



AN EVIDENCE-BASED APPROACH TO PENSION FUNDING REFORM

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The state's current payment schedule for paying off unfunded liabilities in the state's two largest pension systems, the State Employees' Retirement System (SERS) and the Teachers' Retirement System (TRS) is unsustainable. The annual increases in Annual Required Contributions (ARC) have outpaced revenue growth in recent years and the trend is expected to continue throughout the remaining years of the current amortization schedule. ARC payments to meet outstanding unfunded liabilities under the current actuarial funding policy will become increasingly volatile as the end of the current amortization period approaches in FY 2032. The rapidly rising ARC payments have contributed to the state's budget instability in recent years and the problem projects to grow more acute. Reforming the funding policy for SERS and TRS now can bring greater predictability to future ARC payments, thereby improving long-term budget stability.

The Office of the State Comptroller has worked with actuaries and pension experts to analyze various reforms to our actuarial funding policy for the SERS system. The analysis focuses specifically on SERS because the Comptroller administers SERS benefits and is the administrative home to the policy board that oversees the program, the Connecticut State Employees Retirement Commission (Retirement Commission). The Comptroller is also an ex-officio member of the Retirement Commission. Funding scenarios for TRS were not included as the Comptroller's office has no direct relationship to TRS.

The goal of the analysis was to determine a responsible, evidence-based and prudent pension funding reform option that utilizes accepted actuarial principles and best practices for pension funding policy. To that end, this report details three pension funding scenarios, as well as a baseline scenario that shows current funding methodology for comparison. All of the scenarios analyzed retain all retirees in the existing State Employees' Retirement Fund with benefits prefunded through employer and employee contributions. In addition, all scenarios utilize closed amortization periods, setting a date certain by which current UAAL will be paid off. In addition, scenarios were developed and analyzed in accordance with their ability to meet the following core principles:

- Ensuring adequate payments to meet obligations,
- Achieving cost stability and predictability,
- Maximizing investment returns to offset future state obligations, and
- Preserving and strengthening the state's bond rating



The goal of the analysis was to determine a responsible, evidence-based and prudent pension funding reform option that utilizes accepted actuarial principles and best practices for pension funding policy.



Ensuring adequate payments to meet obligations

New funding policies for our state's major pension plans must require adequate ARC payments to pay off the state's unfunded actuarial accrued liabilities (UAAL) in a reasonable time period. Our current funding policy established ARC payments that were too low to reduce the UAAL in the early years of the amortization period, resulting in a growing, rather than declining, UAAL despite the state often paying most or the entire ARC. The result is back-loaded payments that are now rising rapidly as the end of the amortization period approaches. A new funding policy should establish ARC payments adequate to reduce UAAL throughout the amortization period and pay off existing and new UAAL in a reasonable time frame.

Achieving cost stability and predictability

Cost stability and predictability, in particular, must be the focus of any conversation about Connecticut's budget, tax policy and – in this case – pension funding. The significant annual increases required by our actuarial funding policy and amortization schedule result in pension obligations that are growing as a percentage of total state expenditures. Pension payments for SERS and TRS, including payments toward pension obligation bonds for TRS, accounted for 12 percent of the state General Fund budget in FY 2015 and the percentage is growing annually. The growing pension obligations require reductions elsewhere in the budget or increases in revenue to cover the growing costs.

In addition to the projected growth in ARC payments over the remaining term of the amortization schedule, the calculated ARC payments are subject to significant volatility due to the state's current actuarial funding policy and adopted actuarial assumptions. Currently, all actuarial gains and losses are incorporated into the initial amortization schedule. This approach can result in significant volatility in ARC payments as the end of the amortization schedule approaches (see attachment I). Moreover, the actuarial assumptions currently utilized by the plan, specifically an overly aggressive investment return assumption, increase the likelihood actuarial losses will occur in the future. Actuarial losses that result from missed projections will require higher ARC payments than currently projected.

GOALS

- *Ensure adequate payments to meet obligations*
- *Preserve and strengthen the state's bond rating*
- *Achieve cost stability and predictability*
- *Maximize investment returns to offset General Fund obligations*

Reforming the pension funding policy presents a significant opportunity to improve cost stability and predictability in the ARC payments and, as a consequence, the state budget at large. Strategies for reducing the volatility in ARC payments should be incorporated into any actuarial funding policy reform considered. Two important considerations are 1) adopting more conservative actuarial assumptions in order to reduce the risk of actuarial losses from missed assumption targets and 2) adopting a layered fixed-period amortization of either 15 or 20 years for actuarial gains and losses to moderate the impacts of actuarial gains and losses over time on ARC payments. Layered fixed-period amortization would amortize annual actuarial gain and losses incurred over a closed amortization period on their own closed-fixed amortization schedule. By amortizing gains and losses over a longer period the annual impact on ARC payments is lessened and, over time, assuming reasonable actuarial assumptions and disciplined payments by the legislature, gains and losses are likely to even out, further reducing the volatility of ARC payments. For more detail and an example of the utility of layered fixed-period amortization for gains and losses, see attachment I.



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Maximizing investment returns to offset future state obligations

Investment returns achieved from investing pension funds provide an important and significant source of revenue for both SERS and TRS. Revenues from investment returns reduce the revenue required from state resources through annual ARC payments. The structure of a pension funding policy has a significant impact on the total investment returns that will ultimately be achieved by the funds. More resources allotted to funds in the form of ARC payments in the near term result in lower total pension costs over the long-term as the compounded interest earned on the additional dollars invested offsets future state obligations. The total cost of state contributions under various reform alternatives must be a key consideration in evaluating the merits of potential options.

Preserving and strengthening the state's bond rating

The state's bond rating as determined by major rating agencies has a direct impact on state borrowing costs. Recently, the rating agency Standard & Poor's (S&P) warned that if pension funding reform "led us to conclude that actuarial unfunded pension liabilities were likely to grow substantially over time, [it] could prompt us to lower the state's [bond rating] by one notch."¹ To defend against a bond rating down grade, pension funding reform should not be used to alleviate immediate budget pressures by pushing pension obligations into the future as S&P warns against. Instead a new funding policy should set up a responsible payment schedule that matches or increases payments toward the UAAL in the short-term while flattening out the balloon payments required at the end of the current amortization period and committing to pay off the UAAL in a reasonable time frame.

To measure the performance of each scenario presented in this report in relation to the core principles described above, the following measures were applied to each scenario:

- **Funding percentage** – the percentage of assets held by the pension fund in comparison to the assets required to cover earned benefits. Funding percentage can be used to measure funding policy adequacy. Absent significant shocks to the system, an adequate funding policy should improve the funding percentage from year to year.
- **Annual Required Contributions** – the employer's periodic required contribution to a defined benefit plan to cover the normal cost (the cost of benefits attributable to the current year of service and the amortization payment (a catch-up payment for past service costs to fund the unfunded actuarial accrued liability - UAAL). The ARC payment represents the direct budget impact of the funding policy in a given fiscal year. Volatility in the ARC can create budget challenges as can ARC payments that increase year over year. The stability of ARC payments throughout the amortization period is a direct measure of cost stability and predictability.
- **Compound Annual Growth Rate (CAGR) of ARC payments** – The growth rate of ARC payments over a specified time period. Here the CAGR is used to measure the growth rate of ARC payments from the initial year of implementation of any new funding policy against select future fiscal years. The measure gives an indication of how the ARC is growing in nominal dollars over the selected time period. CAGR is another measure of cost stability and predictability.

¹Keith Phaneuf, "S&P warns Malloy's pension plan could cause bond rating cut", CT Mirror. Dec. 16, 2015. ctmirror.org/2015/12/16/sp-threatens-to-lower-cts-bond-rating-if-malloys-pension-plan-is-adopted



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- *The total principal and financing costs of paying off the UAAL* – the total cost expressed in terms of net present value in paying off the UAAL over the entire amortization period. Future payments against UAAL are discounted using a 3-percent inflation assumption.² Using the net present value measure, it is possible to compare the estimated total budget cost of paying down the UAAL in real 2016 dollars between various funding-policy scenarios.³

In addition to a table displaying the measures above at key future dates, each scenario is also accompanied by line graphs that compare the projected payment schedule and estimated future funded ratios of each scenario to a baseline scenario (described below). An inflation-adjusted ARC payment line is also incorporated to provide a visual indication of the level of effort making the estimated ARC payments will require in the future under each scenario.

No one measure is used to determine the effect of policy alternatives on the state's bond rating. Generally rating agencies take into account the totality of factors in evaluating a pension funding policy. As a result, each of the above measures is relevant in determining the potential impact on the state's bond rating from a proposed change to SERS pension funding policy.



Recently, the rating agency Standard & Poor's (S&P) warned that if pension funding reform "led us to conclude that actuarial unfunded pension liabilities were likely to grow substantially over time, [it] could prompt us to lower the state's [bond rating] by one notch."

² An inflation assumption of 3 percent was selected to comport with the inflation assumption currently used for SERS actuarial reporting.

³ Real dollars refers to a value that has been adjusted for inflation to make dollar amounts comparable across time. All real dollar calculations in this analysis use 2016 as the base year and adjust all future years by an assumed inflation rate of 3 percent.



ANALYSIS

Four distinct policy options or scenarios are analyzed below, including a baseline scenario which incorporates the current actuarial funding policy for SERS and three alternative options or scenarios. The components of the actuarial funding policy analyzed are included in a summary table for each scenario. Changes from the baseline scenario are highlighted in bold. In addition, each scenario is accompanied by a short description, a table of the descriptive statistics described above, and two graphs displaying ARC payments over time and the funded ratio. Finally, each scenario is accompanied by a short discussion of how it performs relative to the baseline scenario and other scenarios presented on the measures selected for analysis.

SERS currently utilizes the following funding policy, payment schedule and actuarial assumptions.

CURRENT	
Actuarial cost method:	Projected Unit Credit
Amortization method:	Level percent of payroll, closed
Remaining amortization period	16 years
Asset valuation method	5-year smoothed actuarial value
ACTUARIAL ASSUMPTIONS:	
Investment rate of return	8%
Inflation rate	3%
Wage growth	3.5%

Recently, State Treasurer Denise Nappier has indicated that the appropriate investment return assumption for state pension fund investments is 7 percent.⁴ To comport with the Treasurer’s assessment of the most reasonable future performance of pension fund investments, the current investment return assumption of 8 percent is reduced to 7 percent to produce the baseline funding scenario for this analysis. As mentioned above, in each additional scenario changes from the baseline will be in bold.

Holding all actuarial assumptions constant is necessary to make informed comparisons across various funding options. Funding scenarios must be compared using the same actuarial assumptions, otherwise differences in ARC payments, funding ratios, CAGR and total principal and financing costs are incomparable. Scenarios with the most aggressive assumptions will perform the best on most measures, but the better performance is merely the result of assumed better future performance of factors unrelated to the pension funding policy. Under any future scenarios in which there are long-term investment gains, more conservative assumptions will result in lower total pension costs as the interest earned on the additional contributions will offset future pension payments.

