



# PERA: PENSION PLAN SOLVENCY ANALYSIS

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# Analytical Overview

- Breaking down the composition of PERA's unfunded liability shows that Colorado faces a multi-faceted challenge with a need to reform: (1) assumptions, (2) actuarial methods, (3) contribution rates, and (4) governance structure. Any changes that do not address these factors will only be short-term adjustments.
- The changes necessary for PERA to adopt a more conservative risk tolerance and best practices will require a sharp increase in contributions — whether from taxpayers, members, or both.
  - However, there are a range of revenue constraints that will require any increases to be limited at first, and phased-in over time. This should not stop PERA from embracing improved assumptions and methods for reporting purposes.
- Meanwhile, Colorado should create new retirement security-focused plans for future hires that are fully funded from the start with sound assumptions, methods, and contribution rate. This will ensure no future employees are hired into a plan that is using assumptions or methods that are creating challenges for plan solvency.

# SOURCES OF THE CHALLENGES FACING PERA

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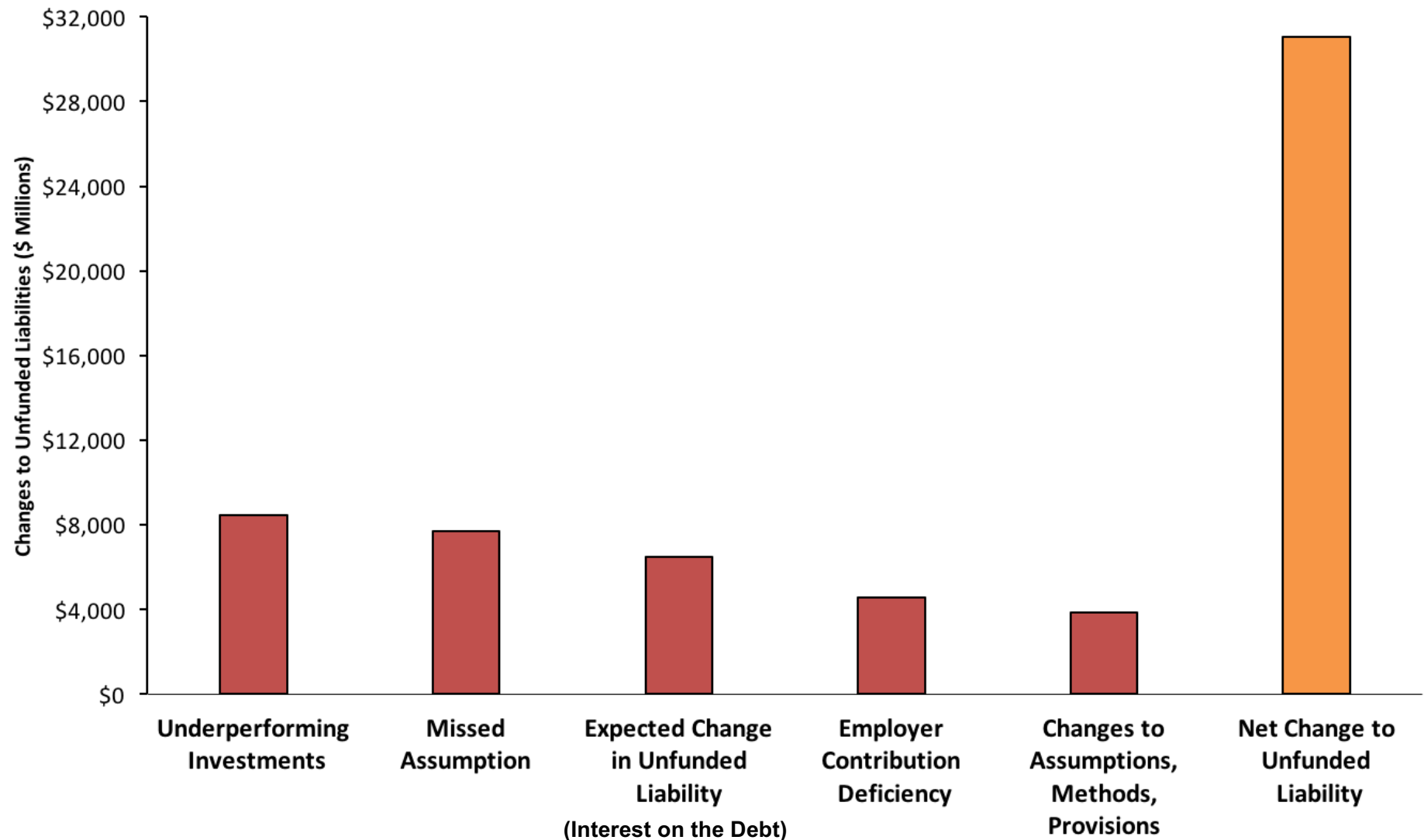
# Driving Factors Behind PERA Problems

1. **Underperforming Investment Returns** have been the largest contributor to the unfunded liability, adding \$8.4 billion to the unfunded liability since 1996.
  - *PERA's assets have consistently returned less than assumed, leading to growth in pension debt.*
2. **Actuarial Experience** diverging from actuarial assumptions has driven up the unfunded liability by \$7.7 billion since 1996.
  - *This suggests a disconnect between the actual experience of PERA divisions year-to-year and the long-term assumptions.*
3. **Insufficient Contributions** have added \$4.6 billion to the unfunded liability since 1996.
  - *The use of statutorily defined contribution rates instead of actuarially determined contributions has perpetuated the growth of unfunded liability.*



# The Causes of the Pension Debt

PERA's Reported Actuarial Experience, 1996 to 2016



Source: Pension Integrity Project analysis of PERA actuarial valuation reports. Data represents composition of cumulative unfunded liability by gain/loss category. Data covers DPS from 2010 to 2016, and all other divisions from 1996 to 2016.

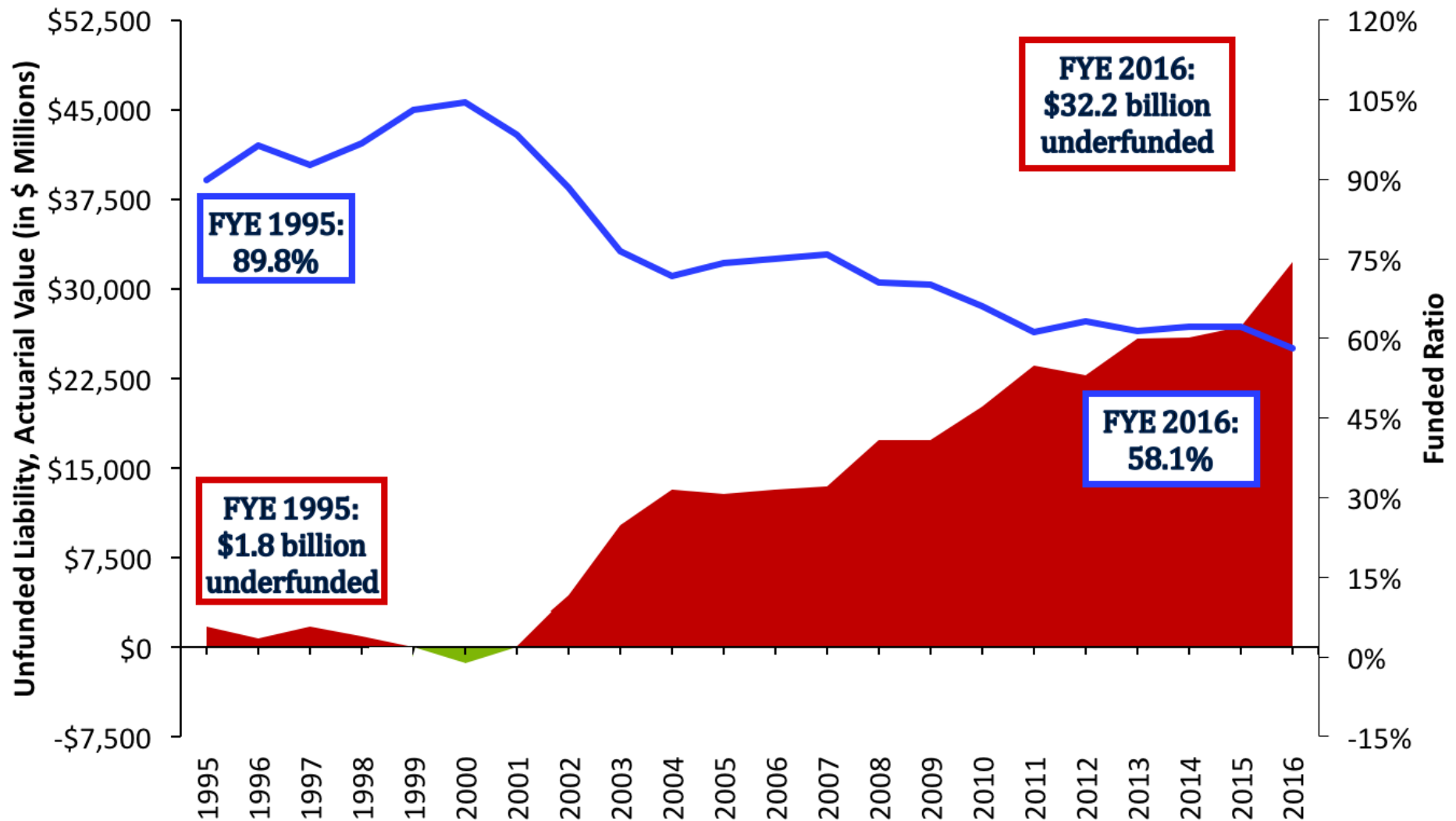
# Why Composition of the Unfunded Liability is Important



- PERA faces challenges with:
  1. Assumptions not matching up with reality
  2. Actuarial methods underpricing the true costs of the plan
  3. Insufficient employer contribution rates set in statute that systematically underfund the plan
  4. Decision-making process that makes fiduciary decisions regarding assumptions, methods, benefit distributions, and reporting methods
- This means the solution has to be multi-faceted and tackle all of the problems that PERA faces.

Note: The wide difference between the PERA valuation of pension debt (\$32.2 billion) and the GASB 67/68 valuation of pension debt (\$50.8 billion), combined with the composition of unfunded liability analysis on the previous slide, suggest a multi-faceted challenge that will require more than adjustments around the edges of the plan.

# PERA's Degrading Solvency (1995-2016) — PERA Valuation A History of Volatile Funding Progress

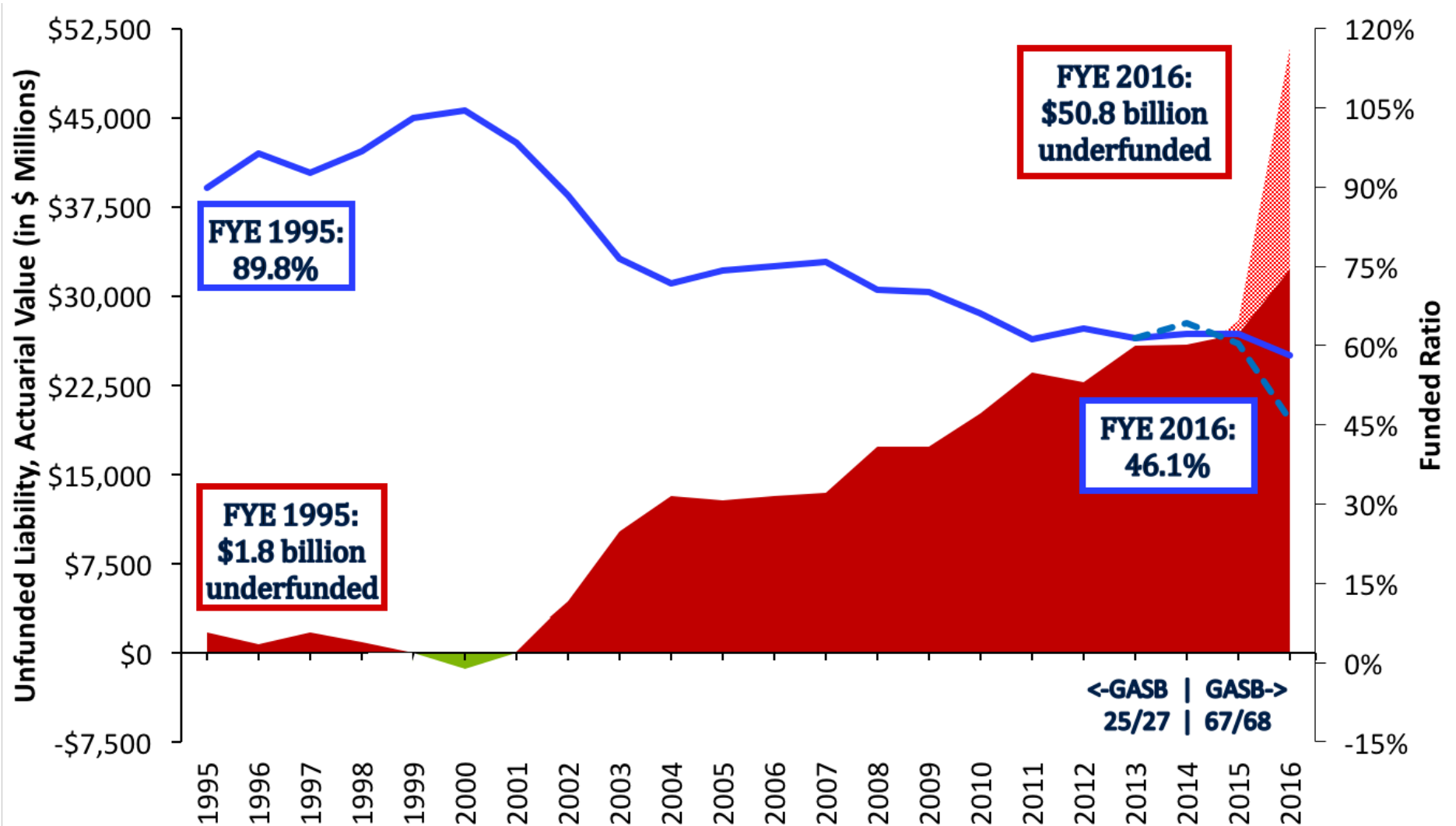


Source: Pension Integrity Project analysis of PERA actuarial valuation reports and CAFRs. DPS figures prior to 2010 are taken from plan's valuation reports and CAFRs. The combined funding progress excludes DPS plan from 1995 to 1996. Figures on an actuarial value basis.



