7. Actuarial Accrued Liability Experience (Gain)/Loss		
a. Actuarial Accrued Liability Experience	\$	(23,402,331)
b. Additional Liability Due to Cost-of-living Adjustments <sup>2</sup>		15,235,917
c. Additional Liability Due to Changes in Actuarial Assumptions		-
d. Additional Liability Due to Changes in Plan Provisions		<u>-</u>
8. Total Experience (Gain)/Loss - New Amortization Base (6) + (7)(a) + (7)(b) + (7)(c) + (7)(d)	\$	38,666,798
9. Actual June 30, 2020 Unfunded Actuarial Accrued Liability (5) + (8)	\$	831,554,515

<sup>1</sup> Based on Actuarial (smoothed) Value of Assets. Includes a gain due to contributions made in excess of the Actuarially Determined Contribution.

<sup>2</sup> The Board granted a Cost-of-Living Adjustment (COLA) of 2.00% effective January 1, 2021, in accordance with the Board's COLA policy, compared to the assumed increase of 1.30%.



SECTION II - FUNDING

**D. Reconciliation of Actuarial Accrued Liability**

1. June 30, 2019 Actuarial Accrued Liability	\$	5,809,484,699	
2. Normal Cost for 2019 Plan Year		173,676,697	
3. Actual Benefit Payments <sup>1</sup>		330,337,694	
4. Transfers, Purchases, and Reinstatements <sup>2</sup>		7,880,357	
5. Interest of 7.50% on (1) + (2) - (3) + (4) <sup>3</sup>		436,863,559	
6. Expected June 30, 2020 Actuarial Accrued Liability: (1) + (2) - (3) + (4) + (5)	\$	6,097,567,618	
7. (Gain)/Loss Components			
a. Member Experience Other Than Salary Experience	\$	8,235,762	0.1%
b. Member Salary Experience		(31,638,093)	(0.5%)
c. Additional Liability Due to Cost-of-Living Adjustment <sup>4</sup>		15,235,917	0.3%
d. Additional Liability Due to Assumption Changes		-	0.0%
e. Additional Liability Due to Plan Provision Changes		-	0.0%
f. Total: (7)(a) + (7)(b) + (7)(c) + (7)(d) + (7)(e)	\$	(8,166,414)	(0.1%)
8. Actual June 30, 2020 Actuarial Accrued Liability: (6) + (7)(f)	<b>\$</b>	<b>6,089,401,204</b>	

<sup>1</sup> Includes refunds of accumulated member contributions.

<sup>2</sup> Includes \$232,410 of reciprocity and RSMo 169.655 transfers and \$7,647,947 of member service purchases and reinstatements.

<sup>3</sup> Reflects a half year of interest on benefit payments and transfers, purchases and reinstatements.

<sup>4</sup> The Board granted a Cost-of-Living Adjustment (COLA) of 2.00% effective January 1, 2021, in accordance with the Board's COLA policy, compared to the assumed increase of 1.30%.

SECTION II - FUNDING

**E. Reconciliation of Market Value of Assets**

	<b>June 30, 2019</b>	<b>June 30, 2020</b>
1. Market Value of Assets, Prior June 30	\$ 4,769,765,289	\$ 5,018,523,615
2. Operating Revenues (Receipts)		
a. Employer Contributions	\$ 120,042,046	\$ 124,544,728 <sup>1</sup>
b. Member Contributions	126,609,105	131,335,977 <sup>2</sup>
c. Interest	27,736,272	27,381,626
d. Dividends	28,208,144	24,539,979
e. Net Income from Security Lending Activities	548,283	370,348
f. Net Capital Appreciation/(Depreciation)	319,477,594	177,882,877
g. Investment Expenses	(56,197,193)	\$ (48,319,863) <sup>3</sup>
h. Other Income	163	70
i. Total Receipts:	\$ 566,424,414	\$ 437,735,742
(2)(a) + (2)(b) + (2)(c) + (2)(d) + (2)(e) + (2)(f) + (2)(g) + (2)(h)		
3. Operating Expenses (Disbursements)		
a. Benefit Payments	\$ 291,568,479	\$ 309,657,862
b. Refunds to Members	18,673,920	20,679,832
c. Administrative Expenses	7,414,688	7,077,068 <sup>4</sup>
d. Other Expenses	9,001	722
e. Total Disbursements:	\$ 317,666,088	\$ 337,415,484
(3)(a) + (3)(b) + (3)(c) + (3)(d)		
4. Excess of Revenues over Expenses: (2)(i) - (3)(e)	\$ 248,758,326	\$ 100,320,258
5. Market Value of Assets, Current June 30: (1) + (4)	<b>\$ 5,018,523,615</b>	<b>\$ 5,118,843,873</b>

<sup>1</sup> Includes \$232,410 of reciprocity and RSMo 169.655 transfers, \$601,532 of contributions for system employees other than investment staff, \$227,562 of contributions for system investment staff, and \$42,936 of interest and other adjustments.

<sup>2</sup> Includes \$7,647,947 of member service purchases and reinstatements.

<sup>3</sup> Includes \$227,562 of contributions for system investment staff.

<sup>4</sup> Includes \$601,532 of contributions for system employees other than investment staff.

SECTION II - FUNDING

**F. Development of Actuarial Value of Assets**

1.	Actuarial Value of Assets June 30, 2019		\$ 5,019,868,477
2.	Activity for Fiscal Year 2020		
a.	Contributions <sup>1</sup>		\$ 255,880,705
b.	Benefit Payments <sup>2</sup>		<u>(330,337,694)</u>
c.	Net Cash Flow		\$ (74,456,989)
3.	Expected Returns <sup>3</sup>		\$ 373,748,476
4.	Assets Before Allocation of Gain/Loss: (1) + (2)(c) + (3)		\$ 5,319,159,964
5.	Actual Returns for 2020 (Net of Expenses)		\$ 174,777,247
6.	Excess Returns for 2020: (5) - (3)		\$ (198,971,229)
7.	Recognized Excess Returns:		
	<u>Year</u>	<u>Excess Return</u>	<u>% Unrecognized</u>
	2020	(198,971,229)	80%
	2019	(43,417,454)	60%
	2018	36,574,752	40%
	2017	157,973,676	20%
	2016	(258,726,115)	0%
	Total		<u>\$ (61,313,275)</u>
8.	Actuarial Value of Assets, June 30, 2020: (4) + (7)		<b>\$ 5,257,846,689</b>

<sup>1</sup> Includes \$232,410 of reciprocity and RSMo 169.655 transfers, \$601,532 of contributions for System employees other than investment staff, \$227,562 of contributions for system investment staff, \$42,936 of interest and other adjustments, and \$7,647,947 of member service purchases and reinstatements.

<sup>2</sup> Includes refunds of accumulated member contributions.

<sup>3</sup> Assumes cash flows occur at mid-year.

