SOCIETY OF ACTUARIES

2018 ANNUAL MEETING & EXHIBIT

Oct. 14–17, 2018
Music City Center
Nashville, TN

Session 159PD: Public Sector Pension Plan Innovations

10/17/2018
8:30-9:45 a.m.

2018 ANNUAL MEETING & EXHIBIT

Public Sector Pension Plan Innovations

William B. Fornia, FSA Moderator

October 17, 2018

SOCIETY OF ACTUARIES®

SOCIETY OF ACTUARIES
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Retirement 20/20

- Society of Actuaries created Retirement 20/20 in 2006
  - brought together experts interested in and impacted by retirement issues in order to design new retirement systems from the ground up that better meet the economic and demographic needs for the 21st century in North America
  - First models tended to focus on private sector solutions
  - 2017 call for models focused on public plans

- I had the privilege of reading the papers and being a judge

https://www.soa.org/press-releases/2018/retirement-20-20/

SOA Retirement 20/20 Public Pension Model Prizewinners

- Funding of Public Sector Pension Plans
  - Chun-Ming (George) Ma, FSA, FCIA, Ph.D.
- Multiple Employer Pension Plan Risk-Sharing Model
  - Sandra J. Matheson, MBA
  - Gene Kalwarski, FSA, EA, FCA, MAAA
- The South Dakota Retirement System Generational Benefit Structure
  - Douglas J. Fiddler, ASA, EA, FCA, MAAA
  - R. Paul Schrader, ASA
  - Robert A. Wylie
- A Middle Ground for Public Plans
  - Rowland Davis, FSA

SOA Retirement 20/20 Public Pension Model Honorable Mentions

- Full Funding of Traditional State and Local Government Pensions: The Entry-Age-Service-Cost Method
  - Jonathan Barry Forman, J.D.
  - Michael J. Sabin
- Tontine Pensions Could Solve the Chronic Underfunding of State and Local Pension Plans
  - Jonathan Barry Forman, J.D.
  - Michael J. Sabin
- Finding the Optimal Pension Plan for Public Sector Workers: A Mix of DB and DC Pension Elements
  - Robert L. Brown, Ph.D., FSA, ACAS, FCIA
  - Stephen A. Eadie, FSA, FCIA
- Public Pension Plan Design: A Two-Component Approach to Addressing Challenges
  - Tammy F. Dixon, FSA, EA, MAAA
  - Maria Kirilenko, EA, MAAA

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2018 ANNUAL MEETING & EXHIBIT

Getting There from Here

June 2018

Maine Public Employees Retirement System

Today's Information

- The PLD Consolidated Retirement Plan
- Retirement Plan Landscape
- PLD Plan in Comparison to Other US Plans
- PLD Plan Changes Adopted May 10, 2018
- Remaining Changes Under Consideration
  - Retire/Rehire provisions
  - Re-entering the PLD Plan after Retiring

What is “There” for a Defined Benefit Pension Plan?

Having confidence that the plan can pay full benefits throughout *every* member’s entire retirement.

Protecting the Participating Local District Consolidated Retirement Plan

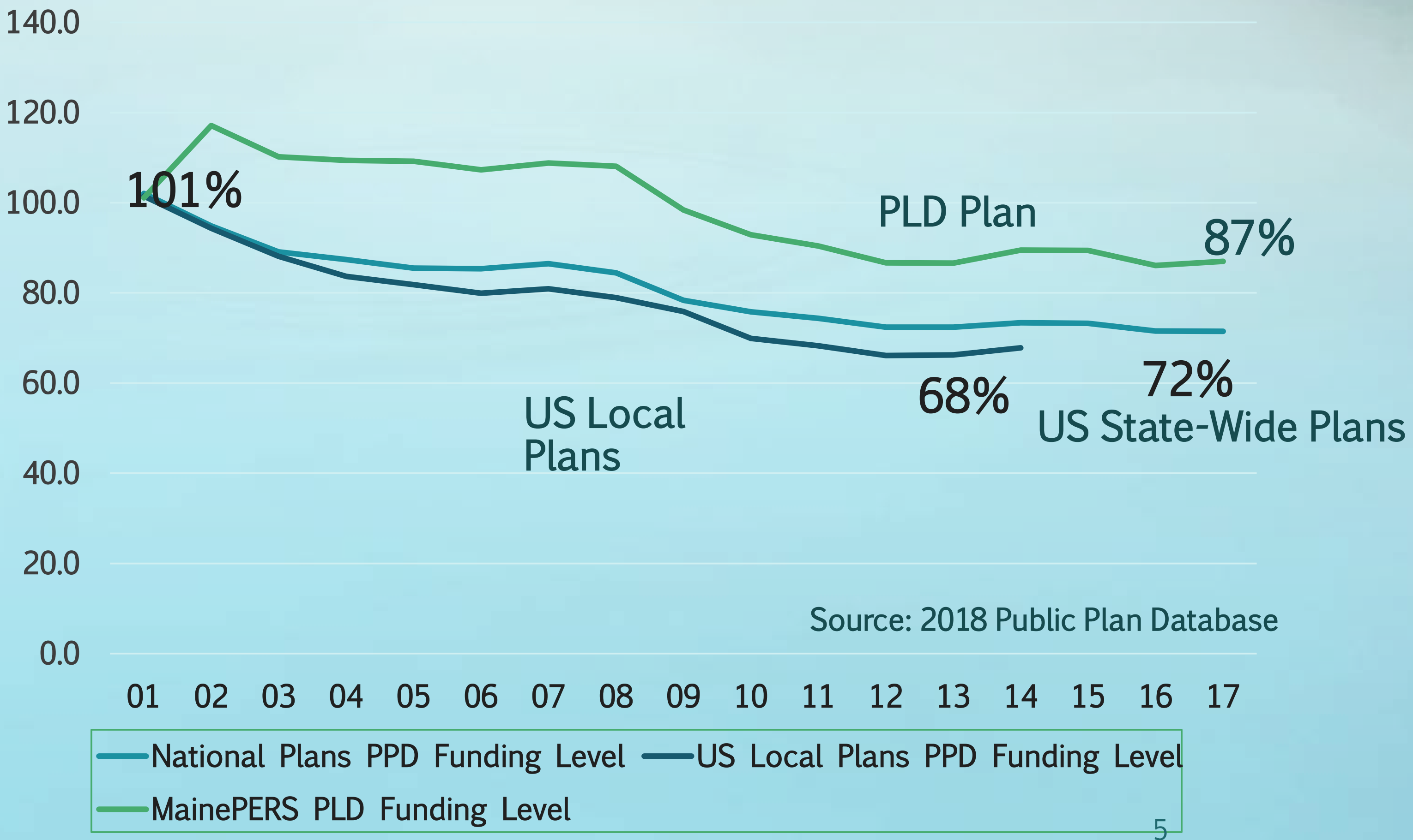
- Established in 1994 by consolidating over 300 individual local plans
- What is the structure?
  - Multiple-employer cost-sharing plan
  - 11 different plan options for employers to choose from
  - Employer participation is voluntary
- What is the funding history?
  - 108-110% funded up until the 2009 recession
  - The discount rate was gradually reduced from 7.75% in 2009 to 6.875% in 2016
  - The Plan is currently 87% funded with a proposed 6.75% discount rate

How Does the PLD Plan Compare?

PLD Funding has Remained Fairly Strong

- The PLD Plan did not increase benefits (liabilities) during the 1990's which helped maintain their funding status in the early 2000's
- Instead employer rates were reduced from 8% to 3% through 2009 which reduced funding after the recession
- Complicating this reduction was employer rates could only be increased 1% per year after 2009, continuing to decrease funding until normal costs were covered in rates

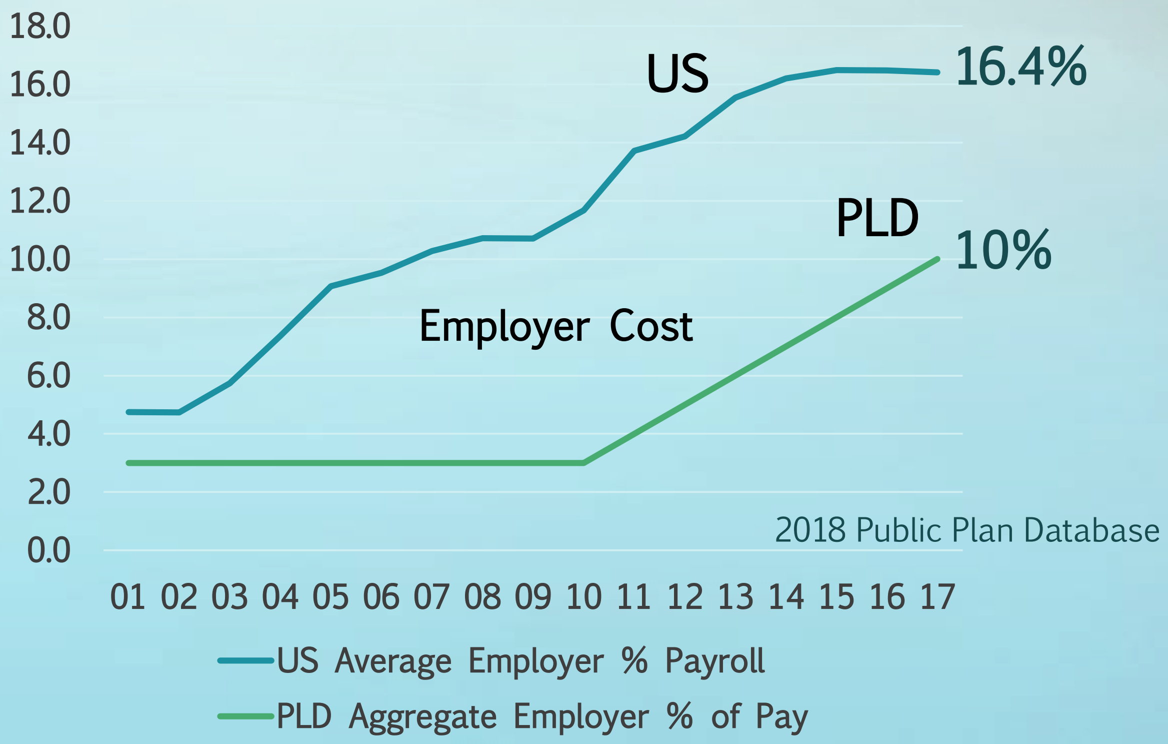
PLD, Local and National Funding Levels



How Does the PLD Plan Compare?
Costs are Also Reasonable

Rise of US Average & PLD Employer *Aggregate* Costs

- US average employer pension costs have increased in spite of cost-reduction measures:
  - Plans in over 35 states have increased rates
    - Some states have statutory rates that have not changed
  - Plans in over 30 states have reduced COLAs, 17 of which affect current retirees
  - Plans in over 40 states have reduced future benefits



So . . . What Was the Problem for the PLD Plan?

