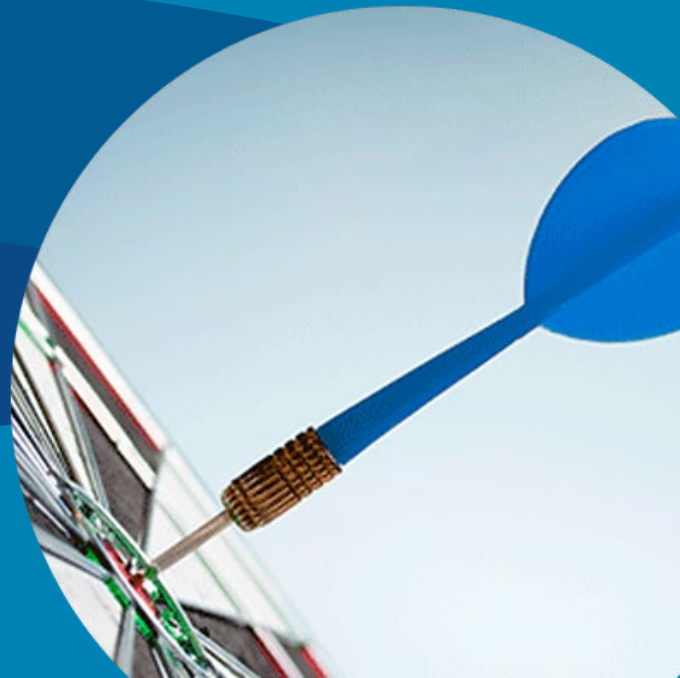# PERA Assumption Review
Colorado Legislative Council
September 2, 2021

Joe Newton, FSA

Dana Woolfrey, FSA

Agenda by Meeting

- Last Meeting: Focused on findings that are leading to recommendations

- This Meeting:
  - Review recommendations
  - Opportunity to clarify or expand on recommendations
  - Work through remaining findings
  - Provide some considerations for the current or future legislature/committees

Summary Recommendations: Technical

- Request from PERA for the currently scheduled 2024 Experience Study be accelerated into 2022, for use in the December 31, 2022 Valuation. With emphasis on
  - The withdrawal assumption
  - The retirement assumption and possible other factors that are producing the annual actuarial losses from this source
  - Treatment of new entrants in the determination of the ADC and in projections

- Request PERA shorten amortization periods used for future layers to align with the goal of reaching full funding by 2048
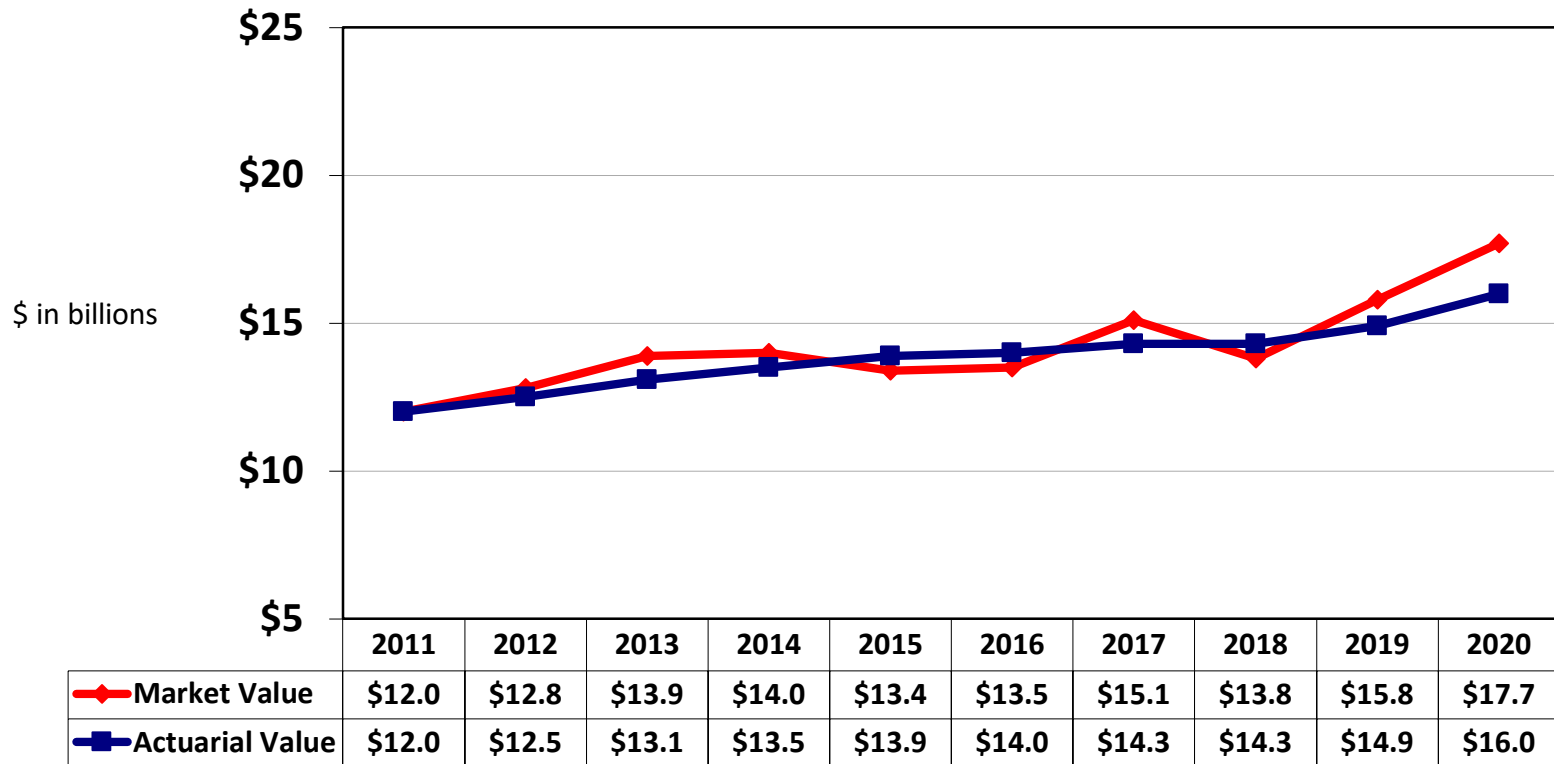
Summary Recommendations: Communication

- Request the signal light report include a historical reconciliation of gains/losses by source

- Request the valuation and signal light report include a clearer statement, towards the front of the report, on the main goal(s) of the funding policy and the progress towards achieving those goal(s)

- Request more consistent messaging/definitions of the "funding period", especially being distinct from the amortization period

Scope of Review: Covered last meeting

- An analysis of the validity and appropriateness of the actuarial methods and assumptions adopted by the PERA Board that are used in the actuarial valuations of the financial situation of the Hybrid DB Plan.

