Report to the General Assembly and VSERS and VSTRS Boards of Trustees on Recommendations to Reduce Pension and OPEB Liabilities

January 15, 2021

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Summary of Findings and Recommendations

The recommendations outlined in this report can reduce pension Unfunded Actuarial Accrued Liabilities (UAAL) for the Vermont State Employees Retirement System (VSERS) and the Vermont State Teachers Retirement System (VSTRS) by $474 million and reduce the Actuarial Determined Employer Contribution (ADEC) by $85 million. While shy of the total target of $604 million in the UAAL and $96.6 million for the ADEC, it is a significant reduction to the existing liabilities and costs to the taxpayer.

By directing a minimal amount of funds for prefunding, including the use of existing resources, the Net Other Post-Employment Liabilities (NOL) can be reduced by $1.68 billion.

All in, these recommendations will reduce the State's post-employment liabilities by $2.2 billion.

Recommendations:

Recommendation #1: Maintain a defined-benefit system for current and future retirees.

Recommendation #2: Any benefit changes to the retirement systems should NOT be made for existing retirees.

Recommendation #3: Continue to fund the actuarial determined employer contribution (ADEC).

Recommendations to Reduce Pension and Other Post-Employment Benefit (OPEB) Liabilities:

- For both the VSERS and VSTRS, a series of recommendations is made to reduce liabilities and costs through:
    - Reductions/elimination of cost of living adjustments for active employees upon retirement;
    - Increasing the years used to calculate the Average Final Compensation (AFC);
    - Expanding the use of "Rule of 87" and "Rule of 90" which combine years of service and age for the purposes of eligibility for normal retirement; and
    - Increasing employee contributions.

- To the extent that additional COVID/CARES Act monies are available, allocating dollars to both pensions and OPEB to further close the unfunded liability gap and lower the ADEC. With the new Administration in Washington and changes to both houses of Congress, there is a possibility of additional revenues without strings/restrictions. Paying down the state's debts with a portion of these funds should be a priority.

- Considering using excess revenues or federal Cares Act monies to establish a reserve that can be used to gradually reduce the ADEC requirements, taking pressure off operating budgets.

- In the case of OPEB, establishing a statutory funding policy that increases funding over time in increments at approximately 3%, close to the long-term rate of inflation. This funding policy will

require minimal initial funds over the current premium payments and create more predictability in annual funding.

- The implementation of these proposals will significantly reduce benefits and increase employee contributions. From a risk sharing perspective, employees are taking on a substantially greater portion of the actuarial losses. Of the $604 million in increases, employees could, if all recommendations are accepted, take on as much as 78% of the increase in liabilities and 88% of the contribution increases. Future gains, if any, should be shared. To the extent that gains over the next several years reduce liabilities, language should be added to state statute to permit review of benefit and contribution levels and effectively share gains between the employee and the employer (State).

Background and Objectives

Pensions

In order to fulfill the promise of paying members' future retirement benefits, each retirement system (state or VSERS, teacher or VSTRS, and municipal or VMERS) has developed a funding plan. The primary objective of funding is to equitably allocate costs between generations of taxpayers and provide retirement security to members and retirees who therefore have the assurance their current and future benefits will be paid. The funds come from three sources: employee contributions, employer contributions, and investment income interest. Interest earned on investments from the retirement fund is the largest source of funds used to pay benefits.[1]

Every year, in October, an independent actuary, Segal, completes an annual valuation of the retirement systems at the requests of the Boards of Trustees for the three retirement systems (state, teacher, and municipal). These valuations are based on active member and retiree census and a series of assumptions demographic/experience and economic (inflation and investments). The result of the valuations includes five key components: 1) the actuarial accrued liability (AAL); 2) the actuarial value of the assets; 3) the resulting gap between these, called the unfunded actuarial accrued liability (UAAL); 4) the normal cost and 5) the actuarially determined employer contribution (ADEC) which is derived from the normal cost and the unfunded liability.

The ADEC is the method by which the UAAL is eventually paid off, assuming it is funded. It includes the employer portion of the normal cost and an "installment" to pay down the UAAL. The normal cost represents the portion of the cost of projected benefits allocated to the current plan year. The employer normal cost equals the total normal cost of the plan reduced by employee contributions. The UAAL for all three pension funds is amortized over a period of years with the expectation that, per statute, it will be fully retired by fiscal year 2038.

The VMERS ADEC is not funded through state resources, rather it is converted to employer contribution rates (as a percentage of payroll) that are paid by municipal entities, local education agencies (for non-teacher certified employees) and similar entities. This report will focus only on VSERS and VSTRS that are paid primarily through state funds.

The ADEC for VSERS is appropriated and paid to the VSERS pension fund by the general fund and other state funds based on payroll levels in each cost center as a percentage of payroll. Approximately 40% is paid through the general fund and the balance through multiple funds including human service funds and the transportation fund. Approximately 23% of the appropriated funds are reimbursed from federal funds. The VSTRS normal cost is paid through the state's education fund and the unfunded

[1] Separate annual valuations are done for funding purposes, based on the specific state funding plan and for standardized accounting purposes stipulated by the Government Accounting Standards Board (GASB) which issues statements to codify the accounting rules (for pensions these are primarily GASB 67 and 68. The GASB 67/68 valuations utilize slightly different assumptions and amortization periods for those assumptions. But the primary difference is that the accounting reports use a market value of assets rather than an actuarial value of assets that smooths volatility over a five-year period. The smoothing method makes more sense for budgeting, and GASB has acknowledged that funding and accounting are divorced under the GASB 67/68 statements. This report will only focus on the funding valuations.

liability is budgeted and paid for by the general fund with the exception of a portion related to federal reimbursements to teachers which is transferred to the VSTRS pension fund.

The valuation results are made based on the assumptions and the expectation that they represent the future experience of the funds. By statute, an experience study is conducted for all systems, at least every five years (and earlier as needed) to review and reset those assumptions. This includes a lookback over the previous five years and a projection of future assumptions. VSERS and VSTRS experience studies were conducted for the fiscal year ending June 30, 2014. A partial review was conducted in fiscal year 2017 as the Boards of Trustees had contracted with a new independent actuary (Segal) and chose to review these assumptions prior to a formal experience study. That review included changes to mortality, cost of living, and the rate of return (investment). The most recent experience study was completed in 2020 for the fiscal year ending June 30, 2019.

In September 2020, as a result of the Experience Study, the three trustee Boards and VPIC lowered the expected interest rate of return from 7.5% to 7.0% and the Trustee Boards adopted various other economic and demographic assumption changes.

The 2019 experience study results were then used in the June 30, 2020 annual valuation which was then used to recommend the fiscal year 2022 appropriations. The results of the experience study and the valuation adversely impacted the UAAL and significantly increased the ADEC for fiscal year 2022. The impact is as follows:

VSERS

Scope of the Challenge (Dollars in Millions)

	2019 Valuation* 2021 budget	Estimated Results based on Experience Study	2020 Valuation** 2022 budget
Unfunded Liability	$815.5	$1,032.3	$1,040.5
change		$216.8	$225.0
ADEC	$83.9	$113.6	$119.9
change		$29.7	$36.0

* Used to develop FY2021 budget
** Impacts the FY2022 budget

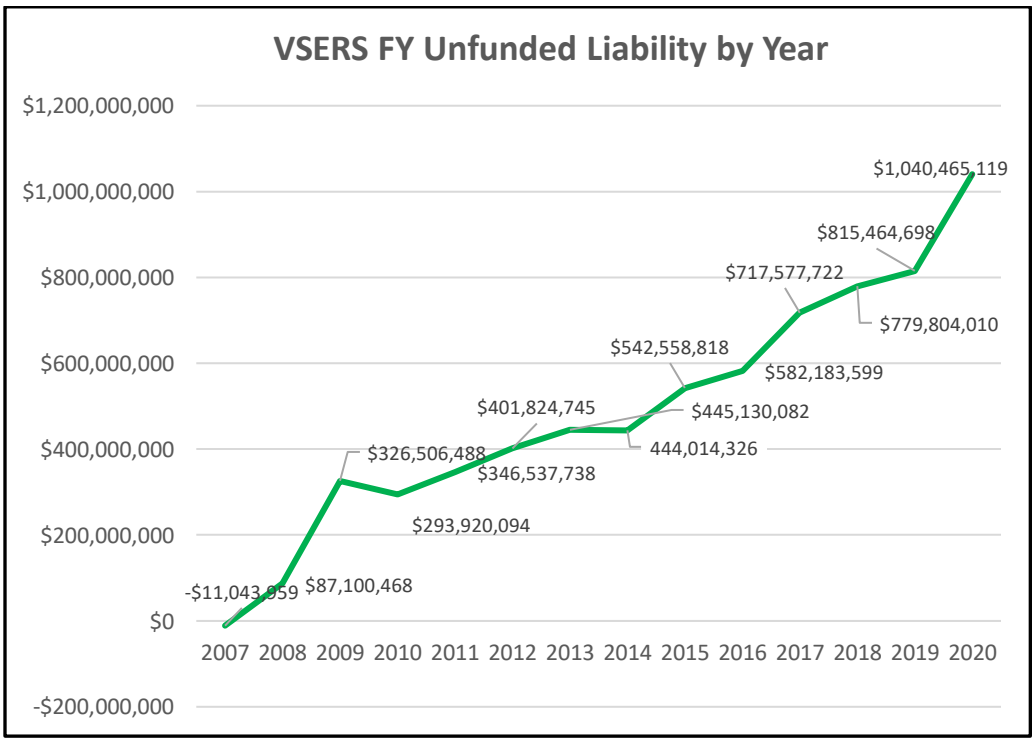
VSTRS

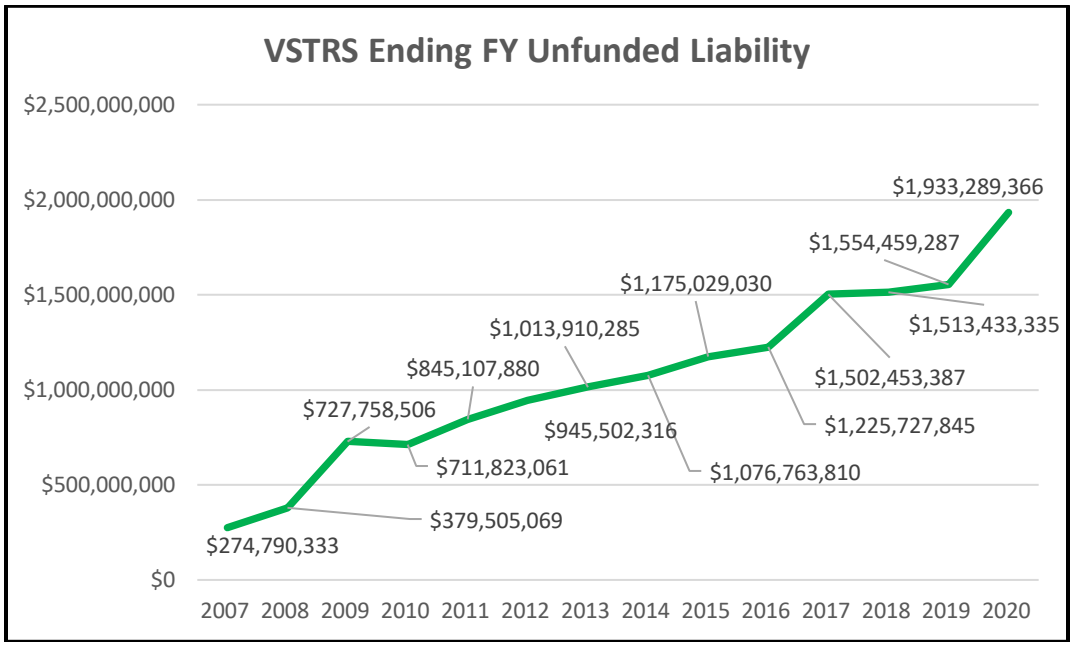
Scope of the Challenge (Dollars in Millions)			
	2019 Valuation* 2021 budget	Estimated Results based on Experience Study	2020 Valuation** 2022 budget
Unfunded Liability	$1,554.0	$1,880.0	$1,933.0
change		$326.0	$379.0
ADEC	$135.6	$186.4	$196.2
change		$50.8	$60.6

* Used to develop FY2021 budget
** Impacts the FY2022 budget

The results of the experience studies and subsequent valuations prepared by the State's independent actuary are outlined in Appendix A.1 and A.2. In the case of VSERS, approximately 30% of the increase in liabilities is attributable to demographic changes with the balance related to the change in the interest rate assumption. In the case of VSTRS, the combined impacts of the experience study and demographic losses in the valuation account for roughly 50% of the increase in liabilities.