⁴ Office of the State Treasurer. “State Treasurer Nappier Presents Preliminary Analysis of Governor’s Pension Funding Proposals Calls for Iron-Clad Guarantee of State’s Payments to Retirees.” Press Release. December 14, 2015. www.otc.ct.gov/pressreleases/press2015/PR121415PensionAlternativesRev.pdf



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BASELINE SCENARIO

BASELINE	
Actuarial cost method:	Projected Unit Credit
Amortization method:	Level percent of payroll, closed
Remaining amortization period	16 years
Asset valuation method	5-year smoothed actuarial value
ACTUARIAL ASSUMPTIONS:	
Investment rate of return	7%
Inflation rate	3%
Wage growth	3.5%

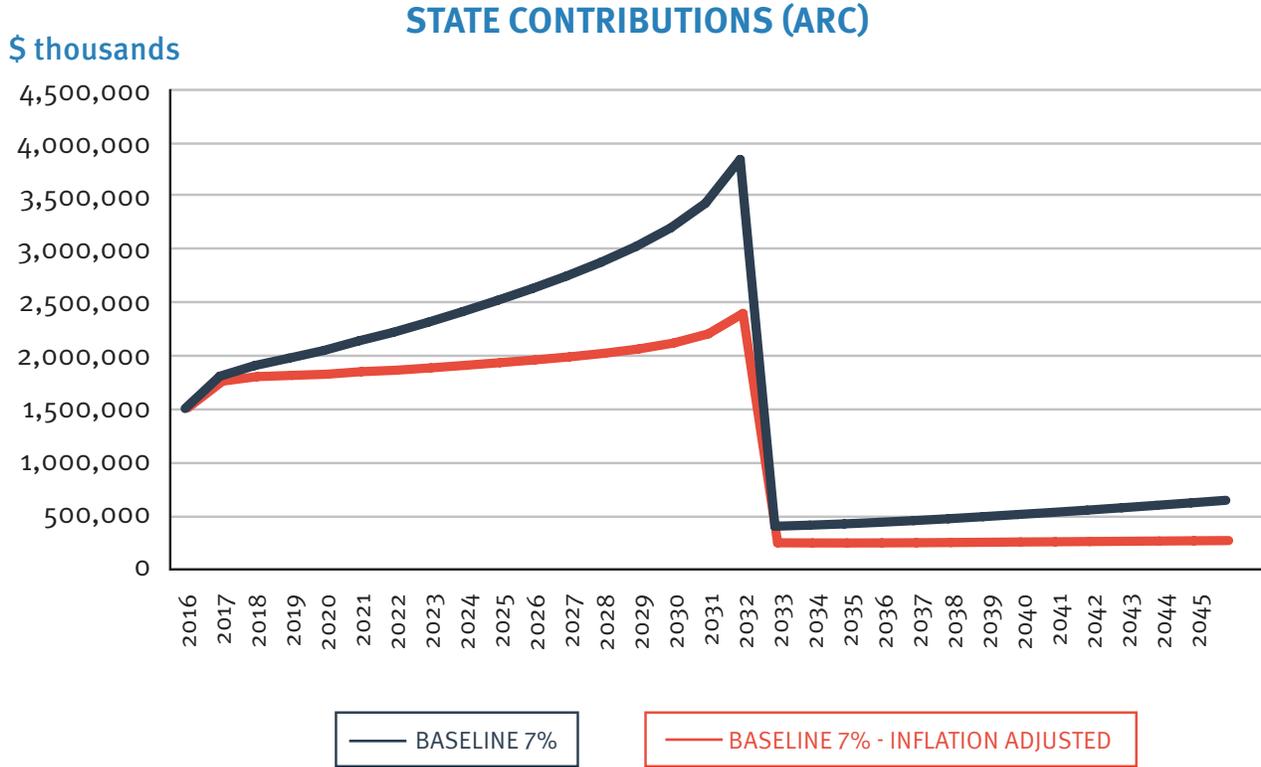
BASELINE SELECT MEASURES

\$ thousands

	FY	Funded Ratio	Total State Contribution	(Savings)/Cost from Current State Contributions	CAGR of State Contribution relative to 2017	Net Present Value of UAAL Contributions 27,133,320
1st Year	2017	39%	1,817,419	248,276	0.00%	
10 Yr. Projection	2026	61%	2,638,952	354,727	4.23%	
End 16 Yr. Amortization	2032	91%	3,850,675	542,232	5.13%	
20 Yr. Projection	2036	100%	447,083	110,723	-7.12%	
End 25 Yr. Amortization	2041	100%	540,161	132,854	-4.93%	



BASELINE SCENARIO



The challenges with the baseline scenario are clearly indicated in the line graph above. Assuming actuarial assumptions are met, the baseline scenario requires significant increases in ARC payments each fiscal year, which will place significant stress on the state budget. In addition, the current pension funding policy incorporates all actuarial gains and losses into the base amortization period, thus as the end of the amortization period approaches substantial fluctuations in gains and losses will have significant impacts on the ARC payments projected above (see example in attachment I). The volatility will further challenge state budget makers as they try to meet growing future ARC payments.

The scenarios below explore options to alleviate the significant growth in ARC payments over the remaining period of our current amortization schedule. Some scenarios perform better than others; the benefits and weaknesses of each option are discussed below.



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SCENARIO #1

Scenario 1 simply extends the closed amortization period from the remaining 16 years to 25 years while continuing to utilize a level percent of payroll to amortization method.

SCENARIO #1	
Actuarial cost method:	Projected Unit Credit
Amortization method:	Level percent of payroll, closed
Remaining amortization period	25 years
Asset valuation method	5-year smoothed actuarial value

SCENARIO #1 SELECT MEASURES

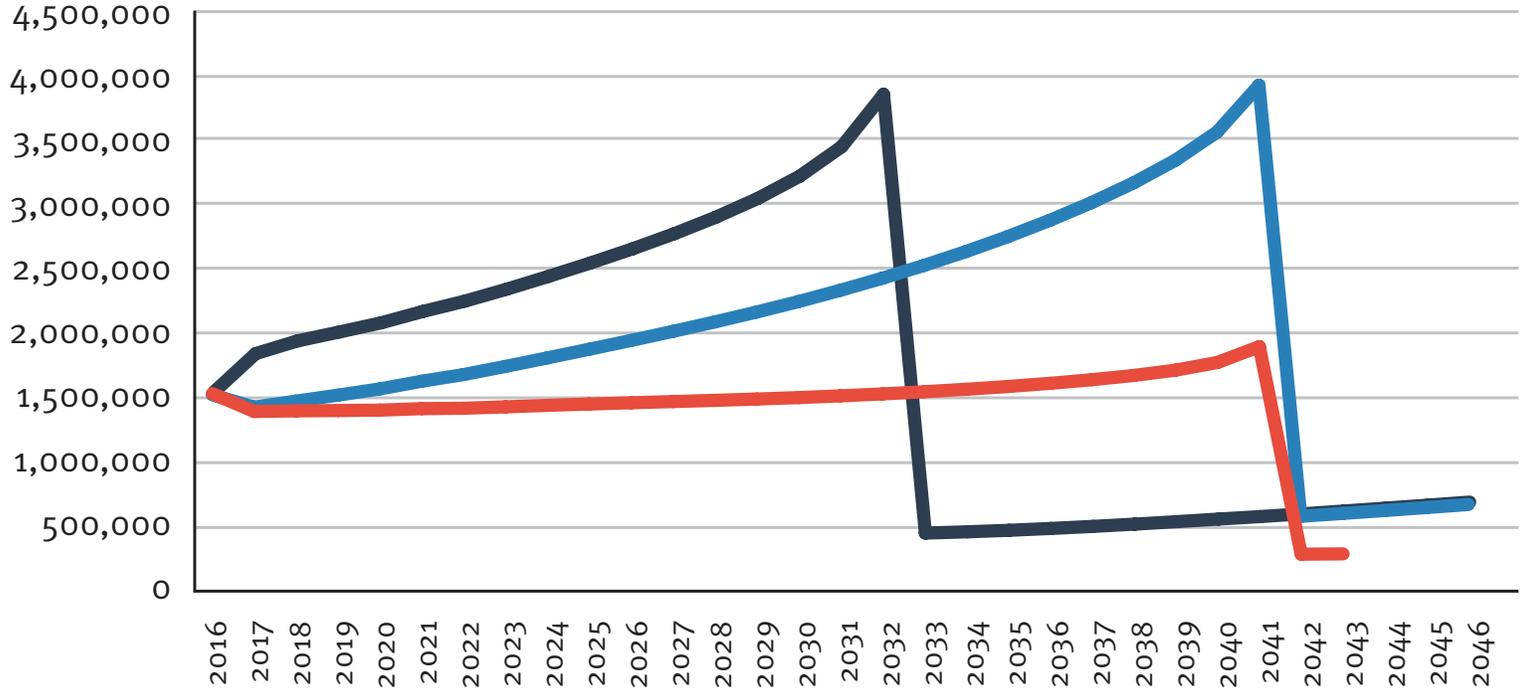
\$ thousands

	FY	Funded Ratio	Total State Contribution	(Savings)/Cost from Baseline State Contributions	CAGR of State Contribution relative to 2017	Net Present Value of UAAL Contributions 31,079,349
1st Year	2017	39%	1,416,856	(400,563)	0.00%	
10 Yr. Projection	2026	46%	1,939,677	(699,275)	3.55%	
End 16 Yr. Amortization	2032	55%	2,427,139	(1,423,536)	3.65%	
20 Yr. Projection	2036	67%	2,881,075	2,433,992	3.81%	
End 25 Yr. Amortization	2041	92%	3,940,299	3,400,138	4.35%	

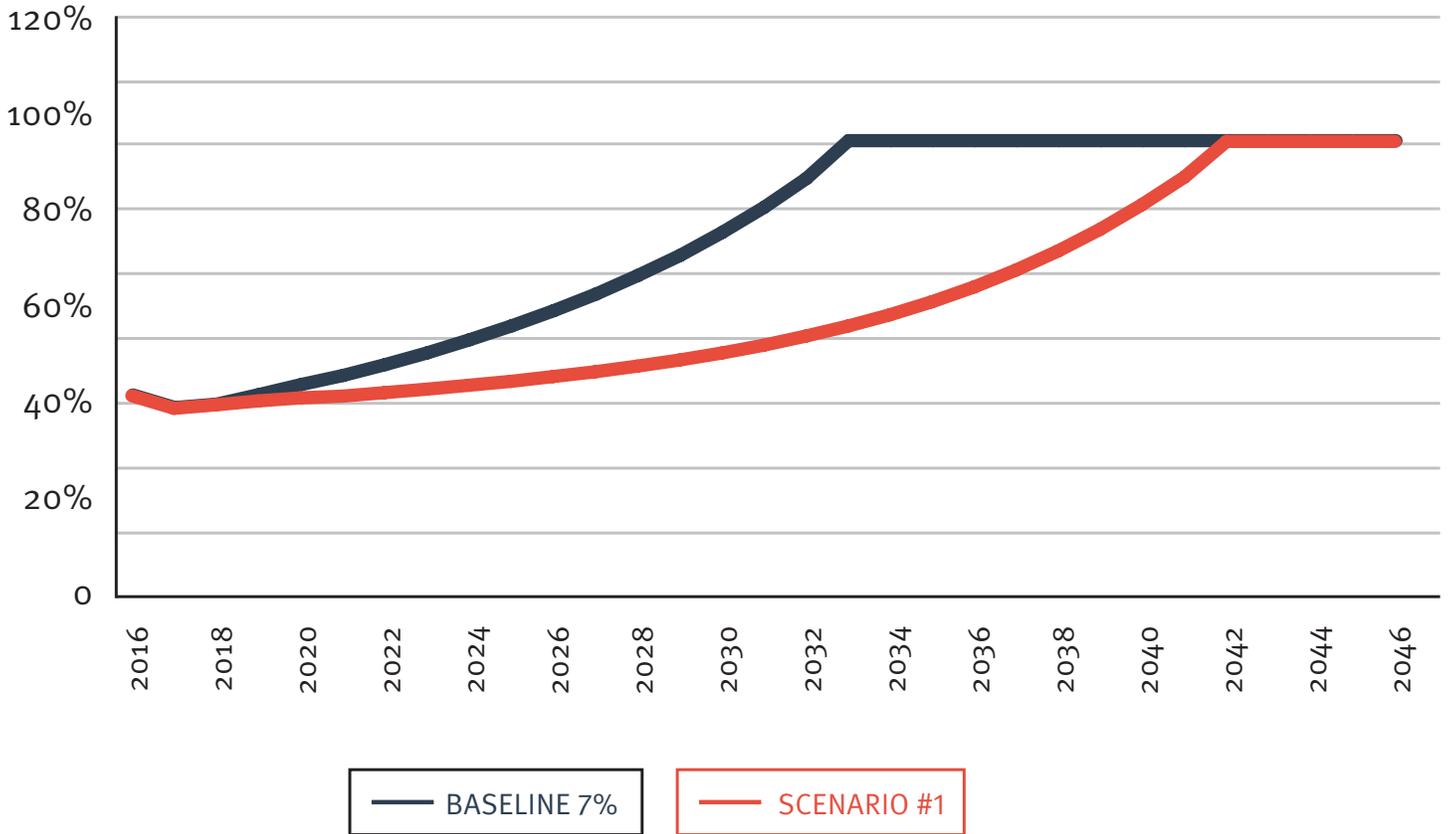


STATE CONTRIBUTIONS (ARC)

\$ thousands



SCENARIO #1 FUNDED RATIO



Spreading out the ARC payments and retaining a level percent of payroll amortization method creates immediate budgetary relief and more manageable ARC payments over the next 16 years – the period remaining on our current amortization schedule. As a tradeoff, the extension of the amortization period results in a significantly lower funded ratio over the term of the extended amortization period and an increase in the principal and financing costs associated with paying off the UAAL of almost \$3 billion in real 2016 dollars.