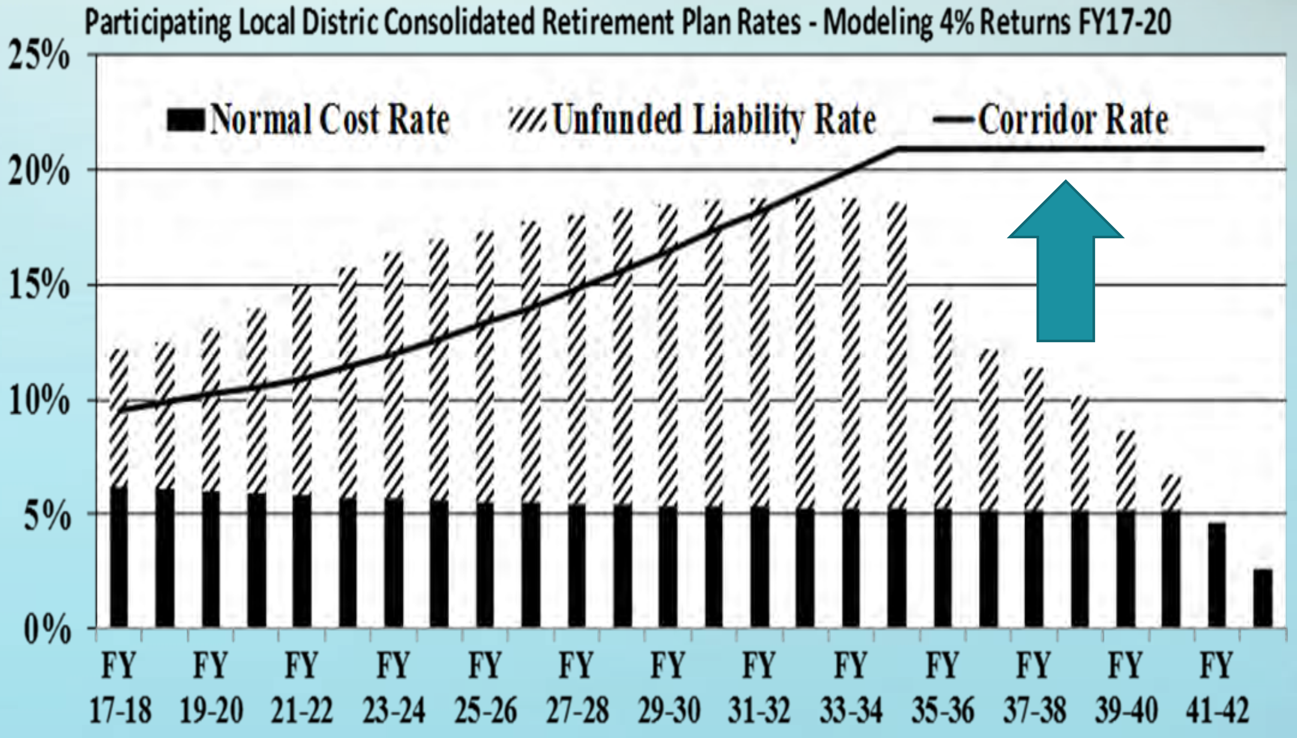
- By 2016, employer and employee rates were moving toward covering the normal and UAL costs
- 3 primary problems remained

1. Employers had forgotten their costs were really 8% and were frustrated that there was "no end" to cost increases
   - For a voluntary plan employer withdrawal could be catastrophic
2. The corridor cost calculation method that helped slow the move from over- to 100% funded slowed the increase back to full funding
3. Following 1.5% returns in fiscal years 2015 and 2016, market returns were predicted to stabilize at 4% or so for four years and gradually return to 7-8%

Stress Testing Expected Slow Markets Showed Employer Contributions that Could Double

Actual and Projected Returns as of 6/30/16

Employer Rates w/ FY17-20 Projected Returns



Source: Cheiron Trend Modeling

Avoiding Employer Rate Increases or Benefit Reductions
First Step was to Understand the Risks

- Financial Markets
- Longevity/Mortality
- Maturing Plans
- Labor Pool and Member Demographics
- Declining Funding Levels
- Higher Contribution Rates

What's the Problem? – the Markets are Roaring

Market Volatility

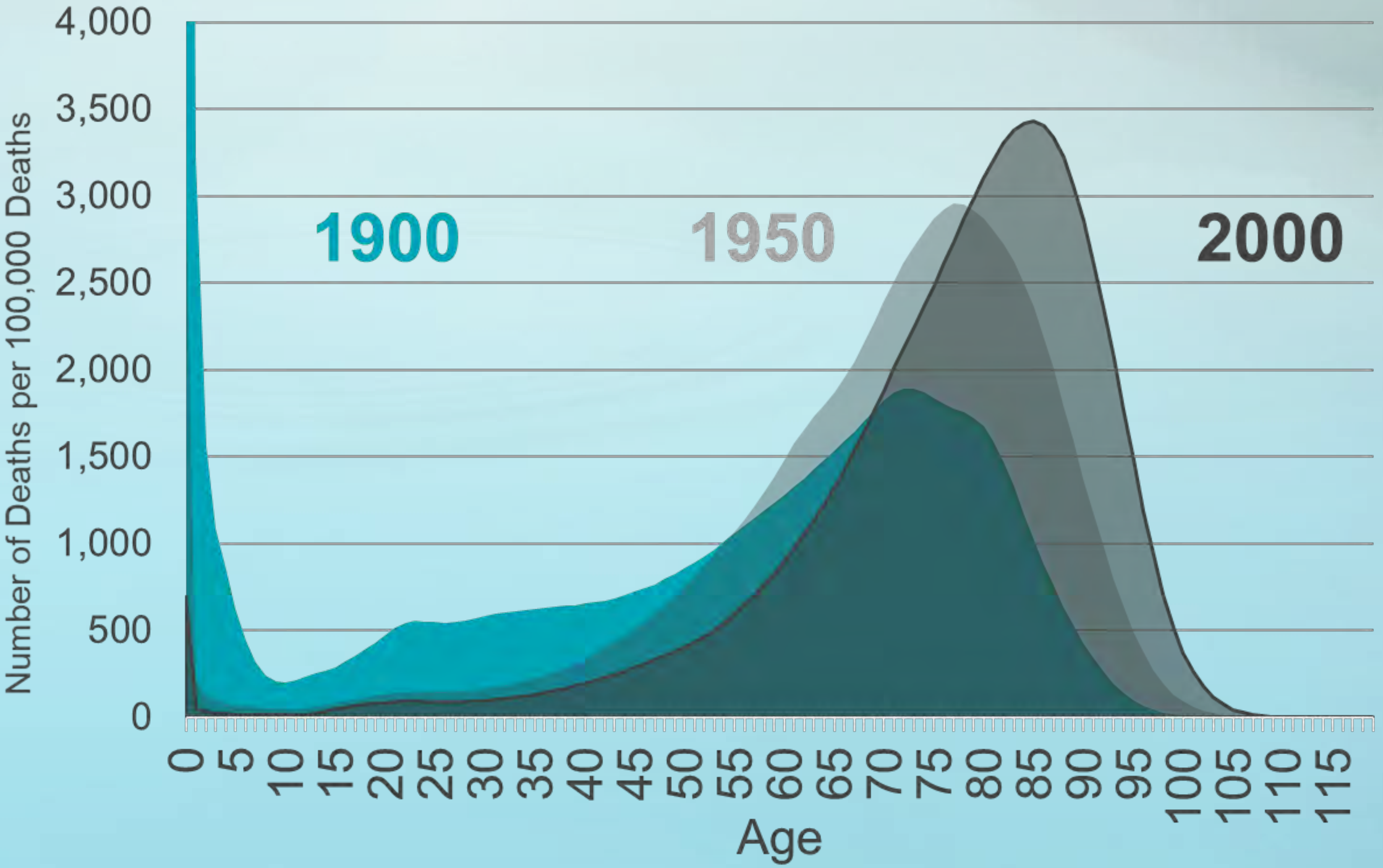
- DB plans may be long-term investors, but the risky asset mix required to meet the earnings assumption means short-term volatility can wreak havoc on annual contribution rates
- *RISK* - Employers might withdraw leaving the remaining employers and members with increasing liabilities and higher rates

MainePERS Short/Long-term Returns

MainePERS Returns

Retirement Plan Landscape
Longevity/Mortality

- Current census data shows people who reach age 65 will live on average to age 84
- *RISK* – Costs could increase