- Identifying deviations in actuarial methods and assumptions that have resulted in the existing Hybrid DB Plan terms and provisions no longer meeting targets and achieving sustainability that could indicate that assumptions should be changed.

- Recommendations for any adjustments that should be considered with respect to the assumptions used to model PERA's financial situation.

- An analysis of the calculated normal costs that will cover current pension benefits and the share of contributions going to cover the unfunded liability of PERA.

- Recommendations about the enhancements that PERA could make to the annual analysis that it conducts pursuant to Senate Bill 14-214 to determine whether its model assumptions are meeting targets and achieving sustainability.
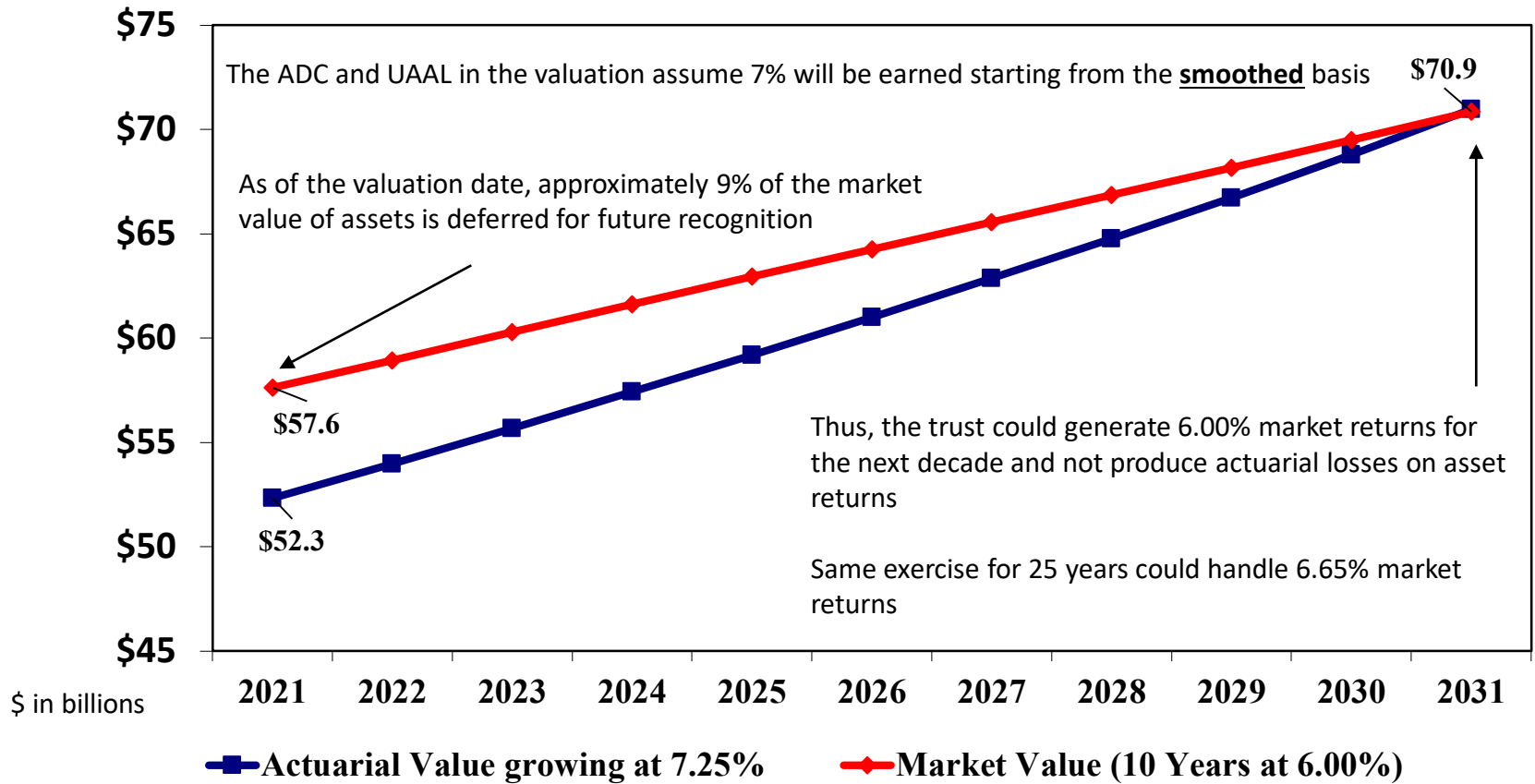
Impact of Recent Strong Investment Performance:
Historical Market and Actuarial (Smoothed) Values of Assets: State

$ in billions

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Market Value	$12.0	$12.8	$13.9	$14.0	$13.4	$13.5	$15.1	$13.8	$15.8	$17.7
Actuarial Value	$12.0	$12.5	$13.1	$13.5	$13.9	$14.0	$14.3	$14.3	$14.9	$16.0

Actuarial Value is a 4-year smoothed version of the Market Value

The Actuarial Value is 90.4% of the Market Value as of December 31, 2020

Projected Growth of Market and Actuarial Assets: All of PERA

The ADC and UAAL in the valuation assume 7% will be earned starting from the **smoothed** basis

As of the valuation date, approximately 9% of the market value of assets is deferred for future recognition

$57.6

$52.3

$70.9

Thus, the trust could generate 6.00% market returns for the next decade and not produce actuarial losses on asset returns

Same exercise for 25 years could handle 6.65% market returns

$ in billions

■— Actuarial Value growing at 7.25%   ◆— Market Value (10 Years at 6.00%)

Scope of Review: Covered Today

- An analysis of whether or not PERA is on track to achieve full funding by 2048, including the likelihood of achieving full funding, and, if not, recommendations for corrective actions.

- Recommendations about the necessity of continuing the direct distribution to PERA pursuant to Section 24-51-414, C.R.S.

