



# VRS Update

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November 14, 2016

- Status of Pew Recommendations
- VRS Membership Statistics
- Hybrid Retirement Plan Potential Modifications
- Optional Defined Contribution Plan
- Stress Testing and Sensitivity Analysis
- Comments & Considerations



# Status of Pew Recommendations

# VRS Progress Related to Pew Recommendations



- VRS focuses on disclosure and does so in a variety of ways:
  - Comprehensive Financial Annual Report (CAFR)
  - Joint Legislative Audit and Review Commission (JLARC)
  - House Appropriations Committee
  - Senate Finance Committee
  - Auditor of Public Accounts (APA)
  - VRS website (dedicated Investments and Financial Reporting sections)
  - Presentations to various stakeholders, associations, and member or employer groups
- VRS posts its funding policy as well as 20- and 25-year performance data and other investment-related information on-line
- VRS plans to move forward with additional reporting related to carried interest and similar fee structures on a prospective basis
- VRS conducts scenario, simulation and stress testing, as well as sensitivity analyses, and sees opportunities to build upon our ongoing work in this area



## Membership Statistics

# VRS Total Membership

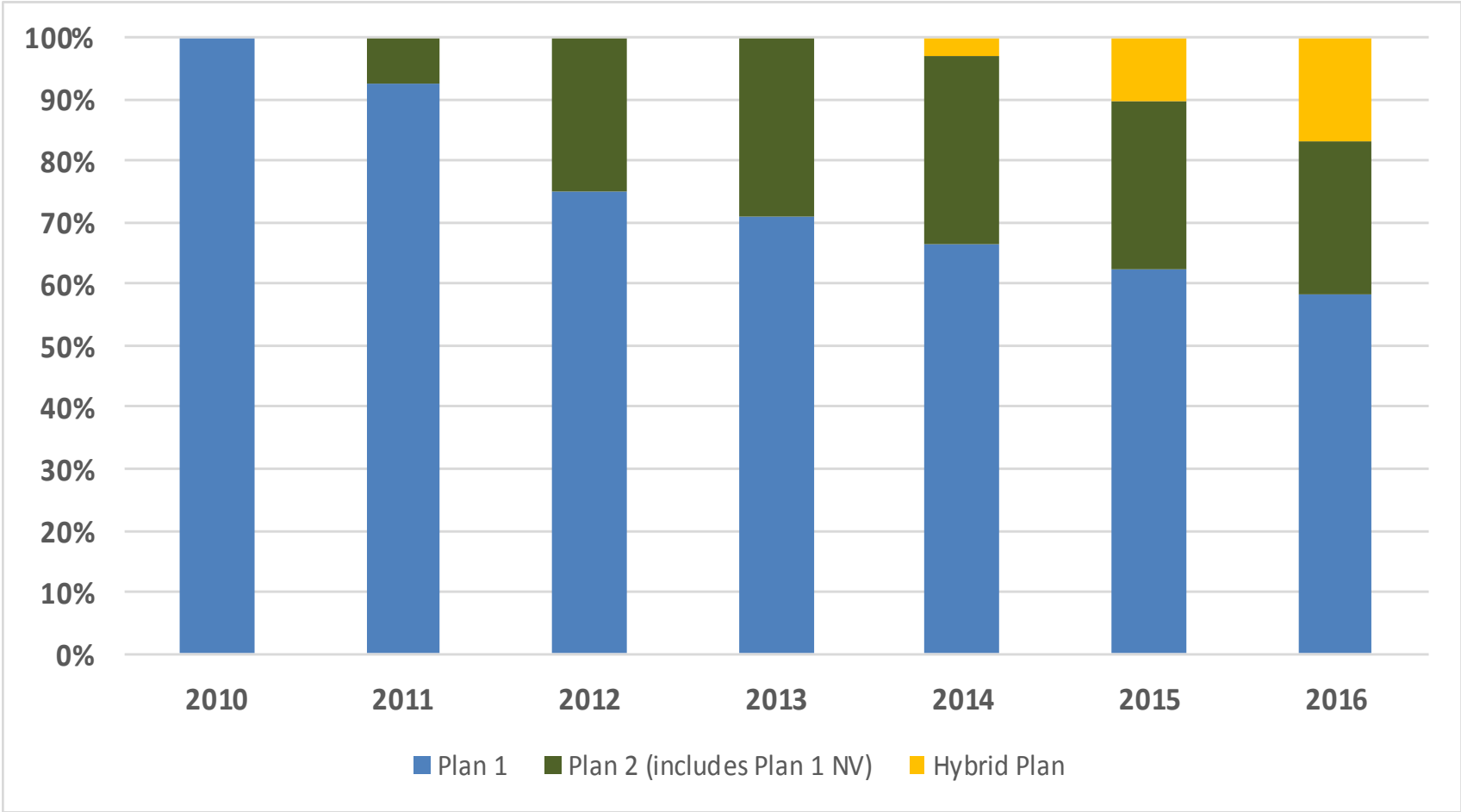


	Plan 1	Plan 2	Hybrid	Total
Teachers	88,904	37,057	20,893	146,854
Political Subdivisions	57,197	32,402	16,055	105,654
State Employees	46,201	19,032	12,418	77,651
State Police Officers' Retirement System (SPORS)	1,400	547	–	1,947
Virginia Law Officers' Retirement System (VaLORS)	4,502	4,645	–	9,147
Judicial Retirement System (JRS)	267	69	82	418
<b>Total Active Members</b>	<b>198,471</b>	<b>93,752</b>	<b>49,448</b>	<b>341,671</b>

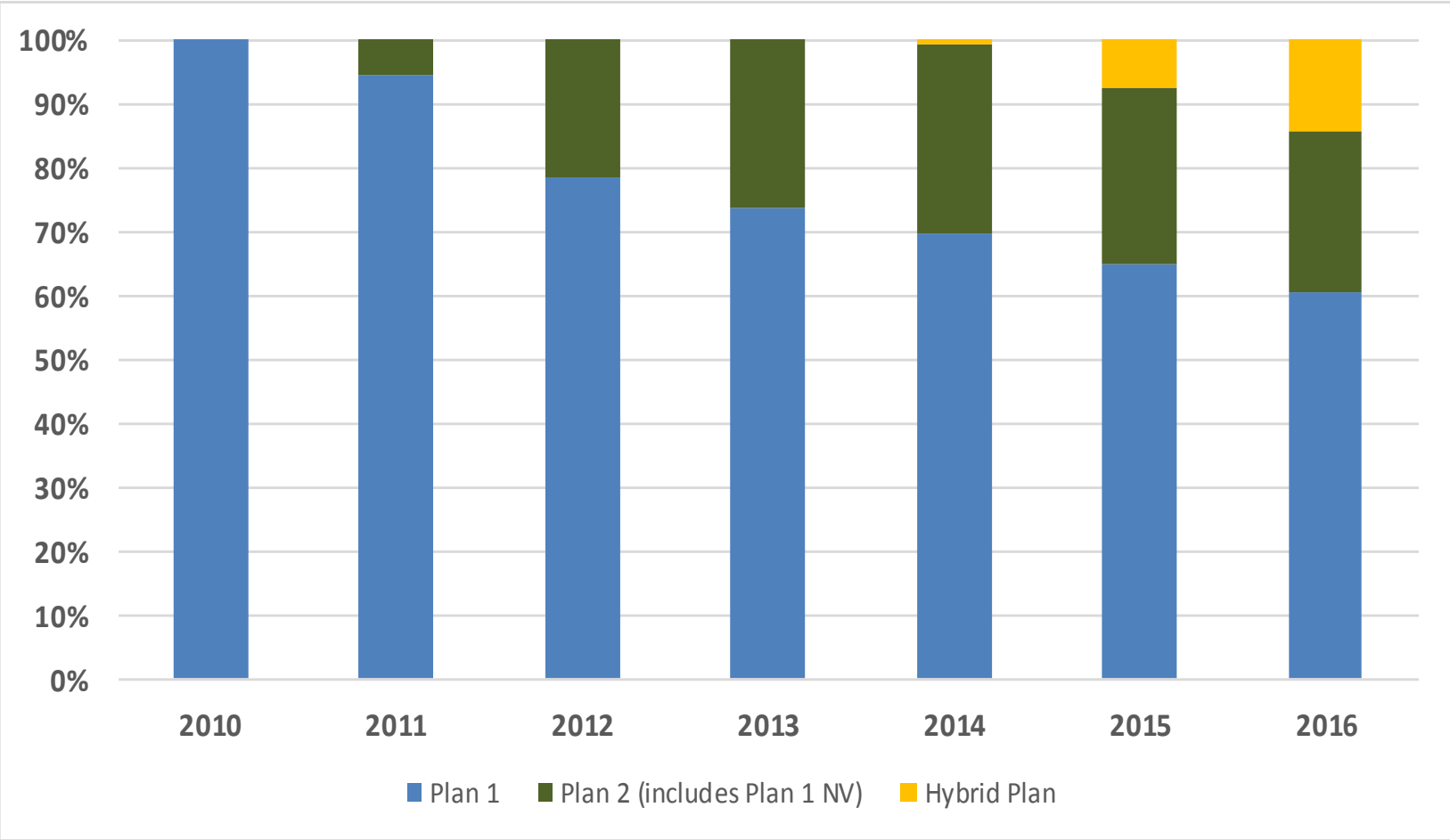
Total Active Members	Retirees/ Beneficiaries	Inactive/ Deferred Members	VRS Total Population
<b>341,671</b>	<b>192,065</b>	<b>144,181</b>	<b>677,917</b>

As of June 30, 2016

# State Active Member Breakdown



# Teacher Active Member Breakdown





# Benefit Comparison



	<b>State</b> As of June 30, 2016	<b>Teachers</b> As of June 30, 2016	<b>Local</b> As of June 30, 2016
<b>Actives:</b>			
Average Age	48.2	45.1	46.2
Average Service	12.5	11.9	11.0
Average Entry Age	35.7	33.2	36.2
Average Salary	\$53,389	\$51,449	\$43,819
<b>Retirees:</b>			
Avg. Age @ Retirement	63.8	62.5	63.2
Avg. Service @ Retirement	23.0	22.5	20.9
Avg. Benefit @ Retirement	39.1%	38.3%	34.7%
Avg. Annual Benefit	\$21,981	\$22,821	\$16,855
Avg. Social Security Benefit at Age 62	\$20,400	\$19,344	\$16,524

# Average Age at Retirement



## Average Retirement Age for Members Retiring by Fiscal Year

Plan	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
State	62.1	60.8	60.7	60.6	62.2	62.9	63	63.1	63.7	63.8
Teachers	60.4	59.4	59.3	59.3	61.1	61.5	61.8	62.2	62.3	62.5

## Average Service at Retirement for Members Retiring by Fiscal Year

Plan	2007*	2008	2009	2010	2011	2012	2013	2014	2015	2016
State		24.2	24.4	24.6	23.3	20.8	22.6	21.7	22.7	23.0
Teachers		24.6	24.6	24.6	24.4	23.0	23.3	22.4	22.5	22.5