SECTION II - FUNDING

**G. Contribution Rate**

<b>Development of Actuarially Determined Contribution Rate:</b>	<b><u>June 30, 2019</u></b>	<b><u>June 30, 2020</u></b>
1. Anticipated Payroll	\$ 1,665,654,047	\$ 1,732,243,294
2. Normal Cost		
a. Amount	\$ 173,676,697	\$ 181,297,752
b. Percentage of Payroll	10.43%	10.47%
3. Unfunded Actuarial Accrued Liability (UAAL) Amortization		
a. Amount	\$ 52,046,253	\$ 55,915,866
b. Percentage of Payroll	3.12%	3.23%
4. Actuarially Determined Contribution Rate		
a. Percentage of Payroll: (2)(b) + (3)(b)	<b>13.55%</b>	<b>13.70%</b>
b. Effective UAAL Amortization Period	22.7 Years	22.0 Years
5. Recommended Total Contribution Rate, Member + Employer		
a. Percentage of Payroll	<b>13.72%</b>	<b>13.72%</b>
b. Effective UAAL Amortization Period	20.9 Years	21.8 Years
c. Effective Date	July 1, 2020	July 1, 2021

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SECTION II - FUNDING

**H. Development of the Normal Cost Rate**

	<u>Dollar <sup>1</sup></u>	<u>Rate</u>
1. Active Members		
a. Retirement Benefits	\$ 131,754,666	7.61%
b. Termination Benefits	45,701,406	2.64%
c. Death and Disability Benefits	<u>3,841,680</u>	<u>0.22%</u>
e. Total Normal Cost	\$ 181,297,752	10.47%
2. Anticipated Member Payroll	\$ 1,732,243,294	

<sup>1</sup> Normal cost amounts include a 1.50% load for anticipated losses on service purchases.

SECTION II - FUNDING

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

	<u>Date Base Established</u>	<u>Reason</u>	<u>Remaining Balance <sup>1</sup></u>	<u>Remaining Period</u>	<u>Amortization Amount</u>	<u>Rate</u>
1.	6/30/2007	Plan Amendment	\$ 809,546	7	\$ 130,103	0.01%
2.	6/30/2011	UAAL Fresh Start	576,224,901	21	\$ 39,872,942	2.30%
3.	6/30/2012	Actuarial Experience	138,678,534	22	\$ 9,319,676	0.54%
4.	6/30/2013	Plan Amendment	1,628,654	13	\$ 157,783	0.01%
5.	6/30/2013	Actuarial Experience	68,152,058	23	\$ 4,456,742	0.26%
6.	6/30/2014	Actuarial Experience	(125,862,286)	24	\$ (8,023,177)	-0.47%
7.	6/30/2015	Actuarial Experience	(42,064,028)	25	\$ (2,618,016)	-0.15%
8.	6/30/2016	Actuarial Experience and Assumption Changes	49,376,557	26	\$ 3,004,916	0.17%
9.	6/30/2017	Actuarial Experience and Assumption Changes	84,491,303	27	\$ 5,034,550	0.29%
10.	6/30/2018	Actuarial Experience and Assumption Changes	23,695,088	28	\$ 1,384,155	0.08%
11.	6/30/2019	Actuarial Experience	17,757,390	29	\$ 1,018,081	0.06%
12.	6/30/2020	Actuarial Experience	38,666,798	30	\$ 2,178,111	0.13%
	Total		\$ 831,554,515		\$ 55,915,866	3.23%
10.	Anticipated Member Payroll				\$ 1,732,243,294	

<sup>1</sup> In accordance with the funding policy, amounts are amortized as a level percent of payroll assuming 3.25% payroll growth and 7.50% discount rate.

SECTION II - FUNDING

**J. History of Contribution Rates**<sup>1</sup>

<u>Valuation Date</u>	<u>Effective Date</u>	<u>Total Contribution Rate</u>
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%
June 30, 2017	July 1, 2018	13.72%
June 30, 2018	July 1, 2019	13.72%
June 30, 2019	July 1, 2020	13.72%
June 30, 2020	July 1, 2021	13.72%

<sup>1</sup> Valuation results prior to June 30, 2009 were calculated by the prior actuary.

SECTION II - FUNDING

**K. Historical Investment Experience**

<u>Year Ending June 30</u>	<u>Rate of Investment Return</u>		<u>Actuarial Assumed Interest Rate</u>
	<u>Market Basis <sup>1</sup></u>	<u>Actuarial Basis <sup>2,3</sup></u>	
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%
2018	8.7%	8.0%	7.60%
2019	6.9%	6.5%	7.50%
2020	3.7%	6.3%	7.50%

<sup>1</sup> As provided by PEERS. Net of all expenses and fees.

<sup>2</sup> Approximate return net of all expenses and fees and assuming all cash flows occurred at mid-year.

<sup>3</sup> Valuation results prior to June 30, 2009 were calculated by the prior actuary.



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SECTION III - ACCOUNTING

**ACCOUNTING**

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SECTION III - ACCOUNTING

PLAN FINANCIAL STATEMENTS UNDER GASB #67

**A. Statement of Fiduciary Net Position under GASB #67 as of June 30, 2020**

1.	Assets		
	a. Cash	\$	65,055,037
	b. Receivables		
	i. Contributions Receivable	\$	22,793,136
	ii. Accrued Interest and Dividends		10,082,650
	iii. Investment Sales		260,773,218
	iv. Due from PSRS		-
	v. Other		2
	vi. Total Receivables	\$	293,649,006
	c. Total Investments		
	i. Short-Term Investments	\$	108,604,370
	ii. US Treasuries and TIPS		934,262,847
	iii. US Public Equities		1,358,181,220
	iv. Global Public Equities		767,758,495
	v. Public Debt		228,718,918
	vi. Private Equity		654,620,637
	vii. Private Credit		86,533,892
	viii. Private Real Estate		438,764,539
	ix. Hedged Assets		486,571,900
	x. Total Investments	\$	5,064,016,818
	d. Invested Securities Lending Collateral		14,497,536
	e. Prepaid Expenses		7,370
	f. Fixed Assets, Net of Depreciation		-
	g. Total Assets: (1)(a) + (1)(b)(vi) + (1)(c)(x) + (1)(d) + (1)(e) + (1)(f)	\$	5,437,225,767
2.	Deferred Outflow of Resources		
	a. Outflows Related to Other Post Employment Benefit Obligations	\$	76,587
3.	Liabilities		
	a. Accounts Payable	\$	1,856,633
	b. Interest Payable		48,710
	c. Securities Lending Collateral		14,492,771
	d. Investment Purchases		298,312,543
	e. Due to PSRS		909,995
	f. Accrued Medical Claims <sup>1</sup>		21,450
	g. OPEB Liability for System Employees <sup>1</sup>		1,610,599
	h. Compensated Absences <sup>1</sup>		1,100,704
	i. Total Liabilities: (3)(a) + (3)(b) + (3)(c) + (3)(d) + (3)(e) + (3)(f) + (3)(g) + (3)(h)	\$	318,353,405
4.	Deferred Inflow of Resources		
	a. Inflows Related to Other Post Employment Benefit Obligations	\$	105,076
5.	Fiduciary Net Position Restricted for Pensions: (1)(g) + (2)(a) - (3)(i) - (4)(a)	<b>\$</b>	<b>5,118,843,873</b>

<sup>1</sup> Compensation and benefit costs related to System employees and paid from the Trust.