The history and growth in the liabilities is as follows (see also Appendix B.1 and B.2):





Beyond the most recent experience study, other events have significantly increased pension liabilities and costs, including but not limited to:

- Great Recession impact (VSERS, VSTRS)
- Historical lack of funding of the ADEC in past years (VSTRS)
- Demographic/Experience and Economic Assumptions vs. Actual experience (VSERS, VSTRS)
- Retirement incentive programs (2009-2010, 2016) that reduced short-term operating costs, but significantly increased pension costs (VSERS)
- Teacher turnover and retirements as a consequence of benefit changes and workforce changes (Act 46) (VSTRS)
- Federal monetary policy impact on interest rates (VSERS, VSTRS)
- Impact of COVID through valuation date (VSERS, VSTRS)

Appendix C.1 and C.2 provide a summary of cumulative changes in liability from fiscal years 2007 to 2020.

Appendix D.1 and D.2 track the growth in the ADEC and the actual contributions. While current contribution levels meet the ADEC requirements, the VSTRS system has a history of underfunding from the early 1990s to 2007 (see Exhibit D.3).

Without intervention, the UAAL for VSERS and VSTRS in aggregate would represent an increase of $604 million. The increase in the ADEC would be $96.6 million. Given the significant increased UAAL and the ADEC cost for the State, both the VSERS and VSTRS Board of Trustees passed a motion directing the Treasurer to work with stakeholder groups to identify and review recommendations to lower the unfunded liability and the ADEC to at least the previous FY2021 projections and to present those recommendations to the Governor and the General Assembly by January 15, 2021.

Other Post- Employment Benefits (OPEB):

OPEB refers to other benefits received in retirement, primarily health care offered through the VSERS and VSTRS health plans. On an accounting basis, health care accounting is dictated by GASB, specifically Standards 74 and 75[2]. The OPEB standards were implemented in fiscal years 2017 and 2018, replacing prior guidance, and changing the way the plans are reported in the State's financial statements. As in the case of pensions, the intent of the standards is to provide consistency in reporting of these liabilities across states and municipalities and to increase transparency.

GASB 75 requires the State to place a net long-term OPEB liability on its government-wide financial statements. These represent current and future accrued liabilities for existing members and retirees. These long-term unfunded liabilities do not impact primary funds such as the general fund although current year premiums (not full accrued liabilities) are appropriated, paid for and accounted for in these funds. These become more expensive without prefunding.

Application of the GASB requirements results in a calculation of unfunded liabilities (referred to as net OPEB liability). Responsible government and financial practice dictates that pre-funding must occur or financial stresses will be exacerbated. Unlike pensions, Vermont does not prefund these liabilities beyond token amounts. Only small amounts have been set aside for future benefits, $57.6 million for the VSERS plan representing only 3.88% of OPEB liability and just $8.7 million for the VSTRS plan, equivalent to just 0.69% of the liabilities. But the plans have no policy for prefunding of benefits, which will result in significant pressures on the unfunded liability each year, driving up future costs for taxpayers.

In fact, the considerable rise in OPEB unfunded liabilities reflected in the fiscal year 2020 OPEB valuation is directly related to the lack of prefunding. Since the State does not currently prefund OPEB benefits, the actuary calculates the ADEC using a standardized discount rate prescribed by the GASB, the 20-year AA municipal bond rate. This rate will vary from year to year based on the interest rate market and has little to do with the investment rates experienced by Vermont. It is an artificial construct to standardized interest rates when prefunding has not been initiated. Because of a decline in interest rates driven by federal monetary policy, this year's interest rate pushed up the unfunded liabilities by $256 million for the VSERS OPEB and $232 million for the VSTRS OPEB. The State therefore had a $488 million increase in liabilities just for this factor. Without this, both plans would have experienced a reduction in liabilities due to better-than-expected claims experience (see Appendix E.1 and E.2). By using a Vermont assumed return rate rather than the standard bond rate and based on applicable pension related assumptions, the liabilities would be further reduced by $1.2 billion in addition to the $488 million.

The State needs to move to a formalized and codified system of prefunding retiree healthcare. In 2019 and 2020, the Treasurer's Office provided the Administration and the General Assembly a plan to begin a path to prefunding. The Treasurer's Office's recommendations agree with the VSTRS and VSERS Boards' stated position that prefunding is the most cost-effective approach to deliver health care services. If adopted, the result would be a reduction of the liabilities by over $1.68 billion compared to

[2] Unlike pensions where a separate funding and GASB actuarial presentation is completed, the actuaries prepare one report due to the lack of any significant funding and a policy plan.

the 2020 valuation. The Treasurer's Office will resubmit a plan to achieve prefunding in the next legislative session.

It should be noted that a move to prefunding would not require the State to appropriate the full funding of the ADEC. This can be achieved by incrementally increasing the appropriation over and above the pay-go portion, but significantly less than the ADEC, combined with a statutorily defined funding policy. The State would have to commit to a pattern of incremental increases that roughly correspond to the rate of inflation over the full amortization period.

To date, most of the State's efforts have been focused on lowering liabilities rather than prefunding and some success has been achieved. Over the years, the systems have adopted changes to a tiered structure of benefits tied to years of service and changes to formularies and contract provisions. These have generated immediate savings and lowered liabilities by hundreds of millions of dollars.

While efforts to lower the liability side of the equation are helpful, the simple fact is nothing can replace the value of prefunding and compound interest.

Summary

The remainder of this report will provide recommendations for lowering the liabilities for both the state and teacher pension and retiree health care systems. This is a comprehensive "four bucket" approach, to address increasing liabilities and reduce costs, current and future, for the taxpayers.

General Recommendations for the VSERS and VSTRS Pension Systems/Fund

Recommendation #1: Maintain a defined-benefit system for current and future retirees.

Under a defined benefit (DB) system the employer guarantees an annual retirement payment for their employee that is based on a formula. The defined benefit is calculated based on an employee's years of service, age at retirement, and either ending salary or average salary for a period of time (AFC or average final compensation).

In a defined contribution (DC) system, the ultimate retirement benefit is the accumulated value of an individual's account at retirement, resulting from employer contributions, his/or her own contributions and investment returns.

Below are summary points that lead the Treasurer's Office to conclude that DB plans provide the best value to taxpayers for each dollar of taxpayer money. Also as noted previously, the largest portion of payments to retirees comes from interest earned in DB plans rather than taxpayer dollars. The Treasurer's Office will not provide a full analysis of DB, DC or hybrid plans in this report, but is prepared to further discuss these issues with the General Assembly. A quick overview of salient points includes:

DB plans cost less:

A DC plan would replace the normal cost component of the DB plan but at a higher cost. The current state employee DC plan for exempt employees has an employer contribution rate of 7% of payroll which is greater than the adjusted normal cost for the DB pension. Further, with the recommendations made in later sections of the report, the normal cost for the DB plans will further decrease making the gap more favorable to DB plans. In addition, shifting to a DC plan would not eliminate the unfunded liability. Evidence from other states indicates the UAAL would likely grow. According to a Pennsylvania report, shifting to DC accounts results in higher future costs, because individual accounts have lower investment returns and higher fees than DB pensions.[3]

A 2014 study by National Institute on Retirement Security (NIRS) calculated that the economic efficiencies embedded in DB pensions enables these retirement plans to deliver the same retirement income at a 48% lower cost than 401(k)-type defined contribution (DC) accounts.[4]

DC plans do not provide retirement security:

DC plans are dependent upon the participant individually managing their investments. Without professional management and with higher fees than a pooled investment plan there is greater risk of a lack of retirement security.

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[3] http://keystoneresearch.org/sites/default/files/Five_Reasons_to_Reject_3-Way_Hybrid_Final.pdf

[4] https://www.nirsonline.org/reports/still-a-better-bang-for-the-buck-an-update-on-the-economic-efficiencies-of-defined-benefit-pensions/

A 2017 Government Accountability Office (GAO) report noted:

> "… one type of retirement plan is a traditional defined benefit pension. These are employer-sponsored plans that traditionally promise to provide a benefit for the life of the participant, based on a formula specified in the plan that typically takes into account factors such as an employee's salary, years of service, and age at retirement. However, these plans have become much less common over the years. Since 1975, there has been a marked shift to defined contribution plans…. Combined with increases in longevity, this shift has increased the risks and responsibilities for individuals in planning and managing their retirement. Yet research shows that many households are ill-equipped for this task and have little or no retirement savings." [5]

Inadequate retirement from DC plans requires additional public sector supports in retirement, such as fuel assistance, housing, and assistance payments. These supports are paid for dollar for dollar rather than through investment income, again more costly to the taxpayer. The safety net itself is also under stress. Recent studies point to rising levels of bankruptcy among older Americans, citing reductions in safety-net programs and a shift to 401(k)-type plans. The rate of seniors age 65 and older who have filed for bankruptcy has tripled since 1991.[6]

Retirement security is good for the economy:

Reliable and adequate income in retirement is important to Vermont's economic prosperity. Retirees with adequate and reliable income buy goods and services and are part of the economic generator. The NIRS published *Pensionomics 2021: Measuring the Economic Impact of Defined Benefit Pension Expenditures* which calculates the national economic impacts of U.S pension plans, as well as the impact of state and local plans on a state-by-state basis.[7] This study finds that in 2018, $578.7 billion in pension benefits were paid to 23.8 million retired Americans. These, according to the study, supported:

- 6.9 million American jobs that paid nearly $394.2 billion in labor income.
- $1.3 trillion in total economic output nationwide.
- $703.9 billion in value added (GDP); and
- $191.9 billion in federal, state, and local tax revenue.

The report further noted that:

- Each dollar paid out in pension benefits supported $2.19 in total economic output nationally.
- Each taxpayer dollar contributed to state and local pensions supported $8.80 in total output nationally.

The report provides the following data for Vermont:

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[5] https://www.gao.gov/key_issues/financial_security_for_older_americans/issue_summary

[6] Thorne, Deborah and Foohey, Pamela and Lawless, Robert M. and Porter, Katherine M., Graying of U.S. Bankruptcy: Fallout from Life in a Risk Society, August 5, 2018
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3226574

[7] https://www.nirsonline.org/wp-content/uploads/2021/01/pensionomics2021_vt.pdf

- State and local pension funds in Vermont and other states paid a total of $524.4 million in benefits to Vermont residents in 2018.
- Retirees' expenditures from these benefits supported a total of $670.3 million in total economic output in the state, and $366.7 million in value added in the state.
- $324.9 million in direct economic impacts were supported by retirees' initial expenditures. An additional $186.2 million in indirect impact resulted when these businesses purchased additional goods and services. $159.1 million in induced impacts occurred when workers employed by businesses as a result of the direct and indirect impacts made expenditures.

DC utilization by eligible Vermont active employees (exempt positions) has declined.

DC plans, at least in Vermont, do not appear to be the preferred model by employees. At the time the DC plan for exempt employees was initiated, 48% of eligible employees opted into the plan. That dropped to 39% by 2011, 34% by 2015 and is currently at 30%. Employees, when given the opportunity prefer the DB plan which makes it a better tool for recruitment and retention.

COVID and Pensions: The need for a defined benefit and the retirement security it creates is even more important as we deal with the COVID pandemic and the resulting economic crisis. A recent article by Mark Miller, a columnist for Reuters, and a contributor to WealthManagement.com and the AARP magazine noted:

> "Investing guru Bill Bernstein has compared investors in defined-contribution plans to airline passengers sent to the cockpit to fly the plane. Bernstein would much prefer a retirement system that relies on defined-benefit pensions, with their professional management and automatic participation.
>
> The unfolding coronavirus crisis underscores the value of professional pension pilots--and the structure of defined-benefit plans, which do not rely on short-term market performance to meet near-term obligations. The same claim cannot be made for the 401(k) or IRA accounts of investors who are retired or close to retirement. Such investors are facing tough questions now about the reliability of their portfolios."[8]

Recommendation #2 Any benefit changes to the retirement systems should NOT be made for existing retirees.

The Treasurer's Office has conveyed to the Trustees of the Retirement Boards that its recommendation will not include benefit changes for current retirees. At the time a member retired, he/she received an estimate and final determination of the retirement calculation and monthly benefit and subsequently made decisions based on that information. The Treasurer's Office does not believe that any changes should be applied to those members and that it would create significant hardship for older retirees whose salaries for the purpose of calculating average final compensation were considerably lower. Based on 2019 valuation results, the Treasurer's Office (Appendix F.1 and F.2) presents the distribution of retirement benefits by years of retirement.

[8] https://www.morningstar.com/articles/980630/what-the-economic-downturn-could-mean-for-pension-plans

Recommendation #3: Continue to fund the actuarially determined employer contribution (ADEC).

