



GASB 75 Actuarial Valuation Report

The State of Tennessee

State Employee Group Plan

For the Fiscal Year Ending June 30, 2020

Measurement Date July 1, 2019

Introduction

This report documents the results of the actuarial valuation for the fiscal year ending June 30, 2020 of the State Employee Group Plan for The State of Tennessee. These results are based on a Measurement Date of June 30, 2019 and include medical benefits provided to the retirees and covered spouses by the State. All reporting requirements are included in the employer's financial statement. The information provided in this report is intended strictly for documenting information relating to the State and plan disclosure and reporting requirements.

Determinations for purposes other than the financial accounting requirements may be significantly different from the results in this report. Thus, the use of this report for purposes other than those expressed here may not be appropriate.

This valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board. In addition, the valuation results are based on our understanding of the financial accounting and reporting requirements under U.S. Generally Accepted Accounting Principles as set forth in Government Accounting Standards Board Statement 75 (GASB 75) including any guidance or interpretations provided by the State and/or its audit partners prior to the issuance of this report. The information in this report is not intended to supersede or supplant the advice and interpretations of The State of Tennessee's auditors. Additional disclosures may be required under GASB 74.

A valuation model was used to develop the liabilities for the July 1, 2019 valuation. The valuation model relies on ProVal software, which was developed by Winklevoss Technologies, LLC. Experts within Aon selected this software and determined it is appropriate for performing valuations. We coded and reviewed the software for the provisions, assumptions, methods, and data of the State Employee Group Plan.

.A model was used to develop the appropriate GASB discount rate. The undersigned relied on experts at Aon Investment Consulting for the development of the capital market assumptions and the model underlying the expected rate of return.

The valuation model outputs various cost scenarios. The "1% increase" and "1% decrease" interest rate scenarios vary only the discount rate assumption, in order to illustrate the impact of a change in that assumption in isolation. In practice, certain other assumptions, such as the expected or realized asset returns, would also be expected to vary when the discount rate changes. Therefore, the output from these scenarios should be used solely for assessing the impact of the discount rate in isolation and may not represent a realistic set of results for other purposes.

The "1% increase" and "1% decrease" healthcare cost trend scenarios vary only the healthcare cost trend assumption, in order to illustrate the impact of a change in that assumption in isolation. Therefore, the output from these scenarios should be used solely for assessing the impact of the healthcare cost trend in isolation and may not represent a realistic set of results for other purposes.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to (but not limited to) such factors as the following:

- Plan experience differing from that anticipated by the economic or demographic assumptions;
- Changes in actuarial methods or in economic or demographic assumptions;
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and
- Changes in plan provisions or applicable law.

Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

Funded status measurements shown in this report are determined based on various measures of plan assets and liabilities. For entity and plan disclosure and reporting purposes, funded status is determined using plan assets measured at market value. Plan liabilities are measured based on the interest rates and other assumptions summarized in the Actuarial Assumptions and Methods section of this report.

These funded status measurements may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, and funded status measurements for The State of Tennessee and plan disclosure and reporting purposes may not be appropriate for assessing the need for or the amount of future contributions. In conducting the valuation, we have relied on personnel, plan design, health care claim cost, and asset information supplied by The State of Tennessee as of the valuation date. While we cannot verify the accuracy of all the information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it has produced appropriate results.

The actuarial assumptions and methods used in this valuation are described in the Actuarial Assumptions and Methods section of this report. The State of Tennessee selected the economic and demographic assumptions and prescribed them for use for purposes of compliance with GASB 75. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience.

The undersigned are familiar with the near-term and long-term aspects of OPEB valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. The information provided in this report is dependent upon various factors as documented throughout this report, which may be subject to change. Each section of this report is considered to be an integral part of the actuarial opinions.

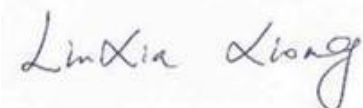
To our knowledge, no colleague of Aon providing services to The State of Tennessee has any material direct or indirect financial interest in The State of Tennessee. Thus, we believe there is no relationship existing that might affect our capacity to prepare and certify this actuarial report for The State of Tennessee.



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Table of Contents

Accounting Requirements

Development of Net OPEB Expense	2
Reconciliation of Net OPEB Liability	4
Deferred Outflows/Inflows	5
Plan Fiduciary Net Position Projection	6
Sensitivity	8
Disclosure—Changes in Net OPEB Liability and Related Ratios	9

Appendix

Participant Data	12
Asset Allocation	13
Health Care Claims Development	14
Actuarial Assumptions and Methods	17
Actuarial Assumptions and Methods—Discussion	23
Plan Provisions	24

Accounting Requirements

Development of GASB 75 Net OPEB Expense

Calculation Details

The following table illustrates the Net OPEB Liability under GASB 75.

	Fiscal Year Ending 6/30/2020
(1) OPEB Liability	
(a) Retired Participants and Beneficiaries Receiving Payment	\$ 437,238,611
(b) Active Participants	<u>728,644,320</u>
(c) Total	\$ 1,165,882,931
(2) Plan Fiduciary Net Position	<u>213,702,707</u>
(3) Net OPEB Liability	\$ 952,180,224
(4) Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	18.33%
(5) Deferred Outflow of Resources for Benefit Payments/Contributions Made After Measurement Date	\$ 137,074,607

Expense

The following table illustrates the OPEB expense under GASB 75.