SECTION III - ACCOUNTING

**PLAN FINANCIAL STATEMENTS UNDER GASB #67**

**B. Statement of Changes in Fiduciary Net Position under GASB #67 for the Year Ended June 30, 2020**

1.	Fiduciary Net Position as of June 30, 2019	\$	5,018,523,615
2.	Additions		
a.	Contributions		
i.	Member Contributions <sup>1</sup>	\$	131,335,977
ii.	Employer Contributions - Proportionate Share		123,440,288
iii.	Employer Contributions - Other <sup>2</sup>		1,104,440
iv.	Non-Employer Contributing Entity Contributions		-
v.	Total Contributions	\$	<u>255,880,705</u>
b.	Investment Income/(Loss)		
i.	Net Appreciation/(Depreciation)	\$	177,882,877
ii.	Net Interest and Dividend Income		51,921,605
iii.	Net Income from Security Lending Activities		370,348
iv.	Other Net Investment Income		-
v.	Investment Expenses and Rebates <sup>3</sup>		(48,319,863)
vi.	Total Investment Income/(Loss)	\$	<u>181,854,967</u>
c.	Other Additions		
i.	Miscellaneous Income	\$	70
ii.	Total Other Additions	\$	70
d.	Total Revenue (Additions): (2)(a)(v) + (2)(b)(vi) + (2)(c)(ii)	\$	437,735,742
3.	Deductions		
a.	Monthly Benefits	\$	309,657,862
b.	Refunds of Contributions		20,679,832
c.	Administrative Expenses <sup>4</sup>		7,077,068
d.	Other Expenses		722
e.	Total Expenses (Deductions): (3)(a) + (3)(b) + (3)(c) + (3)(d)	\$	<u>337,415,484</u>
4.	Net Increase (Decrease) in Fiduciary Net Position: (2)(d) - (3)(e)	\$	100,320,258
5.	Fiduciary Net Position as of June 30, 2020: (1) + (4)	<b>\$</b>	<b>5,118,843,873</b>

<sup>1</sup> Includes \$7,647,947 of member service purchases and reinstatements.

<sup>2</sup> Includes \$232,410 of reciprocity and RSMo 169.655 transfers, \$601,532 of contributions for system employees other than investment staff, \$227,562 of contributions for system investment staff and \$42,936 of interest and other adjustments.

<sup>3</sup> Includes \$227,562 of contributions for system investment staff.

<sup>4</sup> Includes \$601,532 of contributions for system employees other than investment staff, but does not include \$42,936 of interest and other adjustments to employer contributions.

SECTION III - ACCOUNTING

**EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68**

**C. Net Pension Liability under GASB #68 for the Year Ended June 30, 2020**

1.	Total Pension Liability		
	a. Total Pension Liability - Beginning of year	\$	5,809,484,699
	b. Total service cost		173,676,697
	c. Interest cost <sup>1</sup>		436,863,559
	d. Experience (gains)/losses		(8,166,414)
	e. Assumption changes		-
	f. Plan amendments		-
	g. Benefit payments <sup>2</sup>		(330,337,694)
	h. Transfers, Purchases, and Reinstatements		<u>7,880,357</u>
	i. Total Pension Liability - End of year	\$	6,089,401,204
2.	Plan Fiduciary Net Position		
	a. Plan Fiduciary Net Position - Beginning of year	\$	5,018,523,615
	b. Employer contributions <sup>3</sup>		124,544,728
	c. Member contributions <sup>4</sup>		131,335,977
	d. Non-employer contributing entity contributions		-
	e. Investment return		
	i. Expected investment return <sup>1,5</sup>	\$	373,647,611
	ii. Investment gain/(loss)		<u>(191,792,574)</u>
	iii. Net investment return		181,855,037
	f. Benefit payments <sup>2</sup>		(330,337,694)
	g. Administrative and Other Expenses <sup>6</sup>		<u>(7,077,790)</u>
	h. Plan Fiduciary Net Position - End of year:	\$	5,118,843,873
3.	Net Pension Liability		
	a. Net Pension Liability: (1)(i) - (2)(h)	\$	<b>970,557,331</b>
	b. Plan Fiduciary Net Position as a Percentage of the Total Pension Liability : (2)(h) / (1)(i)		84.1%

<sup>1</sup> Reflects interest on total service cost and actual benefit payments.

<sup>2</sup> Includes refunds of accumulated member contributions.

<sup>3</sup> Includes \$232,410 of reciprocity and RSMo 169.655 transfers, \$601,532 of contributions for system employees other than investment staff, \$227,562 of contributions for system investment staff, and \$42,936 of interest and other adjustments.

<sup>4</sup> Includes \$7,647,947 of member service purchases and reinstatements.

<sup>5</sup> 7.50%, net of investment expenses and assuming cash flows occur at mid-year.

<sup>6</sup> Includes \$601,532 of contributions for system employees other than investment staff, but does not include \$42,936 of interest and other adjustments to employer contributions.

SECTION III - ACCOUNTING

**EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68**

**D. Deferred Inflows and Outflows of Resources under GASB #68 for the Year Ended June 30, 2020**

Fiscal Year Established	Reason	Remaining Balance At Beginning of Year	Remaining Period <sup>1</sup>	Annual Recognition	Remaining Balance At End of Year
1. Liability experience					
a. Inflows					
2017	Experience gain	\$ 723,843	0.58	\$ 723,843	\$ -
2018	Experience gain	\$ 2,962,134	1.57	\$ 1,886,711	\$ 1,075,423
2019	Experience gain	\$ 13,078,787	2.42	\$ 5,404,458	\$ 7,674,329
2020	Experience gain	\$ 8,166,414	3.37	\$ 2,423,269	\$ 5,743,145
b. Outflows					
None					
2. Assumption changes					
a. Inflows					
None					
b. Outflows					
2017	Assumption loss	\$ (22,749,756)	0.58	\$ (22,749,756)	\$ -
2018	Assumption loss	\$ (27,231,493)	1.57	\$ (17,344,901)	\$ (9,886,592)
3. Investment experience <sup>2</sup>					
a. Inflows					
2017	Investment gain	\$ 70,393,563	2.00	\$ 35,196,783	\$ 35,196,780
2018	Investment gain	\$ 27,300,639	3.00	\$ 9,100,213	\$ 18,200,426
b. Outflows					
2016	Investment loss	\$ (51,440,294)	1.00	\$ (51,440,294)	\$ -
2019	Investment loss	\$ (28,494,057)	4.00	\$ (7,123,515)	\$ (21,370,542)
2020	Investment loss	\$ (191,792,574)	5.00	\$ (38,358,515)	\$ (153,434,059)
4. Total deferred inflows / outflows: (1) + (2) + (3)					
a. Inflows					
	Total	<b>\$ 122,625,380</b>		<b>\$ 54,735,277</b>	<b>\$ 67,890,103</b>
b. Outflows					
	Total	<b>\$ (321,708,174)</b>		<b>\$ (137,016,981)</b>	<b>\$ (184,691,193)</b>

<sup>1</sup> 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.

<sup>2</sup> Net of investment expenses.