The Treasurer's Office has consistently advocated for full funding of the ADEC. The result of failure to fund the ADEC (previously called the ARC) is clear when looking at the funding history of VSTRS. Because of underfunding over a number of years, it came into the Great Recession with a lower funded status than VSERS and has consistently lagged since that time.

Specific Recommendations to Reduce the Unfunded Actuarial Accrued Liability and the Actuarially Determined Employer Contribution

For both the VSERS and VSTRS plans, the Treasurer's Office, in cooperation with the employee groups - the Vermont State Employees Association (VSEA), the Vermont Troopers Association (VTA), and the Vermont-National Education Association (NEA), undertook a review of possible scenarios and combinations of scenarios to reduce the costs of the systems. While employee groups participated in the process, the VSEA has not come to a final conclusion on the recommendations. The VSEA has expressed some concerns with various parts of the proposal, but is committed to a dialogue with the Treasurer's Office and the General Assembly. The NEA has not approved of any recommendations included in this report. The Treasurer's Office does, however, appreciate their input and cooperation in reviewing these options and believes these will add to the dialogue during the legislative session.

Meetings were held with each employee group's representatives either weekly or twice weekly. Treasurer's Office staff also met with the VSEA Board of Trustees and Legislative Committee members as well as with over 100 members of the VSEA Council. The Treasurer's Office also met with members of the Vermont Trooper's Association as well as the VT-NEA Board of Directors. On January 12th the Treasurer met with over 300 VSEA members and over 700 NEA members in separate meetings. The VSEA also conducted 13 educational meetings for members.

The VSERS and VSTRS Trustee Boards reviewed draft PowerPoints including the recommended and possible scenarios on January 7th (VSERS) and 8th (VSTRS). The Treasurer's Office met again with each Trustee Board on January 14th.

A number of options were reviewed for each system. These include:

- Increased Employee contributions (various scenarios);
- Various Changes to cost of living adjustments (COLAs) for ACTIVE members upon retirement (Not recommending any changes to current retirees);
- Increase Average Final Compensation (AFC) years;
- Revisions to Vesting;
- Rule of 87and 90 (age and years of service);
- Early retirement Factors Using Actuarial Equivalents; and
- Changes to AFC Benefit Percentage.

In addition, various dedicated revenue sources were discussed.

The scenarios are included as Appendix G.1 and G.2 for VSERS and VSTRS respectively. Adoption of any of these involves considerable change to benefit structures. When looking at any one scenario it

should be noted that, when taken in combination with another (for instance COLAs in combination with AFC changes), some decrease in overall effect is anticipated. In other words, the sum of the parts do not equal the whole. For that reason, when some consensus formed around particular combinations of scenarios was achieved, these were costed as a group.

While options for each system will be outlined separately, the issue of COLAs, as it relates to both systems and its members, requires more focused attention. [9] This is the one single category that significantly lowers the liabilities and the ADEC. The following scenarios were examined:

- Elimination of COLAs for all active members upon retirement (not current retirees);
- Elimination of COLAs for all members, except those within five years of normal retirement;
- Elimination of COLAs for all members, except those within ten years of normal retirement;
- Remove COLA for only all non-vested active members upon retirement; and
- COLA Threshold -COLAs Applied on a certain ceiling of annual benefit amount.

The more exceptions applied to COLA reductions/eliminations, the less impact in reaching the objective to lower the UAAL and the ADEC, as noted in the following charts:

VSERS

Scenario		1	2	3	4	5
Description ($ in millions)	**2020 Valuation Assumptions**	**Remove COLA for all Actives**	**Remove COLA for all Actives except those within 5 Years of Retirement**	**Remove COLA for all Non-Vested Actives**	**Remove COLA for all Actives except those within 10 Years of Retirement**	**COLA Threshold - COLAs Applied on the First $24,000 Annual Benefit Amount**
Actuarial Accrued Liability						
Total	$3,095.3	$2,856.5	$2,978.6	$3,083.3	$3,025.1	$2,960.8
Change from Valuation Assumptions:		($238.8)	($116.7)	($12.0)	($70.2)	($134.5)
Actuarial Value of Assets	$2,054.8	$2,054.8	$2,054.8	$2,054.8	$2,054.8	$2,054.8
Unfunded Actuarial Accrued Liability	$1,040.5	$801.7	$923.8	$1,028.4	$970.3	$905.9
Change from Valuation Assumptions:		($238.8)	($116.7)	($12.0)	($70.2)	($134.5)
Funded Percentage	66.4%	71.9%	69.0%	66.6%	67.9%	69.4%
Change from Valuation Assumptions:		5.5%	2.6%	0.3%	1.5%	3.0%
Normal Cost	$70.8	$57.2	$61.3	$67.0	$63.7	$64.1
Change from Valuation Assumptions:		($13.6)	($9.5)	($3.8)	($7.1)	($6.7)
Actuarially Determined Contribution for Fiscal 2022	$120.0	$84.7	$99.7	$114.8	$106.3	$101.2
Change from Valuation Assumptions:		($35.3)	($20.3)	($5.1)	($13.7)	($18.8)

[9] Currently individuals receiving normal retirement benefits would receive a COLA in January after completing after 12 months of retirement. Individuals selecting early retirement are not eligible until they reach retirement age.

VSTRS

Scenario		1	2	3	4	5
Description ($ in millions)	2020 Valuation Assumptions	Remove COLA for all Actives	Remove COLA for all Actives except those within 5 Years of Retirement	Remove COLA for all Non-Vested Actives	Remove COLA for all Actives except those within 10 Years of Retirement	COLA Threshold - COLAs Applied on the First $24,000 Annual Benefit Amount
Actuarial Accrued Liability Total	$3,969.0	$3,803.9	$3,866.9	$3,964.7	$3,904.8	$3,875.1
Change from Valuation Assumptions:		($165.1)	($102.1)	($4.3)	($64.2)	($93.9)
Actuarial Value of Assets	$2,035.7	$2,035.7	$2,035.7	$2,035.7	$2,035.7	$2,035.7
Unfunded Actuarial Accrued Liability	$1,933.3	$1,768.2	$1,831.2	$1,929.0	$1,869.1	$1,839.4
Change from Valuation Assumptions:		($165.1)	($102.1)	($4.3)	($64.2)	($93.9)
Funded Percentage	51.3%	53.5%	52.6%	51.3%	52.1%	52.5%
Change from Valuation Assumptions:		2.2%	1.4%	0.1%	0.8%	1.2%
Normal Cost	$72.1	$64.5	$65.9	$70.5	$67.2	$68.0
Change from Valuation Assumptions:		($7.7)	($6.2)	($1.6)	($4.9)	($4.1)
Actuarially Determined Contribution for Fiscal 2022*	$196.2	$173.7	$180.7	$194.1	$185.4	$183.7
Change from Valuation Assumptions:		($22.5)	($15.5)	($2.1)	($10.8)	($12.5)

*The Actuarially Determined Contribution amounts for Fiscal 2022 shown above are based on the statutory requirements by the Board.

For the VSERS plan, the COLA options range from a reduction to the UAAL from a savings of $12 million based on application to only non-vested members to $238.8 million assuming elimination of COLA for all active members upon retirement. For the same scenario, the VSTRS had a range in savings of $4.3 million to $165.1 million. In both cases, there was more interest by employee groups and the Treasurer's Office in applying a COLA threshold where all active members upon retirement would be eligible for COLA up to a threshold, for instance up to $24,000 as noted above. In the case of VSTRS, COLA thresholds at $15,000 and $20,000 were also calculated in an attempt to generate additional savings.

Eliminating or reducing a COLA significantly reduces the lifetime benefits of a retiree as purchasing power is diminished over time. The Treasurer's Office, however, reluctantly, sees some level of COLA reduction as the only viable option to make a significant reduction to approach the targeted savings. The use of a threshold, while reducing the savings, does provide a level of retirement security for retirees, especially those that receive a smaller retirement benefit.

VSERS Options/Scenarios:

A total of 29 scenarios or combination of scenarios were reviewed. These are included in Appendix G. In looking at scenarios that reached the targeted savings, four options were developed. There was some consensus that option #4 provided more protection for lower income individuals with assumed lower benefit levels. While the sum of each scenario included in option #4 would meet the target, in combination with interactions between these, the final result was just shy of the target. Given that the fiscal year 2019 valuation incorporated a projected increase of roughly $2.6 million for the fiscal year 2022 contribution over the 2021 ADEC, it is reasonable to adjust the target by that amount, further reducing the variance. The Treasurer's Office recommends implementation of the concept articulated in Option #4.

VSERS - Options to Meet Targets (in $ millions)

		UAAL	ADEC:	Comments:
	Target:	225	36	
1	All Actives, eliminate COLA upon Retirement	-238	-35.3	ADEC off target by $700 K, UAAL estimate exceeded by $13 million
2	Eliminate COLA for actives upon retirement except those within 5 years normal retirement as of implementation date	-116.7	-20.3	
	Add 4 years to AFC	-81.5	-12.4	
	Decrease Due to Combination of elements	8.15	2.108	
	Rule of 90	-66.2	-9.1	Likely will decrease AFC savings because of longer working time
	Estimated Savings/Preliminary	-256.25	-39.692	
3	Eliminate COLA for actives upon retirement except those within 5 years normal retirement as of implementation date	-116.7	-20.3	
	Add 2 years to AFC	-39.2	-6	
	Decrease Due to Combination of elements	3.92	1.02	
	Rule of 90	-66.2	-9.1	Likely will decrease AFC savings because of longer working time
	Estimated Savings/Preliminary	-218.18	-34.38	Need to identify $15.9 additional savings to UAAL
4	COLA threshold $24K for all actives upon retirement	-134.5	-18.8	
	AFC add 2 years	-31.9	-5	
	Rule of 90	-53.5	-7.3	
	Contribution increase by .35%		-2.1	
	Estimated Savings	-219.9	-33.2	After adjusting for impact of combined elements, just shy of target.

Note: For Options #2 and #3 estimates will vary and likely be lowered because of interactions between various elements. The actuary will adjust for these interactions if these remain under consideration.

The details of that option are outlined in more detail below (see Exhibit G.1 for additional explanatory notes):

Scenario		5	27	28	29
Description ($ in millions)	**2020 Valuation Assumptions**	**COLA Threshold - COLAs applied up to the First $24,000 Annual Benefit Amount**	**Revised AFC - Add 2 Years* + (5)**	**Update all pre-Rule of 90 Retirement Eligibility Requirements to Rule of 90 + (27)**	**Increase Employee Contribution Rates by 0.35%** + (28)**
Actuarial Accrued Liability					
Total	$3,095.3	$2,960.8	$2,928.8	$2,875.3	
Change from previous scenario		($134.5)	($31.9)	($53.5)	
Change from Valuation Assumptions		($134.5)	($166.5)	($220.0)	
Actuarial Value of Assets	$2,054.8	$2,054.8	$2,054.8	$2,054.8	
Unfunded Actuarial Accrued Liability	$1,040.5	$905.9	$874.0	$820.4	
Change from previous scenario		($134.5)	($31.9)	($53.5)	
Change from Valuation Assumptions		($134.5)	($166.5)	($220.0)	
Funded Percentage	66.4%	69.4%	70.2%	71.5%	
Change from previous scenario		3.0%	0.8%	1.3%	
Change from Valuation Assumptions		3.0%	3.8%	5.1%	
Normal Cost	$70.8	$64.1	$62.0	$59.5	
Change from previous scenario		($6.7)	($2.1)	($2.5)	
Change from Valuation Assumptions		($6.7)	($8.8)	($11.3)	
Actuarially Determined Contribution for Fiscal 2022	$120.0	$101.2	$96.1	$88.8	$86.8
Change from previous scenario		($18.8)	($5.0)	($7.3)	($2.1)
Change from Valuation Assumptions		($18.8)	($23.8)	($31.1)	($33.2)

*Group C averaging period would increase from 2 to 3 in the "Add 2 Years" scenario.
**The Present Value of Additional Employee Contributions from Fiscal 2022 through Fiscal 2039 from Scenario 29 is $24.3 million.

At its January 14th meeting, the VSERS Board of Trustees passed two motions with respect to the report:

Motion 1
The board has received the Treasurer's Report and recognizes that the ADEC for FY22 and beyond may not be sustainable and as a result recognizes that changes in benefit levels to reduce the unfunded liability may be required.

Motion 2
The board directs the Treasurer to: (1) identify and review strategies to reduce pressure on and increase the stability of ADEC contributions and lower the unfunded liability in future years, including risk/gain sharing models, establishment of a reserve fund, and separate or rolling amortization schedules; (2) cost the options for benefit changes by group per member; (3) assess, to the extent possible, the potential for the options to affect assumed actuarial retirement projections and estimate the effect on the financial condition of the system, and supplement any prior report with this additional information by February 22nd.