- Any other recommendations the subcommittee could make to PERA regarding assumptions, funding policy, reporting practices, or other operational policies

2021 Signal Light Report

- There were several enhancements to the 2021 Signal Light Report

- These enhancements provide more sensitivity to other sources of variance besides the investment return assumption

Probability of Outcomes

State	Probability of Meeting Criteria based on Source of Variance					
Status	100% Funded By	Investment Return	Salary Increase	Population	Demographic Changes	All
Dark Green	2041	52%	92%	100%	96%	52%
Green	2048	10%	8%		4%	8%
Total Green		62%	100%	100%	100%	60%

Light Yellow	2058	11%				9%
Yellow	2068	7%				6%
Orange	Neutral	16%				15%
Red	Insolvent	4%				10%

Baseline deterministic projection reaches full funding in 2041

Data From Signal Light Report

Annual Standard Deviations Used: 12.8% for Investments, 0.77% for Salary Increases, 1.85% for Population Changes, and 0.59% for Demographic Changes

Probability of Outcomes

School		Probability of Meeting Criteria based on Source of Variance				
Status	100% Funded By	Investment Return	Salary Increase	Population	Demographic Changes	All
Dark Green	2041	47%	32%	13%	27%	47%
Green	2048	9%	68%	87%	73%	8%
Total Green		56%	100%	100%	100%	55%
Light Yellow	2058	10%				8%
Yellow	2068	7%				6%
Orange	Neutral	20%				17%
Red	Insolvent	7%				14%

Baseline deterministic projection reaches full funding in 2043

Data From Signal Light Report

Annual Standard Deviations Used: 12.8% for Investments, 0.77% for Salary Increases, 1.85% for Population Changes, and 0.59% for Demographic Changes

GRS

Non-Investment Sources of Variance

- As shown, the non-investment potential sources of variance are unlikely to produce undesirable outcomes on their own

- However, they can produce a compounding effect in poor scenarios, especially when combined with a poor investment scenario

Success In the Signal Light report

- A scenario is counted as a success if:
  - The funded percentage in 2048 is >=100%; and
  - The funded percentage after 2048 must remain over 100% (through 2070); and
  - The funded percentage prior to 2048 remains >0%

GRS

All 4 of these scenarios are not considered a success in the signal light report

Projected Funded Ratios
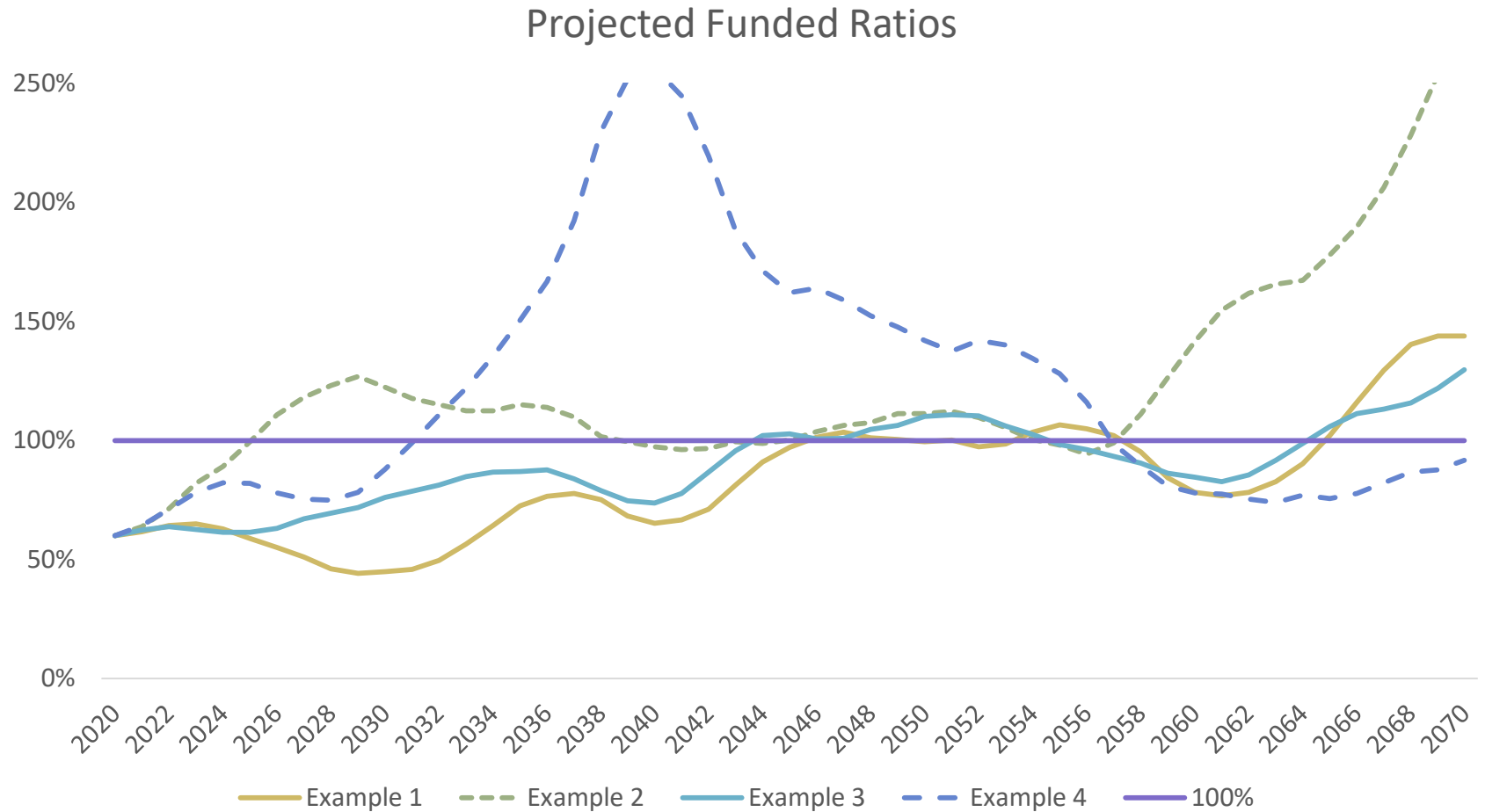
Probabilities of Full Funding

	State	School	Local	Judicial	DPS
Funding Period in Signal Light Report	20	22	8	7	7
Signal Light Report, probability fully funded by 2048	62%	56%	64%	76%	85%
% of scenarios that achieve 100% funded status for two consecutive years on or before 2048	67%	64%	79%	87%	91%