	Fiscal Year Ending 6/30/2020
(1) Service Cost	\$ 65,979,106
(2) Interest Cost	50,866,612
(3) Expected Investment Return	(6,041,081)
(4) Employee Contributions	0
(5) Administrative Expense	0
(6) Plan Changes	0
(7) Amortization of Unrecognized	
(a) Liability (Gain)/Loss	(10,297,180)
(b) Asset (Gain)/Loss	174,777
(c) Assumption Change (Gain)/Loss	<u>(29,642,501)</u>
(8) Total Expense	\$ 71,039,733

Shown below are details regarding the calculation of Service Cost, Interest Cost and Expected Investment Return components of the Expense.

	Fiscal Year Ending 6/30/2020
(1) Development of Service Cost:	
(a) Normal Cost at Beginning of Measurement Period	\$ 65,979,106
(2) Development of Interest Cost:	
(a) Total OPEB Liability at Beginning of Measurement Period	\$ 1,385,238,244
(b) Normal Cost at Beginning of Measurement Period	65,979,106
(c) Actual Benefit Payments	(92,950,959)
(d) Discount Rate	<u>3.62%</u>
(e) Interest Cost	\$ 50,866,612
(3) Development of Expected Investment Return:	
(a) Plan Fiduciary Net Position at Beginning of Measurement Period	\$ 0
(b) Actual Contributions—Employer	301,486,469
(c) Actual Contributions—Employee	0
(d) Actual Benefit Payments	(92,950,959)
(e) Administrative Expenses	0
(f) Other	0
(g) Expected Return on Assets	<u>6.00%</u>
(h) Expected Return	\$ 6,041,081

Reconciliation of Net OPEB Liability

Shown below are details regarding the Total OPEB Liability, Plan Fiduciary Net Position, and Net OPEB Liability for the Measurement Period from June 30, 2018 to July 1, 2019:

	Increase (Decrease)		
	Total OPEB Liability (a)	Plan Fiduciary Net Position (b)	Net OPEB Liability (c) = (a) – (b)
Balance Recognized at 6/30/2019 (Based on 6/30/2018 Measurement Date)	\$ 1,385,238,244	\$ 0	\$ 1,385,238,244
Changes Recognized for the Fiscal Year:			
Service Cost	\$ 65,979,106	N/A	\$ 65,979,106
Interest on the Total OPEB Liability	50,866,612	N/A	50,866,612
Changes of Benefit Terms	0	N/A	0
Differences Between Expected and Actual Experience	(21,409,873)	N/A	(21,409,873)
Changes of Assumptions	(221,840,199)	N/A	(221,840,199)
Benefit Payments	(92,950,959)	(92,950,959)	0
Contributions From the Employer	N/A	301,486,469	(301,486,469)
Contributions From the Employee	N/A	0	0
Net Investment Income	N/A	5,167,197	(5,167,197)
Administrative Expense	N/A	0	0
Net Changes	\$ (219,355,313)	213,702,707	\$ (433,058,020)
Balance Recognized at 6/30/2020 (Based on 7/1/2019 Measurement Date)	\$ 1,165,882,931	\$ 213,702,707	\$ 952,180,224

Deferred Outflows/Inflows

The following table illustrates the Deferred Inflows and Outflows as of June 30, 2020 under GASB 75.

	Deferred Outflows	Deferred Inflows
(1) Difference Between Actual and Expected Experience	\$ 0	\$ (60,628,289)
(2) Net Difference Between Expected and Actual Earnings on OPEB Plan Investments	699,107	0
(3) Assumption Changes	<u>52,040,471</u>	<u>(227,444,591)</u>
(4) Sub Total	\$ 52,739,578	\$ (288,072,880)
(5) Contributions Made in Fiscal Year Ending 6/30/2020 After Measurement Date	<u>153,021,695</u>	<u>0</u>
(6) Total	\$ 205,761,273	\$ (288,072,880)

Amortization of Deferred Inflows/Outflows

The table below lists the amortization bases included in the deferred inflows/outflows as of June 30, 2020.

Date Established	Type of Base	Period		Balance		Annual Payment
		Original	Remaining	Original	Remaining	
	Liability					
6/30/2020	(Gain)/Loss	7.10	6.10	(\$21,409,873)	(\$18,394,398)	(3,015,475)
6/30/2020	Asset (Gain)/Loss	5.00	4.00	\$873,884	\$699,107	174,777
6/30/2020	Assumptions	7.10	6.10	(\$221,840,199)	(\$190,595,101)	(31,245,098)
	Liability					
6/30/2019	(Gain)/Loss	7.80	5.80	(\$56,797,301)	(\$42,233,891)	(7,281,705)
6/30/2019	Assumptions	7.80	5.80	\$69,985,461	\$52,040,471	8,972,495
6/30/2018	Assumptions	8.00	5.00	(58,959,184)	<u>(\$36,849,490)</u>	<u>(7,369,898)</u>
	Total Charges				(235,333,302)	(39,764,904)

Amounts Recognized in the deferred outflows of resources and deferred inflows of resources related to OPEB will be recognized in the OPEB expense as follows:

Year End June 30:

2021	\$ (39,764,904)
2022	\$ (39,764,904)
2023	\$ (39,764,904)
2024	\$ (39,764,904)
2025	\$ (39,939,590)
Total Thereafter	\$ (36,334,095)

Plan Fiduciary Net Position Projection

The following table illustrates the projection of the fiduciary net position for use in the calculation of the discount rate as of June 30, 2020.

