



Virginia
Retirement
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Patricia S. Bishop
Director

September 9, 2016

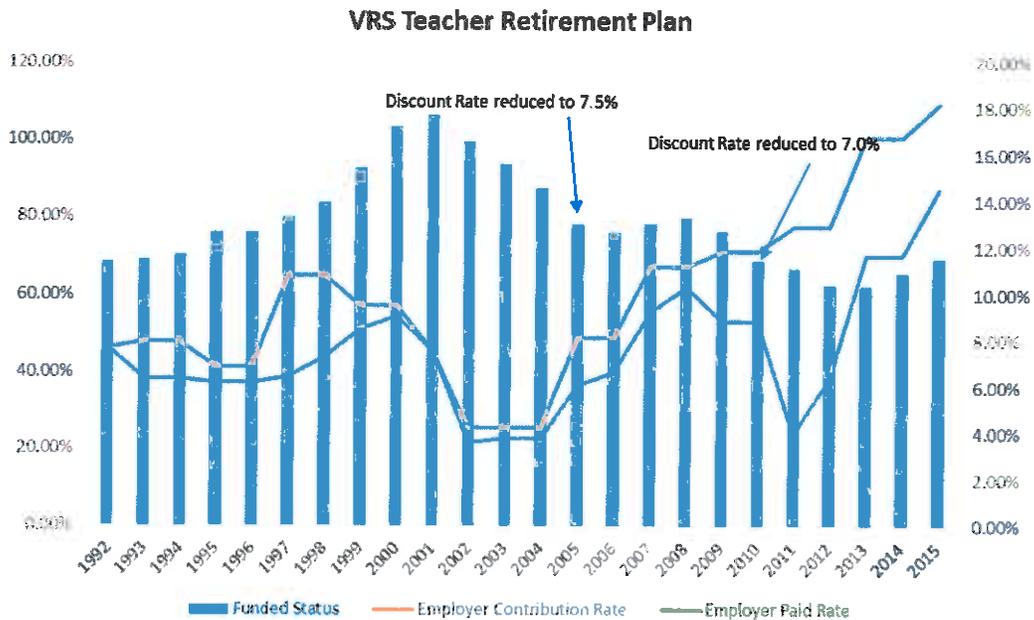
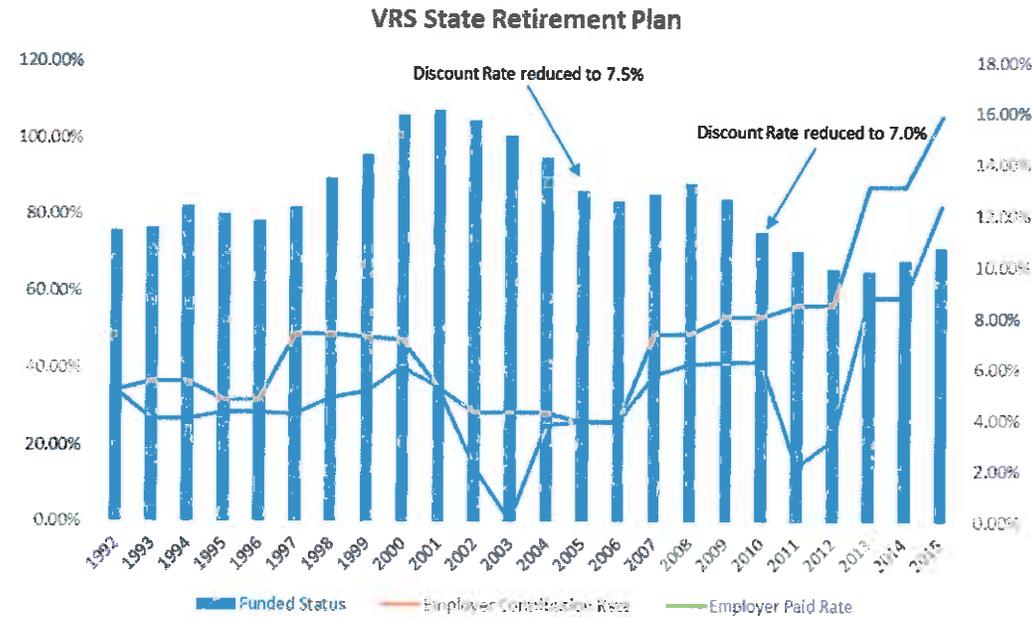
The Honorable William J. Howell
The Speaker of the House of Delegates of Virginia
P.O. Box 406
Richmond, Virginia 23218

Dear Mr. Speaker:

In response to questions posed at the August meeting of the Commission on Employee Retirement Security and Pension Reform, the Virginia Retirement System (VRS) compiled a variety of data and information to assist you and the other Commission members. VRS has been in ongoing communication and dialogue with the Pew Charitable Trusts team (Pew) throughout this process and we greatly appreciate the open and constructive information exchange we have had with them. In that regard, we have shared this information with them as well.