# PERA's Degrading Solvency (1995-2016) — GASB Valuation

## A History of Volatile Funding Progress



Source: Pension Integrity Project analysis of PERA actuarial valuation reports and CAFRs. DPS figures prior to 2010 are taken from plan's valuation reports and CAFRs. The combined funding progress excludes DPS plan from 1995 to 1996. Figures on an actuarial value basis.



# CHALLENGE 1: ASSUMED RATE OF RETURN

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- **Unrealistic Expectations:** The *Assumed Return* for PERA's defined benefit plans is exposing taxpayers to significant investment return risk
- **Underpricing Contributions:** The use of an unrealistic *Assumed Return* has likely resulted in underpriced *Normal Cost* and an under calculated *Actuarially Determined Contribution*

# Summary of the Challenge: Assumed Rate of Return

(1 of 2)



1. There is a *low probability* that PERA will earn its assumed rate of return due to the “New Normal” facing institutional investors. (Slide 14)
2. Interest rates have fallen far below rates seen in the 1980s and 1990s, meaning there are lower returns to fixed income investments. Thus, PERA’s 30-year and 20-year average returns reflect fundamentally different market environments than exist today and are not good measures of success. (Slide 15)
3. Virtually all capital market forecasts suggest that returns to equity investments over the next 10 to 20 years will be *lower* than over the last 30 years. (Slide 16)
4. *Equity markets have fully recovered* from the lows of the financial crisis, yet the plan’s funded ratio has not. This suggests there is more going on to plan solvency than just the financial crisis — and that is shown in the composition of unfunded liability data. (Slide 17)

# Summary of the Challenge: Assumed Rate of Return

(2 of 2)

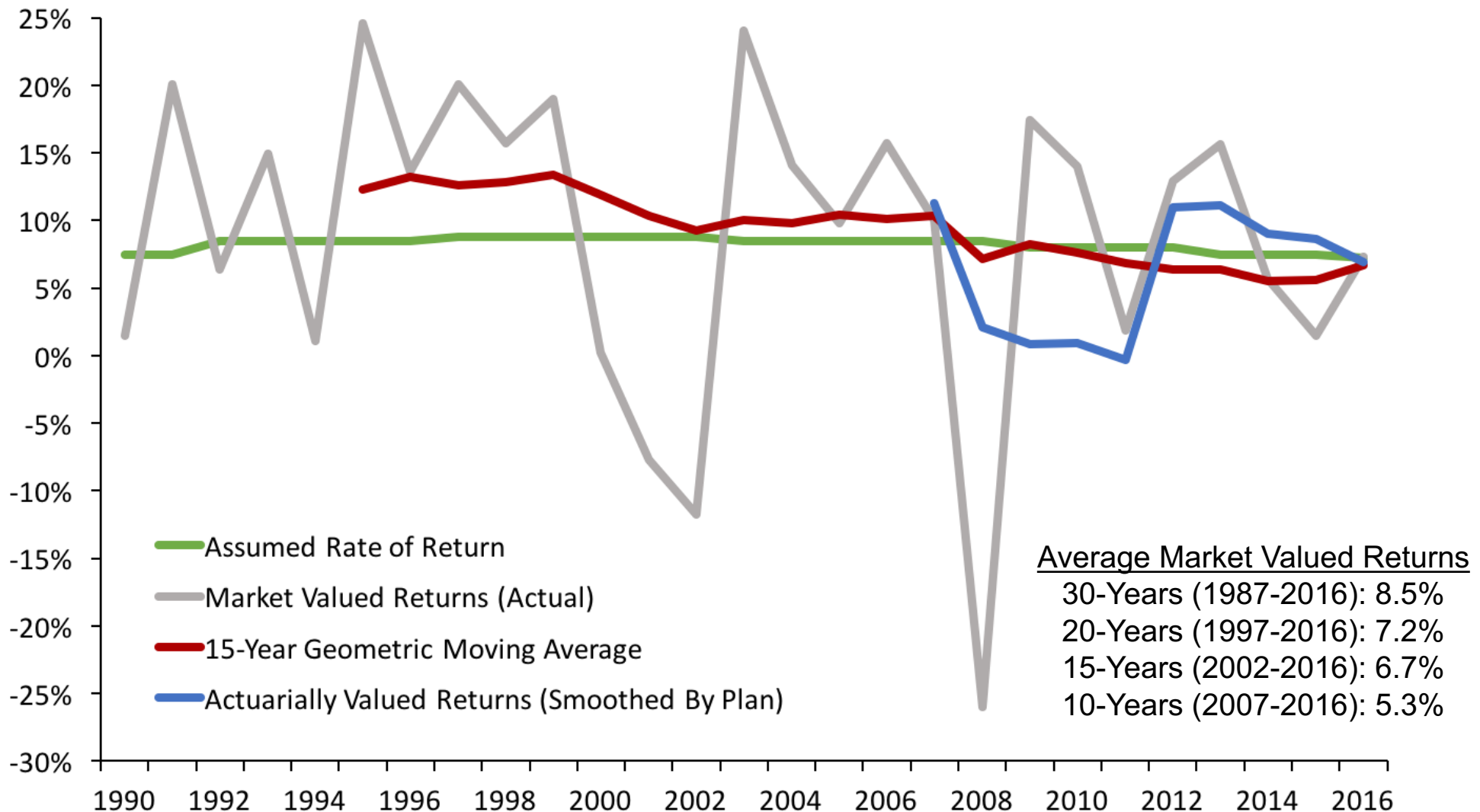


5. The best case scenario for PERA is a *50% chance* of earning a 7.25% rate of return. But other capital market outlooks suggest the odds of 7.25% are much lower. Do Colorado taxpayers and PERA members want this level of risk? (Slides 18-19)

Conclusion: PERA must either increase the risk in its portfolio by adopting more 'alternatives' to chase higher yields, or PERA must embrace the lower return environment in markets today.

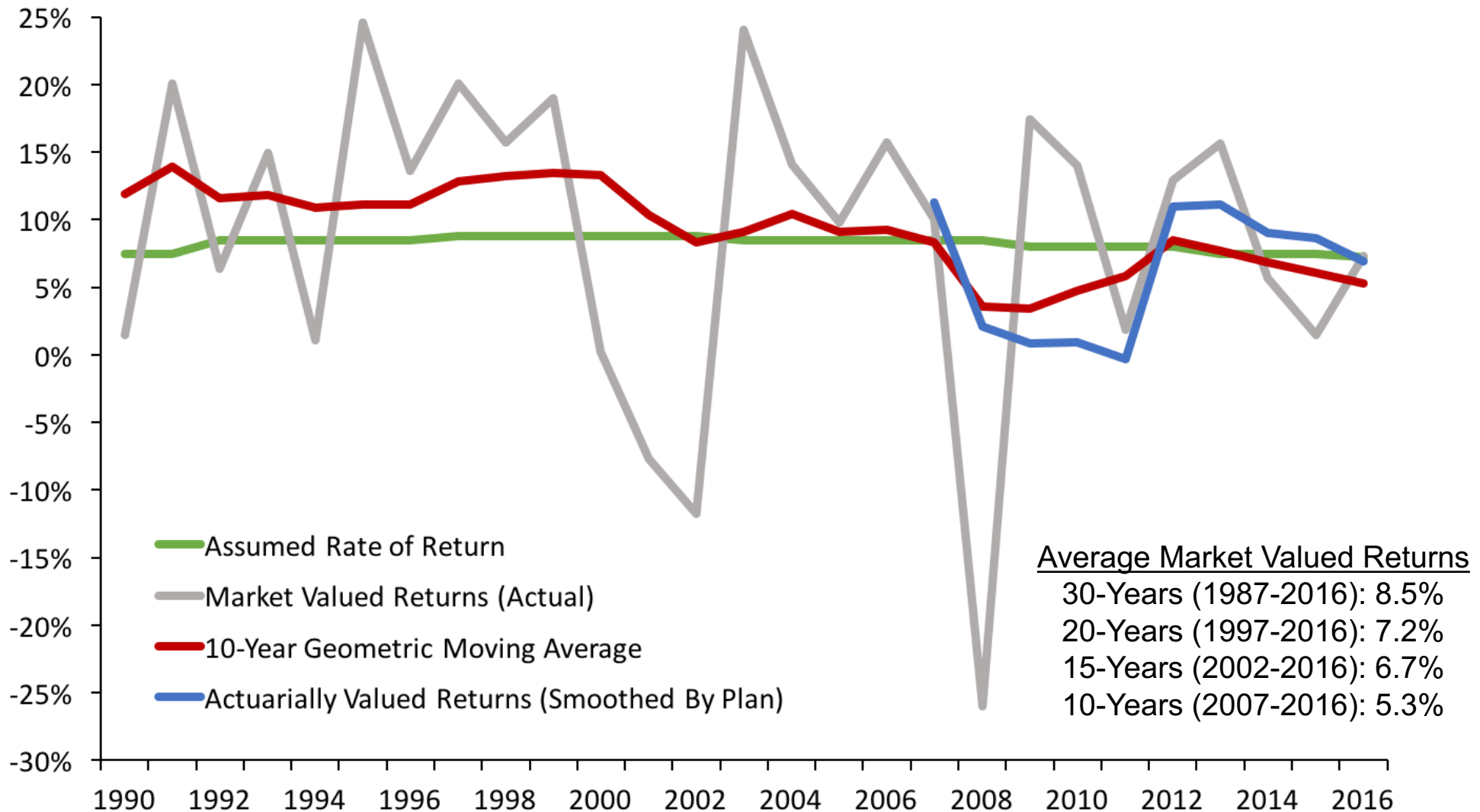
- Risk Perspective 1: *How risky should the asset portfolio be?*
  - What is an unacceptable target allocation of assets across investment vehicles that have varying degrees of risk?
- Risk Perspective 2: *How risky should the assumed return be?*
  - What is an unacceptable threshold of probability in achieving a given assumed rate of return that taxpayers and plan members should accept?
  - Should the assumed return have at least a 60% chance of being achieved? 75%?

# PERA Problem: Underperforming Assets, 15-Year Rolling Average Investment Return History, 1990-2016



Source: Pension Integrity Project analysis of PERA actuarial valuation reports. Lines shown are geometric means.

# PERA Problem: Underperforming Assets, 10-Year Rolling Average Investment Return History, 1990-2016



Source: Pension Integrity Project analysis of PERA actuarial valuation reports. Lines shown are geometric means.

# New Normal: The So-Called Recovery Has Already Happened, the Market Has Changed

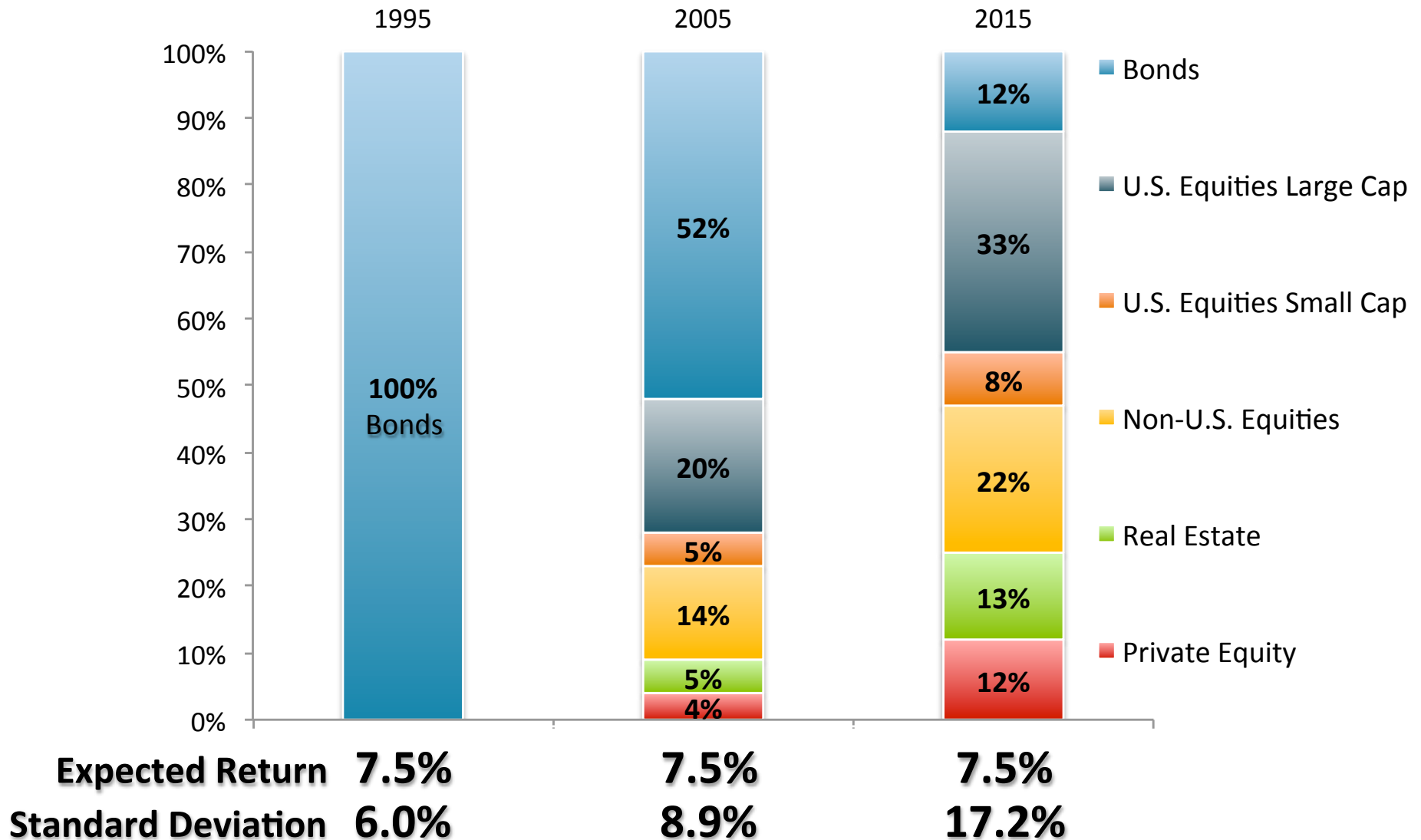


The “new normal” for institutional investing suggests that achieving even a 6% average rate of return is optimistic.