VSTRS Options/Scenarios:

While there is a pathway to fully achieve the targets for VSERS, no such option was identified for VSTRS. An elimination of the COLA for all actives upon retirement achieved results closest to the target but at a price. This option is comprised of:

VSTRS - Options to Meet Targets (in $ millions)

		UAAL	ADEC:
	Target:	379.0	60.6
1	Eliminate all COLAs for active members upon retirement	-165.1	-22.5
	Revise AFC to 7 Years	-81.8	-11.5
	Update Rule of 90*	-7.2	-0.6
	Contribution increase to 8%		-17.6
	Estimated Savings	-254.1	-52.2

The above scenario reaches 67% of the targeted UAAL savings and 86% of the ADEC target.

*Update all pre-Rule of 90 retirement eligibility requirements to Rule of 90.

The details of this option are as follows:

Scenario		1	25	26	27	28
Description ($ in millions)	2020 Valuation Assumptions	Remove COLA for all Actives	Revised AFC - 7 Years + (1)	Update all pre-Rule of 90 Retirement Eligibility Requirements to Rule of 90 (updated retirement rates) + (25)	Increase Employee Contribution Rates to 7.00%** + (26)	Increase Employee Contribution Rates to 8.00%** + (26)
Actuarial Accrued Liability						
Total	$3,969.0	$3,803.9	$3,722.1	$3,714.8		
Change from previous scenario		($165.1)	($81.8)	($7.2)		
Change from valuation assumptions		($165.1)	($246.9)	($254.2)		
Actuarial Value of Assets	$2,035.7	$2,035.7	$2,035.7	$2,035.7		
Unfunded Actuarial Accrued Liability	$1,933.3	$1,768.2	$1,686.4	$1,679.1		
Change from previous scenario		($165.1)	($81.8)	($7.2)		
Change from valuation assumptions		($165.1)	($246.9)	($254.2)		
Funded Percentage	51.3%	53.5%	54.7%	54.8%		
Change from previous scenario		$0.0	$0.0	$0.0		
Change from valuation assumptions		2.2%	3.4%	3.5%		
Normal Cost	$72.1	$64.5	$60.3	$60.3		
Change from previous scenario		($7.7)	($4.2)	$0.0		
Change from valuation assumptions		($7.7)	($11.8)	($11.8)		
Actuarially Determined Contribution for Fiscal 2022*	$196.2	$173.7	$162.2	$161.6	$150.9	$144.0
Change from previous scenario		($22.5)	($11.5)	($0.6)	($10.7)	($17.6)
Change from valuation assumptions		($22.5)	($34.0)	($34.6)	($45.3)	($52.3)

*The Actuarially Determined Contribution amounts for Fiscal 2022 shown above are based on the statutory requirements by the Board.
**The Present Value of Additional Employee Contributions from Fiscal 2022 through Fiscal 2039 is $106.6 million for scenario 27 and $186.1 million for scenario 28.

This option brings the savings to within 67% of the UAAL target and 86% of the ADEC.
The VSTRS Board of Trustees reviewed this option and voted to recommend the following revisions:

- The Board voted unanimously to recognize that eliminating the COLA does not recognize the impacts on those with a lower benefit and in an effort to try to provide some retirement security the Board directed the Treasurer's Office to research a range of COLA options for those in retirement with a lower benefit amount to provide to the general assembly.

- The Board voted by roll call to accept the Treasurer's recommendation on employee contribution rates with the caveat that a possible phase-in is examined at either 7 or 8 percent recognizing the impact of COVID-19 on active teachers.

Subsequent to the meeting the Treasurer's Office requested and received updates using two additional thresholds, $15,000 and $20,000. Revising the option to address the Board's concern, the resulting options are:

VSTRS -Additional Options*

		UAAL	ADEC:
	Target:	379.0	60.6
2	COLA threshold $24K for all actives upon retirement	-93.9	-12.5
	Revise AFC to 7 Years	-81.8	-11.5
	Update Rule of 90*	-7.2	-0.6
	Contribution increase to 7%		-10.7
	Estimated Savings	-182.9	-35.3
3	COLA threshold $20K for all actives upon retirement	-104.5	-13.9
	Revise AFC to 7 Years	-81.8	-11.5
	Update Rule of 90*	-7.2	-0.6
	Contribution increase to 7%		-10.7
	Estimated Savings	-193.5	-36.7
4	COLA threshold $15K for all actives upon retirement	-118.8	-15.8
	Revise AFC to 7 Years	-81.8	-11.5
	Update Rule of 90*	-7.2	-0.6
	Contribution increase to 7%		-10.7
	Estimated Savings	-207.8	-38.6

*The actual cost impacts of combining these elements may vary.

The above is below the UAAL savings target representing between 48.2% to 54.8% of the total and between 58.2% to 63.6% of the ADEC target.

At its January 14th meeting, the VSTRS Board of Trustees passed two motions with respect to the report:

Motion 1
The board has received the Treasurer's Report and recognizes that the ADEC for FY22 and beyond may not be sustainable and as a result recognizes that changes in benefit levels to reduce the unfunded liability may be required.

Motion 2
The board directs the Treasurer to: (1) identify and review strategies to reduce pressure on and increase the stability of ADEC contributions and lower the unfunded liability in future years, including risk/gain sharing models, establishment of a reserve fund, and separate or rolling amortization schedules; (2) cost the options for benefit changes by group per member; (3) assess, to the extent possible, the potential for the options to affect assumed actuarial retirement projections and estimate the effect on the financial condition of the system, and supplement any prior report with this additional information by February 22nd.

Additional Revenues:

The State's receipts as compared to the consensus revenue estimates appear to be strong. While this could be an anomaly, any available revenues should be directed to paying down liabilities than new or expansion of new programs. Onetime revenues should not be built into the base budget but provide an opportunity for pay down of liabilities.

With the new Administration in Washington and changes to both houses of Congress, there is a possibility of additional revenues without strings/restrictions. Paying down the state's debts should be a priority.

Risk Sharing and Actuarial Gains:

The implementation of these proposals will significantly reduce benefits and increase employee contributions. From a risk sharing perspective, employees are taking on a substantially greater portion of the actuarial losses. Of the $604 million in increases, employees could, if all recommendations are accepted, take on as much as 78% of the increase in liabilities and 88% of the contribution increases. Future gains, if any, should be shared. To the extent that gains over the next several years reduce liabilities, language should be added to state statute to permit review of benefit and contribution levels and effectively share gains between the employee and the employer (State).

OPEB Recommendations

As noted by our independent actuary, Segal, by incrementally increasing the appropriation over and above the pay-go portion, combined with a statutorily defined funding policy, prefunding can be achieved. The State does not have to appropriate the full funding of the ADEC to begin prefunding, which is likely not a mark that could be achieved in the current budgetary environment.

Prefunding could begin with a relatively small increment over the pay go or premium payments. From there, the State would then commit to a pattern of incremental increases that roughly correspond to the rate of inflation over the full amortization period. Treasury staff and the actuary modeled this for the Retired Teachers Health Medical Benefits Fund (RTHMB) during the 2020 legislative session and determined that a $6 million increase over the current 2021 appropriation would have started the State down this path. While that path was not taken this past session, the opportunity to do this still exists and Treasury staff believe that the needed level of appropriation could be reduced. The key is the policy statement that would need to be adopted by statute. That policy statement would require incremental increases, which after an initial three-to-five-year period, would increase at roughly 3% through the amortization period, very close to the long-term projection for inflation. The results of such a step are significant--it would create predictability in the OPEB costs, it would permit us to immediately lower the liabilities and, since interest is now being accumulated to pay liabilities, it would lower taxpayer costs over the long-term. The Treasurer's Office would like to work with DHR and its actuaries to develop a similar model for the VSERS OPEB.

The RTHMB plan has an approximately $8.7 million fund balance which is the result of a one-time increase in Employee Group Waiver Plan (EGWP) reimbursements recognized during FY20. While this is higher than projected, it is not alone sufficient for us to pursue pre-funding without a commitment in statute and additional on-going appropriations above the pay go amount. In order for the policy to meet the crossover analysis, the projected contributions need to (when combined with investment revenue resulting from the growing fund balance) meet the demand of the expected premiums to be paid. As noted earlier in this report regarding the pensions, a significant portion of monies available for benefits is generated from investments. Important work during the last session was achieved in authorizing the Treasurer to invest OPEB assets with VPIC, however we need to combine those efforts with a policy of pre-funding and commensurate appropriations to allow for investment and to let those investments subsidize the Pay-go costs.

For the State OPEB, the current balance of $57 million would help in jump starting prefunding. In addition, there appears to be roughly $16 million of reserves more than required levels in the state health fund. In the past, any excess has been reduced by providing "rate holidays" where employees are not charged premiums for a period, usually a month. While that saves members and provides relief to the state budget as the state pays a subsidy to health care, it is a one-time funding source. A more efficient model would be to use these monies as an additional source of prefunding. On a biweekly basis, each cost center/fund is charged a cost for health care and pensions, as a percent of payroll. Some of those dollars, equal to the excess reserve, could be allocated to the OPEB fund.

Our requests for both OPEB plans are essentially the same and can be summarized as a commitment in statute to appropriate more than the Pay-go which will allow the fund balance to be invested, grow, and offset future benefit payments, and thus achieve pre-funding and a $1.68B decrease in the State's liabilities.

Appendices

Appendix A.1

Changes to Liabilities and ADEC Based on Experience Study and the 2020 Valuation

VSERS Experience Study

Cost Impact (Based on the June 30, 2019 Actuarial Valuation)

Description	Current Assumptions	All Proposed Demographic Assumptions	All Proposed Demographic and Economic Assumptions Including 7.00%
Actuarial Accrued Liability *Change from prior column* *Cumulative change*	$2,780.0M	$2,846.1M *+66.1M* *+66.1M*	$2,996.8M *+150.7M* *+216.8M*
Actuarial Value of Assets	$1,964.5M	$1,964.5M	$1,964.5M
Unfunded Actuarial Accrued Liability	$815.5M	$881.6M	$1,032.3M
Funded Percentage *Change from prior column* *Cumulative change*	70.7%	69.0% *-1.7%* *-1.7%*	65.6% *-3.4%* *-5.1%*
Normal Cost *Change from prior column* *Cumulative change*	$53.2M	$59.3M *+6.1M* *+6.1M*	$67.7M *+8.4M* *+14.5M*
Actuarially Determined Contribution for FY 2021 *Change from prior column* *Cumulative change*	$83.9M	$95.8M *+11.9M* *+11.9M*	$113.6M *+17.8M* *+29.7M*

Valuation Impacts

Actuarial Experience for Year Ended June 30, 2020

1	Net loss from investments*	-$23,939,803
2	Net gain from other experience	9,416,896
3	Net experience loss: 1 + 2	-$14,522,907

Experience Gain/(Loss) Due to Changes in Demographics for Year Ended June 30, 2020

Net turnover	-$2,812,974
Retirement	-8,892,489
Mortality	3,692,473
Disability retirements	-434,494
Salary and service increases for continuing actives	-3,697,977
COLA experience	23,969,841
Miscellaneous	-2,407,484
Total	$9,416,896

Appendix A.2

Changes to Liabilities and ADEC Based on Experience Study and the 2020 Valuation

VSTRS Experience Study

Cost Impact (Based on the June 30, 2019 Actuarial Valuation)

Description	Current Assumptions	All Proposed Demographic Assumptions	All Proposed Demographic and Economic Assumptions Including 7.00%
Actuarial Accrued Liability	$3,505.3M	$3,641.6M	$3,831.5M
Change from prior column		*+136.3M*	*+189.9M*
Cumulative change		*+136.3M*	*+326.2M*
Actuarial Value of Assets	$1,950.9M	$1,950.9M	$1,950.9M
Unfunded Actuarial Accrued Liability	$1,554.5M	$1,690.7M	$1,880.6M
Funded Percentage	55.7%	53.6%	50.9%
Change from prior column		*-2.1%*	*-2.7%*
Cumulative change		*-2.1%*	*-4.8%*
Normal Cost	$40.8M	$60.9M	$69.2M
Change from prior column		*+20.1M*	*+8.3M*
Cumulative change		*+20.1M*	*+28.4M*
Actuarially Determined Contribution for FY 2021	$135.6M	$168.1M	$186.4M
Change from prior column		*+32.5M*	*+18.3M*
Cumulative change		*+32.5M*	*+50.8M*

Segal

Valuation Impacts

Actuarial Experience for Year Ended June 30, 2020

1	Net loss from investments*	-$21,306,964
2	Net loss from other experience	-37,111,741
3	Net experience loss: 1 + 2	-$58,418,705