SECTION III - ACCOUNTING

EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68

**D. Deferred Inflows and Outflows of Resources under GASB #68 for the Year Ended June 30, 2020 (Continued)**

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

Year Ending June 30:

2021	\$	(2,168,479)
2022	\$	(31,688,677)
2023	\$	(44,585,420)
2024	\$	(38,358,514)
2025	\$	-
Thereafter	\$	-

SECTION III - ACCOUNTING

**EMPLOYER FINANCIAL STATEMENTS UNDER GASB #68**

**E. Pension Expense under GASB #68 for the Year Ended June 30, 2020**

1. Service cost	
a. Total service cost	\$ 173,676,697
b. Member contributions <sup>1</sup>	(123,688,030)
c. Administrative and other expenses <sup>2</sup>	6,433,322
d. Net employer service cost: (1)(a) + (1)(b) + (1)(c)	<u>\$ 56,421,989</u>
2. Plan amendments	\$ -
3. Interest cost	\$ 436,863,559
4. Expected return on assets <sup>3</sup>	\$ (373,875,173)
5. Recognition of deferred (inflows) / outflows of resources related to:	
a. Liability experience (gains) / losses	\$ (10,438,281)
b. Assumption changes (gains) / losses	40,094,657
c. Investment (gains) / losses	52,625,328
d. Total: (5)(a) + (5)(b) + (5)(c)	<u>\$ 82,281,704</u>
6. Total collective pension expense: (1)(d) + (2) + (3) + (4) + (5)(d)	<b>\$ 201,692,079</b>

<sup>1</sup> Excludes \$7,647,947 of member service purchases and reinstatements.

<sup>2</sup> Administrative expenses exclude \$601,532 of contributions for system employees other than investment staff, but includes \$42,936 of interest and other adjustments to employer contributions.

<sup>3</sup> Gross of \$227,562 of contributions for system investment staff.

SECTION III - ACCOUNTING

**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, 2020
  - Valuation Date                            June 30, 2020
  - 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. Since the last experience study, the investment return and COLA assumptions were updated as of June 30, 2017, based on changes to the Board's funding policy adopted at the November 3, 2017 meeting. For the June 30, 2018 valuation, the investment return assumption was again reviewed and updated from 7.60% to 7.50% as adopted at the October 29, 2018 meeting. The next experience study is scheduled to be completed prior to the June 30, 2021 valuation.
  
  - Inflation                                    Increasing from 1.95% to 2.25% over six years, beginning January 1, 2022, and 2.25% thereafter
  - 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 1.35% to 1.65% over six years beginning January 1, 2022. The COLA reflected for January 1, 2021 is 2.00%, in accordance with the COLA proposed for approval by the Board at the October 26, 2020 meeting. This COLA assumption reflects an assumption that general inflation will increase from 1.95% to a normative inflation assumption of 2.25% over six 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.



SECTION III - ACCOUNTING

**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 7.50% as of June 30, 2020, 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.

	<u>1% Decrease (6.50%)</u>	<u>Current Rate (7.50%)</u>	<u>1% Increase (8.50%)</u>
Net Pension Liability	\$ 1,710,402,567	\$ 970,557,331	\$ 349,781,807

3. Classes of plan members covered:

- Retired members, beneficiaries and disabled members receiving benefits:	33,232
- Inactive members (vested and non-vested):	22,509
- Former members:	16,469
- Active Plan Members:	50,179
- Total membership:	122,389

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, 2020, the money-weighted return on the plan assets is 3.7%.

5. The components of the Net Pension Liability for the Public Education Employee Retirement System of Missouri as of June 30, 2020, are as follows:

- Total Pension Liability	\$ 6,089,401,204
- Plan Fiduciary Net Position	5,118,843,873
- Net Pension Liability	\$ 970,557,331
- Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	84.1%

SECTION III - ACCOUNTING

**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**<sup>1</sup>

Year Ending June 30:	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
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	\$ 5,209,368,865
b. Total service cost <sup>2</sup>	159,672,364	156,599,641	161,391,660	150,975,958	161,028,014
c. Interest cost <sup>3</sup>	315,131,402	333,780,285	372,184,628	374,497,203	397,675,858
d. Experience (gains)/losses	(14,308,876)	45,342,850	(58,947,668)	(4,467,870)	(6,735,556)
e. Assumption changes	-	-	65,420,724	140,420,925	61,921,295
f. Plan amendments	-	-	-	-	-
g. Benefit payments <sup>4</sup>	(216,624,810)	(235,070,181)	(250,390,477)	(269,268,101)	(287,634,108)
h. Transfers, Purchases, and Reinstatements	-	175,552	7,690,111	7,544,793	6,853,242
i. Total Pension Liability - End of year	<u>\$ 4,211,488,832</u>	<u>\$ 4,512,316,979</u>	<u>\$ 4,809,665,957</u>	<u>\$ 5,209,368,865</u>	<u>\$ 5,542,477,610</u>
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	\$ 4,446,418,007
b. Employer contributions <sup>5</sup>	100,699,735	103,624,310	106,717,021	111,239,585	115,103,143
c. Member contributions <sup>6</sup>	106,420,656	110,443,660	114,257,497	118,446,790	121,467,850
d. Non-employer contributing entity contributions	-	-	-	-	-
e. Net investment return	544,154,941	163,719,697	60,317,389	485,046,866	381,523,965
f. Benefit payments <sup>4</sup>	(216,624,810)	(235,070,181)	(250,390,477)	(269,268,101)	(287,634,108)
g. Administrative and Other Expenses <sup>7</sup>	(4,840,435)	(5,629,551)	(6,981,577)	(6,377,806)	(7,113,568)
h. Plan Fiduciary Net Position - End of year	<u>\$ 3,846,322,885</u>	<u>\$ 3,983,410,820</u>	<u>\$ 4,007,330,673</u>	<u>\$ 4,446,418,007</u>	<u>\$ 4,769,765,289</u>

<sup>1</sup> As allowable under GASB #68, PEERS elected to prepare the information prospectively from June 30, 2013.

<sup>2</sup> 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 shown for fiscal year ending on or after 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.

<sup>3</sup> 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.

<sup>4</sup> Includes refunds of accumulated member contributions and other interfund transfers.

<sup>5</sup> Includes contributions for reciprocity and RSMo 169.655 transfers, contributions for system employees, and interest and other adjustments.

<sup>6</sup> Includes contributions for service purchases and reinstatements.

<sup>7</sup> Includes contributions for system employees, but excludes interest and other adjustments to employer contributions.

SECTION III - ACCOUNTING

**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 (continued) <sup>1</sup>**

Year Ending June 30:	<u>2019</u>	<u>2020</u>
1. Total Pension Liability		
a. Total Pension Liability - Beginning of year	\$ 5,542,477,610	\$ 5,809,484,699
b. Total service cost <sup>2</sup>	170,543,513	173,676,697
c. Interest cost <sup>3</sup>	417,341,777	436,863,559
d. Experience (gains)/losses	(18,483,245)	(8,166,414)
e. Assumption changes	-	-
f. Plan amendments	-	-
g. Benefit payments <sup>4</sup>	(310,242,399)	(330,337,694)
h. Transfers, Purchases, and Reinstatements	<u>7,847,443</u>	<u>7,880,357</u>
i. Total Pension Liability - End of year	\$ 5,809,484,699	\$ 6,089,401,204
2. Plan Fiduciary Net Position		
a. Plan Fiduciary Net Position - Beginning of year	\$ 4,769,765,289	\$ 5,018,523,615
b. Employer contributions <sup>5</sup>	120,042,046	124,544,728
c. Member contributions <sup>6</sup>	126,609,105	131,335,977
d. Non-employer contributing entity contributions	-	-
e. Net investment return	319,773,263	181,855,037
f. Benefit payments <sup>4</sup>	(310,242,399)	(330,337,694)
g. Administrative and Other Expenses <sup>7</sup>	<u>(7,423,689)</u>	<u>(7,077,790)</u>
h. Plan Fiduciary Net Position - End of year	\$ 5,018,523,615	\$ 5,118,843,873

<sup>1</sup> As allowable under GASB #68, PEERS elected to prepare the information prospectively from June 30, 2013.