In addition, the exponential growth in ARC payments at the end of the amortization period is not eliminated, but rather delayed. The annual growth in ARC payments is more limited as indicated by the CAGR measure in fiscal years 2026 and 2032 than under the baseline scenario, but annual ARC payments will still rise over this period and continue to rise through the new close of the amortization period in FY 2042.



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SCENARIO #2

Scenario 2 extends the closed amortization period from the remaining 16 years to 25 years and changes the amortization method from level percent of payroll to level dollar.

SCENARIO #2	
Actuarial cost method:	Projected Unit Credit
Amortization method:	Level dollar, closed
Remaining amortization period	25 years
Asset valuation method	5-year smoothed actuarial value

SCENARIO #2 SELECT MEASURES

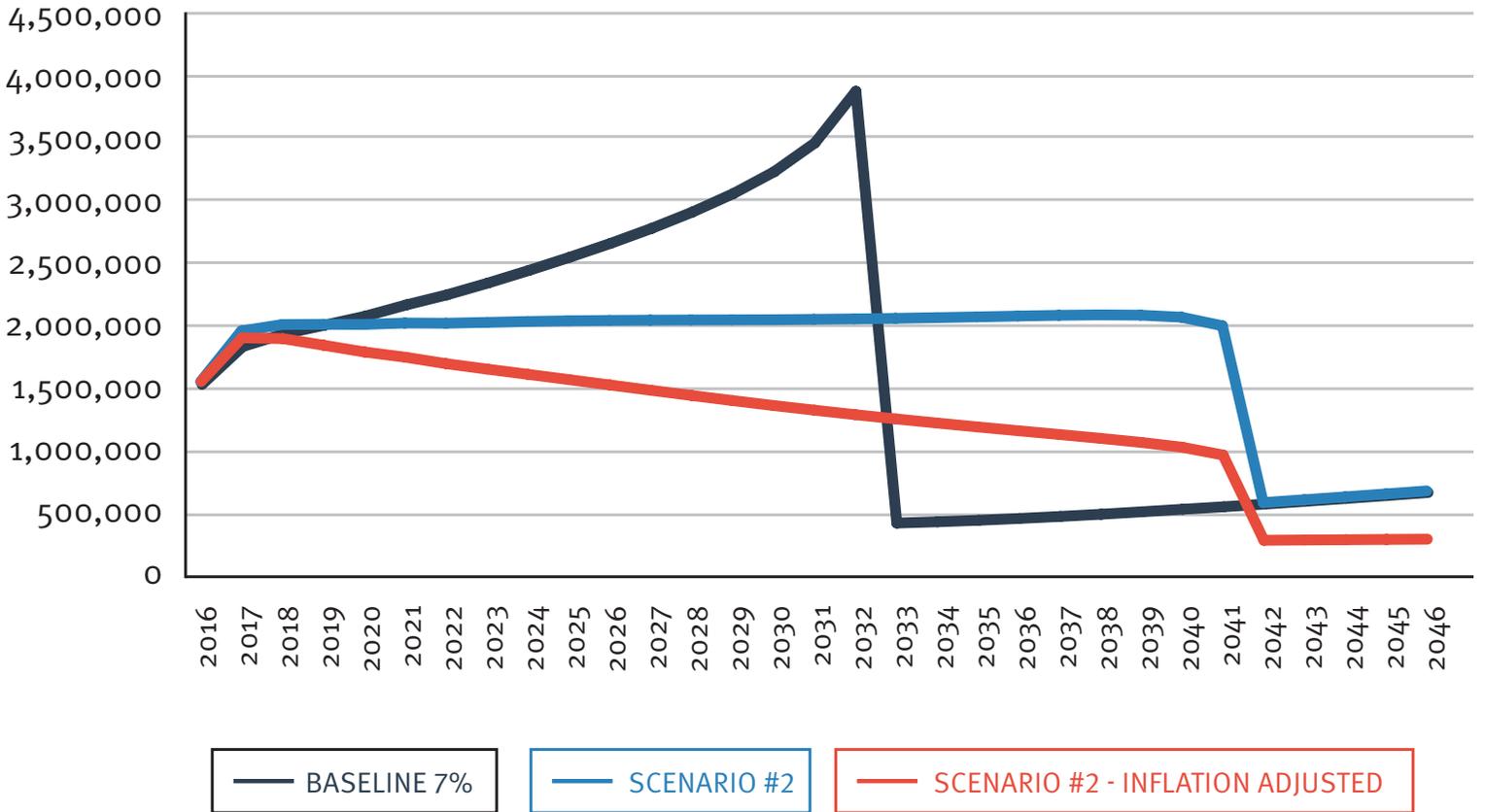
\$ thousands

	FY	Funded Ratio	Total State Contribution	(Savings)/Cost from Baseline State Contributions	CAGR of State Contribution relative to 2017	Net Present Value of UAAL Contributions 28,091,336
1st Year	2017	39%	1,914,951	97,532	0.00%	
10 Yr. Projection	2026	57%	1,997,853	(641,099)	0.47%	
End 16 Yr. Amortization	2032	71%	2,009,685	(1,840,990)	0.32%	
20 Yr. Projection	2036	81%	2,032,174	1,585,091	0.31%	
End 25 Yr. Amortization	2041	97%	1,955,554	1,415,393	0.09%	

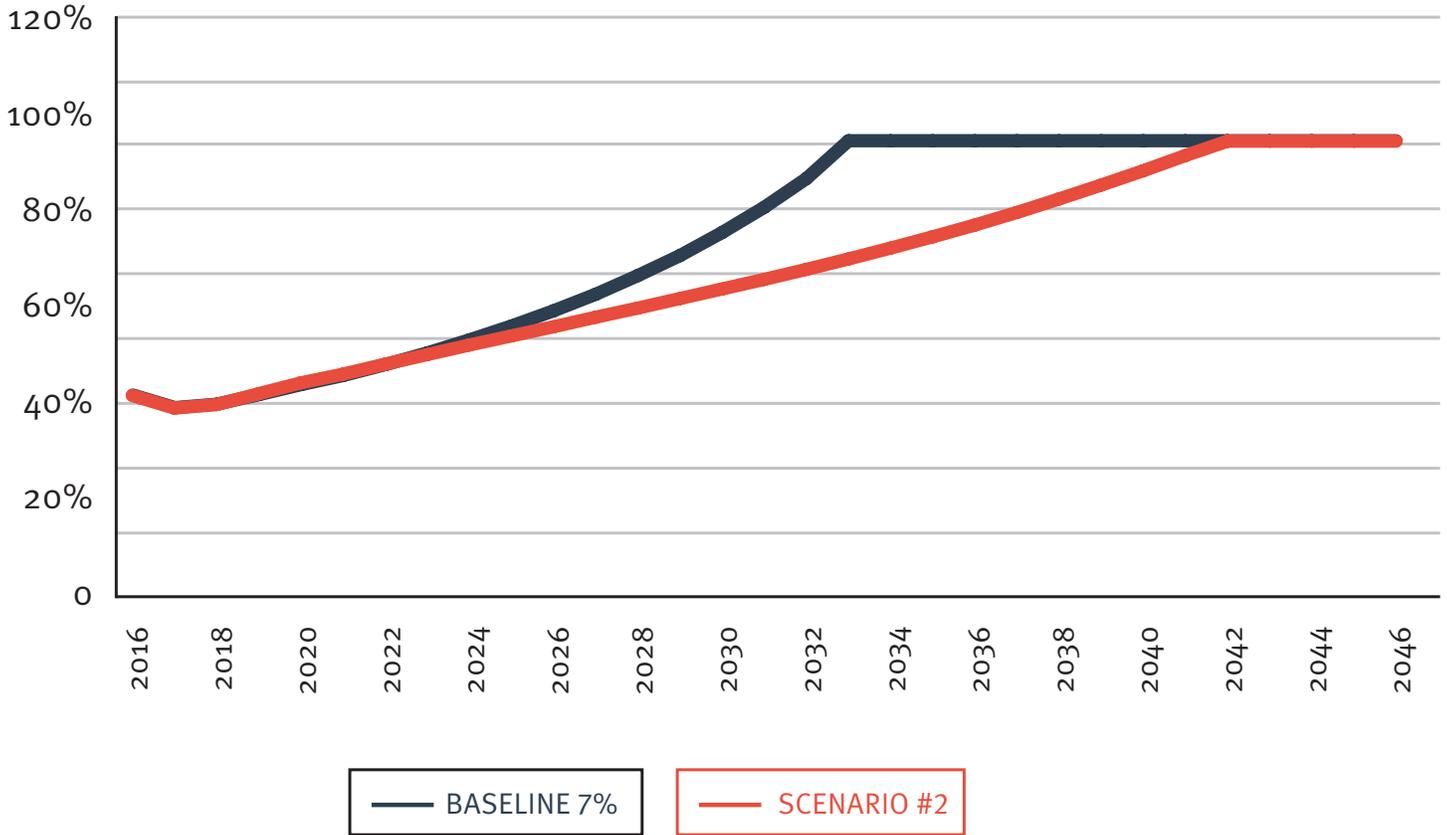


STATE CONTRIBUTIONS (ARC)

\$ thousands



SCENARIO #2 FUNDED RATIO



Changing to level dollar amortization and extending the amortization results in a significant improvement in performance on several measures. It creates substantial predictability in the payment schedule by moving to a level dollar amortization method. Under level dollar the UAAL is paid down in essentially equal parts over the term of the amortization period. The result is an ARC payment that is flat in nominal dollar terms and significantly declines over time in real dollar terms. Moreover, the higher ARC payments in the short-term help to offset the cost of extending the amortization period from 16 to 25 years, adding less than \$1 billion as measured in real 2016 dollars to total principal and financing costs of paying off the UAAL, (see the net present value of UAAL contributions).

Scenario 2 performs significantly better than Scenario 1 in terms of the funded ratio throughout the extended 25-year amortization period. The contrast between Scenario 1 and Scenario 2 is most stark in FY 2032 when Scenario 2 is projected to provide a funded ratio of 71 percent compared to 55 percent under Scenario 1 and requires an ARC payment of approximately \$400 million less than Scenario 1; more than \$1.8 billion less than the Baseline Scenario.