- The probabilities provided in the Signal Light Report are measured in a manner that is quite conservative
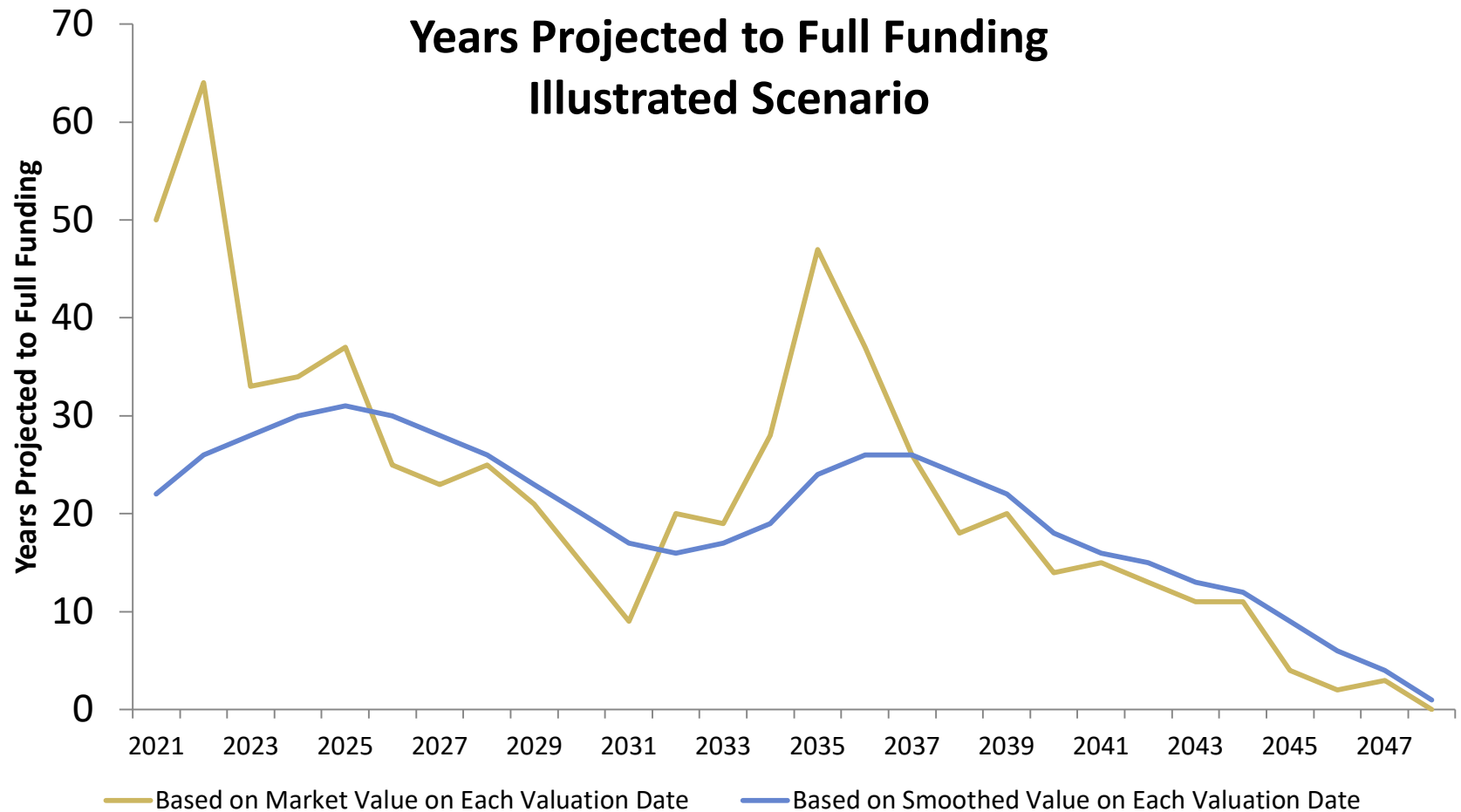
GRS Projections

- The following are our estimates of what the probabilities of achieving full funding by 2048 are for:
  - PERA as a whole
  - School on its own

- These illustrate changes as discussed in our report, including estimated changes to assumptions adopted as of 2022, (withdrawal, retirement, new entrants)

**GRS**

Probability of Achieving Full Funding by 2048

	From Market Assets as of December 31, 2020	From Smoothed Assets as of December 31, 2020
Total PERA	59%	51%
School Only	57%	47%

Impact of Smoothing on Communications

**Years Projected to Full Funding
Illustrated Scenario**

Based on Market Value on Each Valuation Date · Based on Smoothed Value on Each Valuation Date

Projection for PERA in Total

Probability of Achieving Full Funding On or Before

Legend: From Smoothed Assets, From Market Assets
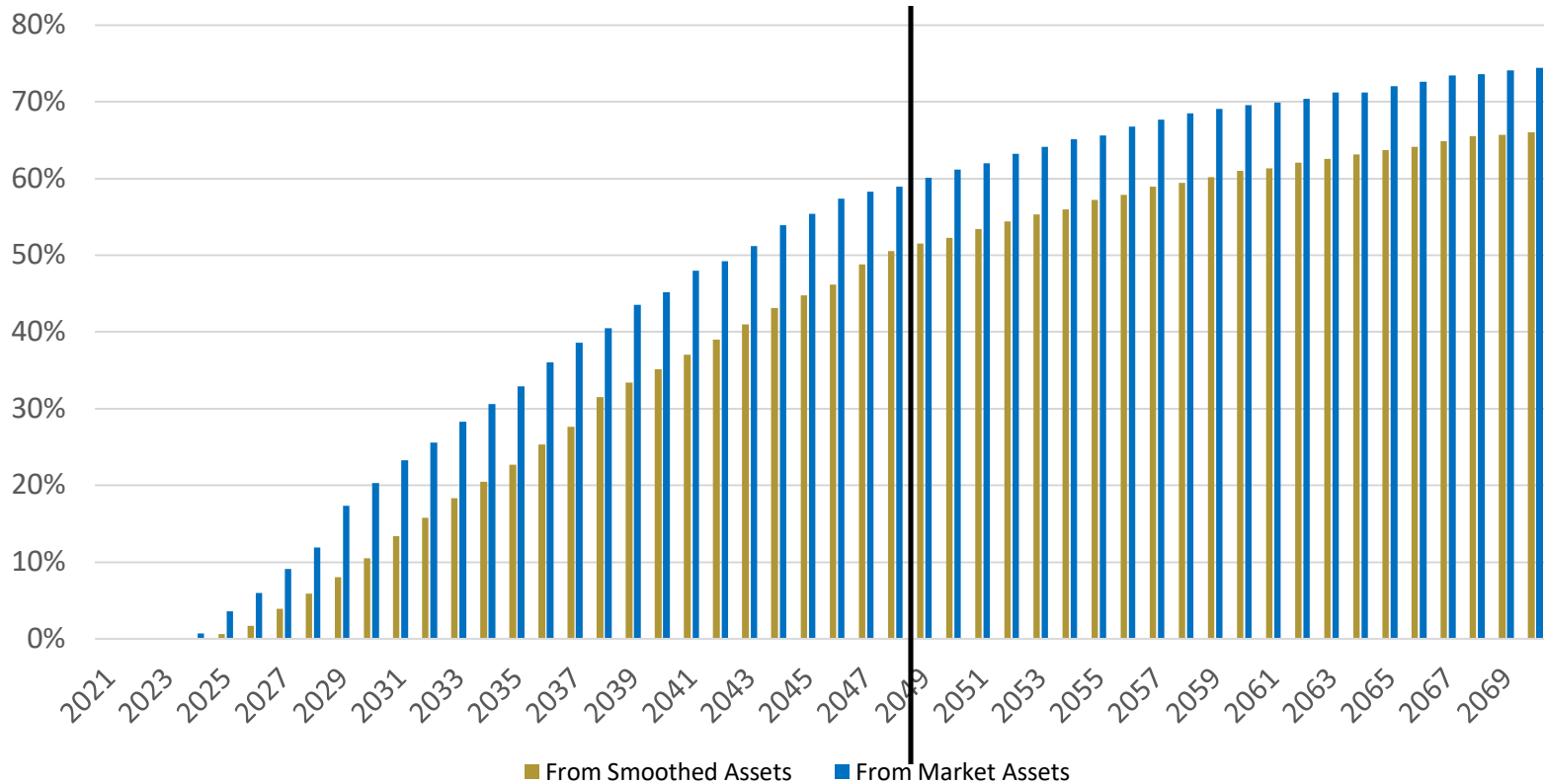
Probability of Occurring At Some Point Prior to 2048