<sup>2</sup> 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 shown for fiscal year ending on or after 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.

<sup>3</sup> 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.

<sup>4</sup> Includes refunds of accumulated member contributions and other interfund transfers.

<sup>5</sup> Includes contributions for reciprocity and RSMo 169.655 transfers, contributions for system employees, and interest and other adjustments.

<sup>6</sup> Includes contributions for service purchases and reinstatements.

<sup>7</sup> Includes contributions for system employees, but excludes interest and other adjustments to employer contributions.

SECTION III - ACCOUNTING

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

**H. Schedule of Net Pension Liability and Related Ratios under GASB #67 and #68 <sup>1</sup>**

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 <sup>2</sup>	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%
6/30/2018	\$ 5,542,477,610	\$ 4,769,765,289	\$ 772,712,321	86.1%	\$ 1,636,007,948	47.2%
6/30/2019	\$ 5,809,484,699	\$ 5,018,523,615	\$ 790,961,084	86.4%	\$ 1,665,654,047	47.5%
6/30/2020	\$ 6,089,401,204	\$ 5,118,843,873	\$ 970,557,331	84.1%	\$ 1,732,243,294	56.0%

<sup>1</sup> As allowable under GASB #68, PEERS elected to prepare the information prospectively from June 30, 2013.

<sup>2</sup> 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.

SECTION III - ACCOUNTING

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

**I. Schedule of Contributions under GASB #67 and #68**

1.  Year Ending	2.  Actuarially Determined Contribution <sup>1</sup>	3.  Actual Employer Contributions	4.  Contribution Excess / (Deficiency)  (3) - (2)	5.  Actual Covered Member Payroll	6.  Contributions as a Percentage of Covered Payroll  (3) / (5)
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	111,239,585	2,432,352	1,621,568,294	6.86%
6/30/2018	97,653,104	115,103,143	17,450,039	1,677,888,382	6.86%
6/30/2019	113,567,475	120,042,046	6,474,571	1,749,884,052	6.86%
6/30/2020	119,461,270 <sup>2</sup>	124,544,728	5,083,458	1,815,520,816	6.86%

<sup>1</sup> Employer portion of the Actuarial Determined Contribution, net of member contributions.

<sup>2</sup> The actuarially determined contribution rate for employers for the year ending June 30, 2020 is 6.58%. This consists of an employer normal cost rate of 3.56%, which is net of the 6.86% contribution rate for members, and a UAAL amortization rate of 3.02%. Based on these percentages, the actuarial determined contribution amount for employers consists of \$64,632,541 for normal cost and \$54,828,729 for UAAL amortization.

SECTION III - ACCOUNTING

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

**J. Schedule of Money-Weighted Returns under GASB #67 and #68<sup>1</sup>**

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%
6/30/2018	8.7%
6/30/2019	6.9%
6/30/2020	3.7%

<sup>1</sup> As allowable under GASB #68, PEERS elected to prepare the information prospectively from June 30, 2013.

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## SECTION IV - CENSUS DATA

### **CENSUS DATA**

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SECTION IV - CENSUS DATA

**A. Reconciliation of Member Counts**

	Actives <sup>1</sup>	Former Members <sup>2</sup>	Inactive Members <sup>3</sup>	Disabled Retirements	Service Retirements <sup>4</sup>	Beneficiary	Total
Total as of June 30, 2019	49,345	15,535	21,583	832	28,947	2,071	118,313
New Memberships <sup>5</sup>	7,257	2	1,609	0	0	0	8,868
Terminated Members Reinstated	499	0	(499)	0	0	0	0
Refunds	(1,230)	(1,210)	(1,313)	0	0	0	(3,753)
Other Terminations	(3,685)	1,839	1,846	0	0	0	0
Service Retirements	(1,723)	0	(409)	0	2,132	0	0
Disabled Retirements	(24)	0	(8)	32	0	0	0
Death with Beneficiary	(27)	(8)	(5)	(24)	(184)	248	0
Death without Beneficiary	(82)	(47)	(42)	(1)	(720)	(93)	(985)
Voided memberships	(15)	0	(5)	0	0	0	(20)
Refund Pending	(114)	359	(245)	0	0	0	0
Benefit Expirations	0	0	0	0	0	(13)	(13)
Critical Shortage	(21)	0	0	0	0	0	(21)
Death Pending	0	0	0	(7)	(10)	17	0
Data Adjustments	(1)	(1)	(3)	(1)	1	5	0
Total as of June 30, 2020	50,179	16,469	22,509	831	30,166	2,235	122,389

<sup>1</sup> The number of active members as of June 30, 2020 includes 956 members who retired in July 2020.

<sup>2</sup> Includes terminated and deceased former members whose contributions had yet to be distributed as of the valuation date.

<sup>3</sup> The number of inactive members as of June 30, 2020 includes 63 members who retired in July 2020.

<sup>4</sup> Includes members with benefits on hold that will be re-started at a future date.

<sup>5</sup> 10 members were removed that were hired and terminated during the year that have no liability associated with them.



SECTION IV - CENSUS DATA

**B. Member Census Statistics as of June 30, 2020**

	<u>Male</u>	<u>Female</u>	<u>Total</u>
1. Active			
Number <sup>1</sup>	13,049	37,130	50,179
Average Age	48.4	47.9	48.0
Average Years of Service	7.5	8.5	8.2
Anticipated Payroll of Actives <sup>2</sup>	\$ 531,100,542	\$ 1,201,142,752	\$ 1,732,243,294
2. Inactive			
Vested			
Number <sup>3</sup>	1,201	5,666	6,867
Annual Deferred Annuities	\$ 6,998,342	\$ 22,200,409	\$ 29,198,751
Non Vested			
Number	4,046	11,596	15,642
Account Balance	\$ 9,916,094	\$ 25,484,017	\$ 35,400,111
Former Members Entitled to a Deferred Annuity			
Number	19	28	47
Annual Deferred Annuities	\$ 175,474	\$ 158,249	\$ 333,723
Former Members Entitled to a Refund of Contributions			
Number	5,804	10,618	16,422
Account Balance	\$ 5,698,265	\$ 13,881,726	\$ 19,579,991
3. Retiree/Beneficiary/Disabled			
Number	7,961	25,271	33,232
Annual Benefits Payable <sup>4</sup>	\$ 83,310,998	\$ 219,538,539	\$ 302,849,537

<sup>1</sup> Includes 956 members who retired in July 2020.

<sup>2</sup> Figures shown are the anticipated pay for the one-year period following the valuation date; excludes 956 members who retired in July 2020.

<sup>3</sup> Includes 63 members who retired in July 2020.

<sup>4</sup> Excludes 1,019 members who retired in July 2020. Of these 1,019 members, 956 members are included in the active number and 63 are included in the inactive number. The annual benefits payable for the 1,019 members who retired in July 2020 are \$13,859,875.