## Average Entry Age for Members by Fiscal Year

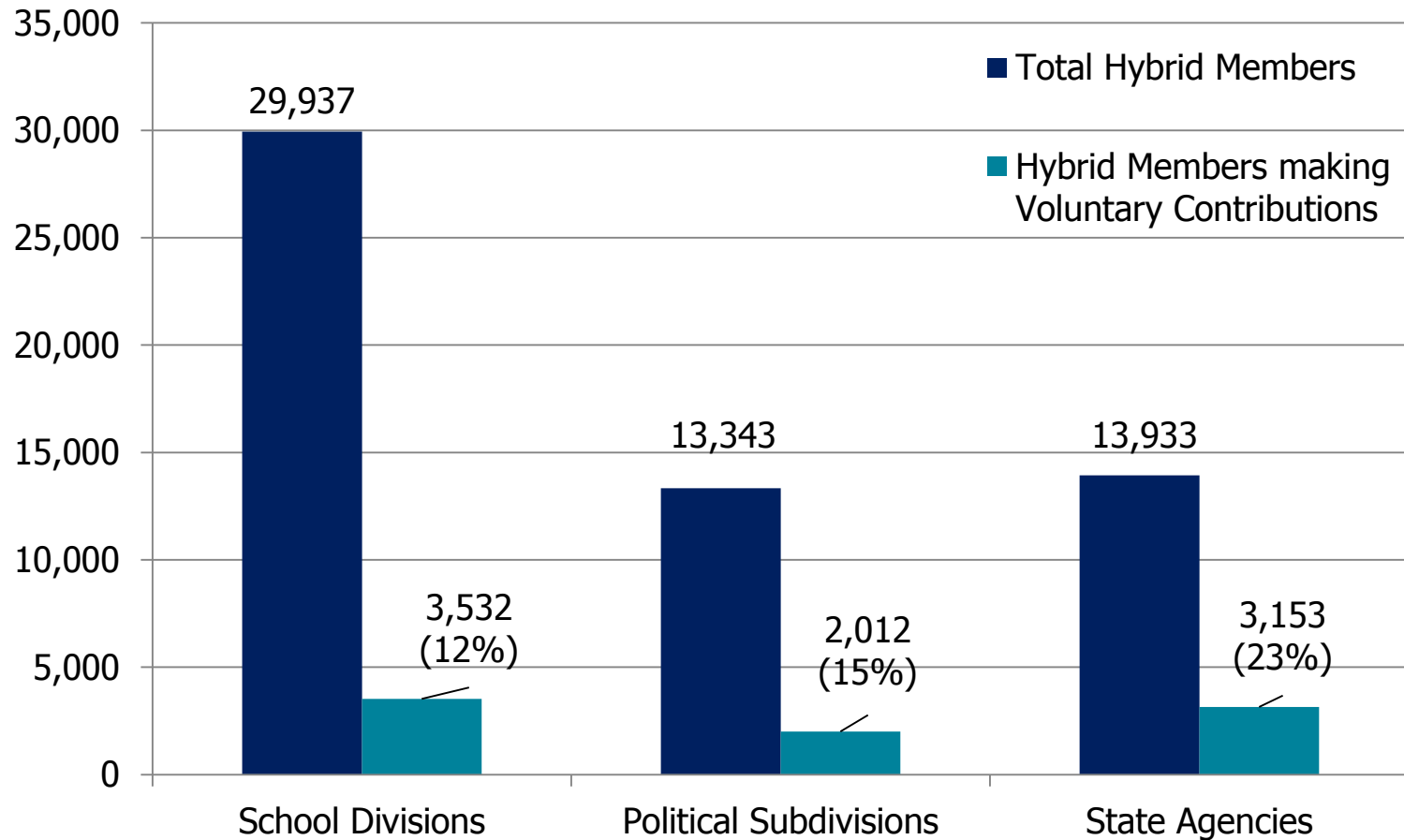
Plan	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
State	34.9	34.7	34.8	35.0	35.1	35.3	35.5	35.5	35.6	35.7
Teachers	33.2	32.7	33.4	33.4	33.4	33.3	33.3	33.2	33.2	33.2

\* Average Service for members retiring in 2007 was not available.

# Hybrid Retirement Plan



## Hybrid Members by Employer Type

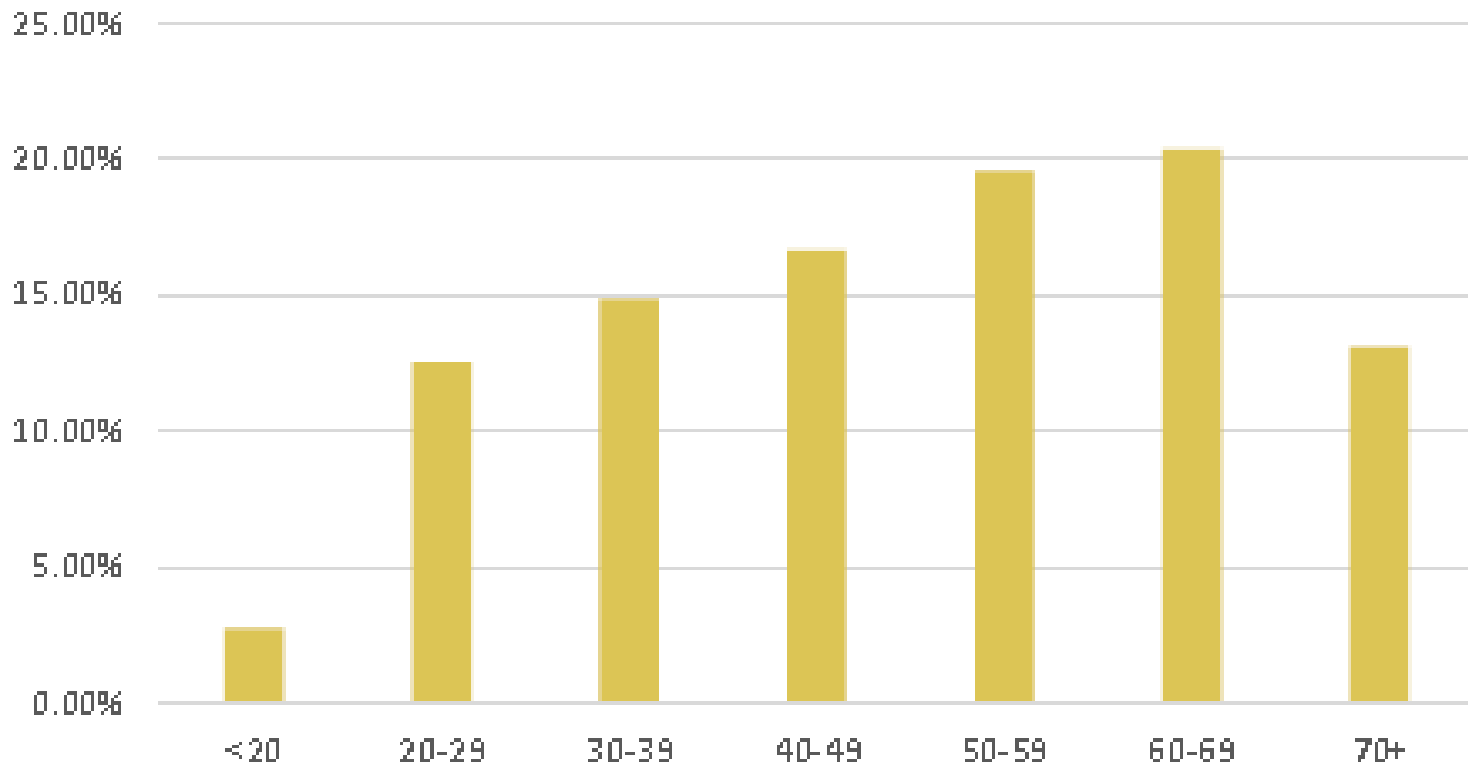


As of October 1, 2016

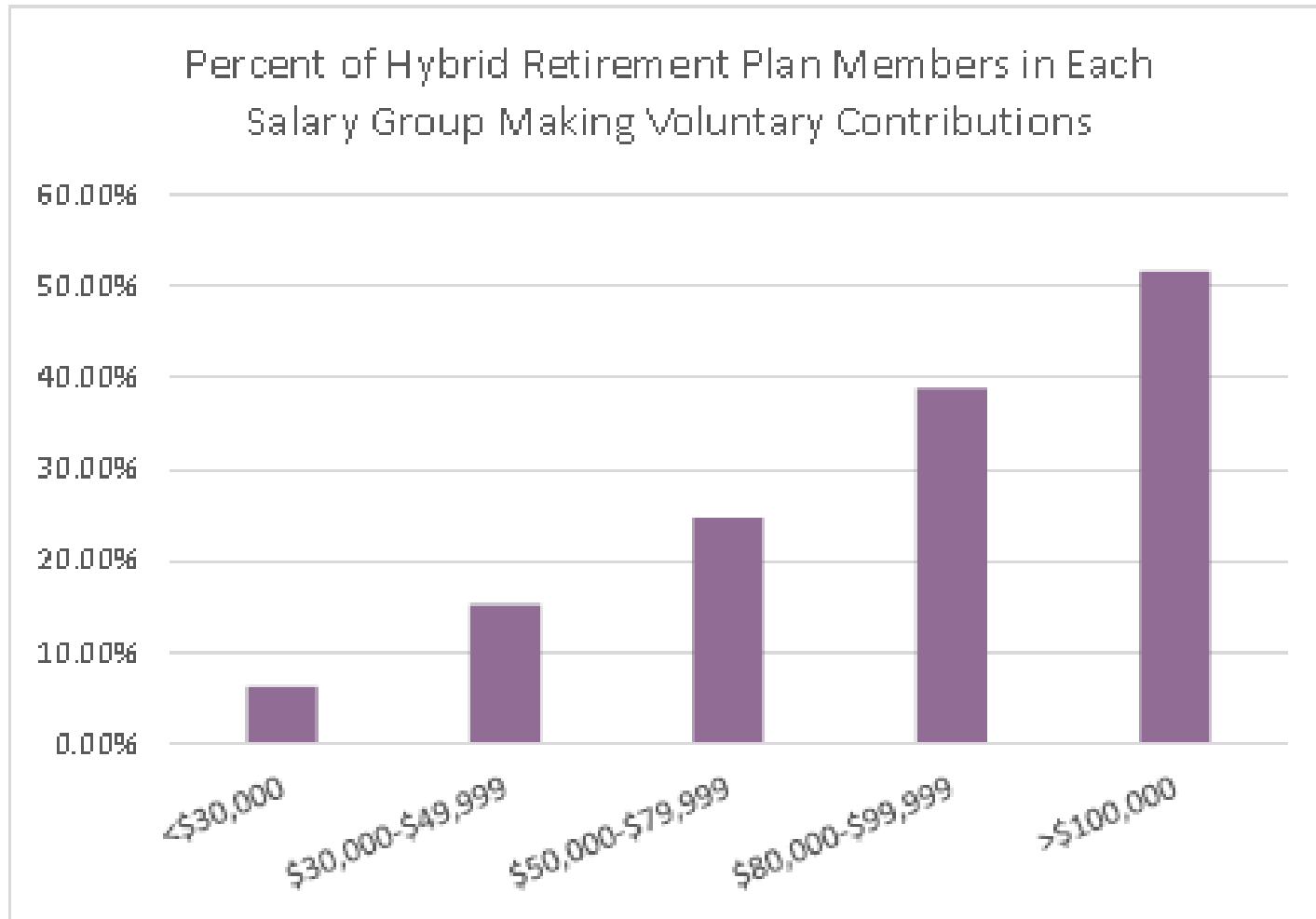
# Hybrid Retirement Plan



Percent of Hybrid Retirement Plan Members in Each Age Group Making Voluntary Contributions