(\$ in thousands)

Year Ending June 30 ²	Beginning Fiduciary Net Position (a)	Total Contributions (b)	Benefit Payments (c)	Investment Earnings (e)	Ending Fiduciary Net Position ¹ (f)
2019	\$213,703	\$153,022	\$80,140	\$-4,435	\$282,150
2020	282,150	137,074	98,598	18,126	338,752
2021	338,752	126,303	100,295	21,149	385,910
2022	385,910	124,055	101,711	23,869	432,123
2023	432,123	122,355	102,394	26,571	478,655
2024	478,655	119,456	103,959	29,230	523,381
2025	523,381	116,091	104,374	31,800	566,899
2026	566,899	114,436	103,252	34,395	612,477
2027	612,477	111,701	102,211	37,078	659,044
2028	659,044	107,317	102,026	39,746	704,081
2029	704,081	103,683	101,775	42,347	748,335
2030	748,335	103,274	102,713	44,962	793,859
2031	793,859	102,662	104,624	47,618	839,515
2032	880,682	98,399	107,380	50,148	880,682
2033	880,682	90,369	110,023	52,299	913,328
2034	913,328	86,291	111,972	54,078	941,726
2035	941,726	89,023	113,185	55,828	973,392
2036	973,392	91,498	114,566	57,762	1,008,086
2037	1,008,086	49,996	116,136	58,552	1,000,498
2038	1,000,498	0	116,295	56,592	940,795
2039	940,795	0	115,520	53,033	878,307
2040	878,307	0	115,098	49,296	812,505
2041	812,505	0	113,296	45,401	744,610
2042	744,610	0	111,235	41,388	674,763
2043	674,763	0	107,167	37,318	604,914
2044	604,914	0	103,545	33,234	534,603
2045	534,603	0	97,744	29,187	466,045
2046	466,045	7,088	92,489	25,441	406,085
2047	406,085	0	83,968	21,883	343,999
2048	343,999	0	75,728	18,401	286,673

¹ (f)=(a) + (b) – (c) – (d) + (e)

² Years later than were omitted from this table.

Plan Fiduciary Net Position

The last year in which projected benefit payments are due from the Plan is 2110.

The Plan's projected fiduciary net position is not projected to reach \$0.

As such, the Plan's fiduciary net position was projected to be available to make all projected future benefit payments for current Plan members. In other words, there is no projected "depletion date" when projected benefits are not covered by projected assets. Therefore, the long-term expected rate of return on Plan investments of 6.00% per annum was applied to all periods of projected benefit payments to determine the total OPEB liability as of June 30, 2020 shown earlier in this report, pursuant to paragraph 48 of GASB Statement No. 74.

In projecting the Plan's fiduciary net position the following assumptions were made:

1. Interest rate for discounting was 6.00% per annum.
2. Projected total contributions are employer contributions to the unfunded actuarial accrued liability and normal cost (including administrative expenses). Based on the closed amortization period in place, the unfunded liability is projected to be paid off in 2037. Contributions are assumed to be paid mid-year.
3. Assumed contributions are based on the contribution policy of The State of Tennessee as communicated on July 1, 2019. The State of Tennessee will contribute no less than the Actuarially Determined Contribution, as authorized by Pub. Ch. No. 426.
4. Projected benefit payments have been determined in accordance with Paragraphs 30-35 of GASB Statement No. 75, and are based on the closed group of active, retired members and beneficiaries as of June 30, 2020. Benefit payments are assumed to be paid mid-year.
5. Projected investment earnings are based on the assumed investment rate of return of 6.00% per annum. The first year's earnings have been adjusted to account for the actual return through June 30, 2020.

Interest Rate Sensitivity

The following table illustrates the impact of interest rate sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2020:

	1% Decrease (5.00%)	Current Rate (6.00%)	1% Increase (7.00%)
(1) Total OPEB Liability	\$1,249,411,149	\$1,165,882,931	\$1,089,218,434
(2) Plan Fiduciary Net Position	<u>213,702,707</u>	<u>213,702,707</u>	<u>213,702,707</u>
(3) Net OPEB Liability	\$1,035,708,442	\$ 952,180,224	\$ 875,515,727

Healthcare Cost Trend Sensitivity

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability for fiscal year ending June 30, 2020:

	1% Decrease	Trend Rate	1% Increase
(1) Total OPEB Liability	\$1,067,079,862	\$1,165,882,931	\$1,280,091,240
(2) Plan Fiduciary Net Position	<u>213,702,707</u>	<u>213,702,707</u>	<u>213,702,707</u>
(3) Net OPEB Liability	\$ 853,377,155	\$ 952,180,224	\$1,066,388,533