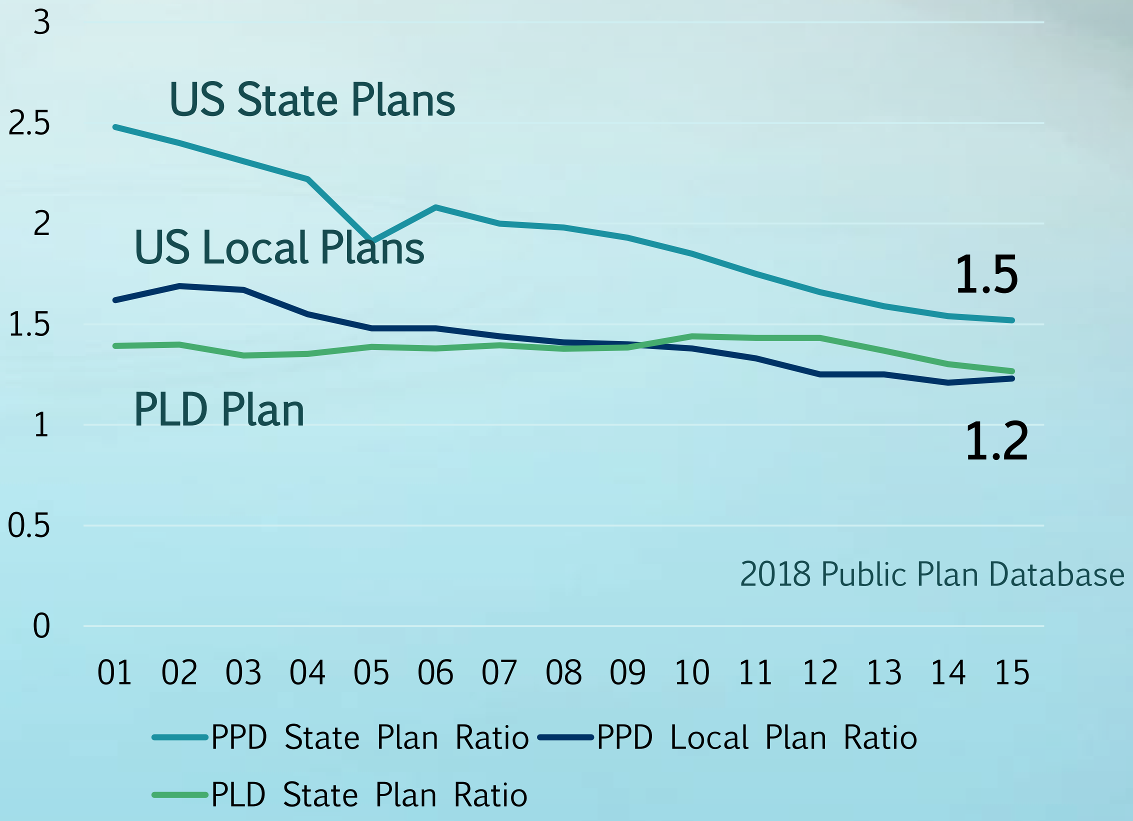


Retirement Plan Landscape
Defined Benefit Plan Maturity

Plans are Getting Older

- The PLD Plan is mature because it is a continuation of multiple separate plans
- Maine has the second oldest population; the oldest average worker age, and the lowest unemployment rate in the US
- *RISK* – Unmanageable increase in retire/rehire

Active to Retired Ratios



Other Demographic Challenges

- Health
  - Healthcare advancements create longer lifespans at an increased cost
  - Retirees have higher healthcare insurance premiums and co-pays
- Boomerang Kids
  - "It's Official: The Boomerang Kids Won't Leave" *NYT June 20, 2014*
- Supplemental Retirement Savings Challenges
  - "Studies show that most Americans worry that their savings will fall short in retirement" *CNN March 16, 2018*
- People are Working Longer
  - "Dying at your desk is not a retirement plan" Washington Post June17, 2017
- *RISK* – members face new challenges and have to be able to rely on their benefit being there throughout their life

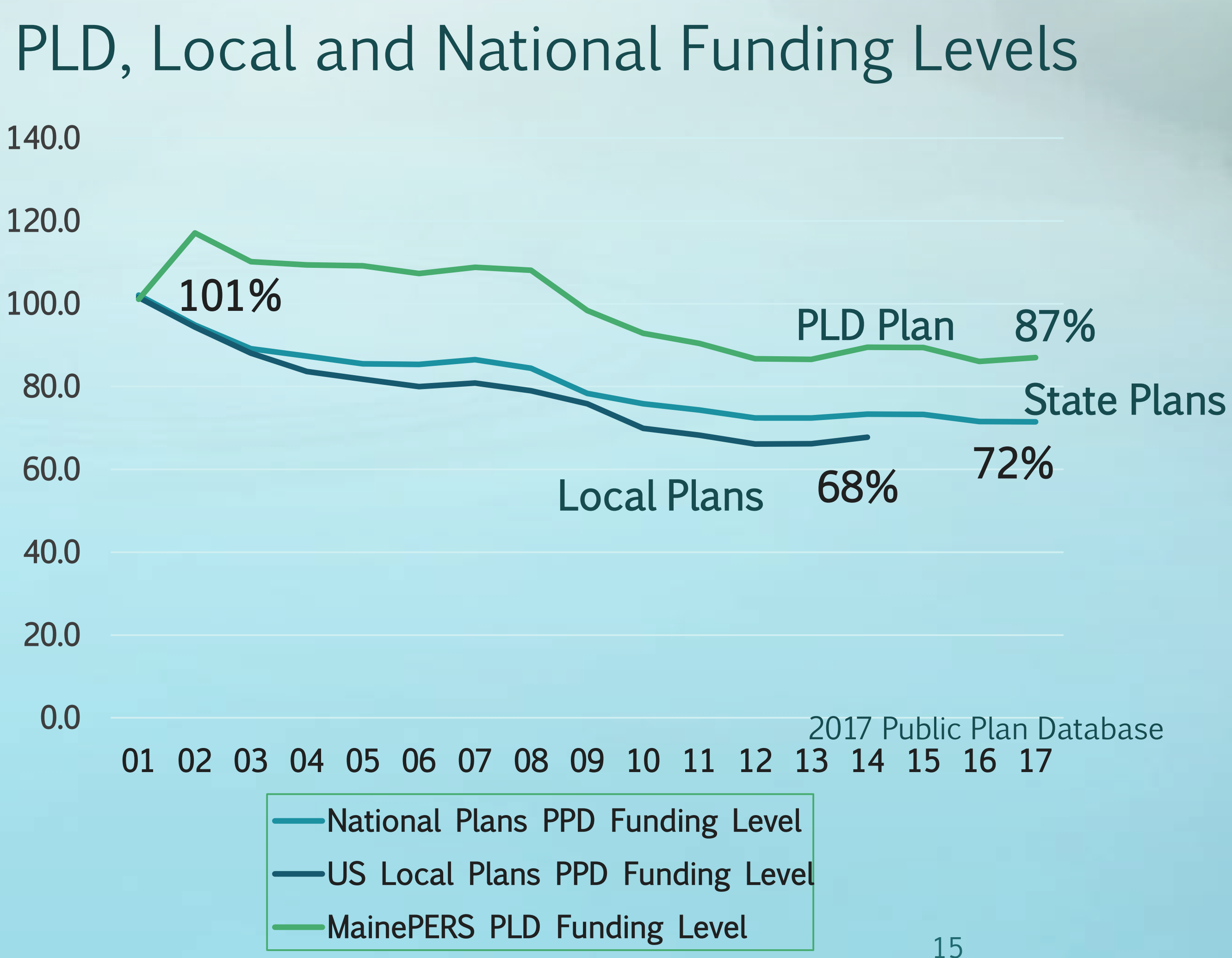
What had the PLD Plan Done Right?

- The expected rate of return (discount rate) was gradually reduced from 7.75% in 2009 to 6.875% in 2016 whenever strong returns occurred (further reduction to 6.75% proposed)
- MainePERS has kept up the funding for demographic changes that increase plan cost, such as people living longer
- Contribution rates have been increased to help restore the funding lost in the recession
  - Some changes were made to PLD requirements and discretionary benefits in 2014
- MainePERS invests to earn strong returns without taking undue risk

What was the Overall Conclusion?

More Declines in Plan Funding Will Trigger Plan Take-aways

- The traditional methods of addressing decreased funding were not acceptable
  - Raise contribution rates to whatever level is needed
    - *Result*: Employers will drop out of the Plan
  - Reduce benefit levels
    - *Result:* Members may not want or value the Plan
  - Lower, freeze, or eliminate COLAs
    - *Result:* Retirees benefit value deteriorates
  - Close the Plan
- Can be a downward spiral



The definition of insanity is doing the same thing over and over and expecting different results.

Who made this accurate observation?