# Hybrid Retirement Plan



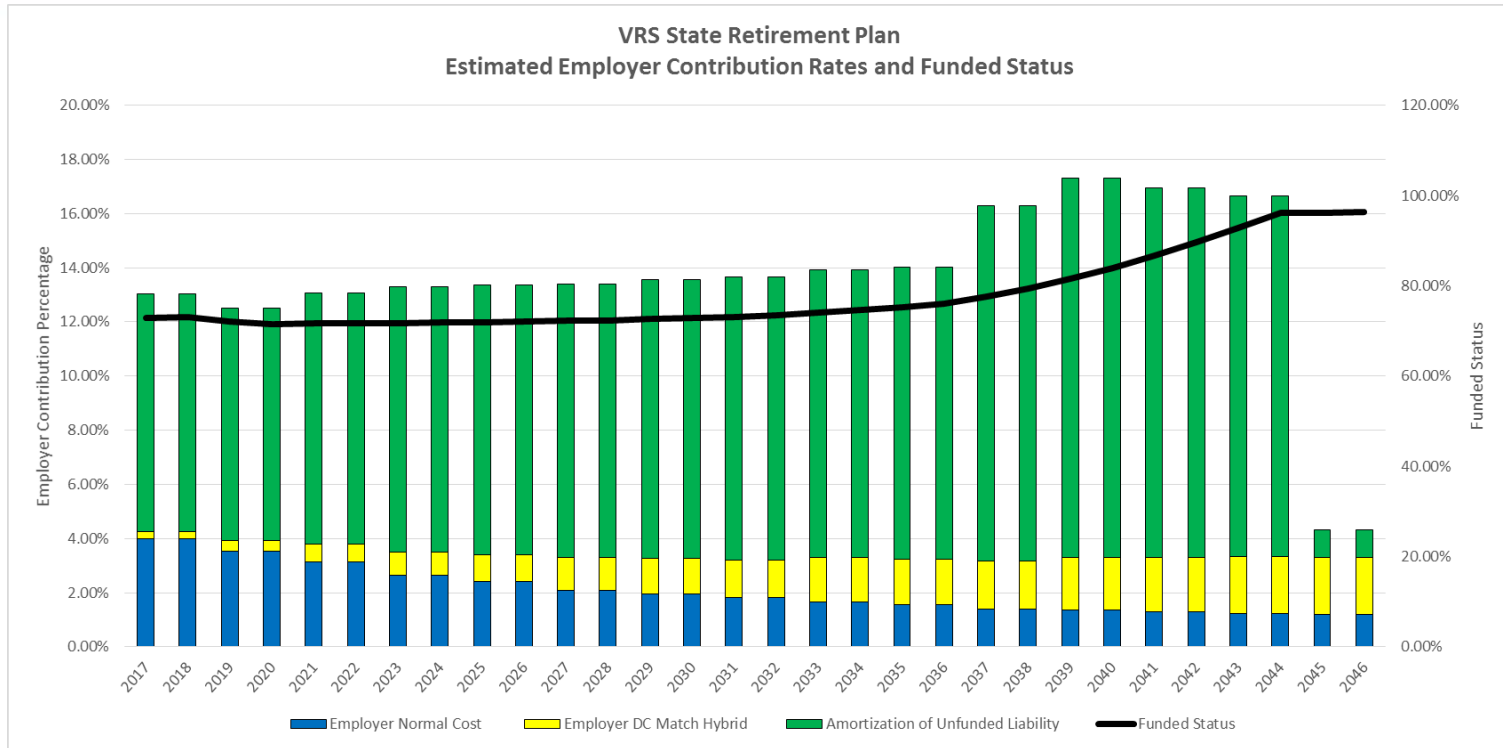


# Hybrid Retirement Plan Potential Modifications

- Change allocation of member contribution from 4% DB/ 1% DC to 3% DB / 2% DC
- Set default member voluntary contribution to 0.5% at date of hire, with ability to opt-out
  - Currently, there is no default voluntary contribution
- Accelerate auto-escalation to 0.5% increase in voluntary contributions every 2 years for members not at the maximum voluntary level
  - Currently, auto-escalation is 0.5% every three years

# State Retirement Plan

## Estimated Employer Costs under Current Plan Design



Employer Cost	2017	2027	2037	2045
Normal Cost	4.45%	2.35%	1.67%	1.47%
DC Component	0.10%	1.21%	1.76%	2.09%
UAAL	8.94%	10.32%	13.38%	1.04%
<b>Total Employer Cost</b>	<b>13.49%</b>	<b>13.88%</b>	<b>16.81%</b>	<b>4.60%</b>

- Largest component of employer rate is amortization of legacy unfunded liability. Legacy unfunded is being amortized over a 30-year closed period which is set to expire in 2044.
- Defined benefit normal cost decreases over time as hybrid plan membership grows.





# Comparison of Costs

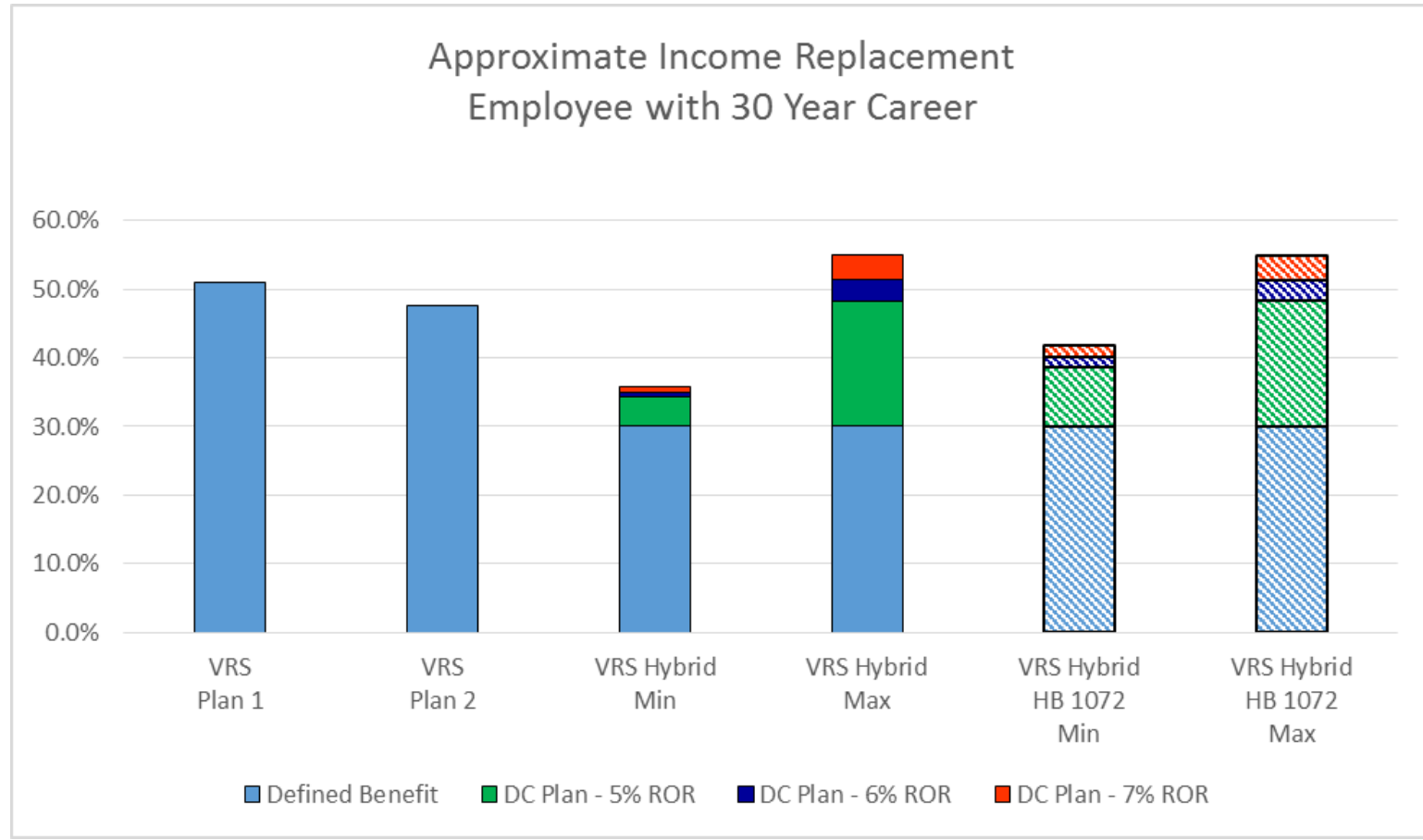
## Proposed Hybrid HB 1072

	VRS State Retirement Plan				Proposed Hybrid HB 1072
	VRS Plan 1	VRS Plan 2	Hybrid	Blended Rate	
<b>Total Benefit Normal Cost</b>	9.64%	8.95%	5.17%	9.10%	5.17%
<b>Member Contribution Rate</b>	5.00%	5.00%	4.00%	4.92%	3.00%
<b>Employer Normal Cost Rate</b>	4.64%	3.95%	1.17%	4.18%	2.17%
<b>Employer Match to DC Plan</b>	0.0%	0.0%	1.21%	0.10%	2.21%
<b>Administrative Expense</b>	0.27%	0.27%	0.27%	0.27%	0.27%
<b>Total Employer Rate without Unfunded Amortization Cost</b>	4.91%	4.22%	2.65%	4.55%	4.65%
<b>Amount to Amortize Unfunded Liability</b>	8.94%	8.94%	8.94%	8.94%	8.94%
<b>Total Employer Rate</b>	13.85%	13.16%	11.59%	13.49%	13.59%

- The proposed hybrid design does increase employer cost, but the 2.21% employer match to the defined contribution component of the hybrid has no future risk to the employer.

# Income Replacement Ratios

## 30-Year Career Employee

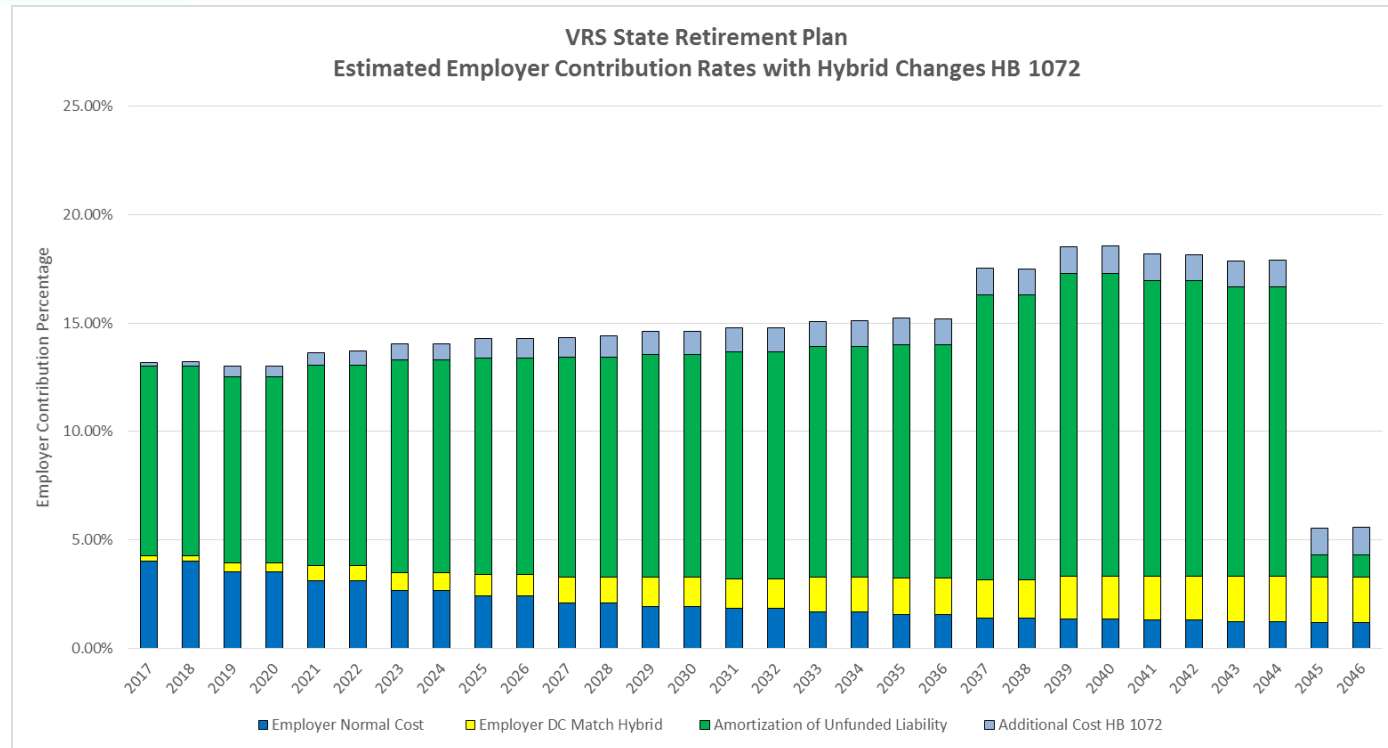


- Modeled above are the estimated replacement ratios for a 30-year employee hired at age 35. The Hybrid plan is modeled assuming 3 sets of long-term rates of return on DC fund balances, 5%, 6% and 7%.