1. Over the past two decades there has been a steady change in the nature of institutional investment returns.
  - 30-year Treasury yields have fallen from around 8% in the 1990s to consistently less than 3% today.
  - Globally, interest rates are at ultralow historic levels, while market liquidity continues to be restrained by financial regulations.
2. McKinsey & Co. forecast the returns to equities will be 20% to 50% lower over the next two decades compared to the previous three decades.
  - Using their forecast model, the best case scenario for a 60/40 portfolio of equities and bonds is likely to earn less than a 5% return.
3. As PERA waits for the “recovery” its unfunded liabilities continue to grow.

# New Normal: Market Trend Towards Risk

Average Portfolio Asset Allocation Necessary for a 7.5% Expected Return Has Required Shifting from 100% Bonds to a Riskier Mix of Asset Classes



# New Normal: Forecasts for Future Returns are Significantly Lower than Past Returns



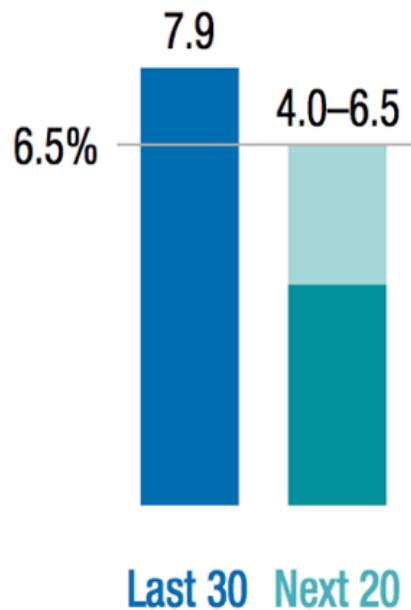
The past 30 years saw returns that exceeded the long-run average

■ Historical real returns  
— Last 100 years average return

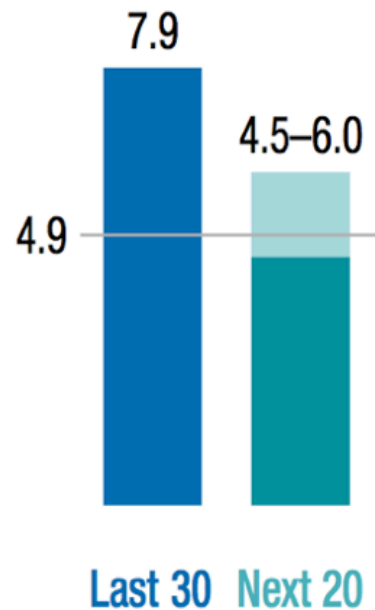
The next 20 years could be more challenging

■ Growth-recovery scenario  
■ Slow-growth scenario

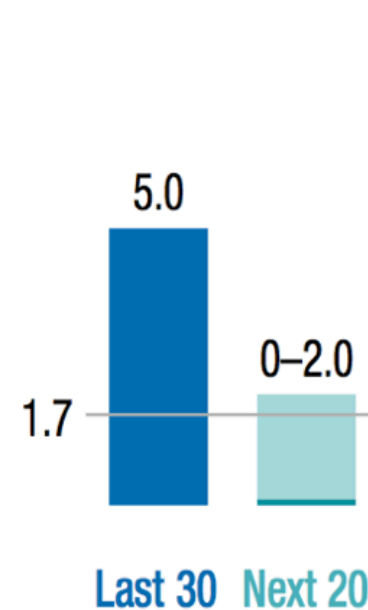
## US equities



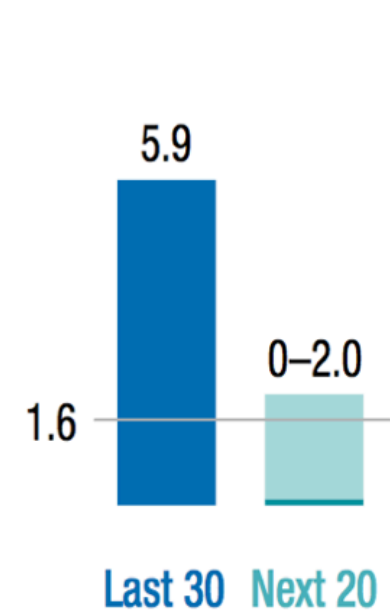
## European equities



## US bonds

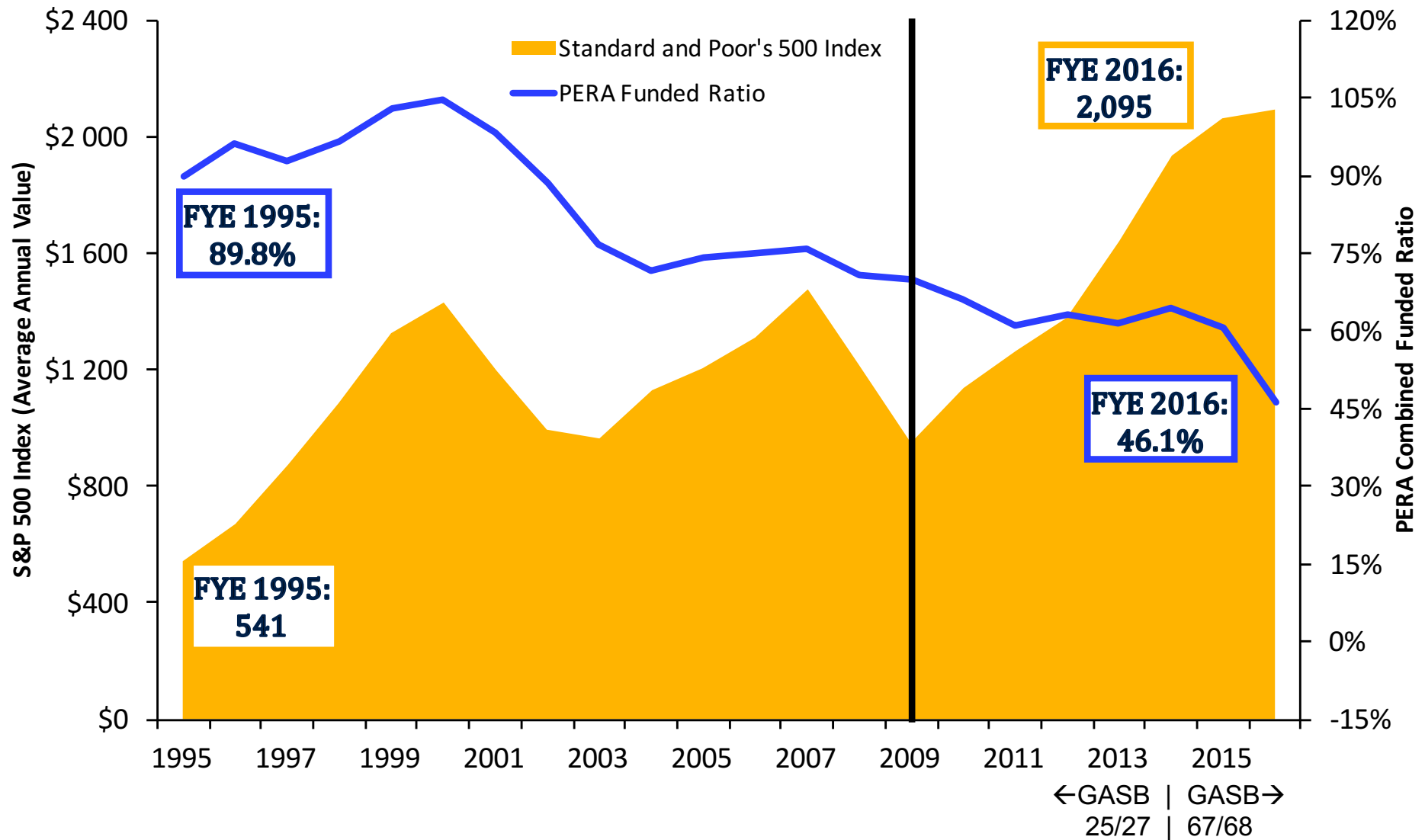


## European bonds





# New Normal: Markets Have Recovered Since the Crisis—PERA's Funded Ratio Has Not



Source: Pension Integrity Project analysis of PERA actuarial valuation reports. Funded ratio shown for 2014-16 period is based on GASB 67/68 results.

# Probability Analysis: Measuring the Likelihood of PERA Achieving Various Rates of Return



| Possible Rate of Return | Probability of PERA Achieving A Given Return Based On: |                             |                               |                                      |
|-------------------------|--|-----------------------------|-------------------------------|--------------------------------------|
|                         | PERA Expectations                                      | BNY Mellon 10-Year Forecast | JP Morgan 10-15 Year Forecast | Research Affiliates 10-Year Forecast |
| 8%                      | 38%  | 24%                         | 19%                           | 12%                                  |
| 7.5%                    | 45%  | 32%                         | 27%                           | 17%                                  |
| 7.25%                   | 49%  | 36%                         | 31%                           | 20%                                  |
| 7%                      | 53%  | 40%                         | 35%                           | 23%                                  |
| 6.5%                    | 61%  | 50%                         | 45%                           | 31%                                  |
| 6%                      | 68%  | 59%                         | 56%                           | 39%                                  |
| 5%                      | 80%  | 76%                         | 74%                           | 57%                                  |

Source: Pension Integrity Project Monte Carlo model based on PERA asset allocation and reported expected of returns by asset class. Forecasts of returns by asset class generally from BNYM, JPMC, and Research Affiliates were used and matched to the specific asset class of PERA. Probability estimates are approximate as they are based on the aggregated return by asset class. For complete methodology contact Reason Foundation.

# Probability Analysis: Measuring the Likelihood of PERA Achieving Various Rates of Return



| Probability of Achieving the Return | PERA Based on <b>BNY Mellon</b> 10-Year Forecast | PERA Based on <b>JP Morgan</b> 10-15 Year Forecast | PERA Based on <b>Research Affiliates</b> 10-Year Forecasts |
|-------------------------------------|--|--|--|
| 5%                                  | 7.7%   | 7.2%   | 7.0%   |
| 25%                                 | 5.7%   | 5.4%   | 4.8%   |
| 50%                                 | 4.3%   | 4.0%   | 3.3%   |
| 75%                                 | 2.9%   | 2.7%   | 1.8%   |
| 95%                                 | 1.0%   | 0.8%   | -0.3%  |
| Plus Inflation Assumption           | 2.2%   | 2.25%  | 2.10%  |
|                                     |  |  |  |

PERA Pre-2016: [4.7% Real Return] + [2.8% Inflation] = 7.5% Assumed Return

PERA New: [4.85% Real Return] + [2.4% Inflation] = 7.25% Assumed Return

Source: Pension Integrity Project Monte Carlo model based on PERA asset allocation and reported expected of returns by asset class. Forecasts of returns by asset class generally from BNYM, JPMC, and Research Affiliates were used and matched to the specific asset class of PERA. Probability estimates are approximate as they are based on the aggregated return by asset class. For complete methodology contact Reason Foundation.

# Sensitivity Analysis: Gross Normal Cost Comparison Under Alternative Assumed Rates of Return

(Amounts to be Paid in 2017-18 Contribution Fiscal Year, % of projected payroll)



|  | State<br>Division<br>Gross NC | School<br>Division<br>Gross NC | DPS<br>Division<br>Gross NC | Local<br>Division<br>Gross NC | Judicial<br>Division<br>Gross NC |
|--|-------------------------------|--------------------------------|-----------------------------|-------------------------------|----------------------------------|
| <b>7.25%</b><br>Assumed Return<br>(Current Baseline) | 10.87%                        | 12.22%                         | 12.89%                      | 10.36%                        | 18.50%                           |
| <b>6.25%</b><br>Assumed Return                       | 13.3%                         | 15.2%                          | 15.9%                       | 12.9%                         | 22.4%                            |
| <b>5.0%</b><br>Assumed Return                        | 17.1%                         | 19.8%                          | 20.6%                       | 16.7%                         | 28.3%                            |

Note: These alternative gross normal cost figures should be considered approximate guides to how much more normal cost should be under different discount rates. Any policy changes should be based on more precise normal cost forecasts using detailed plan data. Alternative normal cost rates based reported liability sensitivity from the FYE 2016 PERA CAFR. The gross normal cost rates include 40bp for administrative expenses, as currently included by PERA.

# CHALLENGE 2: OTHER ASSUMPTIONS AND ACTUARIAL METHODS

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- The combination of unmet actuarial assumptions and slow-paced changes to those assumptions is likely resulting in an understated size of unfunded liabilities

# Summary of the Challenge: Actuarial Assumptions and Methods



- Missing assumptions other than the assumed return has collectively added almost as much to PERA pension debt as just missing the investment target.
  - It is reasonable to expect that the assumptions used by actuaries will not always align with actual experience, they do the best they can. But nevertheless, the disconnect between reality and assumptions has created nearly 25% of the growth in pension debt since 1996.
- The unfunded liability amortization method currently in use effectively backloads debt payments in future years and depends too much on the accuracy of payroll growth assumptions.