Disclosure—Changes in the Net OPEB Liability and Related Ratios

Changes in the Net OPEB Liability and Related Ratios¹

	June 30, 2018	June 30, 2019	June 30, 2020
Total OPEB Liability			
Service Cost	\$ 69,209,230	\$ 64,540,887	\$ 65,979,106
Interest Cost	41,044,542	48,603,403	50,866,612
Changes of Benefit Terms	0	0	0
Differences Between Expected and Actual Experiences	0	(56,797,301)	(21,409,873)
Changes of Assumptions	(58,959,184)	69,985,461	(221,840,199)
Benefit Payments	90,359,337	(83,634,891)	(92,950,959)
Net Change in Total OPEB Liability	\$ (39,064,749)	\$ 42,697,559	\$(219,355,313)
Total OPEB Liability (Beginning)	1,381,605,434	1,342,540,685	1,385,238,244
Total OPEB Liability (Ending)	\$ 1,342,540,685	\$ 1,385,238,244	\$1,165,882,931
Plan Fiduciary Net Position			
Contributions—Employer	\$ 0	\$ 0	\$ 301,486,469
Contributions—Member	0	0	0
Net Investment Income	0	0	5,167,197
Benefit Payments	90,359,337	(83,634,891)	(92,950,959)
Administrative Expense	0	0	0
Other	0	0	0
Net Change in Plan Fiduciary Net Position	\$ 0	\$ 0	\$ 213,702,707
Plan Fiduciary Net Position (Beginning)	0	0	0
Plan Fiduciary Net Position (Ending)	\$ 0	\$ 0	\$ 213,702,707
Net OPEB Liability (Ending)	\$ 1,342,540,685	\$ 1,385,238,244	\$ 952,180,224
Net Position as a Percentage of OPEB Liability	0.00%	0.00%	18.33%
Covered-Employee Payroll	\$ 2,722,360,000	\$ 2,775,186,075	\$3,082,586,938
Net OPEB Liability as a Percentage of Payroll	49.32%	49.92%	30.89%

¹ GASB 75 was effective first for employer fiscal years beginning after June 15, 2017.

Disclosure—Contribution Schedule

Contributions

	Fiscal Year Ending	
	2019	2020
Actuarially Determined Contribution	\$ 135,810,151	\$ 145,396,683
Contributions Made in Relation to the Actuarially Determined Contribution	301,486,469	153,021,695
Contribution Deficiency (Excess)	\$ (165,676,318)	\$ (7,625,012)
Covered-Employee Payroll	\$ 2,775,186,075	\$ 3,082,586,938
Contributions as a Percentage of Payroll	10.9%	5.0%

Notes to Schedule:

Valuation Date: Actuarially determined contribution rates are calculated as of June 30, one year prior to the end of the fiscal year in which contributions are reported.

Methods and assumptions used to determine contribution rates:

Actuarial Cost Method	Entry Age Normal with 20-year closed amortization period for initial unfunded and subsequent actuarial gains/losses.
Asset Valuation Method	Market
Salary Increases	Variable
Investment Rate of Return	6.00%, net of OPEB plan investment expense, including inflation.
Retirement Age	Earlier of age 60 with 5 years of creditable service or any age with 30 years of creditable service.
Mortality	RP-2014 Employees and Healthy Annuitants mortality table projected generationally with MP-2016 from the central year for pre-retirement. For post-retirement the tables are Blue Collar and adjusted with a 2% load for males and a -3% load for females.

Appendix

Participant Data

The actuarial valuation was based on personnel information from The State of Tennessee records as of July 1, 2019. Following are some of the pertinent characteristics from the personnel data as of that date. Both age and service have been determined using years and months as of the valuation date.

July 1, 2019

Health Care Participants

Active Participants

Total Number of Active Members	49,468
Average Age	50.64
Average Service	15.85

Inactive Participants

Currently Receiving Benefits ¹	7,468
Average Age	61.27

Entitled to But Not Yet Receiving Benefit Payments	92
Average Age	55.17

Total Participants

Number	57,028
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¹ This count does not include the 1,941 covered spouses of retirees.

Asset Allocation

The long-term expected rate of return on OPEB plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of OPEB plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of geometric real rates of return for each major asset class included in the OPEB plan's target asset allocation as of June 30 are summarized in the following table¹:

Asset Class	Expected Nominal Rate of Return	Expected Real Rate of Return	Allocation
Large Cap U.S. Equity	7.05%	4.75%	33.00%
International (Non-U.S.) Equity (Developed)	7.96%	5.63%	16.00%
Emerging Markets Equity	8.28%	5.95%	4.00%
Cash (Gov't)	0.93%	-1.25%	5.00%
Long Duration Bonds – Gov't / Credit	2.85%	0.63%	25.00%
U.S. REITs	6.57%	4.28%	10.00%
Private Debt - Direct Lending	6.90%	4.60%	7.00%
Total Portfolio	6.51%	4.22%	100.00%

The discount rate used to measure the total OPEB liability is 6.00%. The projection of cash flows used to determine the discount rate assumed that employer contributions will be made at rates equal to the actuarially determined contribution rates. For this purpose, only employer contributions that are intended to fund benefits of current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs of future plan members and their beneficiaries, as well as projected contributions from future plan members, are not included. Based on these assumptions, the OPEB Fund's fiduciary net position was projected to be available to make all projected future benefit payments for current plan members. Therefore, the long-term expected rate of return on OPEB Plan investments was applied to all periods of projected benefit payments to determine the total OPEB liability.