Experience Gain/(Loss) Due to Changes In Demographic Experience for Year Ended June 30, 2020

Net turnover	-$21,770,846
Retirement	-24,972,035
Mortality	-3,335,043
Disability retirements	-53,881
Salary increases and service increases for continuing actives	10,408,437
COLA experience	8,838,015
Miscellaneous	-6,226,388
Total	-$37,111,741

Appendix B.1

Funding Progress of the VSERS Retirement System - (Amounts in Thousands)

Year ending June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a) (in thousands)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b-a)/c)
2020	**$ 2,054,826**	**$ 3,095,291**	**$ 1,040,465**	**66.4%**	**$ 551,981**	**188.5%**
2019	1,964,501	2,779,966	815,465	70.7%	$ 527,571	154.6%
2018	1,881,805	2,661,609	779,804	70.7%	521,671	149.5%
2017	1,793,795	2,511,373	717,578	71.4%	504,553	142.2%
2016	1,707,268	2,289,452	582,184	74.6%	471,268	123.5%
2015	1,636,268	2,178,827	542,559	75.1%	462,057	117.4%
2014	1,566,076	2,010,090	444,014	77.9%	437,676	101.4%
2013	1,469,170	1,914,300	445,130	76.8%	416,766	106.8%
2012	1,400,779	1,802,604	401,825	77.7%	385,526	104.2%
2011	1,348,763	1,695,301	346,538	79.6%	398,264	87.0%
2010	1,265,404	1,559,324	293,920	81.2%	393,829	74.6%
2009	1,217,638	1,544,144	326,506	78.9%	404,516	80.7%
2008	1,377,101	1,464,202	87,101	94.1%	404,593	21.5%
2007	1,318,687	1,307,643	(11,044)	100.8%	386,917	-2.9%
2006	1,223,323	1,232,367	9,044	99.3%	369,310	2.4%
2005	1,148,908	1,174,796	25,888	97.8%	349,258	7.4%
2004	1,081,359	1,107,634	26,275	97.6%	336,615	7.8%
2003	1,025,469	1,052,004	26,535	97.5%	319,855	8.3%
2002	990,450	1,017,129	26,679	97.4%	300,994	8.9%
2001	954,821	1,026,993	72,172	93.0%	278,507	25.9%
2000	895,151	967,064	71,913	92.6%	266,519	27.0%
1999	804,970	876,412	71,442	91.8%	238,281	30.0%
1998	733,716	804,501	70,785	91.2%	235,956	30.0%
1997	639,128	753,883	114,755	84.8%	227,000	50.6%

Appendix B.2

Funding Progress of the VSTRS Retirement System - (Amounts in Thousands)

Year ending June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (UAAL) (b-a) (in thousands)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b-a)/c)
2020	$ 2,035,714	3,969,003	1,933,289	51.3%	$ 645,903	299.3%
2019	1,950,860	3,505,319	1,554,459	55.7%	$ 624,908	248.8%
2018	1,866,121	3,379,554	1,513,433	55.2%	612,899	246.9%
2017	1,779,592	3,282,045	1,502,453	54.2%	607,355	247.4%
2016	1,716,296	2,942,024	1,225,728	58.3%	586,397	209.0%
2015	1,662,346	2,837,375	1,175,029	58.6%	557,708	210.7%
2014	1,610,286	2,687,049	1,076,764	59.9%	567,074	189.9%
2013	1,552,924	2,566,834	1,013,910	60.5%	563,623	179.9%
2012	1,517,410	2,462,913	945,503	61.6%	561,179	168.5%
2011	1,486,698	2,331,806	845,108	63.8%	547,748	154.3%
2010	1,410,368	2,122,191	711,823	66.5%	562,150	126.6%
2009	1,374,079	2,101,838	727,759	65.4%	561,588	129.6%
2008	1,605,462	1,984,967	379,505	80.9%	535,807	70.8%
2007	1,541,860	1,816,650	274,790	84.9%	515,573	53.3%
2006	1,427,393	1,686,502	259,109	84.6%	499,044	51.9%
2005	1,354,006	1,492,150	138,144	90.7%	468,858	29.5%
2004	1,284,833	1,424,661	139,828	90.2%	453,517	30.8%
2003	1,218,001	1,358,822	140,821	89.6%	437,239	32.2%
2002	1,169,294	1,307,202	137,908	89.5%	418,904	32.9%
2001	1,116,846	1,254,341	137,495	89.0%	403,258	34.1%
2000	1,037,466	1,174,087	136,621	88.4%	387,999	35.2%
1999	931,056	1,065,754	134,698	87.4%	372,299	36.2%
1998	821,977	955,694	133,717	86.0%	357,899	37.4%
1997	717,396	849,179	131,783	84.5%	364,695	36.1%

Appendix C.1

Cumulative Changes in Unfunded Actuarial Accrued Liability -VSERS Category	Cumulative 2007-2020	Cumulative 2011-2020
Beginning FY Unfunded liability	$ 9,044,004	$ 293,920,094
Changes in Actuarial Assumptions	480,841,346	489,354,525
Changes in System Provisions	47,465,002	22,252
Incorporation of Temp Salary Decreases	(69,913,212)	-
Change in employee contribution rate	(2,610,261)	(2,610,261)
All other expected increases/reductions	(57,597,843)	(79,843,570)
Other expense gain/loss	8,798,318	9,482,240
Salary experience gain/loss	88,151,220	95,627,506
COLA experience gain/loss	(123,583,917)	(110,469,758)
Net Turnover (new mmbers, terminations)	77,509,729	61,630,140
Investment gain/Loss	317,484,349	56,205,931
Mortality gain/loss	40,982,471	40,657,045
Retirements gain/loss	128,594,128	97,520,027
Disability experience gain/loss	2,590,399	2,357,312
Other gain/loss	92,709,386	86,611,636
Ending FY Unfunded Liability	$ 1,040,465,119	$ 1,040,465,119

Note: Investment losses from Great Recession period (2008,2009,2010) total $284.7 million.

Appendix C.2

Cumulative Changes in Unfunded Actuarial Accrued Liability - VSTRS Category	Cumulative 2007-2020	Cumulative 2011-2020
Beginning FY Unfunded liability	$259,108,435	$711,823,061
Expected adj. not incl. assumption/benefit changes	37,199,874	(5,786,660)
Assumption Changes	828,540,973	783,238,313
Plan Provisions	(46,409,122)	0
Net Investment	384,996,680	52,038,767
Salary	(129,391,882)	(125,779,835)
COLA	(102,730,234)	(88,185,397)
Mortality	18,350,215	20,000,804
Retirement	184,010,383	162,532,393
Disability	3,761,046	2,670,773
Net Turnover	320,448,149	319,901,420
Contribution Shortfall incl. Health Care Approp.	175,907,621	101,499,179
Other Gains/Losses	(502,768)	(663,448)
Ending FY Unfunded Liability	$1,933,289,366	$1,933,289,366

Appendix D.1

History of Employer Contributions

VSERS				
FY	ADEC	Contribution	Excess	% Contributed
2021	$ 83,876,570			
2020	78,943,914	84,429,972	5,486,058	106.9%
2019	62,984,742	66,617,894	3,633,152	105.8%
2018	52,065,397	64,564,323	12,498,926	124.0%
2017	48,503,358	60,280,480	11,777,122	124.3%
2016	46,237,853	54,347,060	8,109,207	117.5%
2015	44,651,783	55,881,364	11,229,581	125.1%
2014	40,217,666	56,482,985	16,265,319	140.4%
2013	37,081,864	51,370,307	14,288,443	138.5%
2012	36,587,864	40,302,433	3,714,569	110.2%

Appendix D.2

History of Employer Contributions

VSTRS				
FY	ADEC	Contribution	Excess	% Contributed
2021	$ 132,141,701			
2020	126,197,389	126,941,582	744,193	100.6%
2019	105,640,777	119,174,913	13,534,136	112.8%
2018	88,409,437	114,598,921	26,189,484	129.6%
2017	82,659,576	82,887,174	227,598	100.3%
2016	76,102,909	76,947,869	844,960	101.1%
2015	72,857,863	72,908,805	50,942	100.1%
2014	68,352,825	72,668,413	4,315,588	106.3%
2013	60,182,755	65,086,320	4,903,565	108.1%
2012	51,241,932	56,152,011	4,910,079	109.6%

Appendix D.3

Historical Underfunding of VSTRS

Year	Recommended Contribution For Budget Based on Actuarial Projection	Actual Contribution	$ Difference: Act vs. Rec.*	Percentage of Request
1979	7,806,825	4,825,155	2,981,670	61.81%
1980	8,944,090	8,471,960	472,130	94.72%
1981	9,862,861	8,830,900	1,031,961	89.54%
1982	10,200,209	7,822,760	2,377,449	76.69%
1983	10,721,814	10,929,355	(207,541)	101.94%
1984	12,341,069	11,592,100	748,969	93.93%
1985	13,475,181	12,567,866	907,315	93.27%
1986	14,668,095	14,461,148	206,947	98.59%
1987	15,925,452	16,239,416	(313,964)	101.97%
1988	16,294,346	17,186,259	(891,913)	105.47%
1989	18,072,172	19,000,000	(927,828)	105.13%
1990	21,320,155	19,561,000	1,759,155	91.75%
1991	25,013,437	15,000,000	10,013,437	59.97%
1992	28,595,220	14,618,992	13,976,228	51.12%
1993	28,819,875	19,890,048	8,929,827	69.02%
1994	25,805,408	20,580,000	5,225,408	79.75%
1995	27,451,926	18,080,000	9,371,926	65.86%
1996	29,884,559	11,480,000	18,404,559	38.41%
1997	30,954,237	18,080,000	12,874,237	58.41%
1998	33,519,949	18,106,581	15,413,368	54.02%
1999	27,232,542	18,080,000	9,152,542	66.39%
2000	23,573,184	18,586,240	4,986,944	78.84%
2001	20,882,521	19,143,827	1,738,694	91.67%
2002	21,965,322	20,446,282	1,519,040	93.08%
2003	23,197,088	20,446,282	2,750,806	88.14%
2004	29,608,892	24,446,282	5,162,610	82.56%
2005	43,592,332	24,446,282	19,146,050	56.08%
2006	49,923,599	24,985,506	24,938,093	50.05%
2007	38,200,000	38,496,410	(296,410)	100.78%
2008	40,749,097	40,955,566	(206,469)	100.51%
2009	37,077,050	37,349,818	(272,768)	100.74%
2010	41,503,002	41,920,603	(417,601)	101.01%
2011	48,233,006	50,268,131	(2,035,125)	104.22%
2012	51,241,932	56,152,011	(4,910,079)	109.58%
2013	60,182,755	65,086,320	(4,903,565)	108.15%
2014	68,352,825	72,668,412	(4,315,587)	106.31%
2015	72,857,863	72,908,805	(50,942)	100.07%
2016	76,102,909	76,947,869	(844,960)	101.11%
2017	82,659,576	82,887,174	(227,598)	100.28%
2018	88,409,437	114,598,921	(26,189,484)	129.62%
2019	105,640,777	119,174,913	(13,534,136)	112.81%
2020	126,197,389	126,941,582	(744,193)	100.59%

*Beginning 1996, budget contribution amount per prior valuation report

Appendix E.1

Vermont State Employees' Retirement System
Reconciliation of Actuarial Accrued Liability (AAL) - In $Millions