	Reaching Highest Contribution Step	ADC Exceeding 1% more than Max Actual Contribution
Total PERA	64%	52%

- There are about the same number of scenarios that reach the goals (full funding) as will need additional contributions past allowable under current statutes

- It is the ultimate limits in the Statute that create these possibilities, not the annual limit on how much can change in one year

Considerations

- If uncomfortable with current probabilities:
  - The change to shorter amortization periods will help
  - Past that, could add two more steps in each direction to add more potential adaptation as experience unfolds
    - Could be employer money only, employer and member, or all three sources similar to the current provisions
    - These are not projected to come into play, but there are scenarios that would need further adjustment and having the provisions already in place would allow for a faster reaction if it is deemed necessary. Doing this while there is potential in both directions could be seen as a political balance.

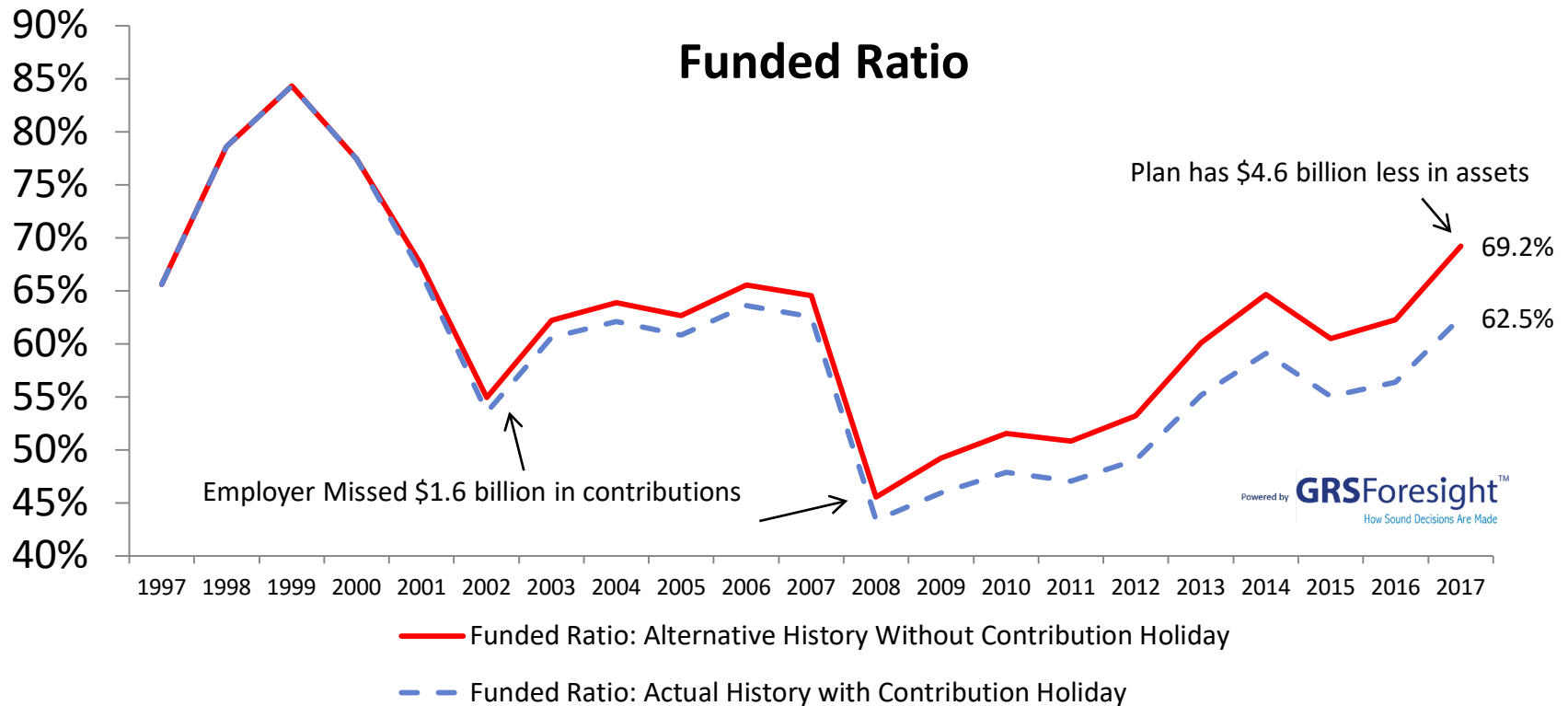# Necessity of continuing the direct distribution to PERA pursuant to Section 24-51-414, C.R.S