¹ These rates of return reflect The State of Tennessee's best estimate.

Health Care Claims Development

The sample per capita claims cost assumptions shown below by age, benefit, and plan represent the true underlying baseline experience estimated for State Employee Group Plan's sponsored postretirement benefits and costs. These rates are used in the expense calculation for the period 7/1/2019–06/30/2020 and disclosures as of 06/30/2020.

Age	Medical/Rx/Admin
55	\$10,281
60	\$12,701
65	\$6,576
70	\$7,773
75	\$8,694
80	\$9,146
85	\$9,468
90+	\$9,644

For pre-65 and post-65 retiree claims, retiree claims developed using historical claims.

Historical Claims and Enrollment basis—The average medical or Rx per capita claims costs were developed from actual claims experience and enrollment for the period from July 1, 2016 through June 30, 2019. Claims and enrollment information was provided by The State of Tennessee's health care vendors. The annualized paid claims experience for each respective historical base period was adjusted to an incurred basis by adding the change the estimated change in reserve. Claims experience was adjusted for differences in plan design between the historical periods and the projection period using plan design relative values from Aon's actuarial models. No adjustment was necessary for large claims. The average medical or Rx per capita claims costs from each respective historical base period were trended to, already centered at the mid-point of the annual period following the valuation date.

In order to improve the credibility of a single projection estimate, a combination of estimates from the distinct historical periods was used, placing 50% credibility on the most recent period, 33% on the next most recent, and 17% on the oldest period. Finally, average medical or Rx per capita claims costs were then age-adjusted based on the demographics of the population, and the assumed health care aging factors shown in the table below.

Per capita administration and other fixed costs were developed and added onto the per capita claims cost assumptions using information supplied by The State of Tennessee. These per capita assumed administrative costs were based on actual 2019 per employee rates, which were converted from a per employee basis to a per member basis using the most recent election file provided by The State of Tennessee. For 2019, \$369 annually per person was added for pre-65 retirees, post-65 retirees and spouses.

Health Care Aging (Morbidity) Factors:

Since health care costs increase with age, and an OPEB valuation is by its nature an analysis of a closed group that will age throughout the measurement, the effect that this aging of the population will have on claims costs must be reflected in the valuation. The claim costs for medical and prescription drugs and Rx were assumed to increase with age according to the table below.

Age Band	Medical	Rx	Composite
40-44	3.00%	4.80%	3.3%
45-49	3.70%	4.70%	3.8%
50-54	4.20%	4.70%	4.3%
55-59	4.40%	4.60%	4.4%
60-64	3.70%	4.60%	3.8%
65-69	2.70%	3.80%	3.1%
70-74	1.80%	2.50%	2.1%
75-79	2.20%	0.80%	1.4%
80-84	2.80%	0.20%	1.3%
85-89	1.40%	0.10%	0.6%
90+	0.00%	0.00%	0.0%

The aging factor assumptions shown above were based on normative data analyses, along with consideration of the results from the 2013 Society of Actuaries sponsored study “Health Care Costs—From Birth to Death” prepared by Dale H. Yamamoto, reporting on the effect of age on claims costs. In addition to age, this study shows the effect of service type (medical vs. pharmacy) and gender on claims costs.

Health Care Cost Trend Rates:

The health care cost trend assumptions shown below were based on national average information from a variety of sources, including S&P Healthcare Economic Index, NHCE data, plan renewal data, and vendor Rx reports, with adjustments based on the provisions of the benefits sponsored by The State of Tennessee.

Year	Pre-65	Post-65
2019	6.03%	5.20%
2020	5.84%	5.03%
2021	5.66%	4.85%
2022	5.48%	4.68%
2023	5.30%	4.50%
2024	5.12%	4.50%
2025	4.94%	4.50%
2026	4.76%	4.50%
2027	4.58%	4.50%
2028	4.53%	4.50%
2029+	4.50%	4.50%

Health Care Reform Excise Tax Adjustment:

For the excise tax, the overall value of the benefit was compared to the projected excise tax thresholds in each future year. The key assumptions for determining the excise tax are:

- Plan costs were developed on a two-tier basis (individual and individual plus spouse) for all retirees and assumed to increase with the valuation trend
- The 2018 cost thresholds are assumed to be \$10,200 for individual and \$27,500 for family coverage (\$11,850 and \$30,950 for non-Medicare retirees).
- 2022 thresholds are adjusted accordingly by the amount that the accumulated 2010-2022 cost increases, observed for the BCBS “standard” plan option under the FEHBP program, exceeds 55% x chained CPI⁴.
- After 2022, the cost thresholds are indexed by chained CPI (chained CPI+1% for 2022 to 2023 only). Chained CPI is assumed to be 2.25% in all future years.