Introducing New Market Risk Sharing Mechanisms

How a Defined Benefit Plan Can Manage Market Risk

- Prioritize the security of the basic benefit – final average salary X service credit X multiplier
- Evaluate and modify 20th century discretionary benefits, those that are not part of the basic benefit formula, commensurate with the 21st century
- Moderate the variability of contributions into the plan by creating an acceptable range (high and low) contribution rate for both employers and employees
  - Share both market ups and downs with employees instead of employers only
- Set appropriate investment goals and asset allocations

The New Framework for Creating PLD Plan Sustainability and Avoiding Continuous Degradation of Benefits

Priority - Protect the Basic Benefit

- The basic benefit formula provides a stable and sound basis for member retirement saving and planning
- Average final compensation X multiplier X years worked = basic benefit

Part 1

Adjust Incentives, Subsidies & Discretionary Add-ons

- Adjust high-cost provisions that are not part of the basic retirement benefit

Part 2

Introduce New Market Risk Sharing Mechanisms

- Manage the negative impacts to the plan when short-term market losses erode plan funding

Adjusting Discretionary Benefits

Original Plan Provision	Adjusted Plan Provision
All employees receive service credit or FAS increase for unused vacation/sick time	Employees with more than 20 years in the plan continue to receive this benefit
Age 60 plan members pay 2.125% per year for early retirement; age 65 plan members pay 6%	No early retirement subsidy except for a closed group of grandfathered members
No cost for retire/rehire	Minimum 5% contribution rate, adjustable for increases in the UAL, due on salary of PLD retiree in a PLD covered position
COLA paid annually based on CPI-U up to 3% of benefit with 12 month waiting period	COLA paid annually based on CPI-U up to 2.5% of benefit with 24 month waiting period

Reallocating Risk More Fairly

Current Rate Structure

- Current aggregate employer rate is 10% with no upper limits
- Current aggregate member rate 8.0% is fixed, without annual market gain/loss sharing

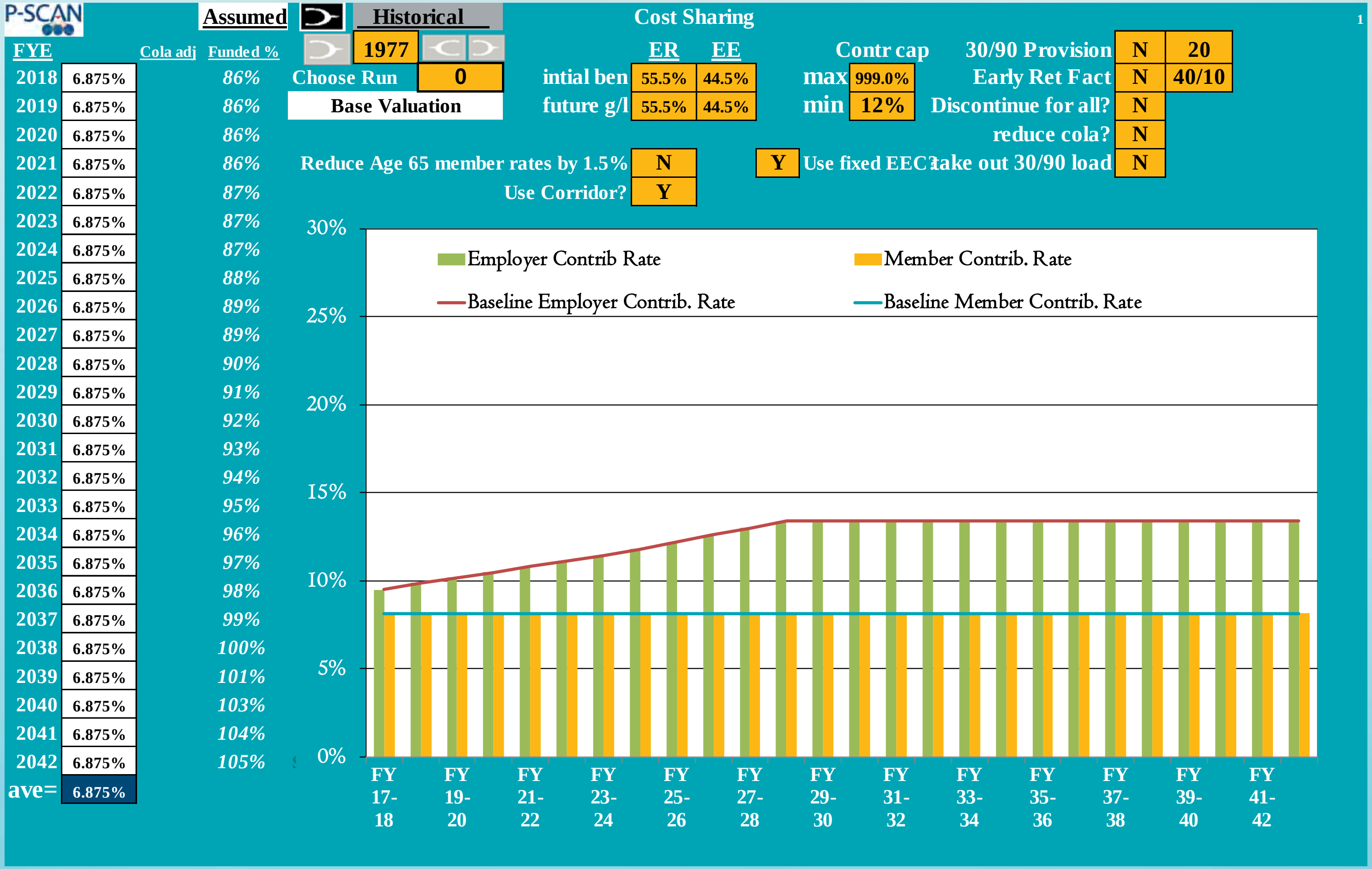
Proposed Future Rate Structure

- Base will be FY19 calculated rates
- Employer and member cost split of future *total annual increase or decrease* is 55%/45%
- Employer aggregate cap will be 12.5%, minimum not less than 55% of total calculated normal cost
- Member aggregate cap will be 9.0%, minimum not less than less 45% of total calculated normal cost

COLA

- If any market losses are severe enough to exceed the employer and member contribution caps, the COLA formula would reduce the COLA
  - This would most likely partially reduce rather than freeze the COLA

PLD Funding Projection Before Changes and assuming 6.875% Return in Each Year



FYE	Assumed	Funded %
2018	6.875%	86%
2019	6.875%	86%
2020	6.875%	86%
2021	6.875%	86%
2022	6.875%	87%
2023	6.875%	87%
2024	6.875%	87%
2025	6.875%	88%
2026	6.875%	89%
2027	6.875%	89%
2028	6.875%	90%
2029	6.875%	91%
2030	6.875%	92%
2031	6.875%	93%
2032	6.875%	94%
2033	6.875%	95%
2034	6.875%	96%
2035	6.875%	97%
2036	6.875%	98%
2037	6.875%	99%
2038	6.875%	100%
2039	6.875%	101%
2040	6.875%	103%
2041	6.875%	104%
2042	6.875%	105%

PLD Funding Projection Before Changes with 4% Returns for 4 Years then 6.875%

P-SCAN

Assumed | Historical | Cost Sharing

1977 | Choose Run 0 | Base Valuation

	ER	EE
intial ben	55.5%	44.5%
future g/l	55.5%	44.5%

Contr cap	
max	999.0%
min	12%

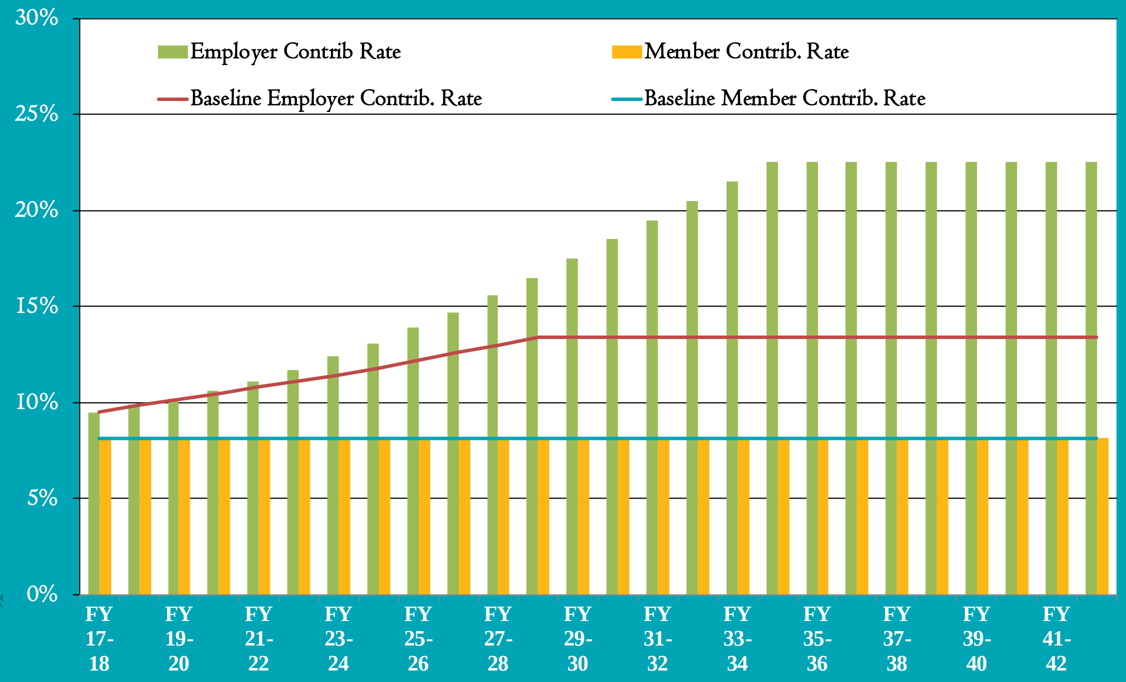
30/90 Provision	N	20
Early Ret Fact	N	40/10
Discontinue for all?	N	
reduce cola?	N	
take out 30/90 load	N	