# Challenges from Aggressive Actuarial Assumptions

## Actual Experience Different from Actuarial Assumptions



- **(-) Withdrawal Rate and New Member Rate Assumptions**
  - PERA withdraw rates and new hire rates have *differed from expectations* resulting in \$3.9 billion growth in unfunded liabilities from 1996-2016.
- **(-) Age & Service Retirement**
  - PERA members have been *retiring at younger than expected ages*, resulting in a larger liability than expected and \$3.6 billion growth in unfunded liabilities from 1996-2016.
- **(-) Service Purchases**
  - PERA members have made *more service purchases than expected*, resulting in \$2.4 billion growth in unfunded liabilities from 1996-2016 (of which \$1.2 billion was in 2003).
- **(-) Death and Disability Benefits**
  - PERA disability and survivor claims *have been more than expected*, resulting in \$0.6 billion added to unfunded liabilities from 1996-2016.

# Challenges from Aggressive Actuarial Assumptions

## Actual Experience Different from Actuarial Assumptions



- **(+) Overestimated Payroll Growth**

- PERA *employers have not raised salaries as fast as expected*, resulting in lower payrolls and thus lower earned pension benefits. This has meant a reduction in unfunded liabilities of \$2.9 billion from 1996 to 2016.

- **(-) Overestimated Payroll Growth**

- However, overestimating payroll growth is creating a long-term problem for PERA because of its combination with the level-percentage of payroll amortization method used by the plan.
- This method *backloads pension debt payments* by assuming that future payrolls will be larger than today (a reasonable assumption). But when payroll does not grow as fast as expected, employer contributions must rise as a percentage of payroll. This means the amortization method combined with the inaccurate assumption is delaying debt payments.



# Challenges from Aggressive Actuarial Assumptions

## Actual Experience Different from Actuarial Assumptions



- **(-) Changes to Assumptions & Methods (Non-Recurring Items)**
  - All else equal, the lower the discount rate, the larger the reported value of accrued liabilities. For example, changes to the discount rate (correlated with changes to the assumed return) between 2013 and 2016 resulted in recognizing \$7.1 billion in additional unfunded liabilities.
    - Importantly, the changes to the discount rate ***did not “create” more unfunded liability*** the way that missing the investment return assumption does, but instead is more accurately recognizing what unfunded liabilities exist for PERA.
- **(+) Changes to Provisions (Non-Recurring Items)**
  - When benefits are increased or decreased it will influence the funded status of the plan. For example, major changes to the pension system in 2009 (SB 10) resulted in a reduction of \$8.8 billion in unfunded liabilities.

# Summary of the Challenge: Assumptions & Methods

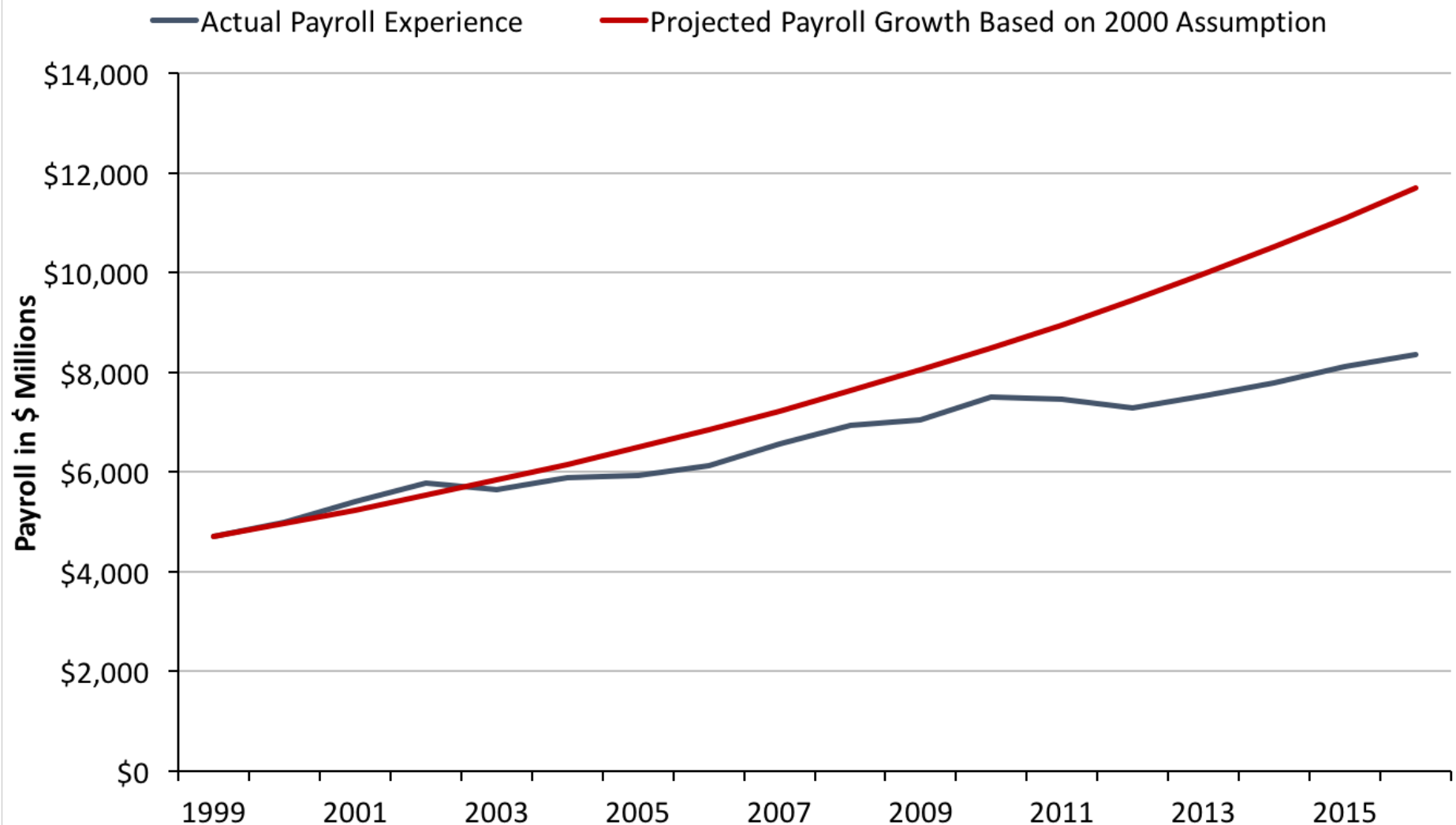
## Amortization Method Backloads Payments



- For financial reporting purposes, PERA currently uses a level-percent of payroll method over 30-years. However, this approach depends on the long-term accuracy of the payroll growth assumption.
  - If salaries do not grow as fast as expected, then that means down the road when a debt payment is made as a percentage of total payroll, the resulting dollar amount will be smaller than expected today.
  - In short, *back-loading debt payments* as a percentage of payroll is effectively a tool to artificially lower today's actuarially determined contribution rate.
- Moreover, the number of years in PERA's amortization schedule are unnecessarily long —
  - The plan adopted to pay off all pre-2014 unfunded liabilities over a closed 30-year period is a reasonable approach to tackling a big problem
  - However, amortizing all future unfunded liabilities over 30-years is much too long; these future unfunded liabilities should be paid off over much shorter, 10- to 15-year periods.

# Challenges from Aggressive Actuarial Assumptions, 2000-16

## Actual Change in Payroll v. Assumption



# Summary of the Challenge: Assumptions & Methods

## Discount Rate Undervalues Liabilities (1 of 2)



1. **The “discount rate” for a public pension plan should reflect the risk inherent in the pension plan’s liabilities:**
  - Most public sector pension plans — including Colorado PERA — use the assumed rate of return and discount rate interchangeably, even though each serve a different purpose.
  - The **Assumed Rate of Return** adopted by PERA estimates what the plan will return on average in the long run and is used to calculate contributions needed each year to fund the plans.
  - The **Discount Rate**, on the other hand, is used to determine the net present value of all of the already promised pension benefits and supposed to reflect the risk of the plan sponsor not being able to pay the promised pensions.

# Summary of the Challenge: Assumptions & Methods

## Discount Rate Undervalues Liabilities (2 of 2)



- 2. Setting a discount rate too high will lead to undervaluing the amount of pension benefits actually promised:**
  - If a pension plan is choosing to target a high rate of return with its portfolio of assets, and that high assumed return is then used to calculate/discount the value of existing promised benefits, the result will likely be that the actuarially recognized amount of accrued liabilities is undervalued.
- 3. It is reasonable to conclude that there is almost no risk that Colorado would not pay out all retirement benefits promised to members and retirees.**
  - Colorado's Constitution protects vested pension benefits against impairment of contract.
- 4. The discount rate used to account for this minimal risk should be appropriately low.**
  - The higher the discount rate used by a pension plan, the higher the implied assumption of risk for the pension obligations.



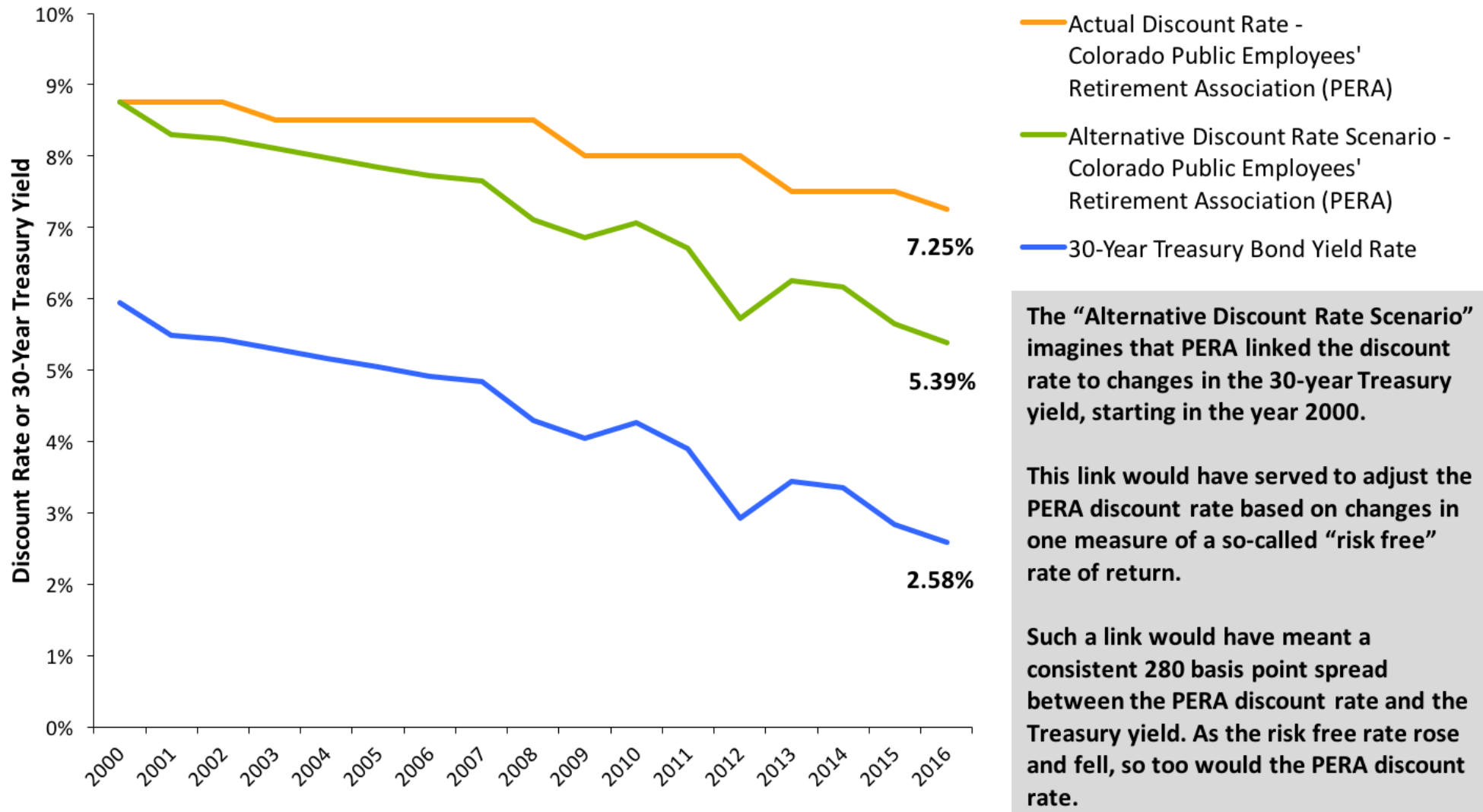
# PERA Pension Debt Sensitivity

## FYE 2016 Unfunded Liability Under Varying Discount Rates

| Market Value Basis                              | Funded Ratio | Unfunded Liabilities (Net Pension Liability) | Accrued Liabilities (Total Pension Liability) |
|---|--------------|--|---|
| <b>7.25%</b> Discount Rate (Current Baseline)   | 56.1%        | \$33.8 billion                               | \$76.9 billion                                |
| <b>~5.25%</b> Discount Rate (Blended GASB Rate) | 46.0%        | \$50.8 billion                               | \$94.2 billion                                |

Source: Pension Integrity Project analysis of PERA FYE 2016 CAFR. Blended GASB figures reflect a 5.26% DR (State & School), 7.25% DR (DPS & Local), and 5.18% DR (Judicial), all totaled up and reported on page 44 of the 2016 CAFR

# Comparing Change in Discount Rate to the Change in the Risk Free Rate, 2000-2016



# CHALLENGE 3: INSUFFICIENT CONTRIBUTIONS

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- Since 2003 PERA's pension plans have been falling behind their Actuarially Determined Contributions, which resulted in need for much higher contributions today



# Summary of the Challenge: Insufficient Contributions

(1 of 3)



- Over the past decade, employer contributions have regularly been short of the actuarially determined contribution (ADC).
- Employer contribution rates *determined by legislative statute* are not enough to keep up with the actual amount necessary to amortize the debt.
- **2016: State Division Employer ADC v. Statute**
  - *Statutory* Employer Contribution: 19.25% of payroll
  - *Actuarially Determined* Contribution: 22.3% of payroll
- **2016: School Division Employer ADC v. Statute**
  - *Statutory* Employer Contribution 19.15% of payroll
  - *Actuarially Determined* Contribution : 22.4% of the payroll

# Summary of the Challenge: Insufficient Contributions

(2 of 3)



- In short, state statutes have created a structural underfunding problem for PERA.
- The AED and SAED programs *have not been enough* to keep up with growing actuarially determined contributions, nor are they an effective means of ensuring a defined benefit plan is fully funded.
  - Each year actuaries determine what employer contribution rate is necessary to fully fund the normal cost and unfunded liability amortization payment for that given year... but this is ignored.
  - The problem is that the actual employer contribution — a statutory rate + AED + SAED — is divorced from the actuarial process of determining necessary rates

Note: Employer contributions are determined by statute. There is a base employer contribution + an Amortization Equalization Disbursement (AED) + a Supplemental Amortization Equalization Disbursement (SAED). AED and SAED payments are currently vary from 1.5% to 5% of payroll, but they have a maximum combined payment of 10% for the State, School, and DPS Divisions. The legislature may have been guided by the actuarial process when determining these rates and maximums, but that will not help the plan because the actuarial rates are already above the statutory employer contributions rates.