Our excise tax model determined the additional trend loads to be applied to the existing valuation trend table in order to reflect the present value of expected tax amounts (40%) of the excess over the thresholds.

On a blended basis, the excise tax threshold is estimated to be reached in fiscal year 2023, which means the first trend load is applied to the valuation trend from 2022 to 2023.

The “*Further Consolidated Appropriations Act, 2020*” signed into law on December 20, 2019, included a permanent repeal of the excise tax on high-cost plans (a.k.a. “the Cadillac tax”) for all tax years beginning after December 31, 2019. The excise tax was originally imposed by the Affordable Care Act in 2010. GASB 75 requires that all calculations are based upon the measurement date, so the effect of the excise tax was included in this valuation. The increase in liabilities due to the excise tax is 0.5% as of the measurement date. In future years, there will be no impact. This change will be treated as an assumption change as of the June 30, 2020 measurement date.

Actuarial Assumptions and Methods

The following outlines the assumptions and method Aon will use in determining the GASB expense calculations for the State Employee Group Plan for the fiscal year ending June 30, 2020.

Actuarial Method	Entry Age Normal Cost Method
Normal Cost	Determined for each active employee as the Actuarial Present Value of benefits allocated to the valuation year. The benefit attributed to the valuation year is that incremental portion of the total projected benefit earned during the year in accordance with the plan provisions. This allocation is based on each individual's service between date of hire and date the individual becomes fully eligible for benefits.
Asset Valuation Method	Market Value of Assets as of the Measurement Date
Discount Rate	The State has selected 6.00% compounded annually. The State's Funding Policy is expected to provide sufficient revenue over time to enable the OPEB Trust to be the sole provider of the benefits. It is assumed that this assumption will be supported by the Investment Policy.
Expected Return on Assets	6.00%
Mortality Rates	<p>Healthy: RP-2014 Employees and Healthy Annuitants mortality table projected generationally with MP-2016 from the central year.</p> <p>Post-retirement tables are Blue Collar and adjusted with a 2% load for males and a -3% load for females, projected generationally from 2014 with MP-2016</p> <p>Disabled: Reflects those used by TCRS and are taken from the gender distinct table published in the IRS Revenue Ruling 96-7 for disabled lives with a 10% load.</p>
Valuation Date	July 1, 2019
Measurement Date	June 30, 2019
Census Data	July 1, 2019
Fiscal Year Ending	June 30, 2020

Inflation	Long-term price inflation is assumed to be 2.20% per year.
Data Assumptions	In cases of a discrepancy between expected service and service reported for this valuation, imputed service was used.
Salary Increases	Assumed salary increases are the same as used by TCRS: 8.72% at age 20 graded to 3.44% at age 70 (with 4.00% weighted average).
Demographic Assumptions- General	Unless noted otherwise, demographic assumptions employed in this Actuarial Valuation were the same as those employed in the July 1, 2017 for a Group I employees in the Pension Actuarial Valuation of the Tennessee Consolidated Retirement System (TCRS). These demographic assumptions were developed by TCRS from an Actuarial Experience Study (undertaken on behalf of TCRS) and are considered appropriate for use in this OPEB Actuarial Valuation. These include assumed rates of future salary increases, termination, mortality, disability, and retirement.
Retirement Rates	See Table 1
Withdrawal Rates	See Table 2
Disability Rates	See Table 3
Expected Retiree Contributions	Members are required to make monthly contributions in order to maintain their coverage. For the purpose of this Valuation a weighted average has been used with weights derived from the current distribution of members among plans offered. Such average expected retiree premium contributions for the first year, before any direct State subsidies, are shown in the table below.

Average Premium (as of Valuation Date)
\$785/month

Coverage Acceptance Rates Following are the assumptions as to future Medical Coverage Acceptance Rates. Acceptance rates, presented below, result from an analysis of the choice pattern exhibited by employees retiring in recent years. Retirees changing coverage to The Tennessee Plan are considered lapsing coverage for the purpose of this Valuation.

Coverage Acceptance for Pre-65 Elections		
Subsidy Level	Total Acceptance Rate	Percentage of Retirees Electing Dual Coverage
80%	90%	45%
70%	80%	40%
60%	45%	22.5%

Future participation Active employees currently declining coverage are assumed to opt into the plan in the future and accept retiree coverage at a 10% rate. Covered employees are assumed to remain covered until retirement.

Decrement Timing	Decrements of all types are assumed to occur at the middle of the year.
Eligibility Testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement Relativity	Decrement rates are treated as absolute rates of decrement.

Method Changes

There have been no method changes since the prior year.

Assumption Changes

The financial accounting valuation reflects the following assumption changes:

- The discount rate increased from 3.62% to 6.00%. This decreased the total OPEB liability by 17.2%.
- The medical and drug trend rate assumptions were updated to reflect more recent experience as of the Measurement Date.
- A change in expected per capita health claims to reflect more recent information as of the Measurement Date.
- Updating the claims and trend assumptions increased the total OPEB liability by 1.4%.