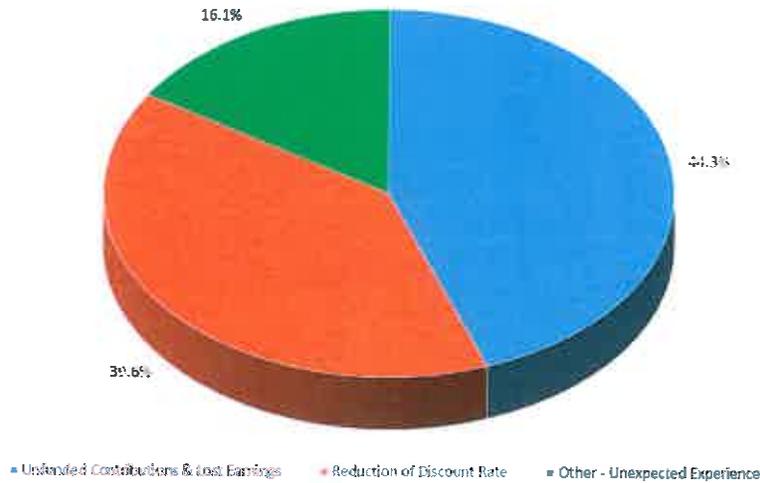
VRS Sources of Unfunded Liability

While the information provided by Pew on slide 8 of the presentation closely reflects the experience over the last 10 years, we thought it was important for Commission members to understand that the source of unfunded liabilities is dependent on the period over which the analysis is conducted. As you know, underfunding of the pension rates has been taking place for a period dating back to 1993. To illustrate, the following charts show the required and paid contributions for the State and Teacher plans since 1992. During the period depicted in the following two charts, the State plan was funded at the required rate only three times and the Teacher plan only once.



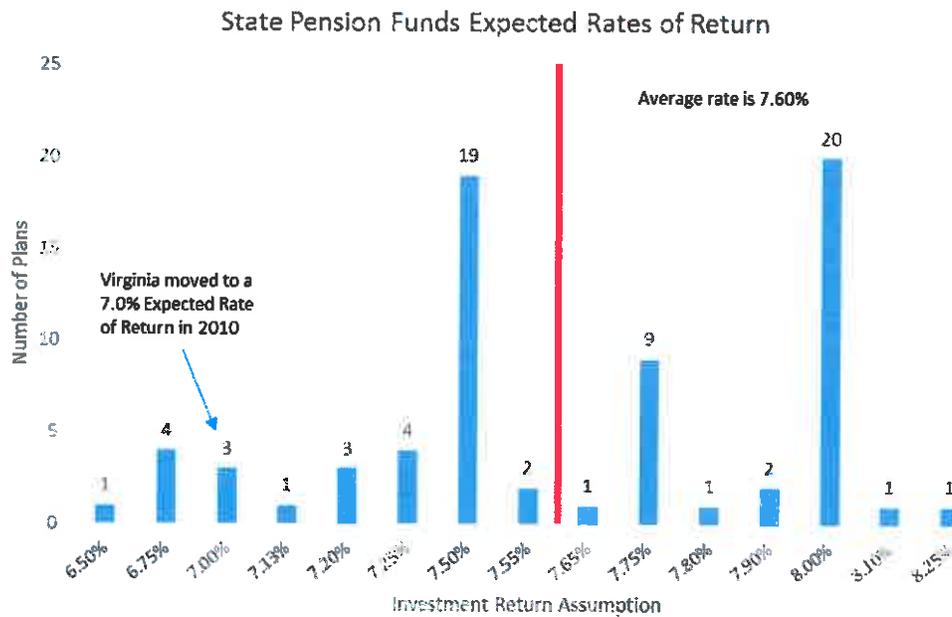
When taking into account the additional unpaid contributions and also capturing the excess investment returns achieved during the 1990s, about 44% of the unfunded liabilities are due to underfunding and lost earnings on those contributions. An additional 40% is due to the reduction in the plan discount rate from 8% to 7.5% in 2005, and then to 7% in 2010. The remaining 16% is due to unexpected plan experience, including investment losses over the last 25 years.

Estimated Sources of Unfunded Liability Over Last 25 Years
 State Plan as of June 30, 2015



State Pension Fund Expected Rates of Return

A question was raised as to which retirement systems have an investment return assumption below 7%. The following chart shows the investment return assumptions for state plans as of February 2016 compiled by the National Association of State Retirement Administrators (NASRA), as well as a listing of plans at each rate.



Investment Return Assumption								
6.50%	6.75%	7.00%	7.13%	7.20%	7.25%	7.50%	7.55%	
District of Columbia	Indiana Kentucky County Kentucky ERS Texas Municipal	Idaho New York Virginia	Maine	Delaware Missouri Local Wisconsin	Illinois SERS Illinois Universities North Carolina South Dakota	Arkansas PERS Arizona Public Safety California Colorado Georgia Iowa Illinois Municipal Illinois Teachers Kentucky Teachers Massachusetts New York Teachers Oklahoma PERS Oregon PERS Pennsylvania Rhode Island South Carolina Tennessee Utah West Virginia	Hawaii Maryland	

7.65%	7.75%	7.80%	7.90%	8.00%	8.10%	8.25%
Florida	Louisiana Michigan Municipal Mississippi Montana North Dakota Teachers New Hampshire New Mexico Ohio Teachers Wyoming	Washington	New Jersey Vermont Teachers	Alaska Alabama Arkansas Teachers Arizona SRS Connecticut Kansas Michigan Schools Michigan SERS Minnesota Missouri PEERS Missouri State Missouri Teachers North Dakota PERS Nebraska Nevada Ohio PERS Oklahoma Teachers Texas County & District Texas ERS Texas Teachers	Vermont State	Ohio Police & Fire