The analysis of Scenario 2 indicates that moving to a level dollar amortization pays big dividends in the long-term and offsets some of the negative impacts of extending the amortization period. Under Scenario 2, cost predictability and stability are improved, future pressure on the state budget as a result of SERS pension payment growth is alleviated, and the increase in total principal and financing costs of paying off the UAAL increase, but significantly less than would occur from extending the amortization period without adjusting the amortization method to level dollar as in Scenario 1.



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SCENARIO #3

Scenario 3 splits the UAAL into two categories; a statutory base and an experience base, and applies different amortization periods to each. The statutory base is the UAAL that had accumulated as of December 31, 1983, (the date Tier I employee benefits closed to new enrollment).⁵ Under this scenario the state would commit to paying off the statutory base as well as the additional costs associated with adjusting the investment return assumption from 8 percent to 7 percent within the current amortization schedule. The remaining UAAL of \$10.6 billion, the experience base, would be amortized over a 25-year closed amortization period. The amortization method is changed to level dollar as in Scenario 2.

SCENARIO #3	
Actuarial cost method:	Projected Unit Credit
Amortization method:	Level dollar, closed
Remaining amortization period	16 years – Statutory Base (4.2 billion) and Assumption Changes – 7% investment return (\$3.3 billion) 25 Years – Remaining UAAL balance of \$10.6 billion
Asset valuation method	5-year smoothed actuarial value

SCENARIO #3 SELECT MEASURES \$ thousands

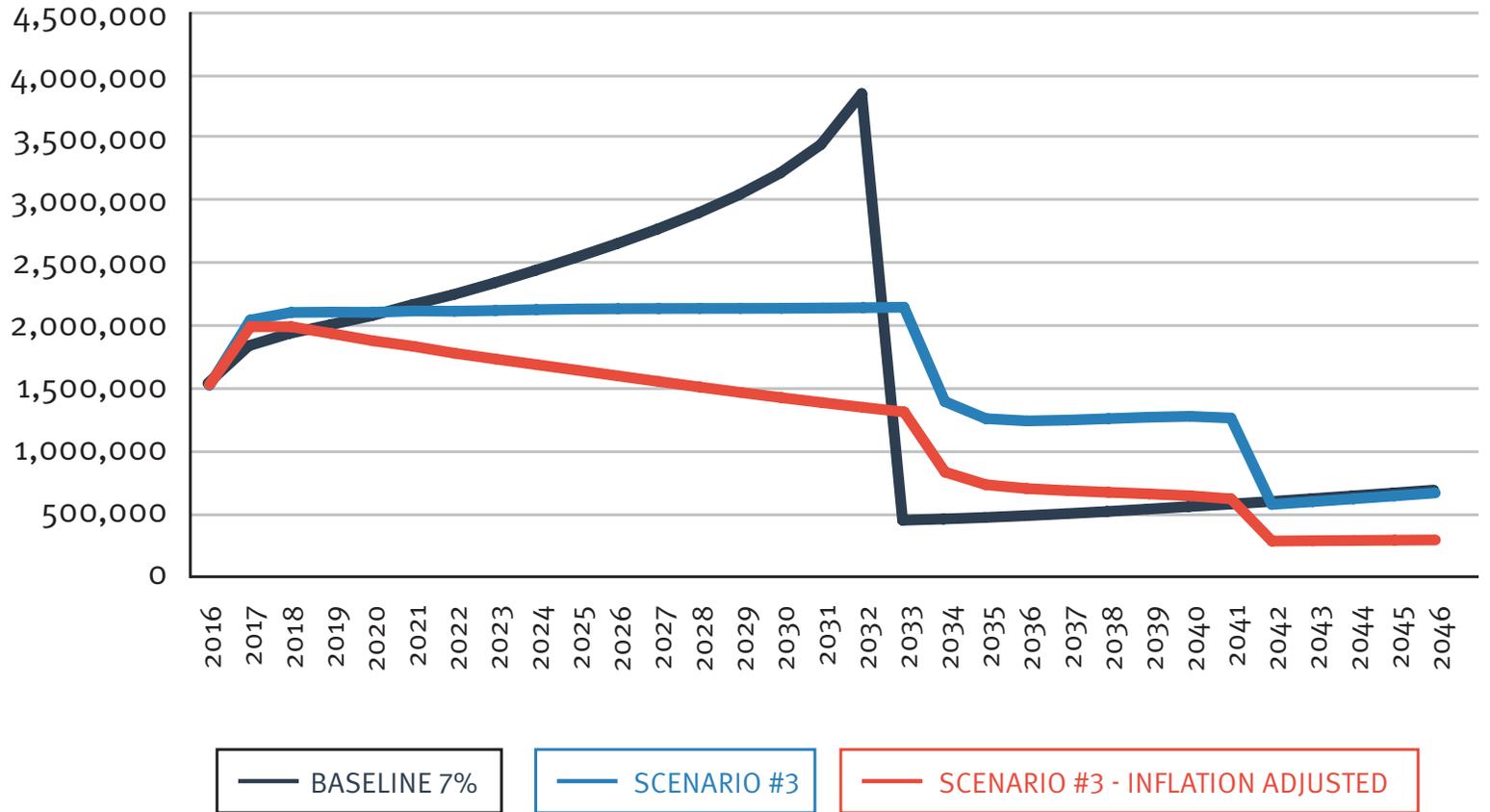
	FY	Funded Ratio	Total State Contribution	(Savings)/Cost from Baseline State Contributions	CAGR of State Contribution relative to 2017	Net Present Value of UAAL Contributions 26,652,221
1st Year	2017	39%	2,038,297	220,878	0.00%	
10 Yr. Projection	2026	61%	2,129,106	(509,846)	0.49%	
End 16 Yr. Amortization	2032	79%	2,137,081	(1,713,594)	0.32%	
20 Yr. Projection	2036	91%	1,230,261	783,178	-2.62%	
End 25 Yr. Amortization	2041	98%	1,253,342	713,181	-2.01%	

⁵ Connecticut General Statutes - Section 5-162-h(b)(2)

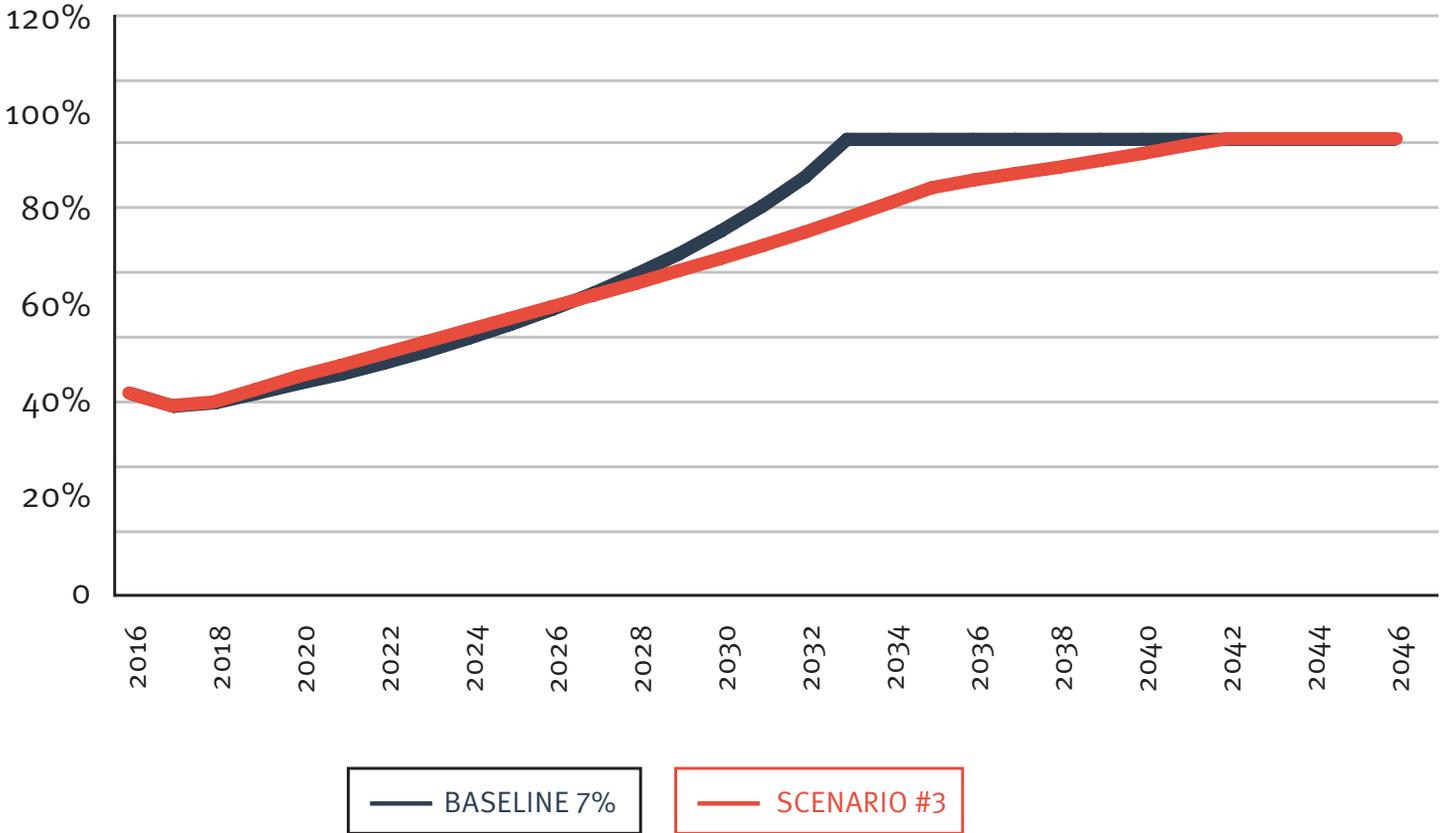


STATE CONTRIBUTIONS (ARC)

\$ thousands



SCENARIO #3 FUNDED RATIO



As the analysis indicates, combing a shift to level dollar amortization and splitting the UAAL into two bases has certain advantages. By requiring more contributions in the early years of the amortization period total principal and interest costs of paying off the UAAL are reduced. In fact total principal and interests costs are lower in real 2016 dollars compared to the Baseline Scenario, despite extending the amortization period for a portion of the unfunded liability. Moreover, Scenario 3 offers a flat payment schedule in nominal dollars through FY 2032, the end of the current amortization schedule, while also providing significant budgetary relief beyond FY 2032 as compared to Scenario 1 or Scenario 2. Finally, Scenario 3 provides higher projected funded ratios than either Scenario 1 or Scenario 2 over the term of the amortization period and higher projected funded ratios than the Baseline Scenario through FY 2026.

Scenario 3 does require a significant increase in ARC payments over the baseline in the near term, an increase in the ARC of more than \$220 million in the first year of the amortization period.



DISCUSSION

The analysis above reveals that certain reforms to SERS pension funding policy would better meet the core principles identified while establishing a schedule of achievable ARC payments for paying off existing UAAL by a date certain. The analysis reveals that the key components of an improved pension funding policy include:

- Adoption of a more conservative investment return assumption
- A change in amortization method from level percent of payroll to level dollar
- An extension of the amortization period from 16 to 25 for paying off the at least part of the UAAL

Combined, the adoption of a more conservative investment return assumption, the change in amortization method and the extension of the amortization period result in an achievable ARC payment schedule, and comport with the core pension funding policy principles identified.

The combined reforms ensure adequate payments to meet obligations as indicated by projected consistent year-over-year improvement in the funded ratio, particularly in the early years of the amortization schedule when ARC payments can often be inadequate to improve the funded ratio. In addition, the adoption of a more conservative investment return assumption will reduce the chances of actuarial losses due to inadequate investment returns. Actuarial losses associated with lower investment returns than assumed in the SERS funding policy have been a big contributor to the increase in SERS unfunded liabilities since FY 2000. ARC payments calculated using overly aggressive investment return assumptions were inadequate to improve the funded ratio of SERS for most of this time period.