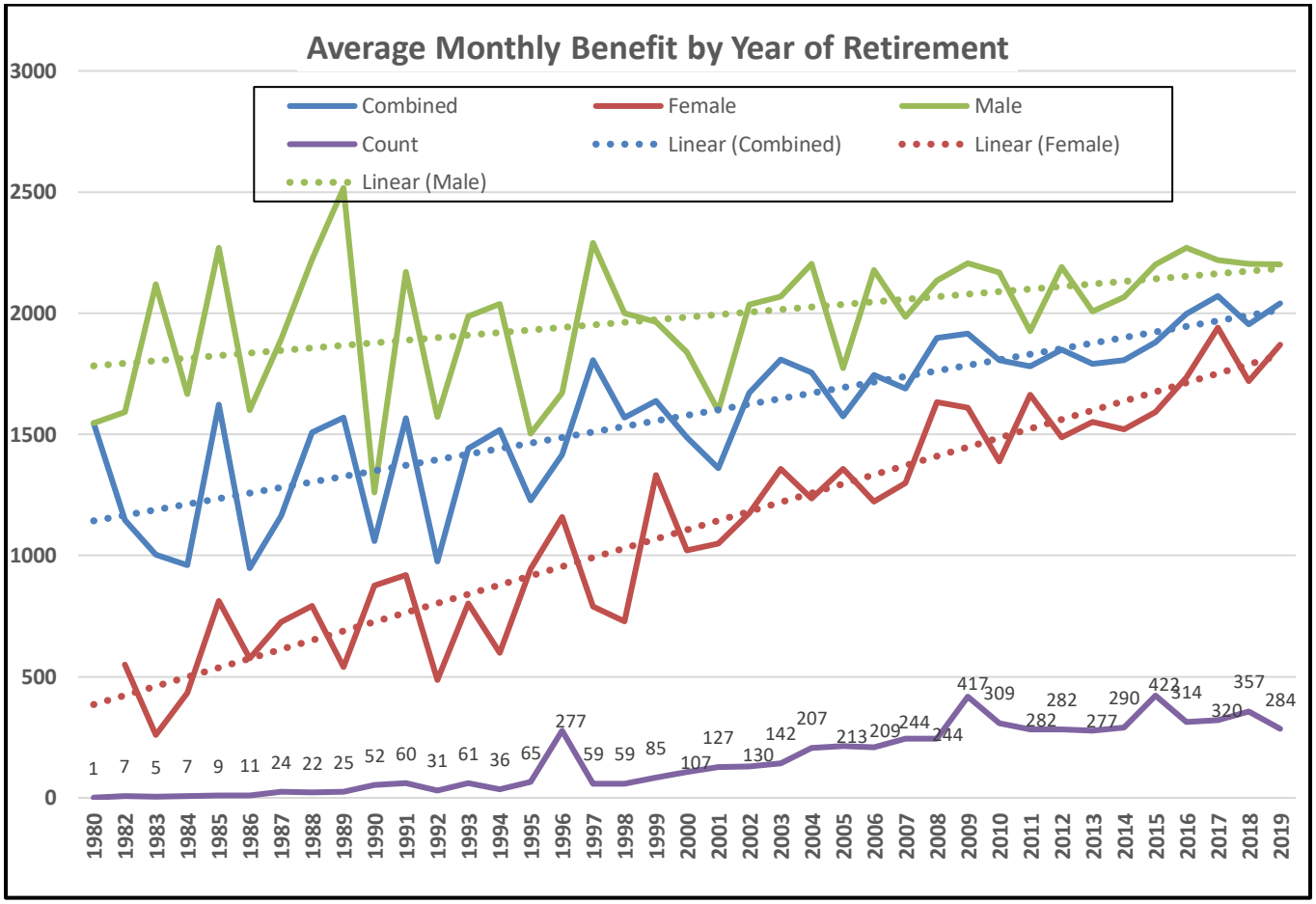
		AAL	% Change	Comments
June 30, 2019 From Prior Report	$	1,279		Segal December 2019 Report
June 30, 2020 Expected	$	1,335		Expected increases due to normal plan operations
Changes				
Differences Between Expected and Actual Experience		20	1.5%	Differences between 2019 and 2018 census data
Per Capita Claims		(105)	-7.8%	Updated per capita claims
Contribution Rates		27	2.2%	Updated contributions based on 2021 premium rates and benefit elections
Health Trend Rates		(43)	-3.4%	Updated based on 2020 Health Trend Analysis
Excise Tax Repealed		(19)	-1.6%	Excise tax repealed
Mortality Rates		(10)	-0.8%	Updated based on pension experience study
Disability Rates		0	0.0%	Updated based on pension experience study
Withdrawal Rates		0	0.0%	Updated based on pension experience study
Retirement Rates		28	2.3%	Updated based on pension experience study
Salary Scale		(6)	-0.5%	Updated based on pension experience study
Discount Rate		256	20.8%	Decreased from 3.50% to 2.23%
June 30, 2020 Accrued Liability	$	1,483	15.9%	Segal November 2020 Report

Appendix E.2

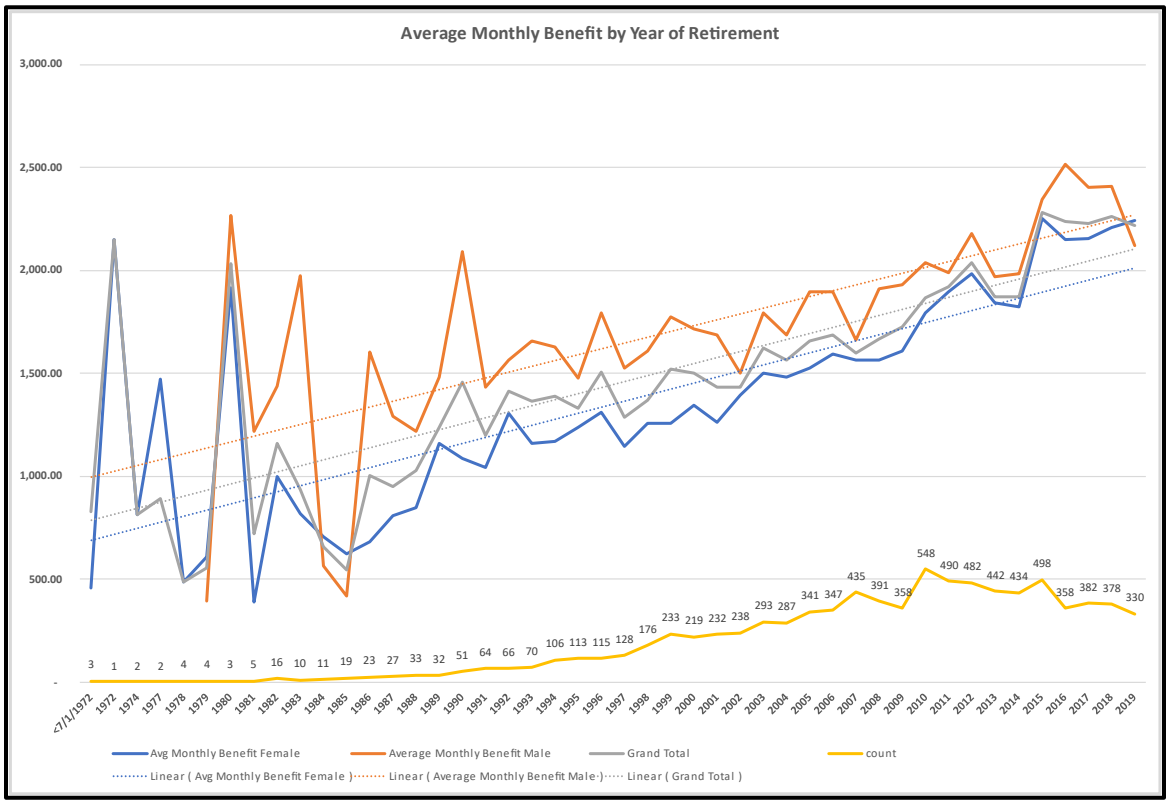
Vermont State Teachers' Retirement System
Reconciliation of Actuarial Accrued Liability (AAL) - In $Millions

		AAL	% Change	Comments
June 30, 2019 From Prior Report	$	1,041		Segal November 2019 Report
June 30, 2020 Expected	$	1,081		Expected Increases due to normal plan operations
Changes				
Differences Between Expected and Actual Experience	$	31	2.9%	Differences between 2019 and 2018 census data
Removal of the Excise Tax	$	(46)	-4.1%	Excise tax repealed
Per Capita Claims	$	(45)	-4.2%	Updated per capita claims
Contributions	$	79	7.7%	Updated contributions based on 2020 premium rates and benefit elections as of June 30, 2019
Health Trend Rates	$	(24)	-2.2%	Updated based on 2020 Health Trend Analysis
Salary Scale	$	(6)	-0.6%	Updated based on pension experience study
Mortality Rates	$	20	1.9%	Updated based on pension experience study
Disability Rates	$	-	0.0%	Updated based on pension experience study
Withdrawal Rates	$	17	1.6%	Updated based on pension experience study
Retirement Rates	$	(8)	-0.7%	Updated based on pension experience study
Enrollment	$	(3)	-0.3%	Modified for terminated vested members and retirees without current coverage
Percent Married	$	(60)	-5.5%	Decreased for both males and females
Discount Rate	$	232	22.4%	Decreased from 3.50% to 2.21%
June 30, 2020 Accrued Liability	$	1,268	21.8%	Segal November 2020 Report

Appendix F.1


Average Monthly Benefit by Year of Retirement
Combined
Female
Male
Count
Linear (Combined)
Linear (Female)
Linear (Male)
3000
2500
2000
1500
1000
500
0
1 7 5 7 9 11 24 22 25 52 60 31 61 36 65 277 59 59 85 107 127 130 142 207 213 209 244 244 417 309 282 282 277 290 422 314 320 357 284
1980 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019

Appendix F.2



Appendix G

Appendix G, on the following pages, includes all additional scenarios performed by Segal, our independent actuary. The VSERS scenarios are first, followed by the VSTRS scenarios.

VSERS

Scenario		1	2	3	4	5
Description ($ in millions)	**2020 Valuation Assumptions**	**Remove COLA for all Actives**	**Remove COLA for all Actives except those within 5 Years of Retirement**	**Remove COLA for all Non-Vested Actives**	**Remove COLA for all Actives except those within 10 Years of Retirement**	**COLA Threshold - COLAs Applied on the First $24,000 Annual Benefit Amount**
Actuarial Accrued Liability						
Total	$3,095.3	$2,856.5	$2,978.6	$3,083.3	$3,025.1	$2,960.8
	Change from Valuation Assumptions:	($238.8)	($116.7)	($12.0)	($70.2)	($134.5)
Actuarial Value of Assets	$2,054.8	$2,054.8	$2,054.8	$2,054.8	$2,054.8	$2,054.8
Unfunded Actuarial Accrued Liability	$1,040.5	$801.7	$923.8	$1,028.4	$970.3	$905.9
	Change from Valuation Assumptions:	($238.8)	($116.7)	($12.0)	($70.2)	($134.5)
Funded Percentage	66.4%	71.9%	69.0%	66.6%	67.9%	69.4%
	Change from Valuation Assumptions:	5.5%	2.6%	0.3%	1.5%	3.0%
Normal Cost	$70.8	$57.2	$61.3	$67.0	$63.7	$64.1
	Change from Valuation Assumptions:	($13.6)	($9.5)	($3.8)	($7.1)	($6.7)
Actuarially Determined Contribution for Fiscal 2022	$120.0	$84.7	$99.7	$114.8	$106.3	$101.2
	Change from Valuation Assumptions:	($35.3)	($20.3)	($5.1)	($13.7)	($18.8)

Plan changes involving adjustments to the COLA
Plan changes involving adjustments to the AFC
Plan changes involving adjustments to the Vesting Schedule
Plan changes involving adjustments to the Early Retirement Factors
Plan changes involving adjustments to the Eligibility Requirements
Plan changes involving adjustments to the Benefit Formula
Plan changes involving adjustments to the employee contribution rates

Assumption changes were adopted by the Board in September 2020 and were effective for the June 30, 2020 valuation. Combinations of scenarios may not have aggregate results equal to the sum of the individual scenarios.

The individual cost impacts above can be summed together in order to estimate the total impact on the cost if two or more of the scenarios were combined. However, the actual cost impact from adding scenarios is likely to be less than the sum of the parts due to interaction among the various components analyzed in each individual scenario.

Please refer to the June 30, 2020 actuarial valuation and the experience study dated September 24, 2020 for additional information regarding participant data, plan provisions, and assumptions.

We did not assume participant behavior would change and therefore did not revise any assumptions as a result of these plan changes. If the plan changes do affect the participant behavior, the savings would be different.

The plan changes were valued assuming that the changes could be fully implemented and that no portion of current accrued or projected benefits were protected. If any changes are implemented with such protections in place, or if required by law, the reductions in actuarial accrued liability and actuarially determined contribution will be lower than shown above.

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VSERS

Scenario		6	7	8	9
Description ($ in millions)	**2020 Valuation Assumptions**	**Revised AFC - Add 2 Years***	**Revised AFC - Add 4 Years***	**Revised AFC - Highest Consecutive 5 Years for All Members**	**Revised AFC - Highest Consecutive 7 Years for All Members**
Actuarial Accrued Liability					
Total	$3,095.3	$3,056.1	$3,013.8	$3,048.0	$3,006.0
	Change from Valuation Assumptions:	($39.2)	($81.5)	($47.3)	($89.3)
Actuarial Value of Assets	$2,054.8	$2,054.8	$2,054.8	$2,054.8	$2,054.8
Unfunded Actuarial Accrued Liability	$1,040.5	$1,001.3	$959.0	$993.2	$951.2
	Change from Valuation Assumptions:	($39.2)	($81.5)	($47.3)	($89.3)
Funded Percentage	66.4%	67.2%	68.2%	67.4%	68.4%
	Change from Valuation Assumptions:	0.9%	1.8%	1.0%	2.0%
Normal Cost	$70.8	$68.3	$65.8	$67.8	$65.3
	Change from Valuation Assumptions:	($2.5)	($5.0)	($3.0)	($5.5)
Actuarially Determined Contribution for Fiscal 2022	$120.0	$113.9	$107.5	$112.7	$106.3
	Change from Valuation Assumptions:	($6.0)	($12.4)	($7.3)	($13.6)

*Group C averaging period would increase from 2 to 3 in the "Add 2 Years" scenario and from 2 to 5 in the "Add 4 Years" scenario.