Reduce Age 65 member rates by 1.5% N

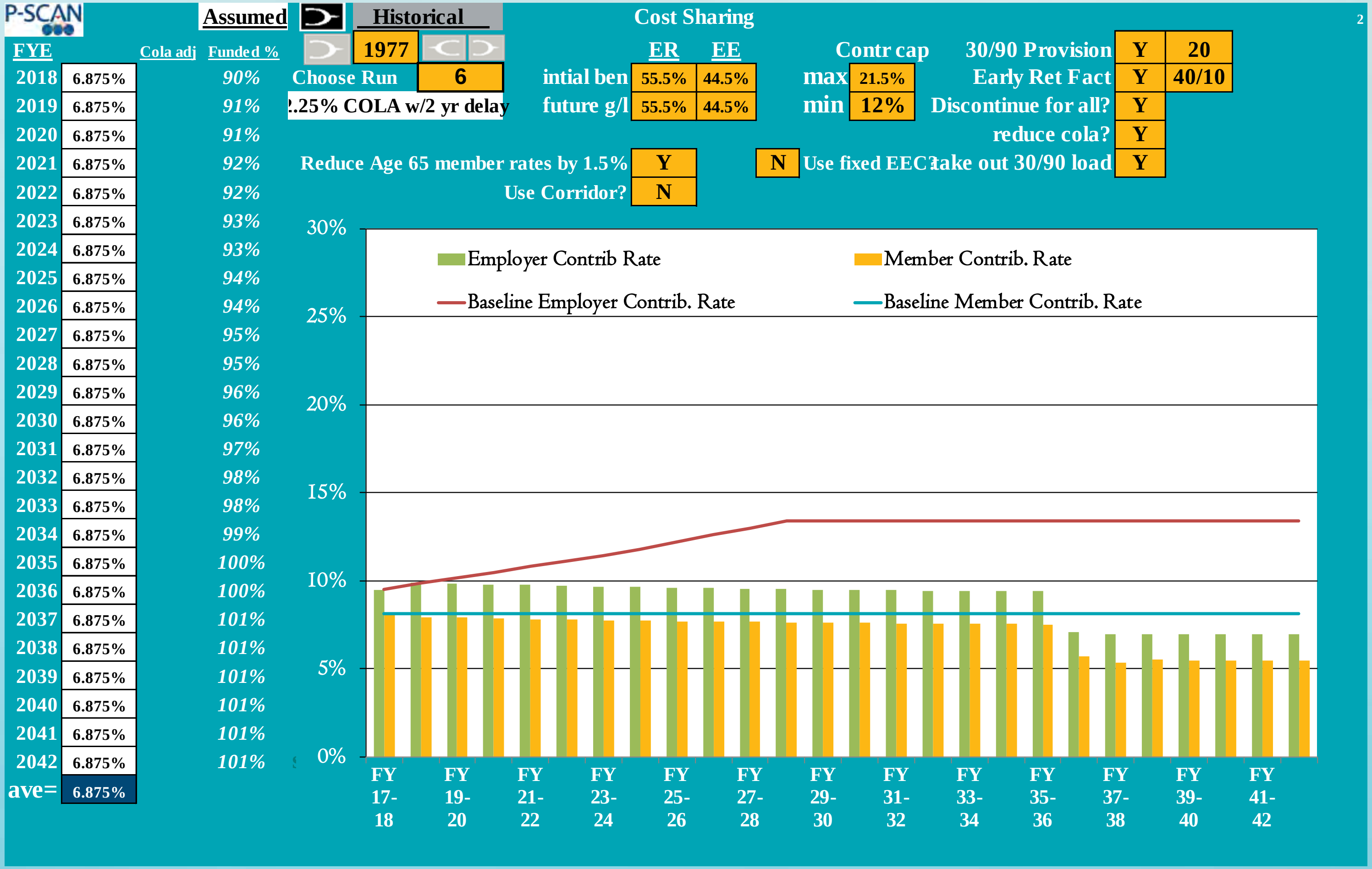
Use Corridor? Y

Y Use fixed EEC?

FYE		Cola adj	Funded %
2018	4.000%		86%
2019	4.000%		85%
2020	4.000%		84%
2021	4.000%		83%
2022	6.875%		81%
2023	6.875%		80%
2024	6.875%		79%
2025	6.875%		79%
2026	6.875%		79%
2027	6.875%		80%
2028	6.875%		80%
2029	6.875%		81%
2030	6.875%		82%
2031	6.875%		83%
2032	6.875%		85%
2033	6.875%		86%
2034	6.875%		88%
2035	6.875%		90%
2036	6.875%		92%
2037	6.875%		95%
2038	6.875%		97%
2039	6.875%		100%
2040	6.875%		102%
2041	6.875%		105%
2042	6.875%		107%
ave=	6.415%		



PLD Funding Projection After Changes and assuming 6.875% Return in Each Year



PLD Funding Projection After Changes with 4% Returns for 4 Years then 6.875%

P-SCAN

Assumed | Historical

Cost Sharing

	ER	EE
intial ben	55.5%	44.5%
future g/l	55.5%	44.5%

1977

Choose Run: 6

.25% COLA w/2 yr delay

Contr cap: max 21.5%; min 12%

30/90 Provision: Y, 20

Early Ret Fact: Y, 40/10

Discontinue for all?: Y

reduce cola?: Y

Reduce Age 65 member rates by 1.5%: Y

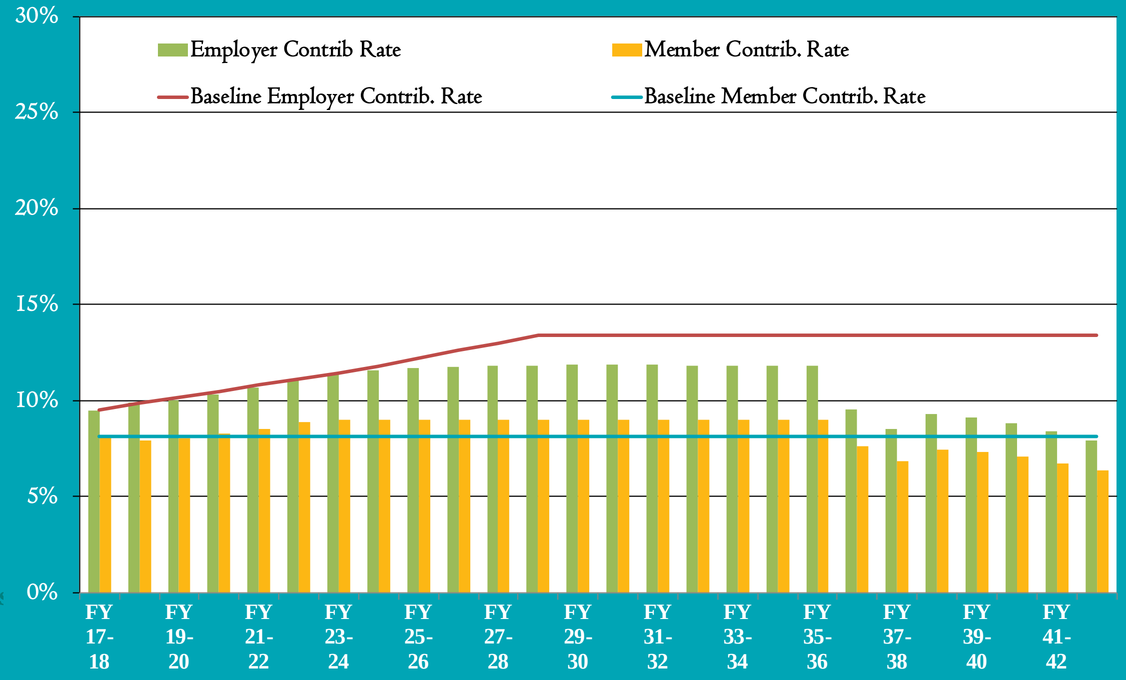
Use fixed EEC?: N

take out 30/90 load: Y

Use Corridor?: N

2

FYE		Cola adj	Funded %
2018	4.000%		90%
2019	4.000%		90%
2020	4.000%		89%
2021	4.000%		88%
2022	6.875%		86%
2023	6.875%		86%
2024	6.875%	-2%	85%
2025	6.875%	-5%	86%
2026	6.875%	-7%	86%
2027	6.875%	-8%	86%
2028	6.875%	-9%	87%
2029	6.875%	-10%	88%
2030	6.875%	-10%	89%
2031	6.875%	-10%	90%
2032	6.875%	-10%	90%
2033	6.875%	-10%	91%
2034	6.875%	-9%	93%
2035	6.875%	-9%	94%
2036	6.875%	-9%	95%
2037	6.875%		96%
2038	6.875%		96%
2039	6.875%		97%
2040	6.875%		97%
2041	6.875%		98%
2042	6.875%		98%
ave=	6.415%		



South Dakota Retirement System

Douglas Fiddler, ASA
Senior Actuary, SDRS

Traditional Defined Benefit Plan Basics

$$C + I = B + E$$

Contributions		Investment Returns		Benefits		Expenses
Vary as Necessary	+	Estimated	=	Fixed	+	Stable & Less Significant

Annual actuarial valuation determines required contributions and if experience is worse than assumed, contribution increases (most often employer contribution increases) are the likely result.

South Dakota Retirement System (SDRS) Basics

$$C + I = B + E$$

Contributions

Fixed

+

Investment Returns

Estimated

=

Benefits

Defined – but Vary as Necessary

+

Expenses

Stable & Less Significant

Annual actuarial valuation determines level of variable benefits and compliance with statutory funding thresholds. If experience is significantly worse than assumed, additional benefit adjustments may be required