# State Retirement Plan

## Estimated Employer Costs with Changes to the Hybrid (HB 1072)



Employer Cost	2017	2027	2037	2045
Normal Cost	4.45%	2.35%	1.67%	1.47%
DC Component	0.10%	2.22%	2.88%	3.33%
UAAL	8.94%	10.32%	13.38%	1.04%
<b>Total Employer Cost</b>	<b>13.49%</b>	<b>14.88%</b>	<b>17.93%</b>	<b>5.84%</b>

- Due to blending in hybrid participants, initial impact is estimated at 0.19% of state payroll and is expected to approach 1.65% of payroll over the next 30 years.
- Estimated costs assume 50% of the eligible members retain auto-escalation and auto-enrollment.

# Hybrid Plan Voluntary Contribution Auto-Escalation



## Current Auto – Escalation Schedule

Timing	DB	Member		Employer	
		DC Mandatory	Voluntary	DC Mandatory Match	Voluntary Match
HireDate	4.00%	1.00%	0.00%	1.00%	0.00%
Year 3	4.00%	1.00%	0.50%	1.00%	0.50%
Year 6	4.00%	1.00%	1.00%	1.00%	1.00%
Year 9	4.00%	1.00%	1.50%	1.00%	1.25%
Year 12	4.00%	1.00%	2.00%	1.00%	1.50%
Year 15	4.00%	1.00%	2.50%	1.00%	1.75%
Year 18	4.00%	1.00%	3.00%	1.00%	2.00%
Year 21	4.00%	1.00%	3.50%	1.00%	2.25%
Year 24	4.00%	1.00%	4.00%	1.00%	2.50%

Total Employee Contribution	Total Employer Match
5.00%	1.00%
5.50%	1.50%
6.00%	2.00%
6.50%	2.25%
7.00%	2.50%
7.50%	2.75%
8.00%	3.00%
8.50%	3.25%
9.00%	3.50%

- The current plan would take 24 years for a member to reach maximum savings in the defined contribution portion of the hybrid retirement plan.



## Proposed Auto – Escalation Schedule in HB 1072

Timing	DB	Member		Employer	
		DC Mandatory	Voluntary	DC Mandatory Match	Voluntary Match
HireDate	3.00%	2.00%	0.50%	2.00%	0.25%
Year 2	3.00%	2.00%	1.00%	2.00%	0.50%
Year 4	3.00%	2.00%	1.50%	2.00%	0.75%
Year 6	3.00%	2.00%	2.00%	2.00%	1.00%
Year 8	3.00%	2.00%	2.50%	2.00%	1.25%
Year 10	3.00%	2.00%	3.00%	2.00%	1.50%

Total Employee Contribution	Total Employer Match
5.50%	2.25%
6.00%	2.50%
6.50%	2.75%
7.00%	3.00%
7.50%	3.25%
8.00%	3.50%

- The proposed auto-escalation schedule would reduce the time to reach maximum savings in the defined contribution portion of the hybrid retirement plan to 10 years.



## PEW Recommended Auto – Escalation Schedule

Timing	DB	Member		Employer	
		DC Mandatory	Voluntary	DC Mandatory Match	Voluntary Match
HireDate	3.00%	2.00%	1.00%	2.00%	0.50%
Year 1	3.00%	2.00%	2.00%	2.00%	1.00%
Year 2	3.00%	2.00%	3.00%	2.00%	1.50%

Total Employee Contribution	Total Employer Match
6.00%	2.50%
7.00%	3.00%
8.00%	3.50%

- PEW recommendation for auto-escalation schedule would reduce the time to reach maximum savings in the defined contribution portion of the hybrid plan to 3 years.



# Optional Defined Contribution Plan

# VRS Contribution Rate Development



- New plan designs introduced by previous pension reforms have remained as new tiers under the current VRS structure.
- VRS has provided a single blended rate to each employer based on the demographics of the plan.
- The tiered approach prevents stranding legacy liability under a closed plan which would require accelerated payback of the unfunded liability, increasing employer's cost.
  - Even under a new funding policy, excluding new hires from participating in paying down the legacy unfunded would force a change in amortization from level percentage of pay to level dollar, which would increase costs to employers.
  - VRS assumes that an introduction of an optional DC plan would follow previous reforms and be structured as an additional tier of benefits.
  - Costs of optional DC plan designs would, therefore, need to include an additional charge to pay down legacy unfunded liability.





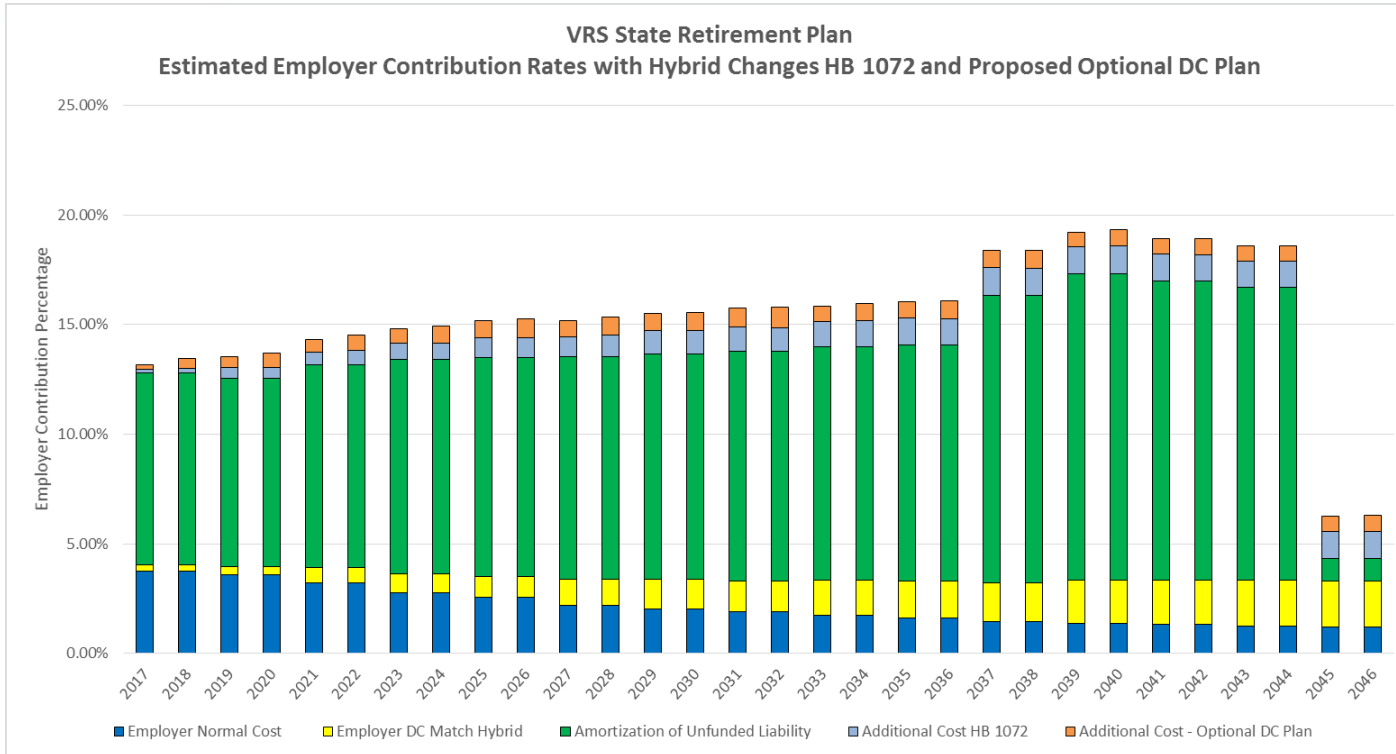
# Comparison of Plan Costs

## Optional DC Plans

	VRS State Retirement Plan				Proposed Hybrid HB 1072 After 25 Years 50% Opt Out	Optional Defined Contribution Plan (ORPPA)
	VRS Plan 1	VRS Plan 2	Hybrid	Blended Rate		
<b>Total Benefit Normal Cost</b>	9.64%	8.95%	5.17%	9.10%	5.17%	
<b>Member Contribution Rate</b>	5.00%	5.00%	4.00%	4.92%	3.00%	5.00%
<b>Employer Normal Cost Rate</b>	4.64%	3.95%	1.17%	4.18%	2.17%	
<b>Employer Match to DC Plan</b>	0.0%	0.0%	1.21%	0.10%	2.75%	8.50%
<b>Administrative Expense</b>	0.27%	0.27%	0.27%	0.27%	0.27%	0.27%
<b>Total Employer Rate without Unfunded Amortization Cost</b>	4.91%	4.22%	2.65%	4.55%	5.19%	8.77%
<b>Amount to Amortize Unfunded Liability</b>	8.94%	8.94%	8.94%	8.94%	8.94%	8.94%
<b>Total Employer Rate</b>	13.85%	13.16%	11.59%	13.49%	14.13%	17.71%

# State Retirement Plan

## Estimated Employer Costs with HB 1072 and Optional DC Plan (ORPPA)

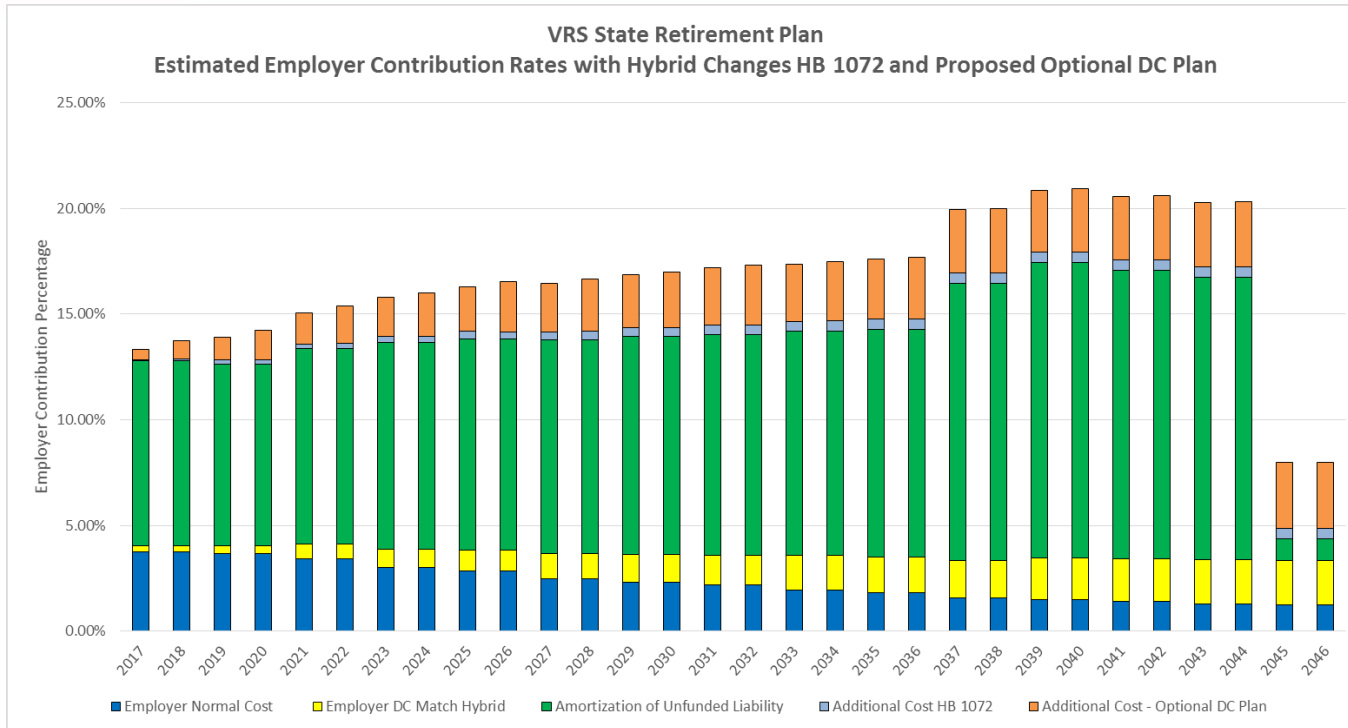


Employer Cost	2017	2027	2037	2045
Normal Cost	4.45%	2.35%	1.67%	1.47%
DC Component	0.10%	2.85%	3.82%	4.04%
UAAL	8.94%	10.32%	13.38%	1.04%
<b>Total Employer Cost</b>	<b>13.49%</b>	<b>15.52%</b>	<b>18.87%</b>	<b>6.55%</b>

- Largest component of employer rate is still amortization of legacy unfunded liability, which will be paid off through 2044.
- Assumes 25% of new hires would elect Optional DC plan each year.