# Summary of the Challenge: Insufficient Contributions

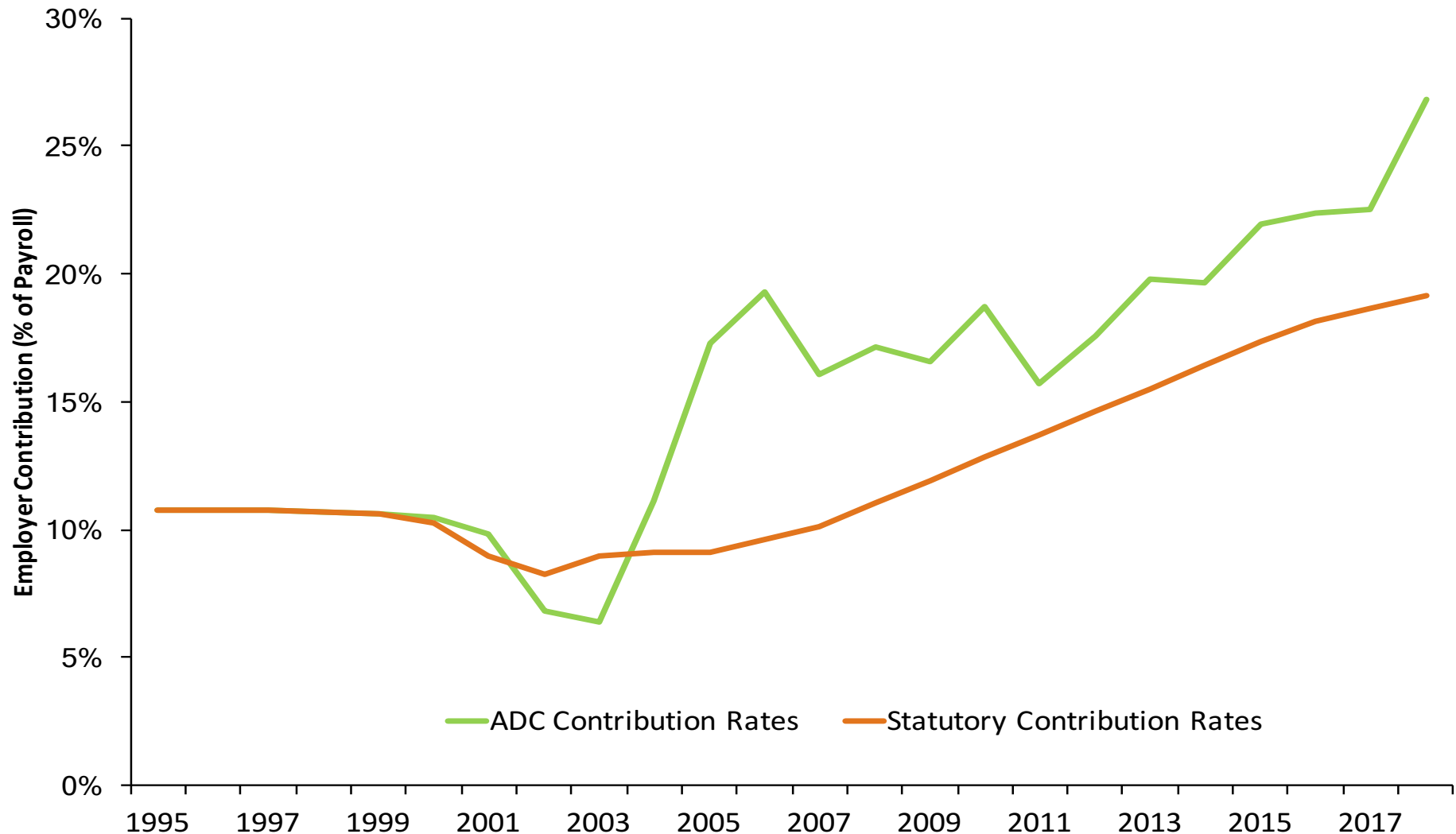
(3 of 3)



- A probable reason for the use of a statutorily contained contribution rate is to avoid having actual rates grow faster than revenues given TABOR constraints. However, if true this would mean political decisions are driving funding policy rather than fiducially responsible management practices.
- Solving this challenge may require ramping up contributions over time — whether from employees or taxpayers.
- Every day that this challenges is not solved is a day that more people are being hired into a plan that is being structurally and systematically underfunded.

## Employer Contribution Trend, 1995 to 2018

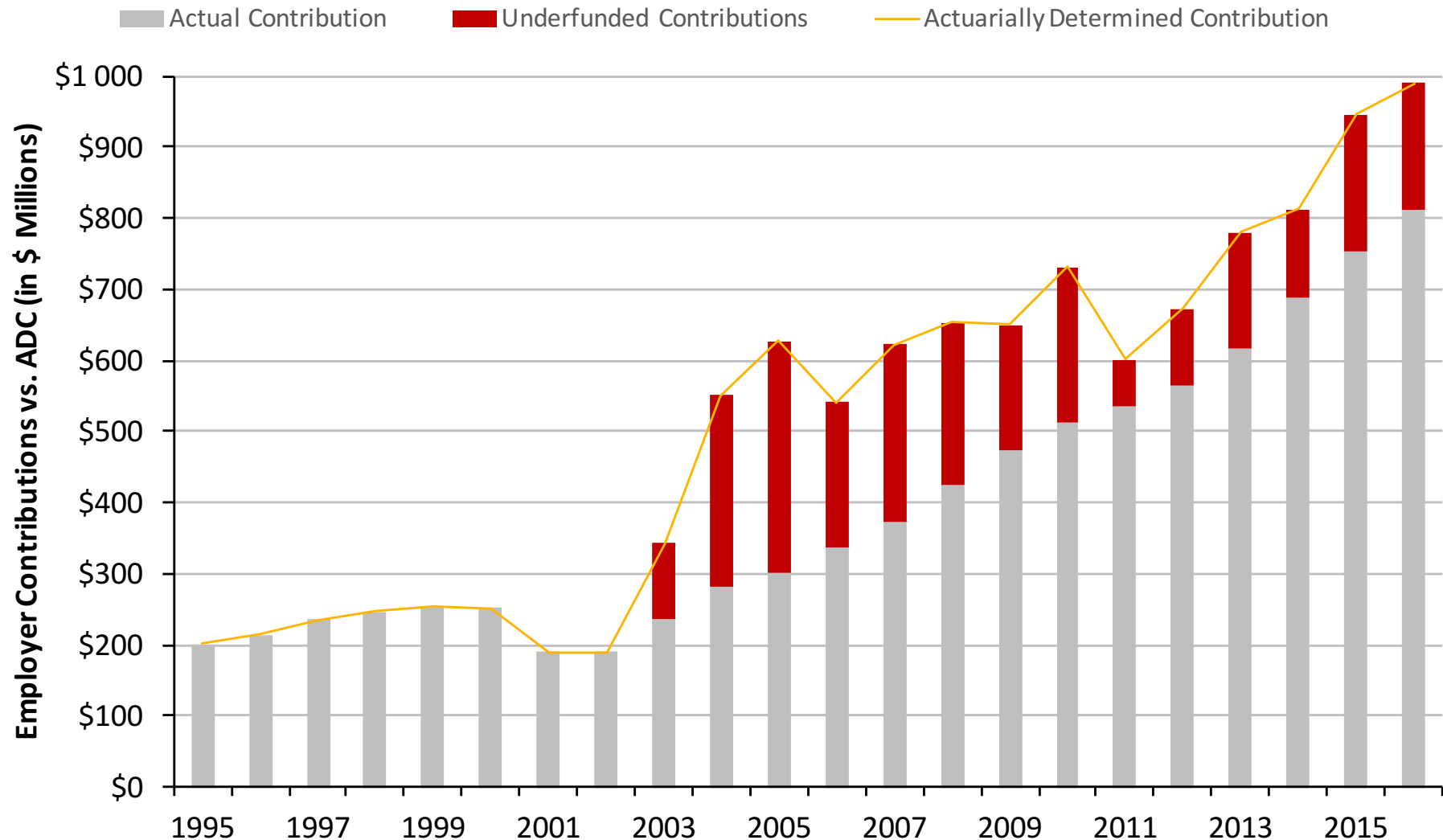
## School: ADC v. Statutory Contribution Rates



Source: Pension Integrity Project analysis of PERA actuarial reports and CAFRs. Rates shown exclude the Health Care Trust Fund contribution rates. Statutory rates displayed do not account for the contribution reductions mandated by the Senate Bill 10-146 between 2010 and 2012. The Statutory rates following the 2016 fiscal year are calculated using the 10.15% base and future amortization equalization contribution rates.

# Actuarially Determined Employer Contribution History, 1996 to 2016

## School: Actual v. Required Contributions

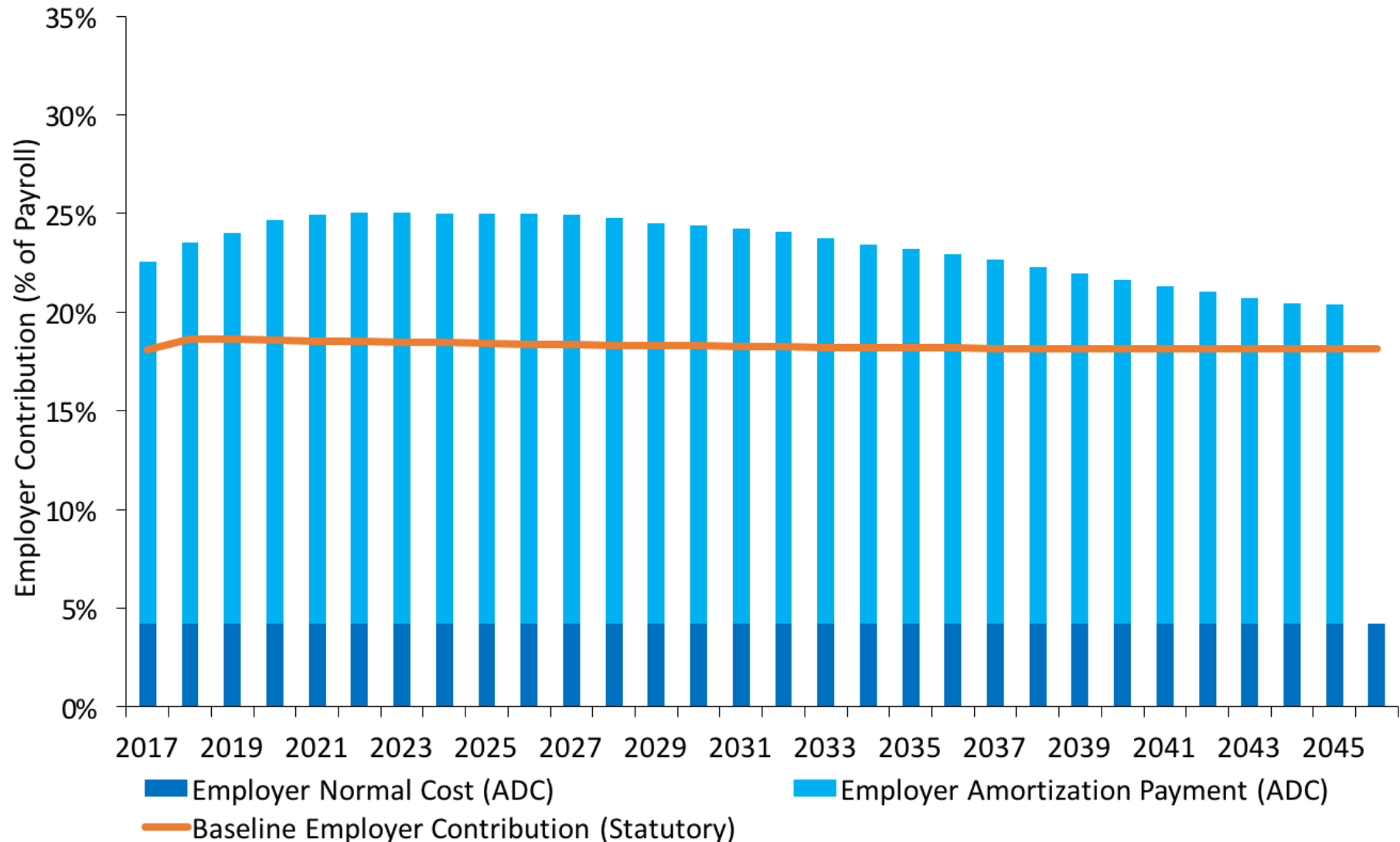


Source: Pension Integrity Project analysis of PERA actuarial reports and CAFRs.  
Statutory rates displayed do not account for the contribution reductions mandated by the Senate Bill 10-146 between 2010 and 2012.