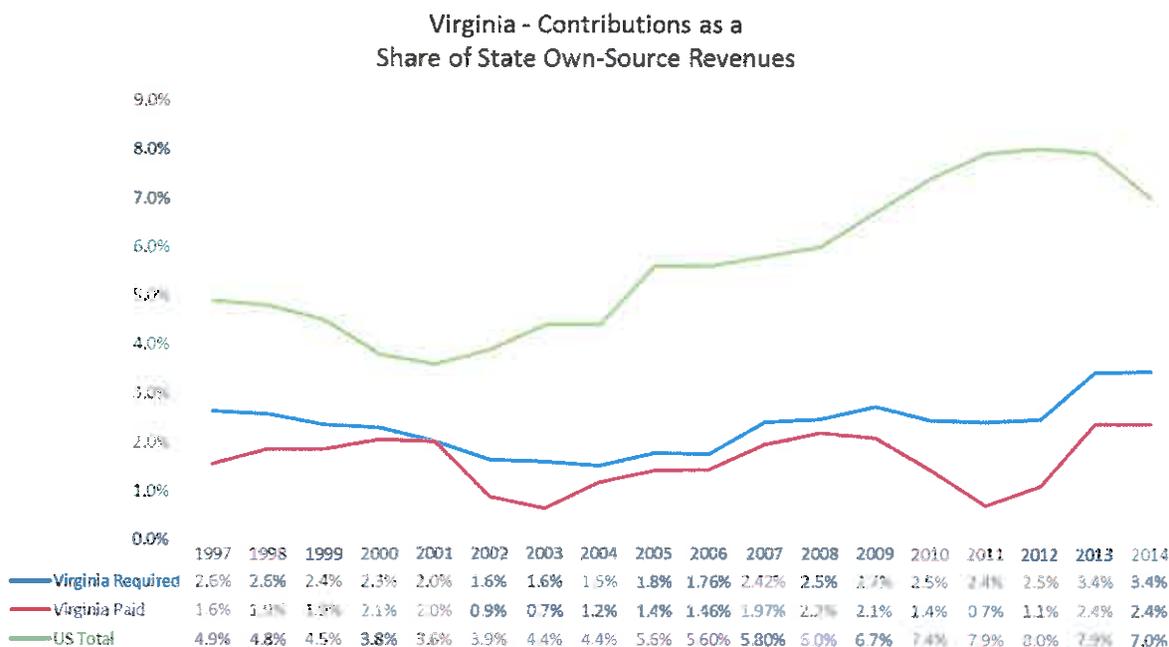
Attrition Curve

The sample attrition curve presented on slide 20 of Pew’s presentation is the actuarially assumed termination rates for an employee who enters the system at age 30. To develop these assumptions, VRS reviews assumptions versus plan experience during annual actuarial valuations as well as conducts an experience study every four years. Further, VRS undergoes a quadrennial actuarial audit conducted by a third-party actuarial firm hired by JLARC, which reviews plan assumptions among a number of other items.

The employee turnover assumptions used by VRS are based on the age and service of the employees. Therefore, it is important for Commission members to understand that one curve is not representative of the whole population, only those entering at age 30. Members who are older when they enter or who have more years of service would generally have lower assumed rates of termination, while employees younger than age 30 would generally have higher assumed turnover and would create a different attrition curve than the sample provided. Most employers, including those in VRS, experience the greatest amount of turnover in the first five years of employment. However, in the case of VRS-participating employers, sometimes this turnover does not mean the employee leaves a VRS-covered

position since the employee may be moving from one VRS employer to another VRS employer. In general, the actuarial tables in isolation do not necessarily capture employment or re-hiring by another participating employer. However, we performed additional analyses on VRS data. As an example, in looking at the current Teacher plan active population, we found that approximately 40,250 of the 147,000 active teachers have prior service with another VRS employer, meaning that nearly 30% of the active population terminated but then were rehired by another VRS-covered employer.

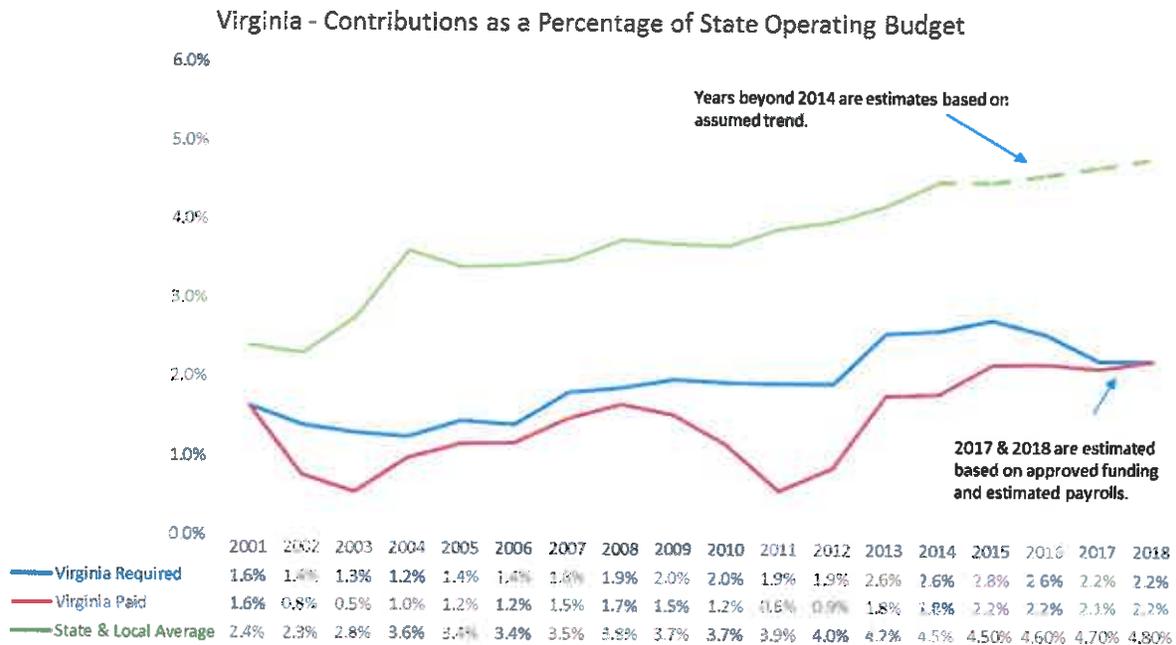
Virginia Actuarial Required Contribution as a Percentage of State Revenue



The chart on slide 41 of Pew’s presentation provides Virginia’s actuarial required contributions as a share of State own-source revenue, and this methodology facilitates comparisons among multiple states. Based on discussions with the Pew team, we understand that the chart includes contributions for political subdivisions and teachers. However, political subdivisions derive their funding for contributions from local revenue, and the teacher contribution payments are derived from a combination of local and state revenue.