SECTION IV - CENSUS DATA

**C. History of Active Member Average Pay, Age, and Service**<sup>1</sup>

1. Valuation Date	2. Active Members	3. Covered Payroll (\$ in Thousands)	4. Average Pay (3) / (2)	5. Annual Percent Change	6. Average Attained Age	7. Average Years of Service
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	1,558,183	33,133	2.2%	48.3	8.5
6/30/2018	48,549	1,636,008	34,422	3.9%	48.2	8.5
6/30/2019	49,345	1,665,654	34,464	0.1%	48.1	8.3
6/30/2020	50,179 <sup>2</sup>	1,732,243 <sup>3</sup>	35,192 <sup>3</sup>	2.1%	48.0	8.2

<sup>1</sup> Valuation results prior to June 30, 2009 were computed by the prior actuary.

<sup>2</sup> Includes 956 members who retired in July 2020.

<sup>3</sup> Excludes pay for the 956 members who retired in July 2020.

SECTION IV - CENSUS DATA

**D. Distribution of Active Members by Salary**<sup>1</sup>

Salary	Number	Percent
Under \$5,000	438	0.89%
\$5,000 - 9,999	1,528	3.10%
\$10,000 - 14,999	2,941	5.98%
\$15,000 - 19,999	4,138	8.41%
\$20,000 - 24,999	6,954	14.13%
\$25,000 - 29,999	7,202	14.63%
\$30,000 - 34,999	5,992	12.17%
\$35,000 - 39,999	4,913	9.98%
\$40,000 - 44,999	3,833	7.79%
\$45,000 - 49,999	3,112	6.32%
\$50,000 - 54,999	2,386	4.85%
\$55,000 - 59,999	1,808	3.67%
\$60,000 - 64,999	1,095	2.22%
\$65,000 - 69,999	817	1.66%
\$70,000 - 74,999	541	1.10%
\$75,000 & Over	1,525	3.10%
Total	49,223	100.00%

<sup>1</sup> Excludes 956 members who retired in July 2020.

SECTION IV - CENSUS DATA

**E. Distribution of Active Members by Age and Service <sup>1</sup>**

<b>Attained Age</b>	Distribution of Active Members by Age and Service as of June 30, 2020							Total
	0 to 4 years	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	Over 30	
<25	1,762	13						1,775
25-29	3,036	365	5					3,406
30-34	2,811	883	176	2				3,872
35-39	3,022	1,097	537	149	6			4,811
40-44	2,822	1,372	726	404	148	4		5,476
45-49	2,413	1,434	986	633	317	84	9	5,876
50-54	2,213	1,507	1,270	971	582	188	50	6,781
55-59	2,092	1,433	1,454	1,290	1,049	280	122	7,720
60-64	1,771	1,163	1,079	1,066	854	350	149	6,432
≥65	1,301	908	642	465	359	192	163	4,030
Total	23,243	10,175	6,875	4,980	3,315	1,098	493	50,179

<sup>1</sup> Includes 956 members who retired in July 2020.

SECTION IV - CENSUS DATA

**F. Distribution of Inactive Members by Age and Service**<sup>1</sup>

Attained Age	Distribution of Inactive Members by Age and Service as of June 30, 2020							Total
	0 to 4 years	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	Over 30	
<25	1,491							1,491
25-29	3,549	48						3,597
30-34	2,553	304	11					2,868
35-39	1,895	521	90	9				2,515
40-44	1,567	592	161	38	1			2,359
45-49	1,357	753	231	58	8	2		2,409
50-54	1,091	926	387	116	26			2,546
55-59	945	1,076	522	179	28	3		2,753
60-64	694	419	161	52	1	1		1,328
≥65	500	104	26	11	1	1		643
Total	15,642	4,743	1,589	463	65	7		22,509

<sup>1</sup> Includes 63 members who retired in July 2020.

SECTION IV - CENSUS DATA

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

<b>Attained Age</b>	Distribution of Retired Members, Beneficiaries, and Disabled Members by Age and Number of Years Retired as of June 30, 2020							Total
	0 to 4 years	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	Over 30	
<50	74	65	29	15	2	3	2	190
50-54	142	45	13	10	7	2	1	220
55-59	1,020	260	69	30	10	6	2	1,397
60-64	3,475	1,152	244	61	14	8	8	4,962
65-69	2,985	3,259	838	139	35	10	12	7,278
70-74	1,011	2,732	2,480	736	93	8	10	7,070
75- 79	331	987	1,695	1,728	480	35	9	5,265
80-84	104	308	529	1,085	1,216	287	19	3,548
85-89	20	77	174	262	751	635	125	2,044
≥90	1	21	51	76	144	393	572	1,258
Total	9,163	8,906	6,122	4,142	2,752	1,387	760	33,232

<sup>1</sup> Does not include 1,019 members who retired in July 2020.

SECTION IV - CENSUS DATA

**H. History of Retirees, Beneficiaries, and Disabled Members**<sup>1,2</sup>

Valuation Date	Service Retirees			Disability Retirees			Beneficiaries		
	Added	Removed	End of Year	Added	Removed	End of Year	Added	Removed	End of Year
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
6/30/2018	2,028	788	27,575	36	27	813	216	107	1,972
6/30/2019	2,104	732	28,947	44	25	832	193	94	2,071
6/30/2020	2,133	914	30,166	32	33	831	270	106	2,235

<sup>1</sup> Does not include 1,019 members who retired in July 2020.

<sup>2</sup> 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 Calendar Year	Effective Date of First COLA	First COLA Percentage Increase	Total Increases Through January 2020	January 2021 Increase Based on Proposal	Total Increases Through January 2021 <sup>1</sup>	Number of Retired Members at 6/30/2020 <sup>2</sup>
1989 & Earlier	Various	Various	80.00%	0.00%	80.00%	435
1990	Jan. 1994	3.00%	78.81%	0.67%	80.00%	158
1991	Jan. 1995	2.50%	73.59%	2.00%	77.06%	171
1992	Jan. 1996	3.00%	69.35%	2.00%	72.74%	209
1993	Jan. 1997	2.80%	64.42%	2.00%	67.71%	230
1994	Jan. 1998	2.30%	59.93%	2.00%	63.13%	272
1995	Jan. 1999	1.70%	56.34%	2.00%	59.47%	326
1996	Jan. 2000	2.00%	53.71%	2.00%	56.78%	377
1997	Jan. 2001	3.70%	50.71%	2.00%	53.72%	446
1998	Jan. 2002	3.30%	45.34%	2.00%	48.25%	447
1999	Jan. 2003	1.10%	40.70%	2.00%	43.51%	572
2000	Jan. 2004	2.10%	39.16%	2.00%	41.94%	636
2001	Jan. 2005	3.30%	36.29%	2.00%	39.02%	626
2002	Jan. 2006	2.50%	31.96%	2.00%	34.60%	672
2003	Jan. 2007	4.30%	28.73%	2.00%	31.30%	760
2004	Jan. 2008	2.70%	23.42%	2.00%	25.89%	802
2005	Jan. 2009	5.00%	20.17%	2.00%	22.57%	858
2006	Jan. 2010	0.00%	14.44%	2.00%	16.73%	898
2007	Jan. 2011	0.00%	14.44%	2.00%	16.73%	1,063
2008	Jan. 2012	2.00%	14.44%	2.00%	16.73%	1,067
2009	Jan. 2013	2.00%	12.20%	2.00%	14.44%	1,164
2010	Jan. 2014	2.00%	10.00%	2.00%	12.20%	1,529
2011	Jan. 2015	2.00%	7.85%	2.00%	10.01%	1,552
2012	Jan. 2016	2.00%	5.74%	2.00%	7.85%	1,519
2013	Jan. 2017	0.00%	3.66%	2.00%	5.73%	1,711
2014	Jan. 2018	1.63%	3.66%	2.00%	5.73%	1,801
2015	Jan. 2019	2.00%	2.00%	2.00%	4.04%	1,861
2016	Jan. 2020	0.00%	0.00%	2.00%	2.00%	1,993
2017	Jan. 2021	2.00%		2.00%	2.00%	1,982
2018						2,172
2019						2,130
2020						558
<b>Total</b>						<b>30,997</b>

<sup>1</sup> Cumulative lifetime COLA increases are limited to 80%.