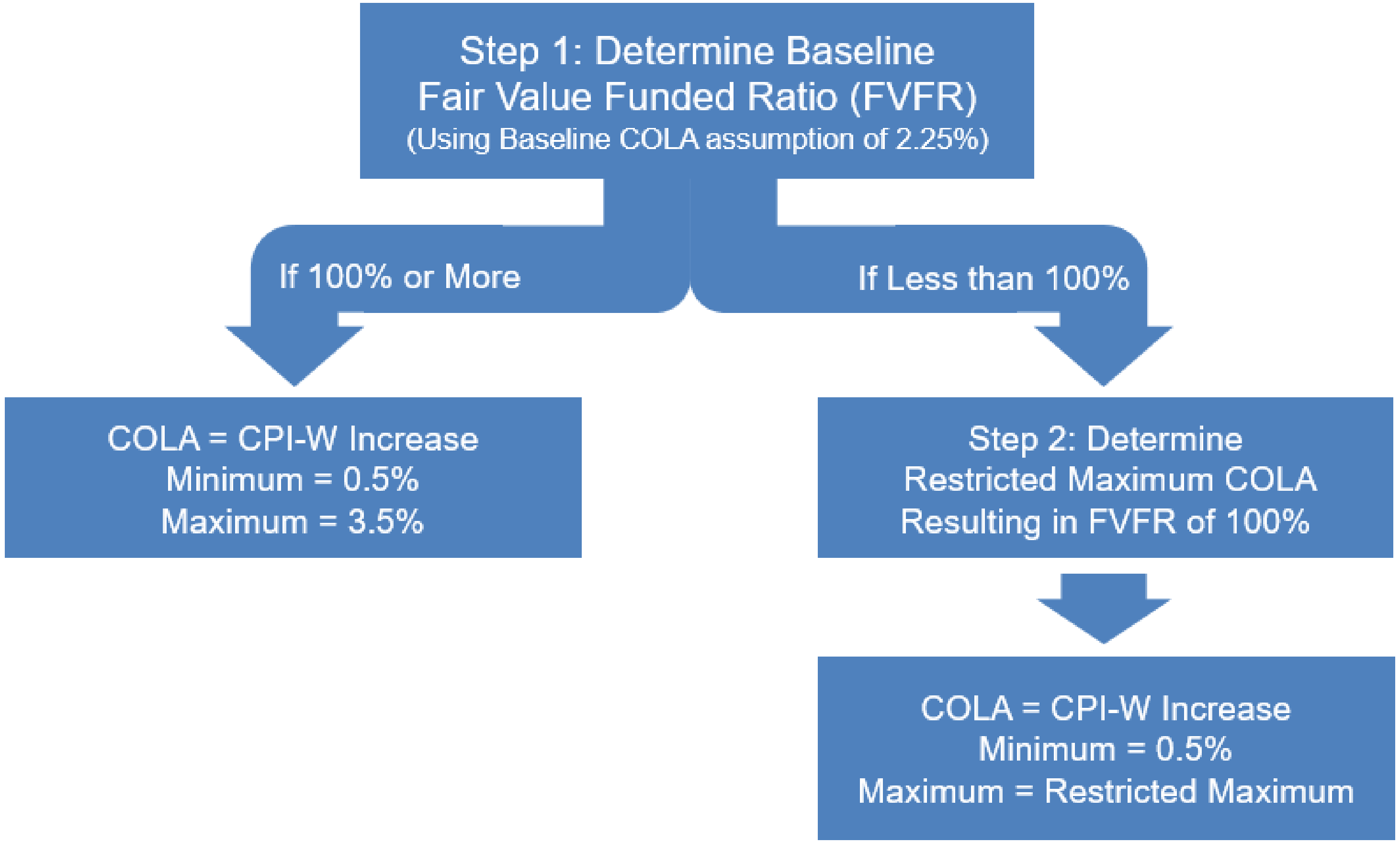
SDRS Statutory Funding Thresholds

- If not met, corrective actions required – legislative changes to benefits
- Prior to recent changes, thresholds were:
  - 80% funded ratio
  - Fixed, statutory contributions meet actuarial requirement (NC + expenses + amortization of UAL over 20-30 years)
- With new variable benefits, thresholds are
  - 100% funded ratio – recognizing automatically adjusting benefits
  - Contributions meet actuarial requirement (NC + expenses)

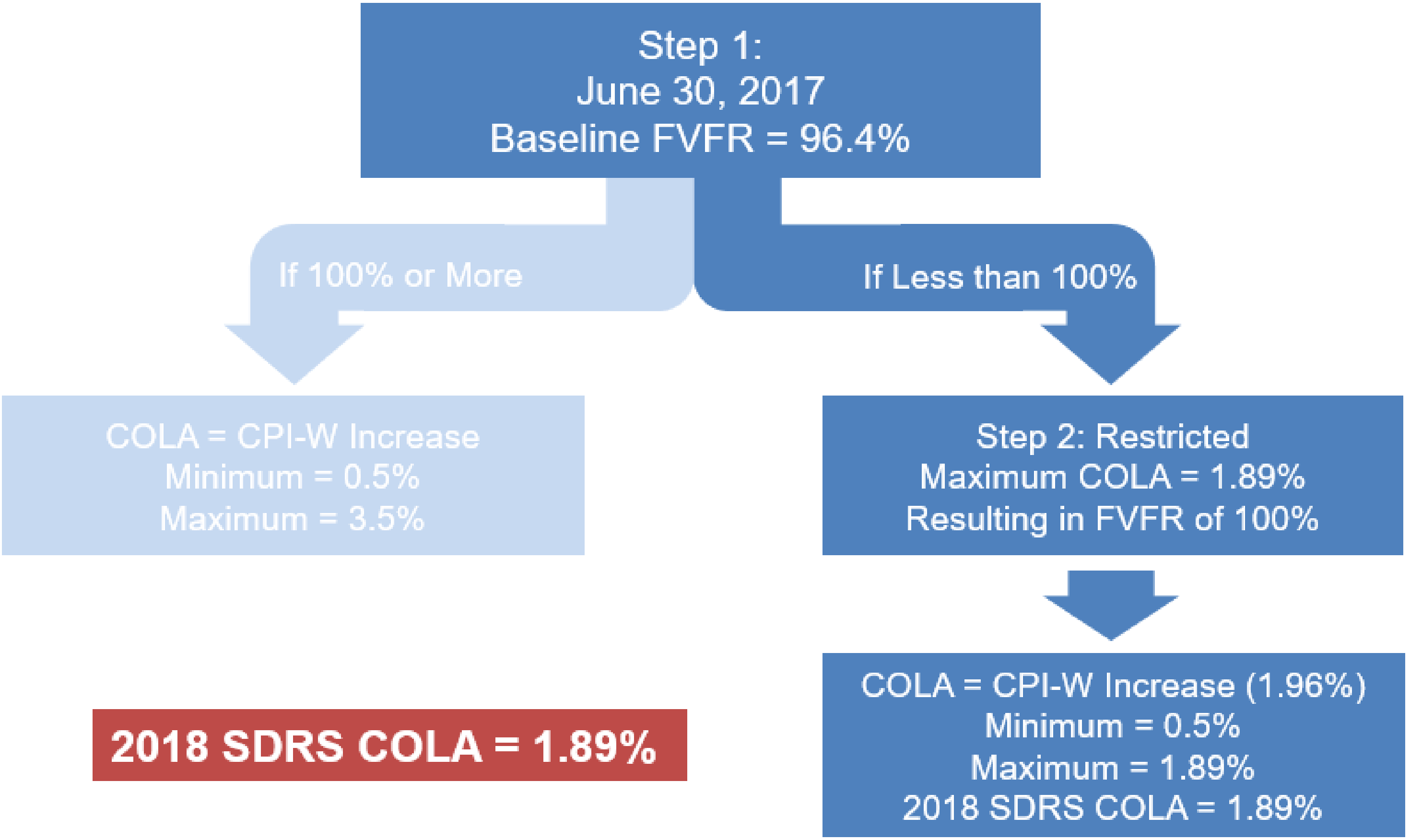
SDRS Automatic Benefit Variability

- 2016 Legislation created new benefit structure (Generational) for new hires after June 30, 2017
  - Same NC as old tier
  - Increased NRA 2 years, removed subsidies, increased base benefit multiplier
  - Added Variable Retirement Account – notional account credited with 1.5% of pay and actual investment earnings, payable at retirement, death, disability
- 2017 Legislation modified SDRS COLA
  - COLA equal to inflation between 0.5% and 3.5% if sufficiently funded – 100% funded ratio
  - If not sufficiently funded, restricted maximum COLA applied that results in 100% funded ratio
  - Goal for COLA changes: replace infrequent, significant changes with annual, incremental COLA adjustments

SDRS COLA Process



SDRS COLA Process – 2017 Valuation (2018 COLA)



SDRS COLA Process – Preliminary 2018 Valuation (2019 COLA)

Step 1:
June 30, 2018
Baseline FVFR = 98.0%

If 100% or More

COLA = CPI-W Increase
Minimum = 0.5%
Maximum = 3.5%

If Less than 100%

Step 2: Restricted
Maximum COLA ≈ 2.05%
Resulting in FVFR of 100%

COLA = CPI-W Increase (≈3.0%)
Minimum = 0.5%
Maximum ≈ 2.05%
2019 SDRS COLA ≈ 2.05%

2019 SDRS COLA ≈ 2.05%

COLA process can be modified for application to different funding target, such as funding period or funded ratio less than 100%

SDRS Generational Benefit Structure Goals

- Restructure benefits with same NC as original tier (Foundation)
- Eliminate or remove subsidies that favor some members over others
- Recognize increasing life expectancy
- Meet income replacement goals for career members
- Better meet employers' workforce needs

SDRS Benefit Structure Comparison

Foundation Members

(Hired before July 1, 2017)

- NRA = 65
- Subsidized early retirement (Rule of 85 unreduced, 3% /year reduction)
- Unreduced 60% joint and survivor benefit for married retirees
- Benefit multiplier = 1.55%

Generational Members

(Hired after June 30, 2017)

- NRA = 67
- 5% reduction per year early
- Reduced joint and survivor benefits available
- Benefit multiplier = 1.80%
- Variable Retirement Account:
    - Annual contribution = 1.5% of pay
    - Credited with actual investment return
    - Payable at retirement, death, disability