Actuarially Determined Employer Contribution Forecast (% of Payroll)

## School: ADC v. Projected Statutory Rate

Discount Rate: 7.25%, Assumed Return: 7.25%, Actual Return: 7.25%, Employee Contribution: 8%



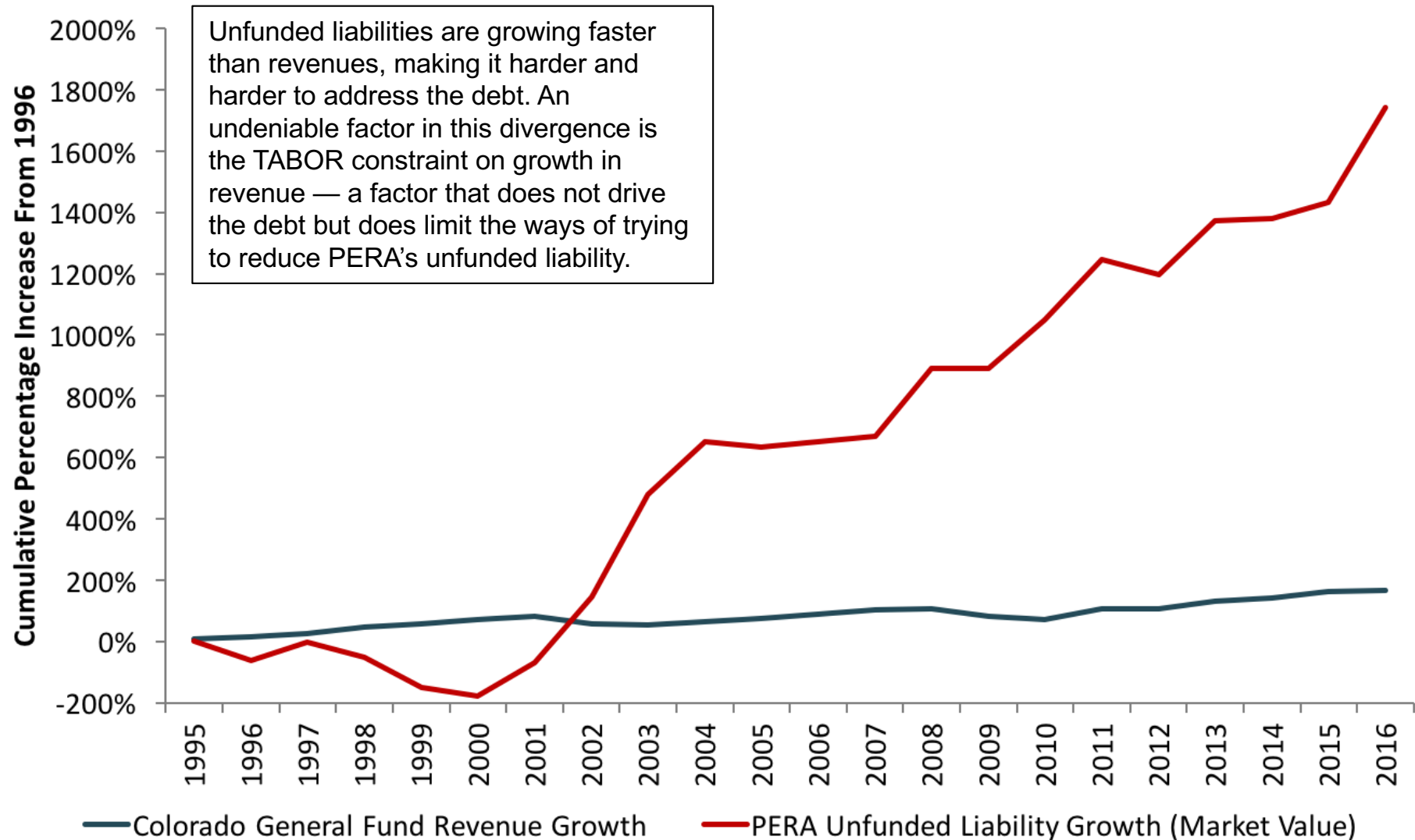
Source: Pension Integrity Project actuarial forecast of PERA School Division plan. Scenario assumes that the state pays 100% of the actuarially determined contribution each year, which is not status quo policy. Continuing to pay statutory rates under these alternative scenarios would result in even higher ADC rates.

# CHALLENGE FOR REFORM: REVENUE LIMITATIONS

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- There is an undeniable need to increase contributions to the various PERA divisions, but TABOR does create a constraint in finding a source for these contributions.

# PERA Unfunded Liabilities are Growing Faster than the Colorado Government



Source: Pension Integrity Project analysis of PERA actuarial valuation reports and NASBO Fiscal Survey of States publications

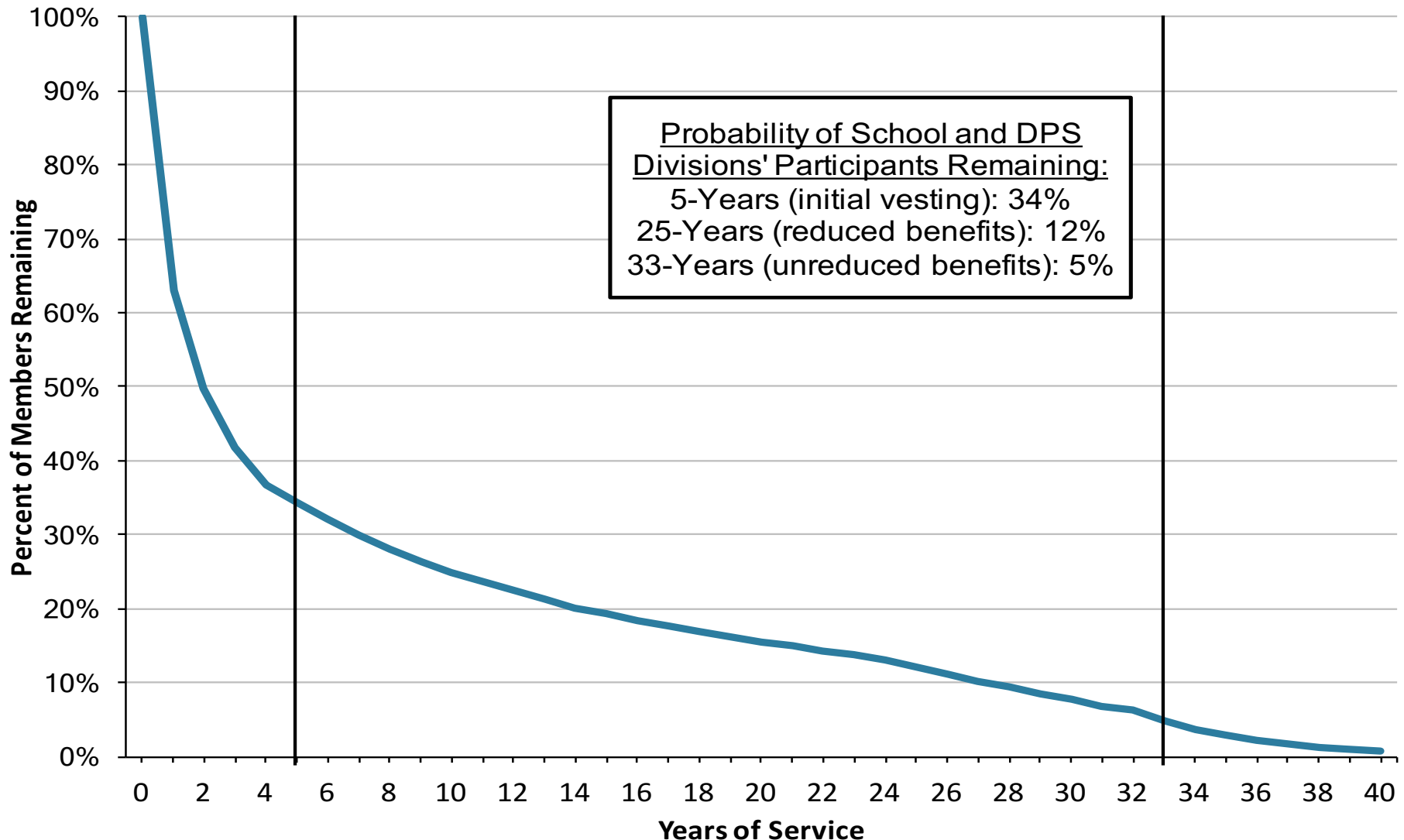


# CHALLENGE FOR REFORM: THE EXISTING BENEFIT DESIGN DOES NOT WORK FOR EVERYONE

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- There is high turnover in the School/DPS Division plans.
- This may mean the current plan does not support recruiting and retention goals.
- More importantly, this means that if reform involves any reductions in the defined benefit for new hires the changes may exacerbate those recruiting and retention challenges.

# Probability of School and DPS Divisions' Members Remaining in PERA, Cumulative



Source: Pension Integrity Project analysis of PERA actuarial reports and CAFRs.

# Do School and DPS Retirement Plans Work for Today's Employees?



- **~65%** of new teachers/educators leave before 5 years
  - School and DPS plans' members need to work for 5 years before their benefits become vested.
  - This teacher turnover rate exceeds occupation averages nationally.
  - Another 30% of new teachers who are still working after 5 years will leave before 10 years of service
- **84%** of all teachers hired next year will leave before reaching 19 years of service
  - Members of the School and DPS Divisions need to work 19 years before the present value of their contributions + refund bonus is worth more than the value of the accumulated pension benefits
- **12%** of all teachers hired next year will still be working after 25 years, long enough to qualify for a reduced benefits

# FRAMEWORK FOR PENSION REFORM SOLUTIONS

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# Objectives of Good Reform

- **Keeping Promises:** Ensure the ability to pay 100% of the benefits earned and accrued by active workers and retirees
- **Retirement Security:** Provide retirement security for all current and future employees
- **Predictability:** Stabilize contribution rates for the long-term
- **Risk Reduction:** Reduce pension system exposure to financial risk and market volatility
- **Affordability:** Reduce long-term costs for employers/taxpayers and employees
- **Attractive Benefits:** Ensure the ability to recruit 21st Century employees
- **Good Governance:** Adopt best practices for board organization, investment management, and financial reporting

# Pension Reform Strategy

(1 of 5)



>> Address all challenges for PERA

## 1. Assumptions & Methods

- Modify assumptions and methods to adopt a more conservative approach to risk tolerance

## 2. Contribution Methods

- Phase in paying the actuarially determined contribution rate

## 3. Benefit Design

- Identify adjustments to the current system that can contain costs without undermining retirement security
- Create a new retirement plan(s) for future hires that is sustainable from day 1 and avoids adding more people to the status quo

## 4. Governance Framework for Decisions

# Pension Reform Strategy

(2 of 5)



## 1. Assumptions & Methods

- Generally prioritize transparency of actual actuarial costs by using a more conservative risk tolerance when determining assumptions and methods
  - Do not factor in how changes to assumptions might change the actuarially determined contribution rate
- Reduce investment risk and align assumed return with a more realistic probability of success
- Review and adjust assumptions related to withdraw rates, new hire/headcount growth, payroll growth, retirement rates, service purchase rates, disability claim rates, inflation, and mortality
- Consider adjusting the amortization method to use shorter layered bases for future unfunded liability change

# Pension Reform Strategy

(3 of 5)



## 2. Contribution Methods

- Switch from paying statutorily determined contributions to paying actuarially determined contributions
- Phase in the adjustment over time if it is budgetarily challenging to jump right to paying the actuarially determined contribution



# Pension Reform Strategy

(4 of 5)



## 3. Benefit Design

- Identify adjustments to the current system that can contain costs without undermining retirement security
- Create new retirement plans for future hires that is sustainable from day 1 and avoids adding more people to the status quo

If it is not possible to immediately change assumptions and start paying 100% of the actuarially determined contribution, then any new employee hired into a PERA plan is perpetuating the existence of a poorly funded structure. Creating new retirement plans can include:

- a new defined benefit plan that uses appropriate assumptions
- a defined contribution retirement plan that is built for retirement security
- a choice between a DB or DC plan
- a combination of DB and DC plan designs (or “hybrid” plan)



# Example Plan Designs for New Hires

## 1. **Modified DB Plan**

- Build a defined benefit plan with a graded multiplier and short vesting period to more evenly distribute benefits; and require very conservative funding policy and contribution rate methods from day 1

## 2. **Defined Contribution Retirement Plan**

- Make the existing DC plan available for all members; improve statutorily required education and counseling services to support members; ensure default settings support retirement security; provide for an income-focused, auto-rebalancing option

## 3. **Hybrid DB/DC Plan**

- Create a plan that combines a smaller 'Modified DB' with a DC Plan

## 4. **Choice-Based DB and DC System**

- Enroll members in a DC Plan, but offer choice of a 'Modified DB' Plan

# Pension Reform Strategy

(5 of 5)



## 4. Governance Framework for Decisions

- Ensure that the board design includes representation from all stakeholders in the plan, including active members, retirees, employers, and taxpayers
- Ensure that fiduciary important decisions with respect to investment allocation, actuarial assumptions, and benefit distributions are determined by individuals professionally equipped to well represent stakeholders



# Questions?

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# APPENDIX 1: ADDITIONAL ILLUSTRATIONS

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# Degrading Solvency: Growing Unfunded Liabilities for All Plans



- PERA defined benefit plans have experienced volatile changes in their funding level over the past two decades

| Unfunded Liabilities  | 1996            | 2006           | 2016           |
|-----------------------|-----------------|----------------|----------------|
| <b>State</b>          | \$0.65 billion  | \$4.9 billion  | \$11.6 billion |
| <b>School</b>         | \$0.05 billion  | \$7.2 billion  | \$18.1 billion |
| <b>Denver Schools</b> | -\$0.03 billion | \$0.39 billion | \$1.03 billion |
| <b>Judicial</b>       | \$0.0 billion   | \$0.04 billion | \$0.15 billion |
| <b>Local</b>          | -\$0.03 billion | \$0.68 billion | \$1.3 billion  |
| <b>Total</b>          | \$0.64 billion  | \$13.2 billion | \$32.2 billion |

Source: Pension Integrity Project analysis of PERA actuarial valuation reports; DPS 1996 data from DPS CAFR. Years represent fiscal year ended dates. Figures for 1996 and 2006 are on an actuarially valued basis (under GASB 25/27); figures for 2016 are for net pension liability (under GASB 67/68).