The combined reforms also achieve cost stability and predictability by establishing a schedule of ARC payments that is essentially flat in nominal dollar terms over an applicable amortization period and declines in real 2016 dollar terms. In addition, the adoption of a more conservative actuarial investment return assumption that better matches current market conditions reduces the chances of actuarial gains and losses associated with investment returns. Actuarial gains and losses impact future ARC calculations, negatively impacting the cost stability and predictability of ARC payments.

Reducing the investment return option and changing the amortization method to level dollar both result in increased ARC payments in the short-term and therefore more money in the SERS pension fund available for investment. The combined impact of the changes to the investment return assumption and amortization method are somewhat offset by the extension of the amortization period. Still, the total principal and interest cost for paying off the UAAL is similar to the baseline scenario, when the above reforms are instituted. The combined reforms maximize investment returns in comparison to other options that create more affordable and stable long-term ARC payments.

The above reforms are within actuarial best practice and represent a reasonable and responsible strategy for creating stable, predictable and manageable SERS ARC payments in the future. Viewed in totality, it is likely such reforms would be viewed positively by independent bond rating agencies.



Equally as important to a prudent reform of the SERS pension funding policy is the adoption of a layered fixed period amortization policy for gains and losses. As discussed earlier, and demonstrated in appendix I, amortizing gains and losses independently from the base amortization period significantly reduces the volatility of future ARC payments. Finally, a newly adopted funding policy should be accompanied by a commitment to regular independent comprehensive audits of the plans' actuarial valuations to determine the reasonableness of the actuarial methods and assumptions being used. Such regular audits will help right the ship should the plan begin to veer off course again. GASB recommends such audits every 5 to 8 years.⁶

CONSIDERATIONS FOR IMPLEMENTATION

The initial increase in ARC payments that would be required from lowering the investment return assumption to 7 percent and moving to level dollar amortization on the current amortization schedule for SERS creates immediate budget challenges. The initial budget impact of such changes can be partially offset by extending the amortization period for some or all of the UAAL to 25 years, however even with the extension of the amortization period, lowering the investment return option and changing to level dollar will not be easy. It will require a short-term increase in ARC payments at a time when the state is struggling to fund other priorities. Still, the long-term benefits are significant. By adopting these policies now the state has the opportunity to put pension funding issues in the rearview mirror as pension costs would become a declining, rather than increasing, percentage of future budgets, freeing up vital resources to fund other budget priorities and increasing budget stability.

There are several reasonable options to reduce the immediate budget impact of adopting the policies recommended above, including phasing in the increased ARC payments over a 2- or 3-year period or utilizing a small pension obligation bond (POB) to facilitate a phase-in of full ARC payments from the budget. POBs are generally controversial as many jurisdictions have used them to engage in market speculation in effort to achieve arbitrage, earn higher returns on the money raised from the bond sale than paid in interest on the bonds. The strategy is risky and does not always pan out. However, in this case the goal would not be to achieve arbitrage, but rather to facilitate the ramp up in state ARC payments to accommodate a reduced investment return assumption and moving to a level dollar amortization method. Additionally, and perhaps as important, the POBs would present an opportunity to ensure future ARC payments are responsibly made by incorporating a bond covenant requiring full funding of the ARC over the life of the bonds. Such a covenant currently exists for POBs in TRS and has resulted in full ARC payments by the legislature in every year since its adoption.

⁶ GASB. "Sustainable Funding Practices of Defined Benefit Pension Plans". October 2009. www.gfoa.org/sustainable-funding-practices-defined-benefit-pension-plans



CONCLUSION AND RECOMMENDATION

The analysis and discussion detailed above clearly indicate that reasonable options exist to reform the SERS actuarial pension funding policy to create more manageable future ARC payments while meeting certain core principles:

- Ensuring adequate payments to meet obligations,
- Achieving cost stability and predictability,
- Maximizing investment returns to offset future state obligations, and
- Preserving and strengthening the state's bond rating

Specifically, Scenario 2 and Scenario 3 analyzed above best comport with the identified core principles and result in manageable projected ARC payments. While both Scenario 2 and Scenario 3 represent reasonable and responsible proposals for reforming the SERS pension funding policy, Scenario 3 stands out as the most fiscally prudent option. Scenario 3 incorporates the reforms listed above, but only extends the amortization period for paying off a portion of the UAAL. By committing to pay down a portion of the UAAL on the current amortization schedule Scenario 3 is the only reform option analyzed that actually reduces, in real 2016 dollars, the total principal and financing costs of paying off UAAL as compared to the Baseline Scenario. In addition Scenario 3 will provide future legislatures significant budgetary relief in both FY 2033 and FY 2042. Lastly, Scenario 3 improves the funded ratio for SERS more quickly in the short-term than any other option analyzed, putting the plan in the strongest financial position over the next several years.

It is recommended that labor and management adopt a new actuarial funding policy for SERS that embraces the policy changes modeled in Scenario 3, including:

- Changing the amortization method from level percent of payroll to level dollar,
- Committing to pay off a portion of the UAAL on our current amortization schedule, and
- Extending the amortization period to a maximum of 25 years for the remaining UAAL.

These changes combined with the adoption of layered fixed period amortization for gains and losses and a commitment to regular independent comprehensive audits of the plans' actuarial valuations to determine the reasonableness of the actuarial methods and assumptions being used create a strong foundation for a responsible reform to SERS actuarial funding policy.

Moving to a responsible pension funding policy now will pay huge dividends for the state in the future. I am hopeful that the state will heed the Governor's call to action and make the changes necessary to SERS pension funding policy to create real cost stability and predictability. Doing so will protect future generations from ballooning costs and ensure SERS has the resources necessary to fulfill incurred obligations.



APPENDIX I - IMPACT OF AN ASSET SHOCK IN THE FINAL YEARS OF AN AMORTIZATION PERIOD

In order to display the importance of moving to a layered amortization for actuarial gains and losses as part of pension funding reform for SERS we worked with pension experts at PEW Charitable Trusts to demonstrate the impact of an economic shock in the final years of a closed amortization period. The demonstrations below assume an economic shock that results in a 15% reduction in pension plan assets 5 years prior the end of the amortization period under our current actuarial funding policy (demonstration 1), an assumed reform of the policy that adopts a level dollar amortization method, lowers the investment return assumption to 7 percent and expands the amortization period to 25 years in the absence of layered amortization (demonstration 2) and the same reforms as demonstration 1 but with layered amortization for gains and losses (demonstration 3).⁷

The current funding policy (demonstration 1) requires the hypothetical asset shock to be amortized over just 5 years. The short amortization period combined with the level percent of payroll funding methodology results in exponential growth in the ARC payments over the final few years of the amortization schedule culminating in a final balloon payment of over \$7 billion.

The policy changes adopted in demonstration 2, a level dollar amortization method, a reduced investment return assumption and the extension of the amortization period to 25 years, only moderately reduce ARC payments following the modeled asset shock. Under both the current funding policy (demonstration 1) and the assumed changes in demonstration 2 the ARC payments jump to levels that would likely be unachievable for a future legislature to meet.

Adopting layered amortization for actuarial gains and losses would mute large increases in required contributions after a significant loss in assets. Demonstration 3 models the stabilizing impact of layered amortization for gains and losses following a significant asset shock on ARC payments.

In demonstration 3 the adoption of layered amortization for actuarial gains and losses results in a required an ARC payment the year immediately preceding the end of the amortization period that is less than half the ARC in the demonstrations in which layered amortization was not utilized.

The demonstrations below clearly indicate adding layered amortization for actuarial gains and losses significantly increases cost predictability and stability and should be adopted with any funding policy changes that utilize a closed amortization period.

⁷ These examples are stylized to show only the effects of a one-time asset shock that would occur in reality amongst many yearly gains and losses, possibly leading the system to experience results much different than those depicted below.



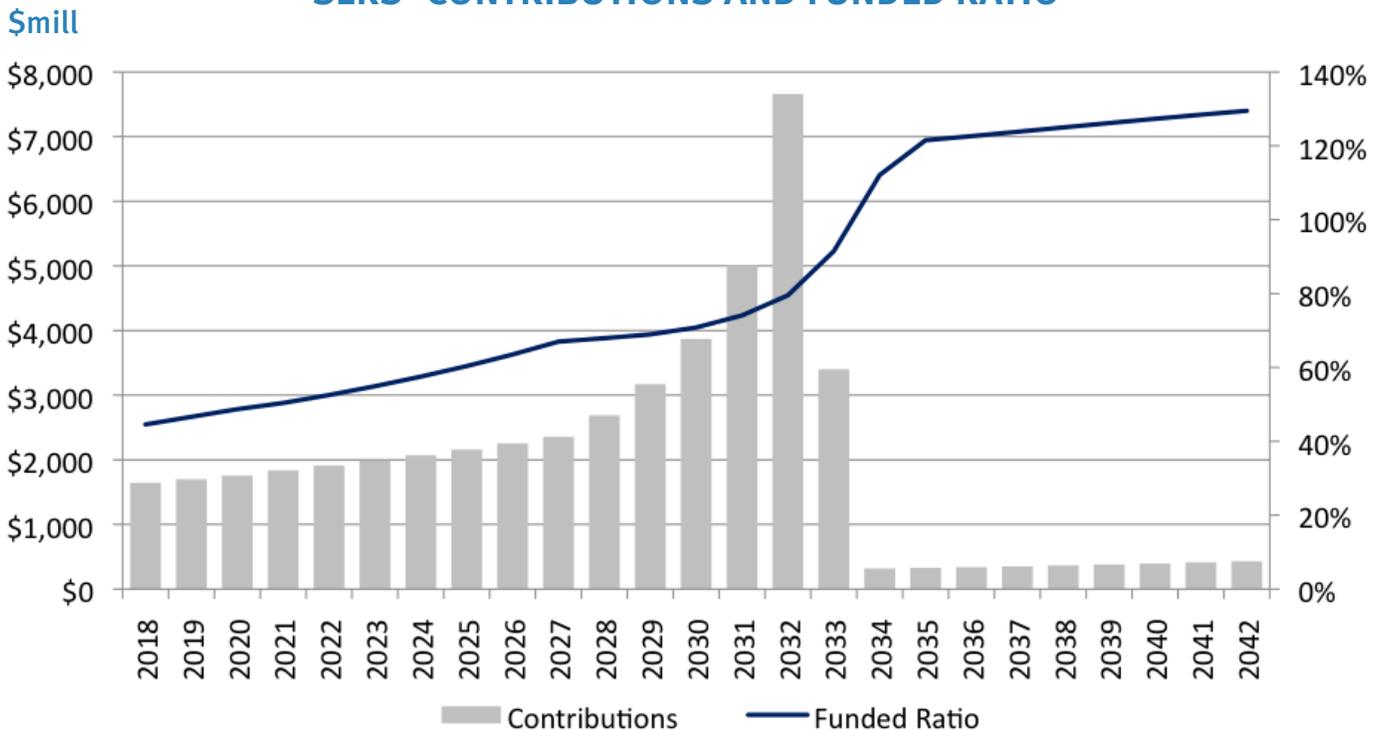
AN EVIDENCE-BASED APPROACH TO PENSION FUNDING REFORM

Demonstration 1

Utilizes the current funding policy and introduces a shock to plan assets of 15% five years before the completion of the amortization schedule.