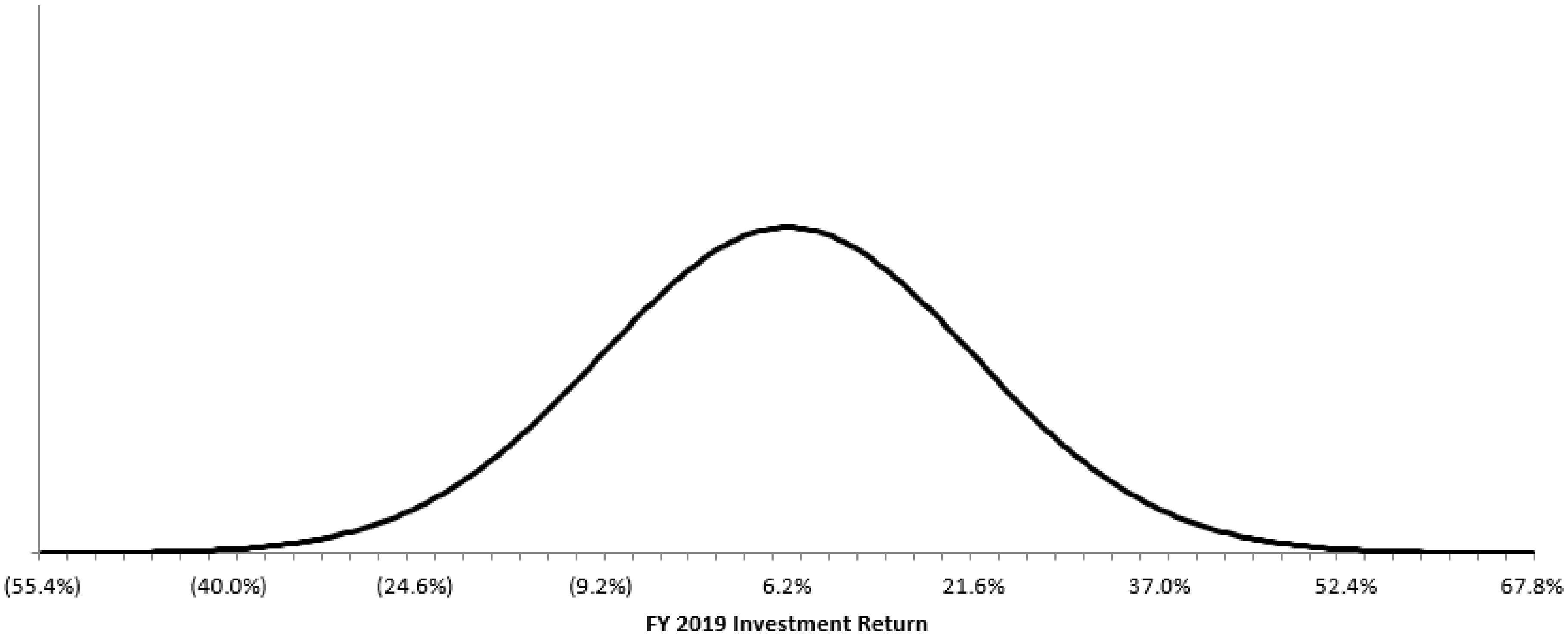
SDRS Governance

- SDRS Board of Trustees:
  - Composed of member, employer, and executive branch representatives
  - Responsible for ensuring financial integrity of system
  - Responsible for formulating and communicating sound pension policy
  - Proposes necessary legislative changes
  - Leads, initiates, and advocates
- Oversight by standing, bi-partisan, bi-cameral legislative committee
- South Dakota Investment Council:
  - Composed of investment professionals
  - Responsible for investment of SDRS funds and oversight of investment staff
- All parties work to maintain culture of collaboration, trust, and confidence

SDRS Policy Perspective

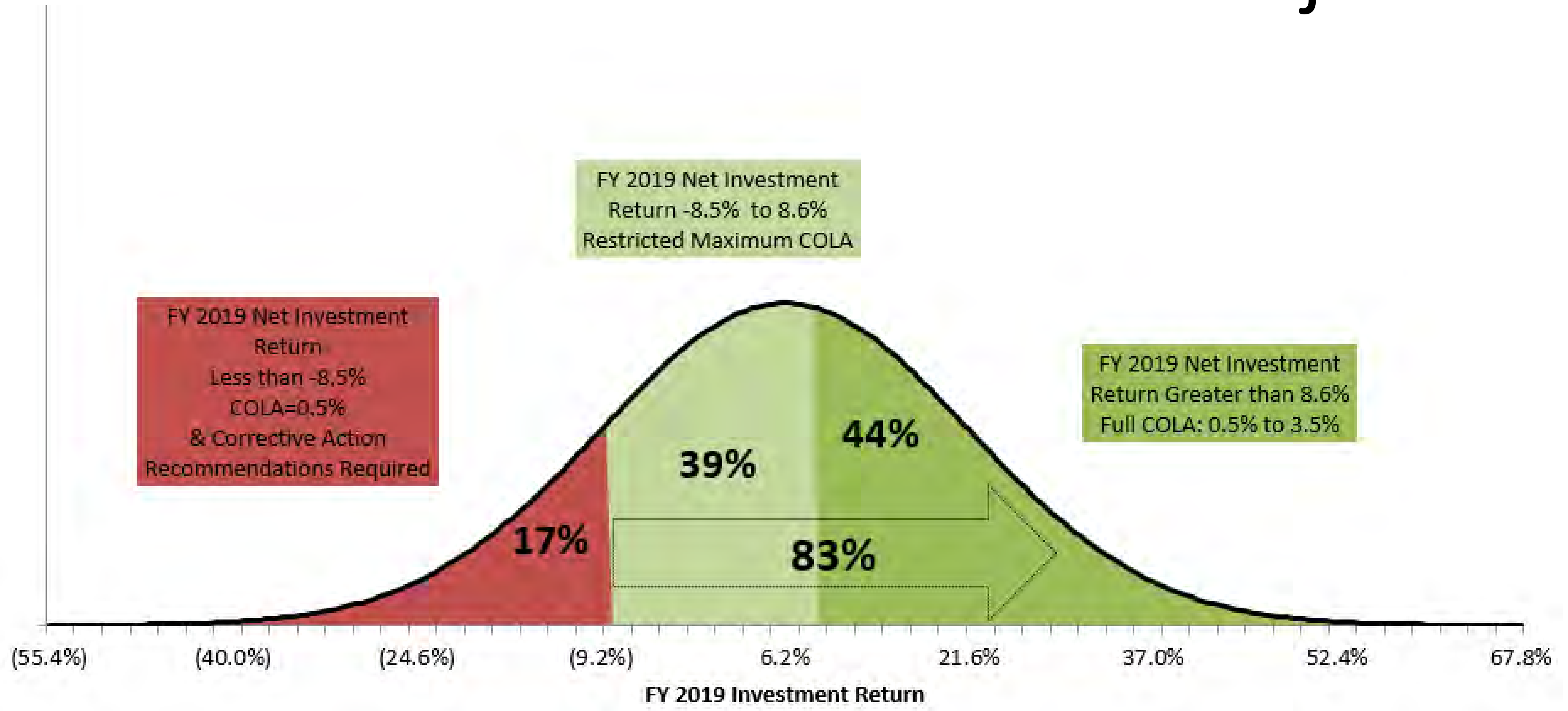
- Benefits:
  - Defined benefit plan preferred for efficiency
  - Hybrid benefits are essential for equity among career and non-career members
  - Variable benefits essential for success – COLA is most logical to vary
  - Benefits should meet income replacement objectives, artificially inflated benefits must be avoided
- Governance/Plan Management:
  - Board of Trustees has expertise, knowledge, & resources to actively lead SDRS
  - SDRS must manage benefits within resources provided by fixed contributions:
    - Variable contributions may require unpredictable cost increases
    - Contributions alone may not solve funding issues for mature plans
    - If costs are not controlled, SDRS will be replaced by a DC plan

SDRS Risk Communications – Expected 1 Year Investment Return Distribution



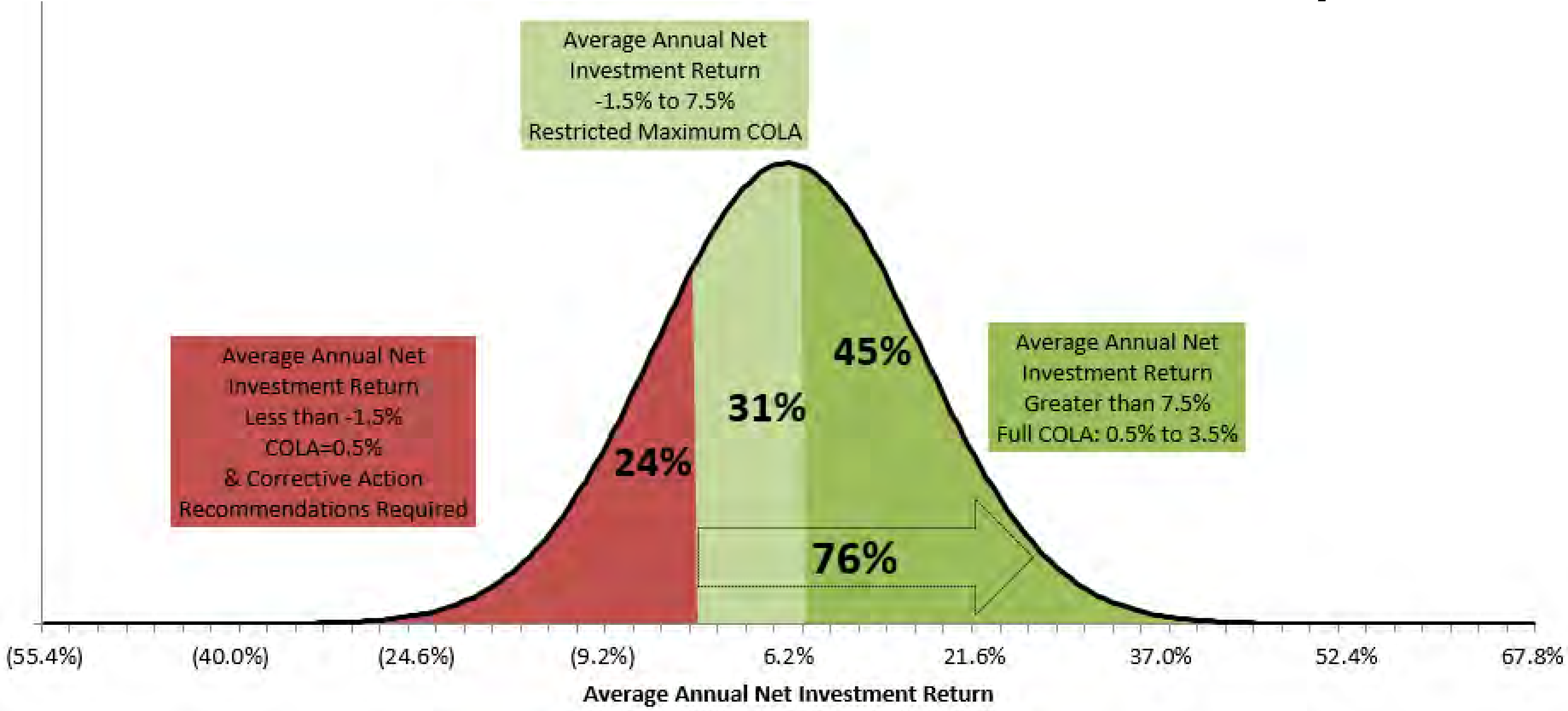
- Expected return distribution for baseline asset allocation:
  - Expected mean = 6.19%
  - Expected standard deviation = 15.4%