# State Retirement Plan

## Estimated Employer Costs with HB 1072 and Optional DC Plan (ORPPA)



Employer Cost	2017	2027	2037	2045
Normal Cost	4.45%	2.35%	1.67%	1.47%
DC Component	0.10%	3.88%	5.24%	5.73%
UAAL	8.94%	10.32%	13.38%	1.04%
<b>Total Employer Cost</b>	<b>13.49%</b>	<b>16.54%</b>	<b>20.29%</b>	<b>8.24%</b>

- Largest component of employer rate is still amortization of legacy unfunded liability, which will be paid off through 2044.
- Assumes 70% of new hires would elect Optional DC plan each year.

# State Retirement Plan

## Estimated Employer Costs



Current Plan	Employer Cost	2017	2027	2037	2045
	Normal Cost	4.45%	2.35%	1.67%	1.47%
	DC Component	0.10%	1.21%	1.76%	2.09%
	UAAL	8.94%	10.32%	13.38%	1.04%
	<b>Total Employer Cost</b>	<b>13.49%</b>	<b>13.88%</b>	<b>16.81%</b>	<b>4.60%</b>

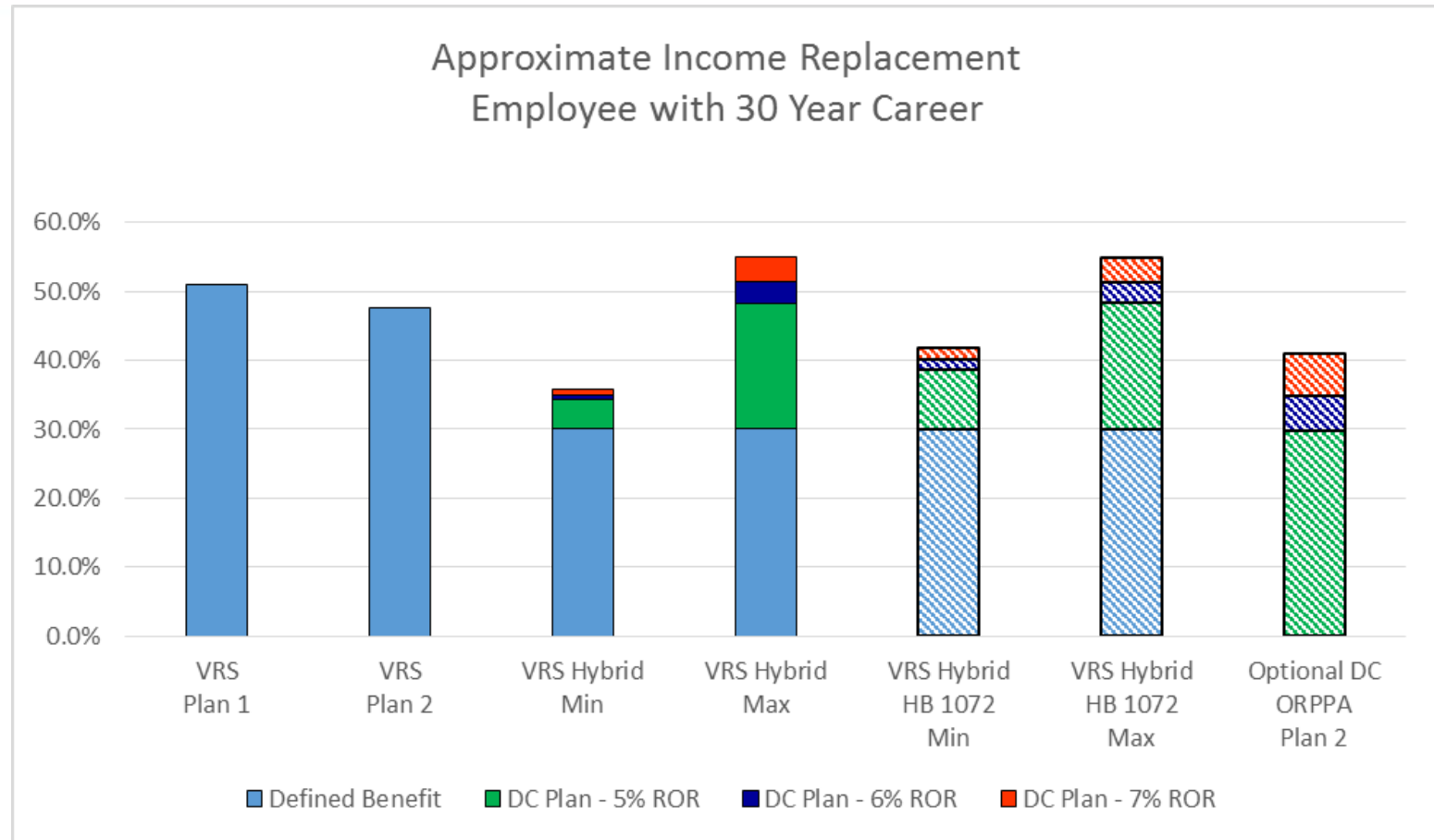
Adding Provisions of HB 1072	Employer Cost	2017	2027	2037	2045
	Normal Cost	4.45%	2.35%	1.67%	1.47%
	DC Component	0.10%	2.22%	2.88%	3.33%
	UAAL	8.94%	10.32%	13.38%	1.04%
	<b>Total Employer Cost</b>	<b>13.49%</b>	<b>14.88%</b>	<b>17.93%</b>	<b>5.84%</b>

Adding Provisions of HB 1072 & Offering Optional DC Plan 25% Election	Employer Cost	2017	2027	2037	2045
	Normal Cost	4.45%	2.35%	1.67%	1.47%
	DC Component	0.10%	2.85%	3.82%	4.04%
	UAAL	8.94%	10.32%	13.38%	1.04%
	<b>Total Employer Cost</b>	<b>13.49%</b>	<b>15.52%</b>	<b>18.87%</b>	<b>6.55%</b>

Adding Provisions of HB 1072 & Offering Optional DC Plan 70% Election	Employer Cost	2017	2027	2037	2045
	Normal Cost	4.45%	2.35%	1.67%	1.47%
	DC Component	0.10%	3.88%	5.24%	5.73%
	UAAL	8.94%	10.32%	13.38%	1.04%
	<b>Total Employer Cost</b>	<b>13.49%</b>	<b>16.55%</b>	<b>20.29%</b>	<b>8.24%</b>

# Income Replacement Ratios

## 30-Year Career Employee

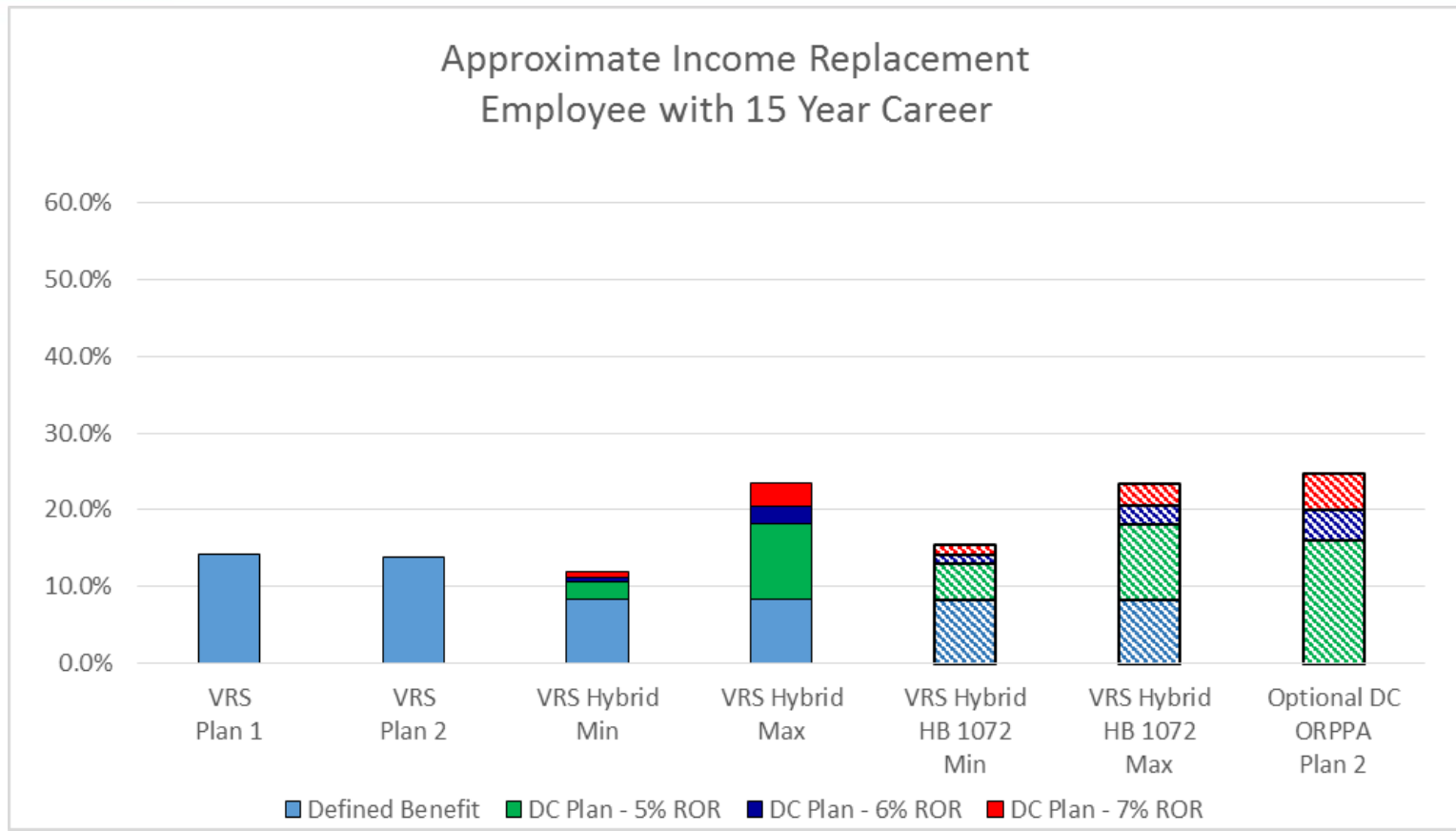


- Modeled above are the estimated replacement ratios for a 30-year employee hired at age 35. The Hybrid plan is modeled assuming 3 sets of long term rates of return on DC fund balances, 5%, 6% and 7%.