DEMONSTRATION 1: CURRENT POLICY	
Actuarial cost method:	Projected Unit Credit
Amortization method:	Level percent of payroll, closed
Remaining amortization period	16 years
Asset valuation method	5-year smoothed actuarial value
ACTUARIAL ASSUMPTIONS:	
Investment rate of return	8%
Inflation rate	3%
Wage growth	3.5%

DEMONSTRATION 1 SERS- CONTRIBUTIONS AND FUNDED RATIO



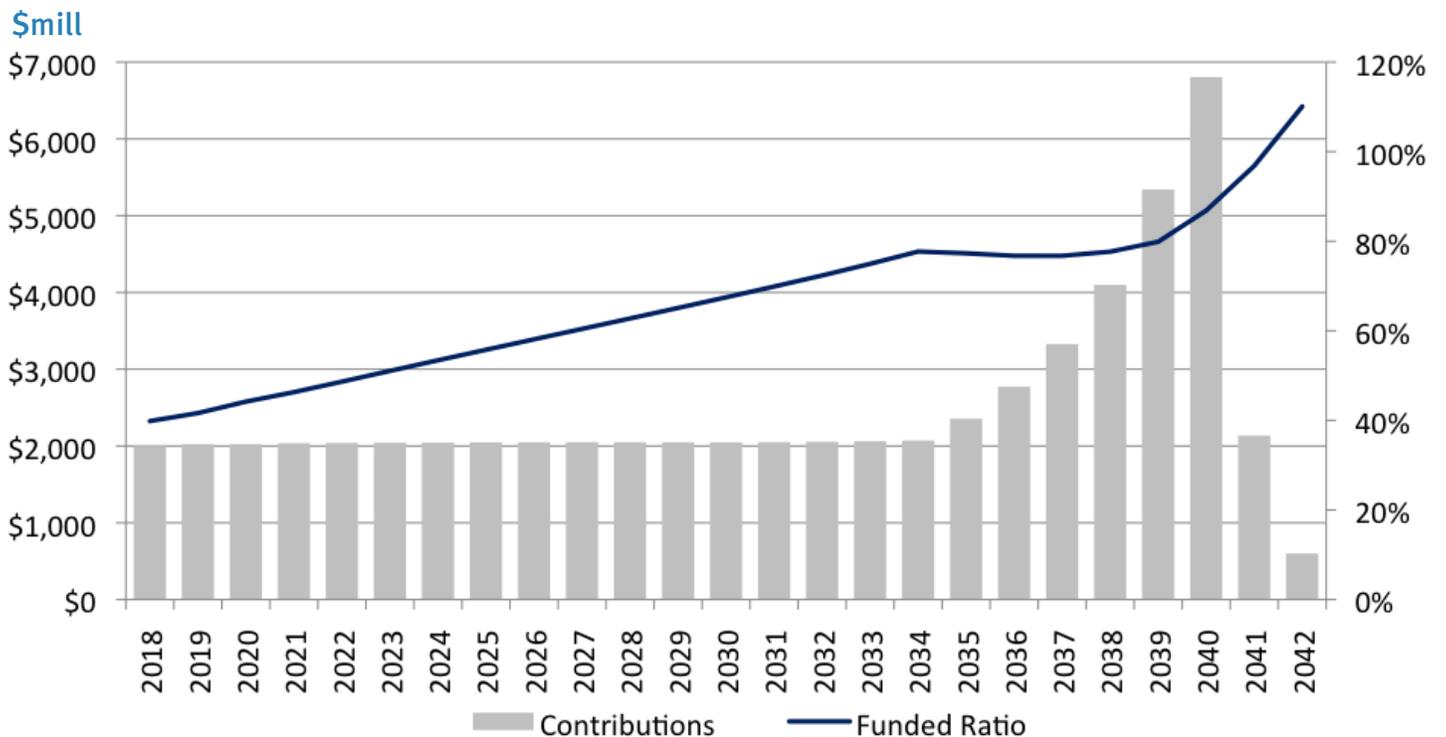
AN EVIDENCE-BASED APPROACH TO PENSION FUNDING REFORM

Demonstration 2

This scenario depicts what the system's contributions would be under a level dollar amortization method, when an asset shock of 15% occurs five years before the completion of the amortization schedule.

DEMONSTRATION 2: LEVEL DOLLAR	
Actuarial cost method:	Projected Unit Credit
Amortization method:	Level Dollar, closed
Remaining amortization period	25 years
Asset valuation method	5-year smoothed actuarial value
ACTUARIAL ASSUMPTIONS:	
Investment rate of return	7%
Inflation rate	3%
Wage growth	3.5%

DEMONSTRATION 2 SERS- CONTRIBUTIONS AND FUNDED RATIO



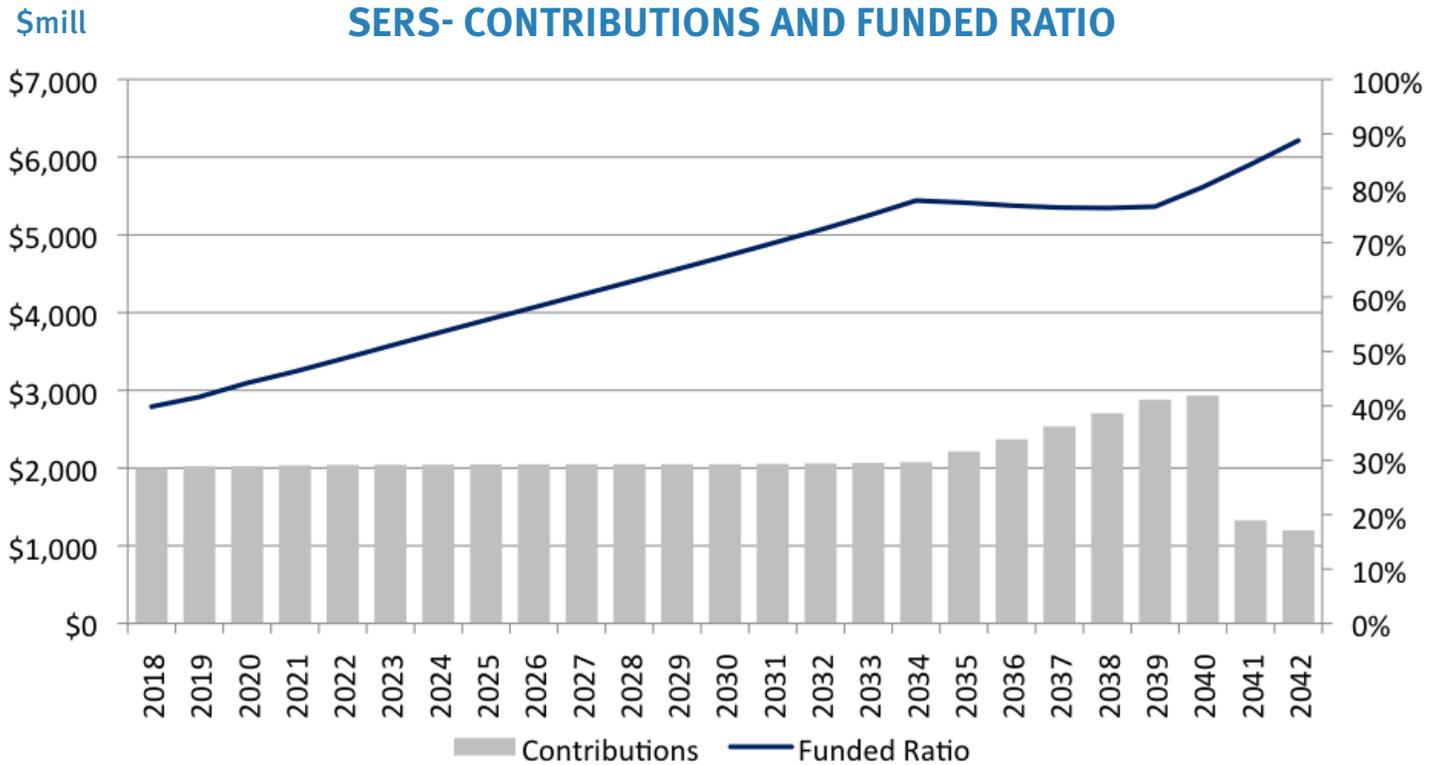
AN EVIDENCE-BASED APPROACH TO PENSION FUNDING REFORM

Demonstration 3

This scenario utilizes the same amortization method as Scenario 2, but now includes the introduction of layered bases to any new gains or losses on assets, thus allowing the asset shock of 15% that occurs five years before the completion of the amortization schedule to be paid over an additional 20-year period.

DEMONSTRATION 2: LEVEL DOLLAR	
Actuarial cost method:	Projected Unit Credit
Amortization method:	Level percent of payroll, closed, layered bases
Remaining amortization period	25 years
Asset valuation method	5-year smoothed actuarial value
ACTUARIAL ASSUMPTIONS:	
Investment rate of return	7%
Inflation rate	3%
Wage growth	3.5%

DEMONSTRATION 3 SERS- CONTRIBUTIONS AND FUNDED RATIO



APPENDIX II

Baseline Scenario
Connecticut SERS
30 Year Projection based on June 30, 2014 Valuation
Assuming 7.00% Investment Return for All Years in Projection
Baseline Results - Amortization Period is a Closed 16 Year Period in 2015 Valuation
(Dollars in Thousands)