<sup>2</sup> Includes Service Retirees and Disabled Retirees (beneficiaries of deceased members are excluded) as of June 30, 2020; excludes 1,019 members who retired in July 2020, or any additional members who have retired since.



SECTION IV - CENSUS DATA

**J. Distribution of Retired Members by Type and Monthly Amount <sup>1</sup>**

<u>Monthly</u>	<u>Service</u>	<u>Disability</u>	<u>Beneficiary</u>	<u>Total</u>
Less than \$100	1,241	22	144	1,407
\$100-199	4,073	113	404	4,590
\$200-299	3,873	138	373	4,384
\$300-399	2,996	146	263	3,405
\$400-499	2,470	102	219	2,791
\$500-999	7,864	246	530	8,640
\$1,000-1,499	4,160	60	194	4,414
\$1,500 & Over	3,489	4	108	3,601
Total	30,166	831	2,235	33,232

<sup>1</sup> Does not include 1,019 members who retired in July 2020.

SECTION IV - CENSUS DATA

**K. Distribution of Retired Members by Type of Benefit**<sup>1</sup>

<u>Type of Benefit</u>	<u>Number</u>	<u>Annual Benefit</u>
Service Retirees		
Options 1 & 10 (Life Only)	20,146	\$ 172,817,950
Options 2 & 21 (100% J&S with Pop-Up)	6,173	\$ 63,789,463
Options 3 & 31 (75% J&S with Pop-Up)	938	\$ 13,596,179
Options 4 & 41 (50% J&S with Pop-Up)	1,482	\$ 21,793,271
Option 5 (10 Years Certain & Life)	1,063	\$ 8,077,519
Option 6 (5 Years Certain & Life)	301	\$ 2,615,488
Options 20 (100% J&S)	30	\$ 169,206
Options 30 (75% J&S)	1	\$ 4,477
Options 40 (50% J&S)	6	\$ 36,157
Accelerated Payment	26	\$ 542,962
Total	<u>30,166</u>	<u>\$ 283,442,672</u>
Disability Retirees	831	\$ 4,824,713
Beneficiaries	2,235	\$ 14,582,152

<sup>1</sup> Does not include 1,019 members who retired in July 2020. The annual benefits payable for the 1,019 members who retired in July 2020 are \$13,859,875.

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SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**ACTUARIAL ASSUMPTIONS AND METHODS**

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SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**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. Since the last experience study, the investment return and COLA assumptions have been updated. For the June 30, 2017 valuations, the investment return assumption was lowered from 7.75% to 7.60% and the COLA assumption was increased based on changes to the Board's funding policy relating to COLAs. Both changes were adopted at the November 3, 2017 meeting. For the June 30, 2018 valuations, the investment return assumption was further lowered from 7.60% to 7.50%, as adopted by the Board at the October 29, 2018 meeting. No assumption changes were made for the June 30, 2019 or June 30, 2020 valuations. In our opinion, the assumptions are reasonable for purposes of this valuation.

Inflation                         Increasing from 1.95% to 2.25% over six years, beginning January 1, 2022, and 2.25% thereafter

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%

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (Continued)**

Investment Returns

Funding: 7.50% per annum (net of investment and administrative expenses).  
 Accounting: 7.50% per annum (net of investment expenses).

Cost of Living Adjustments (COLA)

The COLA reflected for January 1, 2021 is 2.00%, in accordance with the actual COLA approved by the Board. The COLA assumed for future years increases from 1.35% to 1.65% over six years, beginning January 1, 2022. This COLA assumption reflects an assumption that general inflation will increase from 1.95% to a normative inflation assumption of 2.25% over six 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:

<u>Age</u>	<u>Male</u>	<u>Female</u>
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

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**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 are as follows:

<u>Age</u>	<u>Males</u>	<u>Females</u>
<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:

<u>Age</u>	<u>Male</u>	<u>Female</u>
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:

<u>Age</u>	<u>Male</u>	<u>Female</u>
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

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**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:

<u>Years of Service</u>	<u>Rate</u>
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:

<u>Age</u>	<u>Male and Female Rates</u>
30	0.08
35	0.16
40	0.32
45	0.64
50	1.22
55	2.10

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (Continued)**

Retirement Rates

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

Age	Service										
	<u>&lt;=20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>&gt;=30</u>
<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



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SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**A. Actuarial Assumptions (Continued)**

Refund of Contributions	<p>For active members assumed to terminate employment with less than five years of service, regardless of age, 100% are assumed to take an immediate refund of their contributions.</p> <p>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, 100% are assumed to select the option that has the greater present value between an immediate refund and a deferred annuity.</p> <p>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 an immediate lifetime annuity benefit.</p> <p>For inactive members with less than five years of service, regardless of age, 100% are assumed to take a immediate refund of their contributions.</p> <p>For inactive members with five or more years of service, 100% are assumed to select the option that has the greater present value between an immediate refund and a deferred annuity.</p>
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 7.50% 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)	<p>70% of male and female members are assumed to be married.</p> <p>Beneficiaries are assumed to be of the opposite sex from the member.</p> <p>Male spouses are assumed to be 2 years older than females spouses.</p>
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 that are used in the valuation.

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**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	None.

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## SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

### **B. Assumptions Rationale**

Investment Return	The investment return assumption is based on analysis completed by the PEERS 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 October 29, 2018 meeting.
Cost of Living Adjustments	<p>The cost of living adjustment (COLA) assumed in the valuation increases from 1.35% to 1.65% over six years, beginning January 1, 2022. This COLA assumption reflects an assumption that general inflation will increase from 1.95% to a normative inflation assumption of 2.25% over six years. It is also based on the current policy of the Board to grant a COLA on each January 1 as follows:</p> <ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li><li>• 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.</li></ul>
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.

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## SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

### **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	<p>The actuarial cost method is Entry Age Normal - Level Percent of Payroll.</p> <p>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.</p>
Amortization of Unfunded Actuarial Accrued Liability	<p>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.</p> <p>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.</p> <p>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.</p>
Asset Valuation Method	<p>The Actuarial Value of Assets is a smoothed value of assets. The actuarial value at June 30, 2019 was projected by increasing the amount with 7.50% interest, adding contributions made during the year with 7.50% interest for half the year, and subtracting benefit payments made during the year with 7.50% interest for half the year to arrive at a preliminary June 30, 2020 Actuarial Value of Assets. 20% of the difference between the actual returns on market value for the year and the expected 7.50% 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, 2020 Actuarial Value of Assets.</p> <p>For accounting purposes, market value was used.</p>
Changes Since the Prior Valuation	<p>There have been no changes in the actuarial methods since the June 30, 2019 valuation.</p>

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## SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

### D. Assessment of Risk Associated with Measurement of Pension Liability and Contributions

The actuarial valuation results presented herein are based on a single set of actuarial assumptions; however, there is a risk that emerging results may differ significantly if actual experience proves to be different than expected by the current assumptions.