Actuarial Assumptions and Methods

Table 1

Retirement Rates

Early and Normal Retirement Prior to Age 60 with 10 Years of Service Unreduced Retirement Annual Rates					
Year of Eligibility	Male	Female	Year of Eligibility	Male	Female
1	6.0%	7.5%	14	12.0%	12.0%
2	6.0%	7.5%	15	14.0%	14.0%
3	6.0%	7.5%	16	22.0%	22.0%
4	6.0%	7.5%	17	15.5%	17.0%
5	6.5%	7.5%	18	15.5%	17.0%
6	6.5%	7.5%	19	15.5%	17.0%
7	7.0%	8.0%	20	15.5%	17.0%
8	7.0%	8.0%	21	15.5%	17.0%
9	7.5%	8.0%	22	15.5%	17.0%
10	8.0%	8.0%	23	15.5%	17.0%
11	8.5%	9.0%	24	15.5%	17.0%
12	11.0%	12.0%	25	15.5%	17.0%
13	16.0%	18.0%	26	100.0%	100.0%

An additional 7.5% is added to the rates shown above for employees in a year in which they are first eligible for unreduced retirement prior to age 60. In addition, a 2% load is added to the above table upon reaching age 60.

Normal Retirement Age (60 with 10 Years of Service)

Normal Retirement (Age 60 with 10 Years of Service) Unreduced Retirement Annual Rates		
Age	Male	Female
60	10.5%	11.0%
61	13.0%	14.0%
62	18.0%	20.0%
63	14.0%	14.0%
64	16.0%	16.0%
65	24.0%	24.0%
66-74	17.5%	19.0%
75	100%	100%

These rates do not include separation on account of death or disability.

Table 2
 Withdrawal Rates

The following table shows sample annual rates of withdrawal for participants. Note, these rates do not include separation due to death or disability. In addition, any employee terminating with at least 5 years of service and who are within 5 years of Normal Retirement are assumed to commence monthly pension benefits and, thus, become eligible to accept retiree medical coverage.

% Separating Within Next Year										
Years of Service	Male									
	Attained Age									
	20	25	30	35	40	45	50	55	60	65
0	30.0%	25.4%	23.0%	20.8%	18.6%	16.5%	14.8%	15.3%	17.9%	24.0%
1	24.6%	21.4%	18.6%	16.1%	13.8%	12.0%	11.1%	11.6%	14.4%	20.5%
2	17.8%	14.4%	9.6%	5.2%	2.6%	1.8%	2.2%	2.6%	4.3%	--
3	17.8%	14.4%	9.6%	5.2%	2.6%	1.8%	2.2%	2.6%	4.3%	--
4	17.8%	14.4%	9.6%	5.2%	2.6%	1.8%	2.2%	2.6%	4.3%	--
5	17.8%	14.4%	9.6%	5.2%	2.6%	1.8%	2.2%	2.6%	4.3%	--
6	17.8%	14.4%	9.6%	5.2%	2.6%	1.8%	2.2%	2.6%	4.3%	--
7	17.8%	14.4%	9.6%	5.2%	2.6%	1.8%	2.2%	2.6%	4.3%	--
8	17.8%	14.4%	9.6%	5.2%	2.6%	1.8%	2.2%	2.6%	4.3%	--
9	17.8%	14.4%	9.6%	5.2%	2.6%	1.8%	2.2%	2.6%	4.3%	--
10 or	17.8%	14.4%	9.6%	5.2%	2.6%	1.8%	2.2%	2.6%	4.3%	--
Years of Service	Female									
	Attained Age									
	20	25	30	35	40	45	50	55	60	65
0	30.0%	25.4%	23.0%	20.8%	18.6%	16.5%	14.8%	15.3%	17.9%	24.0%
1	24.6%	21.4%	18.6%	16.1%	13.8%	12.0%	11.1%	11.6%	14.4%	20.5%
2	18.3%	14.8%	10.3%	6.3%	3.4%	2.2%	2.3%	3.4%	4.9%	--
3	18.3%	14.8%	10.3%	6.3%	3.4%	2.2%	2.3%	3.4%	4.9%	--
4	18.3%	14.8%	10.3%	6.3%	3.4%	2.2%	2.3%	3.4%	4.9%	--
5	18.3%	14.8%	10.3%	6.3%	3.4%	2.2%	2.3%	3.4%	4.9%	--
6	18.3%	14.8%	10.3%	6.3%	3.4%	2.2%	2.3%	3.4%	4.9%	--
7	18.3%	14.8%	10.3%	6.3%	3.4%	2.2%	2.3%	3.4%	4.9%	--
8	18.3%	14.8%	10.3%	6.3%	3.4%	2.2%	2.3%	3.4%	4.9%	--
9	18.3%	14.8%	10.3%	6.3%	3.4%	2.2%	2.3%	3.4%	4.9%	--
10 or	18.3%	14.8%	10.3%	6.3%	3.4%	2.2%	2.3%	3.4%	4.9%	--

Table 3
Disability Rates

The following table shows sample annual rates of disability.