Valuation Date 6/30/YYYY	FY	Contributions for Fiscal Year Ending											Inflation Adjusted Total State Contributions	CAGR of State Contribution relative to 2017	Net Present Value of UAAL Contributions
		Annual Valuation Payroll	Benefits Payments	Unfunded Accrued Liability Beginning of Valuation Year	Funded Ratio	Employer Normal Cost	Amortization of Unfunded Accrued Liability	Total State Contribution	Employee Contribution	Total Contribution	(Savings)/Cost from Current State Contributions				
2014	2016	3,487,577	1,563,029	14,920,815	41.50%	278,813	1,235,655	1,514,468	77,122	1,591,590	0	1,514,468	1,514,468	0.00%	1,514,468
2015	2017	3,516,662	1,650,465	18,091,955	38.60%	362,471	1,454,948	1,817,419	77,718	1,895,137	248,276	1,764,484	1,764,484	5.49%	1,764,484
2016	2018	3,541,760	1,722,399	18,349,448	39.40%	365,297	1,551,842	1,917,139	80,230	1,997,369	264,833	1,807,087	1,807,087	4.56%	1,807,087
2017	2019	3,612,428	1,797,434	18,128,866	41.60%	367,694	1,619,415	1,987,109	83,794	2,070,903	274,428	1,818,486	1,818,486	4.25%	1,818,486
2018	2020	3,687,348	1,874,138	17,833,740	43.90%	367,987	1,691,143	2,059,130	87,414	2,146,544	283,549	1,829,510	1,829,510	4.27%	1,829,510
2019	2021	3,765,914	1,952,276	17,578,689	46.00%	368,561	1,779,992	2,148,553	91,151	2,239,704	292,500	1,853,361	1,853,361	4.17%	1,853,361
2020	2022	3,847,735	2,032,093	17,119,911	48.50%	365,278	1,863,884	2,229,162	94,994	2,324,156	302,148	1,866,888	1,866,888	4.18%	1,866,888
2021	2023	3,929,729	2,116,671	16,533,971	51.20%	371,660	1,951,418	2,323,078	98,862	2,421,940	313,919	1,888,875	1,888,875	4.20%	1,888,875
2022	2024	4,018,135	2,199,149	15,828,411	54.20%	377,853	2,045,487	2,423,340	102,906	2,526,246	326,677	1,913,007	1,913,007	4.21%	1,913,007
2023	2025	4,110,963	2,281,617	14,981,328	57.40%	382,298	2,146,134	2,528,432	106,968	2,635,400	340,221	1,937,833	1,937,833	4.23%	1,937,833
2024	2026	4,210,217	2,362,389	13,973,556	60.90%	384,892	2,254,060	2,638,952	111,193	2,750,145	354,727	1,963,628	1,963,628	4.26%	1,963,628
2025	2027	4,316,401	2,443,185	12,787,492	64.70%	386,779	2,370,918	2,757,697	115,594	2,873,291	370,683	1,992,219	1,992,219	4.30%	1,992,219
2026	2028	4,427,139	2,524,673	11,405,179	69.00%	388,208	2,499,804	2,888,012	120,101	3,008,113	388,623	2,025,594	2,025,594	4.37%	2,025,594
2027	2029	4,545,862	2,604,014	9,801,273	73.60%	389,758	2,645,169	3,034,927	124,801	3,159,728	409,511	2,066,638	2,066,638	4.47%	2,066,638
2028	2030	4,670,724	2,681,476	7,948,935	78.90%	391,924	2,817,353	3,209,277	129,640	3,338,917	435,346	2,121,710	2,121,710	4.66%	2,121,710
2029	2031	4,805,311	2,754,154	5,811,570	84.70%	396,744	3,043,024	3,439,768	134,842	3,574,610	471,599	2,207,856	2,207,856	5.13%	2,207,856
2030	2032	4,950,741	2,820,769	3,343,379	91.30%	402,564	3,448,111	3,850,675	140,451	3,991,126	542,232	2,399,613	2,399,613	-8.88%	2,399,613
2031	2033	5,106,452	2,881,185	0	100.00%	410,516	0	410,516	146,462	556,978	99,937	248,369	248,369	-8.25%	248,369
2032	2034	5,270,959	2,936,522	0	100.00%	420,632	0	420,632	152,844	573,476	103,288	247,077	247,077	-7.66%	247,077
2033	2035	5,446,115	2,984,178	0	100.00%	432,587	0	432,587	159,571	592,158	106,921	246,698	246,698	-7.12%	246,698
2034	2036	5,630,233	3,025,284	0	100.00%	447,083	0	447,083	164,966	612,049	110,723	247,539	247,539	-6.61%	247,539
2035	2037	5,822,889	3,061,804	0	100.00%	463,155	0	463,155	170,611	633,766	114,752	248,969	248,969	-6.14%	248,969
2036	2038	6,026,725	3,090,954	0	100.00%	480,776	0	480,776	176,583	657,359	119,003	250,913	250,913	-5.70%	250,913
2037	2039	6,240,401	3,114,398	0	100.00%	500,235	0	500,235	182,844	683,079	123,525	253,465	253,465	-5.29%	253,465
2038	2040	6,463,028	3,133,706	0	100.00%	520,455	0	520,455	189,367	709,822	128,191	256,029	256,029	-4.93%	256,029
2039	2041	6,691,998	3,151,318	0	100.00%	540,161	0	540,161	196,076	736,237	132,854	257,984	257,984	-4.59%	257,984
2040	2042	6,930,071	3,165,568	0	100.00%	561,494	0	561,494	203,051	764,545	137,784	260,362	260,362	-4.27%	260,362
2041	2043	7,178,562	3,176,006	0	100.00%	583,776	0	583,776	210,332	794,108	142,888	262,810	262,810	-3.98%	262,810
2042	2044	7,436,073	3,184,512	0	100.00%	606,550	0	606,550	217,877	824,427	148,140	265,109	265,109	-3.71%	265,109
2043	2045	7,702,571	3,192,727	0	100.00%	629,859	0	629,859	225,685	855,544	153,549	267,278	267,278	-3.46%	267,278
2044	2046	7,979,861	3,199,913	0	100.00%	653,634	0	653,634	233,810	887,444	159,100	269,289	269,289		269,289
							36,418,357	50,018,051	4,407,860	54,425,911	7,399,927	36,553,148			27,133,320

APPENDIX II

Scenario 1
Connecticut SERS
30 Year Projection based on June 30, 2014 Valuation
Assuming 7.00% Investment Return for All Years in Projection
Change Amortization Period to Closed 25 Year Period in 2015 Valuation
(Dollars in Thousands)

Valuation Date 6/30/YYYY	FY	Contributions for Fiscal Year Ending											Inflation Adjusted Total State Contributions	CAGR of State Contribution relative to 2017	Net Present Value of UAAL Contributions
		Annual Valuation Payroll	Benefits Payments	Unfunded Accrued Liability Beginning of Valuation Year	Funded Ratio	Employer Normal Cost	Amortization of Unfunded Accrued Liability	Total State Contribution	Employee Contribution	Total Contribution	(Savings)/Cost from State Contributions				
2014	2016	3,487,577	1,563,029	14,920,815	41.50%	278,813	1,235,655	1,514,468	77,122	1,591,590	0	1,514,468	1,514,468	0.00%	1,514,468
2015	2017	3,516,662	1,650,465	18,091,955	38.60%	362,471	1,054,385	1,416,856	77,718	1,494,574	-400,563	1,375,588	1,375,588	0.00%	1,375,588
2016	2018	3,541,760	1,722,399	18,349,448	39.40%	365,297	1,099,014	1,464,311	80,230	1,544,541	-452,828	1,380,254	1,380,254	3.35%	1,380,254
2017	2019	3,612,428	1,797,434	18,543,449	40.30%	367,694	1,143,296	1,510,990	83,794	1,594,784	-476,119	1,382,770	1,382,770	3.27%	1,382,770
2018	2020	3,687,348	1,874,138	18,746,020	41.00%	367,987	1,191,936	1,559,923	87,414	1,647,337	-499,207	1,385,971	1,385,971	3.26%	1,385,971
2019	2021	3,765,914	1,952,276	19,047,613	41.40%	368,561	1,251,483	1,620,044	91,151	1,711,195	-528,509	1,397,464	1,397,464	3.41%	1,397,464
2020	2022	3,847,735	2,032,093	19,208,339	42.20%	365,278	1,306,974	1,672,252	94,994	1,767,246	-556,910	1,400,485	1,400,485	3.37%	1,400,485
2021	2023	3,929,729	2,116,671	19,315,596	43.00%	371,660	1,364,367	1,736,027	98,862	1,834,889	-587,051	1,411,549	1,411,549	3.44%	1,411,549
2022	2024	4,018,135	2,199,149	19,381,152	43.90%	377,853	1,425,015	1,802,868	102,906	1,905,774	-620,472	1,423,201	1,423,201	3.50%	1,423,201
2023	2025	4,110,963	2,281,617	19,390,359	44.80%	382,298	1,488,508	1,870,806	106,968	1,977,774	-657,626	1,433,817	1,433,817	3.54%	1,433,817
2024	2026	4,210,217	2,362,389	19,333,408	45.90%	384,892	1,554,785	1,939,677	111,193	2,050,870	-699,275	1,443,302	1,443,302	3.55%	1,443,302
2025	2027	4,316,401	2,443,185	19,203,176	47.00%	386,779	1,624,044	2,010,823	115,594	2,126,417	-746,874	1,452,661	1,452,661	3.56%	1,452,661
2026	2028	4,427,139	2,524,673	18,993,711	48.30%	388,208	1,696,670	2,084,878	120,101	2,204,979	-803,134	1,462,291	1,462,291	3.57%	1,462,291
2027	2029	4,545,862	2,604,014	18,694,018	49.70%	389,758	1,772,722	2,162,480	124,801	2,287,281	-872,447	1,472,544	1,472,544	3.59%	1,472,544
2028	2030	4,670,724	2,681,476	18,295,415	51.30%	391,924	1,852,567	2,244,491	129,640	2,374,131	-964,786	1,483,873	1,483,873	3.60%	1,483,873
2029	2031	4,805,311	2,754,154	17,785,287	53.10%	396,744	1,936,325	2,333,069	134,842	2,467,911	-1,106,699	1,497,508	1,497,508	3.63%	1,497,508
2030	2032	4,950,741	2,820,769	17,153,810	55.20%	402,564	2,024,575	2,427,139	140,451	2,567,590	-1,423,536	1,512,513	1,512,513	3.65%	1,512,513
2031	2033	5,106,452	2,881,185	16,386,410	57.50%	410,516	2,117,597	2,528,113	146,462	2,674,575	2,117,597	1,529,550	1,529,550	3.69%	1,529,550
2032	2034	5,270,959	2,936,522	15,470,706	60.10%	420,632	2,216,239	2,636,871	152,844	2,789,715	2,216,239	1,548,884	1,548,884	3.72%	1,548,884
2033	2035	5,446,115	2,984,178	14,389,719	63.10%	432,587	2,321,191	2,753,778	159,571	2,913,349	2,321,191	1,570,441	1,570,441	3.76%	1,570,441
2034	2036	5,630,233	3,025,284	13,127,677	66.50%	447,083	2,433,992	2,881,075	164,966	3,046,041	2,433,992	1,595,181	1,595,181	3.81%	1,595,181
2035	2037	5,822,889	3,061,804	11,665,945	70.40%	463,155	2,556,959	3,020,114	170,611	3,190,725	2,556,959	1,623,460	1,623,460	3.86%	1,623,460
2036	2038	6,026,725	3,090,954	9,980,359	74.80%	480,776	2,693,501	3,174,277	176,583	3,350,860	2,693,501	1,656,631	1,656,631	3.92%	1,656,631
2037	2039	6,240,401	3,114,398	8,045,379	79.80%	500,235	2,851,536	3,351,771	182,844	3,534,615	2,851,536	1,698,315	1,698,315	3.99%	1,698,315
2038	2040	6,463,028	3,133,706	5,831,314	85.50%	520,455	3,053,362	3,573,817	189,367	3,763,184	3,053,362	1,758,081	1,758,081	4.10%	1,758,081
2039	2041	6,691,998	3,151,318	3,296,863	91.80%	540,161	3,400,138	3,940,299	196,076	4,136,375	3,400,138	1,881,909	1,881,909	4.35%	1,881,909
2040	2042	6,930,071	3,165,568	0	100.00%	561,494	0	561,494	203,051	764,545	0	260,362	260,362	-3.63%	260,362
2041	2043	7,178,562	3,176,006	0	100.00%	583,776	0	583,776	210,332	794,108	0	262,810	262,810	-3.35%	262,810
2042	2044	7,436,073	3,184,512	0	100.00%	606,550	0	606,550	217,877	824,427	0	265,109	265,109	-3.09%	265,109
2043	2045	7,702,571	3,192,727	0	100.00%	629,859	0	629,859	225,685	855,544	0	267,278	267,278	-2.85%	267,278
2044	2046	7,979,861	3,199,913	0	100.00%	653,634	0	653,634	233,810	887,444	0	269,289	269,289	-2.63%	269,289
							48,666,836	62,266,530	4,407,860	66,674,390	12,248,479	40,617,558			31,079,349

APPENDIX II

Scenario 2
Connecticut SERS
30 Year Projection based on June 30, 2014 Valuation
Assuming 7.00% Investment Return for All Years in Projection
Change to Level Dollar Amortization Basis
Change Amortization Period to Closed 25 Year Period in 2015 Valuation
(Dollars in Thousands)