In order to address the specific nature of the Virginia plans, we believe that it would be useful to provide an analysis of contributions as a percent of state revenues. To do so, it is necessary to remove the plans or portion of plans that receive funding from local revenues. We have updated the chart from the presentation using revenue information from the State Comprehensive Annual Financial Report (CAFR). We have also adjusted the required contributions by excluding political subdivisions, and only included 40% of the Teacher contribution, which is the approximate amount funded through State funds. Further, we have added a line depicting what was actually paid over this period versus what was required.

In addition, another measure we have historically reviewed is the VRS plan contributions as a percentage of the State operating budget. The National Association of State Retirement Administrators (NASRA) produces a report that monitors state and local spending as a percent of budgets. NASRA explains that pension spending levels vary widely among states and that most of the variation is attributable to either differences in benefit levels or variations in the size of the unfunded liabilities. NASRA also states that pension costs for cities are generally higher than those for states due in part to the more labor intensive services delivered at the local level. The NASRA March 2016 Issue Brief stated that, on a nationwide basis, contributions made by state and local governments to pension trusts accounted for approximately 4.1% of direct spending as reported in 2013. The chart below compares Virginia's required and actual contributions as a percentage of the State operating budget. We have also included the average state and local contribution percentages presented in NASRA March 2016 issue brief as a benchmark for comparison.



VRS-Recommended Changes to Hybrid

Pew provided information on HB 1072 from the 2016 General Assembly session in the appendix of the electronic version of the presentation located on the website, which was not covered in their oral presentation. VRS and the Pew team have worked together to update the information on slides 49, 52, 53, and 57 pertaining to HB 1072 and the revised slides have been provided to Pew.

Additional Comments or Requests

Value of Liabilities at Lower Assumed Rates of Return

A Commission member requested the liability levels assuming a lower expected long-term rate of return. We had previously put together the following exhibit demonstrating the impact on employer contribution rates to answer similar questions posed at the July JLARC meeting.

Discount Rate	Current 7.00%	Scenario 1 6.75%	Scenario 2 6.50%
Total Normal Cost Rate	9.10%	9.58%	10.10%
Member Contribution Rate	4.92%	4.92%	4.92%
Employer Normal Cost Rate	4.18%	4.66%	5.18%
Administrative Expense Load	0.27%	0.27%	0.27%
Total Employer Normal Cost Rate	4.45%	4.93%	5.45%
Amortization Rates for Unfunded Liabilities			
Legacy Unfunded	10.91%	10.61%	10.33%
2014 Gain	-0.79%	-0.77%	-0.76%
2015 Gain	-1.18%	-1.15%	-1.13%
Change in Discount Rate	N/A	1.12%	2.25%
Total Amortization Rate	8.94%	9.81%	10.69%
Total Employer Rate	13.39%	14.74%	16.14%
Increase in Rate		1.35%	2.75%
Estimated Increase in Annual Funding		\$53.7 Million	\$109.4 Million
General Fund		\$22.9 Million	\$46.7 Million
Non-General Fund		\$30.8 Million	\$62.7 Million
Unfunded Liability	\$6.41 Billion	\$7.03 Billion	\$7.68 Billion
Funded Status	71.2%	69.3%	67.4%

In response to the Commission member's additional request for information regarding a variety of discount rates down through 5%, the following chart shows the estimated change in plan liabilities at various discount rates. For each 50 basis point decrease in the plan discount rate, the liabilities increase by approximately \$6 billion.

VRS Estimated Plan Liabilities at Various Discount Rates

(\$Billions)

Discount Rate	Accrued Liability						Total VRS	Total Unfunded
	State	Teachers	SPORS	ValORS	JRS	Political Subs		
7.0%	\$22.3	\$42.6	\$1.1	\$1.9	\$0.6	\$19.9	\$88.3	\$21.9
6.5%	\$23.6	\$45.4	\$1.1	\$2.0	\$0.6	\$21.1	\$93.8	\$27.4
6.0%	\$24.9	\$48.3	\$1.2	\$2.2	\$0.7	\$22.5	\$99.8	\$33.3
5.5%	\$26.4	\$51.5	\$1.2	\$2.3	\$0.7	\$23.9	\$106.0	\$39.6
5.0%	\$28.1	\$54.9	\$1.3	\$2.5	\$0.7	\$25.4	\$113.0	\$46.6

Incorporating GASB 68

A Commission member asked whether VRS was impacted by the requirements of GASB 68 to modify the assumed rate of return for reporting purposes. One of the major changes associated with the implementation of GASB 68 was that it removed any direct link between measurements for funding purposes and measurements for financial reporting. VRS, however, did consider the requirements of GASB 68 when creating its funding policy so that liabilities generated for funding valuation purposes would comply with GASB 68 requirements.

In accordance with GASB 68, as long as the projected plan net position related to current employees and inactive employees exceeds the projected benefit payments for those employees, the long-term expected rate of return on investments will serve as the basis for discounting. If a plan reaches a crossover point—when projected benefit payments for current employees and inactive employees exceed the projected plan net position related to those employees—then benefit payments projected to be made from that point forward will be discounted using a high-quality municipal bond interest rate.