# Degrading Solvency: Falling Funded Ratios for All Plans

- PERA defined benefit plans have experienced volatile changes in their funding level over the past two decades

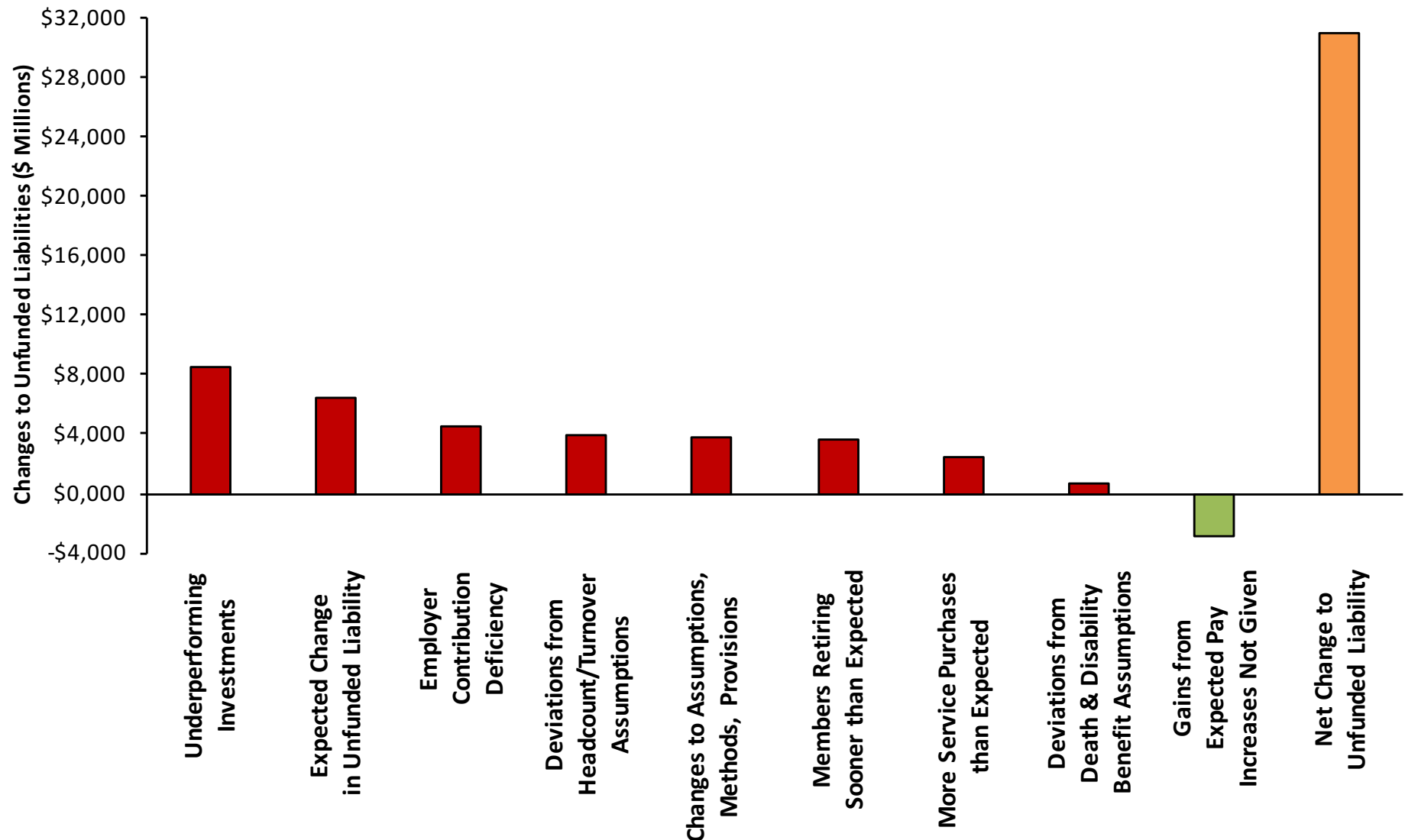
| Funded Ratio          | 1996   | 2006  | 2016  |
|-----------------------|--------|-------|-------|
| <b>State</b>          | 91.0%  | 73.0% | 42.6% |
| <b>School</b>         | 99.5%  | 74.1% | 43.1% |
| <b>Denver Schools</b> | 101.9% | 87.6% | 74.0% |
| <b>Judicial</b>       | 100.9% | 85.1% | 53.2% |
| <b>Local</b>          | 103.1% | 79.5% | 73.6% |
| <b>Total</b>          | 96.8%  | 75.0% | 46.0% |

Source: Pension Integrity Project analysis of PERA actuarial valuation reports; DPS 1996 data from DPS CAFR. Years represent fiscal year ended dates. Figures for 1996 and 2006 are on an actuarially valued basis (under GASB 25/27); figures for 2016 are for net pension liability (under GASB 67/68).



# The Causes of the Pension Debt

Actuarial Experience of PERA, 1996 to 2016

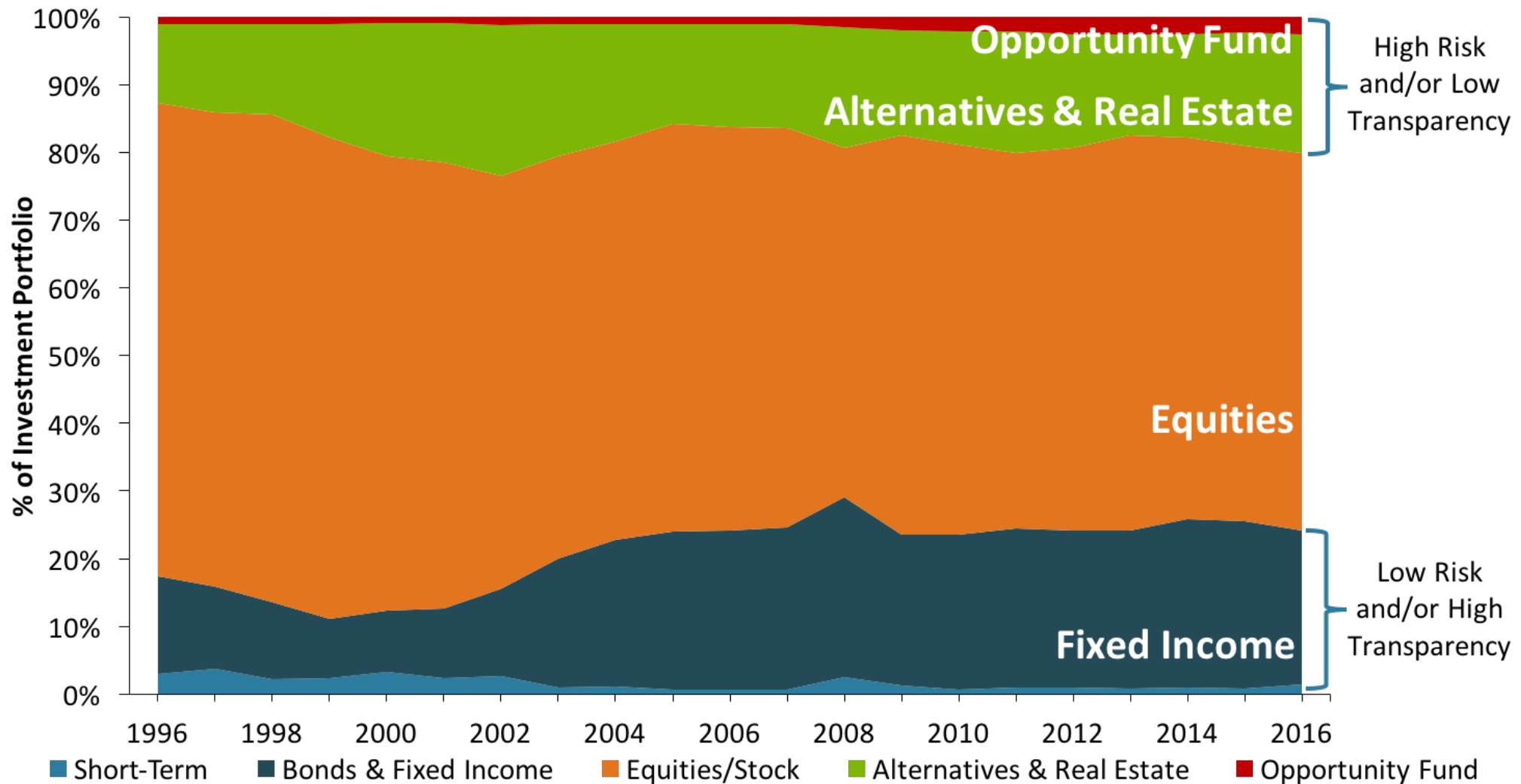


Source: Pension Integrity Project analysis of PERA actuarial valuation reports. Data represents composition of cumulative unfunded liability by gain/loss category. Data covers DPS from 2010 to 2016, and all other divisions from 1996 to 2016.



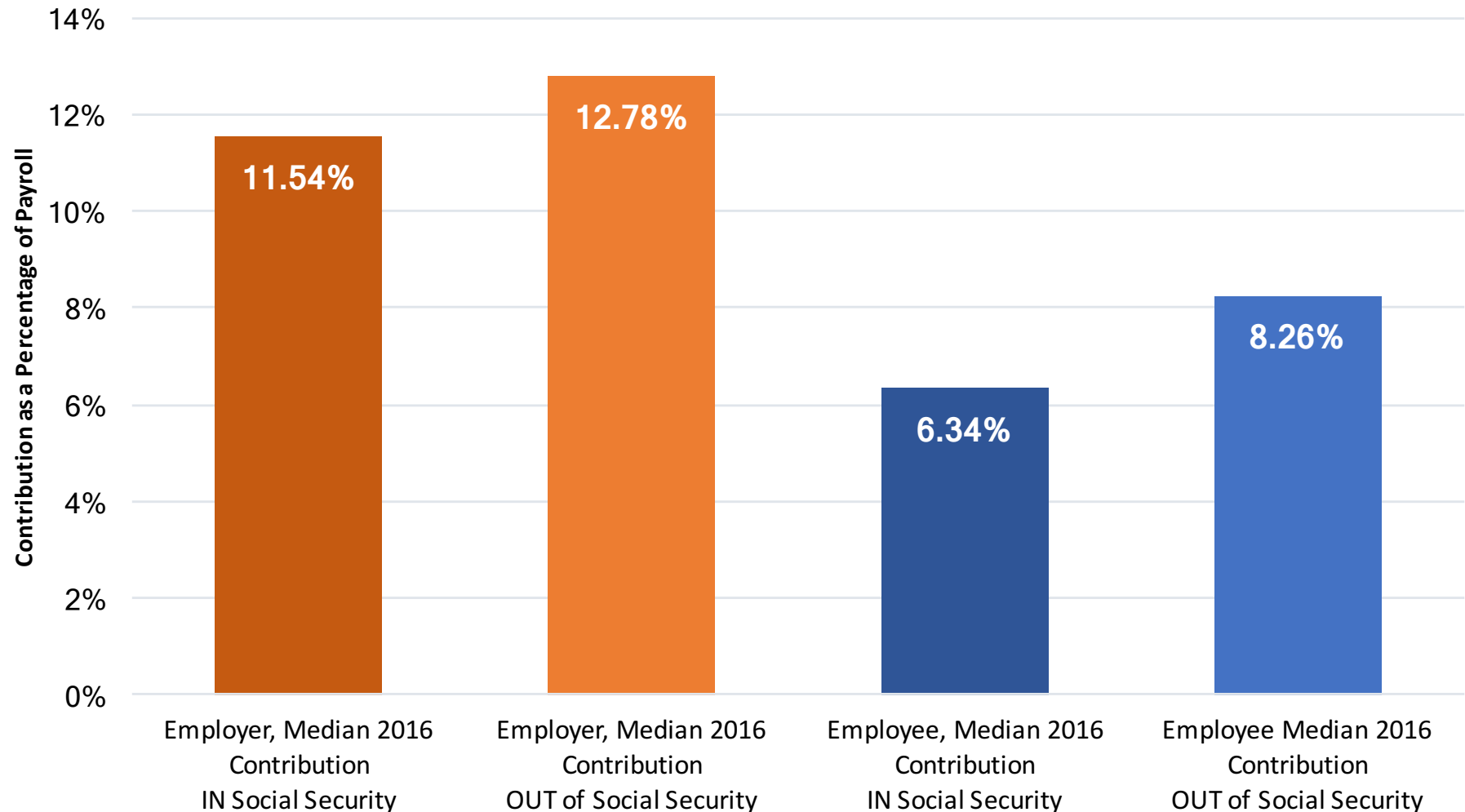
## PERA Asset Allocation (1996-2016)