- This annual $225m is absolutely necessary

- Present Value of $2.7b is approximately 9% of the UAAL

- Projected to accumulate to $17b in assets by 2048 (at 7.25%)

- This is already baked into the ADC numbers and projections

Importance of **committing** to the direct distribution to PERA pursuant to Section 24-51-414, C.R.S

- Contributions are the life blood of a pension system

- Similar to food and water for your body, a pension system can not survive without the appropriate contributions on a consistent basis

- The $225m was missed, as typical, at a time when the market was low, thus there was significant opportunity cost

Actual History of Another System that historically utilized a Fixed Rate Contribution Policy

The long term cost is not just the missed contributions, it also includes the missed investment earnings on those contributions, which are typically missed at what end up being good buying opportunities

Funded Ratio

Plan has $4.6 billion less in assets

69.2%

62.5%

Employer Missed $1.6 billion in contributions

Powered by **GRS**Foresight™
How Sound Decisions Are Made

—— Funded Ratio: Alternative History Without Contribution Holiday

– – Funded Ratio: Actual History with Contribution Holiday

Funding Equation

- This equation will balance over time:

$$C + I = B$$

- Where:
  - C = Contributions
  - I = Investment Earnings
  - B = Benefit Payments

Discretionary Contribution Holiday's Ultimately Lead to Benefit Reductions

$$C + I = B$$

C — Contributions are being reduced

I — Less Assets to Take Advantage of the Bull Market

B — ?
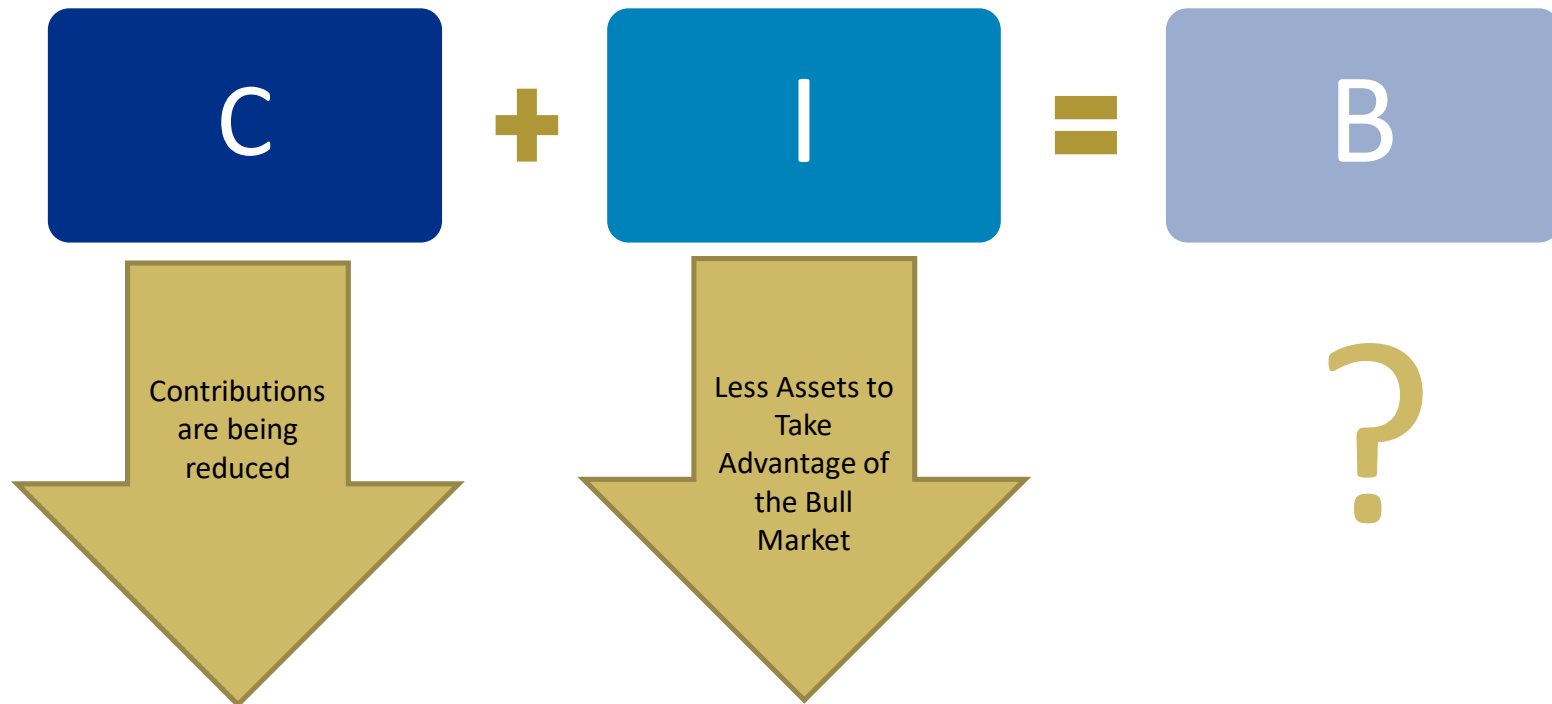
Contribution holidays that are not made up over a short period of time are essentially benefit reductions