The General Assembly has put in place a statutory plan to pay 100% of the required contributions. Therefore, no modified discount rate of return is currently used for GASB reporting for the statewide systems.

Bond Rating – AAA Rated States

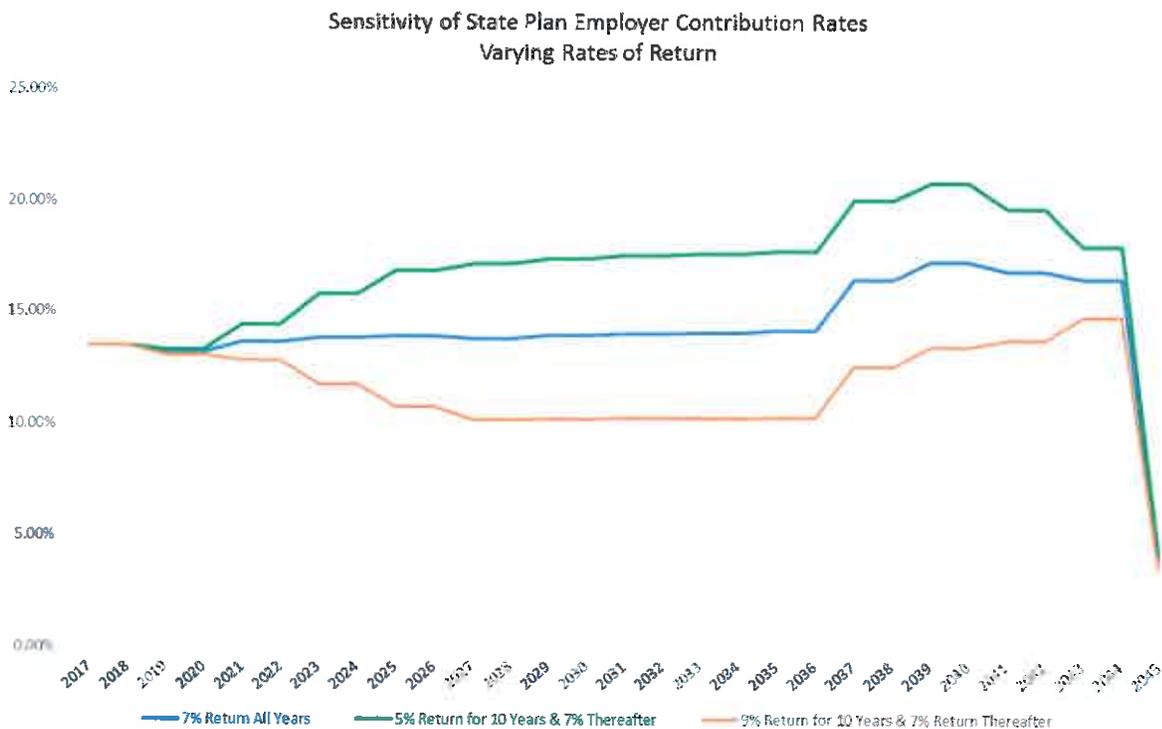
In response to a member’s concern as to whether the General Assembly would continue to fund 100% of the required contributions in the future, we wanted to highlight the increased focus that bond-rating agencies have placed on pension debt and having a plan in place to pay down unfunded benefit obligations. Virginia is one of the few states with a long-standing AAA bond rating. Virginia not only established a statutory plan to achieve full funding of the required contributions, but the Governor and General Assembly actually accelerated efforts to reach 100% funding of the required contributions. Virginia is on pace to be funding 100% of the required contributions for the State, SPORS, ValORS, and Judicial plans by fiscal year 2017 and all plans including the Teacher plan by fiscal year 2018. In addition, the deferred contributions from the 2010-2012 biennium were fully paid off for the State plans and an accelerated payment of \$193 million was made to the Teacher plan toward those deferred contributions. These actions have demonstrated a commitment to continued funding progress.

Stress Testing

Stress testing involves the simulation of different scenarios that could impact a plan's funding policy, investment policy, and benefit levels. VRS has a tool in place that provides us the ability to measure impacts of changes in investment returns and contribution levels. Results and scenarios have typically been shared with the VRS Board's Benefits and Actuarial Committee, but with increasing calls for additional stress testing from organizations such as the Society of Actuaries (SOA) blue ribbon panel, VRS will incorporate more of the analysis at the Board level going forward.

The techniques within stress testing vary, but typically include sensitivity and scenario testing, as well as reverse stress testing.