SDRS Risk Communications – 1 Year Projection



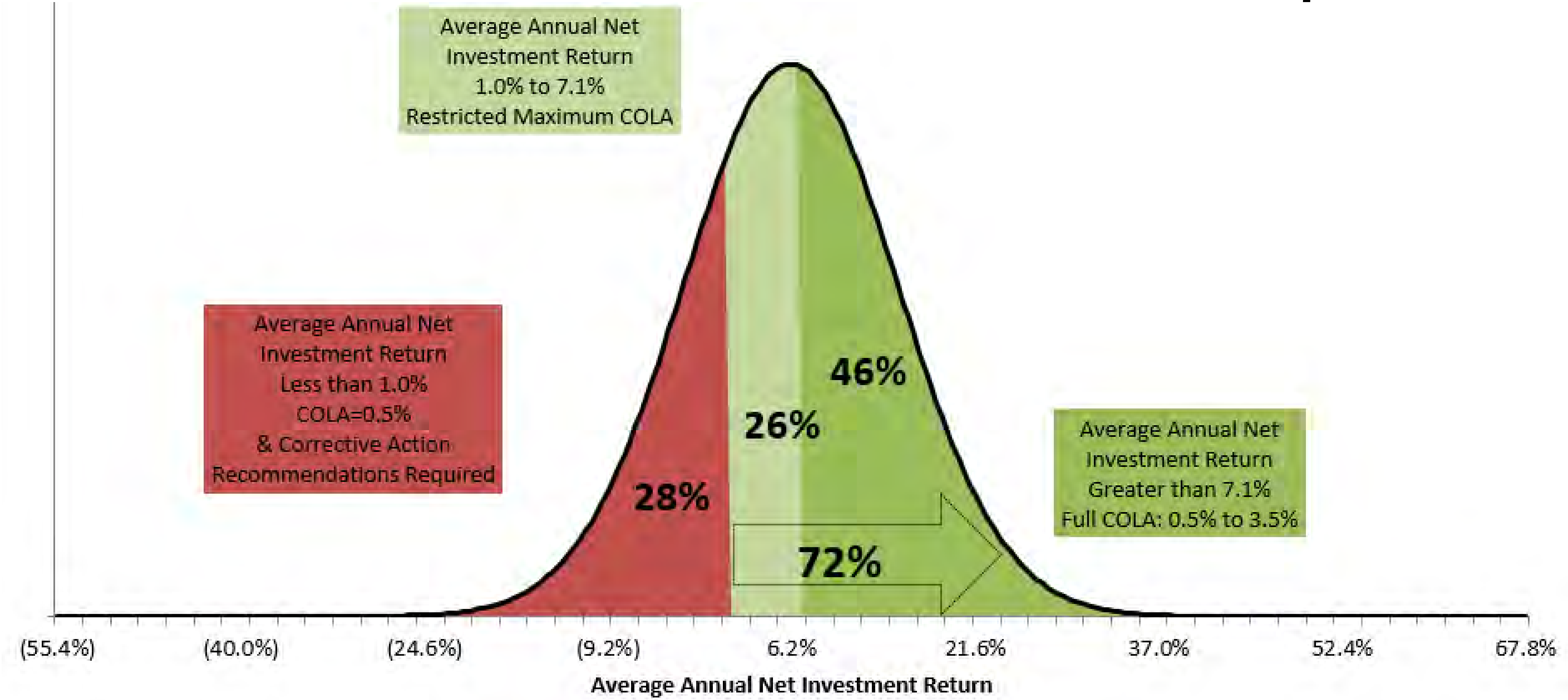
- The likelihoods for 2020 COLA ranges, primarily driven by FY19 investment returns are:
  - 44% likelihood that the baseline COLA will be payable (CPI-W between 0.5% and 3.5%)
  - 39% likelihood that the COLA will have a restricted maximum
  - 17% likelihood that a 0.5% COLA will be payable and additional corrective actions will be required

SDRS Risk Communications – 2 Year Projection



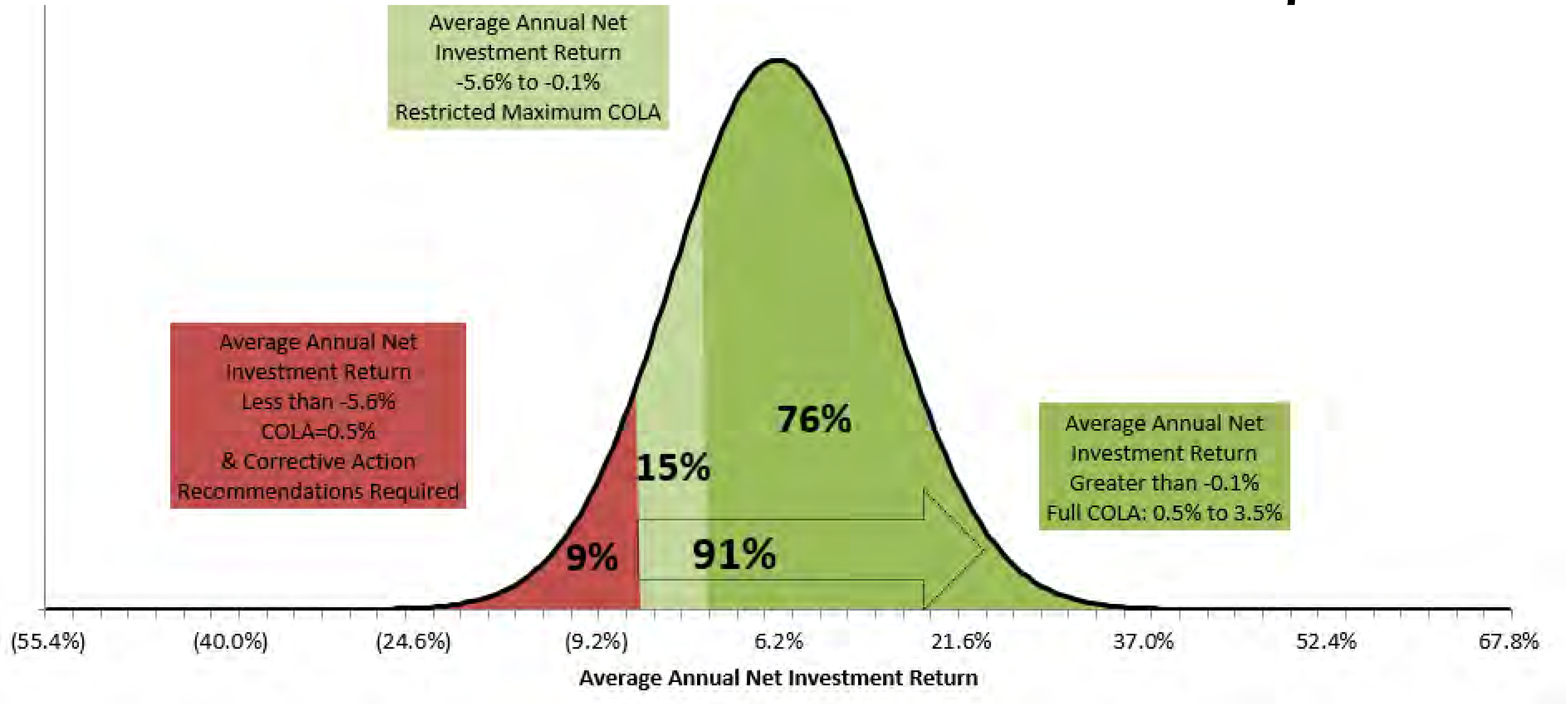
- The likelihoods for 2021 COLA ranges, primarily driven by FY19 and FY20 returns are:
  - 45% likelihood that the baseline COLA will be payable (CPI-W between 0.5% and 3.5%)
  - 31% likelihood that the COLA will have a restricted maximum
  - 24% likelihood that a 0.5% COLA will be payable and additional corrective actions will be required

SDRS Risk Communications – 3 Year Projection



- The likelihoods for 2022 COLA ranges, primarily driven by FY19, FY20 & FY21 returns are:
  - 46% likelihood that the baseline COLA will be payable (CPI-W between 0.5% and 3.5%)
  - 26% likelihood that the COLA will have a restricted maximum
  - 28% likelihood that a 0.5% COLA will be payable and additional corrective actions will be required

SDRS Risk Communications – 3 Year Projection



- From a fair value funded ratio of 120%, the likelihoods for COLAs 3 years later include a 9% likelihood of the minimum COLA and additional corrective actions:
  - Even starting from where we would like to be, we have to monitor and manage the plan to adjust to changing economic conditions

SDRS Summary

- Fixed contributions, variable benefits, and funding thresholds that dictate changes
- COLA and Variable Retirement Account are primary variable features adjusting to investment performance and other experience variations
- With fixed contributions, artificially inflated benefits must be prevented
- Principles can be adapted to other funding conditions and goals

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