– just don't know when or for which members

Excerpt from a Study by the Texas Pension Review Board

Average Funded Ratio ADC vs Fixed-Rate[13]
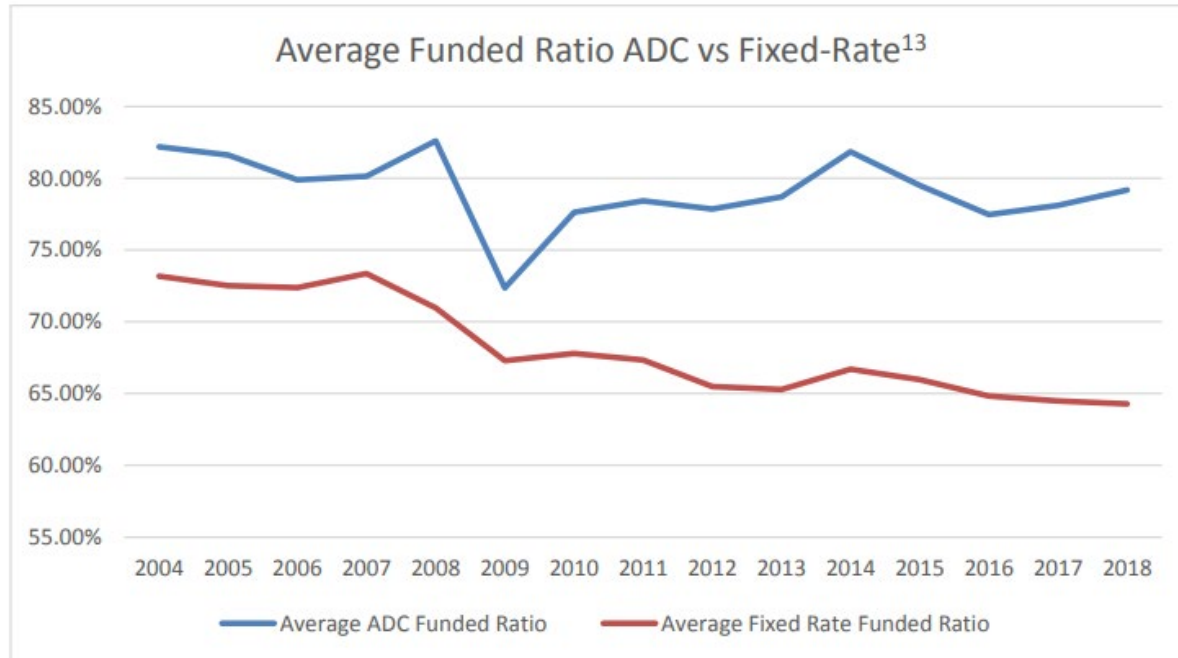
Define Fixed Rate Plans as situations where the plan sponsor has discretion over the amount and timing of the contribution

Define Actuarially Determined Plans as situations where a predetermined formula, either set by the Board or by Statute, without a long term limit, sets the amount of contribution

https://www.prb.state.tx.us/txpen/wp-content/uploads/2019/02/Funding-Policy-Paper.pdf

GRS

NASRA Issue Brief: State and Local Government Contributions to Statewide Pension Plans: FY 18
Issued April 2020

Table 1. Median ARC/ADC received by each classification of employer contribution, FY 01 to FY 18

Method for Determining Employer Contributions	Actuarially Determined	Fixed	Actuarially Determined w/ Limitation	Other
Median ARC/ADC Received	100.0%	87.9%	86.8%	71.7%

Figure F: Average ARC/ADC received for each employer classification: Actuarially Determined, Fixed, Actuarially Determined w/Limitation, and Other, FY 01 to FY 18
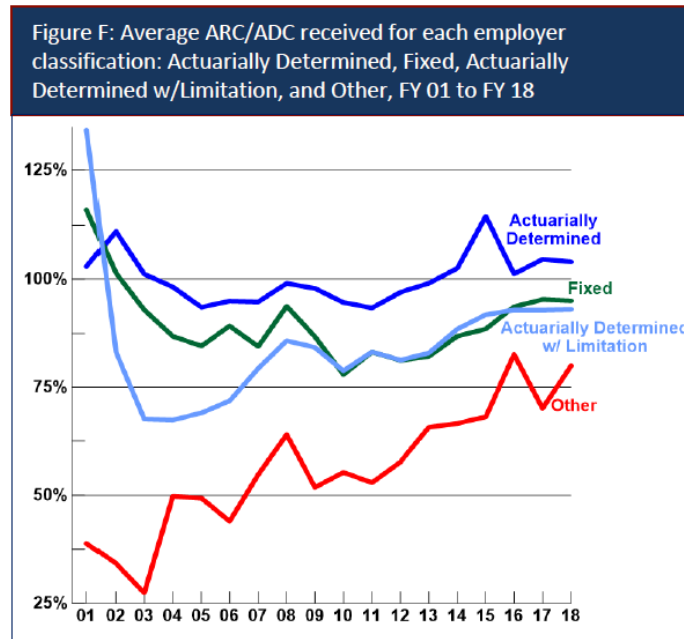
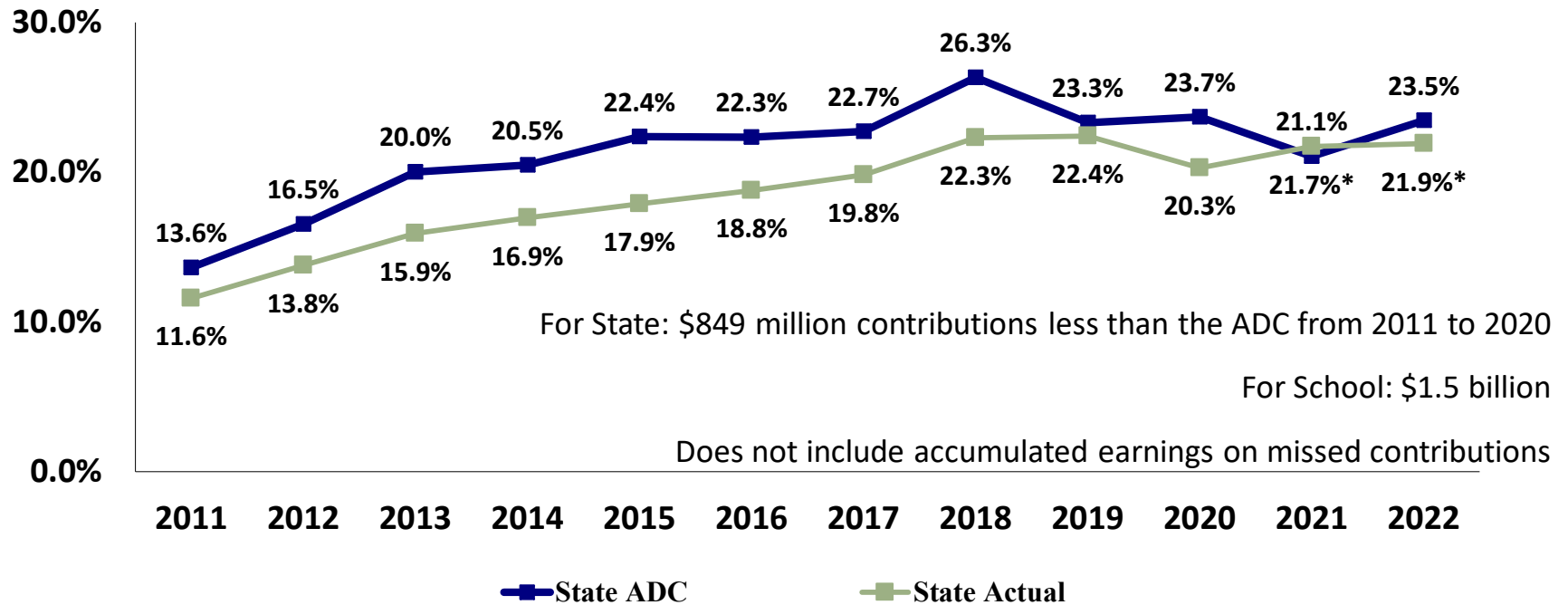Source: State retirement system CAFRS, compiled by NASRA