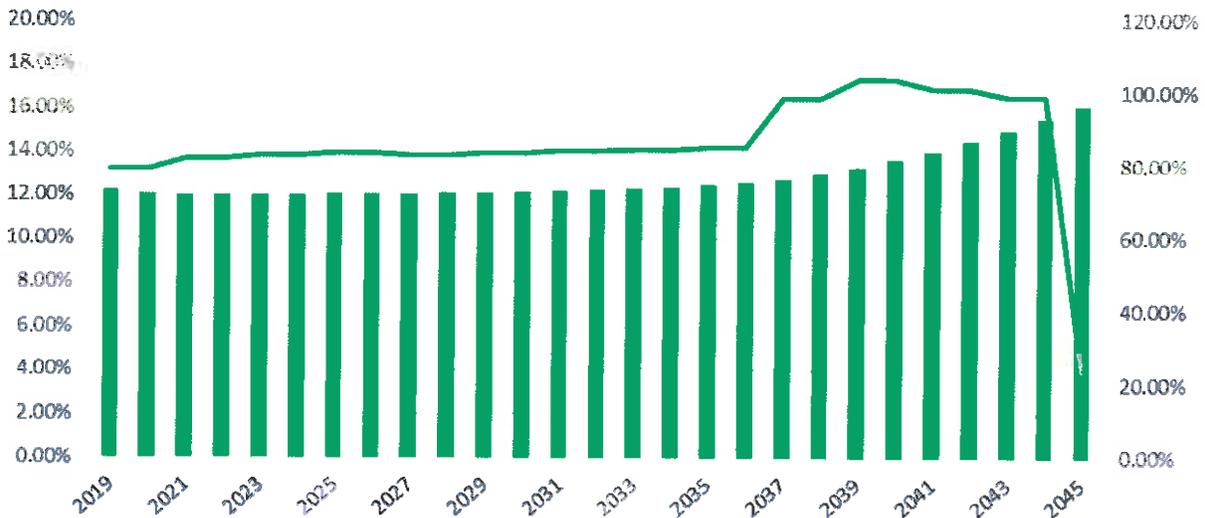
We often use stress testing to review the potential impacts of future investment returns on employer contribution rates and funded status. As an example, the chart below shows the variation in employer costs assuming a five-year return below expectations as well as the impacts of a five-year return above expectations. The sharp decrease in 2045 coincides with the payoff of the legacy unfunded liabilities that were amortized over 30 years beginning in fiscal year 2014.



A Commission member had asked what would happen if the General Assembly only contributed 75% of the required contributions going forward. This would be a typical example of a stress testing scenario.

If the full contribution rate is paid and the assumed rate of return of 7% is achieved, contribution rates will remain relatively level over the next 20 years before dropping significantly after the legacy unfunded is paid off in 2045. During this time, the funded status will rise to near 100% by 2045.

VRS State Retirement Plan
Estimated Employer Contribution Rates and Plan Funded Status
Full Contribution Paid - 7% Assumed Return



If only 75% of the employer required contribution is funded and the assumed rate of return still returns 7%, contribution rates would start out about 3.5% less than under the full contribution scenario, but would steadily climb over the next 20 years back to the current full contribution level. The rate in 2045 would be about 5% higher because, even though the legacy unfunded would be paid off, the plan would have approximately \$5.6 billion in additional unfunded liabilities due to continued underfunding over the last 25 years under this hypothetical scenario. During this time, the funded status would decrease from today's level, and the plan would only be about 75% funded after 25 years as compared to 96% funded under the full contribution scenario.

VRS State Retirement Plan
Estimated Employer Contribution Rates and Plan Funded Status
75% Contribution Paid - 7% Assumed Return



We agree that sensitivity and scenario testing is beneficial to both the VRS Board of Trustees and the General Assembly as another informational tool in reviewing and analyzing the VRS retirement plans.

Additional Comments and Questions

At the first meeting of the Commission, questions arose regarding whether benefits described in the VRS plan only accrue to those who stay to full retirement as described in plan documents and whether less than half of the employees covered actually stay to full retirement or opt for the plan's early retirement option.

Benefits accrue for all active members in VRS, not just for those who stay to full retirement. The defined benefit plans do require members to earn five years of service before becoming vested in their benefit, but a member's contributions, including a guaranteed 4% interest accrual, are always 100% vested for all members. With the advent of the Hybrid Retirement Plan in 2014, members also benefit from employer matching contributions in the defined contribution component of the hybrid plan, which has a tiered four-year vesting schedule. Below is a summary of benefit eligibility in the VRS retirement plans for members who terminate both before and after having five years of service.

Benefit Eligibility upon Termination with less than 5 years of service

Category	Defined Benefit (Plan 1 and Plan 2)	Hybrid Defined Benefit	Hybrid Defined Contribution Account
Refund	Member can take immediate refund of member contributions plus interest . Interest is credited at a 4.0% per year.		Member can take distribution from the defined contribution component of the hybrid plan. Always 100% vested in member contributions. The vesting schedule for employer contributions is as follows: One year - 0 percent vested in the employer contributions. Two years - 50 percent vested in the employer contributions. Three years - 75 percent vested in the employer contributions. Four years - 100 percent vested in the employer contributions.
Rollover	Member can roll member contributions to another retirement account (IRA, DC plan)		Member can roll member contributions and vested employer contributions to another eligible retirement account (IRA, DC plan)
Take no action	Member can leave contributions in plan(defer). If member leaves contributions in plan, 4% interest accrues and member can return to work later, or request refund at future date.		Member can leave contributions in plan(defer). If member leaves contributions in plan, interest accrues based on member's asset allocation and market returns.
If rehired to VRS covered position	If a member takes a refund of contributions, he or she can repurchase the service if they return to active employment at VRS covered employer. Effective January 1, 2017, cost to repurchase service is return of refund with interest at plan funding rate of 7.0%.		Upon rehire member could roll eligible contributions from another qualified plan into the DC portion of the hybrid plan.

Benefit Eligibility upon Termination with 5 or more years of service

Category	Defined Benefit (Plan 1 and Plan 2)	Hybrid Defined Benefit	Hybrid Defined Contribution Account
Refund	Same as non vested member		Same as nonvested member
Rollover	Same as non vested member		Same as nonvested member
Take no Action	Same as non vested member with the addition of having a vested deferred benefit payable at normal retirement age.		Same as nonvested member
If rehired to VRS covered position	Same as non vested member		Same as nonvested member

In addition to a retirement benefit, vested members could also be eligible for ancillary benefits, such as group life and the health insurance credit.

As an example of how members accrue benefits and what they are eligible to receive upon termination, below is an example of an employee hired into the VRS hybrid plan who terminates after three years of

employment. The example shows that the member, after contributing \$5,250 over the three-year period, could terminate and receive a refund of \$9,965.22.