# Income Replacement Ratios

## 15-Year Employee – Hire Age 35 & Terminates at 50

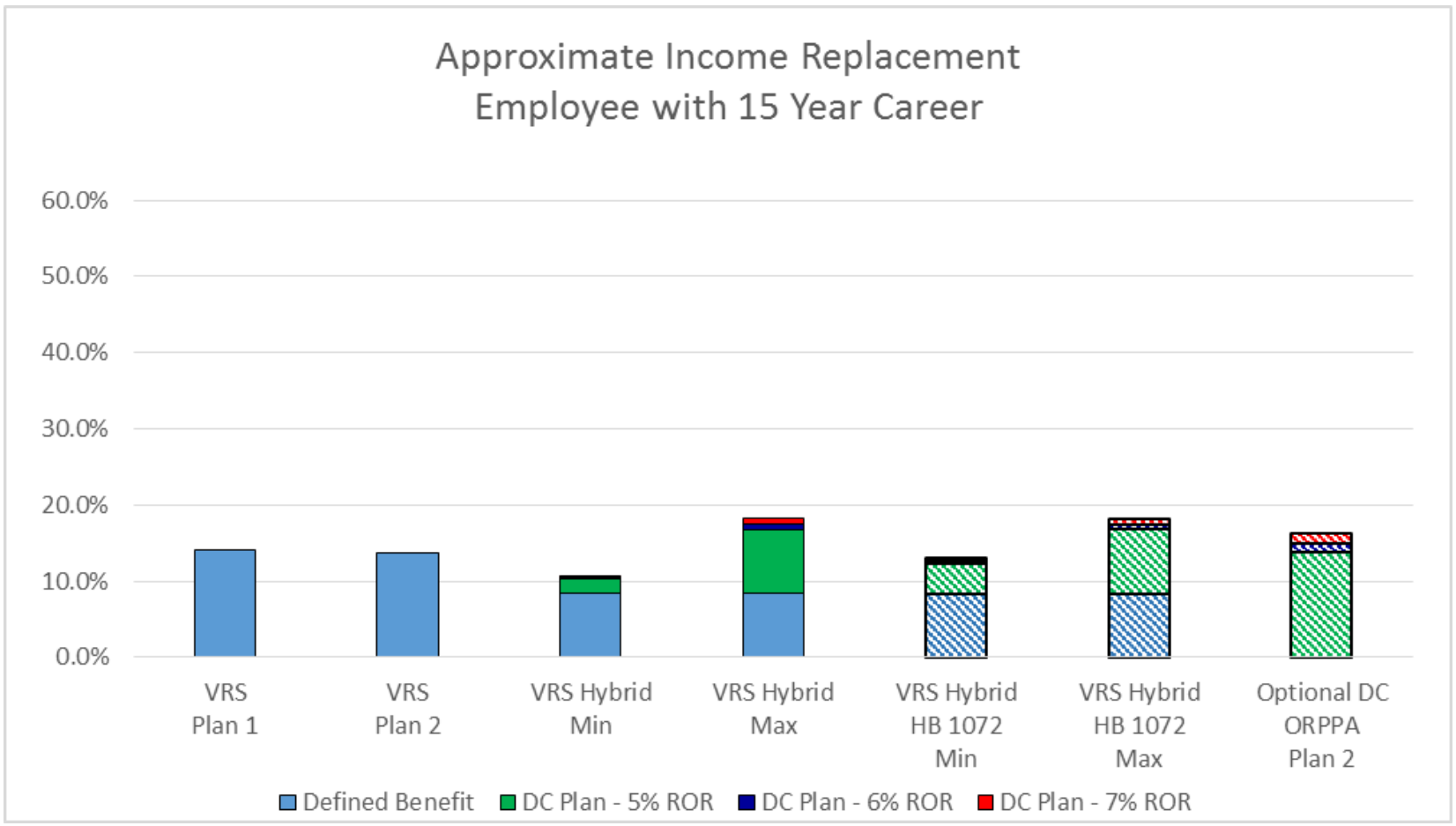


- Modeled above are the estimated replacement ratios for a 15-year employee hired at age 35, who terminates at age 50 and defers benefit to age 65. The Hybrid plan and Optional DC plans are modeled assuming 3 sets of long-term rates of return on fund balances, 5%, 6% and 7%.
- For members, defined contribution plans have the advantage of continuing to earn interest income.



# Income Replacement Ratios

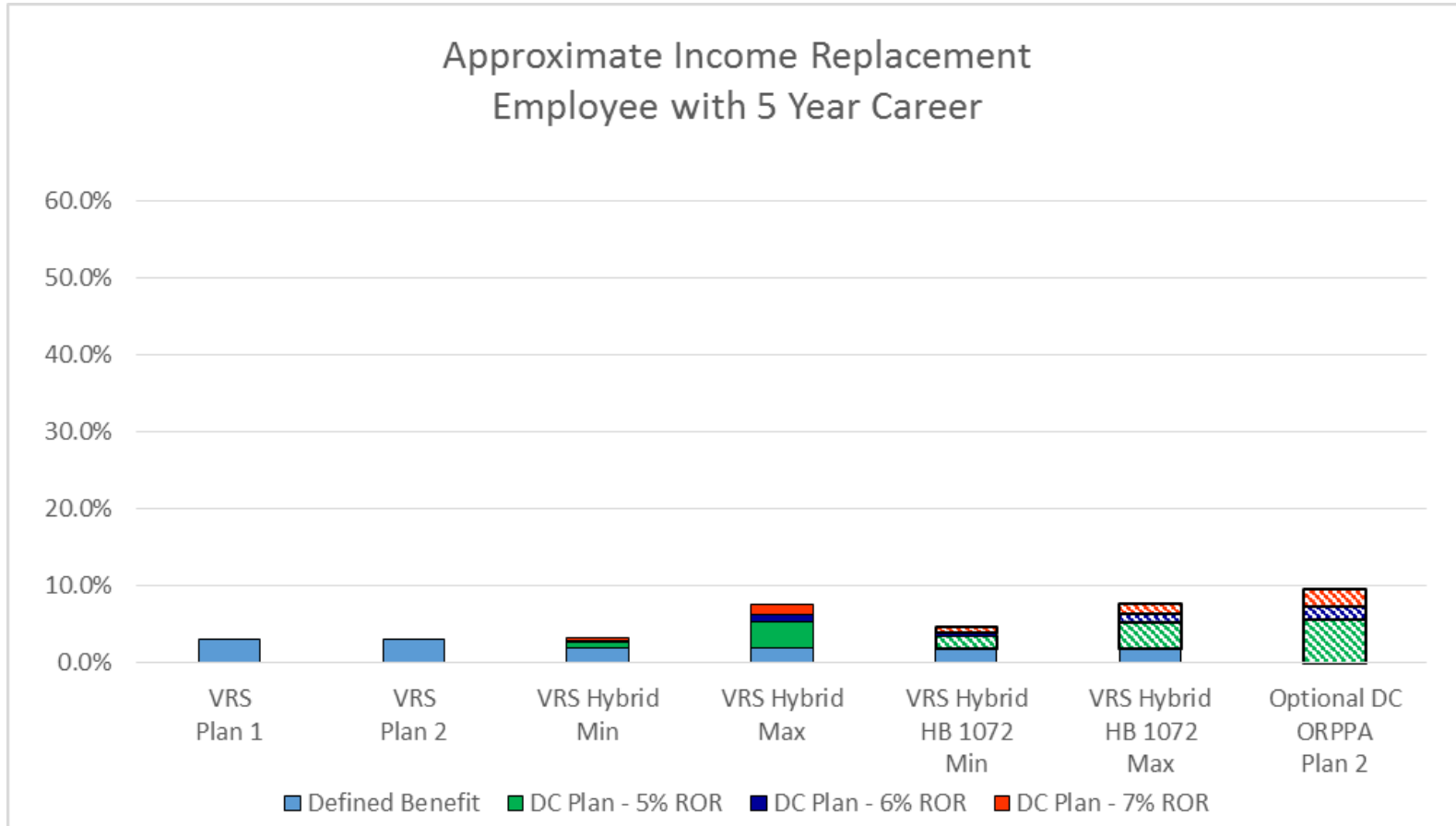
## 15-Year Employee – Hire Age 50 & Terminates at 65



- Modeled above are the estimated replacement ratios for a 15-year employee hired at age 50, who terminates at age 65. The Hybrid plan and Optional DC plans are modeled assuming 3 sets of long term rates of return on fund balances, 5%, 6%, and 7%.

# Income Replacement Ratios

## 5-Year Employee



- Modeled above are the estimated replacement ratios for a 5-year employee hired at age 35, who terminates at age 40 and defers benefit to age 65. The Hybrid plan and Optional DC plans are modeled assuming 3 sets of long term rates of return on fund balances, 5%, 6%, and 7%.
- For members, defined contribution plans have the advantage of continuing to earn interest income.



# Plan Design Questions for Consideration



- Will an election window be offered to existing members?
- Will any election be irrevocable?
- Will hazardous duty employees be eligible for the plan?
- Will disability coverage be provided? If so, what type?
- Will vesting be required? Cliff or graduated vesting?



# Stress Testing and Sensitivity Analysis

- Understanding pension risk is a difficult, but necessary aspect of understanding pension plans.
- Actuarial valuations determine a *single-point* measure of the pension liability and corresponding required actuarial contribution.
- In accepting these measures, it is important to understand the range of future possibilities and associated risks with managing a retirement plan.

- Stress testing involves the simulation of different shocks or scenarios that could impact a plan's funding policy, investment policy, or benefit levels.
- The techniques within stress testing vary, but typically include sensitivity and scenario testing.

- VRS has historically performed stress testing that focused primarily on investments and cash flow requirements.
- In 2014, a report from the Blue Ribbon Panel on public funding (BRP) commissioned by the Society of Actuaries suggested a standardized measure to value plans' liabilities, and proposed stress testing measures that retirement plans should follow as a best practice.
- The stress testing measures proposed by the BRP have not been formally adopted and at this point are not considered actuarial standards of practice. The actuarial standards board is considering these recommendations, and in due time, may adopt or modify the proposed recommendations.
- VRS will continue to explore what measures would be most helpful in identifying and managing risks associated with the VRS plans.

# Sensitivity Testing



- Sensitivity testing involves a change in one risk factor. By moving one risk factor and keeping all others constant, it is easier to understand the impact of a plan's exposure to that risk. An example would be the impact of a change in discount rate.

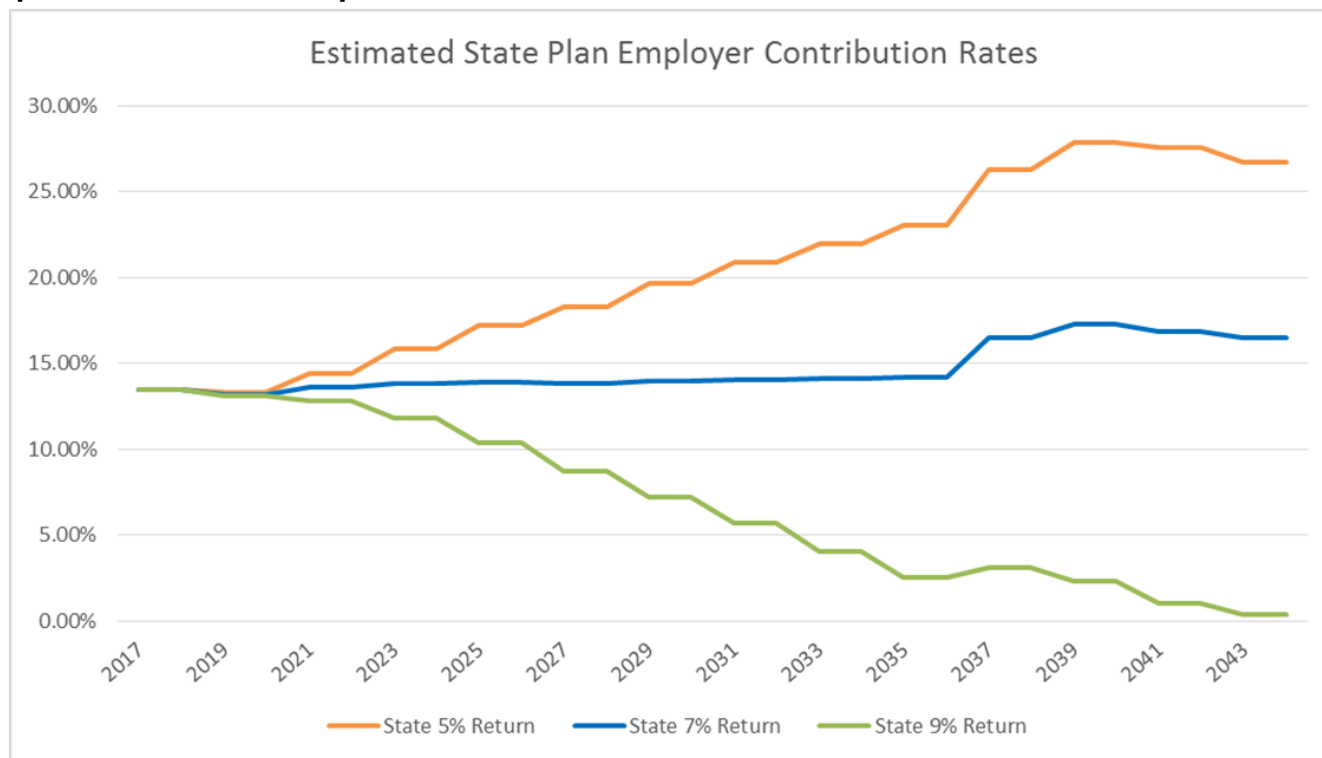
Discount Rate	8.00%	Current 7.00%	6.00%	5.00%
Total Employer Normal Cost Rate	3.54%	4.45%	5.45%	9.48%
Amortization Rates for Unfunded Liabilities				
Total Amortization Rate	5.53%	8.94%	12.49%	16.25%
Total Employer Rate	9.07%	13.39%	17.94%	25.73%
Increase in Rate	-4.32%	0.00%	4.56%	12.34%
Estimated Increase in Annual Funding	(\$167.2) Million		\$176.5 Million	\$478.1 Million
General Fund	(\$71.5) Million		\$75.4 Million	\$204.3 Million
Non-General Fund	(\$95.7) Million		\$101.1 Million	\$273.8 Million
Unfunded Liability	\$4.2 Billion	\$6.4 Billion	\$9.1 Billion	\$12.3 Billion
Funded Status	79.1%	71.2%	63.7%	56.4%

- Provides impact on contributions and funded status if State plan was measured using a different long term discount rate. Analysis typically within a 2% corridor around current assumption.