	Plan changes involving adjustments to the COLA
	Plan changes involving adjustments to the AFC
	Plan changes involving adjustments to the Vesting Schedule
	Plan changes involving adjustments to the Early Retirement Factors
	Plan changes involving adjustments to the Eligibility Requirements
	Plan changes involving adjustments to the Benefit Formula
	Plan changes involving adjustments to the employee contribution rates

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Please refer to the June 30, 2020 actuarial valuation and the experience study dated September 24, 2020 for additional information regarding participant data, plan provisions, and assumptions.

We did not assume participant behavior would change and therefore did not revise any assumptions as a result of these plan changes. If the plan changes do affect the participant behavior, the savings would be different.

The plan changes were valued assuming that the changes could be fully implemented and that no portion of current accrued or projected benefits were protected. If any changes are implemented with such protections in place, or if required by law, the reductions in actuarial accrued liability and actuarially determined contribution will be lower than shown above.

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VSERS

Scenario		10	11	12	13	14
Description ($ in millions)	**2020 Valuation Assumptions**	**Revised Vesting Schedule - 7 Years**	**Revised Vesting Schedule - 10 Years**	**Update Group F - Old Early Retirement Factors to use Actuarial Equivalence**	**Update all pre-Rule of 87 Retirement Eligibility Requirements to Rule of 87**	**Update all pre-Rule of 90 Retirement Eligibility Requirements to Rule of 90**
Actuarial Accrued Liability						
Total	$3,095.3	$3,095.6	$3,096.0	$3,088.5	$3,042.6	$3,029.1
	Change from Valuation Assumptions:	$0.3	$0.8	($6.8)	($52.7)	($66.2)
Actuarial Value of Assets	$2,054.8	$2,054.8	$2,054.8	$2,054.8	$2,054.8	$2,054.8
Unfunded Actuarial Accrued Liability	$1,040.5	$1,040.8	$1,041.2	$1,033.7	$987.8	$974.3
	Change from Valuation Assumptions:	$0.3	$0.8	($6.8)	($52.7)	($66.2)
Funded Percentage	66.4%	66.4%	66.4%	66.5%	67.5%	67.8%
	Change from Valuation Assumptions:	0.0%	0.0%	0.1%	1.1%	1.5%
Normal Cost	$70.8	$70.8	$70.8	$70.4	$68.3	$67.7
	Change from Valuation Assumptions:	$0.0	$0.0	($0.4)	($2.5)	($3.1)
Actuarially Determined Contribution for Fiscal 2022	$120.0	$119.4	$119.2	$118.9	$112.8	$110.9
	Change from Valuation Assumptions:	($0.6)	($0.8)	($1.0)	($7.2)	($9.1)

Plan changes involving adjustments to the COLA
Plan changes involving adjustments to the AFC
Plan changes involving adjustments to the Vesting Schedule
Plan changes involving adjustments to the Early Retirement Factors
Plan changes involving adjustments to the Eligibility Requirements
Plan changes involving adjustments to the Benefit Formula
Plan changes involving adjustments to the employee contribution rates

Assumption changes were adopted by the Board in September 2020 and were effective for the June 30, 2020 valuation. Combinations of scenarios may not have aggregate results equal to the sum of the individual scenarios.

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Please refer to the June 30, 2020 actuarial valuation and the experience study dated September 24, 2020 for additional information regarding participant data, plan provisions, and assumptions.

Where appropriate, we have modified retirement rates slightly to estimate retirement patterns under the proposed retirement eligibility changes.

The plan changes were valued assuming that the changes could be fully implemented and that no portion of current accrued or projected benefits were protected. If any changes are implemented with such protections in place, or if required by law, the reductions in actuarial accrued liability and actuarially determined contribution will be lower than shown above.

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VSERS

Scenario		15	16	17	18	19
Description ($ in millions)	**2020 Valuation Assumptions**	**Decrease Maximum Benefit for Post-2007 Group F to 50% AFC**	**Increase Maximum Benefit for All Group F to 63% AFC**	**Increase Maximum Benefit for All Group F to 70% AFC**	**For Group C, Increase the Maximum Benefit by 1% for each year worked after a participant attains the later of Age 50 or 20 Years of Service**	**For Group C, Increase the Maximum Benefit by 2% for each year worked after a participant attains the later of Age 50 or 20 Years of Service**
Actuarial Accrued Liability						
Total	$3,095.3	$3,086.9	$3,179.3	$3,198.5	$3,081.5	$3,086.5
	Change from Valuation Assumptions:	($8.4)	$84.0	$103.2	($13.8)	($8.8)
Actuarial Value of Assets	$2,054.8	$2,054.8	$2,054.8	$2,054.8	$2,054.8	$2,054.8
Unfunded Actuarial Accrued Liability	$1,040.5	$1,032.1	$1,124.4	$1,143.6	$1,026.6	$1,031.7
	Change from Valuation Assumptions:	($8.4)	$84.0	$103.2	($13.8)	($8.8)
Funded Percentage	66.4%	66.6%	64.6%	64.2%	66.7%	66.6%
	Change from Valuation Assumptions:	0.2%	-1.8%	-2.1%	0.3%	0.2%
Normal Cost	$70.8	$69.6	$72.3	$72.7	$70.1	$70.4
	Change from Valuation Assumptions:	($1.2)	$1.5	$1.9	($0.6)	($0.4)
Actuarially Determined Contribution for Fiscal 2022	$120.0	$118.0	$128.8	$130.9	$118.1	$118.7
	Change from Valuation Assumptions:	($2.0)	$8.9	$11.0	($1.9)	($1.2)

Plan changes involving adjustments to the COLA
Plan changes involving adjustments to the AFC
Plan changes involving adjustments to the Vesting Schedule
Plan changes involving adjustments to the Early Retirement Factors
Plan changes involving adjustments to the Eligibility Requirements
Plan changes involving adjustments to the Benefit Formula
Plan changes involving adjustments to the employee contribution rates

Assumption changes were adopted by the Board in September 2020 and were effective for the June 30, 2020 valuation. Combinations of scenarios may not have aggregate results equal to the sum of the individual scenarios.

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Please refer to the June 30, 2020 actuarial valuation and the experience study dated September 24, 2020 for additional information regarding participant data, plan provisions, and assumptions.

Other than specifically noted below, we did not revise any assumptions as a result of these plan changes.

For the change to the maximum benefit for Group C participants, we would expect this change to incent some participants to delay retirement beyond age 50. The current retirement assumptions are that 100% of Group C participants will retire upon reaching early retirement eligibility. We modeled this scenario assuming that 50% of participants will retire upon reaching the later of age 50 or 20 years of service, then 10% of participants are assumed to retire each subsequent year until age 55, then 100% of participants are assumed to retire at age 55. If more participants delay retirement than assumed, the savings will be greater. Conversely, if fewer participants delay retirement than assumed, the savings will be less.

The plan changes were valued assuming that the changes could be fully implemented and that no portion of current accrued or projected benefits were protected. If any changes are implemented with such protections in place, or if required by law, the reductions in actuarial accrued liability and actuarially determined contribution will be lower than shown above.

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VSERS

Scenario		20	21	22	23	24
Description ($ in millions)	**2020 Valuation Assumptions**	**Increase Employee Contribution Rates by 0.35%**	**Increase Employee Contribution Rates by 0.60%**	**Increase Employee Contribution Rates by 0.85%**	**Increase Employee Contribution Rates by 1.10%**	**Increase Employee Contribution Rates by 1.35%**
Actuarially Determined Contribution for Fiscal 2022	$120.0 Change from Valuation Assumptions:	$117.9 ($2.1)	$116.5 ($3.5)	$115.0 ($5.0)	$113.5 ($6.5)	$112.0 ($8.0)
Present Value of Additional Employee Contributions from Fiscal 2022 through Fiscal 2039	N/A	$23.1	$39.7	$56.2	$72.8	$89.3

Plan changes involving adjustments to the COLA
Plan changes involving adjustments to the AFC
Plan changes involving adjustments to the Vesting Schedule
Plan changes involving adjustments to the Early Retirement Factors
Plan changes involving adjustments to the Eligibility Requirements
Plan changes involving adjustments to the Benefit Formula
Plan changes involving adjustments to the employee contribution rates

Assumption changes were adopted by the Board in September 2020 and were effective for the June 30, 2020 valuation. Combinations of scenarios may not have aggregate results equal to the sum of the individual scenarios.

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We did not assume participant behavior would change and therefore did not revise any assumptions as a result of these plan changes. If the plan changes do affect the participant behavior, the savings would be different.

The plan changes were valued assuming that the changes could be fully implemented and that no portion of current accrued or projected benefits were protected. If any changes are implemented with such protections in place, or if required by law, the reductions in actuarial accrued liability and actuarially determined contribution will be lower than shown above.

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VSERS

Scenario		25	26
Description ($ in millions)	**2020 Valuation Assumptions**	**7.4% on Salary up to $54,000 8% on Salary between $54,000 and $65,800 9% on Salary between $65,800 and $81,000 10% on Salary above $81,000***	**7.4% on Salary up to $40,000 8% on Salary between $40,000 and $60,000 9% on Salary between $60,000 and $80,000 10% on Salary above $80,000**
Actuarially Determined Contribution for Fiscal 2022	$120.0 Change from Valuation Assumptions:	$113.8 ($6.2)	$113.0 ($7.0)
Effective Member Contribution Rate for Salary of $60,000	6.65%	7.46%	7.60%
Effective Member Contribution Rate for Salary of $100,000	6.65%	8.21%	8.36%

*The 25th, 50th, and 75th percentile of projected FY21 active member salaries are $54,000, $65,800, and $81,000, respectively.

Plan changes involving adjustments to the COLA
Plan changes involving adjustments to the AFC
Plan changes involving adjustments to the Vesting Schedule
Plan changes involving adjustments to the Early Retirement Factors
Plan changes involving adjustments to the Eligibility Requirements
Plan changes involving adjustments to the Benefit Formula
Plan changes involving adjustments to the employee contribution rates

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VSERS

Scenario		5	27	28	29
Description ($ in millions)	**2020 Valuation Assumptions**	**COLA Threshold - COLAs applied up to the First $24,000 Annual Benefit Amount**	**Revised AFC - Add 2 Years* + (5)**	**Update all pre-Rule of 90 Retirement Eligibility Requirements to Rule of 90 + (27)**	**Increase Employee Contribution Rates by 0.35%** + (28)**
Actuarial Accrued Liability					
Total	$3,095.3	$2,960.8	$2,928.8	$2,875.3	
Change from previous scenario:		($134.5)	($31.9)	($53.5)	
Change from Valuation Assumptions:		($134.5)	($166.5)	($220.0)	
Actuarial Value of Assets	$2,054.8	$2,054.8	$2,054.8	$2,054.8	
Unfunded Actuarial Accrued Liability	$1,040.5	$905.9	$874.0	$820.4	
Change from previous scenario:		($134.5)	($31.9)	($53.5)	
Change from Valuation Assumptions:		($134.5)	($166.5)	($220.0)	
Funded Percentage	66.4%	69.4%	70.2%	71.5%	
Change from previous scenario:		3.0%	0.8%	1.3%	
Change from Valuation Assumptions:		3.0%	3.8%	5.1%	
Normal Cost	$70.8	$64.1	$62.0	$59.5	
Change from previous scenario:		($6.7)	($2.1)	($2.5)	
Change from Valuation Assumptions:		($6.7)	($8.8)	($11.3)	
Actuarially Determined Contribution for Fiscal 2022	$120.0	$101.2	$96.1	$88.8	$86.8
Change from previous scenario:		($18.8)	($5.0)	($7.3)	($2.1)
Change from Valuation Assumptions:		($18.8)	($23.8)	($31.1)	($33.2)

*Group C averaging period would increase from 2 to 3 in the "Add 2 Years" scenario.
**The Present Value of Additional Employee Contributions from Fiscal 2022 through Fiscal 2039 from Scenario 29 is $24.3 million.