**Employee Hired 7/1/2016 and eligible for Hybrid plan
 Elects to do 2% voluntary contributions into Hybrid defined contribution plan**

	Salary	Member Contribution to Defined Benefit Component of Hybrid	Member Mandatory Contribution to DC Component of Hybrid	Member Voluntary Contribution to DC Component of Hybrid	Employer Match of Mandatory Contribution to DC Component of Hybrid	Employer Match of Voluntary Contribution to DC Component of Hybrid
Year 1	\$35,000.00	\$1,400.00	\$350.00	\$700.00	\$350.00	\$525.00
Year 2	\$35,000.00	\$1,400.00	\$350.00	\$700.00	\$350.00	\$525.00
Year 3	\$35,000.00	\$1,400.00	\$350.00	\$700.00	\$350.00	\$525.00
Total after 3 years	105,000.00	\$4,200.00	\$1,050.00	\$2,100.00	\$1,050.00	\$1,575.00

Terminates at the end of Year 3 - What are they eligible to receive from the retirement plan?

Member can take a refund of contributions with interest

Member DB Contributions with 4% interest	Member Mandatory DC Contribution with interest at assumed 6%	Member Voluntary DC Contribution with interest at assumed 6%	75% of Employer Matching Contributions and interest at assumed 6%	Total Eligible Refund
\$4,370.24	\$1,147.69	\$2,295.38	\$2,151.91	\$9,965.22

This member could also leave contributions in the plan and continue to earn 4% on defined benefit contributions and actual investment returns on defined contribution funds. This would allow the member to pick right back up if rehired by a VRS-eligible employer, or the member could take a payout or rollover at a later date.

We are also providing various other examples we have used in prior presentations to show what a member could receive in a lump-sum payout versus leaving the funds in the plan and deferring receipt until retirement age.

VRS Estimated Retirement Income

Member Terminating with 5 years of service – Age 35 at hire



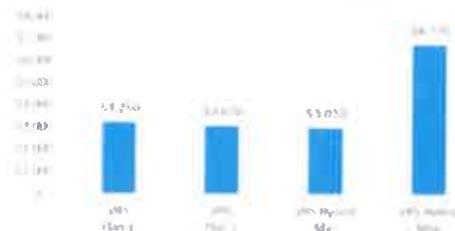
Lump Sum Value of Cashout Benefit at Termination
 Exit Age 40 - 5 Years of Service



Starting salary assumed to be \$35,000 with annual salary increases of 3.0%.

Defined contribution investment return assumed to be 6.0% per year with an annuity conversion rate of 5.0% using RP 2000 mortality table with a 50/50 blend of male and female mortality.

Estimated Annual Benefit Commencing at Age 65
 Exit Age 40 - 5 Years of Service

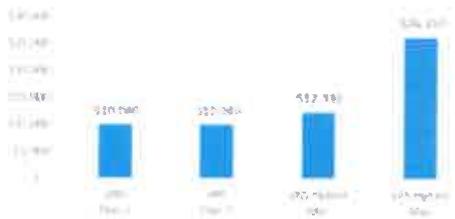


VRS Estimated Retirement Income

Member Terminating with 5 years of service – Age 25 at hire



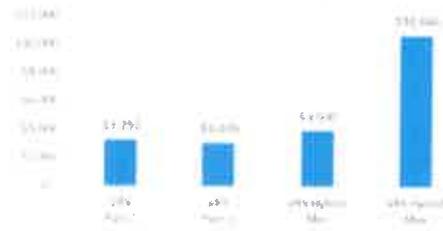
Lump Sum Value of Cashout Benefit at Termination
 Exit Age 30 - 5 Years of Service



Starting salary assumed to be \$35,000 with annual salary increases of 3.0%.

Defined contribution investment return assumed to be 6.0% per year with an annuity conversion rate of 5.0% using RP 2000 mortality table with a 50/50 blend of male and female mortality.

Estimated Annual Benefit Commencing at Age 65
 Exit Age 30 - 5 Years of Service



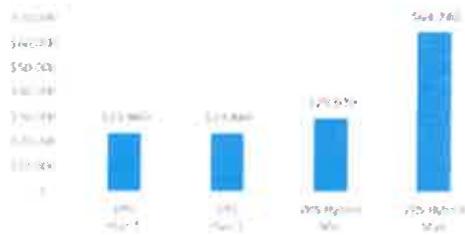
Assuming the same starting salary as the member hired at age 35 from the previous slide, younger members in the Hybrid plan would receive the same cash out value, but have the potential for a greater annuity if they defer commencement to retirement age because their defined contribution balance has more time to earn additional interest.

VRS Estimated Retirement Income

Member Terminating with 10 years of service – Age 35 at hire



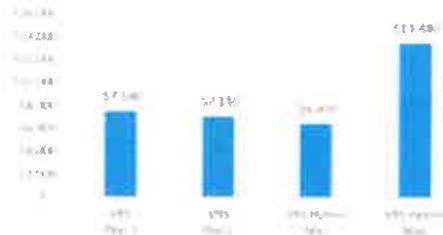
Lump Sum Value of Cashout Benefit at Termination
 Exit Age 45 - 10 Years of Service



Starting salary assumed to be \$35,000 with annual salary increases of 3.0%.

Defined contribution investment return assumed to be 6.0% per year with an annuity conversion rate of 5.0% using RP 2000 mortality table with a 50/50 blend of male and female mortality.