In accordance with Actuarial Standard of Practice No. 51 we have assessed the risks related to the measurement of the Plan's obligations and determination of contributions, and have identified the following as being the most significant risks:

- Investment risk
- Interest rate risk
- Asset/Liability mismatch risk
- Longevity and other demographic risks
- Contribution risk

A numerical assessment of the risks identified was beyond the scope of this engagement, though we encourage such an assessment be performed to better understand exposure to these risks.

**Investment risk:** *The potential that investment returns will be different than expected.*

Poor investment performance decreases the Plan's funded position and could increase the funding deficiency and future contribution amounts.

**Interest rate risk:** *The potential that interest rates will be different than expected.*

The risk that future interest rates negatively affect investment returns. This risk is linked to investment risk as both accounting and funding results use a discount rate that is equal to the expected investment return.

**Asset/Liability mismatch risk:** *The potential that changes in asset values are not matched by changes in the value of liabilities.*

For assets that are not liability hedged, asset/liability mismatch exists to the extent that market fluctuations do not have the same impact on assets and liabilities. This impacts the funded status of the plan and the unfunded actuarial accrued liability that needs to be funded in the future.

**Longevity and other demographic risks:** *The potential that mortality or other demographic experience will be different than expected.*

For participants whose benefits are paid as lifetime annuities, living longer than expected could increase the UAAL of the Plan. Similarly, turnover, retirement, and other demographic experience different than assumed could result in an increase in UAAL of the Plan.

**Contribution risk:** *The potential of actual future contributions deviating from expected future contributions.*

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 risks noted above could trigger changes in the UAAL of the Plan, thus requiring additional funding. In addition, the financial viability and cash position, as well as applicable law of the State of Missouri, could change over time. Finally, the funding method currently assumes a stable payroll growth into the future. To the extent future covered payroll declines, this would lead to a higher contribution rate. For the reasons noted, there is risk that the Actuarially Determined Contribution could increase and/or that some/all employers and members may not fully contribute at the rates established by the Board.

SECTION V - ACTUARIAL ASSUMPTIONS AND METHODS

**D. Assessment of Risk Associated with Measurement of Pension Liability and Contributions (continued)**

As the population ages and the plan matures, the level of risk associated with funding the plan increases. Below are some plan maturity measures that are significant to understanding the risks associated with the plan.

**Ratio of Market Value of Assets to Active Participant Payroll:** The amount of plan assets relative to covered payroll is a significant indicator of contribution risk for the plan since the size of the market value of assets will increase relative to active payroll as the plan matures. A higher ratio means that the PEERS contribution rate would be more sensitive to investment returns that are higher or lower than expected.

Valuation Date	Market Value of Assets (a)	Covered Payroll (b)	Ratio (c) = (a)/(b)
6/30/2016	\$ 4,007,330,673	\$ 1,519,081,146	2.64
6/30/2017	\$ 4,446,418,007	\$ 1,558,183,433	2.85
6/30/2018	\$ 4,769,765,289	\$ 1,636,007,948	2.92
6/30/2019	\$ 5,018,523,615	\$ 1,665,654,047	3.01
6/30/2020	\$ 5,118,843,873	\$ 1,732,243,294	2.96

**Ratio of Retired Life Actuarial Accrued Liability to Total Actuarial Accrued Liability:** As the plan matures, the percentage of the liability attributable to retirees will grow. When more of the total liability is associated with retirees, volatility of investment returns has an impact on the funding of PEERS as it becomes more challenging to recover from investment losses when there is less active payroll to spread costs over. A higher retiree AAL percentage means that the PEERS contribution rate would be more sensitive to investment returns that are higher or lower than expected.

Valuation Date	Retiree AAL (a)	Total AAL (b)	Retiree AAL Percentage (c) = (a)/(b)
6/30/2016	\$ 2,205,327,605	\$ 4,809,665,957	45.85%
6/30/2017	\$ 2,453,877,197	\$ 5,209,368,865	47.11%
6/30/2018	\$ 2,678,123,569	\$ 5,542,477,610	48.32%
6/30/2019	\$ 2,861,160,127	\$ 5,809,484,699	49.25%
6/30/2020	\$ 3,071,099,312	\$ 6,089,401,204	50.43%

**Ratio of Contributions Less Benefit Payments to Market Value of Assets:** When a plan has negative cash flows, meaning benefit payments are greater than contributions, and has a year with lower than expected investment returns, there will then be less total assets that can be reinvested to earn higher returns in future years.

Valuation Date	Contributions (a)	Benefit Payments (b)	Net Cash Flow (c) = (a) - (b)	Market Value of Assets (d)	Ratio (e) = (c)/(d)
6/30/2016	\$ 220,974,518	\$ 250,390,477	\$ (29,415,959)	\$ 4,007,330,673	-0.73%
6/30/2017	\$ 229,686,375	\$ 269,268,101	\$ (39,581,726)	\$ 4,446,418,007	-0.89%
6/30/2018	\$ 236,570,993	\$ 287,634,108	\$ (51,063,115)	\$ 4,769,765,289	-1.07%
6/30/2019	\$ 246,651,151	\$ 310,242,399	\$ (63,591,248)	\$ 5,018,523,615	-1.27%
6/30/2020	\$ 255,880,705	\$ 330,337,694	\$ (74,456,989)	\$ 5,118,843,873	-1.45%

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SECTION VI - SUMMARY OF PLAN PROVISIONS

**SUMMARY OF BENEFIT PROVISIONS**

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A. Summary of Benefit Provisions

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## 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 2020, 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  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).



SECTION VI - SUMMARY OF PLAN PROVISIONS

**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:

<u>Years of Service</u>	<u>Benefit Percentage</u>
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.

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SECTION VI - SUMMARY OF PLAN PROVISIONS

**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	<p>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&amp;S equivalent of the benefit accrued to date of death. The benefit may commence:</p> <ol style="list-style-type: none"><li>1. Immediately if member is eligible to retire at date of death, or</li><li>2. At a future retirement date of the deceased member.</li></ol> <p>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.</p> <p>COLA adjustments similar to those provided to retirees are provided on these benefits.</p>

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SECTION VI - SUMMARY OF PLAN PROVISIONS

**A. Summary of Benefit Provisions (Continued)**

Changes in Benefit Provisions

The working after retirement provision for PSRS retirees under Section 169.560 of the Revised Statutes of the State of Missouri was amended during the year to change the working after retirement limitations without a suspension of retirement allowance for PSRS retirees returning to work at community colleges to equal 550 hours and 50% of salary. The limitation for such retired members was \$15,000 of salary (with no hours-based limit). In addition, the community colleges would no longer contribute to PEERS on behalf of PSRS retirees who return to work in positions that do not require certification by DESE, regardless of whether the PSRS retirees exceed the thresholds that would result in a suspension of benefits.

This amendment to the working after retirement provisions has no impact on our valuation of the benefit liabilities.

It is our understanding that other provisions are the same as the prior year.