Takeaway

- Retirement Systems whose Plan Sponsors have discretion, or control, over the contributions struggle to be successful

- SB 18-200 was a strong step in the right direction in this regard but continues to have long term limitations, and the missed $225 million contribution in 2020 from Section 24-51-414, C.R.S calls commitment into question

GRS

Historical Contributions

State Division

For State: $849 million contributions less than the ADC from 2011 to 2020

For School: $1.5 billion

Does not include accumulated earnings on missed contributions

State ADC values: 13.6% (2011), 16.5% (2012), 20.0% (2013), 20.5% (2014), 22.4% (2015), 22.3% (2016), 22.7% (2017), 26.3% (2018), 23.3% (2019), 23.7% (2020), 21.1% (2021), 23.5% (2022)

State Actual values: 11.6% (2011), 13.8% (2012), 15.9% (2013), 16.9% (2014), 17.9% (2015), 18.8% (2016), 19.8% (2017), 22.3% (2018), 22.4% (2019), 20.3% (2020), 21.7%* (2021), 21.9%* (2022)

— State ADC   **— State Actual**

* Projected/Estimated

Historical Funded Ratio

State Division

Investment Performance was strong during this time period

The funded ratio did not improve due to a combination of the demographic assumptions underperforming and not receiving an actuarially appropriate contribution for most years

Year	Funded Ratio
2011	57.7%
2012	59.2%
2013	57.5%
2014	57.8%
2015	57.6%
2016	54.6%
2017	57.5%
2018	56.1%
2019	58.0%
2020	59.1%

Funded Ratio
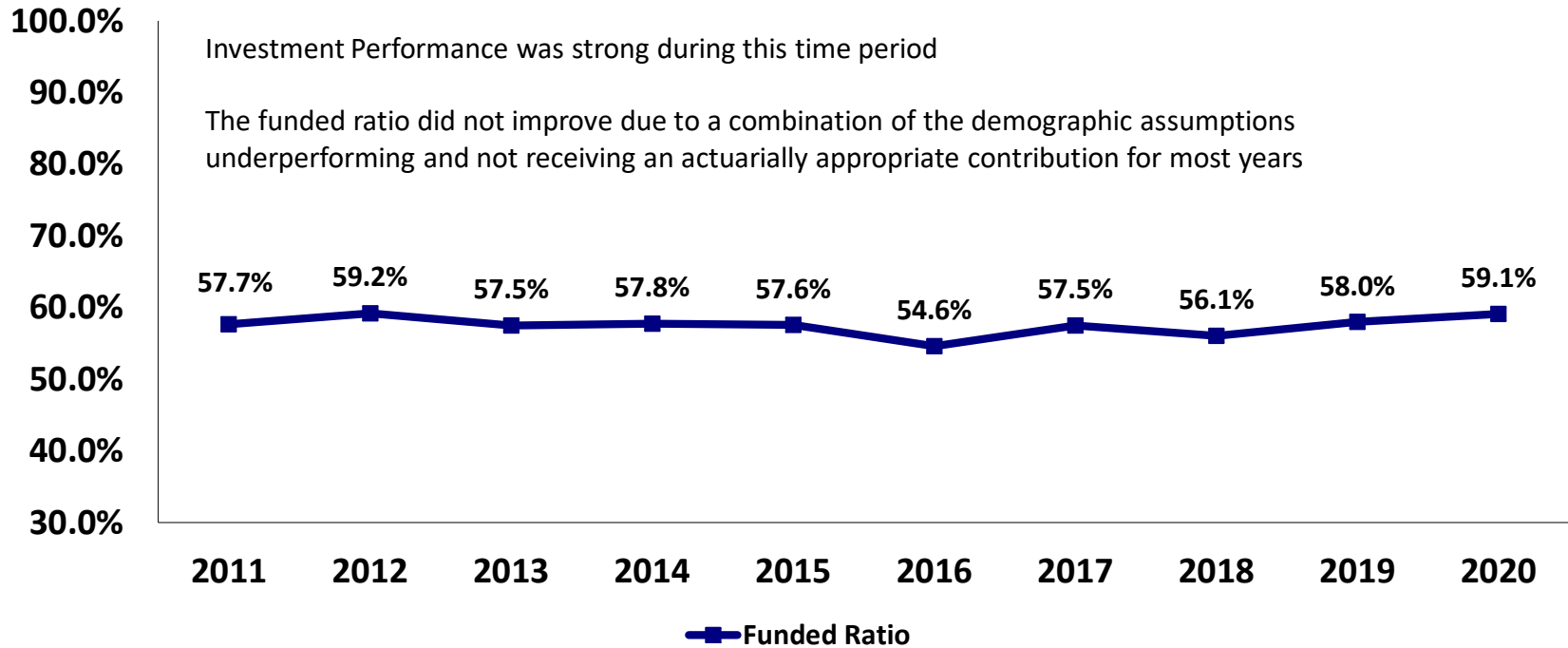
Takeaway

- In a situation where the contribution levels are not expected to sustain the plan "doing nothing" can not be an option.

- There has to be a mechanism to force appropriate change at the appropriate speed

- The potential for "doing nothing" still exists out past the limitations in SB 18-200

Discussed in last meeting: One time $500m

- Would accumulate up to $3.3b by 2048

- Could be the start of a strong, disciplined approach towards financing the current UAAL

- The opposite of the impact from Section 24-51-414, C.R.S

Summary

- The questions raised about the current assumptions need to be addressed to increase the reliability of future communications

- The communications have been improved, including providing more transparency and sensitivity

- However we would recommend further improvement towards clearer and more direct messaging

Summary

- The probability is not over 65% for PERA achieving full funding prior to 2048

- However, the probability is approximately equal to 50%, if not slightly higher, thus PERA is currently on a path towards full funding

Summary

- There are likely to be periods of time when trends are better than anticipated, as well as times when results are lagging expectations.

- For PERA to be successful, the Plan Sponsors have to be committed to appropriate, consistent funding

- The assumptions and the contributions, both, have to be reliable

GRS