# Scenario Testing



- Scenario testing uses a hypothetical situation, which may include “shocks” based on recent events. Analysis is typically conducted over a period of time that is appropriate for the specific risks that are being tested. An example could be expected future rates of return on the fund.

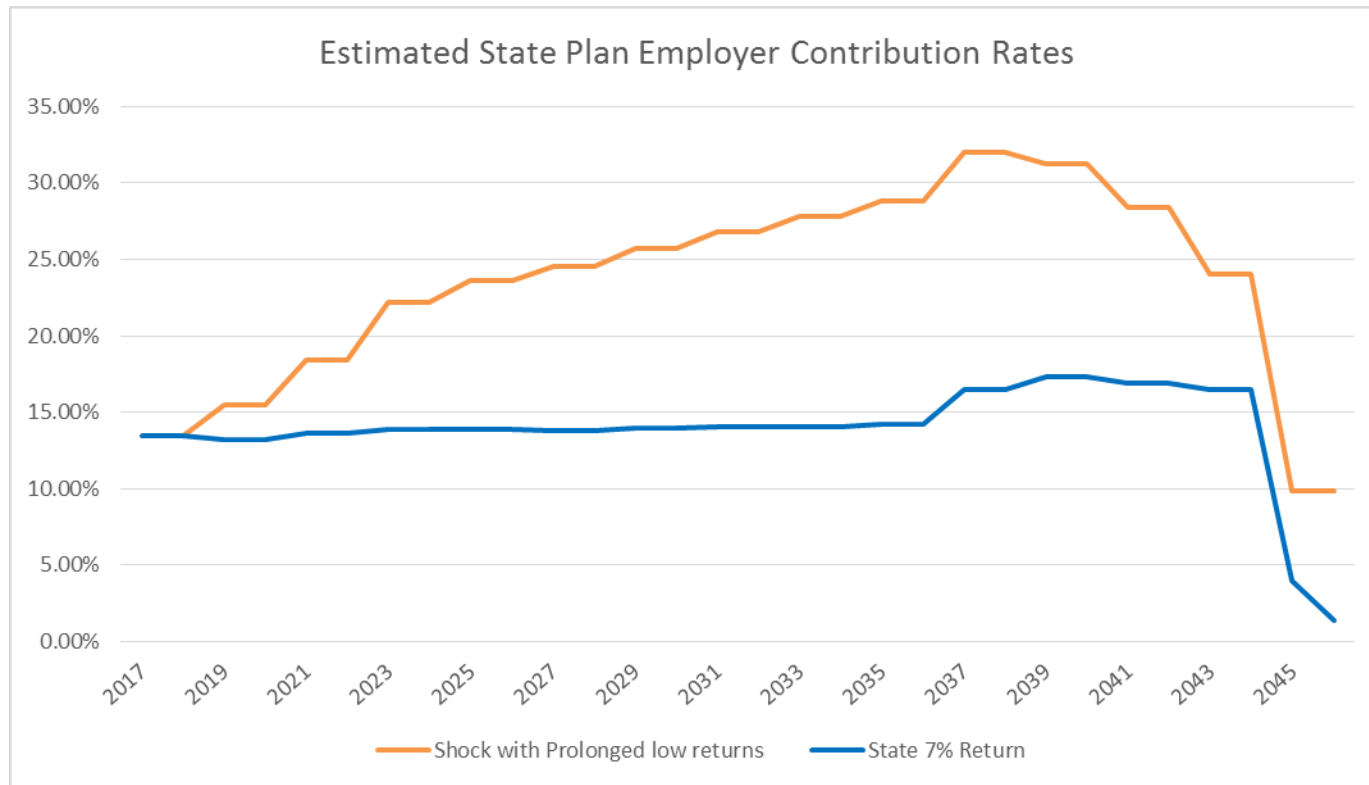


- Provides range of potential future contributions assuming constant long-term rates of return 2% above and below the 7.0% long-term assumption.

# Scenario Testing



- An example of a “shock” scenario could be assuming a 15% investment loss followed by 20 years of 5% investment returns when the plan assumed rate of return is 7.0%.
- Results like these could help to identify areas of concern so that actions can be explored to help mitigate potential future unfavorable outcomes.





- Scenario analysis and stress testing are emerging tools to assess a plan's exposure to risks.
- Though two of the largest risks associated with pension plans are plan funding and investment returns, stress testing can be performed on many other areas including:
  - Impacts of funding below the actuarial determined contribution
  - Inflation/Cost-of-living impacts
  - Change in demographics
  - Long-term salary changes
  - Longevity



# Comments and Considerations

- VRS will build upon the leading practices it has deployed and developed with respect to disclosure, stress testing and sensitivity analysis
- Fully funding the Actuarially Determined Contribution (ADC) is essential for the health and stability of the plans
- It is critical that any changes include continuation of full payment of the ADC and take into account the unfunded liability
- As new plan designs and/or new plans are considered, comprehensive analyses will be required to fully assess impacts from the system, plan sponsor, employer, and member perspectives

- Because 800+ employers will need to modify systems, any plan design change or new plan will need to allow adequate time for implementation
- Delivery of current VRS modernization efforts will be impacted, and new state payroll system (Cardinal) may be impacted as well
- Communication, education and outreach are essential for successful implementation
- The benefits of changes/modifications must be balanced against their impact on other priorities identified by the Commission as a whole and its working groups