% Becoming Disabled Within Next Year		
Sample Ages	Male	Female
20	0.06%	0.03%
25	0.06%	0.03%
30	0.07%	0.04%
35	0.11%	0.06%
40	0.16%	0.14%
45	0.22%	0.24%
50	0.27%	0.33%
55	0.27%	0.38%
60	--	--
65	--	--

Actuarial Assumptions and Methods

Discussion of Actuarial Assumptions and Methods

The State of Tennessee selected the economic, demographic and health care claim cost assumptions and prescribed them for use for purposes of compliance with GASB 75. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience. Mortality, retirement, withdrawal, and disability rates as well as assumed salary increases were developed by TCRS from the 2016 Actuarial Experience Study. Coverage acceptance rates were provided by the prior actuary, but not reviewed for the current valuation. An evaluation of the reasonability and consistency of these assumptions is beyond the scope of the assignment.

Calculation of Normal Costs and Liabilities

The method used to calculate the service cost and accumulated postretirement benefit obligation for determining OPEB expense is the entry age normal cost method. Under this cost method, the actuarial accrued liability is based on a prorated portion of the present value of all benefits earned to date over expected future working lifetime as defined by GASB. The proration is determined so that the cost with respect to service accrued from date of hire is recognized as a level percentage of pay each year. The Normal Cost is equal to the prorated cost for the year of the valuation.

Accounting Information under GASB 75

Benefit obligations and expense/(income) are calculated under U.S. Generally Accepted Accounting Principles as set forth in Government Accounting Standards Board Statement 75.

The total OPEB liability represents the actuarial present value of benefits based on the entry age normal cost method as of the measurement date. The service cost represents the actuarial present value of benefits that are attributed to the 2020 fiscal year, reflecting the effect of assumed future health care claim cost and/or pay increases.

The OPEB expense is the annual amount to be recognized in the income statement as the cost of OPEB benefits for this plan for the period ending June 30, 2020.

Plan Provisions

Eligibility to Participate

All full-time state and higher education employees (hired before July 1, 2015), retirees and vested terminated participants of The State of Tennessee who satisfy the Disability, Vested Termination, Early or Normal Retirement provisions of the Tennessee Consolidated Retirement System (TCRS) may be eligible for certain post-employment benefits under the Tennessee State Employees Group Plan. Any employee, with exception of state judges, becoming members of TCRS on or after July 1, 1976 enters TCRS Group I regardless of employment classification.

Employer Subsidy

State Subsidy as a Percent of Base Premium*	
Service at Retirement	State Subsidy
30+ years of service	80%
20-29 years of service	70%
Less than 20 years of service	60%

*Subsidy amount is based on the premium rates applicable to coverage under the lower cost plan and carrier.

Eligibility for Retirement Normal Retirement

Group I eligibility retirements under TCRS

- Earlier of (i) Age 60 with 5 years of creditable service, or (ii) Any age with 30 years of creditable service

Early Retirement

Group I eligibility retirements under TCRS:

- Age 55 with 5 years of creditable service, or
- Reduced pension benefit upon completion of 25 years of service at any age

Eligibility for Medical Insurance

TCRS Participants

- 10 years employment with the employer and 3 continuous years of insurance coverage in a state-sponsored insurance plan immediately prior to final termination for retirement, or
- 20 or more years of employment with the employer and 1-year insurance coverage in a state-sponsored insurance plan immediately prior to final termination for retirement

- If the individual is retiring through TCRS, they must be receiving a monthly retirement benefit to continue coverage as a retiree. TCRS participants who choose a lump-sum retirement benefit are not eligible to continue insurance at retirement

Other Participants

For ORP (Optional Retirement Program) participants, non-elects (individuals who declined optional membership in the Tennessee Consolidated Retirement System), and state employees on federal appointment not eligible for federal insurance programs, the following rules apply:

- Age 55 with at least 10 but less than 20 total years of employment with the employer and 3 continuous years of insurance coverage in a state sponsored insurance plan immediately prior to final termination for retirement, or
- Age 55 and 20 or more years of employment with the employer and 1 year of insurance coverage in a state-sponsored insurance plan immediately prior to final termination for retirement, or
- 25 years of employment with the employer and 1 year of insurance coverage in a state-sponsored insurance plan immediately prior to final termination for retirement.

Disability Retirement

Retirees who have documentation of SSA disability or have been approved by TCRS for disability retirement, have a date of hire prior to July 1, 2015 and who were participants in a state-sponsored plan at the time of the injury or illness which resulted in their disability may continue coverage provided that no lapse in medical coverage has occurred by meeting either the requirements for TCRS participants, ORP (Optional Retirement Program) participants and other non-TCRS participants outlined above, or by having at least five years employment with the employer immediately prior to final termination due to disability.

Plan Benefits

Eligible retirees may choose among the same Medical Plan options available for similarly situated active employees of the State. Prescription drug coverage is also provided. Disabled retirees under age 65 who are eligible for Medicare must maintain at least Part B coverage.

Although dental and vision for retirees and their dependents are provided, they are fully paid by the

retirees. As such, these benefits are not considered as other postemployment benefits.

Duration of Benefits

Retiree: Coverage continues until Medicare eligible due to age 65.

Spouse and Dependents: Spouses and other eligible dependents are covered under the retiree's option as long as they were covered at the time of termination from active employment. Coverage ceases upon Medicare eligibility at age 65. Dependents may continue coverage following the retiree's death for up to an additional six months at no cost.

Plan Changes Since the Prior Year

There have been no plan changes since the prior year.