- Plan changes involving adjustments to the COLA
- Plan changes involving adjustments to the AFC
- Plan changes involving adjustments to the Vesting Schedule
- Plan changes involving adjustments to the Early Retirement Factors
- Plan changes involving adjustments to the Eligibility Requirements
- Plan changes involving adjustments to the Benefit Formula
- Plan changes involving adjustments to the employee contribution rates

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VSTRS

Scenario		1	2	3	4
Description ($ in millions)	**2020 Valuation Assumptions**	**Remove COLA for all Actives**	**Remove COLA for all Actives except those within 5 Years of Retirement**	**Remove COLA for all Non-Vested Actives**	**Remove COLA for all Actives except those within 10 Years of Retirement**
Actuarial Accrued Liability					
Total	$3,969.0	$3,803.9	$3,866.9	$3,964.7	$3,904.8
	Change from Valuation Assumptions:	($165.1)	($102.1)	($4.3)	($64.2)
Actuarial Value of Assets	$2,035.7	$2,035.7	$2,035.7	$2,035.7	$2,035.7
Unfunded Actuarial Accrued Liability	$1,933.3	$1,768.2	$1,831.2	$1,929.0	$1,869.1
	Change from Valuation Assumptions:	($165.1)	($102.1)	($4.3)	($64.2)
Funded Percentage	51.3%	53.5%	52.6%	51.3%	52.1%
	Change from Valuation Assumptions:	2.2%	1.4%	0.1%	0.8%
Normal Cost	$72.1	$64.5	$65.9	$70.5	$67.2
	Change from Valuation Assumptions:	($7.7)	($6.2)	($1.6)	($4.9)
Actuarially Determined Contribution for Fiscal 2022*	$196.2	$173.7	$180.7	$194.1	$185.4
	Change from Valuation Assumptions:	($22.5)	($15.5)	($2.1)	($10.8)

*The Actuarially Determined Contribution amounts for Fiscal 2022 shown above are based on the statutory requirements by the Board.

	Plan changes involving adjustments to the COLA
	Plan changes involving adjustments to the AFC
	Plan changes involving adjustments to the Vesting Schedule
	Plan changes involving adjustments to the Early Retirement Factors
	Plan changes involving adjustments to the Eligibility Requirements
	Plan changes involving adjustments to the Benefit Formula
	Plan changes involving adjustments to the employee contribution rates

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VSTRS

Scenario		5	6	7
Description ($ in millions)	**2020 Valuation Assumptions**	**COLA Threshold - COLAs Applied on the First $24,000 Annual Benefit Amount**	**COLA Threshold - COLAs Applied on the First $20,000 Annual Benefit Amount**	**COLA Threshold - COLAs Applied on the First $15,000 Annual Benefit Amount**
Actuarial Accrued Liability				
Total	$3,969.0	$3,875.1	$3,864.5	$3,850.2
	Change from Valuation Assumptions:	($93.9)	($104.5)	($118.8)
Actuarial Value of Assets	$2,035.7	$2,035.7	$2,035.7	$2,035.7
Unfunded Actuarial Accrued Liability	$1,933.3	$1,839.4	$1,828.8	$1,814.5
	Change from Valuation Assumptions:	($93.9)	($104.5)	($118.8)
Funded Percentage	51.3%	52.5%	52.7%	52.9%
	Change from Valuation Assumptions:	1.2%	1.4%	1.6%
Normal Cost	$72.1	$68.0	$67.6	$67.0
	Change from Valuation Assumptions:	($4.1)	($4.5)	($5.1)
Actuarially Determined Contribution for Fiscal 2022*	$196.2	$183.7	$182.3	$180.4
	Change from Valuation Assumptions:	($12.5)	($13.9)	($15.8)

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	Plan changes involving adjustments to the COLA
	Plan changes involving adjustments to the AFC
	Plan changes involving adjustments to the Vesting Schedule
	Plan changes involving adjustments to the Early Retirement Factors
	Plan changes involving adjustments to the Eligibility Requirements
	Plan changes involving adjustments to the Benefit Formula
	Plan changes involving adjustments to the employee contribution rates

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VSTRS

Scenario		8	9	10	11
Description ($ in millions)	**2020 Valuation Assumptions**	**Revised AFC - 5 Years**	**Revised AFC - 7 Years**	**Revised Vesting Schedule - 7 Years**	**Revised Vesting Schedule - 10 Years**
Actuarial Accrued Liability					
Total	$3,969.0	$3,921.7	$3,876.5	$3,969.6	$3,970.1
	Change from Valuation Assumptions:	($47.3)	($92.5)	$0.6	$1.1
Actuarial Value of Assets	$2,035.7	$2,035.7	$2,035.7	$2,035.7	$2,035.7
Unfunded Actuarial Accrued Liability	$1,933.3	$1,886.0	$1,840.8	$1,933.8	$1,934.4
	Change from Valuation Assumptions:	($47.3)	($92.5)	$0.6	$1.1
Funded Percentage	51.3%	51.9%	52.5%	51.3%	51.3%
	Change from Valuation Assumptions:	0.6%	1.2%	0.0%	0.0%
Normal Cost	$72.1	$69.7	$67.4	$72.1	$72.1
	Change from Valuation Assumptions:	($2.4)	($4.7)	$0.0	$0.0
Actuarially Determined Contribution for Fiscal 2022*	$196.2	$189.5	$183.2	$196.2	$196.1
	Change from Valuation Assumptions:	($6.7)	($13.0)	($0.1)	($0.1)

*The Actuarially Determined Contribution amounts for Fiscal 2022 shown above are based on the statutory requirements by the Board.

	Plan changes involving adjustments to the COLA
	Plan changes involving adjustments to the AFC
	Plan changes involving adjustments to the Vesting Schedule
	Plan changes involving adjustments to the Early Retirement Factors
	Plan changes involving adjustments to the Eligibility Requirements
	Plan changes involving adjustments to the Benefit Formula
	Plan changes involving adjustments to the employee contribution rates

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VSTRS

Scenario		12	13	14	15
Description ($ in millions)	**2020 Valuation Assumptions**	**Update Group C - Grandfathered Early Retirement Factors to use Actuarial Equivalence**	**Update all pre-Rule of 87 Retirement Eligibility Requirements to Rule of 87 (updated retirement rates)**	**Update all pre-Rule of 90 Retirement Eligibility Requirements to Rule of 90 (updated retirement rates)**	**Increase Maximum Benefit to 70% AFC**
Actuarial Accrued Liability					
Total	$3,969.0	$3,969.0	$3,960.2	$3,960.4	$4,029.6
	Change from Valuation Assumptions:	$0.0	($8.8)	($8.6)	$60.6
Actuarial Value of Assets	$2,035.7	$2,035.7	$2,035.7	$2,035.7	$2,035.7
Unfunded Actuarial Accrued Liability	$1,933.3	$1,933.3	$1,924.5	$1,924.7	$1,993.9
	Change from Valuation Assumptions:	$0.0	($8.8)	($8.6)	$60.6
Funded Percentage	51.3%	51.3%	51.4%	51.4%	50.5%
	Change from Valuation Assumptions:	0.0%	0.1%	0.1%	-0.8%
Normal Cost	$72.1	$72.1	$72.2	$72.2	$74.0
	Change from Valuation Assumptions:	($0.0)	$0.1	$0.0	$1.9
Actuarially Determined Contribution for Fiscal 2022*	$196.2	$196.2	$195.5	$195.5	$203.5
	Change from Valuation Assumptions:	($0.0)	($0.7)	($0.7)	$7.3

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	Plan changes involving adjustments to the AFC
	Plan changes involving adjustments to the Vesting Schedule
	Plan changes involving adjustments to the Early Retirement Factors
	Plan changes involving adjustments to the Eligibility Requirements
	Plan changes involving adjustments to the Benefit Formula
	Plan changes involving adjustments to the employee contribution rates

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VSTRS

Scenario		16	17	18	19	20
Description ($ in millions)	**2020 Valuation Assumptions**	**Increase Employee Contribution Rates to 7.00%**	**Increase Employee Contribution Rates to 7.25%**	**Increase Employee Contribution Rates to 7.50%**	**Increase Employee Contribution Rates to 7.75%**	**Increase Employee Contribution Rates to 8.00%**
Actuarially Determined Contribution for Fiscal 2022*	$196.2 Change from Valuation Assumptions:	$185.6 ($10.6)	$183.9 ($12.3)	$182.1 ($14.1)	$180.4 ($15.8)	$178.7 ($17.5)
Present Value of Additional Employee Contributions from Fiscal 2022 through Fiscal 2039	N/A	$106.4	$126.2	$146.1	$166.0	$185.8

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Plan changes involving adjustments to the COLA
Plan changes involving adjustments to the AFC
Plan changes involving adjustments to the Vesting Schedule
Plan changes involving adjustments to the Early Retirement Factors
Plan changes involving adjustments to the Eligibility Requirements
Plan changes involving adjustments to the Benefit Formula
Plan changes involving adjustments to the employee contribution rates

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VSTRS

Scenario		21	22	23	24
Description ($ in millions)	**2020 Valuation Assumptions**	**6.75% on Salary up to $56,000 7.75% on Salary between $56,000 and $66,800 8.75% on Salary between $66,800 and $78,000 10% on Salary above $78,000****		**6.75% on Salary up to $45,000 7.75% on Salary between $45,000 and $60,000 8.75% on Salary between $60,000 and $75,000 10% on Salary above $75,000**	
		Member Rates for Those Currently at 5% Contribution Level Are 1% Lower Than Rates Shown Above	**Those Currently at 5% Contribution Level Increase to Levels Shown Above**	**Member Rates for Those Currently at 5% Contribution Level Are 1% Lower Than Rates Shown Above**	**Those Currently at 5% Contribution Level Increase to Levels Shown Above**
Actuarially Determined Contribution for Fiscal 2022*	$196.2 Change from Valuation Assumptions:	$189.3 ($6.9)	$185.7 ($10.5)	$188.0 ($8.2)	$184.5 ($11.7)
Effective Member Contribution Rate for Salary of $60,000	5.00% 6.00%	5.82% 6.82%	6.82%	6.00% 7.00%	7.00%
Effective Member Contribution Rate for Salary of $100,000	5.00% 6.00%	6.80% 7.80%	7.80%	7.01% 8.01%	8.01%

*The Actuarially Determined Contribution amounts for Fiscal 2022 shown above are based on the statutory requirements by the Board.
**The 25th, 50th, and 75th percentile of projected FY21 active member salaries are $56,000, $66,800, and $78,000, respectively.

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Plan changes involving adjustments to the AFC
Plan changes involving adjustments to the Vesting Schedule
Plan changes involving adjustments to the Early Retirement Factors
Plan changes involving adjustments to the Eligibility Requirements
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VSTRS

Scenario		1	25	26	27	28
Description ($ in millions)	**2020 Valuation Assumptions**	**Remove COLA for all Actives**	**Revised AFC - 7 Years + (1)**	**Update all pre-Rule of 90 Retirement Eligibility Requirements to Rule of 90 (updated retirement rates) + (25)**	**Increase Employee Contribution Rates to 7.00%** + (26)**	**Increase Employee Contribution Rates to 8.00%** + (26)**
Actuarial Accrued Liability						
Total	$3,969.0	$3,803.9	$3,722.1	$3,714.8		
Change from previous scenario:		($165.1)	($81.8)	($7.2)		
Change from valuation assumptions:		($165.1)	($246.9)	($254.2)		
Actuarial Value of Assets	$2,035.7	$2,035.7	$2,035.7	$2,035.7		
Unfunded Actuarial Accrued Liability	$1,933.3	$1,768.2	$1,686.4	$1,679.1		
Change from previous scenario:		($165.1)	($81.8)	($7.2)		
Change from valuation assumptions:		($165.1)	($246.9)	($254.2)		
Funded Percentage	51.3%	53.5%	54.7%	54.8%		
Change from previous scenario:		$0.0	$0.0	$0.0		
Change from valuation assumptions:		2.2%	3.4%	3.5%		
Normal Cost	$72.1	$64.5	$60.3	$60.3		
Change from previous scenario:		($7.7)	($4.2)	$0.0		
Change from valuation assumptions:		($7.7)	($11.8)	($11.8)		
Actuarially Determined Contribution for Fiscal 2022*	$196.2	$173.7	$162.2	$161.6	$150.9	$144.0
Change from previous scenario:		($22.5)	($11.5)	($0.6)	($10.7)	($17.6)
Change from valuation assumptions:		($22.5)	($34.0)	($34.6)	($45.3)	($52.3)

*The Actuarially Determined Contribution amounts for Fiscal 2022 shown above are based on the statutory requirements by the Board.
**The Present Value of Additional Employee Contributions from Fiscal 2022 through Fiscal 2039 is $106.6 million for scenario 27 and $186.1 million for scenario 28.

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Plan changes involving adjustments to the AFC
Plan changes involving adjustments to the Eligibility Requirements
Plan changes involving adjustments to the employee contribution rates

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