## Expanding Alternatives in Search for Yield



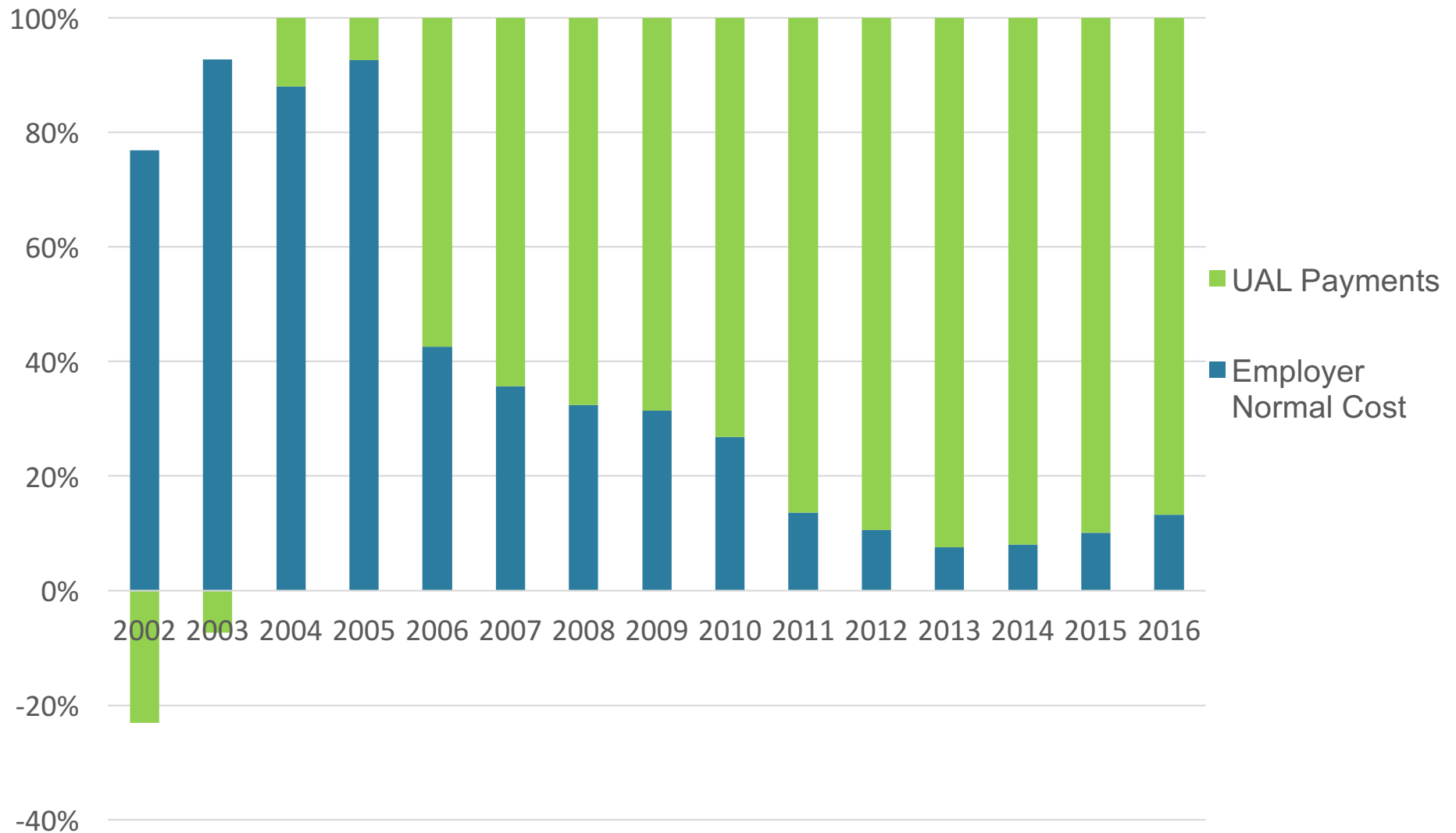
Source: Pension Integrity Project analysis of PERA actuarial valuation reports and CAFRS.

# Comparing Median Contribution Rates for State Plans In/Out of Social Security

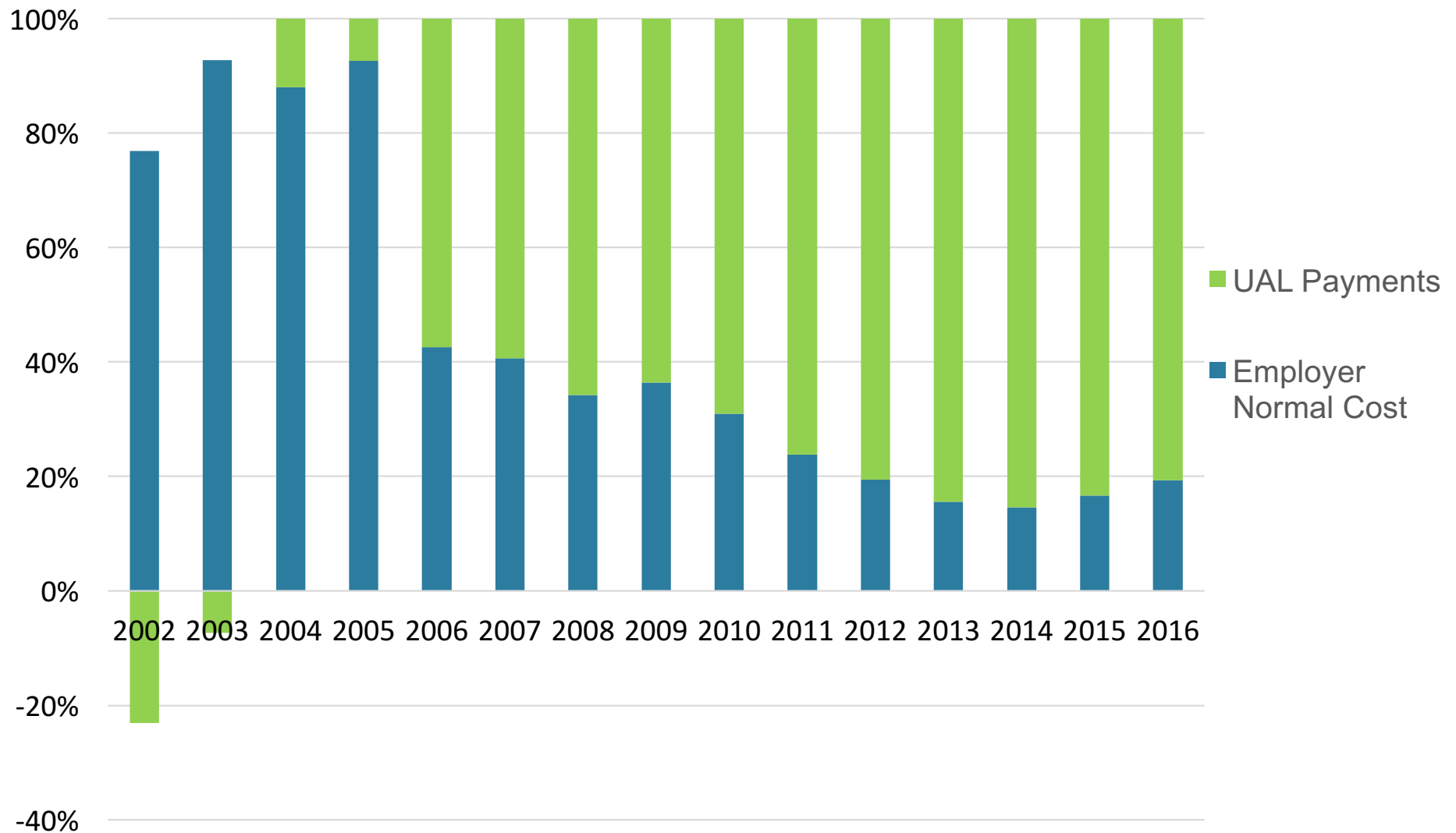


Source: FYE 2016 Public Plans Data for top 114 state administrated defined benefit and cash balance plans

# Normal Cost vs. Amortization Share of Employer Contribution: State Division



# Normal Cost vs. Amortization Share of Employer Contribution: School Division



# APPENDIX 2: REFORM CASE STUDIES

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## Reform Case Studies:

# Michigan Teachers (2017)

### Why?

- Underperforming investment returns
- Back-loaded debt payments escalating (due to use of level-percent amortization method and payroll growth assumption failing to match actual experience)
- Prior reforms (2010, 2012) having limited effect on growth in unfunded liability amortization payments
- History of failing to pay the actuarially determined contribution rate

### What?

- Plan to phase-in lower assumed rate of return
- New choice-based retirement system (DC or DB) for new hires
  - Lower assumed return, new amortization method, cost-sharing contribution rate policy for new-hire DB plan
- One-time money added to reduce unfunded liability
- Legislative commitment to future amortization method changes



## Reform Case Studies:

# Arizona Police & Fire (2016)

## Why?

- Underperforming investment returns
- Permanent benefit increase (PBI) program was skimming investment returns and destabilizing asset growth
- Prior reforms (2011) had negative effect on growth in unfunded liabilities and vesting requirements; reforms making retroactive benefit changes found unconstitutional by AZ Supreme Court

## What?

- New choice-based retirement system for new hires (DB or DC)
  - New amortization method, cost-sharing contribution rate policy, and graded multiplier for new-hire DB plan
- Constitutional ballot measure to change the PBI to a pre-paid COLA that adjusts based on funded ratio
- Retroactive benefit improvement for post-2011 employees
- Change board composition to align with risks within the system and incentivize better future funding policy

Reform Case Studies:

# Arizona Corrections & Probation (2017)



## Why?

- Underperforming investment returns
- Permanent benefit increase (PBI) program skimming investment returns and destabilizing asset growth
- Existing benefit not proving to be a recruiting tool for the high turnover prone jobs represented by the plan

## What?

- New choice-based retirement system (DB or DC) for new probation & surveillance officers
  - New amortization method, cost-sharing contribution rate policy, and graded multiplier for new hire defined benefit plan
- New DC plan for correctional officers
- Constitutional ballot measure to change the PBI to a pre-paid COLA that adjusts based on funded ratio



## Reform Case Studies:

# Pennsylvania State & Teachers (2017)



## Why?

- Underperforming investment returns
- History of failing to pay the actuarially determined contribution rate
- Prior reforms having a limited effect on the growth in unfunded liability amortization payments

## What?

- Create new choice-based retirement system (Hybrid or DC) for new hires
  - Cost-sharing contribution rate policy for DB component of new Hybrid plans
- Create commission to target savings by lowering investment fees paid to asset managers
- Require that any savings resulting from these changes be put back into the fund to pay down unfunded liabilities



## Reform Case Studies:

# Oklahoma State Employees (2014)

## Why?

- Underperforming investment returns
- History of failing to pay the actuarially determined contribution rate
- Existing benefit structure does not prove itself as an effective recruiting tool leading to higher than desired turnover

## What?

- All future COLA increases now required funding by cash before granting the benefit
- New employees (except hazardous duty employees) to participate in a DC plan instead of the previous DB plan



## Reform Case Studies:

# Utah Retirement System (2010)

## Why?

- Underperforming investment returns
- After recession, reaching 100% funding through previous amortization schedule became impossible
- History of failing to pay the actuarially determined contribution rate

## What?

- Create new choice-based retirement system for new hires: New employees participate in either a DC plan or a limited DB plan
- Closed loophole allowing “double-dipping” with retirees returning to the workforce and still receiving pension checks



## Reform Case Studies:

# Limits of Recent Pension Reforms

- **Michigan Teachers**

- Plan to lower the assumed return requires future action by the MPSERS board, state treasurer, and legislature and that could be politically reversed
- Choice-based approach has a one-time option without ability to change the choice within three to five years once a teacher better understands their own career trajectory
- No guarantee of future amortization policy changes

- **Arizona Police/Fire & Probation**

- More conservative funding policy is needed and will require future action by the PSPRS board, and there is no guarantee the incentive approach will work
- New defined benefit plan uses the same assumed rate of return as the legacy plan, instead of starting at a lower rate

- **Pennsylvania State and Teachers**

- New defined benefit plans (within the DB/DC Hybrid plans) use the same assumed rate of return, amortization method, and other funding policies of the legacy plan instead of starting with better assumptions and methods
- Default for all members is into the max hybrid plan option instead of into the plan option that best aligns with the demographics and participation rates of each group of members within PPSERS and PSERS
- DC Only plan option has just a 2% employer match, which may not be enough to ensure the plan option can provide for retirement security
- No plan for changes to the existing assumed return or amortization policy

# Pension Reforms and Addressing the Legacy Unfunded Liability



- **Positive Approaches** to Addressing Legacy UAL
  - *Utah (2014), Oklahoma (2015)* — included in statute a requirement that employers make amortization payments as a percentage of total payroll; effect has been that unfunded liability amortization payments in dollars have been effective the same as if there had been no changes
  - *Arizona Police & Fire (2016), Arizona Corrections (2017), Michigan Teachers (2017)* — included in statute a requirement that employers make amortization payments as a percentage of total payroll + required future UAL to be paid off over 10-year, level-dollar layered amortization bases
- **Negative Approaches** to Addressing Legacy UAL
  - *Michigan State Employees (1996), Alaska State & Teachers (2005), Kentucky State and Local (2014), Pennsylvania (2017)* — made no change with respect to legacy UAL, then made limited or no changes to the assumed rate of return and amortization method + failed to pay 100% of actuarially determined rate, collectively leading to a growth in the legacy UAL
  - *Arizona Elected Officials (2013)* — created a fixed payment schedule for legacy UAL + no change to assumed return over time; led to insufficient funding deemed unconstitutional by trial court in 2017

# The Landscape of Changes to Pension Systems Over Past 20 Years



- **Systems creating choice-based DB or DC plans**
  - *Default to DB:* South Carolina State & Local (2012), Arizona Police/Fire (2016), Arizona Corrections (2017)
  - *Default to DC:* Michigan Teachers (2017)
- **Systems creating choice-based Hybrid or DC plans**
  - Utah (2014), Pennsylvania State & Teachers (2017)
- **Systems creating DC-only plans**
  - Michigan State (1996), Alaska State (2005), Alaska Teachers (2005), Arizona Elected Officials (2013), Arizona Corrections (2017)
- **Systems creating CB-only plans**
  - Nebraska State (2002), Nebraska Local (2002), Kansas State (2012), Kentucky State & State Police (2014), Kentucky Local (2014)
- **Systems creating Hybrid-only plans**
  - Oregon State & Teachers (2003), Georgia State (2008), Rhode Island State & Teachers (2011), Virginia (2012), Tennessee (2013)