Valuation Date 6/30/YYYY	FY	Contributions for Fiscal Year Ending										Inflation Adjusted Total State Contributions	CAGR of State Contribution relative to 2017	Net Present Value of UAAL Contributions
		Annual Valuation Payroll	Benefits Payments	Unfunded Accrued Liability Beginning of Valuation Year	Funded Ratio	Employer Normal Cost	Amortization of Unfunded Accrued Liability	Total State Contribution	Employee Contribution	Total Contribution	(Savings)/Cost from State Contributions			
2014	2016	3,487,577	1,563,029	14,920,815	41.50%	278,813	1,235,655	1,514,468	77,122	1,591,590	0	1,514,468	0.00%	1,514,468
2015	2017	3,516,662	1,650,465	18,091,955	38.60%	362,471	1,552,480	1,914,951	77,718	1,992,669	97,532	1,859,176	0.00%	1,859,176
2016	2018	3,541,760	1,722,399	18,349,448	39.40%	365,297	1,599,870	1,965,167	80,230	2,045,397	48,028	1,852,358	2.62%	1,852,358
2017	2019	3,612,428	1,797,434	18,027,921	41.90%	367,694	1,599,328	1,967,022	83,794	2,050,816	-20,087	1,800,104	1.35%	1,800,104
2018	2020	3,687,348	1,874,138	17,676,019	44.40%	367,987	1,598,014	1,966,001	87,414	2,053,415	-93,129	1,746,766	0.88%	1,746,766
2019	2021	3,765,914	1,952,276	17,430,718	46.40%	368,561	1,608,664	1,977,225	91,151	2,068,376	-171,328	1,705,572	0.80%	1,705,572
2020	2022	3,847,735	2,032,093	17,057,971	48.70%	365,278	1,610,152	1,975,430	94,994	2,070,424	-253,732	1,654,392	0.62%	1,654,392
2021	2023	3,929,729	2,116,671	16,645,021	50.90%	371,660	1,610,456	1,982,116	98,862	2,080,978	-340,962	1,611,642	0.58%	1,611,642
2022	2024	4,018,135	2,199,149	16,209,847	53.10%	377,853	1,611,463	1,989,316	102,906	2,092,222	-434,024	1,570,384	0.55%	1,570,384
2023	2025	4,110,963	2,281,617	15,742,360	55.20%	382,298	1,612,414	1,994,712	106,968	2,101,680	-533,720	1,528,781	0.51%	1,528,781
2024	2026	4,210,217	2,362,389	15,237,076	57.30%	384,892	1,612,961	1,997,853	111,193	2,109,046	-641,099	1,486,590	0.47%	1,486,590
2025	2027	4,316,401	2,443,185	14,691,858	59.50%	386,779	1,613,087	1,999,866	115,594	2,115,460	-757,831	1,444,746	0.43%	1,444,746
2026	2028	4,427,139	2,524,673	14,106,389	61.60%	388,208	1,612,994	2,001,202	120,101	2,121,303	-886,810	1,403,603	0.40%	1,403,603
2027	2029	4,545,862	2,604,014	13,475,923	63.80%	389,758	1,612,406	2,002,164	124,801	2,126,965	-1,032,763	1,363,376	0.37%	1,363,376
2028	2030	4,670,724	2,681,476	12,798,658	66.00%	391,924	1,611,376	2,003,300	129,640	2,132,940	-1,205,977	1,324,417	0.35%	1,324,417
2029	2031	4,805,311	2,754,154	12,069,685	68.20%	396,744	1,609,576	2,006,320	134,842	2,141,162	-1,433,448	1,287,780	0.33%	1,287,780
2030	2032	4,950,741	2,820,769	11,287,747	70.50%	402,564	1,607,121	2,009,685	140,451	2,150,136	-1,840,990	1,252,369	0.32%	1,252,369
2031	2033	5,106,452	2,881,185	10,447,908	72.90%	410,516	1,603,612	2,014,128	146,462	2,160,590	1,603,612	1,218,581	0.32%	1,218,581
2032	2034	5,270,959	2,936,522	9,548,573	75.40%	420,632	1,599,078	2,019,710	152,844	2,172,554	1,599,078	1,186,367	0.31%	1,186,367
2033	2035	5,446,115	2,984,178	8,585,010	78.00%	432,587	1,592,976	2,025,563	159,571	2,185,134	1,592,976	1,155,150	0.31%	1,155,150
2034	2036	5,630,233	3,025,284	7,555,401	80.70%	447,083	1,585,091	2,032,174	164,966	2,197,140	1,585,091	1,125,165	0.31%	1,125,165
2035	2037	5,822,889	3,061,804	6,457,311	83.60%	463,155	1,574,878	2,038,033	170,611	2,208,644	1,574,878	1,095,543	0.31%	1,095,543
2036	2038	6,026,725	3,090,954	5,285,733	86.70%	480,776	1,560,497	2,041,273	176,583	2,217,856	1,560,497	1,065,325	0.30%	1,065,325
2037	2039	6,240,401	3,114,398	4,038,583	89.90%	500,235	1,538,909	2,039,144	182,844	2,221,988	1,538,909	1,033,217	0.29%	1,033,217
2038	2040	6,463,028	3,133,706	2,716,702	93.20%	520,455	1,502,585	2,023,040	189,367	2,212,407	1,502,585	995,202	0.24%	995,202
2039	2041	6,691,998	3,151,318	1,322,797	96.70%	540,161	1,415,393	1,955,554	196,076	2,151,630	1,415,393	933,983	0.09%	933,983
2040	2042	6,930,071	3,165,568	0	100.00%	561,494	0	561,494	203,051	764,545	0	260,362	-4.79%	260,362
2041	2043	7,178,562	3,176,006	0	100.00%	583,776	0	583,776	210,332	794,108	0	262,810	-4.47%	262,810
2042	2044	7,436,073	3,184,512	0	100.00%	606,550	0	606,550	217,877	824,427	0	265,109	-4.17%	265,109
2043	2045	7,702,571	3,192,727	0	100.00%	629,859	0	629,859	225,685	855,544	0	267,278	-3.89%	267,278
2044	2046	7,979,861	3,199,913	0	100.00%	653,634	0	653,634	233,810	887,444	0	269,289	-3.64%	269,289
							40,891,036	54,490,730	4,407,860	58,898,590	4,472,679	37,539,905		28,091,336

APPENDIX II

Scenario 3
Connecticut SERS
30 Year Projection based on June 30, 2014 Valuation
Change to Assuming 7.00% Investment Return for All Years in Projection
Change to Level Dollar Amortization Basis
Proposed Restatement of Unfunded Accrued Liability as of 2015 Valuation - Statutory Bases and Experience Bases
(Dollars in Thousands)

Valuation Date 6/30/YYYY	FY	Annual Valuation Payroll	Benefits Payments	Unfunded Accrued Liability Beginning of Valuation Year	Funded Ratio	Contributions for Fiscal Year Ending							Inflation Adjusted Total State Contributions	CAGR of State Contribution relative to 2017	Net Present Value of UAAL Contributions
						Employer Normal Cost	Amortization of Unfunded Accrued Liability	Total State Contribution	Employee Contribution	Total Contribution	(Savings)/Cost from State Contributions				
2014	2016	3,487,577	1,563,029	14,920,815	41.50%	278,813	1,235,655	1,514,468	77,122	1,591,590	0	1,514,468	0.00%	1,978,929	
2015	2017	3,516,662	1,650,465	18,091,955	38.60%	362,471	1,675,826	2,038,297	77,718	2,116,015	220,878	1,978,929	2.99%	1,978,761	
2016	2018	3,541,760	1,722,399	18,349,448	39.40%	365,297	1,733,971	2,099,268	80,230	2,179,498	182,129	1,978,761	1.54%	1,923,347	
2017	2019	3,612,428	1,797,434	17,900,258	42.30%	367,694	1,733,999	2,101,693	83,794	2,185,487	114,584	1,923,347	1.00%	1,866,089	
2018	2020	3,687,348	1,874,138	17,400,625	45.30%	367,987	1,732,313	2,100,300	87,414	2,187,714	41,170	1,866,089	0.88%	1,821,014	
2019	2021	3,765,914	1,952,276	16,996,661	47.80%	368,561	1,742,493	2,111,054	91,151	2,202,205	-37,499	1,821,014	0.68%	1,766,063	
2020	2022	3,847,735	2,032,093	16,454,531	50.50%	365,278	1,743,494	2,108,772	94,994	2,203,766	-120,390	1,766,063	0.62%	1,719,654	
2021	2023	3,929,729	2,116,671	15,860,825	53.20%	371,660	1,743,297	2,114,957	98,862	2,213,819	-208,121	1,719,654	0.57%	1,674,845	
2022	2024	4,018,135	2,199,149	15,232,749	55.90%	377,853	1,743,791	2,121,644	102,906	2,224,550	-301,696	1,674,845	0.53%	1,629,794	
2023	2025	4,110,963	2,281,617	14,559,375	58.60%	382,298	1,744,213	2,126,511	106,968	2,233,479	-401,921	1,629,794	0.49%	1,584,255	
2024	2026	4,210,217	2,362,389	13,834,323	61.30%	384,892	1,744,214	2,129,106	111,193	2,240,299	-509,846	1,584,255	0.44%	1,539,156	
2025	2027	4,316,401	2,443,185	13,054,500	64.00%	386,779	1,743,773	2,130,552	115,594	2,246,146	-627,145	1,539,156	0.41%	1,494,850	
2026	2028	4,427,139	2,524,673	12,218,569	66.70%	388,208	1,743,090	2,131,298	120,101	2,251,399	-756,714	1,494,850	0.37%	1,451,544	
2027	2029	4,545,862	2,604,014	11,320,696	69.60%	389,758	1,741,884	2,131,642	124,801	2,256,443	-903,285	1,451,544	0.35%	1,409,588	
2028	2030	4,670,724	2,681,476	10,357,916	72.40%	391,924	1,740,204	2,132,128	129,640	2,261,768	-1,077,149	1,409,588	0.33%	1,370,026	
2029	2031	4,805,311	2,754,154	9,324,081	75.40%	396,744	1,737,712	2,134,456	134,842	2,269,298	-1,305,312	1,370,026	0.32%	1,331,758	
2030	2032	4,950,741	2,820,769	8,216,615	78.50%	402,564	1,734,517	2,137,081	140,451	2,277,532	-1,713,594	1,331,758	0.31%	1,295,172	
2031	2033	5,106,452	2,881,185	7,029,176	81.80%	410,516	1,730,206	2,140,722	146,462	2,287,184	1,730,206	1,295,172	-2.25%	813,556	
2032	2034	5,270,959	2,936,522	5,758,675	85.20%	420,632	964,392	1,385,024	152,844	1,537,868	964,392	813,556	-2.69%	712,172	
2033	2035	5,446,115	2,984,178	4,398,796	88.70%	432,587	816,211	1,248,798	159,571	1,408,369	816,211	712,172	-2.62%	681,166	
2034	2036	5,630,233	3,025,284	3,733,051	90.50%	447,083	783,178	1,230,261	164,966	1,395,227	783,178	681,166	-2.47%	664,743	
2035	2037	5,822,889	3,061,804	3,171,349	92.00%	463,155	773,463	1,236,618	170,611	1,407,229	773,463	664,743	-2.31%	651,473	
2036	2038	6,026,725	3,090,954	2,599,733	93.40%	480,776	767,514	1,248,290	176,583	1,424,873	767,514	651,473	-2.16%	638,464	
2037	2039	6,240,401	3,114,398	1,994,029	95.00%	500,235	759,828	1,260,063	182,844	1,442,907	759,828	638,464	-2.05%	623,280	
2038	2040	6,463,028	3,133,706	1,349,765	96.60%	520,455	746,544	1,266,999	189,367	1,456,366	746,544	623,280	-2.01%	598,603	
2039	2041	6,691,998	3,151,318	666,524	98.40%	540,161	713,181	1,253,342	196,076	1,449,418	713,181	598,603	-5.03%	260,362	
2040	2042	6,930,071	3,165,568	0	100.00%	561,494	0	561,494	203,051	764,545	0	260,362	-4.70%	262,810	
2041	2043	7,178,562	3,176,006	0	100.00%	583,776	0	583,776	210,332	794,108	0	262,810	-4.39%	265,109	
2042	2044	7,436,073	3,184,512	0	100.00%	606,550	0	606,550	217,877	824,427	0	265,109	-4.11%	267,278	
2043	2045	7,702,571	3,192,727	0	100.00%	629,859	0	629,859	225,685	855,544	0	267,278	-3.85%	269,289	
2044	2046	7,979,861	3,199,913	0	100.00%	653,634	0	653,634	233,810	887,444	0	269,289			
							37,068,963	50,668,657	4,407,860	55,076,517	650,606	36,057,616			26,652,221