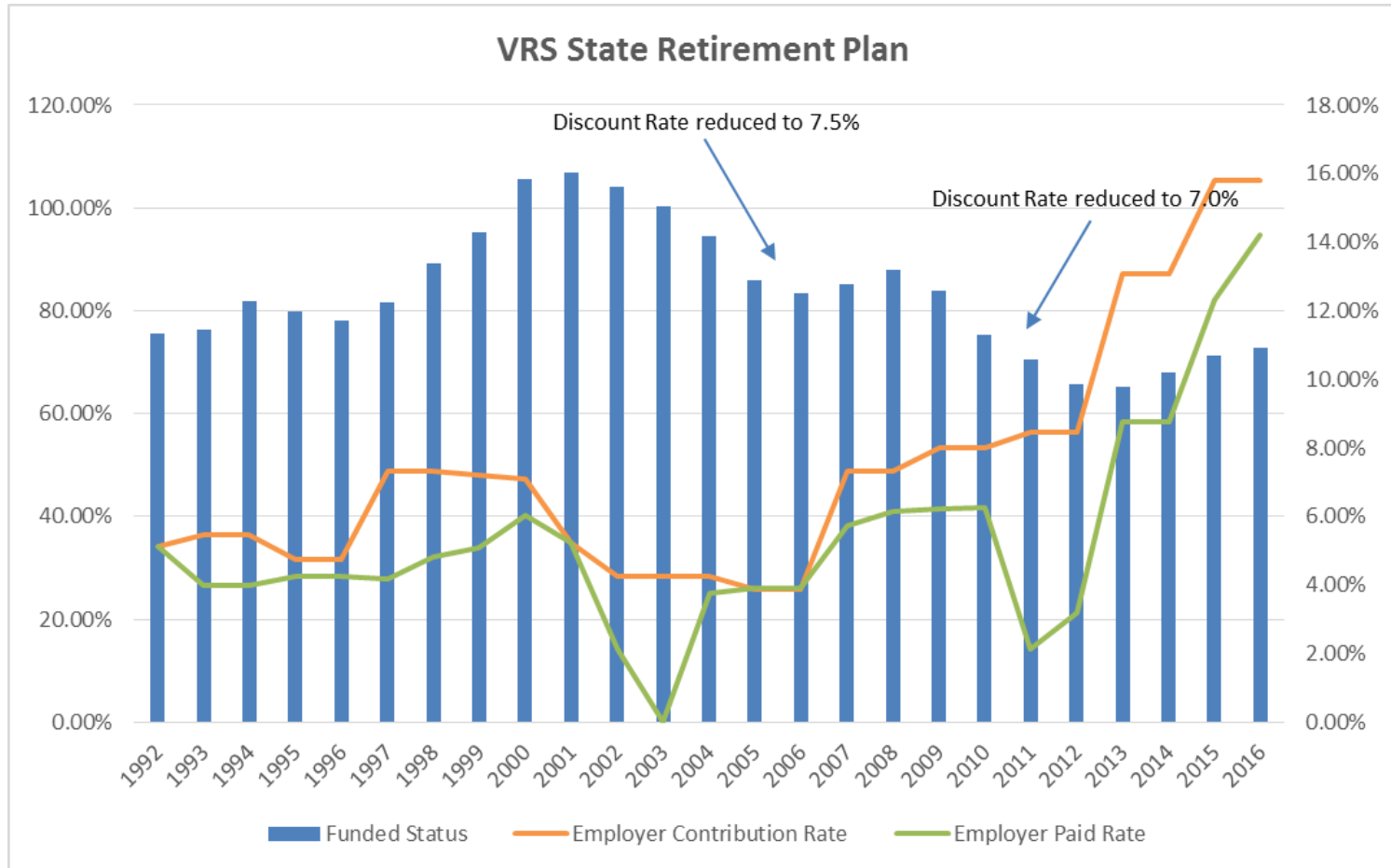
# Appendix

# Estimated Increase in Funding for 1% Increase in Plan Rates



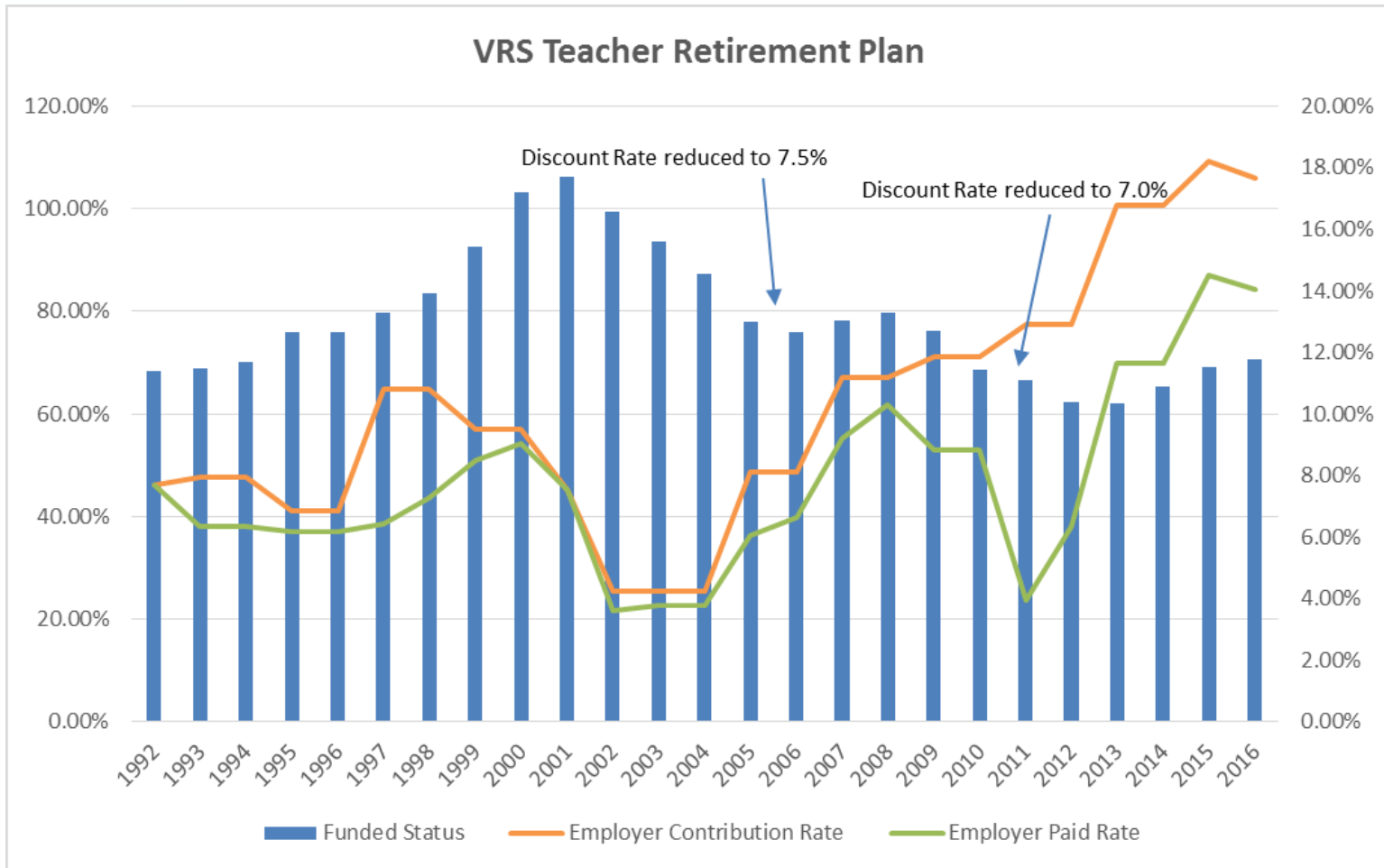
Plan	Payroll 6/30/2016	Estimated Additional Contributions for 1% Increase in Employer Rates	General Fund	Non-General Fund
<b>State</b>	\$ 4,002,000,000	\$ 40,020,000	\$ 17,367,000	\$ 22,653,000
<b>SPORS</b>	\$ 115,000,000	\$ 1,150,000	\$ 980,000	\$ 170,000
<b>VaLORS</b>	\$ 353,000,000	\$ 3,530,000	\$ 3,219,000	\$ 311,000
<b>JRS</b>	\$ 66,000,000	\$ 660,000	\$ 660,000	\$ -
<b>Total State Sponsored</b>	\$ 4,536,000,000	\$ 45,360,000	\$ 22,226,000	\$ 23,134,000
<b>Teachers</b>	\$ 7,667,000,000	\$ 76,670,000	\$ 30,668,000	\$ 46,002,000
<b>Total State-Wide</b>	\$ 12,203,000,000	\$ 122,030,000	\$ 52,894,000	\$ 69,136,000

# Impact of Underfunding – State Plan



- Since 1993 the state plan has been underfunded by \$1.66 billion in contributions.
- Those contributions, with actual interest earned by the fund would be worth approximately \$3.5 billion today.

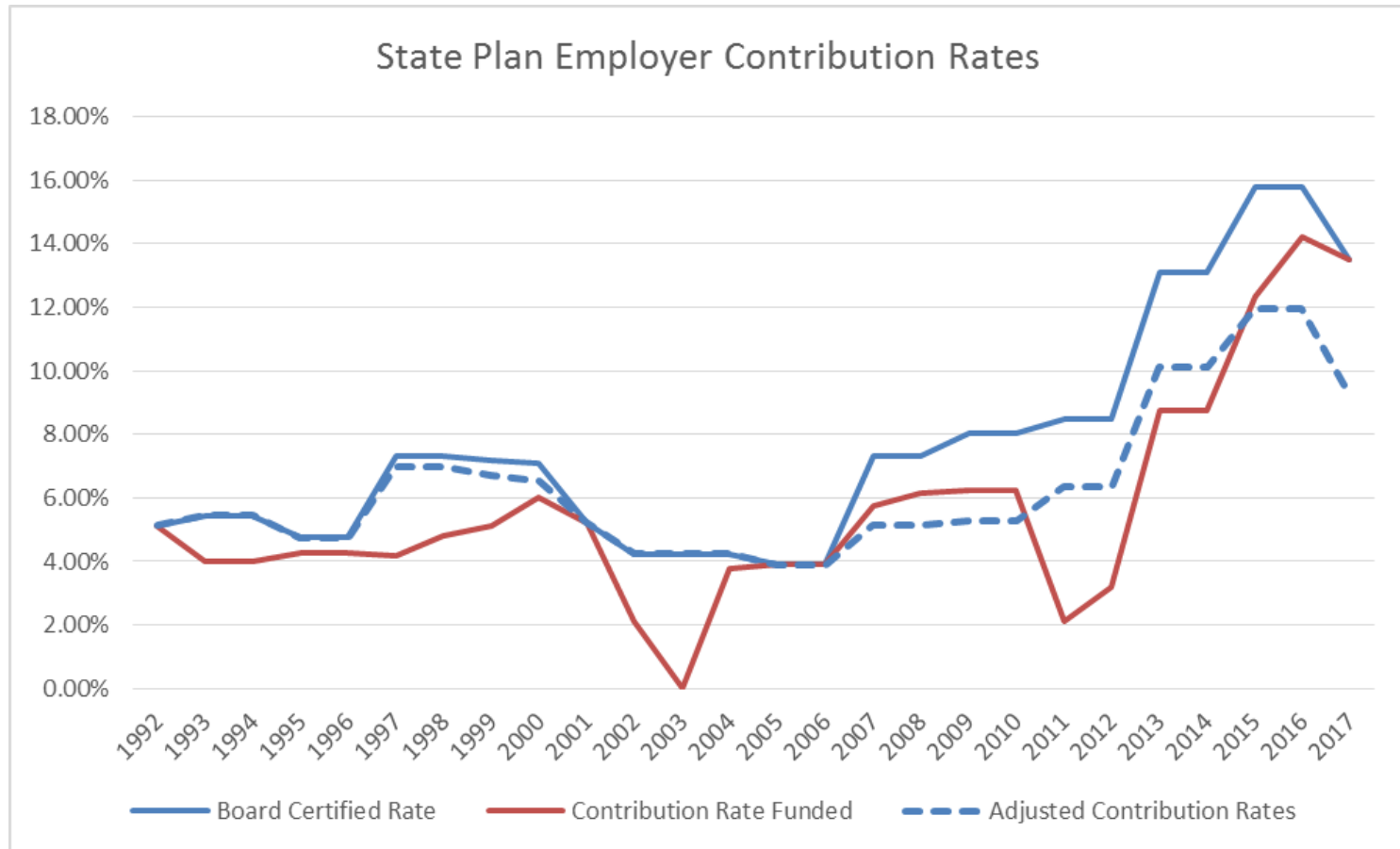
# Impact of Underfunding – Teacher Plan



- Since 1993, the teacher plan has been underfunded by \$3.8 billion in contributions.
- Those contributions, with actual interest earned by the fund, could have been worth approximately \$7.0 billion today.

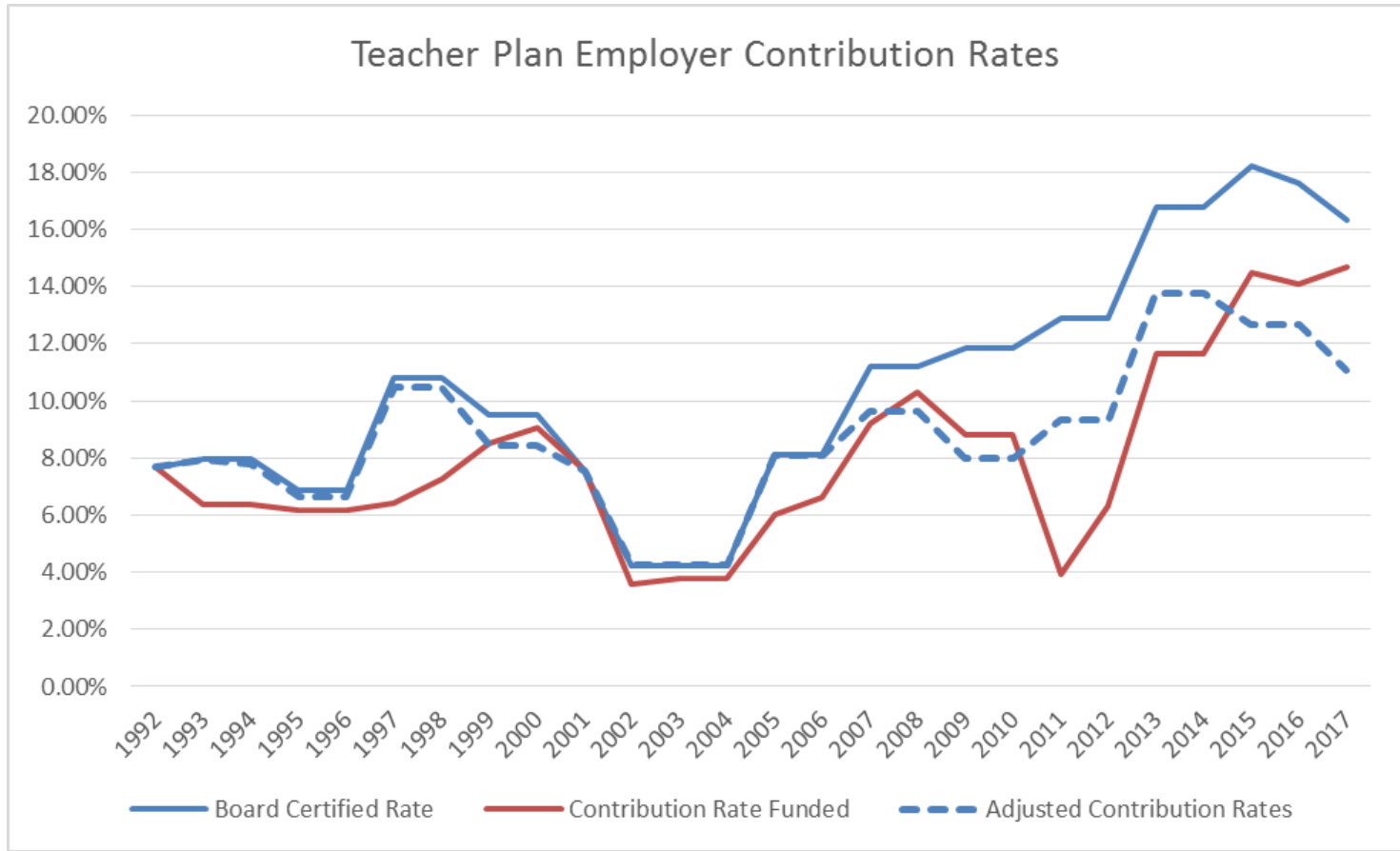


# Impact of Underfunding – State Plan



- If the State plan had received 100% of the required contribution since 1993, the employer rates today would be approximately 9.21% versus the actual 13.49%.
- The funded status as of June 30, 2016 was 72.90%. With full funding of employer rates the funded status would be approximately 87.9%.

# Impact of Underfunding – Teacher Plan



- If the Teacher plan had received 100% of the required contributions since 1993, the employer rates today would be approximately 11.90% versus the actual 16.32%.
- The funded status as of June 30, 2016 was 70.6%. With full funding of rates the funded status would be approximately 86.1%.