Estimated Annual Benefit Commencing at Age 65
 Exit Age 45 - 10 Years of Service

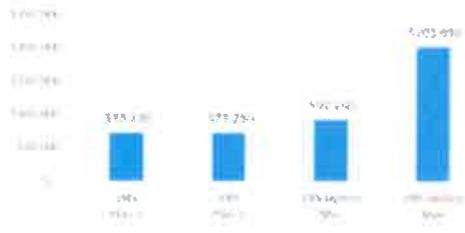


VRS Estimated Retirement Income

Member Terminating with 20 years of service – Age 35 at hire



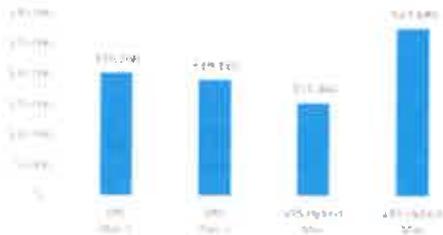
Lump Sum Value of Cashout Benefit at Termination
 Exit Age 55 - 20 Years of Service

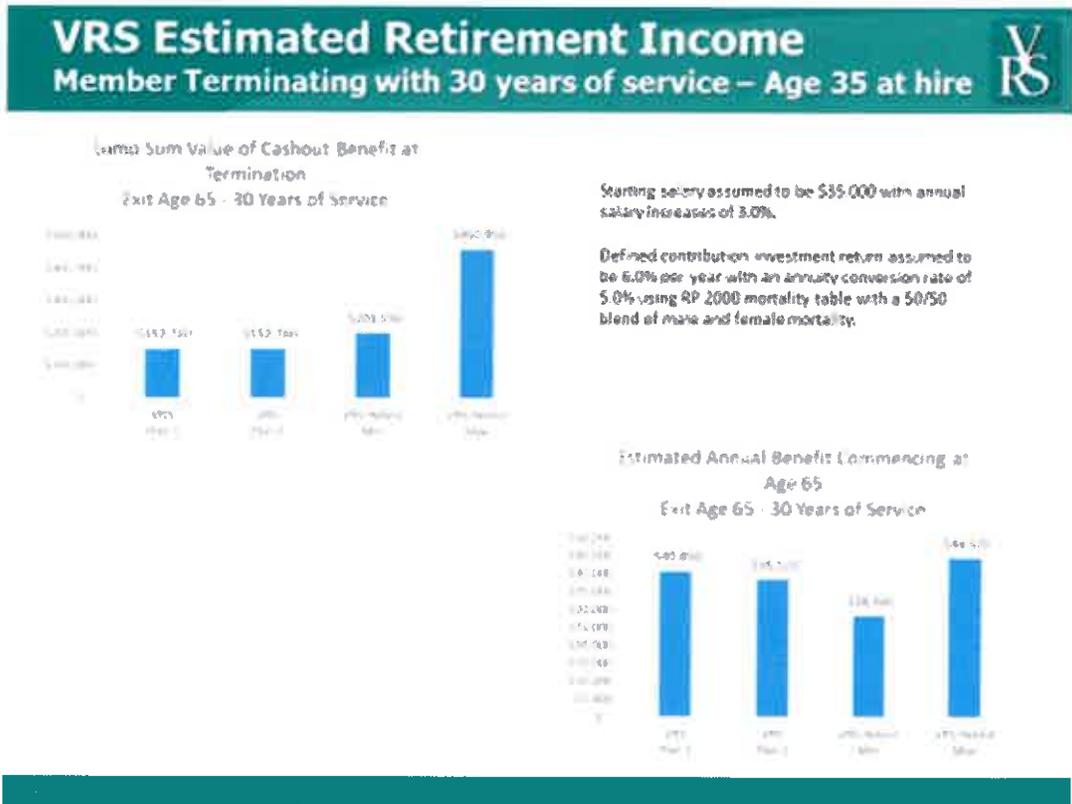


Starting salary assumed to be \$35,000 with annual salary increases of 3.0%.

Defined contribution investment return assumed to be 6.0% per year with an annuity conversion rate of 5.0% using RP 2000 mortality table with a 50/50 blend of male and female mortality.

Estimated Annual Benefit Commencing at Age 65
 Exit Age 55 - 20 Years of Service





A comment was made during a Commission meeting that two employees with identical earnings and employment history can receive different benefits. This comment may have been referring to a situation where one member dies immediately following retirement and the benefit ceases, while another member lives for 35 years and continues to receive a benefit. Although both members are eligible for the same benefit, they receive different payouts simply because one lives longer than the other. Members may choose a survivor option if they want their survivor to receive a benefit upon their death.

Since 2010, Virginia's Governors and the General Assembly have undertaken a series of pension reforms that have bolstered the retirement plan and will, over the long term, strengthen the plan. These initiatives demonstrate a strong commitment to the future of the retirement system and VRS looks forward to continuing to work with the Governor, the Commission and the General Assembly to provide the best retirement outcomes possible for Virginia's more than 677,000 dedicated public employees.

The Honorable William J. Howell
September 9, 2016
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Again, I hope that you and the other members of the Commission find this information helpful. Please let me know if we can provide additional data or if you have any questions related to this information.

Sincerely,



Patricia S. Bishop
Director

cc: The Honorable S. Chris Jones
The Honorable R. Lee Ware
The Honorable T. Scott Garrett
The Honorable James P. Massie III
The Honorable Betsy B. Carr
The Honorable Thomas K. Norment Jr.
The Honorable Emmett W. Hanger Jr.
The Honorable Frank M. Ruff Jr.
The Honorable Frank W. Wagner
The Honorable George L. Barker
Edwin Burton, Ph.D.
Eileen Norcross
Ron Jordan
John Vithoukas
Kathy Burcher
The Honorable John Watkins
The Honorable Ken Stolle
Lt. Col. Robert G. Kemmler
Sara Redding Wilson